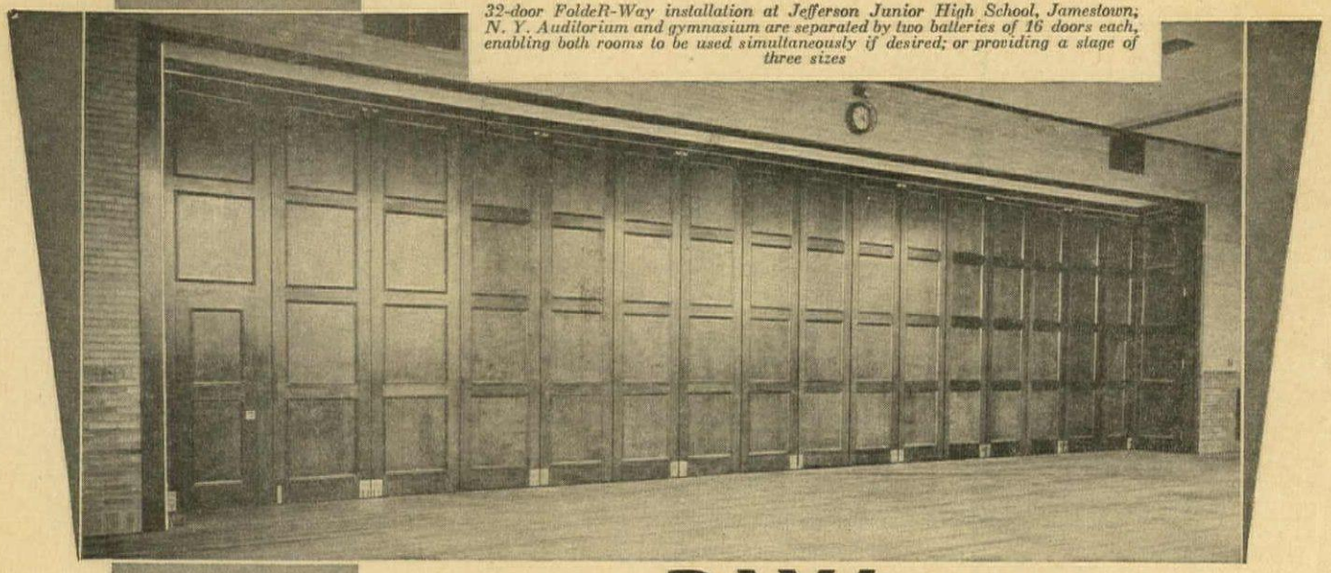
THE ARCHITECTURAL FORUM

IN TWO PARTS PART TWO

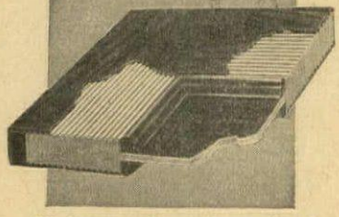
ARCHITECTURAL ENGINEERING & BUSINESS

FEBRUARY 1931



32-door FoldeR-Way installation at Jefferson Junior High School, Jamestown, N. Y. Auditorium and gymnasium are separated by two batteries of 16 doors each, enabling both rooms to be used simultaneously if desired; or providing a stage of three sizes

FoldeR-Way doors are Standard Equipment for Schools



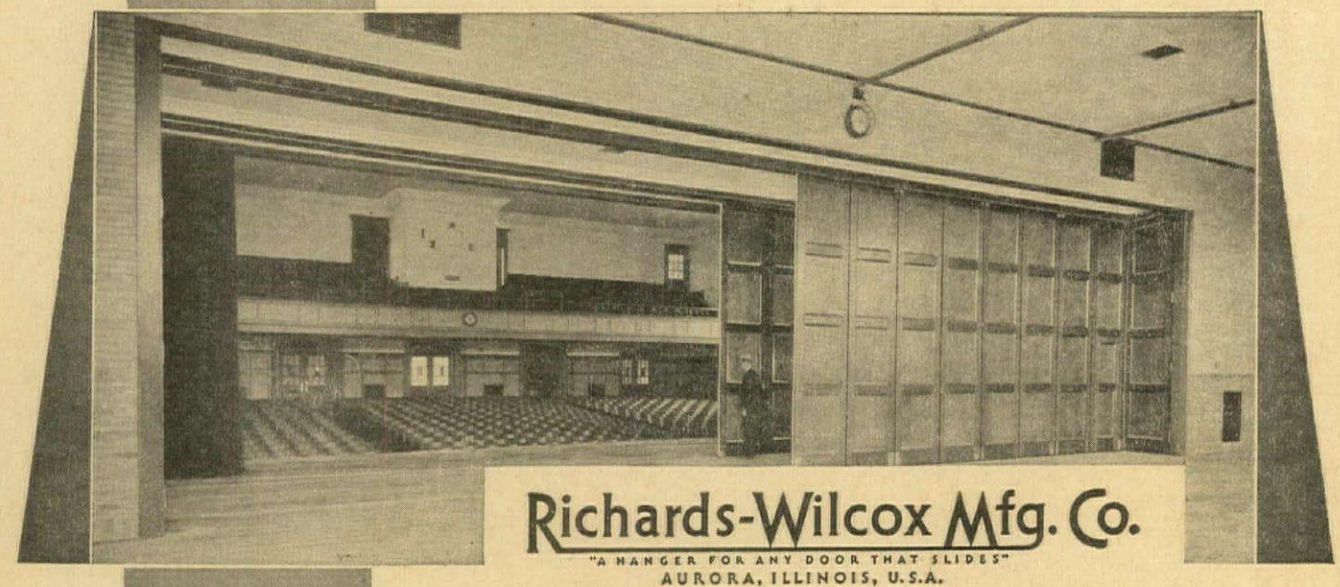
The beauty and smooth operation of R-W Compound Key Veneered doors are lasting. Sagging, warping, swelling, shrinking are practically eliminated by tongue and groove method of applying veneer. These famous doors are now made exclusively and sold only by R-W for FoldeR-Way partitions

Wherever they need large openings and disappearing partitions, the specifications should call for R-W FoldeR-Way equipment. The bigger the opening, the greater the need for FoldeR-Way partition doors. So imperative are silence and smooth, easy, trouble-free operation that nothing less efficient than FoldeR-Way equipment is either practical or economical.

Over 50 years 1880 1931

R-W school equipment includes school wardrobes of every size and design; hardware for every door that slides; and R-W Compound Key Veneered Doors, specially manufactured for FoldeR-Way installations.

Consult an R-W engineer about any doorway problem. Send today for illustrated Catalog No. 43.



Richards-Wilcox Mfg. Co.

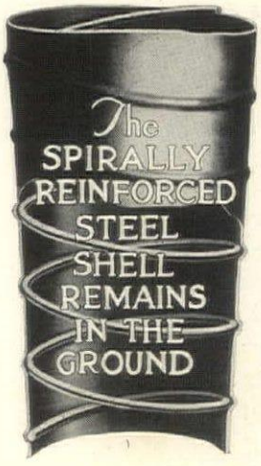
"A HANGER FOR ANY DOOR THAT SLIDES"

AURORA, ILLINOIS, U.S.A.

Branches: New York Chicago Boston Philadelphia Cleveland Cincinnati Indianapolis St. Louis New Orleans Des Moines Minneapolis Kansas City Los Angeles San Francisco Omaha Seattle Detroit Atlanta Richards-Wilcox Canadian Co., Ltd., London, Ont. Montreal Winnipeg

The preference continues for RAYMOND

Because Raymond Concrete Piles meet every demand for safety and certainty no matter what the subsurface conditions . . . because each pile is protected by a reinforced sheet steel shell that wholly maintains the driving resistance, retains the moisture in the concrete and insures perfect, uniform length, taper and setting.



CAST IN PLACE PILES
COMPOSITE PILES
PRECAST PILES
PIPE PILES

*"A form for every pile
A pile for every purpose"*

BUILDING FOUNDATIONS
BULKHEADS AND DOCKS
UNDERPINNING ETC
BRIDGES

RAYMOND CONCRETE PILE CO.

NEW YORK: 140 Cedar St. CHICAGO: 111 West Monroe St.

Raymond Concrete Pile Co., Ltd., Montreal, Canada

Atlanta, Ga.	Kansas City, Mo.	Buffalo, N. Y.	Maracaibo, Ven., S. A.
Baltimore	Los Angeles, Cal.	Milwaukee, Wis.	Caracas, Ven., S. A.
Boston, Mass.	Miami, Fla.	St. Louis, Mo.	Bogota, Colombia, S. A.
Chicago, Ill	Philadelphia, Pa.	St. Paul, Minn.	Buenaventura, Col., S. A.
Cleveland, Ohio	Pittsburgh, Pa.	Montreal, Canada	Omori, Tokyo-Fu, Japan
Detroit, Mich.	San Francisco, Cal.	Hong Kong, China	Portland, Ore.
Houston, Texas	Washington, D. C.	London, England	

21,000 feet of NOVOID 2″ thick insulate the roof of the New York Telephone Co.'s *new* Brooklyn building.

Voorhees, Gmelin & Walker, Architects. *Stephan & Dammer, Inc., Roofing Contractors.*

MOISTURE *won't destroy* THIS *insulation*

MATERIALS that *absorb* moisture gradually lose their insulating effectiveness. Condensation soon leaves them water-soaked and useless.

Novoid, pure Corkboard is cellular, not fibrous or porous in structure. It will not absorb moisture. It has no "blotting action." Novoid stays dry and efficient—never gets water-soaked. That's why Novoid shuts off heat losses indefinitely.

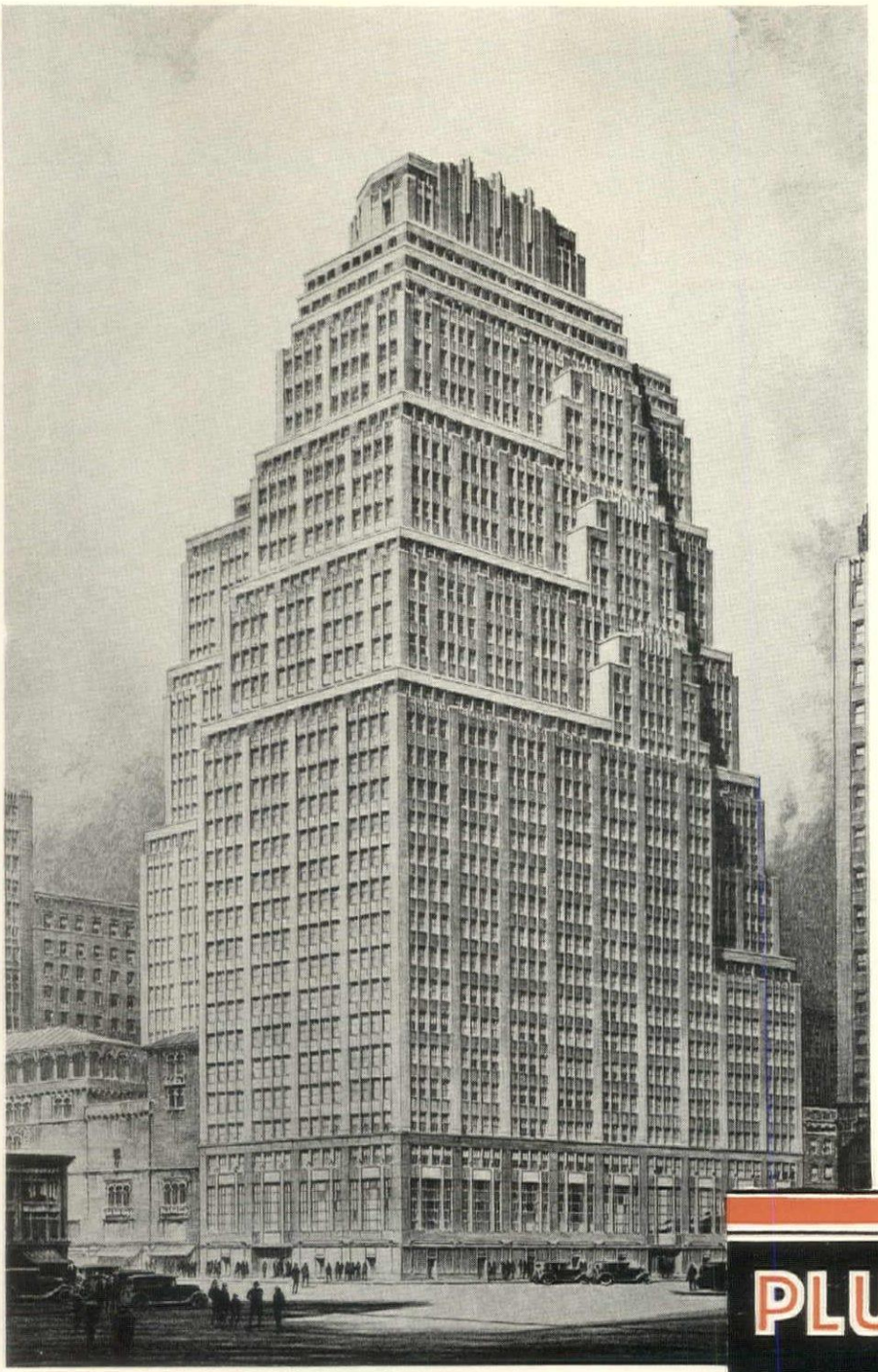
With the flow of heat so definitely checked by the proper thickness of Novoid, the temperature on the under side of the roof is kept above the dew point, and no condensation will ever form to do damage.

Novoid has found a way to combine large and small granules of pure cork into a close-structured corkboard with fewer undesirable voids. This closer structure distinguishes Novoid from all other corkboard.

Send for samples, data, and prices. Test Novoid. Cut it up. See for yourself where the structure of Novoid excels ordinary insulation. Address your request to Cork Import Corporation, 345 West 40th Street, New York City.

Novoid Corkboard Insulation

The close-structured corkboard



1400 BROADWAY
BUILDING, NEW YORK

Architect
The Firm of Ely Jacques Kahn
General Contractor
Godfrey M. Weinstein & Co. Inc.
Plumbing Contractor
Joseph M. Kandel
Heating Contractor
Raisler Heating Company

Specify

WALWORTH
VALVES
FITTINGS
AND TOOLS
for

PLUMBING AND HEATING

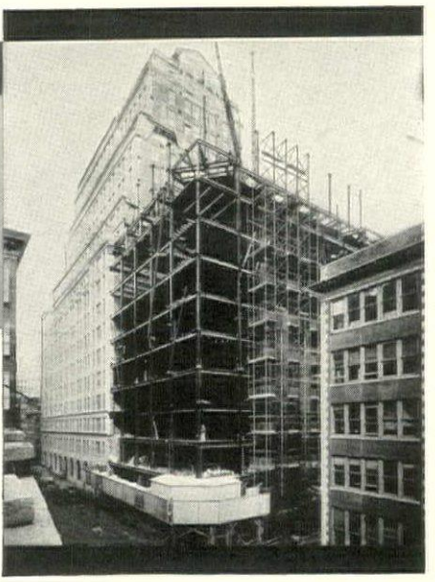
New York's 1931 skyline is filled with tall buildings equipped with Walworth material. Approved Walworth fireline valves and fittings and the plumbing valves throughout this entire building are of the same standard Walworth types which have been supplied for many of the newest and best-known buildings in New York.

WALWORTH COMPANY
General Sales Offices: 60 East 42nd St., New York
Plants at Boston, Mass.; Kewanee, Ill.; Greensburg, Pa. and Attalla, Ala.
• DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD •

WALWORTH

VALVES FITTINGS AND TOOLS

Main elevator lobby of Royal Insurance Co. Bldg. 150 William St., New York City



Addition to Royal Insurance Co. Bldg.
Architects: Starrett & Van Vleck
General Contractor:
Marc Eidlitz & Son, Inc.
Elevator Contractor:
Gurney Elevator Co.

They looked again to "ES"

... *to extend good elevator service*

THE true test of service is the answer to the question, "Would you be willing to duplicate the equipment originally installed, should occasion arise to solve the same problem?"

The owners of the Royal Insurance Building answered this in the affirmative. They were so satisfied with the original "ES" equipment that they looked again to "ES" service when they added to their building and installed six new elevators. They knew that the surest way to maintain good service, when business growth called for greater space and facilities, was to duplicate it.

The original "ES" equipment—which is being duplicated—includes an "ES" Complete Signal System; Special Ground Floor Horizontal Electric Light Position Indicators; Flash Light Night Service Annunciator and Starter's Call Back System; Overhead Type Pneumatic Door Operators.

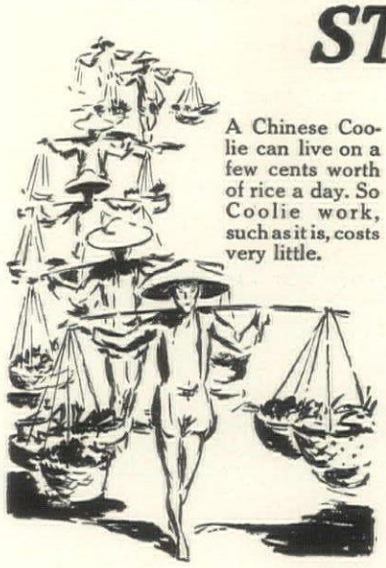
Whether for extending, modernizing or planning new elevator service "ES" engineers are available to help solve your problems.

ELEVATOR SUPPLIES COMPANY, Inc.

MAIN OFFICE AND WORKS
HOBOKEN, N. J.

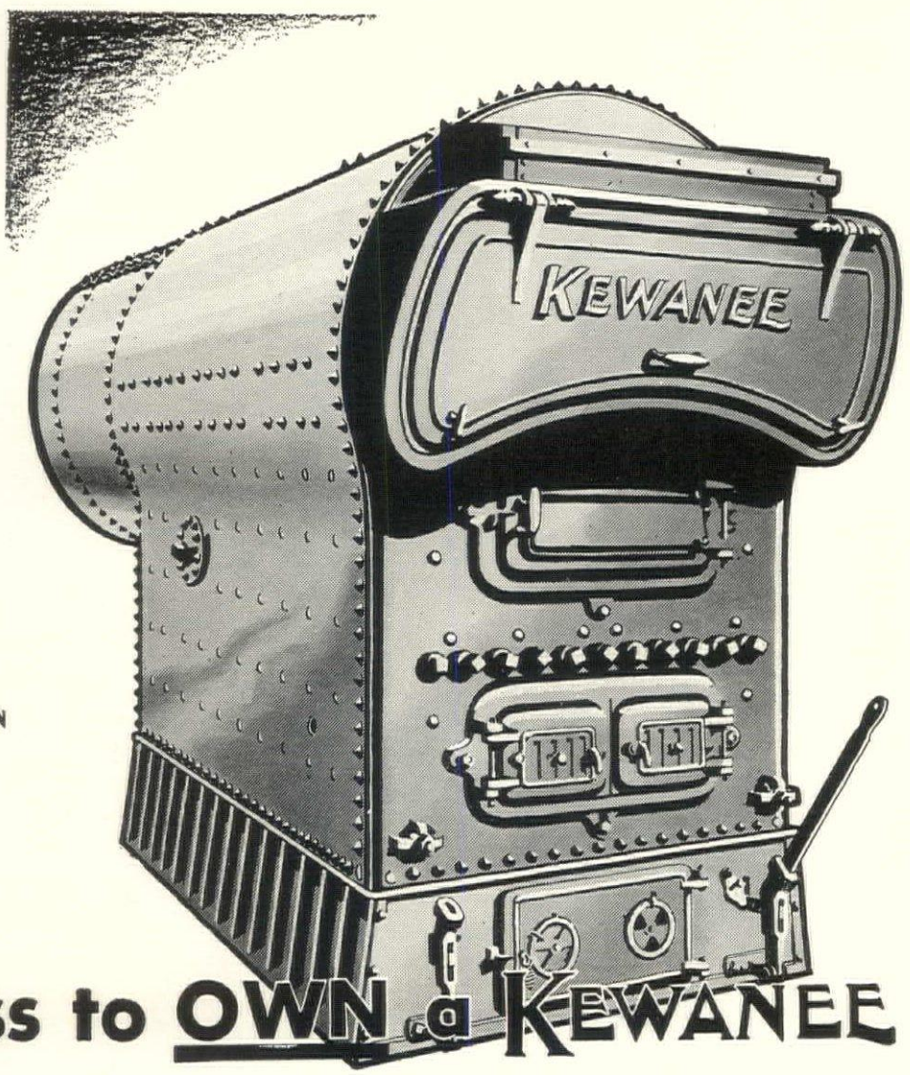
Boston
Chicago
Cincinnati
Cleveland
Detroit
Los Angeles
Dallas
Pittsburgh
Philadelphia
San Francisco

KEWANEE STEEL BOILERS



A Chinese Coolie can live on a few cents worth of rice a day. So Coolie work, such as it is, costs very little.

A Kewanee Smokeless Boiler, designed and built by American workmen according to American standards, burns the lowest priced coals (even screenings); and does it very thoroughly. It *lives* on cheap coal yet produces a maximum amount of heat.



This *every day fuel saving*; plus sturdy steel construction which adds many extra years to the life of a Kewanee; brings its actual cost down to a point that makes it a preferred investment.

If the fuel supply in your city *is* a problem, investigate the advantages of a Kewanee Smokeless before making a boiler selection.

KEWANEE BOILER CORPORATION
division of American Radiator & Standard Sanitary Corporation
KEWANEE, ILLINOIS
Branches in Principal Cities

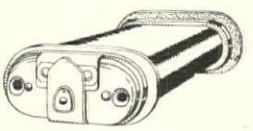
MEMBER OF
STEEL HEATING BOILER INSTITUTE

It Costs Less to OWN a KEWANEE

Sun Life Assurance Co., Montreal.
Largest Building in the British Empire

Darling & Pearson, Toronto, Archts.
A. J. C. Paine, Assoc. Archt.

Central Tube Station, State Mutual Life Assurance Co., Worcester, Mass.
Parker, Thomas & Rice, Archts.
Like in a telephone switchboard, lines reach out to provide communication to all departments.



Oval leather carriers are used wherever the material to be transported, because of bulk or nature, more conveniently fits this shape. Destination of contents indicated by movable numerals in cover. Home station of carrier is usually painted on its side.

PNEUMATIC TUBES

SPEED OFFICE ROUTINE FOR

INSURANCE COMPANIES

THE Sun Life Assurance Company of Toronto, Ontario, through its architects, have recently selected a 29 station 4" x 7" oval G&G Atlas Pneumatic Tube System for its new head office building in Montreal, the largest office building in the British Empire...The State Mutual Life Assurance Co. of Worcester, Mass., whose architects are Parker. Thomas & Rice, is now using this tube system...The enormous amount of paper work in an insurance organization entails the continuous transmission of correspondence, forms, policies, telegrams, etc. between departments. The mechanical messenger service provided by the G&G Atlas Tube System prevents delays by eliminating countless foot messengers, keeps aisles clear, elevators free from congestion, speeds deliveries many fold and assures a smooth operating service. Our Engineering Department is at the service of every architect.

the G&G ATLAS PNEUMATIC TUBE SYSTEM

See our Catalog in Sweet's Archt'l Catalog, 1931 Ed. pp. D6350-52.
In Canada see Specification Data.

G&G ATLAS SYSTEMS, INC.

544 WEST BROADWAY, NEW YORK, N. Y. • *also* CHICAGO AND TORONTO

SAVE ON YOUR MASONRY

BETTER masonry at less cost has made Brixment the world's largest-selling mason's cement:

[1] It costs less than the portland and lime required to make an equal amount of mortar.

[2] No soaking, no slaking. Ready to mix by hand or machine.

[3] Saves bricklayer's time because it's easier to spread and sticks to the headjoint; its unusual plasticity and convenient set help him in striking joints.

[4] Reduces labor in cleaning down the wall because it doesn't slop down over the face of the brick. Louisville Cement Co., Incorporated, Louisville, Kentucky.

CEMENT MANUFACTURERS SINCE 1830

BRIXMENT

for MASONRY and STUCCO

41 MEN •

will receive $17,500.00

will be recognized as the outstanding figures in their industry

WILL YOU BE ONE OF THEM?

THE Second Lincoln Arc Welding Prize Competition offers you this opportunity. The $17,500.00 prize money will be awarded to the forty-one persons who submit the best papers describing the redesign of any product or the design of any proposed product to be fabricated by the arc welding process. The division of the $17,500.00 prize money will be as follows:

FOR FIRST PRIZE PAPER	$7,500.00
FOR SECOND PRIZE PAPER	3,500.00
FOR THIRD PRIZE PAPER	1,500.00
FOR FOURTH PRIZE PAPER	750.00
FOR FIFTH PRIZE PAPER	500.00
FOR SIXTH PRIZE PAPER	250.00
FOR SEVENTH TO FORTY-FIRST PRIZE PAPERS	100.00 each

The attention of industrial executives will be focused upon the winners of this competition. This is your chance to prove to your company and other industrial leaders the merits of your ability. Write today for complete information regarding this competition. Address:

THE LINCOLN ELECTRIC COMPANY
P. O. Box 683 • Cleveland, Ohio

•

The CRYER VALVE Crier

of the D. G. C. TRAP & VALVE CO., INC., 1 E. 43rd St., New York

Number Six NEW YORK, N. Y., MURray Hill 2-7320 *February, 1931*

The flame is drawn into the sleeve around the Venturi tube, caused by partial vacuum created by force of the issuing jet of steam in the Cryer Radiator Control Valve.

Flame Test Shows Why Benefits of Hot Water Heat Are Achieved in Steam Systems

The unique circulating effect of the Cryer Radiator Control Valve on vapor, vacuum or steam heating systems is strikingly shown by the Flame Test.

The flame of a lighted match or candle held just under the jet of steam issuing from the venturi tube, is drawn into the sleeve around the tube (see above). In actual operation the steam and air mixture in the radiator is drawn into the sleeve from the first section of the radiator, in exactly the same way and then recirculated when it strikes the incoming steam.

This continual circulation of steam, air and vapor, quickly heats the entire radiator evenly and holds it constantly at any temperature between 90° and 212° F., as modulated.

Thus you get full hot water advantages combined with the quickness and flexibility of steam or vapor. Large fuel savings are achieved. An equable, even heat always attainable.

No other valve or steam system duplicates these two-in-one effects.

New Thermostatic Trap Uses Two Special Alloys

Full Details of How the Cryer Thermostatic Trap Operates

The Cryer Thermostatic Radiator Trap on the return end of the radiators of any two-pipe low pressure steam, vapor or vacuum heating system, allows water, air and gases to pass from the radiator into the return line, while preventing steam from doing so.

If only condensed water and gases are in the trap, at a temperature less than that of steam, the volatile liquid in the metallic bellows and the bellows itself expand slightly, but not enough to close the opening between the plug on the end of the bellows and the seat through which the contents flow into the return line.

When steam is in the trap, it causes sufficient expansion of the bellows to close the opening between the plug on the end of the bellows and the seat, thus preventing steam from flowing into the return line.

After steam leaves the trap the opening is again uncovered and water can flow out.

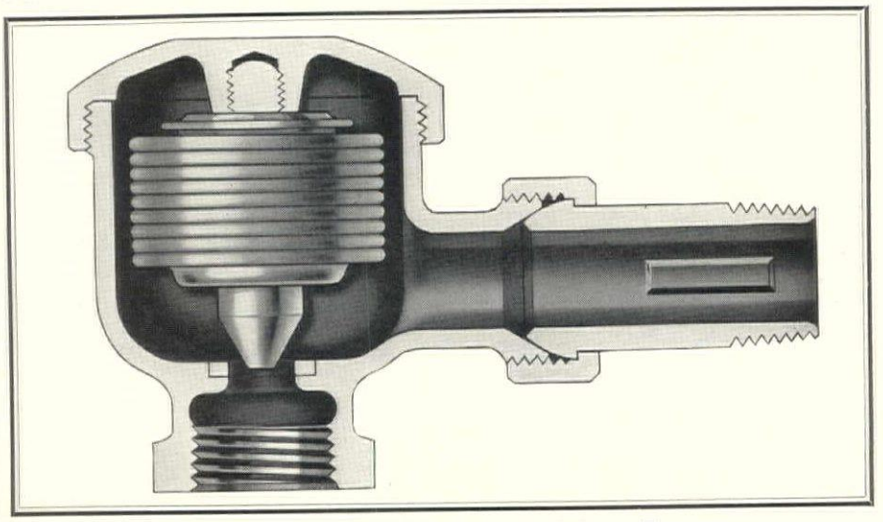
Stainless Steel and a Special Bronze Are Used

In making the Cryer Thermostatic Radiator Trap a special bronze alloy is used for the bellows, and stainless steel for the seat.

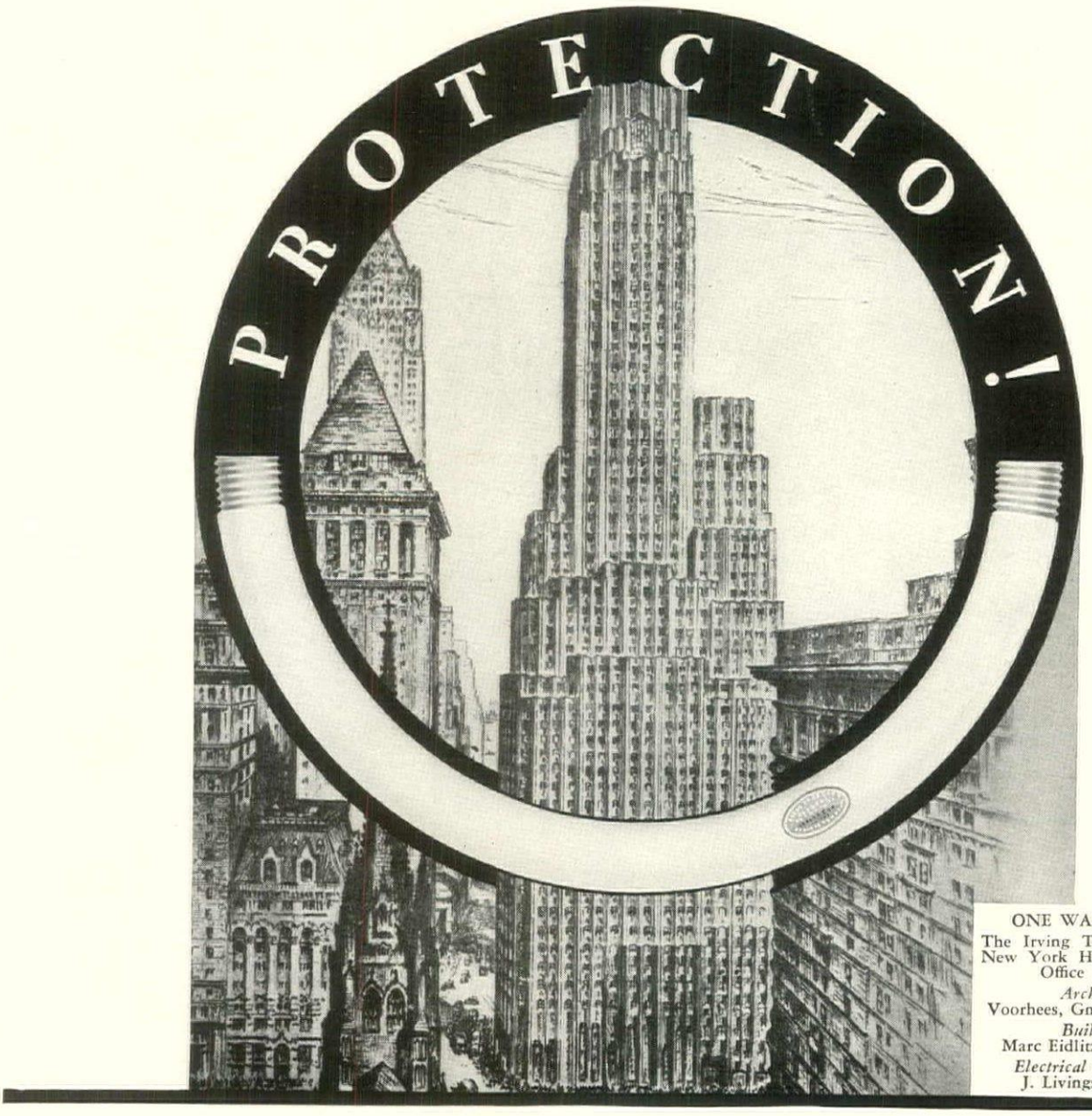
On these two parts of any thermostatic trap depends mainly its satisfactory service.

The special alloys used in the Cryer Thermostatic Radiator Trap are exclusive with that trap. They insure its functioning uniformly and without waste or noise on any low pressure steam, vapor or vacuum system. It is designed for operation at up to 5 lbs. pressure (maximum limit 10 lbs.) and with any practicable vacuum in the return line.

The Cryer Thermostatic Radiator Trap is standard for use on all forms and types of radiation, and in conjunction with any radiator inlet valve of any type whatsoever. Together with the Cryer Radiator Control Valve it provides "hot water" heat on steam systems, as described in column 1.



Cutaway view of Cryer Thermostatic Radiator Trap, showing special alloy bellows and stainless steel seat.



ONE WALL STREET
The Irving Trust Company's New York Headquarters and Office Building
Architect:
Voorhees, Gmelin & Walker
Builder:
Marc Eidlitz & Son, Inc.
Electrical Contractor:
J. Livingston & Co.

FOR WIRING *in the financial heart of the world*

Permanence is built into every element of the 50-story One Wall Street Building that rises out of the financial heart of the world . . . permanence for a generation of business service.

The wiring for this towering structure is protected by "G-E White" Rigid Conduit . . . made to resist rust, to defy time.

"G-E White" is hot-dipped galvanized. A heavy zinc coating is alloyed onto best-grade mild steel tubing, flexible enough for easy bending without cracking or flaking.

The same superior tubing, enameled inside and out, is "G-E Black." G-E Merchandise Distributors everywhere can supply these *permanent* conduits—or write Section C-162 Merchandise Department, General Electric Company, Bridgeport, Conn.

GENERAL ELECTRIC

Rigid Conduit

MERCHANDISE DEPARTMENT · GENERAL ELECTRIC COMPANY · BRIDGEPORT, CONNECTICUT

KEEP SNOWSTORMS OUT of *your* building plans

MANY miles away from a building of yours, snow and ice snap local power lines. Current fails. That building is plunged into sudden darkness.

Think of the possible confusion, inconvenience and danger of sudden current failure in such places as hospitals, theatres, schools, auditoriums . . . wherever crowds may gather.

Current failure seldom happens, but *once* may be too often. Power companies work night and day to give the public dependable service, but they can't foresee such accidents any more than you. But you can guard against them by including Exide Emergency Lighting Batteries in every public building you plan. More and more architects all over the United States are realizing the advantages of Exides and are specifying them.

Should electric current suddenly be interrupted, for any reason, occupants of buildings you plan need never know, for Exides will keep lights burning brightly. These batteries take over the job *instantly and automatically* . . . without a hand touching a switch.

Exide Emergency Lighting Batteries are not expensive. And they cost so very little to operate. Write to us today for Emergency Lighting Bulletin. Or we'll send one of our technical men to call and tell you about Emergency Lighting. No obligation. Act today.

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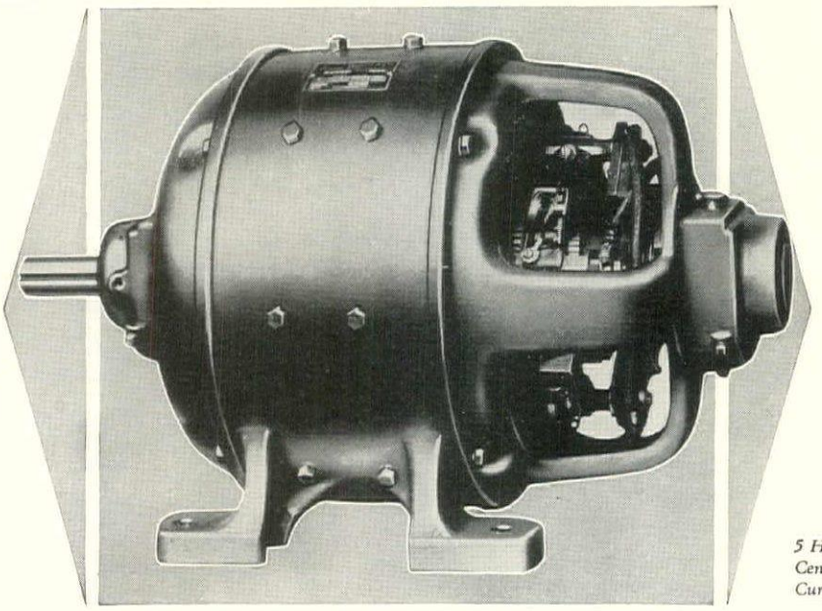
EMERGENCY LIGHTING BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

Exide Batteries of Canada, Limited, Toronto

THEY KEEP A-RUNNING



5 Horse Power Century Direct-Current Motor

CENTURY
Constant Speed
DIRECT-CURRENT MOTORS

The service continuity of these Constant Speed Direct-Current Motors is the result of 37 years spent by the Roth works in perfecting D. C. Motors that "Keep a-Running" in all types of applications.

These motors are also supplied for variable or adjustable speed operation, for general purpose and special applications—with either shunt, compound or series windings for all commercial voltages—in open-type, drip-proof, semi-enclosed and fully-enclosed dust-tight construction.

Built in standard sizes from ¼ to 100 horse power.

CENTURY ELECTRIC COMPANY
1806 PINE STREET · · ST. LOUIS, MO.
40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

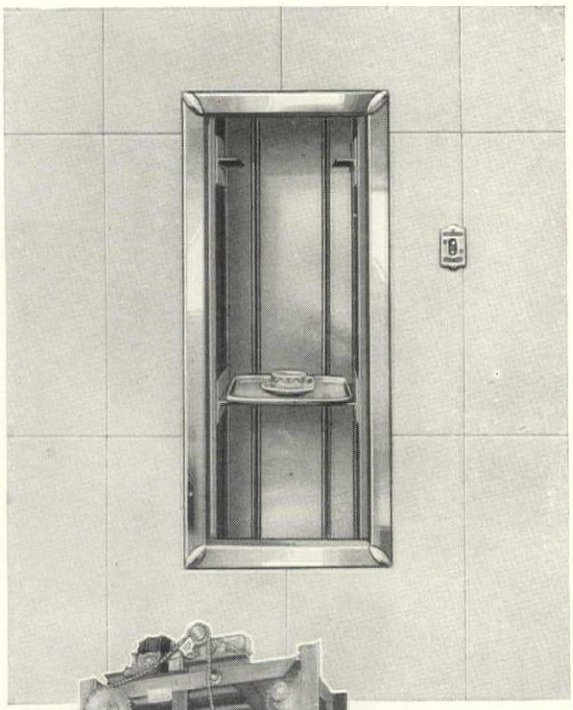
SINGLE PHASE, THREE PHASE, AND DIRECT CURRENT MOTORS

Century MOTORS

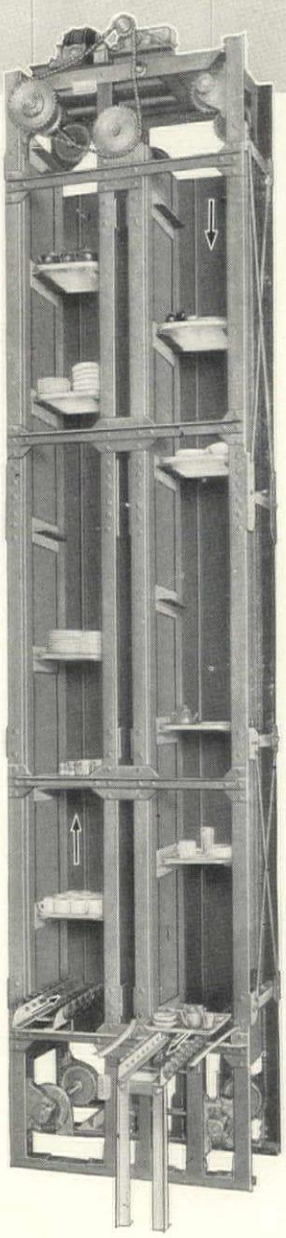
MOTOR GENERATOR SETS, ROTARY CONVERTORS, FANS AND VENTILATORS

FOR MORE THAN 27 YEARS AT ST. LOUIS

DC-2-F



Dining-floor station, single-duty Trayveyor, Horn & Hardart Co., Philadelphia.



Double-duty Trayveyor. There is a model to fit every need.

It's the Most Sanitary Dish and Food Conveyor Made

SANITARY—and easy to keep that way—is the Lamson Trayveyor. It is fully enclosed in a smooth, metal shaft in which there are no crevices or slats to catch dirt. Cleaning is therefore a matter of minutes only.

This feature alone is selling this reliable automatic servant to many leading institutions. But the Lamson Trayveyor offers other equally striking advantages. Its speed, for instance, actually doubles or trebles the usability of the china and silverware.

Another strong feature: Its smooth, steady motion materially reduces dish breakage. Moreover, quick-acting protective devices practically obviate damage due to overloading—and overloading is by far the greatest single cause of trouble with any dish and food conveyor.

Finally, the Trayveyor saves space where space is at a heavy premium, since it operates in a shaft no larger than an ordinary dumb-waiter requires.

If it is an advantage to establish the dining rooms on one floor and the kitchen and dishwashing department on another, then the Trayveyor will be found indispensable.

Automatic, trouble-free, efficient, the precision-built Trayveyor can be had in ascending, descending, reversible, or double-duty models. Write to-day for a practical solution of dish and food conveyor problems.

THE LAMSON COMPANY - Syracuse, New York

A Nation-wide Institution with Offices in Principal Cities

LAMSON TRAYVEYOR

MAIL THIS COUPON

The Lamson Co., Syracuse, N. Y.

I am interested in the Lamson Trayveyor. Please send your new booklet which describes it fully.

Name.....Street.....

City.....State.....

A. F.

A Significant Contribution to Better Prisons . . .

BAYLEY GUARD WINDOWS*

THE wide recognition accorded Bayley by leading architects and prison officials is proof that these outstanding and exclusive features mark a new trend in prison construction.

1. Absence of penal atmosphere.
2. Efficient window as well as guard.
3. Super bar construction assures maximum safety.
4. Assembly of small openings gives adequate daylight, and at same time increases strength of window.
5. Ventilator does not impair safety.
6. Designed in cooperation with prison architects and officials.
7. Available in sizes to fit the smallest as well as the largest wall openings.

**Bayley Guard Windows are available in the Super Bar and the 1½" Standard Tee Bar construction.*

Call in the nearest Bayley representative when preparing prison plans and writing specifications. His experience and knowledge are invaluable. Request latest literature. The William Bayley Co., 147 North St., Springfield, Ohio.

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STEEL WINDOWS & DOORS

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Washington, 1427 I St., N. W.
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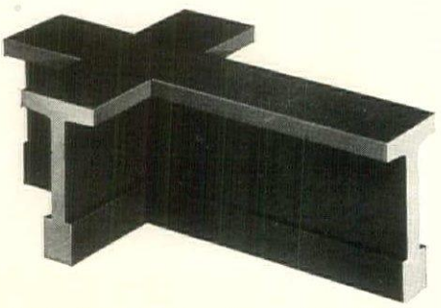
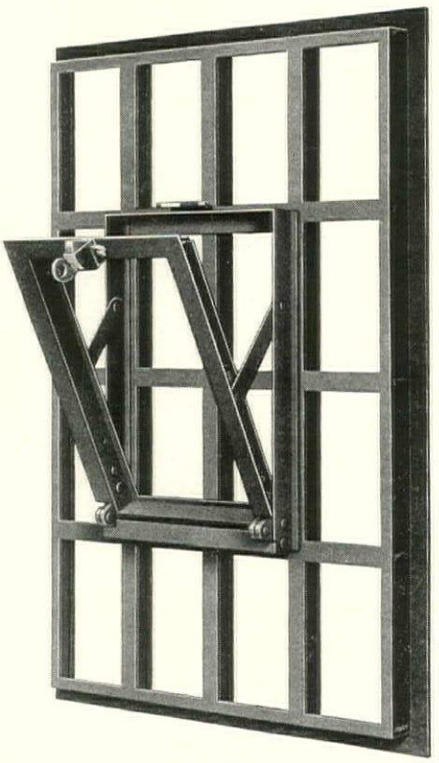
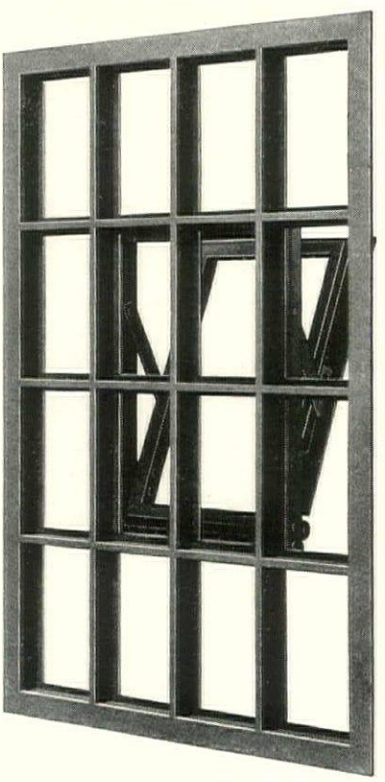
Sales Agencies also in Principal Cities



Bayley Super Bar intersection, one-half actual size.

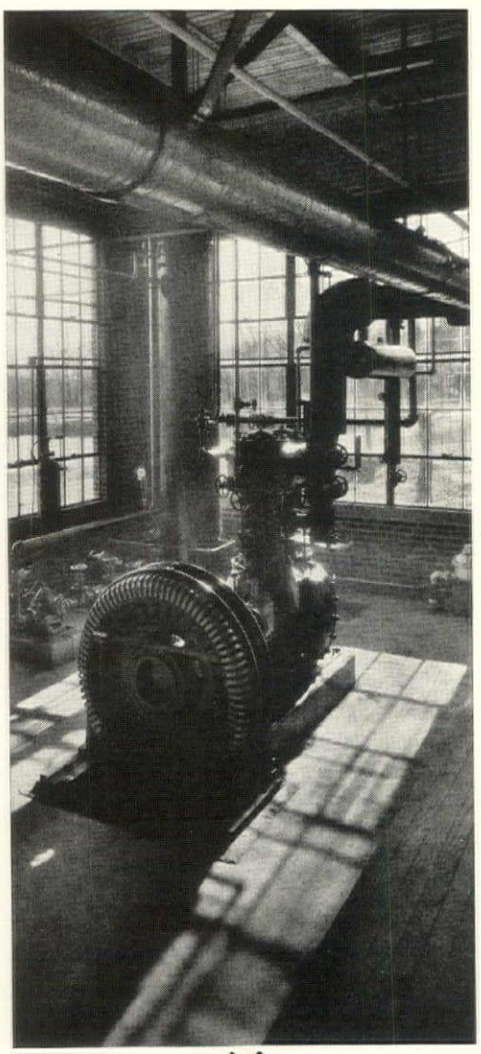


Interior view of a Bayley Guard Window, showing ventilator in open position. Note that horizontal and vertical bars are continuous through ventilator opening. May be screened when desired.



Exterior view of a Bayley Guard Window. Note entire absence of the jail-like appearance always inseparable from the heavy outside bars formerly used.

After the Erecting Engineer *has gone...*



AFTER the refrigerating needs of your projects have been studied, the equipment selected, the installation made...

After the erecting engineer has gone... then what?

Then... whether or not your client gets the benefits of efficient refrigeration depends largely on the Compressor.

The York Vertical Single-acting Enclosed Ammonia Compressor is an outstanding York achievement. In design and refinements, in quality of materials and workmanship, in precision and husky construction... in dependability and economy, the York Compressor is unequalled.

Behind this compressor, is York's 50 years experience in pioneering refrigeration... York's knowledge gained through developing and installing refrigeration for every commercial and industrial use.

The same care in design and manufacture goes into all York equipment...

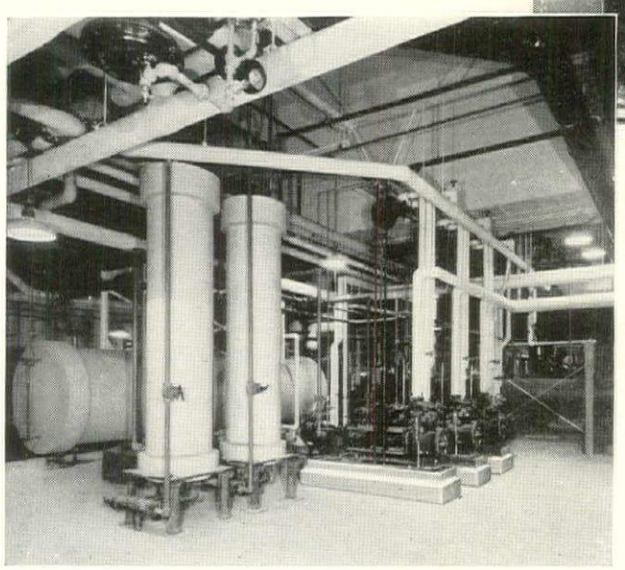
So, after the engineer has gone, if the refrigeration you specified is York Refrigeration, your clients are assured the dependable service, the economy of operation, the satisfaction they need. Let York serve them, through you. Communicate with the nearest of York's 71 direct factory branches.

YORK ICE MACHINERY CORPORATION
» » YORK » PENNSYLVANIA « «

YORK
REFRIGERATION

Cooled by *Carbondale Refrigeration*

Cleveland Union Terminal. Graham, Anderson, Probst and White, Architects.



TO help keep the travelers healthy and comfortable is the job given to Carbondale at the new Cleveland Union Terminal. All refrigerator boxes in the restaurants are cooled by Carbondale exhaust steam refrigerating machines. And during the summer, these dependable machines also serve to cool and condition the air.

Small wonder that Carbondale Refrigeration was chosen for this important service. In The Stevens and the St. George, the world's two largest hotels, in theatres, markets and public buildings throughout the country, Carbondale has proven its reputation for trustworthy performance.

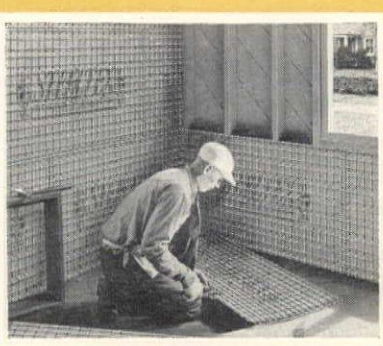
No matter what the refrigerating need may be, call on Carbondale. The specialized experience of Carbondale engineers is at your service.

THE CARBONDALE MACHINE CO.
Carbondale, Pa. *Branches in principal cities*

Carbondale CARMACO **Refrigeration**
ABSORPTION AND AMMONIA COMPRESSION MACHINES

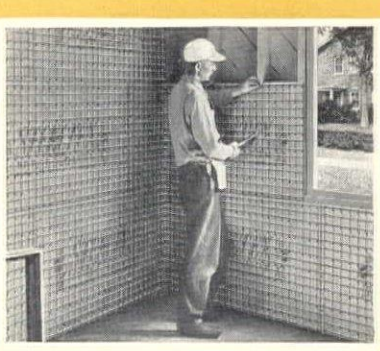
CARBONDALE AMMONIA COMPRESSION REFRIGERATING SYSTEMS USE WORTHINGTON "FEATHER VALVE" COMPRESSORS

RIBBED *STEELTEX* LATH protects plaster walls and ceilings – automatically embeds plaster with steel



Ribbed STEELTEX for plaster is quickly and rapidly applied . . . there is nothing difficult about its application . . . and it is easily shaped or cut to fit window and door openings.

The plaster flows under and around the network of steel wires. These steel wires become automatically embedded in the plaster . . . and give to plaster what it needs,—that is, embedded steel reinforcement for permanency.



Ribbed STEELTEX is simply nailed to studs in the ordinary manner. This illustration shows how Ribbed STEELTEX blankets every room against infiltration of air.

Builds lifetime walls and ceilings

Ribbed *STEELTEX* lath now makes permanent plaster inexpensive . . . and brings to plaster the protective qualities that are so desirable . . . and necessary.

The reinforcement of Ribbed *STEELTEX* consists of a network of steel wires (heavily galvanized). This steel network is securely woven onto the heavy backing. Extending across the back of *STEELTEX*, are rows of V-shaped metal rib stiffeners. These rib stiffeners insure board-like rigidity . . . eliminate belly or sag in the sheet . . . making it easy to produce a plaster slab of uniform and correct thickness.

RIBBED *STEELTEX*
minimizes plaster cracking hazards
Reinforces plaster with embedded steel
Insulates against heat and cold
Retards sound
For any type home or building

Safeguards the investment

Ribbed *STEELTEX* embeds the plaster with a network of steel. Ribbed *STEELTEX*, because of its heavy backing, prevents infiltration of air . . . eliminates the possibility of unsightly streaks or lath marks from showing to mar the plaster beauty.

STEELTEX insulates against heat and cold, strengthens the structural framework and retards sound.

The specification for the backing of *STEELTEX* was developed by the Pittsburgh Steel Company's Industrial Fellowship at the Mellon Institute of Industrial Research.

Turn the pages for further details.

MORE THAN A QUARTER MILLION *STEELTEX* INSTALLATIONS

Ribbed *STEELTEX* lath is suitable, practical and economical for any type of home or building . . . whether large or small . . . costly or low-priced. The walls and ceilings of this modern structure, typical of many others, are protected with *STEELTEX*.

Beautiful, modernistic interiors are costly and precious. Hidden in these walls and ceilings is Ribbed *STEELTEX*, the modern plaster lath and steel reinforcement. The interior will retain its charm and beauty because *STEELTEX* builds lifetime walls and ceilings.

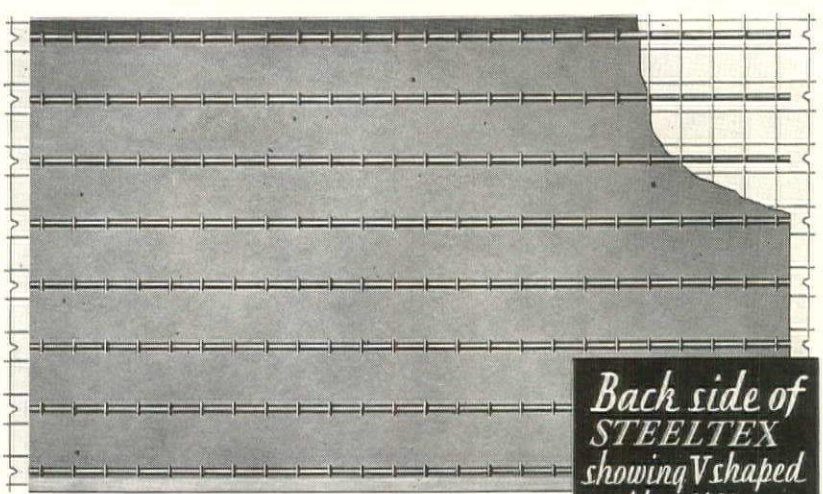
Modern homes like this one, require modern construction methods . . . ordinary lathing methods today fall short of present-day demands. Ribbed *STEELTEX* is up-to-date . . . it reinforces and protects plaster . . . and is more and does more than ordinary lath.

See Sweet's plastering section (volume B, pages 2402 to 2409); floor and roof construction (volume A, pages 320 to 322).

SPECIFY RIBBED *STEELTEX* for plaster–It is more and does more than Ordinary Lath . . . .

Plaster side of STEELTEX

ABOVE: The plaster side of Ribbed STEELTEX. Note the complete network of steel reinforcing wires. This steel network is woven onto a heavy backing. When plastered, STEELTEX becomes a one-piece, solid steel-reinforced slab.



Back side of STEELTEX showing V shaped rib stiffeners

ABOVE: Back side of Ribbed STEELTEX. Across the back are V-Shaped metal rib stiffeners. These ribs, plus the heavy backings, give STEELTEX its board-like rigidity and insure an economical plaster slab of uniform thickness.

STEELTEX Advantages

Ribbed *STEELTEX* makes plaster a lifetime material. Plaster applies easily . . . and stays put.

Plaster slab of uniform thickness assured . . . smooth in back as well as front.

V-shaped metal rib stiffeners produce a level-lathing job of board-like rigidity.

All plaster functions in the slab . . . no waste in keys or hangovers.

Furring device assures embedment in the plaster of network of electrically-welded steel wires.

Network of steel wires strengthens the framework of building.

Steel reinforcing reduces plaster cracking hazards to the minimum.

No possibility of lath or joint marks . . . or unsightly streaks . . . showing to mar the plaster beauty.

Ribbed *STEELTEX* blankets every room preventing infiltration of air.

Insulates against heat and cold.

STEELTEX retards sound.

STEELTEX makes reinforced, quality plaster economical enough for anyone.

Detailed Specifications of Lathing for Plaster

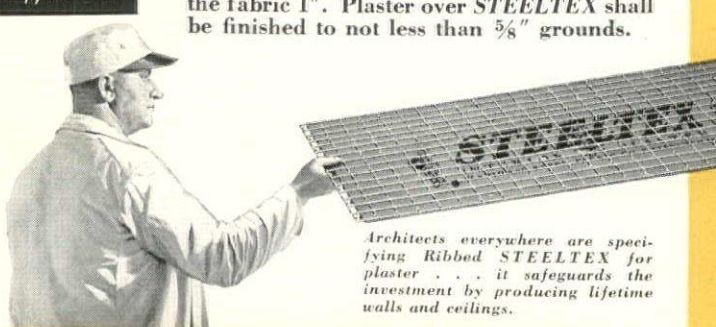
All interior Walls, Partitions and Ceilings (where so specified and designated plaster) shall be lathed with *STEELTEX*, as manufactured by the National Steel Fabric Co., Pittsburgh, Pa., (A 2″ x 2″, 16 gauge, cold drawn, electrically-welded self-furring Galvanized Wire Fabric, to which a tough fibrous backing is secured by means of a 26 gauge V-shaped channel rib).

STEELTEX shall be attached to walls and ceilings with the *STEELTEX* hook head nail . . . plaster-board nail . . . staples, or 4d common wire nails. On side walls nail every 6″; on ceilings every 4″.

Joints shall be broken and shall be so nailed to insure close contact of the overlapping sheets. Each sheet shall be placed so that all joints shall overlap the face of the fabric 1″. Plaster over *STEELTEX* shall be finished to not less than ⅝″ grounds.

Ready for the job when received

Ribbed STEELTEX comes packed in easily-handled bundles . . . each bundle contains 46 sheets (50 square yards).



Architects everywhere are specifying Ribbed STEELTEX for plaster . . . it safeguards the investment by producing lifetime walls and ceilings.

Sign and mail this coupon

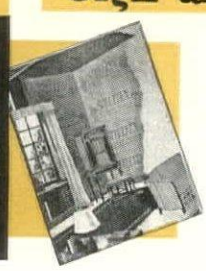
The National Steel Fabric Co., DM 55

Gentlemen:—Please send (free) descriptive *STEELTEX* literature, for floors ☐ for roofs ☐ for interior plaster ☐ for stucco ☐ for brick and stone veneer ☐.

Name.....

Address.....

City.....State.....



NATIONAL STEEL FABRIC COMPANY

DIVISION OF Pittsburgh Steel Co.

UNION TRUST BLDG. PITTSBURGH, U.S.A.

PRINTED IN U.S.A.

Advanced Refrigeration

FRIGIDAIRE

Signs read "Sold" and "Rented"

when buildings are equipped with Frigidaire

Drake Apartment Building, Philadelphia, Pennsylvania, is equipped with Frigidaire. Ritter & Shea, Architects, Murphy-Quigley, Builders.

Anything that cuts building, selling or renting costs is a good thing for architects to put into practice.

And some of the shrewdest architects, builders and contractors say that *one* thing accomplishes *all* of these results—*Frigidaire as part of the kitchen equipment.*

Frigidaire cuts building costs by eliminating the necessity of special alcoves or recessed entry ways. It reduces selling and renting expense by quickly locating buyers or tenants who are eager to enjoy modern refrigeration.

For convincing proof, note the way that signs reading "Sold" and "Rented" and "Frigidaire Equipped" always go together—even when other homes and apartments are begging for buyers and tenants.

Before you advise a client about refrigeration equipment, be sure to get the facts about Frigidaire—facts which will show you that Frigidaire is truly outstanding in construction and performance—that it is the last word in Advanced Refrigeration in every way. Mail the coupon.

FRIGIDAIRE CORPORATION
Subsidiary of General Motors Corporation
DAYTON, OHIO.

★ ★ ★

FRIGIDAIRE CORPORATION,
Subsidiary of General Motors Corporation,
Dept. E-11, Dayton, Ohio.
Please send me your Frigidaire Data Book for Architects and Builders.

Name.....

Address.....

.....

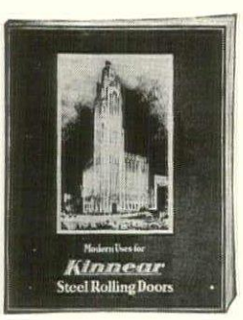
FRIGIDAIRE

A GENERAL MOTORS VALUE

modern—

Inset photograph shows two of the Kinnear Rolling Steel Doors used in the new Shell Oil Company Building in San Francisco. Modern in every respect, it was only natural that Kinnear Rolling Doors should be chosen for this magnificent edifice.

YES, modern as the newest building from a standpoint of efficiency, yet not new or untried. Kinnear not only originated the rolling steel door, but has been responsible for every worth while improvement in design and construction. You'll find them in skyscrapers, factories, warehouses, terminals — everywhere the best in rolling doors is wanted.

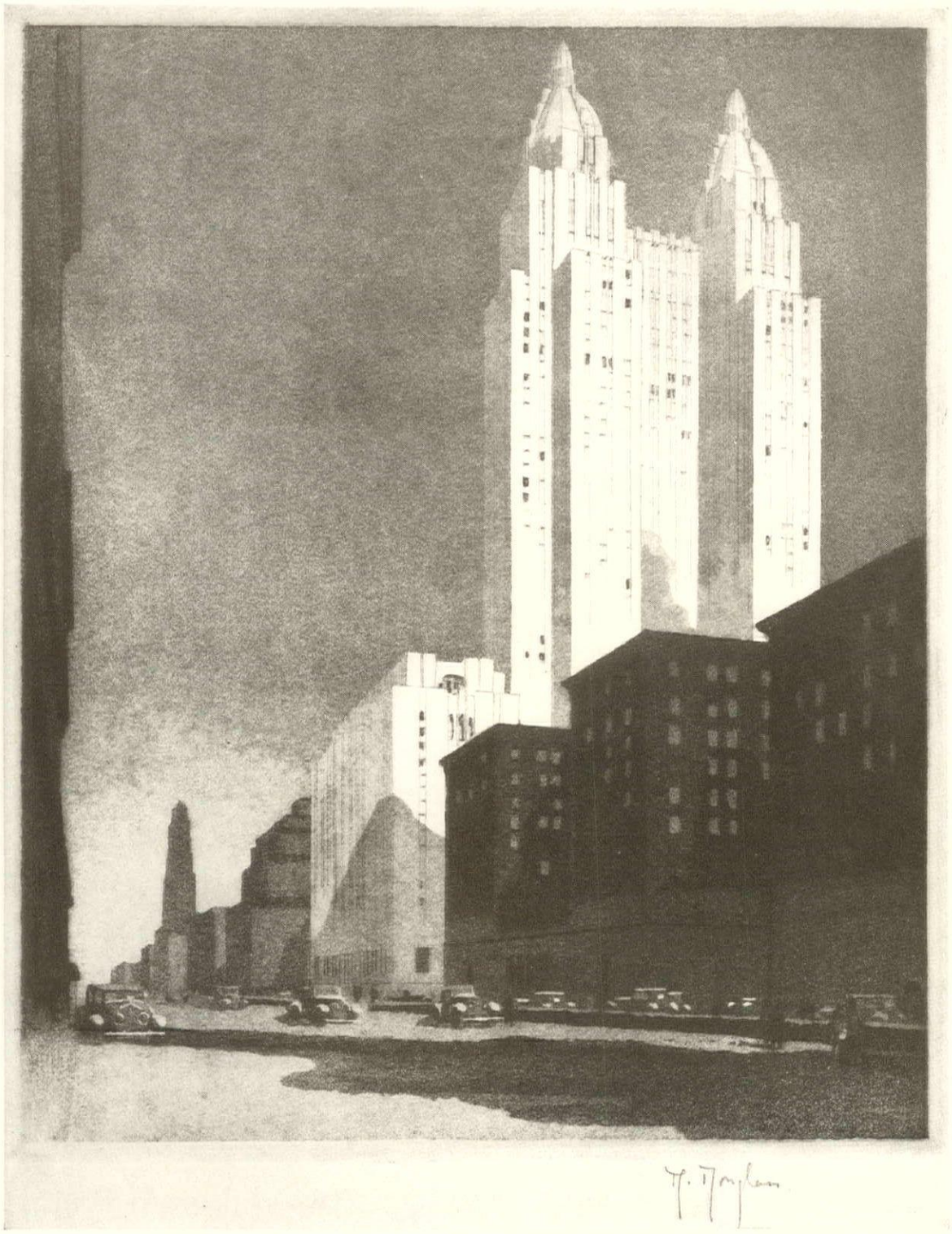


The new Kinnear Rolling Door Catalog is mailed free on request. Kinnear Engineering and Estimating Service is available without charge or obligation.

kinnear
ROLLING DOORS

THE KINNEAR MANUFACTURING CO.
400-440 Field Avenue, Columbus, Ohio, U. S. A.

Boston Chicago Cincinnati Cleveland Detroit New Orleans
New York Philadelphia Pittsburgh Kansas City Washington



NEW LUSTRE FOR A FAMOUS NAME... WALDORF ASTORIA

Aquatint etching of the new Hotel Waldorf Astoria, New York, N. Y.— Schultze & Weaver, Architect — Thompson-Starrett Co., General and Heating Contractor — Clyde R. Place, Consulting and Mechanical Engineer — John McMillan Co., Plumbing Contractor . . . Jenkins Valves are in the plumbing, heating, refrigerating, and fire hose outlet services of this notable hotel . . . Jenkins Bros., New York — Boston—Philadelphia—Chicago—Houston. Jenkins Bros., Ltd., Montreal—London.

Economic Adjustments

in

FUNCTION AND OPERATION

of our major buildings are constantly taking place. Possibly in no one element is this more manifest than in the problems of heating and ventilating. Here advanced thought is presenting new products and new systems to meet an ever changing need.

Architects and engineers are cooperating in this development, but the recorded research and results are largely to be found in the professional journal, Heating and Ventilating. This should be the standard of reference found in every architect's library.

The subscription price is two dollars a year.

A sample copy sent on request.

HEATING AND VENTILATING, 521 Fifth Avenue, New York City

To make any sleight-of-hand a success . . . get the onlookers to overlook one or two realities.

You can be your own illusionist,—convincing yourself and reaching some remarkable conclusions,—just by disregarding a few important details. . . .

But decisions that stand the test of time must be based on all of the *realities* that affect the issue; not *some* of them.

It is especially important to overlook no realities when analyzing steam consumption of heating systems. For correct conclusions and sound decisions it is necessary that every one of the important factors shall be checked and weighed.

Altogether, 45 variable factors may affect the steam consumption of *any* heating system. We have prepared a "check-list" of these 45 variables to help you check your steam consumption figures and estimates. We will be glad to send you one or more copies of this check-list.

Engineers, architects and heating contractors will find the related subjects of heating steam consumption analysis, estimating and heating cost accounting, as presented by Warren Webster & Company, of vital interest. *A request for further details will bring a Webster steam heating specialist to discuss this vitally important subject.*

A Heating System for Every Need and Every Purpose

Heating requirements vary so widely that no one type of heating system can be expected to provide the greatest return on the dollar invested in the heating equipment for all types and sizes of buildings. Realizing this, Warren Webster & Company have consistently developed an entire group of Webster Systems of steam heating to provide *a heating system for every need and every purpose.*

Webster MODERATOR System provides "Controlled - by - the-Weather" heating and makes possible new methods of operation and new standards of economy. Can be applied to any existing steam heating system of sufficient size.

IMPROVED Webster Vacuum System provides distribution balanced from the start—the supply of steam to each radiator is so equalized that all radiators get steam at the same time and in substantially the same proportion, regardless of distance from the boiler. May be supplemented by HYLO Vacuum Variator, permitting manual control by building operator. Applicable to new or existing installations.

IMPROVED Type "R" System for residences and larger buildings as well, combines advantages of steam heating with advantages of hot water, but without limitations. Meets fully the operating requirements of newer fuels, newer types of radiation and newer thermostatic controls. Also provides better-than-ever heating service with old radiation and old controls.

Full details of any or all of these systems will be furnished on request.

Warren Webster & Company, Camden, N.J.
Pioneers of the Vacuum System of Steam Heating
Branches in 60 Principal U. S. Cities
Darling Bros., Ltd., Montreal, Canada

-since 1888
Webster
Systems of Steam Heating

a I 58a

This is one of a series of advertisements discussing the factors affecting heating steam consumption. The purpose of the series is to call attention to the methods of heating steam consumption analysis, estimate and heating cost accounting developed by Warren Webster & Company to provide a reliable basis for comparing heating system efficiency. Actual detailed facts and figures of steam consumption of a number of Webster Systems of Steam Heating, prepared in accordance with these methods, are available for your examination.

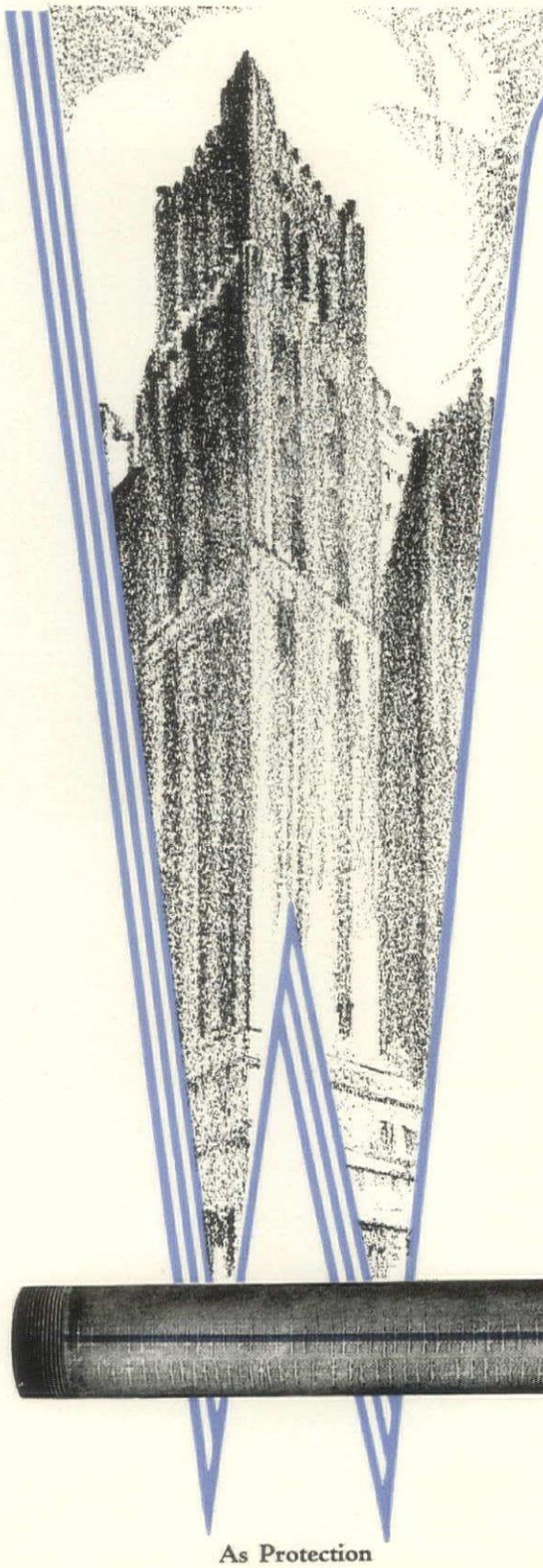
IN THE BANK IT IS A THING

OF **Beauty**

AND **Interest**

Diebold Vaults command the admiration of clients and depositors in a bank. They symbolize the security of modern banking and the wealth of a great nation, for the protection of which such mountains of strength and intricate machinery are devised. . . . Diebold engineers offer complete co-operation with the architect in planning details of construction and installation. See Sweets' Architectural Catalogue for specifications and details. Our field men are always available for consultation.

DIEBOLD SAFE AND LOCK COMPANY . . . CANTON, OHIO
SEVENTY YEARS OF BANK SERVICE



herever

YOU USE PIPE

Specify

TONCAN IRON PIPE

In water lines in buildings; steam and return lines in heating systems; process liquor lines in factories; high over head in mills and power plants, and buried deep in the acid water of mines;—wherever pipe is used, there Toncan Iron Pipe will last longer.

Toncan is an alloy of highly refined Iron, Copper and Molybdenum,—an alloy that has been rigidly tested and proved by the building trades and industry for its extreme resistance to rust and corrosion.

So, wherever you use pipe, whenever severe service says that only the best is good enough, specify Toncan Iron Pipe and experience lower repair and maintenance charges during all the years of its longer trouble-free life.

As Protection
to you
we mark it
BLUE

REG.U.S.PAT.OFF.
TONCAN
COPPER
MO·LYB·DEN·UM
IRON PIPE

REPUBLIC STEEL CORPORATION

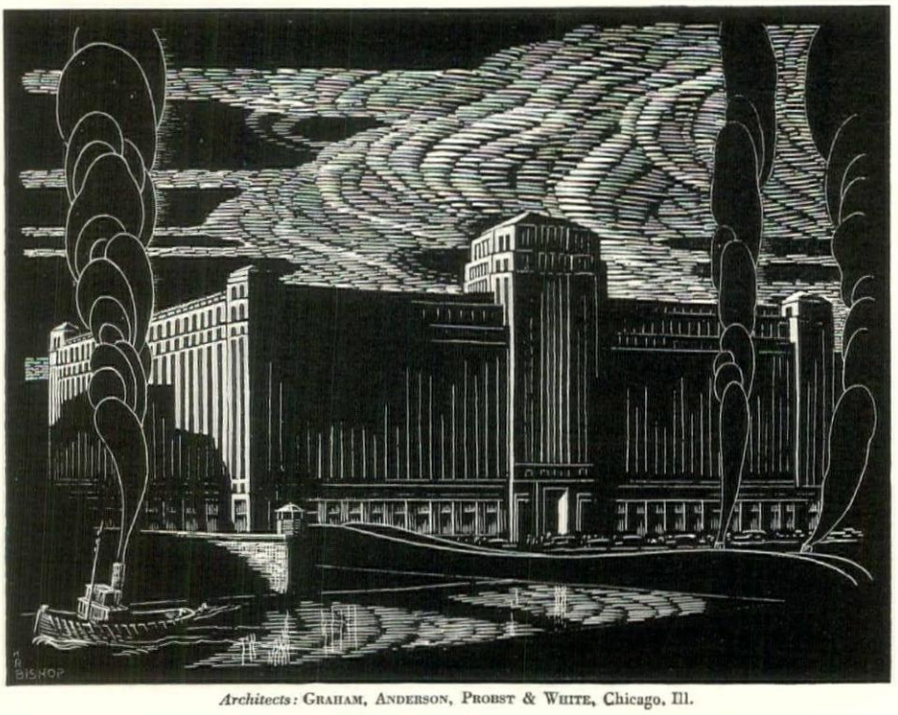
GENERAL OFFICES YOUNGSTOWN, OHIO

THE WORLD'S LARGEST BUILDING HAS MONEL METAL EQUIPPED RESTAURANTS

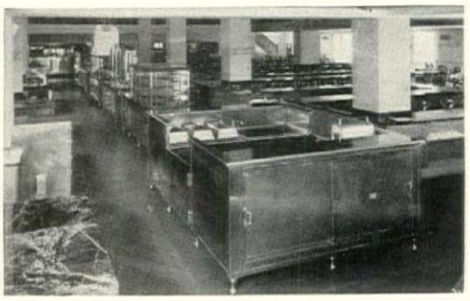
The Monel Metal equipped restaurants kitchens and soda fountains in Chicago's great Merchandise Mart comprise one of the finest food service installations in the world!

Here inviting beauty and spick and span appearance are always insured by Monel Metal's combination of rust-immunity corrosion-resistance cleanability and steel-like strength.

A 16-page booklet is available illustrating and describing this outstanding Monel Metal food service installation. A copy will gladly be sent on request.



Architects: GRAHAM, ANDERSON, PROBST & WHITE, Chicago, Ill.



Duparquet, Huot & Moneuse Co. manufactured and installed complete food service equipment of Monel Metal in the Merchandise Mart. In addition to equipment of their own manufacture, Duparquet, Huot & Moneuse Co. installed * additional Monel Metal equipment furnished by the following companies:

GLASS WASHERS—G. S. Blakeslee & Company, Chicago, Ill.
DISHWASHERS—Crescent Div. of Hobart Mfg. Co., Troy, Ohio.
REFRIGERATORS—"Dry-Kold" Refrigerator Co. . Niles, Mich.
BAKE OVENS—Edison Electric Appliance Co., Inc., Chicago, Ill.
SODA FOUNTAINS—The Liquid Carbonic Corp.* Chicago, Ill.
DISH CONVEYORS—Samuel Olson Co. . . . . Chicago, Ill.
EGG TIMERS—Perfect Automatic Egg Timer & Mfg. Co., Chicago, Ill.
TOASTERS—Savory, Inc. . . . . Buffalo, N. Y.
RANGES—Standard Gas Equipment Corp. . . . . Chicago, Ill.
MEAT & BREAD SLICERS—U. S. Slicing Machine Co., Chicago, Ill.
THERMOTAINERS—Waters-Genter Company, Minneapolis, Minn.

** Soda Fountains were installed by The Liquid Carbonic Corp.*

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nicke..

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

A HIGH NICKEL ALLOY
MONEL METAL
NICKEL ALLOYS LOOK BETTER LONGER

INCO MONEL METAL TRADE MARK

49 PEERVENTS installed in the new Sewanhaka High School

PEERVENTS are often selected for these large modern schools by architects who have had experience with PeerVents on previous school buildings or other public or semi-public buildings. Such is the case with the new Sewanhaka Central High School in Floral Park, Long Island.

Many new school buildings are also PeerVent equipped by the recommendation of another school board which has used the PeerVent System.

Economy and noiseless and efficient operation are important considerations in the selection of heating and ventilation units. The PeerVent System gives all of these points. Building superintendents from coast to coast tell of the excellent service given by these PeerVents.

Peerless engineers will gladly call and discuss any of your heating and ventilation problems without obligation on your part.

Send for the illustrated Peerless catalog.

PEERLESS UNIT VENTILATION CO., Inc.
BRIDGEPORT, CONNECTICUT
Resident Engineers in Principal Cities from Coast to Coast

Architects and Engineers:
Knappe & Morris
New York

Contractor:
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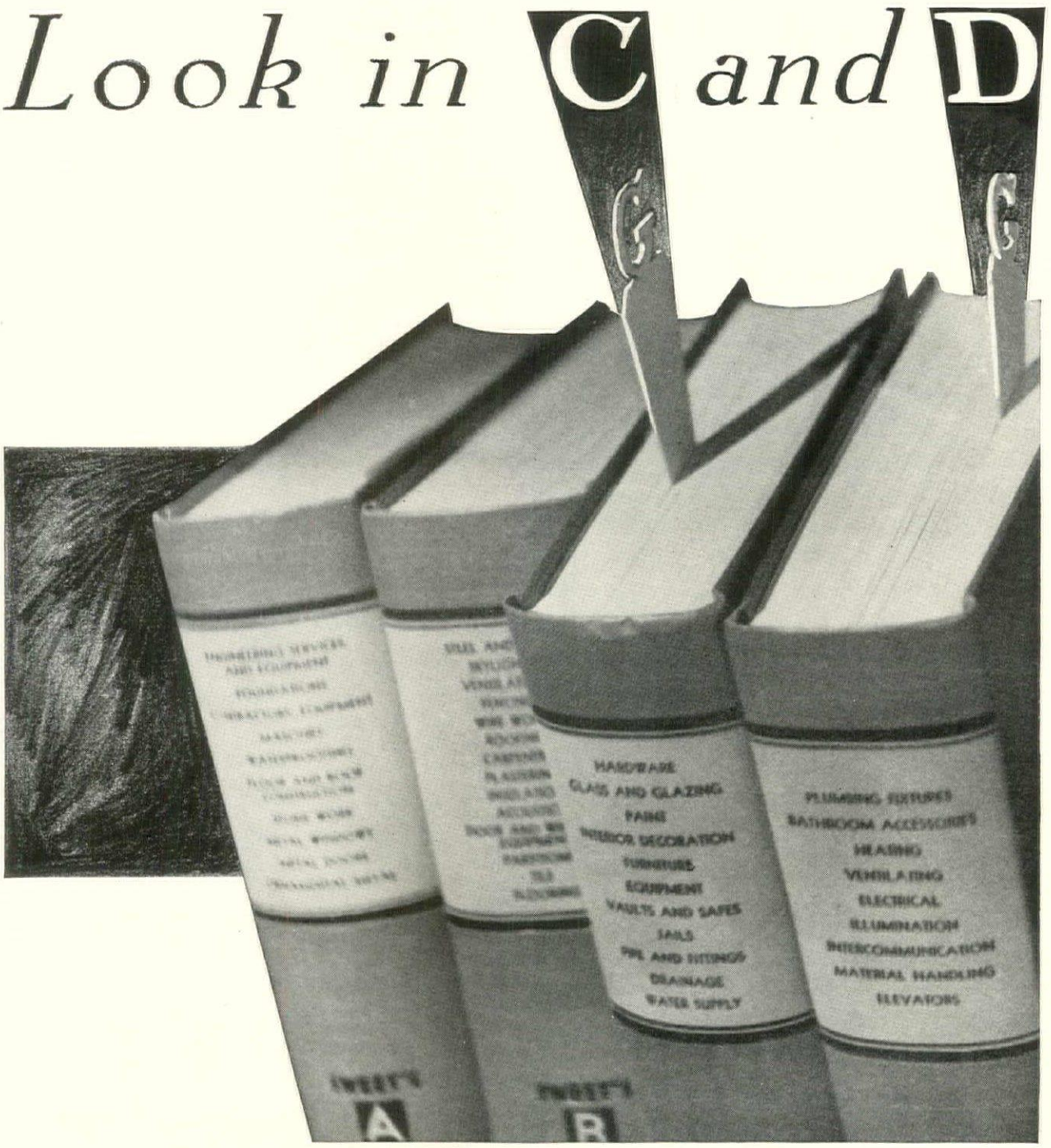
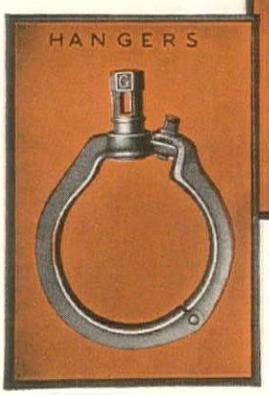
New York

PIONEERS IN UNIT VENTILATION

Look in C and D

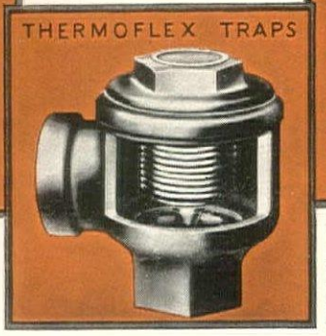


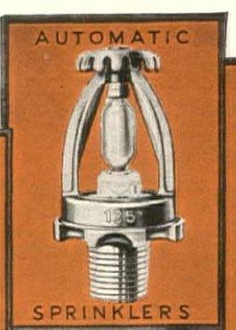
ALL THESE GRINNELL PRODUCTS WILL SAVE MONEY



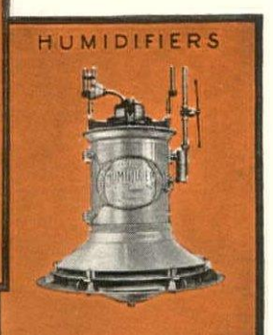
Pipe fittings, perfectly threaded, accurately machined and rigidly inspected. Pipe hangers adjustable after the pipe is up. Reduce installation costs and thereafter keep down maintenance expenses.

These traps with the famous Hydron Bellows, insure perfect operation of your steam radiators.





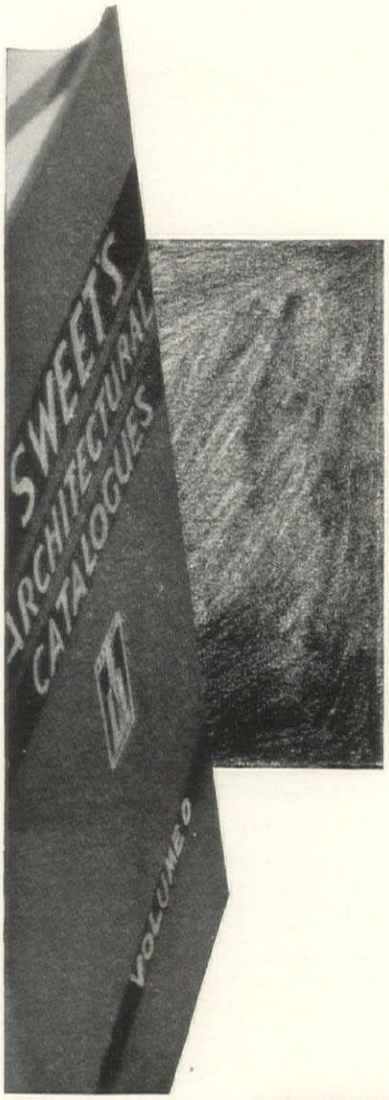
The famous Quartz Bulb Sprinkler Head. In most cases sprinklers will reduce insurance expense from 50 to 90 percent.



Where processes are affected by air dryness large savings can be made by proper humidification equipment.

for GRINNELL

—a time saving habit.



Try it and you will get the habit—a short-cut to authoritative data and practical engineering information on these subjects.

18 pages on heating specialties.
(See Volume D Pages 5531-5552)

39 pages on Thermolier unit heaters.
(See Volume D Pages 5311-5352)

46 pages on Pipe hangers, brackets and supports.
(See Volume D Pages 5389-5436)

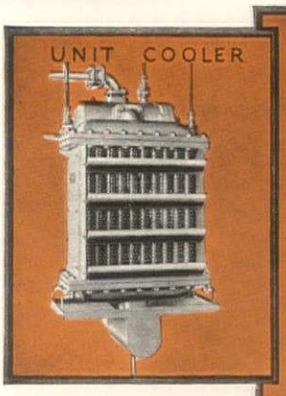
1 page on the Equiflo Valve to balance hot water circulation.
(See Volume D Page 5530)

6 pages on malleable and cast iron fittings, and Triple XXX products for super power.
(See Volume D Pages 5268-5273)

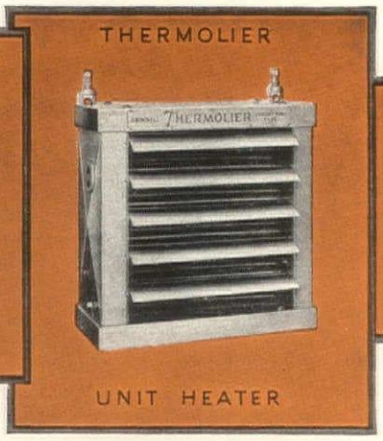
2 pages on Automatic Sprinkler systems.
(See Volume C Pages 4880-4881)

GRINNELL COMPANY INC.

Executive Office: Providence, R. I. *Branches in all Principal Cities*



A revolutionary improvement over pipe coils for room cooling and refrigeration. It replaces more than ten times its weight in pipe coils.



A better and cheaper means of heating many types of commercial buildings. Many heating systems can be modernized almost over-night with a tremendous saving on fuel.

Pipe fabrication, lap joints, loop bends, forged hangers and welded headers comprise the Triple XXX line for Super Power work. By modernizing and using high temperature steam your yearly savings will often run to five or six figures.

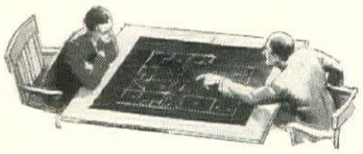
QUESTION:

How should an institutional laundry be planned with reference to cleanliness?

ANSWER:

Immaculate laundering can be accomplished only in an immaculate plant. For this reason no detail should be overlooked that makes for the elimination of dirt. Both dust, which is always present in the air, and lint, released during finishing processes, must be guarded against.

All moldings and recesses for doors, chutes and windows, should be formed smooth and round to prevent dirt from accumulating. Windows and doors opening to the outside should be screened with a fine mesh wire cloth. The finish and form of walls and ceilings should be planned for easy cleaning. Vacuum cleaning equipment is practically a necessity. In most institutional laundries, a vacuum piping system is justified. Careful attention must be given to the location of outlets to provide easy access to all corners, walls and ceilings.



In rooms for breaking or marking, and in flatwork receiving rooms, waste chutes or covered, fireproof receptacles should be provided for the paper, cardboard, match boxes and other articles received with and around clothes, and for the food remnants, menu cards, and cigarette ends that accompany table linen.

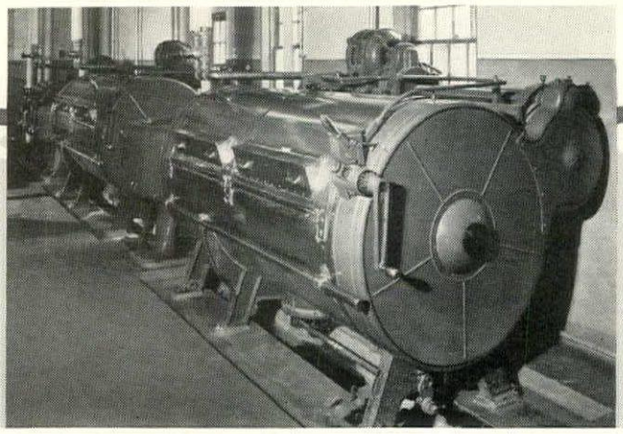
The subject of cleanliness, of which the above is but the merest outline, is one on which Troy Advisory Service is in a position to render valuable assistance to architects and institutional executives engaged in laundry planning.

TROY LAUNDRY MACHINERY CO., INC.

Chicago ⁓ New York ⁓ San Francisco ⁓ Seattle ⁓ Boston ⁓ Los Angeles. Factories: East Moline, Ill.

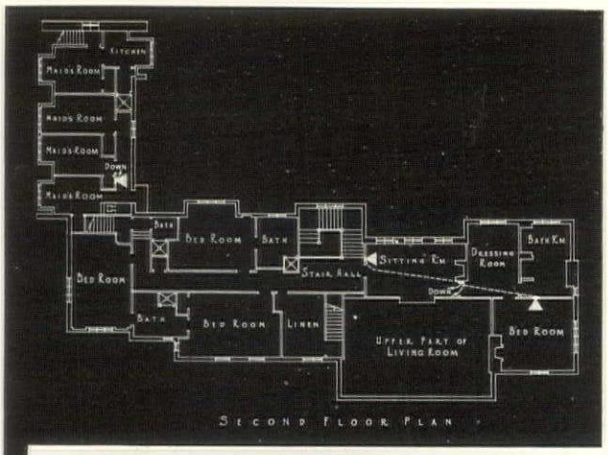
JAMES ARMSTRONG & CO., Ltd., European Agents: London ⁓ Berlin ⁓ Zurich.

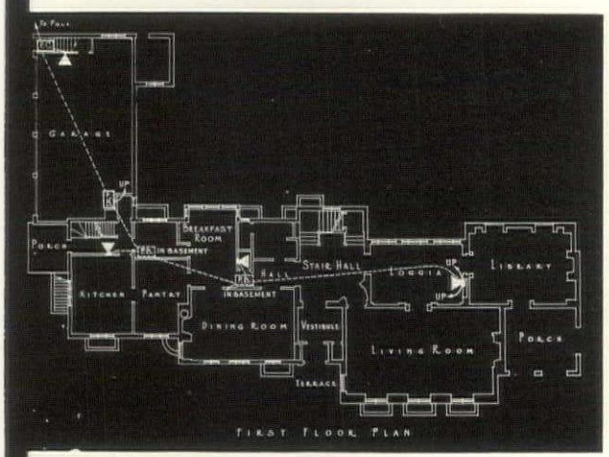
TROY
LAUNDRY MACHINERY

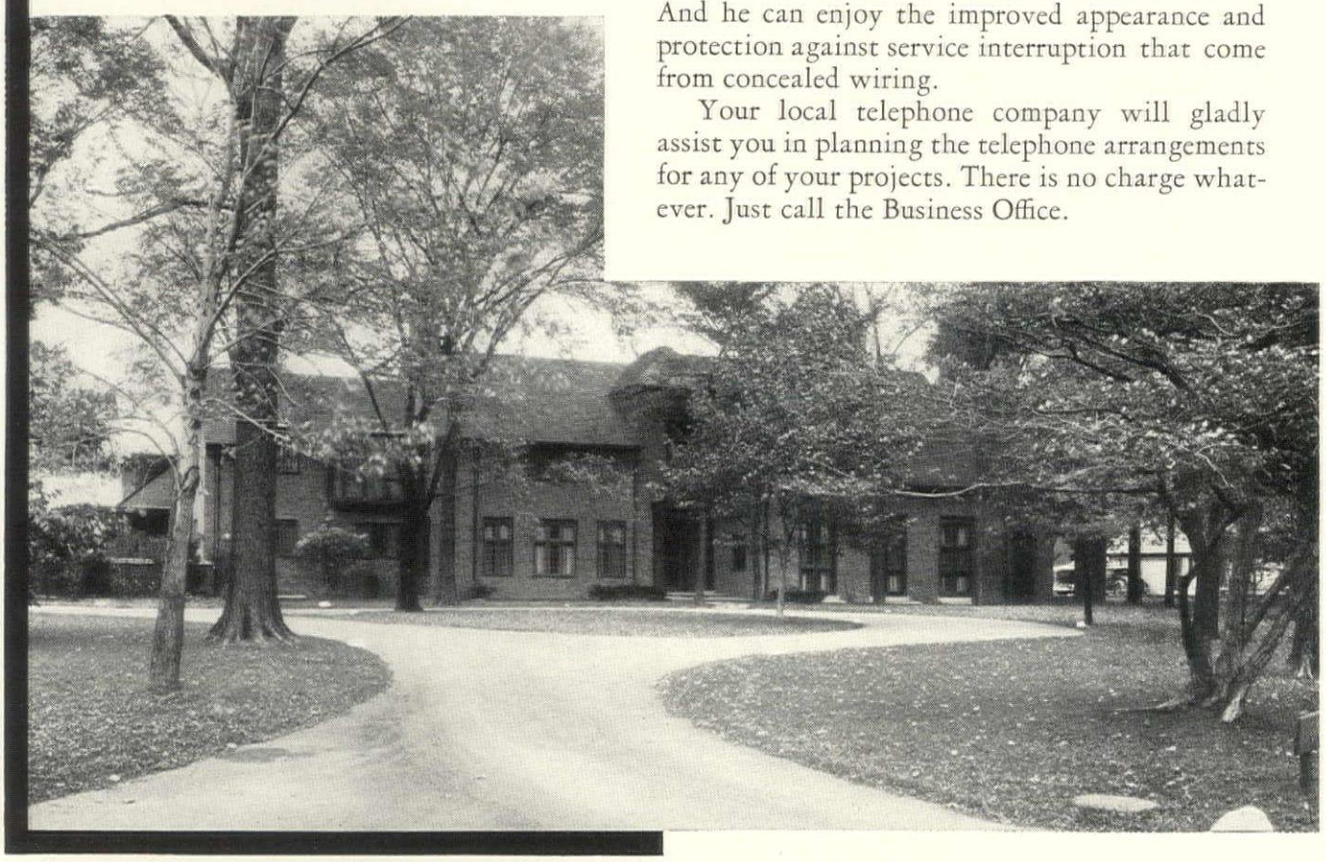


SINCE 1879... THE WORLD'S PIONEER MANUFACTURER OF LAUNDRY MACHINERY

Troy-equipped laundry in the Anna Lee Home, Colonie, N.Y.







TELEPHONE CONVENIENCE CAN BE PLANNED TO MEET FUTURE REQUIREMENTS AS WELL AS PRESENT NEEDS

DISTINCTION in a house is as much a matter of arrangement inside as of appearance outside. Every added convenience contributes to it. And many architects consider *telephone* convenience especially important.

Telephone convenience consists simply in having *enough* telephones—in living-room, library, bedroom, boudoir, kitchen and laundry—wherever they will save time and energy. It is as properly a part of the small home as of the large residence. It can be provided for in advance, by specifying conduit for telephone wires within walls and floors.

That conduit permits the owner to have telephone outlets wherever he wants them. He can change them or add to them as occasion demands. And he can enjoy the improved appearance and protection against service interruption that come from concealed wiring.

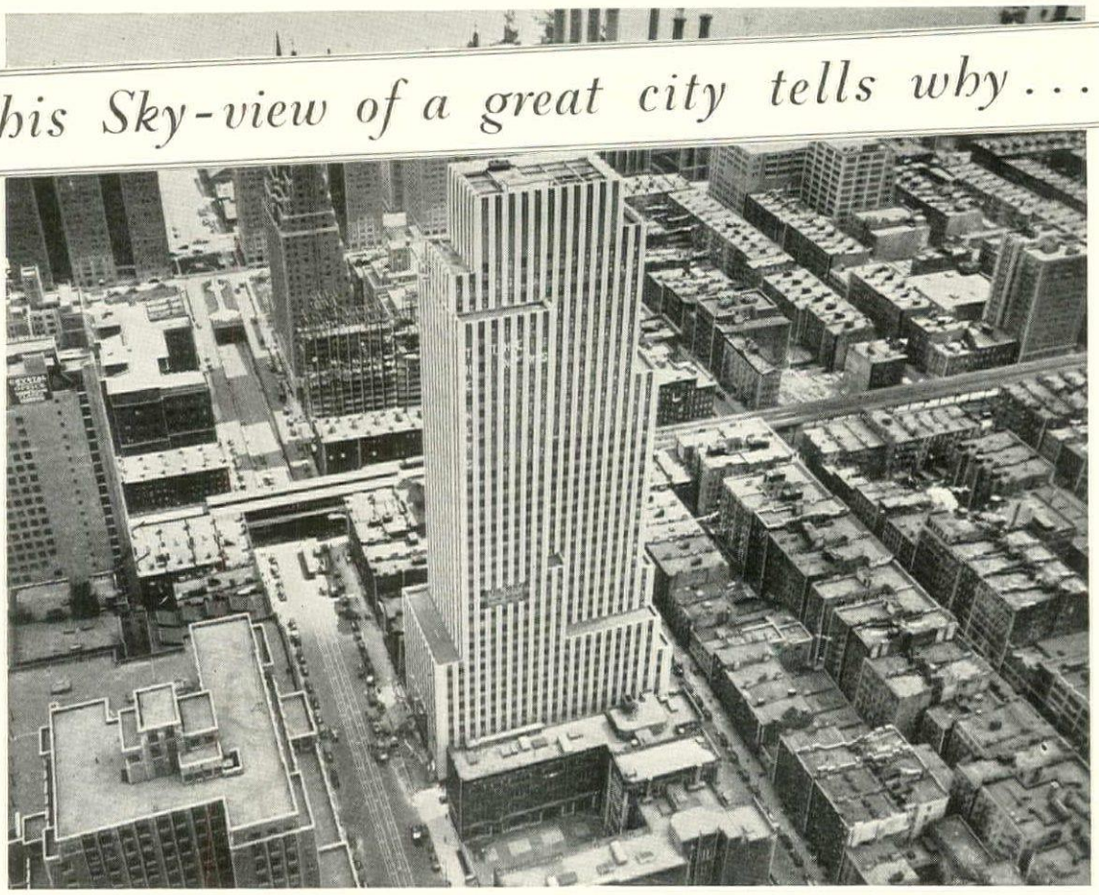
Your local telephone company will gladly assist you in planning the telephone arrangements for any of your projects. There is no charge whatever. Just call the Business Office.

Eight telephone outlets, including one in the basement, and an intercommunicating system, provide suitable telephone convenience in the residence of Mr. Henry P. Williams, 180 Provencal Road, Village of Grosse Pointe Farms, Michigan, as shown above. HUGH T. KEYES, Detroit, *Architect.*

LEGEND
TELEPHONE OUTLET
CONDUIT
PROTECTOR CABINET
PULL BOX

AMERICAN TELEPHONE & TELEGRAPH CO AND ASSOCIATED COMPANIES
BELL SYSTEM

This Sky-view of a great city tells why . . .



Roofs require at least 1″-thick INSULATION

Armstrong's Temlok, the new, low-cost, efficient fibre board, provides for these roofs . . . and the "other roofs," too

AN air-plane view of a city reveals a great variety of roofs. Under normal conditions, most of these roofs require insulation that is at least one solid-inch thick. To provide comfort and fuel-saving, Armstrong's Temlok is made in a solid-inch thickness. The Armstrong Cork & Insulation Company recommends this thickness, in one layer.

Perhaps, however, the architect, in specifying 1″-thick roof insulation, prefers two layers of half-inch material, or an inch of insulation in laminated form. Armstrong's Temlok, fabricated from the heartwood of Southern pine, can meet this demand, too. And there is no lessening of quality, for Temlok, now made available in both solid-inch and half-inch thicknesses, provides efficient fibre board insulation at low cost.

This range of thickness adds another advantage to the many features of Armstrong's Temlok. It is priced within the range of other fibre insulations. It has low conductivity—.32 B. t. u. per sq. ft. per inch thickness, per degree Fahrenheit temperature difference, per hour, at 60 degrees mean temperature. Temlok has low moisture absorption. It provides a strong, secure base for roofing. Armstrong's Temlok is supplied for roof insulation in boards 22″ x 47″. It is convenient to handle and easily sawed.

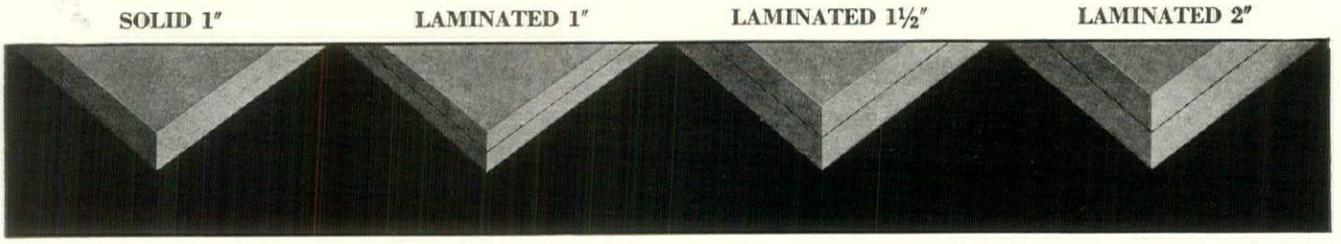
We will gladly send you samples and complete information. Armstrong Cork & Insulation Co., 900 Concord St., Lancaster, Pa.

Armstrong's (A) Product

Armstrong's Temlok

Low-cost, Efficient Insulation for Roofs

SOLID 1″ LAMINATED 1″ LAMINATED 1½″ LAMINATED 2″



THE
ARCHITECTURAL
FORUM

VOL. LIV, No. 2 FEBRUARY, 1931

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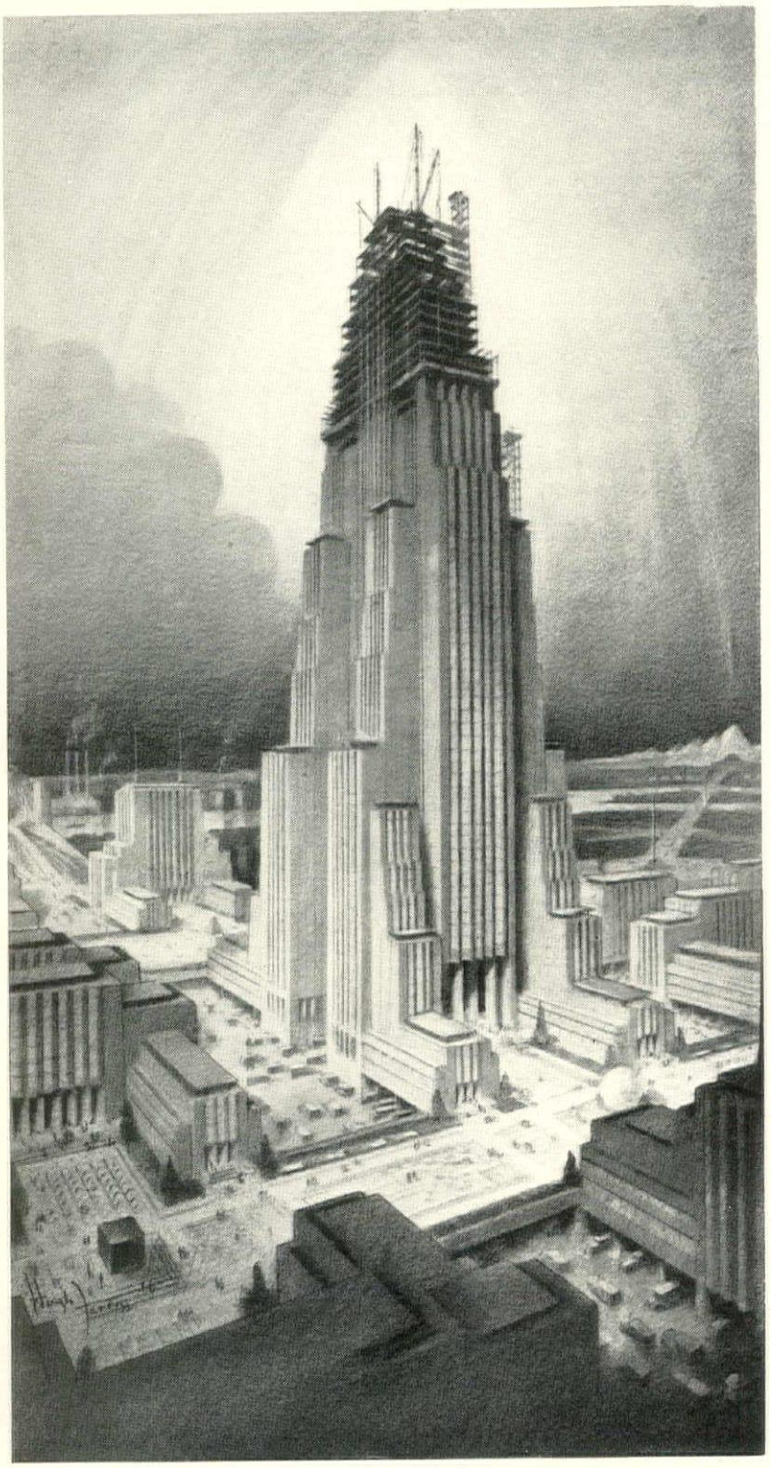
STRUCTURAL STEEL CREATED THE SKYSCRAPER

STEEL SOON BEARS RIPE PROFITS

THE "cloud-touchers" are steel! Every one knows that now. Knows, too, that the higher spires and more daring spans to come must be steel. Of greater significance is a growing recognition of this fact: The humble building at a skyscraper's base, or the modest bridge astride a rural stream, is ready sooner, serves better and lasts longer when this matchless metal is used.

For steel brings the same speed and economy in construction, the same predetermined strength and security to homes, schools, and small as well as large apartment and mercantile houses, factories and bridges. It comes to a building site ready to go into place. Heat or cold, rain or snow cannot affect it. It is permanent, fire-resistive, cannot shrink. It may be quickly erected wherever and whenever men can work.

Before building anything, find out what steel can do for you. The Institute serves as a clearing house for technical and economic information on steel construction, and offers full and free co-operation in the use of such data to architects, engineers and all others interested.



"MUNICIPAL CENTER FOR CITY OF MEDIUM SIZE." AN ENLARGEMENT OF THIS DESIGN BY HUGH FERRISS, ON SPECIAL STOCK FOR FRAMING, WILL BE MAILED WITHOUT CHARGE TO ANY ARCHITECT, ENGINEER OR BUSINESS EXECUTIVE.

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AMERICAN INSTITUTE OF STEEL CONSTRUCTION

STEEL INSURES STRENGTH AND SECURITY

Chicago Comm. Photo

SPIDERWEB STEEL OF DOME,

ADLER PLANETARIUM, CHICAGO

ERNEST A. GRUNSFELD, JR., ARCHITECT

The white rings are the wooden strips to which the fabric is attached, and the dark lines are ribs of the steel frame from which they are suspended. The angular lines near the center are pipe coils and the broad dark strip is the boiler flue. The picture was taken looking directly up.

THE
ARCHITECTURAL
FORUM

VOLUME LIV NUMBER TWO

FEBRUARY 1931

THE CONSTRUCTION AND EQUIPMENT OF THE ADLER PLANETARIUM

ERNEST A. GRUNSFELD, JR.
ARCHITECT

COMPOSITE piles made of wood and concrete were used in the foundations of the Adler Planetarium and Astronomical Museum, Grant Park, Chicago. Made land, on which the structure is located, extends from the bed of the lake elevation,—16′ 0″, considering lake level as datum,—to the terrace about the building. Sixty-foot wooden piles penetrate the original bed of the lake 44′ 0″, above which from datum the concrete piles extend to the foundations below the basement floor at elevation + 19′ 0″. The general level of the terrace about the building is + 30′ 9″.

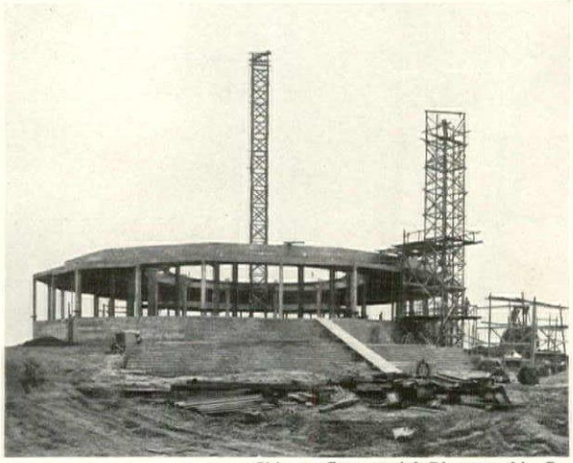
STRUCTURE AND DOMES

All of the structural frame, except the dome, the exterior walls to the first floor level, the first floor and roofs, is made of reinforced concrete. The floors and roofs are of the beam and girder type, some of which are complicated by the unusual shape of the building and other special requirements. The construction of the outer and inner domes are the principal structural items of interest. The hemispherical outer domes of some European planetaria are made of a very thin shell of reinforced concrete in which a network of small rods, so placed as to make a triangular mesh, is used for the reinforcing, which is embedded in gunite by the use of a cement gun. The result is a very thin, dense shell from 2″ to 3″ thick. This type of construction will be discussed and illustrated in a forthcoming issue of THE ARCHITECTURAL FORUM.

The outer dome of the Adler Planetarium is of structural steel, having 24 steel ribs formed to an outer radius of 40′ 7″. A 10′ 0″ diameter ring made of a 12″ channel is placed at the top of the dome to form an opening for the smoke stack and for other purposes. The ribs are 12½″ deep, made of four 2½ x 2½ x 5/16″ angles and 2 x ¼″ lacing bars. They are approximately 59′ 0″ long, spaced about 10′ 8″ apart at the bottom and 1′ 4″ at the top. Twelve of the ribs are supported on steel columns, the 12 intermediate ribs being supported on 18″ I beams attached to the tops of the columns. The ribs are held laterally by straight horizontal struts, five made of two angles and one of a single angle. Diagonal bracing is used where required.

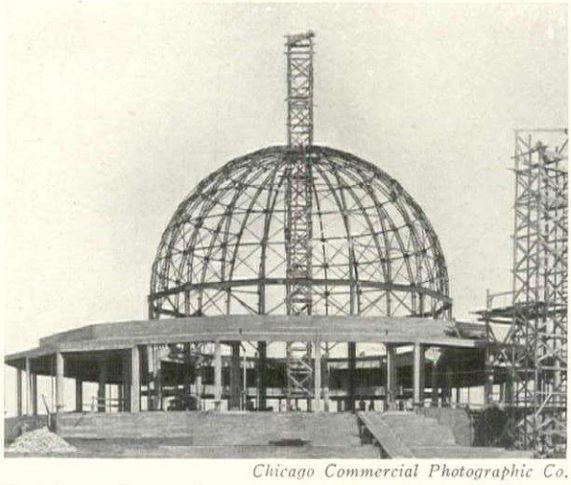
To facilitate the erection of these ribs, a wood framed tower was erected on the first floor in the center of the building. The tower extended up through the center and above the top of the dome and was held in position by guy lines. A derrick boom was attached to the side of the tower and operated through sheaves placed on a crosshead located at the top of the tower. All of the structural steel framing was erected with this derrick. The dome was covered with 1″ precast Haydite tiles made by the Federal Cement Tile Company. These tiles were supported by and fastened to horizontal rings of tee irons bolted to the top flanges of the dome ribs. The

The general design of the Adler Planetarium is discussed in Part One of this issue.



Chicago Commercial Photographic Co.

Concrete construction completed and tower for steelwork in place



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Steel frame of outer dome completed, ready for inner frame

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Installing lightweight concrete tiles, calked with elastic cement

joints between the tiles were calked with elastic cement and the tiles mopped with a heavy coat of asphalt on which a 2″ cork board covering was placed. Horizontal wood nailing strips were fastened to the cork, to which the copper roof covering was attached. The cork insulation was used to prevent condensation on the under side of the dome and thus protect the cloth inner dome from being disfigured and damaged.

INNER DOME

The inner dome, on which are projected by the Zeiss Planetarium Projector the 9,000 stars that are visible to the naked eye, is made of a square-woven cotton sheeting finished with a minimum of starch. Echoes of the lecturer's voice or of music are prevented by using the fabric which permits sounds to pass through it into the space enclosed by the outer dome. In European constructions made with smooth, dense concrete outer domes, it is necessary to suspend thin sheet-iron sound-deflector plates which are intentionally disarranged so that they reflect the sound waves penetrating the fabric with little loss of intensity, in random directions so that sound foci cannot be formed. It was not necessary to use these sound-deflector plates in the Adler Planetarium because the Haydite concrete tiles are of a different character from the gunite material used in the European planetaria, and the steel latticed ribs, purlins, lateral bracing and suspension rods for the inner dome serve to break up the sound waves and prevent the formation of echoes.

The inner dome is supported by light steel hangers, which can be accurately adjusted for length. On the lower ends of these hangers are bolted horizontal angle iron rings. Attached to and between these horizontal rings are steel bars radiating from the top of the dome, similar to the parallels of longitude on a globe, which are punched about 19″ on centers. The surface of the fabric is 12″ from the center line of these radial bars. Supports for the fabric are made of 1″ x ⅛″ bars crimped to prevent twisting. One end of these bars is bent to house the radial bars before mentioned and bolted thereto, the housing holding it firmly in position; the other end is bent at right angles and punched with two bolt holes. To this end is bolted a 1″ x 1¼″ wooden strip bent to form a horizontal ring encircling the dome and to it is nailed a corresponding ¾″ x 1¼″ wooden strip. The cotton fabric is cut in strips about 22″ wide, the edges of which are turned in between the two wooden strips and held firmly in place. These short, crimped steel arms are radial to the center of the hemisphere. The whole arrangement provides true horizontal cir-

cular supports and eventually reduces the chords in the opposite direction to a minimum, so that the fabric very closely approximates a true hemisphere. The steel frame work was arranged to support scaffolding while cloth was being placed in position.

HEATING AND VENTILATION

The heating and ventilating of the Adler Planetarium is divided into several parts. Provisions are made to maintain a sufficient air pressure in the entrance vestibule to prevent the inrush of outdoor air. The entrance foyer and the two cloak rooms are supplied by warm fresh air through ceiling outlets with exhausts in the lower portion of the wall surrounding the Planetarium Chamber. The North and South Exhibit Halls are heated and ventilated in the same manner. Six air changes per hour are furnished in these portions of the building. The Planetarium Chamber has eight fresh air outlets on the south side and eight exhaust outlets on the north side, which are placed about 5′ 0″ above the floor. The fresh air supply capacity is 10,000 cubic feet per minute and the exhaust capacity is 9,000 cubic feet per minute. The library and lecture room have both direct radiation and fresh air supply and exhaust. The executive offices are heated by direct radiation. Four large seven-pipe steam coils are placed about the top of the outer dome and cast iron radiators at the spring line to prevent condensation on its inner surface.

The fresh air inlet is located on the eastern or lake side of the building, being farthest from possible sources of dust. The exhaust outlet is located on the western or city side of the building. The fresh air is washed and further cleansed by passing viscous air filters, because the presence of dust in the fresh air supply would quickly disfigure the white fabric inner dome of the Planetarium Chamber. The vacuum steam system is thermostatically controlled, and fuel oil is used for generating steam.

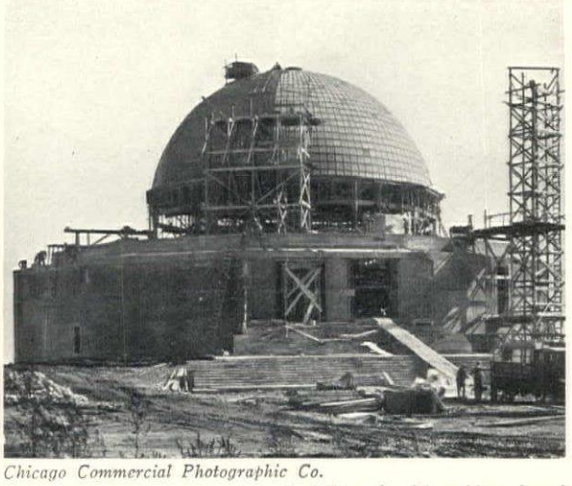
LIGHTING

An emergency system of lighting is provided, operated by remote control at the main entrance or by an automatic control if the normal source of service should fail. The full connected load can be carried by the emergency batteries for a 60-minute period, which would supply ample light for the orderly evacuation of the building.

The Adler Planetarium was designed by Ernest A. Grunsfeld, Jr., architect. Lieberman & Hein were retained as structural engineers, and Martin C. Schwab as consulting engineer for heating, ventilating, electric work and plumbing. The B-W Construction Company was general contractor for the building.

Kaufman & Fabry

Lightweight insulating tiles made to pattern to insure hemisphere



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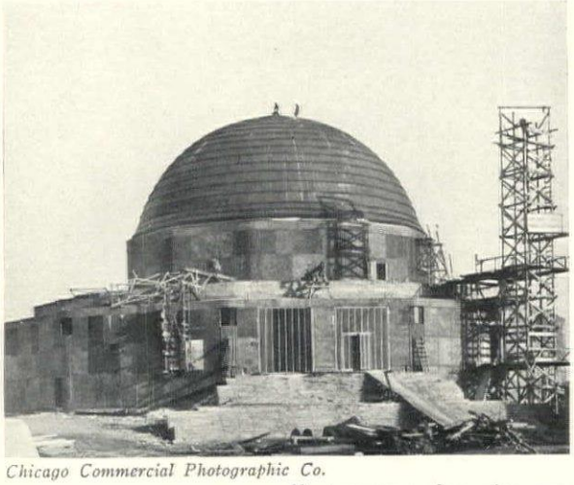
Installing the 2″ corkboard and mopping it well with asphalt



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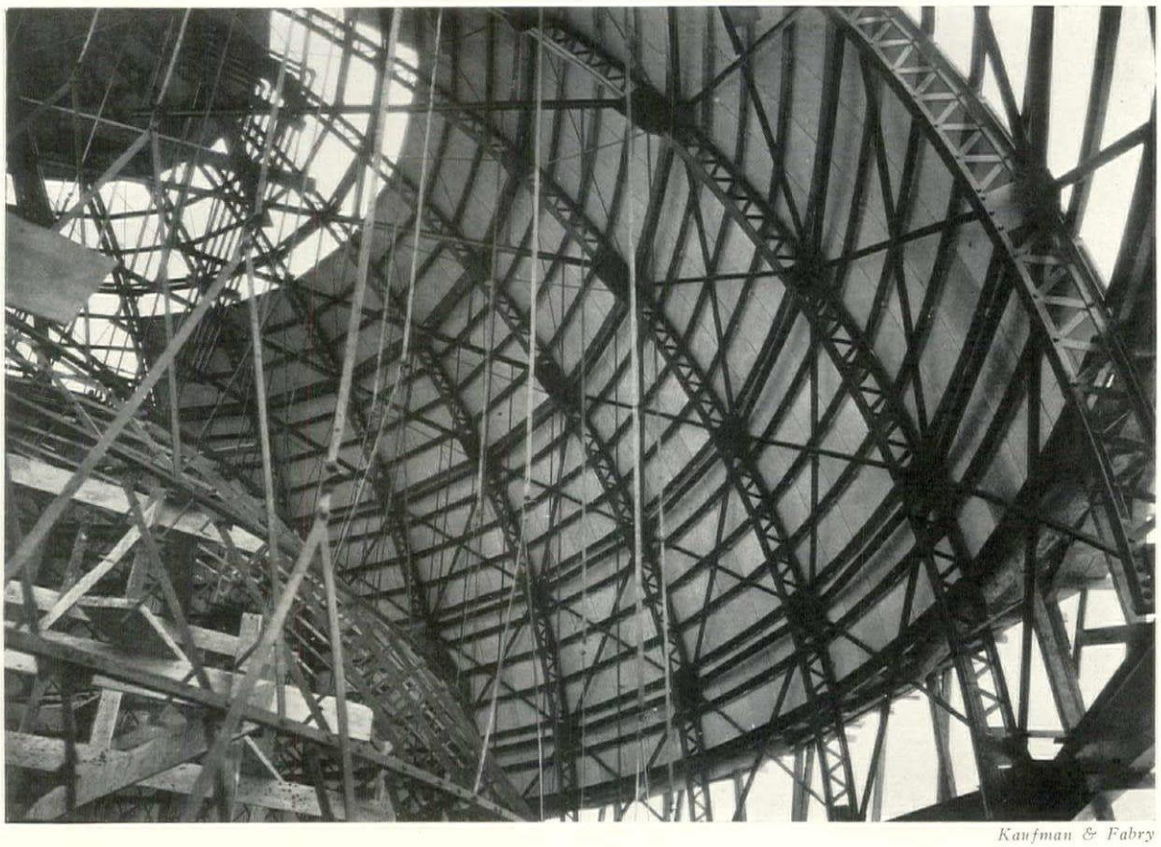
Sheet copper roof covering completed, attached to wood strips

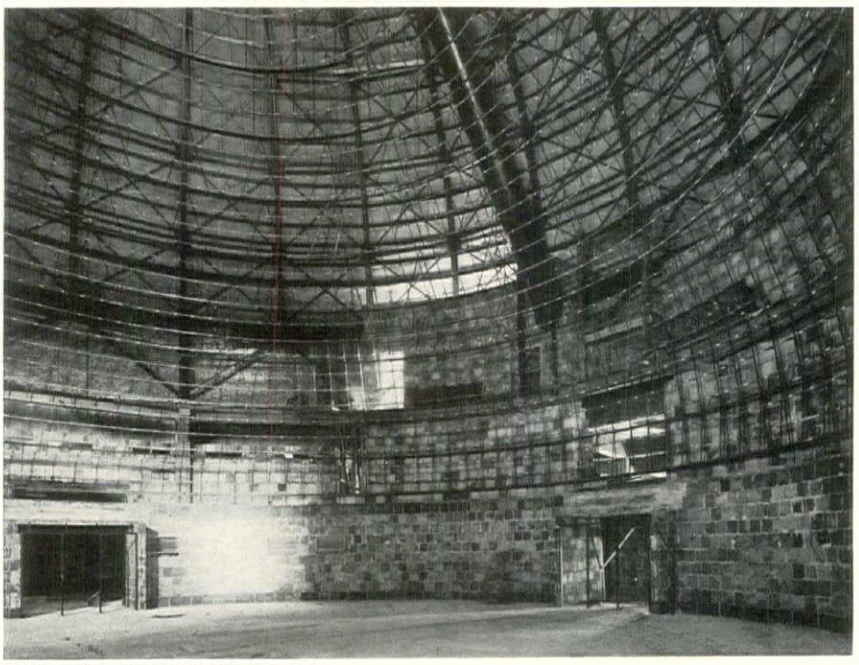


Kaufman & Fabry

FRAMEWORK OF DOMES

ADLER PLANETARIUM, CHICAGO
ERNEST A. GRUNSFELD, JR., ARCHITECT

Suspension bars attached to the steel frame of the outer dome support the horizontal steel rings, to which is attached the framework of inner dome. Steam coils installed at top of the dome



Chicago Commercial Photographic Co.

Horizontal wooden rings installed ready to receive the cloth lining of the inner dome, back of which are located the smokestack and the cast iron radiators at the base of the outer dome

THE EMPIRE STATE BUILDING

SHREVE, LAMB & HARMON, ARCHITECTS

IX. THE MOORING MAST

BY

IRWIN CLAVAN

OF THE OFFICE OF

SHREVE, LAMB & HARMON

THE proposal to provide at the top of the Empire State Building a mooring mast for lighter-than-air craft, first considered by the owners early in the designing of the structure, at once raised the question of practicability. From the beginning, the project has been dealt with entirely on this basis. Technically equipped engineers were called in, authorities in this country and abroad were consulted, private and official agencies were asked to advise, and from all this inquiry a preliminary plan was set up. The mooring mast was to extend not less than 200 feet above the roof of the building's structure; it was to have form and strength sufficient to withstand a horizontal pull of 50 tons at its head, and was to be constructed over such an area and in such manner that stresses resulting from that load and from wind pressures would be transmitted through the building to its foundations nearly 1,100 feet below the base of the mooring mast.

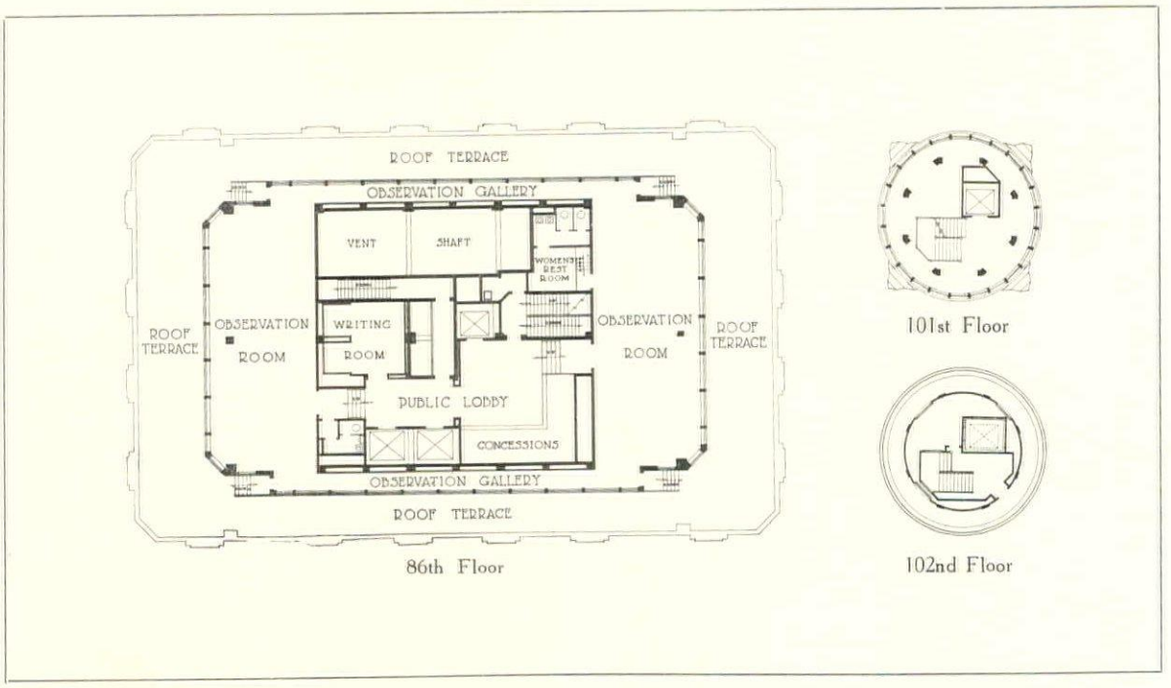
While these fundamental requirements were being met, the owners and architects studied the equipment and mooring operations at the Naval Air Station at Lakehurst, N. J., and the St. Hubert Air Field at Montreal. It was found that the equipment used at the St. Hubert Field, which in turn is patterned after that at Cardington, England, was the more suited to the problem on Empire State. Therefore, insofar as possible, every provision for the installation of that type of equipment has been made, with the essential difference that the ground level of the tower of St. Hubert corresponds to the 86th floor level of the Empire State Building.

From this essential condition arose two sets of influences which have affected the further design of the structure. On the one hand there is the fact that the as yet unsolved problems of mooring air ships to a fixed mast at such a height make it desirable to postpone to a later date the final installation of the landing gear. On the other hand, the location and height of the building itself and the arrangement and equipment of the mast invite the development of certain spaces for use as points of observation, accessible to the public for that purpose without destroying their usefulness or modifying their design as elements of a station for aërial passenger traffic.

Knickerbocker

View from the South
Empire State Building

The housing of this dual function in a form constituting the terminal motive of the great shaft of the building itself presented a problem in design quite unprecedented. The requirement that the frame, the envelope and the equipment must be devised and placed in accordance with the limi-



tations of the building code of New York, in addition to the necessity of providing for the mechanicals of the building centering up above the main roof, further affects the expression of the architectural forms. It is from all of these influences that the observation tower-mooring mast, as it is now being erected, has been derived.

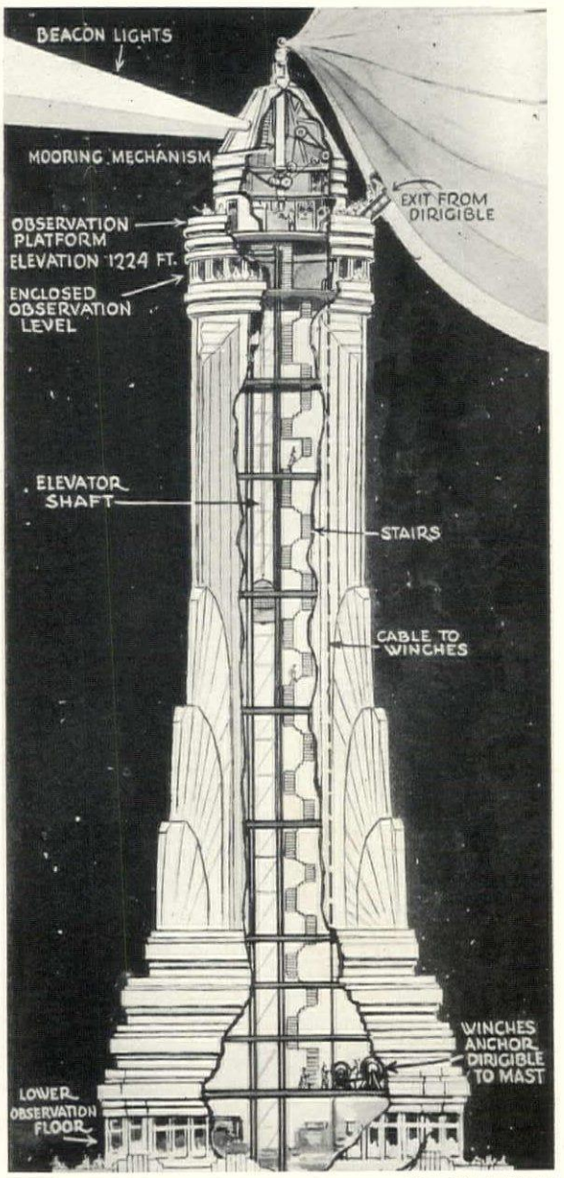
The main roof of the building, 87 feet by 139 feet in area, is reached by taking any one of ten elevators at the ground floor and transferring to either one of two at the 80th floor. These elevators open at the 86th floor to a public lobby, approximately 25 feet square, opening both on the east and west to observation rooms set back from the main wall of the building below. These observation rooms are 24 feet wide and 55 feet long, completely enclosed in glass with the floor raised to such height that there are no obstructions to the view. Connecting with these rooms on the north and south are two observation galleries treated in a similar manner and each measuring 4 feet by 77 feet. The observation rooms and the observation galleries form a complete perimeter of glass-enclosed spaces, raised above the roof and parapet walls of the building. Between the outer walls and the observation rooms and galleries, and below them, are the roof terraces. From the public lobby, an elevator and a stairway rise 167 feet to the upper observation floor level. Here the elevator opens into and is part of a circular room 33 feet in diameter. Glass and metal walls, with a solid metal protection to a height of 3½ feet, form the exterior walls of the tower and permit an unobstructed view. Above this room is the observation platform, reached by an open-rail stairway whose upper landing is 1,224 feet above Fifth Avenue. This is a circular room 25 feet in diameter. Like the observation floor just below it, this room is finished in chrome steel with the forms of the structural steel frame made a part of the design. Extending around this room and reached from it is an open circular platform 4 feet in width protected by a closed rail 4 feet high and sufficient in area to accommodate 40 people at one time. What a view of New York and its environs will be had here! And the word "environs" in this instance takes in a wide range of territory, for on a clear day with a powerful pair of field glasses one may see the stately buildings of Princeton University 48 miles to the southwest, possibly even beyond to Trenton and the Pennsylvania state line at the Delaware River; to the west Delaware Water Gap; and to the north, West Point and Storm King Mountain will fall within range; up Long Island Sound Bridgeport's factories will dot the horizon, while European steamers will cut the skyline two hours from New York's harbor.

It is on this upper observation platform that passengers from air-craft will be landed when the original purpose for which the tower-mast was built has been realized. For a height of 26 feet above this level there is a cylindrical structure 25 feet in diameter, surmounted by a conical form designed for the installation of portions of the equipment used in mooring operations. Below this level and down to level DD (see illustration) an enclosing shaft of metal and glass, 35 feet on each side, forms the transition between the circular landing top and the rectangular housing

base between DD and the main roof. This portion of the tower-mast from level 1092 to its topmost point, 1,250 feet above the street, has no functions other than those of the mooring-mast proper; it is designed to permit passengers to disembark at the observation platform, which will be known as the 102nd floor (at level 1224), walk down the short stairway to the observation floor or the 101st floor (at level 1212) and take an elevator to the 85th floor. Here provision has been made to permit the installation of waiting and baggage rooms, ticket offices and customs offices.

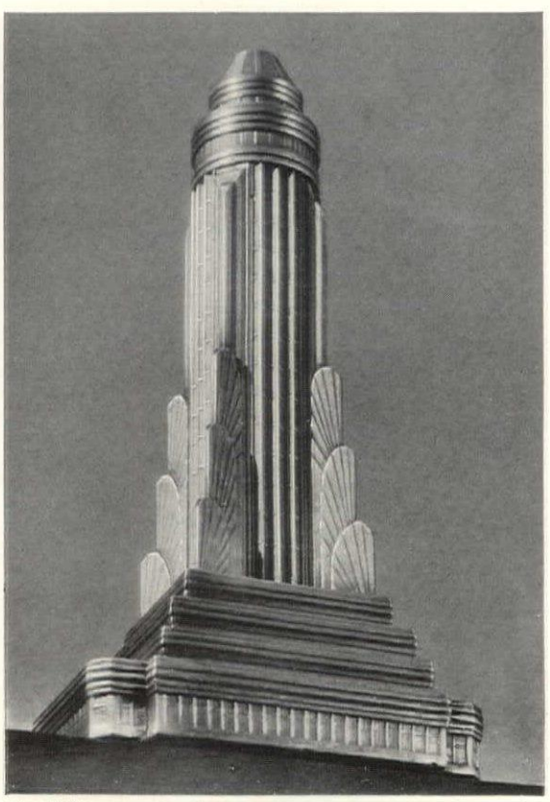
All necessary provision has been made as well for the mooring machinery, the "mooring arm" which will be housed under the conical roof at the top, and the winches and control machinery at the base of the tower, levels AA and BB. These levels also provide space for stairways and elevator equipment and for various types of mechanical equipment. Above those levels is a large "plenum chamber,"—level CC,—into which and from which all the air of the ventilated spaces of the building below is dumped, the air having been forced to this level by means of powerful fans located on the 84th floor.

No occupied spaces exist in the shaft above the ventilation equipment and below the observation floor. This section of the tower contains the necessary pipe shaft, elevator shaft and stairway with an iron platform every 21 feet in height for the



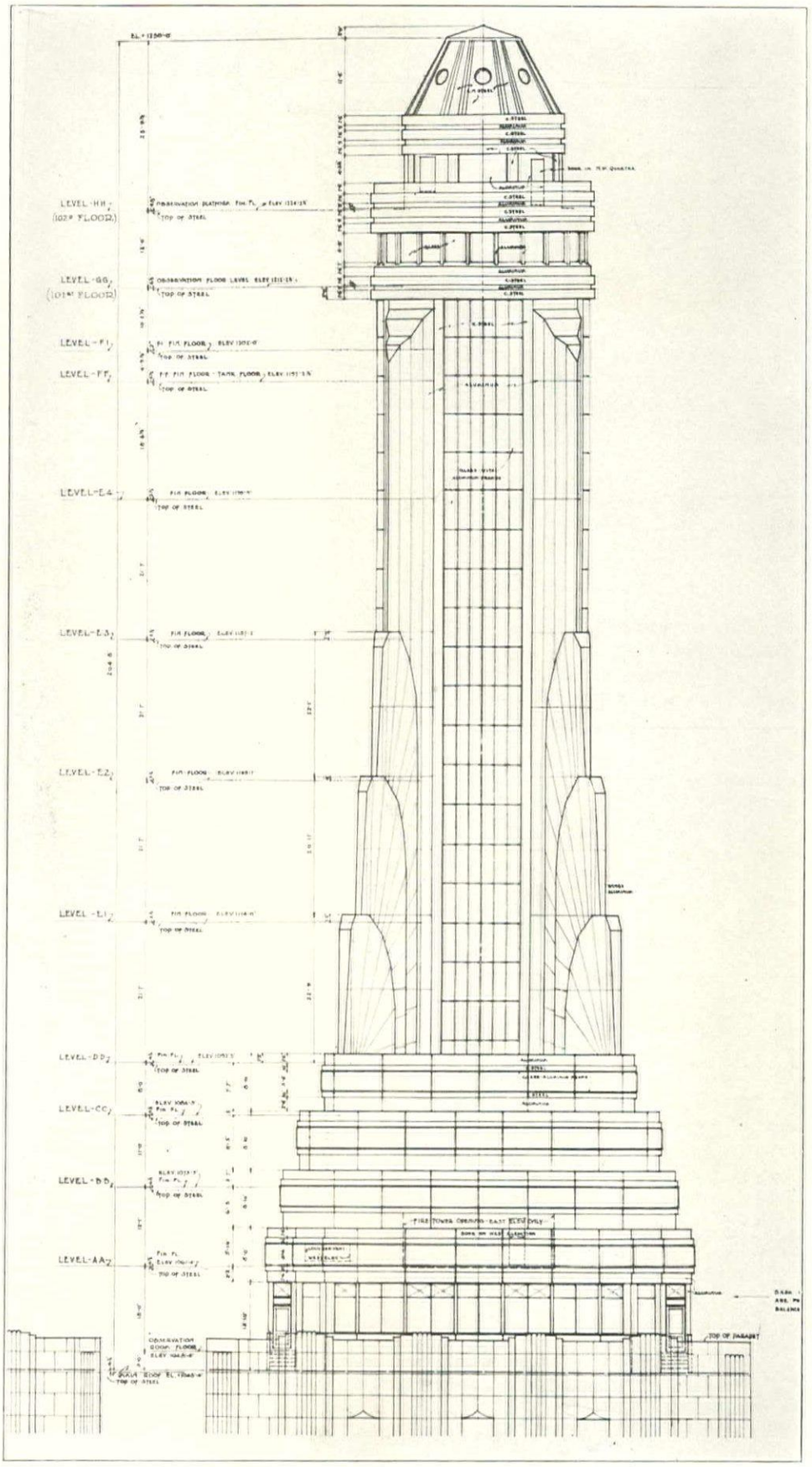
New York World

Artist's conception of the activities to be carried on in the mooring mast when the present plans for dirigible accommodations are complete



Van Anda

Metal-covered model of the mooring mast, showing its monumental character. The exterior is composed of aluminum, chrome-nickel steel and glass



Elevation of the dirigible mast, from the first observation level to the peak, the total height of which is 1,250 feet

proper maintenance of equipment for night illumination.

A novel scheme of night illumination has been adopted. At levels AA, BB, CC and DD there will be horizontal bands of light each 3 feet high and encircling the complete perimeter of those areas. Above these, four vertical strips of light 12 feet wide and 160 feet high will reveal themselves through the illumination through the glass areas forming the middle section of each side of the shaft. Surmounting these is the circular wall of light emanating from the observation platform level, and crowning the whole will be eight powerful "pencils" of light shooting from portholes in the conical form at the very top.

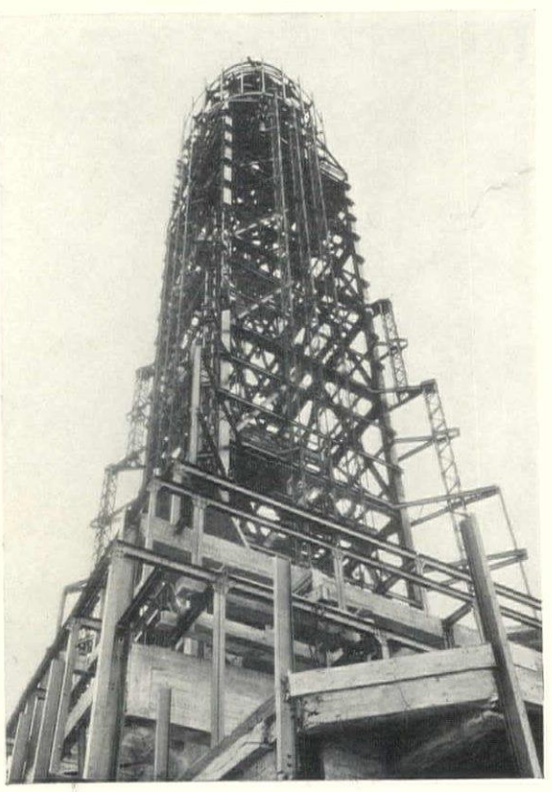
The structural problems involved a number of unusual conditions. The tower and its equipment have a dead weight of 1,050 tons, the steel alone weighing 600 tons; the horizontal pull of the ship was figured in this case at 50 tons, although no ship has yet been built which, under the most extreme conditions, has exerted a pull of over 17 tons. The wind pressure against the surfaces of the tower was assumed at a maximum of 30 pounds per square foot of surface on the exposed face. All of these loads, dead weight, ship pull and wind, had to be carried down through the 1,045-foot height of the building structure, which required the installation of 200 additional tons of steel in the form of heavier column sections and heavier wind-bracing members in the structural steel frame below the tower.

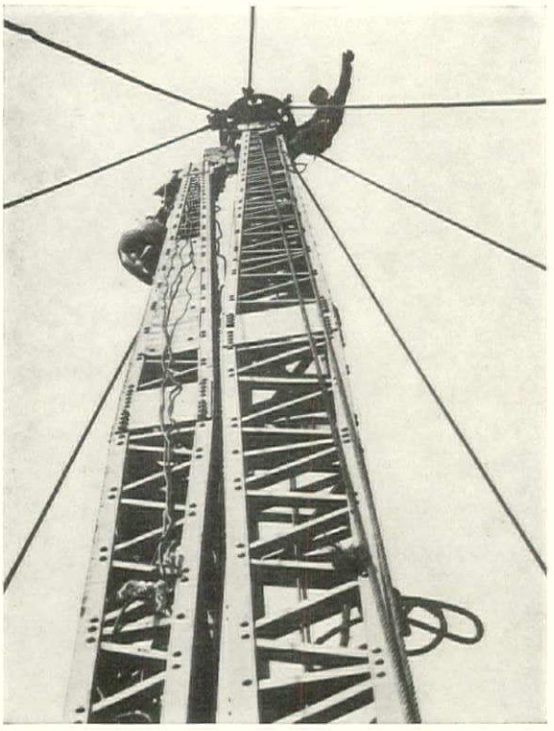
An effort has been made to meet one other possible structural problem. Provision has been made for a possible method of hauling the guide cables used in mooring, similar to those used on the S.S. *Patoka* to which the Los Angeles has already been moored. For this purpose the exterior wall columns have been carried above the main roof level and designed so that there may be anchored to them 100-foot booms, serving the same purpose as the fairleads and snatch-blocks in use in the landing fields with the present type of mooring mast.

None of this complication of use and design will be apparent in the structure when it comes from the hands of the designers and builders. The steel frame will be enclosed in metal and glass, forming a unit approximately equal to a 20-story building rising 205 feet above its support already 1,045 feet above the street. Rolled steel of a chrome-nickel alloy with cast aluminum winged buttresses will frame the windowed base, shaft and head, and present a gleaming surface to the sky. Within, for the present, all the world may visit, gaze, rest and eat,—and drop souvenir postal cards to the "sidewalks of New York" through a mail chute nearly a quarter of a mile high.

Nearing completion of the steel frame. Workmen on the 102nd floor, seen from the derrick

Looking up from the 86th floor after the steel frame of the tower-mast had been erected





ELEVATION— 1250 FEET

Post & McCord's ironworkers raising the derrick for the last time on the Empire State Building

Hine

THE DUAL ELEVATOR HAS COME

BY
A. T. NORTH

WHAT IT MEANS

The Development of the Dual Elevator is One of the Most Important Single Achievements That has Taken Place in the Building Industry Since the First Use of Steel as a Framing Material. Its Common Employment Means: 1. The Material Decrease of Building Service Areas with a Consequent Increase in Rentable Floor Area. 2. A Great Addition to the Economic Height, with a Greater Capacity, Speed and Efficiency of Service

AMERICAN engineers have always possessed the faculty for providing adequate means for satisfying every structural and mechanical requirement. Structural engineers have made possible the increasing heights of steel frame buildings, which are made usable and profitable by the elevatoring engineers. The progressive development of these two types of engineering has been concurrent. The limit of profitable building heights had been reached, however, because the area of the elevator shafts had become disproportionate to the rentable floor space due to elevator limitations. The height limitations of steel construction have not been reached and it became incumbent on the elevatoring engineer to reduce if possible, or not increase, the space used for elevator shafts and at the same time provide adequate elevator service. Obviously, it was necessary to increase the capacity of the elevator shaft. The challenge was accepted and the elevatoring engineers have produced, after several years of intensive development effort, the dual elevator. This type has been installed, successfully operated and tested in the new 11-story office building of the Westinghouse Electric and Manufacturing Company at East Pittsburgh, Pennsylvania.

THE development of the elevator has been signalized by many epochal improvements made to increase safety and speed. It is apparent, however, that the dual elevator is, perhaps, the most important development ever made in elevatoring because of its great economic value. In buildings of sufficient height the area of the normal elevator shafts can be reduced 50 per cent and the area of rentable floor space increased materially; also three cars can be operated independently in one shaft and the area of the normal elevator shafts reduced 66 per cent.

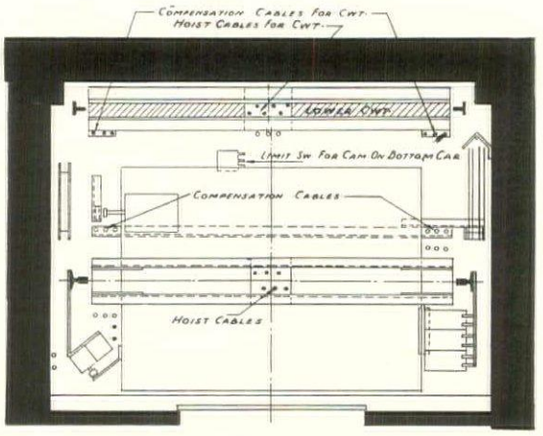
The dual elevator consists of two elevator cars, one above the other, operated independently in the same shaft. The top car is to be used as an express elevator, traveling without making stops until midway of the building height and from there traveling to the top as a local. The bottom car is operated as a local elevator, making all stops to the midway floor. When the cars begin to descend they make the same stops as when ascending.

THE dual elevator apparatus is so devised that the two cars are prevented automatically from traveling in opposite directions. Another safety precaution is provided in the automatic stopping of one car at the floor level when it comes within two floors of the other car. This is similar to the automatic block systems used in subways. Other automatic safety devices are used to prevent rear end collisions and to stop the cars when any part of the control equipment or the cables break.

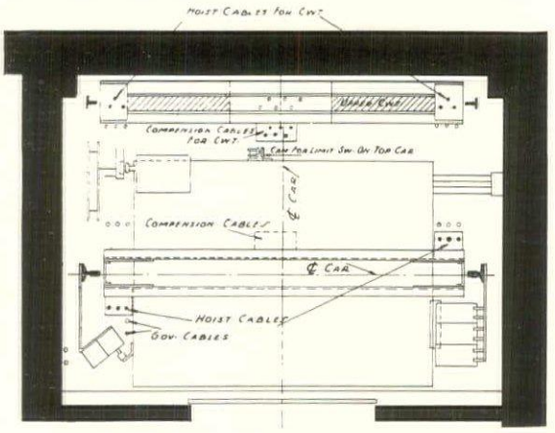
Automatic push button control of the standard type is provided for each car and at each floor. The exact position of one car is indicated in the other car for the guidance of the operator and the information of the passengers.

Aluminum was used wherever the reduced weight improved operation. The car sling and platform framing are made of that metal. The saving in weight reduces the power consumption and the stresses in the equipment and supporting structure. The decreased effort required for stopping the lightweight car is an important safety consideration and should be given serious attention on all elevator installations.

The dual elevator materially increases the economic height of buildings by maintaining the correct proportion of elevator area to the rentable area. Its installation in many existing buildings will increase rentable area and thereby reduce the factor of obsolescence. The technique of determining the nature and extent of elevator requirements will not change materially. There will be changes made in plan arrangements.

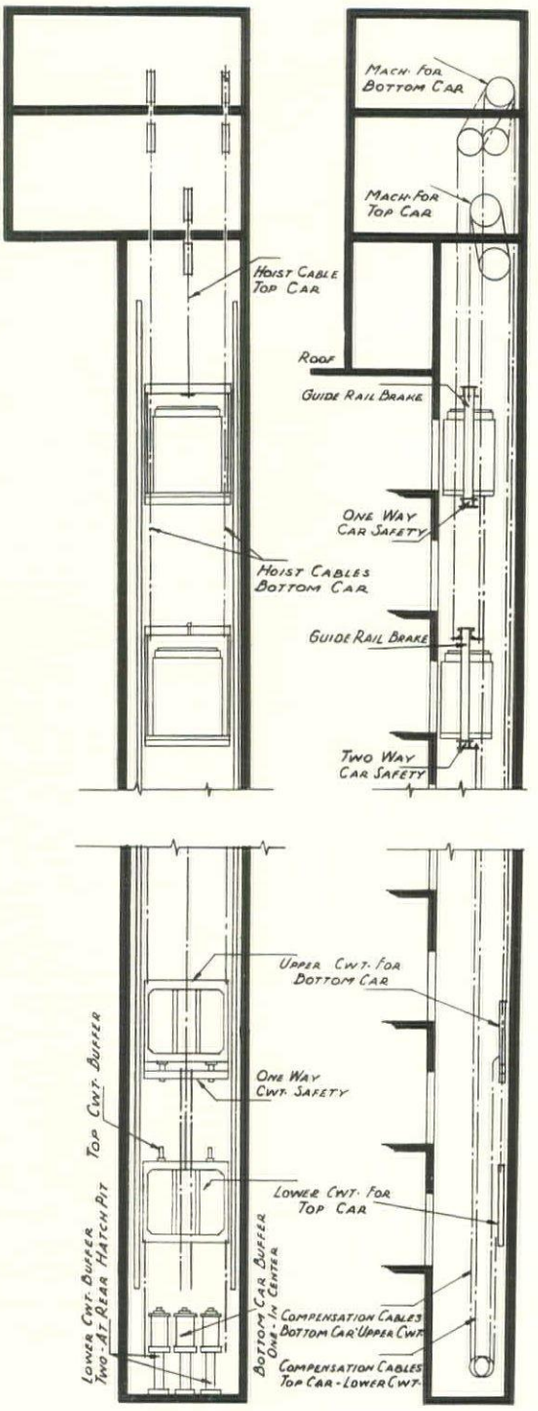


Plan of Shaft and Top Car. The Hoisting Cables are in the Center of the Shaft and the Compensation Cables are on Either Side of the Car



Plan of Shaft and Bottom Car. The Hoisting Cables are at Either Side of the Car and the Compensation Cables for the Counterweight are in the Center

THE hoisting cables for the bottom car lead down each side of the top car and are attached to the cross beam of the bottom car at either end on opposite sides of the center line passing through the guide rails. The other ends of these hoisting cables are attached to the outer ends of the top counterweight. The top car hoisting cables are attached at the top center and lead to the bottom counterweight through a slot in the upper counterweight. The two counterweights travel between the same guide rails which are approximately the same distance apart as the car guide rails. Compensating cables from the bottom car are attached to the top counterweight. The compensating cables from the top car pass down either side of the bottom car and attach to the ends of the bottom counterweight. Of necessity, the loading and unloading of the two cars at the bottom of the building is made at two levels slightly above and below the grade level.



Sectional Diagrams of Shaft with the Dual Elevator. The Upper Drawing Shows the Arrangement of the Two Cars, and the Lower Indicates the System of Counterweights. Notice the Cable Rigging. It Permits Independent Action of Either Car in the Same Direction, and Allows Express and Local Service in the Same Shaft. An Automatic Safety Device Stops the Cars Whenever They Approach Each Other Too Closely, Similar in Principle to the Block System in Subway Transportation

THE STANDARD SPECIFICATION

The Recommendations Contained in the Accompanying Article were Formulated as the Result of a Nation-wide Survey, which Included Sixty Representative Architectural Offices and Fifteen Contractors.

BY
HAROLD R. SLEEPER
OF THE OFFICE OF
FREDERICK L. ACKERMAN, ARCHITECT

THE architectural specification serves primarily to convey by written word those ideas of the architect which cannot so readily be explained graphically. Furthermore, it is a legal and business document, and its appearance, clarity and make-up are indications of the architect's technical qualifications, office organization and business ability. Almost all that has been written about the specification has been concerned with the manner of specifying a certain material, apparatus or construction. Little is on record regarding the physical aspects, methods of compilation or arrangement. An examination of the works of our best architects shows clearly that little thought or effort has been expended towards improving these qualities.

The specification form should be readily adaptable to all types of work from the smallest residence to the most complex hotel. It is believed that a standardization of practice will do much toward the achievement of clear and direct documents; that a standard form will facilitate bidding and avoid many later disputes in the field; and that the use of a common method of compliation will promote a closer cooperation between manufacturer and architect. A uniform make-up will save dollars to all members of the building industry, to say nothing of worries, headaches and fights. If architects are to survive in a world which quickly swallows, for its own profit, any profession which cannot move to the tempo of modern business, they must be on the alert to adopt every new, practical measure to increase the efficiency of their offices. An attempt at stadardization has been made in the development of the New York Building Congress Standard Specifications. These printed specifications are for insertion in toto in each individual chapter as Part B, and though they contain no specific advice as to the physical make-up of Part A, they contain many valuable suggestions as to an arrangement and set-up.

With few exceptions, specifications are used in virtually the same way in every architect's office. It therefore seems desirable, from the standpoint of simplified practice, that some standardization in regard to this utilitarian aspect should be made. The individuality now shown benefits neither the architect, builder or client. The answers to the questionaire recently sent out to some sixty architects, scattered throughout the country, and to some fifteen nationally known builders have been taken with fifty typical specifications as the basis for the notes and recommendations that follow.

COVER MATERIAL

Since a cover is used primarily as a protection to the contents within, it should be selected for general durability and resistance to soil, the specific material depending upon the use of the volume. In addition, covers must contain certain descriptive information in regard to the material therein and so serve as a title page.

The survey of present day work showed that architects are using: first, a medium weight paper cover; second, a lightweight paper and third, a heavyweight paper. A few are bound in cloth, and others are devoid of any cover. A few large public jobs are bound in heavy cardboard covered with paper, making a veritable book. The heavy covers offer better protection, do not roll, do not get torn or folded and stay open more easily. Some covers were so badly mutilated that the writing thereon was no longer legible.

The cover for a single chapter has distinctly less work to do than the cover of an entire volume

and each should be considered as a different type of cover. What will serve well for the first may not do for the second.

These uses can again be divided: (1) covers to be used for estimating, (2) covers for use in the office and on the job. Many estimating sets are not used later, and the treatment they receive is very mild. Therefore these covers may be lightweight compared with the cover that stands duty for the duration of the job.

RECOMMENDED STANDARDS

1. Chapters bound individually
   (a) for estimating—paper, medium weight (120 lbs.)
   (b) other uses—cloth, medium weight (linen glazed)
2. All chapters bound in one volume
   (a) for estimating—cloth, medium weight
   (b) other uses—heavy cloth (linen glazed)

If an architect uses both single chapters and one volume, he should keep three types of covers on hand. If he uses only No. 1 or No. 2 he will need only two types of stock.

Contractors are enthusiastic about the cloth covers, although used by a minority of architect's offices now, they do not tear easily and paper fastenings holding the contents seldom rip out of place.

COVER COLOR

There is little tendency towards standardization in color, the preference displayed for colors being in the following sequence: tan, gray, brown, light buff, green, blue, yellow and cream.

Color serves to hide wear and tear, dirt, grease and grime. It may also serve as a mark of identification. The office of Charles E. Klauder uses the college colors of universities when building for them. For example, a Princeton job cover is orange with a black binding. Thus color serves as an index and makes the selection of the desired volume easy and quick. One contractor urges the use of black, while another suggests that a neutral color be used. The architect that can afford to use color may develop a system wherein each color represents a digit: every ten jobs will then have a distinct color, limited, possibly, to the binding edge.

RECOMMENDED STANDARDS

1. For the large office with many jobs of large size:
   Dark gray cover with strip of color on back edge for index purpose.
2. For medium or small office:
   Dark gray cover.

The gray will soil less easily than tan, as it is more neutral in shade. The most satisfactory grays are those having some warmth in them. The preponderance of tan covers seems due to the fact that printers often have large stocks of that material on hand and usually urge its use.

BINDING

The specification should be bound to hold the pages together until it is desired to separate them for subcontractors' bidding. If trade headings are bound separately, the first binding may be permanent. Bindings should not catch in filing, nor should they come undone unless desired. They should be inexpensive, durable, smooth and semi-looseleaf.

Architects are using various methods, most of which are unsatisfactory. Over half of the offices questioned use the paper fastener run through the left side of the volume and bent over on the back. Some use washers front and back; others use a variation of this method, but conceal the fasteners inside of the cover. Others bind the pages at the top. Some specifications, usually for public work, are sewed and bound with glued covers reinforced with linen on the edges.

Fasteners which go entirely through the covers make filing difficult, as the tips of the fasteners catch on hands, papers, and are generally obnoxious. A volume bound at the top has to be held open, and unless it is bent double, requires both hands. If bent double, the cover gets such hard wear that it soon tears at the crease. Sewing and glueing are necessary for some government work, but do not warrant the expense under usual conditions. Separate chapters cannot be given to subcontractors when the specifications are bound in this manner, and in such cases the whole specification is given to each subcontractor, presupposing a printed page and hence a large supply of volumes.

RECOMMENDED STANDARDS

1. For binders' use:
   Into single trades, permanently stapled, with three staples on left-hand edge. Stapling machines may be purchased inexpensively.
2. For office and job:
   Use one volume for mechanical trades and one volume for architectural trades.

The office and job volume should be bound with concealed paper fasteners forming a semi-looseleaf book. Cover must be 4 inches wider than desired with an over-all dimension to allow for the thickness of the contents and to cover the paper fasteners. The covers are made with five folds in the back edge. If the volume is thin, it will be bound between the folds; if thick, one fold may be let out to accommodate the thickness of the book, and the paper fastener will be turned on the back of the book inside of the cover. Paper fasteners should always be used with washers to prevent sheets from being torn.

SIZE

Architects do approach a standard as to size. At least seventy-five percent of the architects

whose specifications have been examined use the 8½" x 11" letter size sheet, yet the legal size page is still being used by some of the best and oldest architectural firms. This size is awkward to handle and inconvenient to use, for it does not fit into the usual filing cabinet, nor will it stand upright on a desk. The printed specification is usually smaller, and some are made to fit into a coat pocket. They are lost however in a filing case and would be more convenient if made letter size. Contractors are generally in favor of the letter sized document.

RECOMMENDED STANDARDS

Letter size with cover ¼-inch larger all around when bound. Cover to have five folds in back requiring 4 inches more in width. This would make the cover over all 21 inches by 11½ inches.

TITLE ON COVER

The secondary use of the cover is to carry the title by which the volume is identified. The survey shows that this is, in general, uniformly done. The word "specification" with the name and address of the architect are found on most covers, and few volumes show in addition a printed index. This is a good idea if cost has no bearing, but should be supplemented with an index inside of the cover for use in case the cover becomes torn or the surface defaced. Owing to its durability, a cloth cover could be used for the index without an additional one inside. Items which are often omitted from the cover are:

(1) The date.
(2) The number of the copy.
(3) Initial of the writer.
(4) The number of the job.

These are important in any office, for they serve as a systematic and quick source of information.

A third of the covers examined were printed. Some twenty percent were partly printed and partly typed.

RECOMMENDED STANDARDS

1. **Name and address of building and owner's name.**
2. **Name and address of architect (engineer's name if mechanical).**
3. **Copy number.**
4. **Job number.**
5. **Date.**
6. **Writer's initials.**
7. **Trade (if individually bound) or architectural trade or mechanical trade, or both.**

A chapter index is recommended when a strong cover is used.

First recommendation for method of reproduction on cover is printing. Second, is a combination of printing the stock parts of the title, and typing or rubber stamping the rest.

The arrangement should give emphasis to the job name and number, as they are the most important items on the cover.

NUMBER OF COPIES

The number of copies that are required have much to do with the selection of the method of reproduction. So before selecting this method a careful estimate of the requirement should be made.

Modern methods of estimating on large work have made necessary the distribution of many sets; this in turn makes it feasible and less expensive to use newer ways of reproduction. It is certain that many architects are spending more than necessary on this item, and in return are receiving poorer results than might be obtained from a cheaper method. From information received, it appears that for large work with an unlimited number of bidders one hundred copies are often required. On large work with a selected list of bidders some fifty copies will suffice. On moderate size work from twenty to thirty copies are used; and, when the work is to be done by a selected contractor on a cost-plus basis, the number of copies may be still further reduced; fifteen or twenty copies may be ample in this case.

RECOMMENDED STANDARDS

1. **Large work, unlimited number of bidders:**
   - **3 copies for each bidder.**
     (Hold others for their use if requested).
   - **1 for owner (often several in corporate or state work).**
   - **2 for architect.**
   - **1 copy for each engineer (if not in architect's organization).**
2. **Medium sized and small work:**
   - **2 or 3 copies for each bidder.**
   - **1 for owner (may require several).**
   - **2 for architect.**
   - **1 for each engineer (if not in architect's organization).**

If the documents are to be filed with some "Report" organization for use of subcontractors, one or two copies will usually be sufficient.

METHOD OF REPRODUCTION

Specifications must be reproduced accurately and legibly, and at a minimum cost. Often the time available for the actual reproduction work is limited, and the ideal method must be sacrificed for speed. Those methods not requiring proof or copy reading are an advantage and should be considered in the ultimate cost. Permanency is a secondary requirement.

The majority of specifications examined were reproduced by the mimeograph machine in black ink. This method requires that a stencil be cut on a special sheet, placed on a machine, and the copies struck off. Mimeographing may be done in the architect's office. It requires careful checking of the stencil before printing; errors are difficult to correct; and if done by an amateur, the results are not always very legible. The ditto machine, or hectograph method, is very popular

in the Central and Western states. Many of the large offices there use their own machines and thereby save money. A special carbon paper makes a copy for this machine at the same time that the original copy of the final specifications is made. In other words, it does not have to be typed especially as does the mimeo stencil. The results are not as readable, however, and far from permanent. Very few public stenographers are equipped to do this work, but, it is cheap once the equipment is installed. The printing of each sheet is slow and requires time and care; about 10 or 15 minutes are required to run off 100 copies of one page. The machines cost from $175 to $225.

About the same number of architects appear to use blueprinting as the ditto method. Few use the so-called black and white print, which is a new process similar to blueprinting, except that the paper is white and the letters dark. This reproduction looks like a Vandyke print, yet it costs little more than a blueprint. Blueprints fade, curl and are not especially legible; black and white prints may curl, but they are very legible and do not fade if well done. Both of these may be secured in record time and are true reproductions, requiring no proof-reading of any sort. The black and white process is so new that as yet it may not be obtainable in all cities.

THE general practice includes a number of specifications printed on a letter press and a few offset photo-lithographic prints. Printing is used only on the largest work when the expense is not important. Offset photo-lithography method is quite modern; it requires no proof-reading and is accurate and legible. Its drawback is that of high cost if a small number of copies are to be made. It is accomplished, briefly, by photographing twelve pages at once onto metal plates, which are then used on an offset press. Both of these methods cut the bulk of the specification in two by allowing printing on both sides of the sheet. Printing requires nearly two weeks to complete, photo-lithography about one week on the average. It costs little more to secure one hundred copies by either of the last two methods than twenty or thirty.

Multigraphing is done by setting up typewriter type by machine. The copy must be proof-read and the method is not superior to photo-lithography.

The photostat copy is expensive, except for a small number of copies. The process furnishes a permanent, exact reproduction which needs no proof-reading. It consists of photographing the copy onto a sheet which is a half negative and which, after developing, may be used as a finished sheet. It is similar to blueprint except that the background is dark brown. This is again photographed onto a white paper which constitutes the final sheet.

RECOMMENDED STANDARDS

For 10 copies—Ozalid print made from carbon backed typed original.
" 20 " —Ozalid print or mimeograph.
" 30 " —Mimeograph.
" 40 " —Offset, photo-lithography—both sides of sheet.
" 50 " —Offset photo-lithography—both sides of sheet.
" 100 " —Offset photo-lithography or printing—both sides of sheet.

PAPER

Papers used are dependent to some extent on the methods of reproduction. Blueprint and black and white and photostat papers are obtainable in 16 and 24 lbs. If lighter weight papers are used they are likely to cut the hand in handling. Besides, the thicker paper is able to hold the sensitive solution better and consequently gives more accurate results. Usually blueprints are secured on the bulky 24-lb. paper unless a special request is made for thin paper.

Paper for both covers and pages come in the following weights as designated by the trade: 13, 16, 20, 24, 32, 60, 120, 240 and 360 lbs. A 32-lb. paper is not necessarily twice as thick as a 16-lb. as the number is a reference to weight and not thickness. The last four weights would be used for covers. The general classifications of paper is as follows:

Name	*Composition*
Coated stock	Bonds with special finish
Bonds	Hair rag in them
Ledger papers	Mixture of "book" and "bond"
Book papers	Made of a better grade of pulp
Newsprint	Low grade of wood pulp

Special blueprint paper—very stiff with sensitive emulsion.

Special photostatic paper—made of pulp and linen—not strong with a sensitive emulsion.

If the letter press method of reproduction is chosen, any paper may be used. The photo-litho method cannot be used on a smooth-coated paper, but any of the others may be employed. The mimeograph can be used on a bond paper, contrary to the usual opinion. It also may be used with the thin blotter-like mimeograph paper.

There seems actually to be little wear on the paper of specifications if a good cover is used. It is desirable to use a smooth paper for ease in turning pages and in making ink corrections.

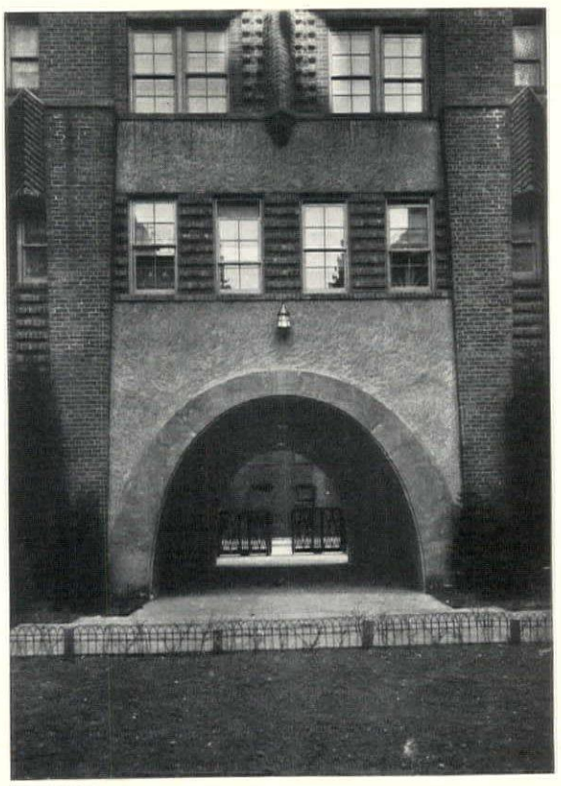
No two papers were found alike in the fifty specifications examined, but the majority were bonds of a cheap grade, usually 16 lbs.

RECOMMENDED STANDARDS

1. For black and white print—16 lb. paper.
2. For letter press coated (smooth)—16 lb. paper.
3. For offset photo-litho—16 lb. bond.
4. For Ditto—20 lb. bond.

THE COÖPERATIVE PLAN —ONE ANSWER TO THE LOW COST HOUSING PROBLEM

THE GRAND STREET APARTMENTS SPRINGSTEEN AND GOLDHAMMER ARCHITECTS



Rothschild

The Grand Street Apartments Cover an Entire City Block. They are Designed to Meet, Simply and Efficiently, the Demand for Inexpensive and Comfortable "White-Collar" Housing.

Brick, Textured Stucco and Concrete. Looking from the Interior Court Toward the Broome Street Entrance

FOREWORD

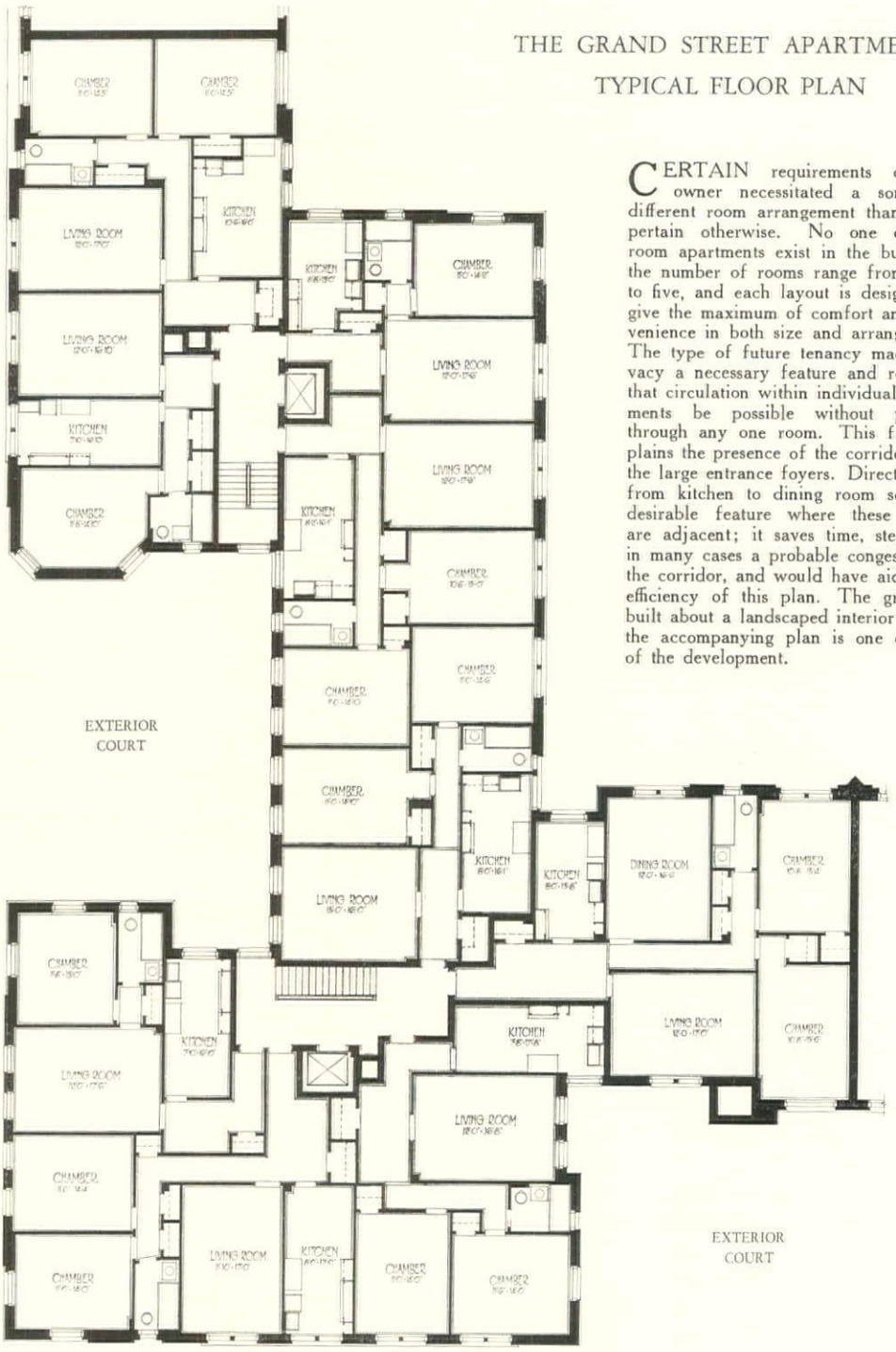
UNDER existing conditions there is no opportunity whatever for the majority of city inhabitants to obtain title to and occupy land and detached houses. In order to make the ownership of land and habitations possible for these people, it is necessary to set up conditions different from those which now obtain in detached house and land ownership. The same reasons that induce the wealthy to purchase ownership of coöperative apartments apply to those of very limited means, —economic and social.

The principal obstacle to ownership of land and habitations of whatever kind is the desire to obtain and enjoy excess profits from the barter and trade in those commodities. Coöperative ownership of land and habitations has been and can be extended, however, to include people of limited means who have the desire to possess them. To stimulate and make possible land and habitation ownership by such persons, the state and city of New York have enacted legislation for that purpose. To limited dividend corporations, the state and municipal taxes are remitted for a period of years. Investment capital has been induced to engage in such operations, notably the Van Cortlandt Park Development in New York, under the management of the Amalgamated Housing Corporation. Seven buildings, five of which were completed in November, 1927, contain 496 apartments embracing 1,958 rooms. Special features include a kindergarten, library, commissary, community hall, and bus service for school children. A dining room and kitchen for the use of the occupants are being constructed in Building No. 3. A large playground is owned and supervised by the Corporation. The law discriminates in certain particulars between the Bronx and Brooklyn and Manhattan, due to different land values.

THE Grand Street Coöperative Apartments, on the other hand, are located in a very congested, high land-value community and are already a successful operation. The general application of this type of housing will require, as does any other type, adequate park facilities for recreation and pleasure, but it will be noted that in the Grand Street improvement ample light and air, a large central courtyard and a roof garden playground are provided. The land is not exploited for excess, speculative profit.

THE GRAND STREET APARTMENTS
TYPICAL FLOOR PLAN

CERTAIN requirements of the owner necessitated a somewhat different room arrangement than might pertain otherwise. No one or two room apartments exist in the building; the number of rooms range from three to five, and each layout is designed to give the maximum of comfort and convenience in both size and arrangement. The type of future tenancy made privacy a necessary feature and required that circulation within individual apartments be possible without passage through any one room. This fact explains the presence of the corridors and the large entrance foyers. Direct access from kitchen to dining room seems a desirable feature where these rooms are adjacent; it saves time, steps and in many cases a probable congestion in the corridor, and would have aided the efficiency of this plan. The group is built about a landscaped interior court; the accompanying plan is one quarter of the development.



SPRINGSTEEN AND GOLDHAMMER,
ARCHITECTS

It is generally conceded that every well intentioned person is entitled to a suitable habitation and a healthful and peaceable existence. When property ownership is included, these conditions inevitably establish a more stable and better conditioned society. The financing and construction of coöperative apartments for persons of limited means should not be considered altogether as a philanthropic project. They are non-profit projects, but their underlying security and rate of return on the capital investment are as reliable as those of thousands of securities that find a ready market for investment capital. This is the result of favorable legislation, which should be enacted in all states and municipalities where there exist unfavorable housing conditions and ownerships limited in numbers. It is true that the securities of such developments are not associated with exploitations for procuring excess speculative profits; it is equally true that such securities are equal in value to those of any other fixed-rate investment.

The condemnation and demolition of undesirable habitations, some of which are really "slums," and the improvement of the ground in large units will not only provide proper and desirable housing, but will also provide employment for investment capital, for all kinds of persons engaged in the building industry, the purchase of materials of construction, and in every way increase the prosperity, stability and culture of society. A. T. N.

THE PRACTICAL SOLUTION

BY

GEORGE W. SPRINGSTEEN

OF

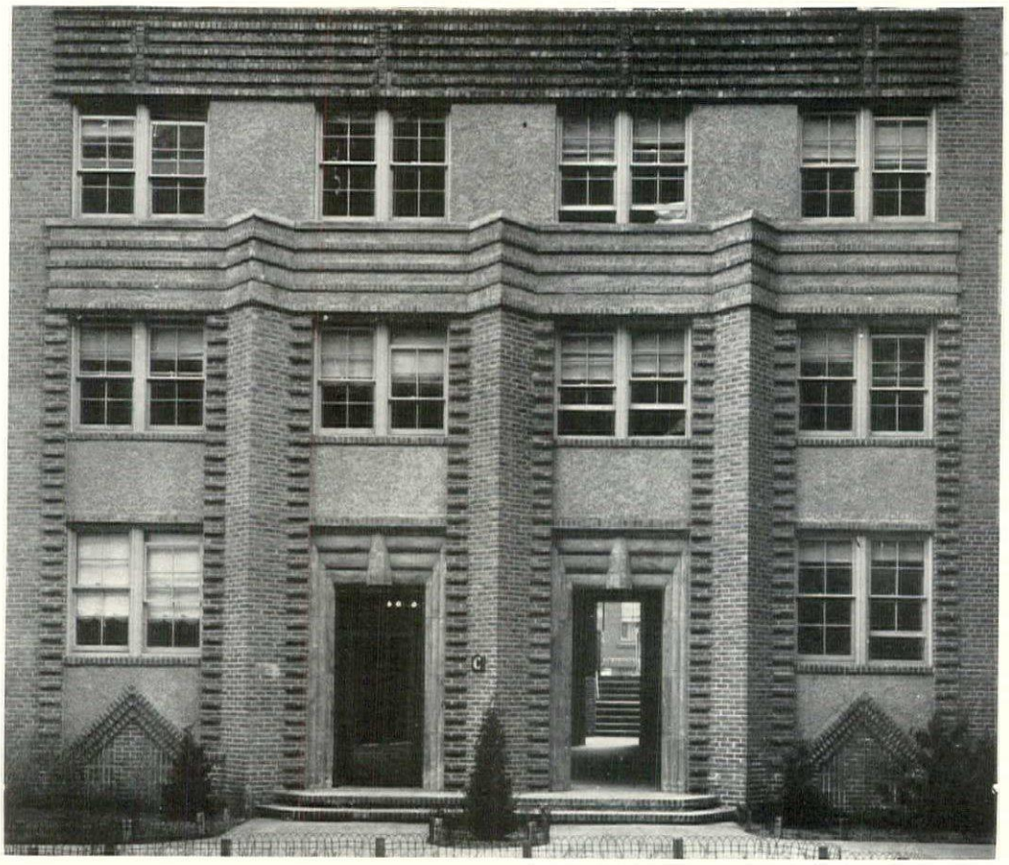
SPRINGSTEEN & GOLDHAMMER, ARCHITECTS

FOLLOWING the war the great demand for and limited amount of housing resulted in an extraordinary attempt to improve the situation. It may not be fair to pass judgment on those housing projects, undertaken when the cost of building construction was at its peak, inasmuch as plans were turned out "overnight" from the architects' offices and in a comparatively short time these buildings were under construction by speculative builders. The builder was not inclined to heed the sage advice to "look ahead," as it was merely an incident in the quick turnover and profit made on his own investment. The wholesale plan of building production continued unimpeded so long as that method provided habitable living quarters regardless of cost. At that time it was possible to disregard the phenomenal increases in rents, which were entirely disproportionate to any standards of previous times, because of the different standard of living and greatly increased scale of wages.

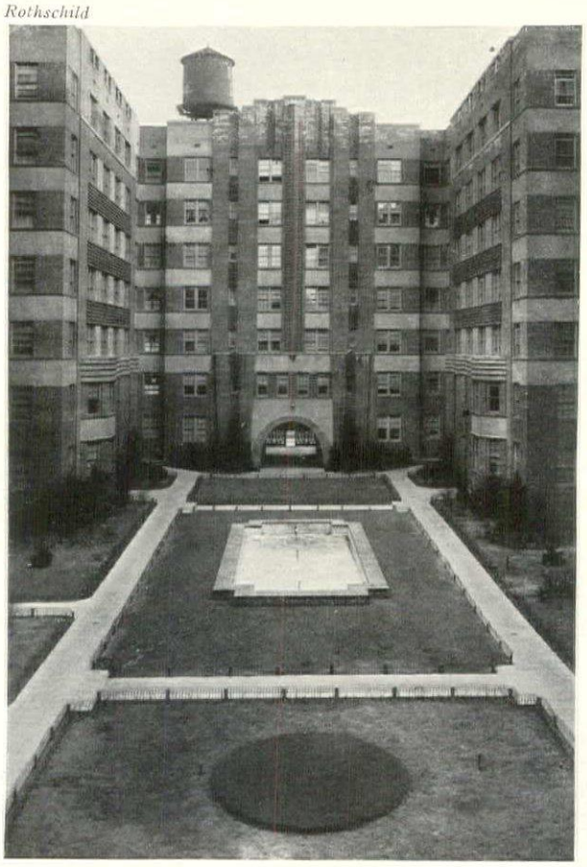
Such abnormal conditions could not continue. Considerable agitation developed to provide both cheaper and better housing, which resulted in legislation known as the State Housing Law (New York) enacted in 1926. The Municipal Assembly of the City of New York (1927) adopted the law and provided that any improvements owned, operated and managed by public or private limited dividend companies organized and operating under the law should be exempt from local taxation for a period of years. This legislation has proved itself to be one of the most constructive undertakings for the purpose of solving the housing problem in this country. It has made it possible to provide the same high standards of housing that are associated with high-priced living quarters, for those who can afford to pay from $9 to $12.50 rent per room per month.

FINANCING AND TAXES

As an outgrowth of this legislation, a coöperative apartment building was constructed by Amalgamated Dwellings, Inc., occupying the city block encompassed by Grand, Broome, Sheriff and Columbia Streets, New York. Primarily, the purpose attained by this undertaking is to furnish inexpensive housing to wage earners who are able to make a minimum cash investment of $150 per room on a total equity of $500 per room and pro rata equity in the ground. Purchasers who are unable to pay the entire sum of $500 per room have been financed through a fund created by Lieutenant-Governor Herbert H. Lehman and Aaron Rabinowitz, member of the State Board of Housing. The purchase capital advanced from this fund is to be amortized during a period of ten years with 6 per cent interest. The operating and maintenance expense is paid by the charge of $12.50 per room per month to each tenant-owner.



Rothschild



THE GRAND STREET APARTMENTS

Above is an Entrance Detail Facing the Interior Court, Shown Below at the Left. Notice the Simplicity of the Detail and the Skillful Combination of Rugged, Plain Materials. Below—A General View of the Grand Street Side

It is interesting to note that this low cost of maintenance and operation for this project is due to the fact that, being constructed by a limited dividend corporation, it is exempt from city taxes and fees as provided by the laws previously mentioned. Under the provisions of the law, a limited dividend corporation must operate such a project with a maximum return limited to 6 per cent per annum on the invested capital. All surplus over the minimum permitted to insure the security of the project must be passed on to the tenants in the form of rent reduction. Another requirement for the successful coöperative apartment building is that no more than two-thirds of the cost of construction can be paid by funds secured by a mortgage carrying an interest rate of 5 per cent per annum. It is obvious that the problem can be and is solved for those persons who are able financially to comply with the requirements of the Grand Street coöperative project, and it is for this group of potential and actual owners that the immediate future holds great promise. For those persons, however, who are not able financially to pay the $12.50 or even a $9 rent per room per month, the situation is quite grave.

We should not despair of better housing conditions when we consider the rapid and successful strides made to that end between the immediate

Another View of the Interior Court, Taken from Beneath the Arch of the Broome Street Entrance

Rothschild

The Main Entrance, from Broome Street. A View of the Interior Court Side is Shown on Page 241

post-war time and the present. The problem of providing suitable housing under emergency conditions was entirely new to us. The state and municipality have done what they can within the limitations of the state constitution and city charter, to which powers a capital controlled by unselfish and humane instincts has performed its quota service. Activity in the field of providing better and less costly housing becomes more apparent and effective with the passing of time, and we trust that, with conscientious and constructive endeavor, the opportunity to secure and enjoy better living conditions and housing will manifest itself in the not far distant future.

STRUCTURE AND EQUIPMENT

The Grand Street coöperative apartment project is housed in a substantial six-story brick structure, having seven stories on the Broome Street frontage due to the difference of the street grades. The structure is built around a large interior court which is improved with a fountain pool, grass plots, planting of shrubs and walks. The building is equipped with an adequate steam boiler and hot water service plant. The heating system is of the two-pipe vacuum type. Brass pipe is provided for the hot water service and branches from the cold water service. The bathrooms are finished with tile floors and wainscoting. The bath tubs are of the built-in type, provided with shower bath apparatus and curtain rods. Pedestal type lavatories, siphon jet water closets, medicine cabinets and the usual toilet room accessories are provided. Metal trim is provided for all windows and interior doors, floors and baseboards are made of wood. Incinerator receptacles are provided in each stair hall. The chimneys from each incinerator enter into, and the smoke and gases pass through, a brick separator chamber on the roof, which serves to prevent the passage of the gas-entrained solid products of combustion through the top of the chimney to the outer atmosphere.

The corridors and stairways are of fireproof construction, the floors finished in terrazzo. The entrance door to each apartment is provided with a peep-hole fixture which enables the occupant to observe the person in the corridor without opening the door. The kitchen equipment consists of a gas range, sinks, electrical refrigeration, and clothes rack of the usual pattern. The entire construction of the building is substantial, and the mechanical equipment is of good quality, showing no evidence of intention or desire to provide the sub-grade construction and quality that is characteristic of "speculative" multiple dwellings.

Entrances are provided on both Sheriff and Columbia Streets, and a principal entrance on Broome Street, which is in a recessed court enclosed in an iron fence and gates. This court is planted with shrubbery and turf. The Grand Street front is occupied by stores, and the low portion of the building between the corner apartments provides access for sunlight and southern breezes to the large central court yard.

The structure contains a large laundry, community auditorium and a recreational roof garden for the children. Children are thus provided with a safe and healthful playground, which is unusual in that section of the city but which is so essential for the development of sound citizens.

CONSTRUCTION DATA AND SPECIAL FEATURES

Grand Street Coöperative Apartments, New York
Date of completion: October, 1930
Cost of construction, 40 cents per cubic foot
Total number of apartments: 231
Total number of apartments per floor: 36
Number of rooms per apartment: 3, 3½*, 4, 4½*, 5
Total number of rooms: 906½
Apportionment of apartments throughout building:

44—3's	19%
65—3½'s	28%
26—4's	11%
74—4½'s	32%
22—5's	10%

Average area of living rooms: 204 sq. ft.
Average area of dining rooms: 200 sq. ft.
Average area of chambers: 160 sq. ft.
Average area of kitchens (including dining alcoves): 129 sq. ft.
Total number of stores: 15
Area of stores: 1,400 sq. ft. each
Elevators: 8 push-button automatic
Grand coverage: 60%
Average area per room of building area: 250 sq. ft.
Average area per room of lot area: 412 sq ft.
Height of ceilings: 8′ 9″

(* Dining alcove designated as ½ room)

THE TRIAL OF FIREPROOF WOOD

BY

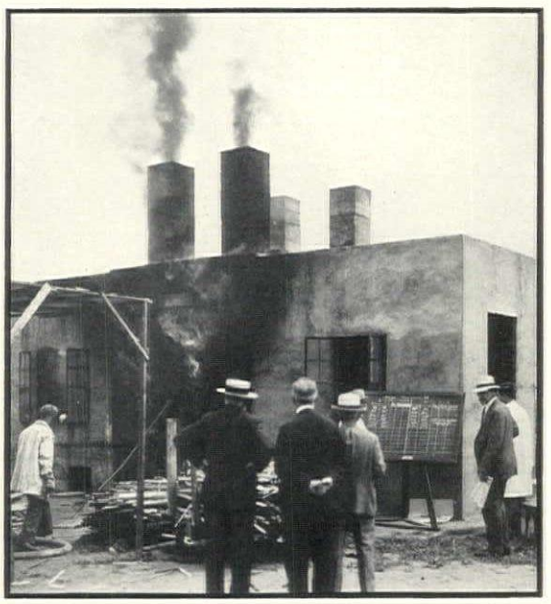
A. T. NORTH

FIRE-RESISTIVE construction is handicapped as to economy and effectiveness by building laws that are formulated on assumptions based largely on innumerable standard fire tests. These can be considered as laboratory tests and as such have all of their practical limitations. To complete the knowledge necessary to formulate a scientific fire-resistive procedure, there is a need for information about (1) the performance of materials and constructions exposed to actual conflagration conditions; (2) the actual contribution of combustible parts of construction to conflagration; and (3), the effects produced by the burning of known volumes of combustible contents. This last item has been investigated by S. H. Ingberg, U. S. Bureau of Standards, and his findings are of great importance, though limited in scope.* Existing fire-resistive construction regulations are based on the time-temperature factor, and until the Ingberg combustible-content-temperature factor is given equal consideration, such regulations will be unscientific and wasteful.

THE LEGAL ASPECT

In the City of New York two laws operate to regulate construction of multiple dwellings,—the Multiple Dwelling Law (a state statute which superseded the state Tenement House Law in 1929) and the City of New York Building Code. The latter recognizes fireproof wood as an admissible material for doors, trim and finish in fireproof construction. The state law does not, but where it permits any wood in such construction, it allows natural untreated wood. This tolerance, broadly speaking, is limited to flooring, trim and finish. The matter of harmonizing the statute and the ordinance has long been a moot question.

"At the 1930 session of the state legislature an amendment to the Multiple Dwelling Law was introduced which if passed would have brought the requirements of that statute into line with those of the Building Code, thereby requiring in all multiple dwellings exceeding 150 feet in height fireproof wood throughout, or no wood at all. The bill was so loosely worded that fireproof wood would have been permitted in certain places and for certain purposes where the use of any wood whatever would be intolerable. The bill passed both houses over vigorous opposition, but was vetoed by the governor."



Officials Making Comparative Fire Tests of Wood, Steel and Kalamein

A FACT FINDING INVESTIGATION

"The Multiple Dwelling Law Committee in considering the subject of fireproof wood found a dearth of information about the subject, and its attitude thereto was controlled largely by a profound objection to creating, by legislation, monopolies for specialized processes and materials. The lack of authoritative information supporting or discrediting the claims of the fireproof wood interests sustained this objection and stiffened the Committee's resolution to resist any recognition of fireproof wood, until thorough investigation should establish its claim to such recognition. The Committee, however, appreciated the potential im-

*See THE ARCHITECTURAL FORUM, October 1929, pp. 601-605: "Fire Resistance of Building Materials and Construction," by H. S. Ingberg.

portance of the subject and undertook on its own account such an investigation." A special committee on fireproof wood was appointed.*

The questions which this Committee intended to answer were:

"1. Shall the Multiple Dwelling Law be amended to provide for the use of fireproof wood?

"2. If the answer to this question is affirmative, shall such provision effectuate either or both of these conditions in whole or in part: (a) Compel that in future fireproof multiple dwellings wood not now required to be fireproofed be fireproof, or (b) Permit in fireproof multiple dwellings the use of fireproofed wood where no wood is at present permitted?"

The report embraces the results of several separate investigations, and the committee was most fortunate in securing the prompt and effective coöperation of the Columbia University Testing Laboratories under the able direction of Professor Albin H. Beyer, Director of Testing. Because of space limitations the salient features only are quoted from the report.

WHAT IS FIREPROOF WOOD?

"Actually no commodity is 'fireproof' in the sense that it will withstand destruction by fire indefinitely. The term 'fireproof' as employed in this report is used in the popular sense, namely, that the product so characterized, as installed, will not itself support combustion though exposed for a substantial period to conflagration temperatures. . . .

"It is not possible to guarantee a wood product as being non-combustible. Properly fireproofed wood does reduce the possibility of fire. The processed lumber as a mass is substantially non-inflammable. The ordinary timber is treated with chemicals whose functions are three-fold. They give off, when heated, a non-inflammable, fire-extinguishing gas or vapor; they fuse over the wood in a protective coating, and they exclude the oxygen necessary to combustion by obstructing the pores of the wood. . . .

"Wood which has been only partially impregnated is more practical for any purpose in which the lumber is not to be re-sawed or milled after treatment. It is less expensive and is lighter in weight than fully impregnated wood.

"Any wood product may be fireproofed, in a varying degree, except the hardwoods such as white oak, ebony and hickory. Pine, balsam, birch and maple, together with most of the lighter varieties, are made adaptable to treatment.

"The processed wood's chief characteristic is that every pore is a diminutive fire extinguisher, because it exudes, when heated, non-inflammable gas or vapor. The larger the surface used, the more effective is this property.

"Wood processed by standard methods takes shellac, paint and varnish well, and the efficiency of glue joints is not lessened. Partially impregnated timbers retain most of the strength of the natural product, but fully fireproofed wood results in a loss of from 10 to 20 per cent in strength.

"Wood is always an excellent non-conductor of heat, and processing does not destroy this property. Thus a processed door is superior in this respect to one of steel, which conducts heat to a greater extent. A processed door is easier to fit and is therefore better protection against smoke. Processed wood may be sawed, planed and sandpapered, although it has a somewhat dulling effect on tools. Processed wood is, on an average, 20 per cent heavier than the natural product. Processed lumber will resist burning, but not charring. Some fireproofed wood may be ignited at a low temperature, as by a match, as most of the chemicals function only at a higher point. However, many treatments have a combination of chemicals which take care of practically all temperatures.

"It is a weakness of processed wood that it can not be guaranteed absolutely for uniformity or quality, as some pieces of wood are more receptive to chemicals than others. However, the mass of properly treated wood, taken as a whole, is adequately fire-resistive to give complete protection against spread of fire."

THE FIRE HAZARD OF UNPROCESSED WOOD

The sub-committee report is voluminous and divided into two sections: First, an analysis of fatal fires in new law tenement houses (erected since 1901); Second, an analysis of spreading fires where the means of communication was wood flooring, trim, doors and windows with their casings. These included the number and causes of fatal fires and of spreading fires; types of construction (fireproof or non-fireproof), height of buildings, damage, causes, what woodwork was involved, and damage to woodwork, in New York City.

New York Fire Department records show that there were 11,552 fires in Manhattan, the Bronx and Richmond, 1925 to 1929, in tenements built since 1901. Analysis of these records shows:

* The committee consisted of F. C. Schmitz, consulting engineer and fireproof wood specialist; Frank H. Alcott, engineer for the National Lumber Manufacturers' Association. H. B. Mulliken, architect, member American Institute of Architects, New York Society of Architects, and the Real Estate Board of New York; Michael Paterno, builder and member of the Board of Governors of the Investing and Contracting Builders Association, Inc.; Harold Riegelman, counsel to the Multiple Dwelling Law Committee, chairman

Total number of fires	11,552
Fires confined to source	10,860—94.0%
Spreading fires	692— 6.0%
These 692 fires were spread:	
By dumbwaiter, elevator shafts, hall and stairways, light and air shafts, and pipe recesses	438— 3.8%
By lath and plaster partitions	68— 0.6%
By windows, doors and trim and wood flooring	186— 1.6%

The study of the nature of fire communication showed that the use of wood in fireproof multiple dwellings is responsible for the spread of fire in nine cases in every 10,000 recorded fires.

FIRE-RESISTANCE OF FIREPROOF WOOD

In appraising the fire-resistance of fireproof wood, consideration must be given to the inflammability of the untreated wood. Data contained in the 1915 *Proceedings of the National Fire Protection Association* give the initial burning or ignition points of several woods. Four air-dried western woods, having average moisture content of 19 per cent, showed initial ignition points from 356° to 405° Fahr., the same woods oven-dried with negligible moisture showing initial ignition points from 348° to 411° Fahr. Five air-dried eastern woods, having average moisture content of 13.1 per cent, showed ignition points of 356° to 405° Fahr., the same woods oven-dried showing ignition points of 348° to 369° Fahr. These tests were considered to be inadequate for the purposes of this survey, and a new comparison of the combustibility of fireproof wood and unprocessed woods commonly used in flooring, trim and finish was undertaken in conjunction with the Columbia University Laboratories. The standard New York Building Code requirements for the Timber, Crib and Shaving Tests, and the Fire Tube Test devised by M. E. Dunlap, Engineer Forest Products Laboratory of the U. S. Department of Agriculture, were applied to commercial samples of treated and untreated wood. All of the samples were dried to a moisture content of approximately 8 per cent and so maintained.

A comparison of the two methods of testing, the Timber and Fire Tube Tests, of the same untreated species, disclosed the fact that combustibility is affected by the species and that certain softwood species, untreated, are considerably less combustible than certain hardwoods. The converse is also true. The New York City law requirements for fireproof wood, as expected, would eliminate all such untreated specimens.

Treated Specimens. Treated samples as tested under the New York City requirements showed considerable variations as to species. The effectiveness of treatment by all manufacturers was indicated by the reduction of glow after extinguishment of flame to considerably below 20 seconds, many of the specimens, both in softwoods and hardwoods, showing no glow whatever. The conclusion as to species of treated wood under different processes are practicable only for chestnut, birch, red oak, soft and hard pines, and poplar.

Comparisons. Tube tests made of such treated wood samples as would unquestionably pass the standard test of the City of New York developed an average maximum temperature of 388° Fahr. and at the end of two minutes the average volume of wood consumed was 20.2 per cent. The average maximum temperature developed in testing *all* of the treated samples submitted was 535° Fahr., and the average volume of wood consumed was 27.4 per cent. For similar tests made on untreated wood the average maximum temperature was 1476° Fahr., and the average volume of wood consumed was 82.6 per cent.

DOOR TESTS

The subject of doors was brought to the attention of the special committee in the form of a report on certain tests conducted by the Columbia University Testing Laboratories, in New York, May, 1929. A digest follows:

Outline of Tests. The fire application tests were made in accordance with Rule 510 of the Industrial Code of the Department of Labor of the State of New York, Bulletin No. 7, prescribing certain specifications relating to construction and test of fireproof and fire-resisting materials. The test procedure is similar to that prescribed in the rules and regulations for fireproof partitions of the Bureau of Buildings of the City of New York.

The test procedure called for raising the furnace temperature gradually to 1700° Fahr. in 30 minutes and maintaining this temperature for the remainder of the fire application period. Fire was continued until flames appeared on the outside surfaces of the doors under test. The three doors, designated as Doors A, B and C, were practically of the same size, varying in thickness and in construction.

Test Procedure. The doors were erected in the walls of the test house and thermocouples installed as required for standard tests. Temperature readings were taken at intervals of about three minutes.

OTHER TESTS

Tests were made at Columbia University of fireproof wood taken from various buildings in New York City. These eleven buildings were erected between the years 1904 and 1925, and their average age was 15½ years. The Timber

Test applied to these specimens developed only one case of the material as substandard to the *present* requirements.

Investigation was made as to the corrosive effect of fireproofing chemicals on metals in proximity to fireproofed wood, and no deterioration was found. The average age of the buildings investigated was 17 years. Original surface finishes were not affected by the fireproofing processes, and the processes have no deteriorating effect upon the holding power of screws or glue. Wood floors treated by the fireproofing process heretofore in vogue, when maintained by washing and scrubbing, do not give satisfactory service.

Nine firms are engaged in the production and marketing of fireproof wood, six in New York State, one each in New Jersey, Tennessee and Wisconsin. Four producers use non-patented secret processes.

The technical details of the standard methods used for testing fireproof wood are omitted because of lack of space.

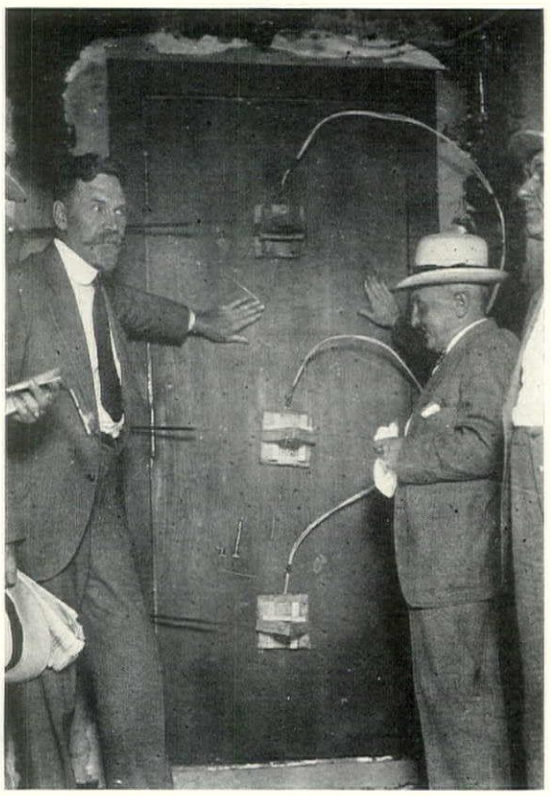
"Obviously, while the tests described in this section are useful in determining the comparative resistance of fire by various woods, processed and untreated, they furnish inadequate basis for determining the action of wood under fire conditions in a fireproof building where the wood is backed against incombustible material. Assuming intensity of heat equal to that used in the tests, it is apparent that large surfaces and greater thicknesses exposed on only one side to such heat will react more efficiently than diminutive fragments placed in a superheated atmosphere affecting all surfaces simultaneously, although in different degrees. This observation applies to both treated and untreated lumber."

COSTS

A comparison of costs for New York City indicates an additional cost of from $90 to $100 per 1,000 feet BM to the cost of untreated lumber.

CONCLUSION

"1. The process whereby wood is chemically treated so that, while retaining in substantial degree the properties of natural wood it resists combustion when exposed to great heat, has been brought to a high degree of efficiency. Those engaged in the industry are to be encouraged to continue its development. In its present stage the processes now recognized, while not preventing the consuming of the wood at temperature which 'incombustible' materials permitted by the Multiple Dwelling Law withstand, effectively prevent the spread of fire. Moreover, the vaporizing of the chemicals with which the wood is impregnated in the presence of heat, tends to lessen the fire hazard in the vicinity of the fireproof wood.



DOOR A was a solid wood door having a fireproof birch core 1 1/8" thick, with 1/8" veneer of fireproofed plywood on both sides. The door jamb was made of 7/8" fireproof birch.

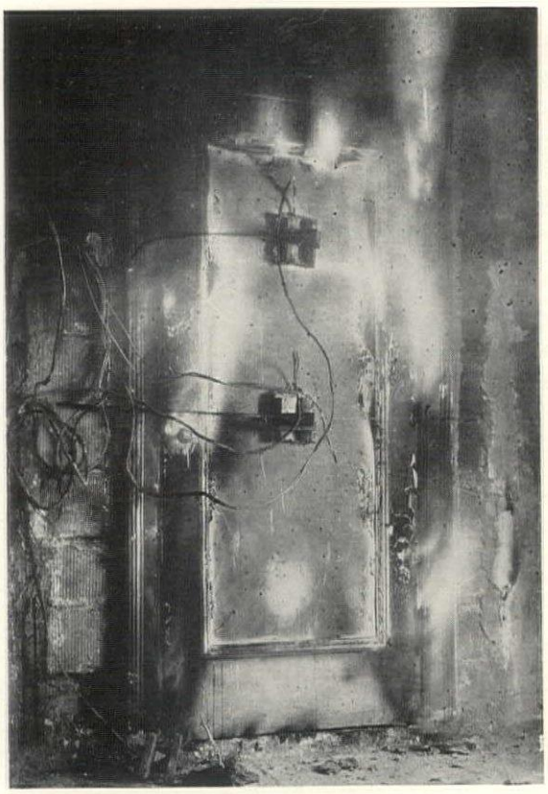
WHAT HAPPENED

No smoke, flames or discoloration appeared on the outside of this door for 74 minutes of fire application, when several charred spots became visible on the outer surface of the panel. These spots quickly enlarged, and at 75½ minutes of firing, flames broke through the panel.

WHAT WAS LEFT

After a fire application period of 75½ minutes the flames broke through the door and consumed practically all of what remained of the door. This door had effectively resisted the application of fire, the temperature of which on one side of the door was 1,497° Fahr. 30 minutes after the test was started and averaged above 1,750° Fahr. for the remainder of the test. No smoke or flames passed through the door, and the temperature on the surface not exposed to the fire reached only 171° Fahr. after one hour and 12 minutes of fire application.

(Continued on page 252)



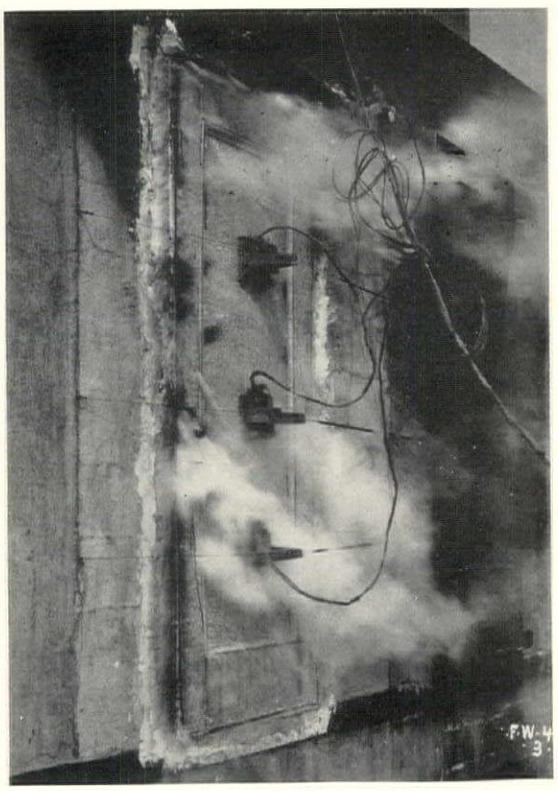
DOOR B was a furniture steel door with Underwriters' Laboratories label, mounted in a steel door frame labeled "Underwriters' Laboratories Inspected Metal Door Frame, etc." The stiles and top rails were 4½" wide, the bottom rail was 9½" wide, all 1¾" thick. The panel consisted of a ¼" thick asbestos sheet covered with 0.042" thick sheet metal. The stiles and rails were filled with wood cores covered with 0.042" thick sheet metal. A pressed steel moulding .055" thick was used between the panel and the stiles and rails.

WHAT HAPPENED

After five minutes of fire application smoke appeared on the outside of this door. The smoke rapidly increased in volume and quickly filled the chamber built around the door. After 17 minutes of firing the volume of the smoke decreased somewhat. The door had warped outward about ½ inch at the top and the bottom. At 18 minutes of firing the gases generated from the wooden core in the stiles and rails caught fire and were burning with a 6-inch flame between the door panel and the top rail. The flames disappeared after a minute, but reappeared again intermittently after 30 minutes of firing and in much greater volume after 40 minutes of firing. At this time the door had warped outward about 1½ inches at the top. From then on up to the end of the test, flames from 4 to 8 inches in length covered the door at the junction of the center panel and the stiles. The fire was extinguished after 76 minutes of fire application.

WHAT WAS LEFT

After a fire application period lasting 75½ minutes, the door appeared to be still intact. A more careful examination showed that this door had warped to such an extent that it could no longer be closed. The metal sheets comprising the panel had separated from the stiles and rails as much as ⅝ of an inch in some places. All the stiles and rails were bowed. The door casing was still in fair condition. The asbestos sheet in the panel was discolored but intact. The wood filling in the rails and stiles was entirely charred and partially consumed; its strength was entirely gone.



DOOR C was a Kalamein door having 4½" wide stiles and top rail and 10" wide bottom rail. The door panel consisted of a single metal sheet 0.0072" thick, wood core encased in 0.025" thick sheet metal. The moulding consisted of a wooden core covered with a pressed sheet-steel moulding. The door was mounted in a substantial Kalamein frame.

WHAT HAPPENED

Three minutes after fire was started, smoke appeared in considerable volume along the mouldings. The door had warped outward at the top. A bundle of excelsior suspended directly in front of the panel caught fire after 5½ minutes of firing. The gases distilled from the wooden core in the stiles and rails burned freely on the outer surface of the door after 8 minutes of firing, and after 16 minutes of firing the entire door was enveloped in flames, and the test was discontinued.

WHAT WAS LEFT

The solid steel panel of this door which had been subjected to only 16 minutes of fire had warped, and the door could not be closed. The steel plate had entirely separated from the top rail, leaving a clear opening of about ⅛ of an inch in width. The connections between the rails and stiles were broken completely. The stiles were bowed outward at mid-height. The wooden filler in the stiles and rails was partially consumed, and what remained was completely charred.

"2. While several instances of apparent diminution of fire-resistive properties with the passage of time were noted, the properly treated fireproof wood appears to retain those properties effectively.

"3. The working of chemicals to the surface of the wood with consequent impairment of finishes has been noted in some cases, but this has not been characteristic where proper methods of processing and kiln drying were used, and where the wood had not been exposed to moisture. In properly treated wood there is no corrosive effect on metals or glue. Darkening of wood is an incident to all types of chemical impregnation. The degree of darkening varies proportionately to the rapidity of kiln drying.

"4. There is no way of ascertaining, by any test now used, the uniformity with which a given piece of lumber has been impregnated. Samples cut at random from any piece of lumber may show greater or less resistance than the average resistance of the whole piece. Samples of the same species submitted by different manufacturers showed marked differences in fire resistance. Samples of different woods from the same manufacturer showed marked variations in fire resistance. Laboratory test is necessary to determine whether the lumber actually furnished on the job approximates required standards. Visual inspection is useless.

"5. A variety of wood fireproofing processes is used. They are not, for the most part, susceptible of control by an enforcing government department. All but one are secret. But the standard tests are sufficient to insure a high degree of average fire resistance. For the compilation of information useful in connection with future research, such tests should be made by the enforcing departments at intervals of five years.

"6. The limited use of natural wood now permitted by the Multiple Dwelling Law in fireproof multiple dwellings involves a fire hazard so imperceptible as to be incapable of definition. For all practical purposes it involves no fire hazard whatever.

"7. The cost of fireproofing natural woods ranges from 36 per cent (for walnut) to 312 per cent (for shortleaf pine) of the cost of the same woods untreated. There is an additional differential for milling and installation. The untreated woods are easier to work and lighter in weight.

"8. Fireproof wood should not be required in place of any natural untreated wood not permitted under the Multiple Dwelling Law.

"9. The extension of the use of wood in fireproof multiple dwellings has been urged in order to secure greater range of materials and variety of design. The use of unprocessed wood within apartments for underflooring, saddles of doors, kitchen dressers, cabinets, wardrobes and interior trim of windows may be safely permitted. Further extension, while of somewhat doubtful wisdom if natural untreated wood is to be used, may be safely allowed by statute if the wood is processed to the extent required by standard tests.

"10. Such extension is predicated upon the condition that the wood, when used for finish, is backed against incombustible material. Under such circumstances it is recommended that, in fireproof multiple dwellings, regardless of height, the use of fireproof wood be permitted within apartments for chair rails, decorative wall paneling, baseboards, mouldings and other interior finish, shelving and fireplace mantels; and that decorative wall paneling of fireproof wood be permitted in the main entrance halls of fireproof multiple dwellings when backed against incombustible materials.

"11. Windows with their frames and sash, when required to be fireproof, may be of fireproof wood. Such frames and casings will resist high temperatures long after the window glass, however reinforced, is destroyed.

"12. Doors of fireproof wood, properly constructed, offer sufficiently effective resistance to fire for all practicable purposes and resistance to smoke superior to types now permitted under the Multiple Dwelling Law. It is recommended that doors and their jambs and casings of materials and construction which shall have withstood successfully a one-hour standard fire test in a manner approved by the enforcing department, be accepted as fireproof doors wherever these are required by the Multiple Dwelling Law.

"13. When fireproof wood is furnished on the job, it should be labeled or stamped with the name of the manufacturers and year of manufacture in accordance with the rules of the enforcing department, thereby minimizing the possibility of substitution of sub-standard material.

"14. Should deterioration tests, periodically made subsequent to installation, reveal diminution of fire or smoke resistance below the standard at date of installation, the equipment should be condemned and its replacement with a standard product required."

This report is especially significant inasmuch as it was approved unanimously by the members of the special committee, after careful and judicial consideration of the evidence secured and presented.

NOTE

The examination of the three doors tested was made in the presence of Mr. Cohen of the Bureau of Buildings of the City of New York. These tests were made by these men of the staff of the Testing Laboratories: Albin H. Beyer, Director of Testing; William J. Krefeld, Engineer of Tests; Donald M. Burmister, Assistant Test Engineer; John J. Shesta, Assistant Test Engineer.

CONCRETE, STONE AND STEEL

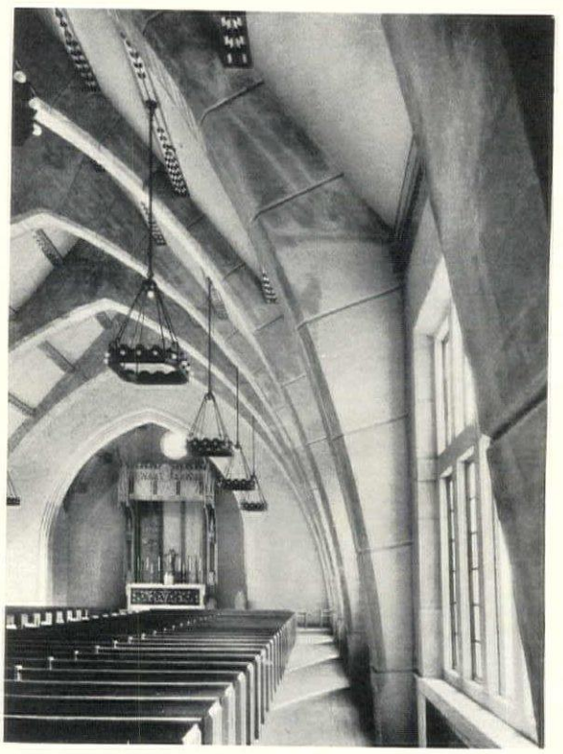
St. Madeleine Sophie's Parish School and Chapel at Germantown, Pa. The general design of this building is illustrated on pages 167 to 172 in Part I of this issue.

HENRY A. DAGIT & SONS
ARCHITECTS

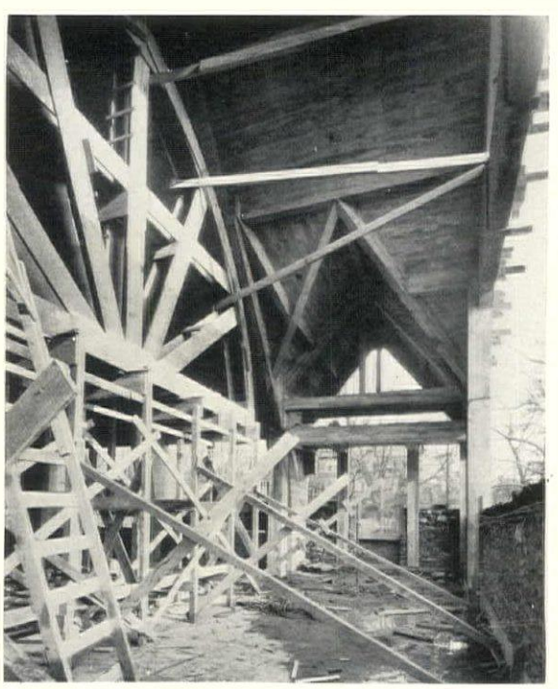
THE problem of the structural design of the parish school and chapel of St. Madeleine Sophie was simple, and the solution straightforward. The program called for a school, a chapel and an auditorium to meet the needs of a modern Catholic parish in a suburban location. The T-plan frankly displays the classrooms in the forward wings. The entrance from the street in the center of the facade gives direct access to the central wing in the rear, which includes the chapel on the first floor level and the auditorium on the basement level below it. The slope of the site brings the grade level slightly above the chapel floor on one side and at the level of the basement floor on the other. This permits fenestration along one side to light the auditorium.

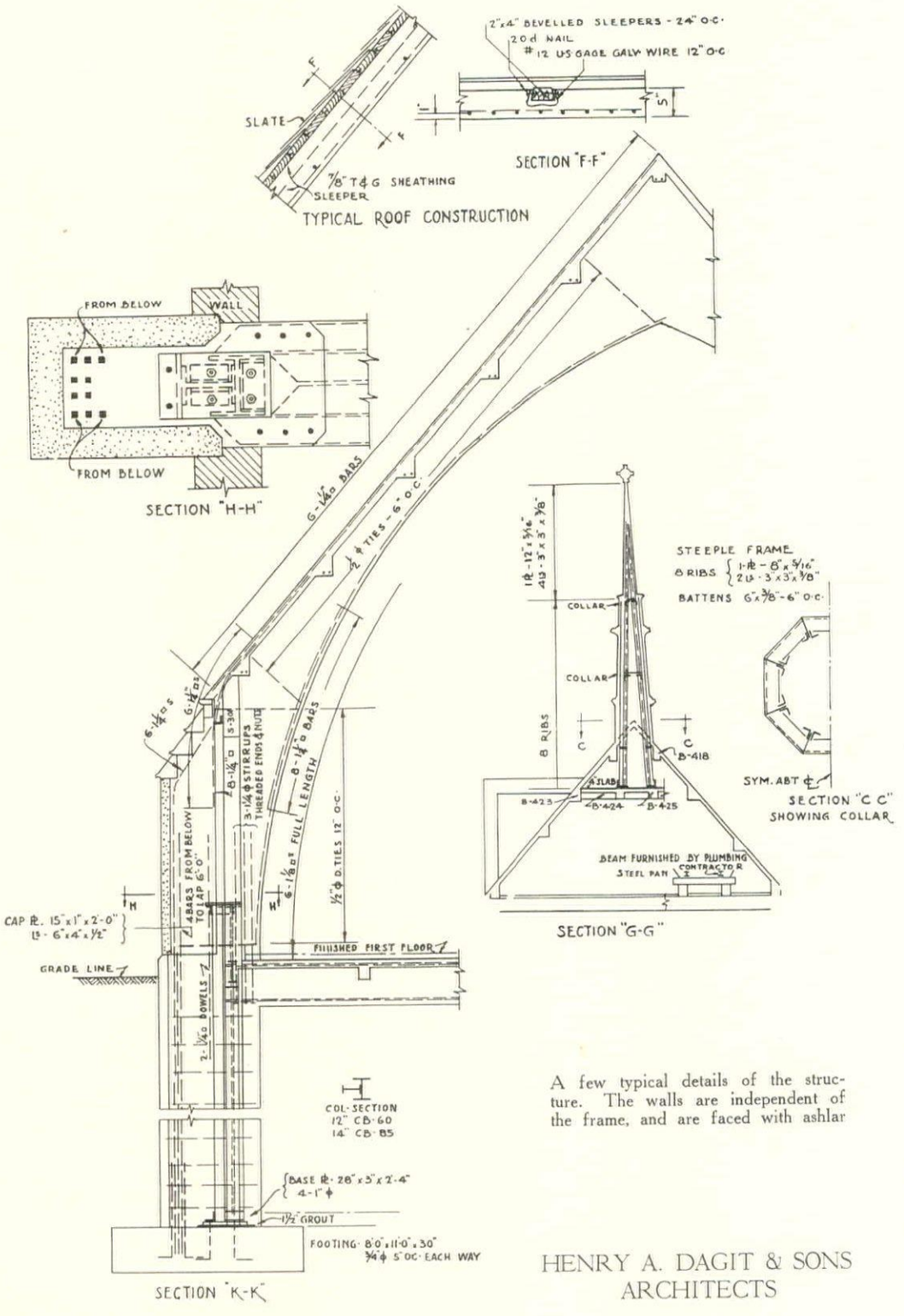
Fireproof construction is employed throughout, and ferro-concrete was chosen because of its plastic possibilities, its economy and its durability. The arches of the chapel are 15 feet on centers and have a 46-foot span. The arches have imitation stone joints where, exposed on the interior and on the exterior, the concrete buttresses are completely concealed in a random ashlar veneer. Concrete purlins from arch to arch support the flat slabs of the roof. Two-inch sheathing was nailed to sleepers which run parallel to the rake of the roof and the slate was nailed to the sheathing.

In making the forms for the arches and roof, holes in the sheathing were left every 5 feet up the roof. A chute above the peak of the roof was used to convey the concrete to each arch and bay. When the concrete filled the first 5 feet of the forms, the openings were sheathed in and the chute was drawn up to the next series of holes. After the forms were removed, the slabs between the purlins were painted a light tone and the purlins decorated in polychrome. The concrete of the arches was left in its natural state. A reproduction of the working drawing of the concrete arches of the chapel is shown on the next page.



A view of the finished interior. The arches are concrete but the window jambs and muntins are of stone. Below—a progress photograph, showing the main arch forming





A few typical details of the structure. The walls are independent of the frame, and are faced with ashlar

HENRY A. DAGIT & SONS
ARCHITECTS

ST. MADELEINE SOPHIE'S PARISH SCHOOL AND CHAPEL

SUPERVISION OF CONSTRUCTION OPERATIONS

BY
WILFRED W. BEACH

CHAPTER 23, FINISH CARPENTRY, (Continued)

LIKE other factors of a finished nature, wood trim, both the material and its treatment, is supposed to correspond with approved samples. A superintendent must make himself more or less familiar with the various woods so used, both "in the white" (unfinished and unstained), and after the application of the different kinds of filling, staining, oiling, shellacking, waxing, varnishing, priming, painting, etc. His activities relating to Finish Carpentry are summed up in terms of general oversight, rather than general interference, at least until the wood trim is actually in process of being installed. His inspection will determine if it is the kind and quality of wood called for; if it is moulded and carved in accordance with details and models, or in conformity with stock designs mentioned; if it is thoroughly dry, and free from warp or other imperfections, due to manufacture, storage or handling.

Yellow pine or fir, at the option of the contractor, was to be used for trim in the basement and gymnasiums, except that gum or birch (for enameling) was specified for all toilets and bathrooms. Oak was to be used everywhere else,—quarter-sawed in vestibules, entrance halls, general office, board room and library, and plain-sawed in other locations. Hardwood doors were to have veneered stiles, rails and panels; other doors to have veneered panels and solid stiles and rails, except that the majority of doors in all corridors were to have glass panels.

VENEERS

The general run of present-day veneer stock is cut from the log by the rotary process, and is about 1/30 to 1/16 inch thick. It is formed into 3- and 5-ply sheets (termed "plywood" by the trade) of varying thicknesses for panels, and is applied over cores of softwood to form stiles and rails. Panels may be set flush with stiles and rails on each side to form "flush-veneered" or "slab" doors. Where doors occur between rooms having different wood trim, they are commonly made (if so specified) with the two faces different, to correspond with both kinds of trim. Some architects object to the pattern of the grain in rotary-cut veneer, and insist upon something better in their higher grade work. Such specifications may call for a minimum thickness of ⅛ inch or more for all veneers, with "grain selected for its special beauty," in which case a criterion must be established by approved samples.

TRIM INSTALLATION

Installation of wood trim in the school building was started in rooms in the third story on the first Monday after the plasterers had vacated the basement,—a week behind the schedule. This was to be made up, and it was evident that the general foreman and superintendent would have their hands full weeding out poor mechanics from the rush crew of "finishers." Oddly enough they had more trouble with the cheaper trim than with the oak and birch. Mechanics seem to allow their lack of respect for softwoods to reflect itself in tool-marks and other signs of carelessness. After the removal of a few casings, on which the round impress of the hammerhead showed over nearly every nail, the foreman learned to be his own inspector, much to the relief of the superintendent. Perfection of mitered and coped joints was also insisted upon, as was the use of none but long pieces of room mould, though the foreman, at first, appeared to think that this injunction in the specifications meant nothing when applied to a school house. The superintendent also gave close attention to the subject of grounds for base, chair rail, picture moulding, wainscot cap and blackboard trim. Secure nailing for door trim was provided by bucks and finished jambs, but all other grounds had been specially provided, and had been gone over in detail ahead of plastering. Nevertheless, several instances were found of grounds being insufficiently secure for attachment of trim, demanding correction.

Adequate anchorage must also be provided for all manner of wood partitions, wainscoting, wall handrails, counters and the like. In high class work, these and the wood stairs are included in the Cabinet Work, and brought to the site, all or partly assembled. For these, the mill man sends a mechanic to the building for measurements as soon as the planes of plaster surfaces can be determined, and (for stairs) when floor levels have been established. Provisions are made for the absorption of minor discrepancies, but anything of a serious nature must be corrected. For this, there should be no one but the affected contractor responsible.

The countless details in connection with the

finish carpentry and cabinet work of any sizable building may appear staggering to a young inspector, but he has only to see that proper materials are supplied, that they are correctly installed, and duly cared for until final acceptance. Adequate inspection implies a knowledge on the part of the inspector of certain fundamentals of the woodworking trades. He should know whether joints are to be butted, coped, mitered, halved, housed, tenoned, keyed or dovetailed; whether they are to be nailed, bradded, screwed, bolted, doweled, glued, white-leaded, clipped or otherwise reinforced; perhaps left so as to slip and allow for shrinkage.

Nails and brads for finish woodwork have small heads, which are supposed to be driven in (set) about ⅛ inch below the finished surface of the wood, and the hole puttied, so as to be practically invisible when varnished or painted over. Since one can never be sure that perfection in this particular will be attained, all face-nailing of high class cabinetwork is forbidden, the joints being glued or secured with concealed fastenings. Where screw heads are to be exposed, they should be round or oval, and fitted with washers. All nails, screws, bolts and similar fastening devices are included in the regular contract for Finish Carpentry, except that screws and washers, if required for window stops or for items of Finish Hardware, are included with such hardware. For window stops, there should be a sufficient number to be spaced about 10 inches apart. They are seldom used for doors because, in such a location, they may be considered a menace to furniture and clothing.

WOOD FLOORS

Selection of types of wood floors by the architect or specification writer is governed by their location, expected service, desired appearance, and other factors. For the porch of a modest cottage, one uses a single thickness of softwood, preferably with no butt joints, and depends upon its being occasionally painted. If hard wear is anticipated, the flooring should be of quarter-sawed fir or yellow pine, or something else as good. But it is to be remembered that yellow pine is likely to shrink, with resultant open cracks. Softwood flooring is also used, over a sub-floor, for interior work, where it is intended to lay parquetry, linoleum, carpet, or other covering. For direct wear and where good appearance is to be considered, higher grade wood flooring may be indicated. Heavy-duty wood floors are either of thick long-lived materials, such as paving blocks, or of boards 25/32 to 1⅛ inches thick, so laid that aisles and other areas subjected to maximum wear are readily replaceable. In warehouse and factory construction, such boards are generally "jointed" (square-edged), since the wear over a matched joint would eventually work down to the tongue-and-groove, and start splintering, whereas a good square-edged maple, beech or vertical-grain pine board can wear nearly through without going to pieces. Block flooring is generally side-and-end-matched and laid with a filler in the joints, either over a wood subfloor or in mastic applied to a well cleaned dry concrete slab, rough or smooth, but fairly even. For high class work, similar floors are supplied in the better woods, laid in various patterns, with tight joints, and dependent entirely upon the mastic for adhesion.

The woods most commonly used for flooring of the better class are oak, maple, birch and beech. Oak flooring may be either plain- or quarter-sawed, white or red. The names of the grades of the flooring just mentioned have recently been simplified to First, Second and Third, with an additional grade in quarter-sawed oak known as First Grade Sap, and a Fourth grade in the cheaper quality of oak.* Yellow pine and fir flooring are supplied in both plain- and quarter-sawed. Stock face widths are 2¼ and 3¼ inches; thicknesses, 13/16 inch; either side-matched or square-edged. The latter can also be had in thicker stock. Some manufacturers of softwood flooring are producing it, likewise, with end-matching. The factory grading of wood flooring may be assumed to be dependable as represented, and yet the superintendent has no assurance that the material will reach the building in that state. Either the dealer or contractor can mix the grades, or practice other substitutions. The architect's man is on the site to detect this, if possible, before any flooring is laid, and hence familiarity with grading rules is an essential part of a superintendent's education. For grading rules of various softwood finish and flooring, the reader is referred to the publications of the different lumber associations and to the U. S. Bureau of Standards' "Simplified Practice Recommendation No. 16," issued by the Government Printing Office, Washington (15c).

LAYING FLOORS

When flooring is to be laid directly on wood subfloors, each area should first be tested to make sure that it offers level and solid bearing throughout. Noisy and creaky wood floors are due to oversights at this stage, and to insufficient nailing, —nails either too short or too few. The material in a wood subfloor is not supposed to be *good,* but it should be good enough for its functions, which are (1) to serve as a temporary floor

*See grading rules of the Oak Flooring Bureau, Hearst Building, Chicago, and "Grading Rules for M.F.M.A. Flooring," Maple Flooring Manufacturers' Association, 332 South Michigan Avenue, Chicago.

during construction operations; (2) to support and reinforce the finished floor and to provide good nailing therefor; and (3) to act as a foundation for the spread of insulating materials. The character of boards suitable for this purpose, and the proper method of their laying were discussed in Chapter 19, "Structural Carpentry." Although they may have been duly inspected when laid, they must be reinspected before being covered. Subflooring is subjected to a lot of mistreatment, especially in frame buildings and over pipe locations, and hence may need much solid repairing in order to pass final inspection. Holes and splinterings must be cut out, with cuts along the centers of bearings, not between them, as is easiest.

After the subfloor is pronounced "O. K.," it is covered with a hard-surfaced black waterproof paper, well lapped, free from torn places, and turned up at all edges. This serves the dual purpose of insulation and the retention of scrub water, in case of slight seepage, and hence ordinary rosin-sized building paper is not appropriate for the purpose. If additional insulation is called for, the waterproof paper should not be omitted, though it cannot be demanded unless specified. Finish flooring may be laid directly on the paper or other insulation, or on wood strips laid at intervals of 12 inches, at right angles to the run of joists. The flooring must be driven up close and nailed in the angle, just over the tongue, once every 12 inches, with flooring nails of a size suited to the thickness of the flooring. Only flooring 25/32 inch and thicker should be laid directly on joists, strips or sleepers. If flooring is end-matched and the supports are not more than 12 inches on centers, it is not essential that the joints occur exactly over bearings, but unmatched ends should never be permitted between bearings. Matched flooring less than 25/32 inch thick should always lie directly on the subfloor or insulation, without intervening air space. Parquetry (also called "parquet") and other thin square-edged stock that requires face-bradding should be laid only over double flooring, since the slight springing of subfloor boards between bearings might cause the brads to work loose.

FLOORS OVER CONCRETE

Where flooring is to be laid on sleepers attached to or embedded in concrete, one cannot be too cautious about the condition of the concrete at the time the flooring is laid. It should be thoroughly dry and, if filled in between sleepers, should have been struck off ¼ inch below their top surfaces to avoid contact between concrete and flooring. If the concrete slab rests on the ground, additional precautions must be taken. First, the slab should be waterproof. Even so, it will "draw damp" from the basement air, and hence should be overlaid with waterproof paper on top of the sleepers, and the underside of the flooring be oiled or painted. If one does not adopt all such preventive measures, one may find the finish flooring in such locations swelling and wavy. This is especially true of the close-grained woods, such as maple.

Grooved blocks (pieces of the flooring) should always be used in driving up the matched flooring. If driven by direct application of the hammer, the marks of the head are likely to show along the joints, or the tongues may be so mashed as to prevent close fit with the next grooves. Expert nailing is also needed, to eliminate the edge marks of final blows, the sure sign of work of the poor floor mechanic. These defects are particularly noticeable in softwood floors, and the young inspector may be assured most positively that they are unavoidable, by even the best of carpenters. He is not to believe any such statement. Good carpenters can do good work, if the contract is of a character to demand it. All joints should be well broken (staggered) and not in observable alignment. Short pieces of flooring should be used, as far as possible, in closets, storerooms and small alcoves, and at the wall ends of each alternate run,—never conspicuously placed, in good work. Flooring should run under the base to the face of plaster in all cases, and continuously through doorways, unless thresholds or changes of material intervene. But these refinements should be specified, if they are to be insisted upon.

SPECIAL WOOD FLOORS

In addition to the regular types of hardwood flooring, there are many of special types to be had, in the woods already named, and in mahogany, walnut, chestnut, butternut, cedar, gum, rosewood, teak, etc. Some of these come in random widths to resemble planking, of varying thicknesses; and may be marked by keys, pegs or other features; for all of which the superintendent should have special details and directions to guide his inspection. He has also to deal with all manner of floor coverings, such as linoleum in sheets and tile patterns; cork carpet; cork; rubber and asphalt; mastic tiling, etc., with each of which he must make himself well acquainted, if he is to act as a competent judge of either the material or its use. For example, if a shipment of linoleum or cork carpet is received at the building, he should know that it must not be unrolled until it has remained in a heated room long enough for the temperature to have permeated the entire roll, —say 36 hours. If unrolled while cold, it is likely to crack, the blame for which will rest definitely on some responsible party.

Any of these sheet or tile materials can be laid over smooth concrete or a wood subfloor and attached by special cement, or as otherwise specified (sometimes bradded to wood). They may also be laid over sheets of insulating material; but a prerequisite in every instance is the definite knowledge that the area to be covered is smooth, even, clean, *dry* and otherwise in fit condition. Furthermore, the superintendent must know whose is the task to properly prepare all surfaces that are to be so covered. The linoleum man may say that a particular area is neither clean enough nor dry enough nor smooth enough, and that he can't do a thing until it is made right. Maybe it is actually up to him to attend to these matters, but it is just as likely that someone else has left his work improperly finished and must come back and make good.

BLACKBOARDS AND TACKBOARDS

Blackboards are of slate or of some manufactured material especially prepared to receive chalk markings. If the manufactured article is specified, the specification writer must decide whose make and what grade (there being differences in quality and prices), and the superintendent should have the maker's description of what is contracted for, or its permissible substitute. Such boards are ¼ inch thick and in standard sizes up to 4 x 8 feet. The writing surfaces generally contain a certain amount of ground slate, and hence they are known as imitation slate, in distinction from the genuine slate boards. Slated cloth, fastened with tacks or paste, is also used for special purposes. Genuine slate for blackboards should be adequately specified, but it is frequently slighted, and hence the superintendent should know a few things about it in addition to knowing that exposed surfaces must be free from imperfections and be properly finished, and that due grounds and other setting details must be in accordance with drawings. Standard specifications provide that such slate shall be "not less than ¼ nor more than ⅜ inch thick. A maximum deviation of 1/16 inch from this thickness will be permitted when an average thickness of at least ¼ inch is maintained." Sizes of slabs should be equalized fairly well throughout each continuous area, 5 feet being the maximum length if not otherwise agreed. If not fixed by law, ordinance or specification, one can properly use 2 feet for the height from floor to top of chalk rail in primary rooms, 2 feet, 6 inches in fourth, fifth and sixth grade rooms; and 3 feet for higher grades, including high schools and colleges. Slabs are 3 feet, 6 inches or 4 feet high, as called for.

Tackboards and bulletin boards are of specified materials, presumably definitely located and detailed, and adequately specified. If they are not, the superintendent must get precise instructions. His interest in window shades may extend anywhere from the ordinary spring roller type to Venetian blinds or the dark shades required for laboratories, lecture rooms and the like, where total light exclusion is demanded. He may also be called upon to pass judgment upon draperies, —even upon stage curtains and scenery. For any such, he must first gain a definite concept of what is supposed to be provided, then ascertain that all requirements have been satisfied and that every contrivance for operating parts is in proper working order. This may prove much more involved than it sounds. A superintendent must have acquired considerable experience before he dare consider himself fully capable of handling all such subjects to completion.

CHAPTER 24—FINISH HARDWARE

A TYPICAL introductory paragraph to a specification for finish hardware reads: "Under Finish Hardware shall be included all butts, hinges, hinge plates, lock-and-latch sets, door bolts, checks, pulls, push- and kick-plates and bars, holders, transom lifts, sash fasts, lifters, sockets, pivot centers, stop screws and washers, base knobs, etc., for all doors, transoms, windows and cabinet work, together with all screws, keys, etc.; all of the required material and quantity."

Finish Hardware may be covered by description or by catalog numbers, or detailed specifications may be omitted and a lump sum allowed for its purchase, delivered at the site. In any event, it must be inspected by someone competent to pass judgment. If substitutions have been permitted, he must know that the items supplied are either equal to those scheduled, or that the difference in value has already been noted and allowed for, if need be. This is taken care of by a comparison of schedules, submitted to the architect weeks before the hardware is due at the building. Later, it is up to the man at the job to see that each item conforms to its schedule designation and catalog description; see that it is of proper materials (for instance, that plated bronze is not substituted for genuine, as disclosed by the magnet test); that all members are of correct size, as well as of the stipulated design; that proper keys are supplied, etc.

FITTING

Fitting a door, preparing it and its jambs for the application of hardware, is a task for an expert carpenter only. He must first make sure of the "swing" of the door, in order to know which jamb is to receive the butts. The door is first sawed (if necessary) to its approximate required size, care being taken that the original size is sufficiently near the ultimate so that the stiles and rails will not be spoiled in the trimming. This is of prime importance in veneered work, since the hardwood edgings may not be more than 5/8 inch deep, and too much cutting would expose the softwood core. This should never be permitted. After a door has been sawed to its approximate size (care being taken that the outside stiles and top rail are kept of equal widths), its four edges are further reduced by skillful planing until it is about 1/8 inch less in width than the distance between rabbets, and about 3/16 inch less in height than the distance between threshold and head rabbet. If there is no threshold, the bottom of the door should be about 1/2 inch above the floor, or a sufficient height to enable it to clear carpets and rugs. The front and back edges are beveled (the equivalent of 1/8 inch in 2 inches) to enable the door to swing clear of its rabbets. Butts should be selected with due consideration for the projection of wainscot cap and other members, in order that the door can be opened at an angle of 180 degrees, if not located in a corner. In lieu of other instructions, the bottom of the lower butt can be placed 9 inches from the floor, and the top of the upper butt 7 inches from the head; and the intermediate butts (if any) equally spaced between. Location of cross rails is ignored in placing butts, except in the case of ornamental strap- or T-hinges. Butts for doors have loose pins for convenience in removing, but the pins should be of a type that will not work up.

CUTTING FOR HARDWARE

The cutting of door stiles for mortice locks or latches must be done with extreme nicety, as is equally true of the cutting of jambs for the strikes. In all better class work, the recessed or "box strikes" should be used to conceal the unfinished wood in the holes; and the lip of the strike should project sufficiently to protect the edge of the casing against the contact of the latch. Latch sets are located with the center of the knob 2 feet, 10 inches to 3 feet, 2 inches above the floor, the lesser dimension applying to residences and schools, and for locks with keyholes above the knobs. The center of a push-plate or push-bar should be about 4 feet, 3 inches above the floor, to properly serve its purpose.

If floor hinges are to be used for certain doors in a building having concrete floor slabs, the superintendent must be advised of the fact well ahead of the pouring of concrete, in order that he may supervise the placing of the necessary boxes or other inserts in the forms, to later accommodate the hinge parts.

An inspector will hear doors referred to as right- and left-hand, and hence should know that, when he stands facing a door that opens *away* from him, it is a right-hand door if hinged on the right, and a left-hand door if hinged on the left. If it opens *toward* him, the reverse is, of course, true. Non-reversible locks can be used only on doors of the "hand" for which they were intended.

TRANSOMS, ETC.

Unless otherwise provided, transom sash are of the same thickness as that of doors in the same jambs, and are of solid wood, seldom veneered. Unless supplied with hardware, they should be nailed or screwed in place. If intended to open, they may be hinged or pivoted, and made to operate with transom lifters, or supplied with one or two chain stays and a ring catch, to be operated with a pole and hook. If not otherwise stipulated, it is proper to hinge a transom at the bottom to open into a room away from the corridor. Fast-joint butts are used for hinged transoms, since loose pins would eventually work out.

Hardware for solid and hollow-metal doors is either of the standard supplied by the makers of the doors or may be purchased with the regular hardware and shipped to the door factory to be applied. Hardware for metal-covered doors is of the same nature as that for wood doors and applied in like manner, by carpenters at the job, who pierce the metal covering as may be necessary for screws and morticing.

FOR CASEMENTS AND DOUBLE DOORS

Hardware for French and casement windows is much the same as that for doors, though on a smaller scale. Due care must be exercised in seeing that the "backset" of the lock (distance from edge of door to center of keyhole) is such as will allow the trim of keyhole and knob sufficient room on the stile. Where hinged doors or casement sash occur in a pair in a single opening, one half, called the bolted or "dead" leaf, must be provided with head- and foot-bolts, either morticed or applied on the surface. The latter offer greater resistance to violence, since morticing cuts away a considerable portion of the stile. This factor should likewise be given due consideration when selecting bolts for double casement sash. Mortice bolts can be placed so as to operate either on the inner face or on the edge of the dead door. The latter method is used where it is desired that the opening be controlled by the key of the regular lock. Com-

bined head and foot bolts (double extension bolts) are to be had, either mortice or surface, operating together by means of a single handle. Exposed bolts of this type are called "cremone" or "cremorne," and are plain or ornamental. Another variety, called "espagnolette," is made to revolve, and is fitted with a hook at top and bottom, each of which engages with a fixed pin or socket. Strikes for head and foot bolts must be well anchored. This is a detail too frequently slighted, especially where those for foot bolts are set in concrete, stone, terrazzo or tile. They should be of a special type for the purpose, the best being a short section of pipe rigidly embedded. A hole cut in a metal threshold to receive the end of a bolt is also good.

The meeting stiles of double doors and casements may be rabbeted together, or the dead leaf provided with a full length stop, termed an "astragal." If rabbeted, the lock must be one with a rabbeted face. If the door opening is one that is much used, neither rabbet nor astragal is needed. The latch may also be omitted, and each door, if single-acting, fitted with a check spring and a pull on one side, and a kick-plate and push-plate on the other. If double-acting, the kick-plates and push-plates are applied both sides. If locking is needed on such a pair, one leaf is provided with head and foot bolts and the other with a dead lock.

All doors in the line of egress from a panic or fire should open *outward,* and, if requiring locking, it should be in the form of a self-releasing or "panic bolt." This feature is covered by law in some states and by ordinance in some cities, and hence must be known to both architect and superintendent. Rear store and basement doors frequently occur in obscure courts and alleys, and consequently need more security than is afforded by ordinary hardware, commensurate with the grille protection of adjoining windows. Such a door may be of metal, or of wood in two thicknesses with a sheet of metal between, and held close by means of a wood or metal bar, with ends resting in strong sockets. An ordinary glazed and paneled door in such a location provides easy ingress, even if locked, barred and bolted.

Special doors in infinite variety are provided for every purpose;—side-sliding, revolving, multiple-folding, horizontal-folding, vertical-sliding, overhead, etc., both hand- and power-operated. For each of these, the maker's description and show drawings should be available. Also, in case of an installation at all complicated, the specifications should provide that the door and equipment must be installed by the manufacturers, or that they are to supervise the setting, and guarantee satisfactory operation.

KEYS

The matter of transfer of keys from contractor's foreman to the architect's representative is of much importance. Aside from a single key to the building and one each to the hardware and paint rooms, the superintendent should accept no keys until a formal acceptance of the entire lot is executed. On work of any size, a key drawer or cabinet is provided, and each pair or set of keys for each lock has its individual place therein. On lesser work the keys are mounted on a board or wire ring and so delivered; each one, in any case, tagged for identification. When the building is otherwise ready for final acceptance, the superintendent makes a careful check of all keys, sees that they are of the kind and number catalogued for each lock, and ascertains that there are none outstanding. Unless specifically empowered by the architect to do so, he avoids any overt act that would make either his employer or himself responsible for the keys after they have been checked over. Rather, he merely witnesses the transfer of the keys to the owner or his agent. Vault and safe combinations are even more delicate matters than keys. Their descriptions should be delivered under seal to the owner, or to the superintendent, who passes them on to the owner, with the seals unbroken.

CHAPTER 25—GLASS AND GLAZING

NEARLY all glass in a modern building is customarily included in a single glazing contract or subcontract. Exceptions to this are the glass of vault lights and skylights, though even the latter is sometimes found in a specification with other glass. However, if a skylight contractor is to guarantee his work or be otherwise responsible for it, he should be allowed to complete his installation, including glass. Other exceptions from a glazing contract are the glass in floors and wainscots, and in manufactured articles, such as cabinets and other furniture. The specifications for each of these should say clearly who is to supply the necessary glass, or, in case of doubt, the superintendent should have the question promptly settled.

PROPER PROTECTION

The glazing of skylights was covered in the chapter on Sheet Metal Work (Chapter 20).

The next appearance of glass at a building is likely to be that for exterior windows. The use of these for the purpose of enclosing the building for plastering was discussed in Chapter 23. The chief concern of the superintendent at this stage, on the subject of glass, is to see that proper measures shall be taken for protecting it and to see that there is a distinct understanding all round as to whose is the responsibility for caring for it. Apparently, the best practice makes the general contractor (if there be one) custodian of the glass until his contract work is accepted. In lieu of a general contractor, the duty should devolve upon that other contractor or party who may be responsible for the premises. He should be authorized to make charges for breakage or other glass damage against those known to have caused it; and to prorate all glass damage from unknown causes against those contractors (including the glazier) having work in the building at the time of the damage. These charges are ordinarily kept by the foreman in charge. The superintendent should have a clear understanding with him as to whether it is expected to collect the assessments direct, or if recourse will be had to the owner to deduct the amounts from contract prices. In the latter event, the superintendent, as the owner's representative, must make daily entry in his own record of all such charges, as reported by the foreman and duly verified. None but a day-by-day record can be considered truly authentic, and the foreman should be made to understand this most thoroughly. The superintendent may be given the task of keeping such record in the foreman's stead, and must proceed accordingly.

DAMAGE RISKS

The major damage to glass during the time of plastering is due to carelessness in handling scaffold plank, and to the splashing of plaster. To guard against the latter, it is well to have all such glass coated on the inside with a soft greasy soap (surgeon's soap) to which plaster will not adhere well. The use of whiting for such coating is not sufficiently protective. Men write on it and rub it off too easily, and dabs of plaster adhere. In a certain large office building, where the plasterer was required to remove plaster from the glass, a final inspection, after the glass had been re-cleaned by the glazing contractor, disclosed an alarming number of scratches, sufficient cause for rejection of a large percentage of the panes. The glass was plate, and hence the replacement cost was high. It was alleged that the glazer's cleaners had done the damage by the use of razor blades; but they were able to demonstrate that, as used, the blades never scratched. Careful investigation by the superintendent revealed that the plaster contractor's cleaners had used wood scrapers for removing the blobs of plaster, and that this had been the direct cause of the scratching, the penalty for which was thereupon assessed by the architect where it belonged. Thereafter that architect made it his practice to specify that all cleaning of glass should be in one contract, either that of the general contractor, the glazier, or of an independent window cleaning concern. He also provided that the same concern should smear the glass with surgeon's soap before plastering was started.

INSPECTION

There is little to be gained by an inspection of glass by the superintendent at the time of first glazing. It must be gone over in detail later,—and replacement is no more difficult toward the end of construction operations than at any other time. For intelligent inspection of a glass installation, a superintendent had best wait until it has all been cleaned, then fortify himself by means of a detailed examination of samples of all the glass included in his specifications. In our school building, plate glass was demanded for mirrors and for all vestibule doors, inside and out. Classroom doors had upper panels of chipped plate, with polished discs (requested by the principal, to enable one to survey the room from the corridor without disturbing the pupils). Transoms over corridor doors were glazed with D. S. A glass, as were adjoining openings, located over the blackboards for supplying "borrowed light" to corridors. Interior transoms were hinged, but other partition glass, including that around vestibule doors, in transoms and side lights, was set directly in stops, without sash. Aside from that in doors and skylights, all exterior glass was specified to be D. S. A. There are four regular grades of ordinary window glass known as "AA," "A," "B" and "C" grades, in each of which grades there are two thicknesses called "single-" and "double-strength," customarily termed "S. S." and "D. S." The best understanding of the grading of window glass is to be had from the United States Government Specifications:

"The defects permitted in 'A' quality are faint strings or lines, slight burn, small seeds, small blisters, and light scratches. No light shall contain all these defects, and those present may not be grouped when in the central area of the sheet.

"Strings, lines, or burn specks shall not be of such intensity that they are visible when observing the sheet at an angle greater than 30 degrees between the line of sight and the glass. Waves shall not be visible at an angle greater than 20 degrees with the glass. Blisters shall not exceed ¼ in. in length unless they occur near the edge of the sheet.

"In general, the central area of the light shall

be practically free from defects, and the appearance of the light as a whole shall be such that there is no perceptible interference with the vision as long as one is not looking through the glass at an acute angle.

"A limited amount of glass, known as 'AA' quality, which is especially free from defects, is sometimes selected for special purposes and may be specified if desired. It must be borne in mind, however, that the total amount of 'AA' glass produced by the manufacturers does not exceed 3 per cent of the total amount of window glass made.

"In general, 'B' quality has the same character of defects as 'A' quality, but they may be more numerous and heavier. They should not, however, be so numerous as to prevent a considerable portion of each light from being reasonably free from such defects.

"All flat glass contains some imperfections, and the principle employed in grading is to exclude all defects that would be objectionable in a given grade. This is difficult to do since there are no sharp lines of demarcation between grades, and experienced inspectors will differ in judgment as the quality of glass approaches the limits of the grades. Small lights must be quite free from imperfections as compared with larger lights, and the center of any sheet should be clear, whereas the edges may contain more pronounced defects.

"All clear window glass shall be relatively flat. Slight curvature, provided it is regular, will be allowed, but the maximum deformation or bow shall not make an arc higher than 0.5 per cent of the length of the sheet. Reverse curve or crooked glass is not allowable. Window glass shall always be glazed with the convex side out.

"Glass must be cut to dimensions ordered with an allowable tolerance of $\frac{1}{32}$-in. per $\frac{1}{8}$-in. thickness."

THICKNESS AND WEIGHT

As to thickness and weight of window glass, single-strength runs 10.5 to 12 lights per inch, and has an average weight of 18.5 oz. per sq. ft. Double-strength runs 8 to 9 lights per inch and weighs about 24.5 oz. Heavier thicknesses of window glass are known as "26-oz." (7.5 to 8 lights per inch), "29-oz." (6.5 to 7 lights per inch), "34-oz." (6 to 6.5 lights per inch) and "39-oz.", which is $\frac{3}{16}$ in. thick. These four thicknesses are called "Crystal Sheet Window Glass." "26-oz. and 29-oz. glass are produced only in 'A' and 'B' qualities. 34-oz. and 39-oz. glass are produced in glazing and auto qualities." 'C' grade is a "glass of inferior quality but not containing stones, heavy cords, or other imperfections serious enough to cause breakage in shipment." Other grades are: *"Fourth Quality,*—contains such defects as eliminate it from 'B' quality standard, but too good to be branded 'C'; *Steel Sash,*—specially selected for the requirements of this class of work. Defects so located as not to obstruct light transmission; and *Greenhouse,*—a special quality selected with reference to the elimination of defects injurious to growing plants."

Standard sizes of window glass are in multiples of 2 in. up to 40 x 50 in. for single-strength, 60 x 80 in. for double-strength, and 78 x 120 in. in heavier sheets. Sheets of intermediate sizes are deemed fractional and may be charged for at the rate applying to the next larger regular size with, ordinarily, no extra charge for cutting.

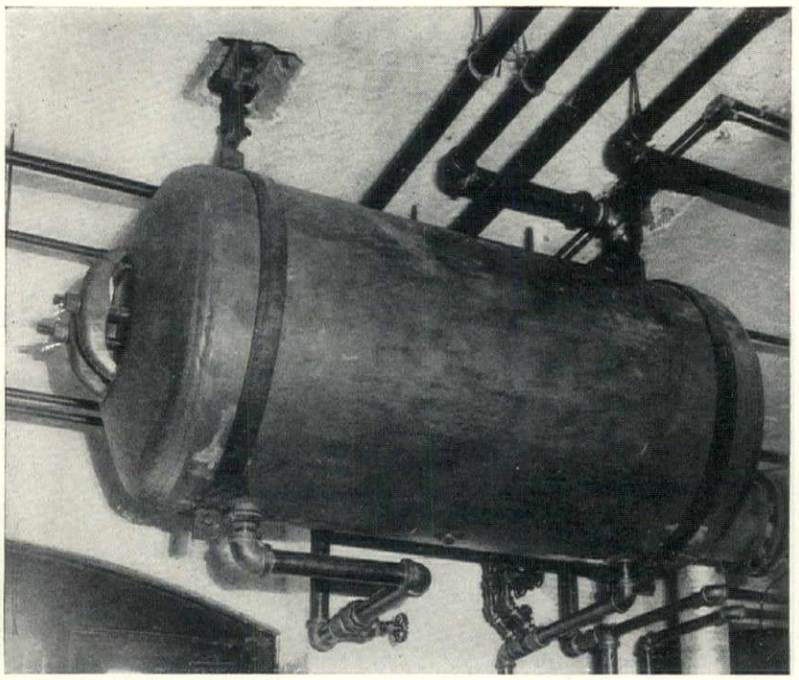
To be continued in THE ARCHITECTURAL FORUM *for April*

NOTE: Referring to Chapter 21, "Furring, Lathing and Plastering," of this series on "The Supervision of Construction Operations," the attention of the author has been called to certain changes that have been made in the recommendations of the Associated Metal Lath Manufacturers since the said chapter (which appeared in the November, 1930, number of THE ARCHITECTURAL FORUM) was written. These changes are incorporated in the 1929 edition of the association's publication, "Metal Lath Construction for Better Plastering and Stucco." The chief variations from the author's text (see page 652) are in limiting the use of 2.2-lb. lath to solid partitions, using a minimum weight of 2.5-lb. for other 12" stud-spacing; cutting down the permissible spacing of 3.4-lb. lath supports in ceilings to 13½"; limiting the spacing of supports for ¼" pencil rods in ceilings to 19" centers; confining the term "running-bars" to the larger members in ceiling construction; and making the sizes of pencil-rods dependent upon their own spacing as well as upon that of their supporting members. The spacing of furring channels for ceilings is also made dependent upon that of their supporting members as well as upon the weight or area of the plaster carried. The general tendency of this latter requirement is to make the assembly of the metal lath and supporting steel stronger and more rigid.

Referring also to the discussion on page 653 of the same issue on the subject of attaching metal lath to masonry, the attention of the reader is called to the fact that the new hardened masonry nails now available have largely eliminated the need for wood nailing strips. It is possible to drive them into almost anything except terrazzo, marble or granite, and lathers may use them freely for attaching metal-lath or corner-beads to concrete or other masonry.

It is important that a specification writer, before tackling this subject, should familiarize himself with the latest literature of the association (including the "Partition Handbook") which can be had by application to the Commissioner, 1821 Engineering Building, Chicago, Ill.

500-Gallon, welded hot water tank of Everdur installed in a New England office building; an investment which will pay dividends by eliminating the possibility of rust repairs and replacements.



Everdur Metal

a copper alloy with the strength of steel ...*ideal* for water tanks

EVERDUR METAL (strengthened copper) is the latest development for rust-proof tanks. In perfecting Everdur, Anaconda has made available a metal possessing the strength and welding properties of steel, and exceeding copper in resistance to corrosion. It is an alloy of copper (96%), silicon and manganese.

Everdur storage tanks are being manufactured in many sizes, ranging from welded residential water-heating units up to the large riveted tanks required for commercial buildings. The cost is moderate compared with other copper alloys because the physical properties of Everdur make it possible to use the thinner gauges specified in steel and to employ the same fabricating methods followed with steel.

Rust troubles will never affect the water systems of buildings equipped with Everdur tanks and Anaconda Brass Pipe for distribution lines. The durability of these metals makes their use a definite economy.

Complete data on the physical and welding properties of Everdur are contained in publications E-2 and E-4. Address The American Brass Company, General Offices, Waterbury, Connecticut.

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EVERDUR

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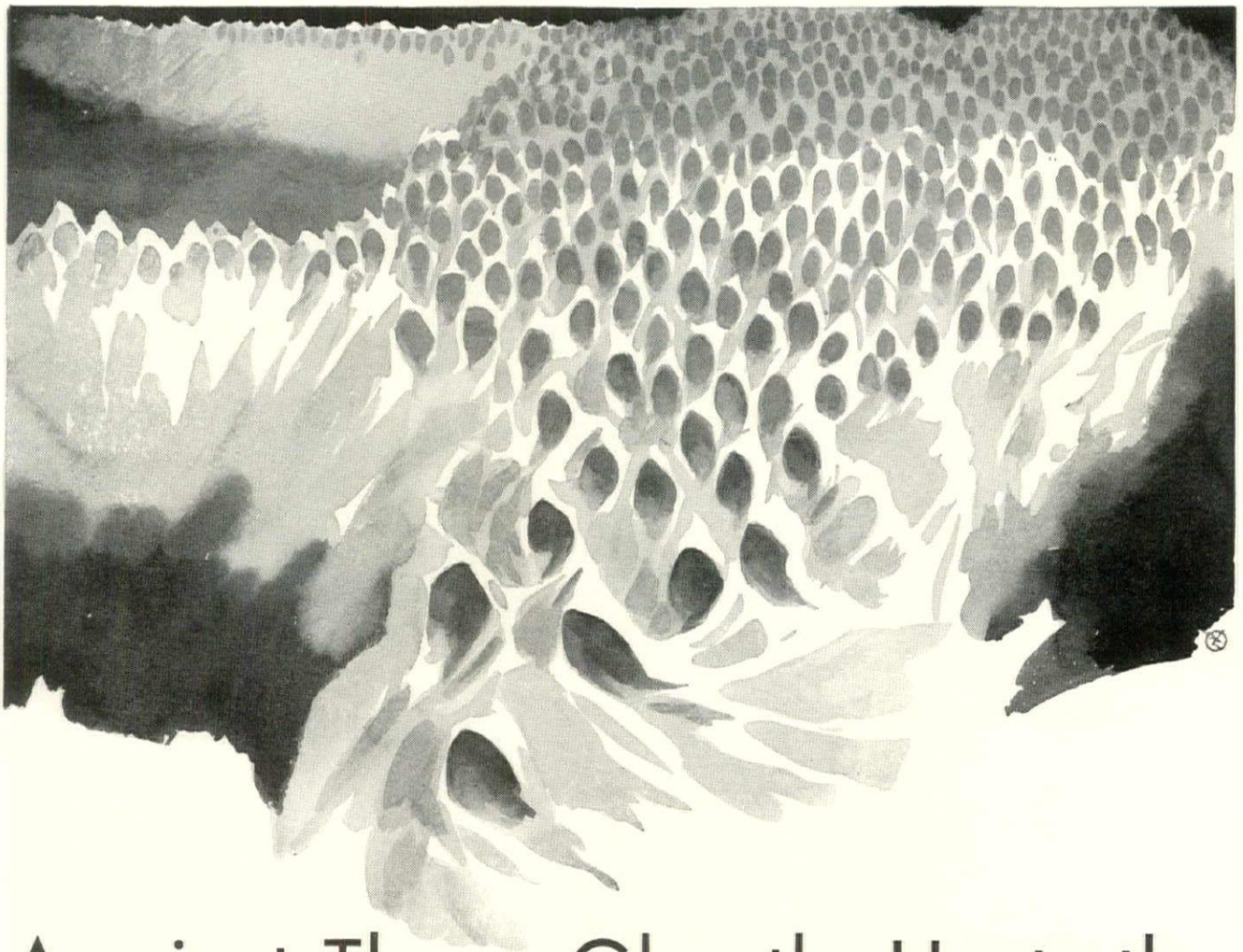
EXCLUSIVELY AN ANACONDA METAL



Against These Ghostly Hosts the Soldier of Sanitation is Your Ally

In the toilet rooms and plumbing fixtures of every public and semi-public building unseen, ghostly legions lie in ambush ready to attack at the first sign of failure or defect.

The final results of such attacks are much more disastrous than the mere dollar costs involved in remedying the troubles.

For bubble cups may wash germs to the lips of unsuspecting drinkers. Poorly operating closets and urinals may become breeding places for the most hideous of infectious diseases.

And with the number of people using the fixtures these dangers are all too common.

To defeat the grim hosts who promote such conditions the Clow Soldier of Sanitation has worked for 52 years. He has developed the most complete line of specialized plumbing fixtures in the world for schools, hospitals, industrial plants and public buildings.

And he has developed manufacturing and testing methods that assure perfect operation of every fixture before it is shipped.

You will notice the results in two ways: (1) the unseen legions ambushed for stealthy attack will be completely routed, (2) the cost of repelling them through the many years to come will be reduced to almost unbelievably low levels.

Call him in.

CLOW

CHICAGO

PREFERRED FOR EXACTING PLUMBING SINCE 1878

Consult your architect

The Clow Soldier of Sanitation is a specialist on all plumbing jobs where sanitation is likely to be an acute problem. At his finger tips is the accrued experience of 52 years. This is Ted Seabrooke, Toledo, Ohio.

MODERN SUBSTANTIAL ADMIRABLE

OHIO SAVINGS BANK AND TRUST COMPANY
TOLEDO

Architect: Mills, Rhines, Bellman and Nordhoff, Toledo; *General Contractor:* A. Bentley & Sons, Toledo; *Plumbing and Heating Contractor:* Howard C. Baker Company, Toledo

UNUSUAL interest attaches to the new 30-story building of the Ohio Savings Bank and Trust Company in Toledo, for unusual measures were taken to assure wise investment of the five and a half million dollars involved.

Bank and office buildings in every part of the United States were visited and compared and the experience of their owners drawn upon. Every specification of material or equipment passed under searching scrutiny. The aim was to embody all that is most modern and known to be worthy, for such a building. The result has been much commended.

The choice of NATIONAL Copper-Steel Pipe for the major tonnage of pipe in this fine structure is one more testimony to the reputation, among informed users, of NATIONAL—

America's Standard Wrought Pipe

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
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NATIONAL PIPE

*Ross Chemical Laboratory **
Alabama Polytechnic Institute, Auburn, Ala.

SHOULD there be any compromise with permanence in the plumbing of a school, college or hospital building? Does a minor saving in first cost reflect sound judgment—when 3, 4 or 5 years will see the demand for laboratory drain replacements? How much better to be able to say, with the architect whose work is pictured, "That *Duriron* Drain Piping, and its calked joints, will stand all the acids ever poured down the drains, as long as the building stands."

For data see our pages in "Sweets"

* *Warren, Knight & Davis, Architects*
E. M. Williams, Sanitary Engineer

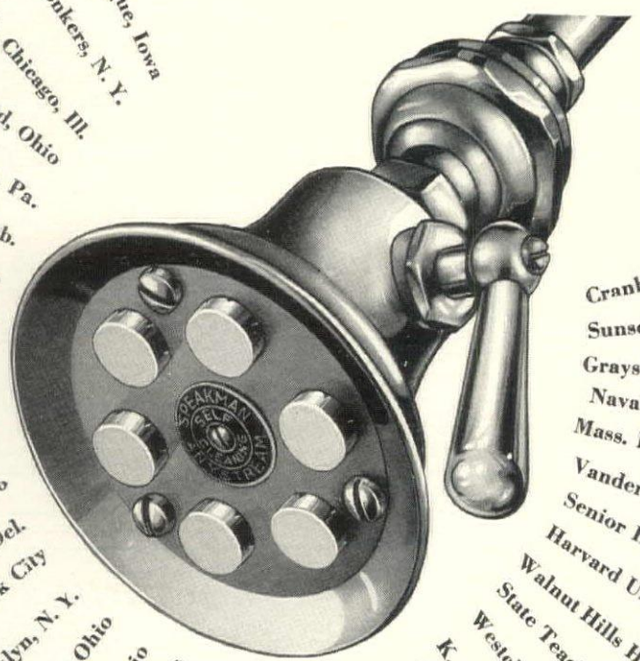
DURIRON ACID PROOF DRAIN-PIPE

A Product of: THE DURIRON COMPANY, Inc., 446 N. Findlay St., Dayton, Ohio

Sales Offices in 36 Principal Cities

We think that architects will be interested in seeing this list of places where SPEAKMAN ANY-STREAM SELF-CLEANING SHOWER HEADS have been installed. It shows how the head is being received. We suggest that you incorporate this head with every shower.

Y. M. C. A., Dubuque, Iowa
Municipal Baths, Yonkers, N. Y.
Beverly Country Club, Chicago, Ill.
Hollenden Hotel, Cleveland, Ohio
Penn State College, State College, Pa.
Senior High School, Norfolk, Neb.
Y. M. C. A., Nashville, Tenn.
Y. W. C. A., Cortland, N. Y..
Onesta Hotel, Canton, Ohio
Hamilton Club, Chicago, Ill.
Y. M. C. A., Springfield, Ill.
Y. W. C. A., Akron, Ohio
Y. M. C. A., Wilmington, Del.
Chrysler Bldg., New York City
Ebbetts Field, Brooklyn, N. Y.
Hotel Cleveland, Cleveland, Ohio
North High School, Akron, Ohio
Missouri Athletic Assn., St. Louis
Catholic College, Mundeline, Ill.
University of Illinois, Urbana, Ill.
Gibson Hotel, Cincinnati, Ohio
Decatur Club Bldg., Decatur, Ill.
Severin Hotel, Indianapolis, Ind.
Mayflower Hotel, Washington, D. C.
Men's Field House, Morgantown, W. Va.
K. of C. Club House, Brooklyn, N. Y.
Westchester Biltmore Country Club, Rye, N. Y.
State Teachers College, Hillwood Lakes, N. J.
Walnut Hills High School, Cincinnati, Ohio
Harvard University, Cambridge, Mass.
Senior High School, Philadelphia, Pa.
Vanderbilt Athletic Assn., Nashville, Tenn.
Mass. Institute Technology, Boston, Mass.
Naval Training Station, Detroit, Mich.
Graystone Park Apt., Morristown, N. J.
Sunset Ridge Country Club, Winnetka
Cranbrook Gymnasium, Detroit, Mich.



It fits all makes and types of showers. Can never stop up!

What it does

Gives a flood shower

A normal shower

A stinging needle bath

All with a slight turn of the lever handle

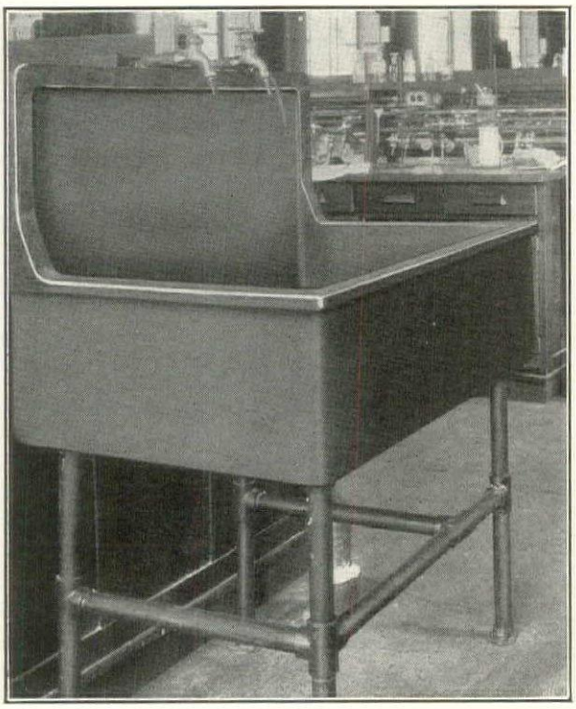
SPECIFICATIONS

K-3395 Speakman Anystream Self-Cleaning Shower Head, with lever handle. Has a ½ inch iron pipe inside thread. Finished in Speakman Chromium plate.

Folders and celluloid mechanical model sent upon request.

SPEAKMAN COMPANY
Wilmington, Delaware

SPEAKMAN
SHOWERS *and* FIXTURES



KNIGHT-WARE Sink Setup at Ohio State University

There are 306 KNIGHT-WARE Sinks now in service in the Chemistry and Pharmacy Buildings at Ohio State University.

GUARANTEED SATISFACTORY · MAURICE A. KNIGHT · ACID-PROOF CHEMICAL STONEWARE

KNIGHT-WARE

"IT IS THE BODY ITSELF"

ACID PROOF LABORATORY SINKS

KNIGHT-WARE Sinks are admirably suited for all laboratory purposes requiring acid proof units.

Made entirely in one-piece without seams or joints and of a body texture that is absolutely impervious to the action of acids, alkalies, chemicals or corrosive solutions and which will not chip, flake or peal, KNIGHT-WARE Sinks are the general choice in the modern laboratory.

KNIGHT-WARE Sinks are manufactured entirely by hand and hence special requirements may be fabricated at no increased proportionate cost over standard types.

Specify KNIGHT-WARE Sinks for economical service and durability.

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MEETING ARCHITECTURAL STANDARDS OF QUALITY

ABOVE: *Solid Nickel Silver* faucet manufactured by The Meyer-Sniffen Co., New York. N. Y.*

* * *

Scottish Rite Temple, Washington, D. C. Architect: John Russell Pope, New York; Solid Nickel Silver plumbing fixtures by The Meyer-Sniffen Co., New York. The manager of this building states that these Solid Nickel Silver fixtures have been used constantly for 15 years and are still attractive and rendering satisfactory service.

ANOTHER SOLID NICKEL SILVER INSTALLATION BY MEYER-SNIFFEN

MODERN buildings deserve plumbing fixtures that remain permanently attractive and render long service. Fixtures made of Solid Nickel Silver are not easily marred or broken during installation and retain their attractive appearance through long years of hard service. Their silver-like beauty is comparable to that of Pure Nickel and other high nickel alloys. The hardness, toughness and strength of Solid Nickel Silver assure exceptional wear resistance of valve seats, adding economy to the inherent beauty of these fixtures. The best architectural opinion is in agreement that plumbing fixtures of Solid Nickel Silver meet the highest standards of quality. Specify Solid Nickel Silver fixtures and be insured of permanent beauty, long life and economy in service.

18% 22 Nickel SILVER

*Diamond Metal is the name used by The Meyer-Sniffen Co. to identify its Nickel Alloy used in manufacturing Nickel Silver plumbing fixtures. This is a solid white metal and contains a high percentage of Nickel.

INCO NICKEL THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y. INCO NICKEL

Quaker City Cold Storage Company Warehouse, Phila., Pa. The Ballinger Co., Architect.*

AIRTIGHT!

IF a massive structure like this one is made *airtight*, there can be no excuse for allowing moisture to damage fine buildings by seeping through the exposed joints of the walls.

Conditions here required an airtight wall. The temperature maintained in the various rooms ranges from ten degrees below zero to thirty-six above. The room walls are covered with cork six to eight inches thick, coated with asphalt and painted. If air leaked through the walls, moisture would condense and freeze, forcing the insulation away from the walls and causing no end of damage. Under such conditions the building just *had* to be airtight.

It was no occasion for penny-wise economies. A good calking compound, well installed, was called for. Pecora Calking Compound is adding to its laurels in one more installation where calking is all important.

SEALED WITH PECORA CALKING COMPOUND

**All exterior joints in spandrel walls between brick and concrete, joints specified ½" to 1", calked with Pecora Calking Compound.*

PECORA PAINT COMPANY,
Fourth and Venango Streets, Philadelphia.

Please tell me why a building isn't completed until it is calked. And give me full information on Pecora Calking Compound.

Name .....

Firm Name .....

Street and No. .....

City and State .....

MANHATTAN TOWERS HOTEL
NEW YORK CITY

Powerizer Centralized Radio Equipped

THERE is at this time no standard for sound and centralized radio systems in buildings. Different hotels whether already erected or in the course of planning and construction have different problems.

A school is another problem, a hospital is still another.

We would be very glad to send you a typical specification of any type of building on which we have had experience. We would suggest that you use our questionnaire which we will be glad to send you together with other literature which we are issuing from time to time.

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POWERIZER SOUND SYSTEMS

no! Mr. Architect

A PISTON TYPE FLUSH VALVE is *not* as good as a DIAPHRAGM TYPE

Architect—Do you mean to tell me that you make a piston type flush valve but you don't recommend it?

Salesman—That's exactly what I mean. We make a piston type flush valve—the best valve of its type that years of experience have taught us how to make. It has features that no other similar valve has. It is made of the finest materials, and the workmanship is unexcelled. In fact, I know of no other piston type valve that can compare with our "Jewel". Yet, I do not recommend it in comparison with a Watrous diaphragm flush valve.

Architect—Why not?

Salesman—Because even the very finest piston type valve is used only where a low-cost job is wanted—where price is the consideration rather than continuous, efficient performance.

Every piston type valve uses cup-leather in the mechanism. As you know, cup-leather is not as lasting under water as is a rubber diaphragm. Besides, there is always a certain amount of water slippage past a cup-leather and this affects the quantity of water delivered at each operation.

If you are compelled to use a piston type valve, I can show you a dozen reasons why you should choose the Jewel. But where you want a flush valve that will give uninterrupted, efficient, economical service over a long period of time, by all means install the Watrous diaphragm flush valve. It is unquestionably the most satisfactory flush valve made.

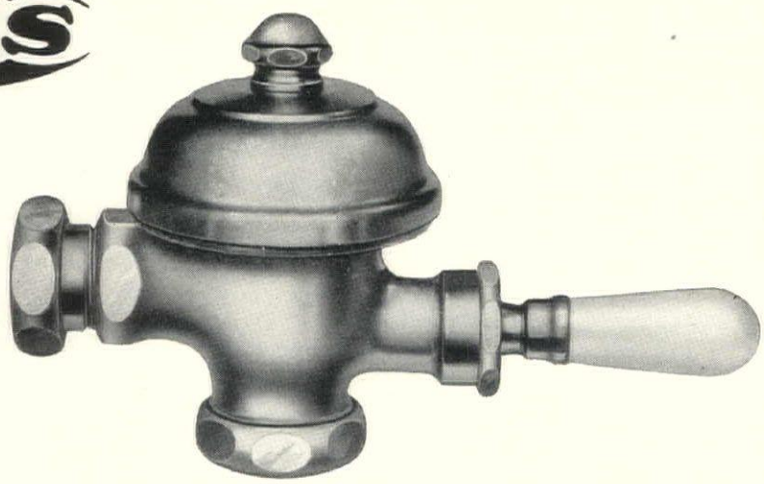
Watrous

DIAPHRAGM FLUSH VALVES

The Watrous Diaphragm Flush Valve is a diaphragm type valve with outside regulation *without restricting the water way.*

It will work in combination with any type of closet bowl and will deliver exactly the proper quantity of water required by each bowl—no more and no less. Thus, efficient sanitation is assured and water waste is eliminated.

The Watrous guarantee is backed by an organization with ample financial resources and a commercial rating of AAA1.



THE IMPERIAL BRASS MANUFACTURING CO.
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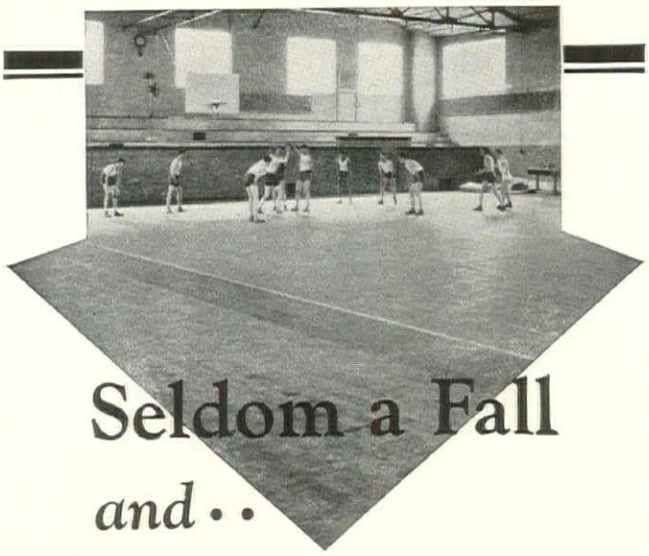
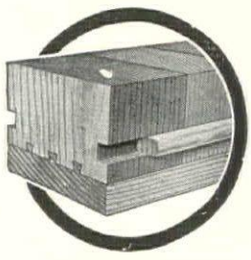


Seldom a Fall
and . .
NEVER A SPLINTER

THIS illustrates a Bloxonend Floor in the gymnasium of the West Senior High School, Green Bay, Wis. C. C. Reynolds, Architect.

Tough End-grain up

A gymnasium floor of Bloxonend minimizes falls and speeds up gymnastics and games because it provides a sure, safe footing. The end-grain fibres form its surface, positively eliminating the hazard of splinters. The floor is long-lived, resilient, sound-absorbing, takes an excellent finish and stays smooth. Powdered boric acid (easily removed with a damp cloth) makes it just right for dancing. Specified by leading architects for gymnasiums, shops and the better type industrial plants.



BLOXONEND comes to the job in 8 ft. lengths with small tough blocks of Yellow Pine dovetailed endwise onto baseboards. The end-grain fibres form the wearing surface.

Sample and Specifications on Request

CARTER
BLOXONEND FLOORING COMPANY
KANSAS CITY, MISSOURI

Branches in Leading Cities—See Sweet's

-BLOXONEND-
Lays Smooth **FLOORING** Stays Smooth

The Bull Dog Method Saves Time and Labor

STEP ONE—PLACING CLIPS. *Note how easily clips are placed in exactly proper position. Single or double guide board insures correct alignment.*

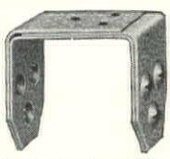
THE Bull Dog Method of anchoring wood floors over concrete saves valuable construction time. No fill to dry—no beveling or shimming—sleepers and finished floor are laid at one time.

Other reasons for using The Bull Dog Process are: ***elimination of dry rot***, doubling floor life; reduction of dead load 18,000 lbs. to 1,000 square feet of slab area; permanent and secure sleeper anchorage, preventing buckling, squeaking and doming. The Junior Clip (5/8" wide) may be used with or without a fill (dependent on the service duty of the floor.) When a fill between the sleepers is desired, any cheap, inexpensive mix such as sand, cinders or cinder concrete can be used.

Millions of BULL DOG FLOOR CLIPS on over 8,000 jobs carry testimony of satisfaction. Made for 2, 3 and 4 inch sleepers. Regular and Junior Styles. Friction tight nailing facilities (nails gratis.) Write for catalog and samples.

THE BULL DOG FLOOR CLIP CO.
108 N. First Ave., Winterset, Ia.
135 Representatives—15 Warehouse Stocks

BULL DOG
Floor Clips



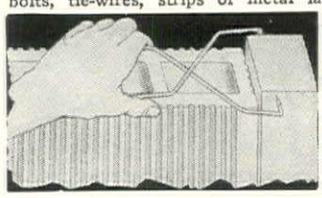
REGULAR CLIP—*3 sizes, 2, 3 and 4 in. 20 gauge galvanized iron.*

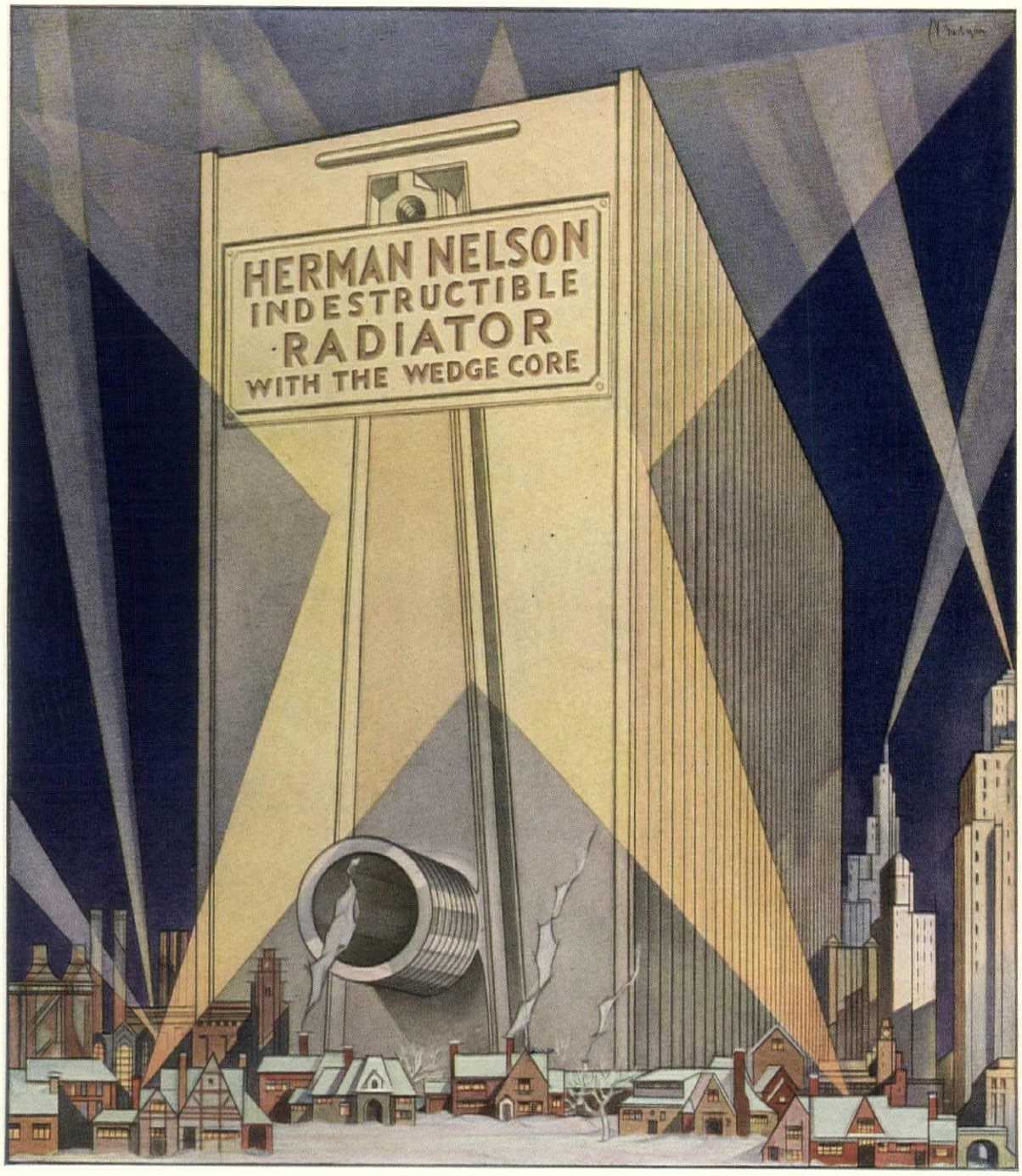
Original Patent granted June 14, 1921
Reissue Patent granted June 29, 1924
Process Patent granted May 19, 1925

JUNIOR CLIP—*3 sizes, 2, 3 and 4 in. 18 gauge galvanized iron.*

The Bull Dog Buck Anchor

THE Bull Dog Buck Anchor forms a rigid truss in the mortar joint which prevents the movement of the buck in any direction. It eliminates the use of nails, screws, bolts, tie-wires, strips of metal lath and iron, and all pounding against the back sides of the buck. Made in three widths of No. 10 Galvanized Steel Wire: 3 in., 4 in., 6 in. Ten per cent of anchors in packing cases are shorts to take care of spaces too short for the regular size anchor.





OUR CONTRIBUTION TO THE ART OF HEATING AND VENTILATION

The Herman Nelson Wedge Core Radiator is an exclusive feature of all Herman Nelson Heating and Ventilating Products and accounts for their satisfactory performance. ✣ ✣ ✣ ✣

THE HERMAN NELSON CORPORATION MOLINE ILLINOIS

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Hand in hand with the nation's educators, the architect is fitting America's youth for the progress of the future. In planning schools, he plans *environment* in which young bodies and minds can find sound growth.

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*Makers of the *Univent*, for the ventilation of schools, offices, churches and all buildings having an acute ventilating problem — the *Herman Nelson Invisible Radiator*, for residences, apartments, hotels, offices, and monumental structures — the *Herman Nelson hiJet Heater*, for economical distribution of heat in factories, mills, garages, warehouses, and smaller buildings.

Selected List of Manufacturers' Publications

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS, AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge unless otherwise noted, by applying on your business stationery to *The Architectural Forum*, 521 Fifth Ave., New York, or the manufacturer direct, in which case kindly mention this publication.

ACOUSTICS

R. Guastavino Co., 40 Court Street, Boston.
Akoustolith Plaster. Brochure, 6 pp., 8½ x 11 ins. Akoustolith as Related to Architectural Acoustics. Booklet 10 pp., 8½ x 11 ins.

Johns-Manville Corporation, New York.
Sound-Absorbing Treatment in Banks and Offices. Booklet, 18 pp., 8½ x 11 ins. Illustrated.
Sound-Absorbing Treatment in Churches and Religious Institutions. Brochure. 22 pp., 8½ x 11 ins. Illustrated.

ASH HOISTS

Gillis & Geoghegan, Inc., 544 West Broadway, New York.
G & G Telescopic Hoist catalog, 8½ x 11 A. I. A. Standard Classification 30il, contains complete descriptions, method of selecting correct model to fit the building's needs, scaled drawings showing space requirements and specifications.

ASH HOISTS—TELESCOPIC

Gillis & Geoghegan, Inc., 544 West Broadway, New York.
G & G Telescopic Hoist catalog, 8½ x 11 A. I. A. Standard Classification 30il, contains complete descriptions, method of selecting correct model to fit the building's needs, scaled drawings showing space requirements and specifications.

BRICK

Hanley Company, Bradford, Pa.
General Catalog. 16 pp. 8½ x 11 ins. Illustrated.
Bradford Reds. Folder. 8 pp., 3 x 8 ins. Illustrated.

CABINET WORK

Henry Klein & Co., 25 Grand Street, Elmhurst, L. I., N. Y.
Driwood Period Mouldings in Ornamented Wood. Brochure, 28 pp., 8½ x 11 ins. Illustrated.
Ensemble Offices for the Banker and Broker. Folder. 4 pp., 8½ x 11 ins. Illustrated.
Luxurious Office Partitions in Walnut, Mahogany and Quartered Oak. Folder. 4 pp., 8½ x 11 ins. Illustrated.

CARPETS

Collins & Aikman Corporation, 25 Madison Avenue, New York.
"Seemingly Seamless Carpets." Booklet, 8 pp., 8½ x 11 ins. Illustrated.

CEMENT

Carney Company, The, Mankato, Minn.
A Remarkable Combination of Quality and Economy. Booklet, 20 pp., 8½ x 11 ins. Illustrated. Important data on valuable material.

Louisville Cement Co., 315 Guthrie St., Louisville, Ky.
BRIXMENT for Perfect Mortar. Self-filing handbook, 8½ x 11 ins. 16 pp. Illustrated. Contains complete technical description of BRIXMENT for brick, tile and stone masonry, specifications, data and tests.

Medusa Portland Cement Co., 1002 Engineers' Building, Cleveland.
Medusa Waterproofed Gray Portland Cement. Booklet, 30 pp., 8½ x 11 ins. Illustrated.
Medusa White Portland Cement, Non-Staining. Brochure, 30 pp., 8½ x 11 ins. Illustrated.

Portland Cement Association, Chicago, Ill.
Concrete Masonry Construction. Booklet, 48 pp., 8½ x 11 ins. Illustrated. Deals with various forms of construction.
Town and Country Houses of Concrete Masonry. Booklet, 20 pp., 8½ x 11 ins. Illustrated.
Facts About Concrete Building Tile. Brochure, 16 pp., 8½ x 11 ins. Illustrated.
The Key to Firesafe Homes. Booklet, 20 pp., 8½ x 11 ins. Illustrated.
Design and Control of Concrete Mixers. Brochure, 32 pp., 8½ x 11 ins. Illustrated.
Portland Cement Stucco. Booklet, 64 pp., 8½ x 11 ins. Illustrated.
Concrete in Architecture. Bound Volume, 60 pp., 8½ x 11 ins. Illustrated. An excellent work, giving views of exteriors and interiors.

CHURCH EQUIPMENT

John Van Range Co., Cincinnati.
Practical Planning for Church Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

CLUB EQUIPMENT

John Van Range Co., Cincinnati.
Practical Planning for Club Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

CONSTRUCTION, FIREPROOF

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Fire Proofing Bulletin 171. 8½ x 11 ins., 32 pp. Illustrated. A treatise on fireproof floor construction.

CONSTRUCTION, STONE AND TERRA COTTA

Cowing Pressure Relieving Joint Company, 100 North Wells St., Chicago, Ill.
Pressure Relieving Joint for Buildings of Stone, Terra Cotta or Marble. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Deals with preventing cracks, spalls and breaks.

DAMPPROOFING

Minwax Company, Inc., 11 West 42nd St., New York.
Complete Index of all Minwax Products. Folder, 6 pp., 8½ x 11 ins. Illustrated. Complete description and detailed specifications.

Toch Brothers, New York, Chicago, Los Angeles.
Handbook of R. I. W. Protective Products. Booklet, 40 pp., 4½ x 7½ ins.

DOORS

The Kawneer Company, Niles, Michigan.
Detail sheet, 8½ x 11 ins., with A.I.A. File No. featuring Heavy Welded Bronze Doors.

David Lupton's Sons Company, Philadelphia.
Lupton Commercial Steel Doors. Folder. 8½ x 11 ins. Illustrated.
Lupton Steel Industrial Doors. Brochure. 8 pp., 8½ x 11 ins. Illustrated. Details and specifications.

DOORS AND TRIM, METAL

The American Brass Company, Waterbury, Conn.
Anaconda Architectural Bronze Extruded Shapes. Brochure, 180 pp., 8½ x 11 ins., illustrating and describing more than 2,000 standard bronze shapes of cornices, jamb casings, mouldings, etc.

William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Tubular Steel Doors. Brochure, 16 pp., 8½ x 11 ins. Illustrated.

Kalman Steel Company, Chicago, Ill.
Finishing Door Openings. A.I.A. file holder with 20 loose-leaf sheets of details and specifications.

The Kawneer Company, Niles, Michigan.
Detail sheet, 8½ x 11 ins., with A.I.A. File No. featuring Heavy Welded Bronze Doors.

Richards-Wilcox Mfg. Co., Aurora, Ill.
Fire-Doors and Hardware. Booklet, 8½ x 11 ins., 64 pp. Illustrated. Describes entire line of tin-clad and corrugated fire doors, complete with automatic closers, track hangers and all the latest equipment—all approved and labeled by Underwriters' Laboratories.

Truscon Steel Company, Youngstown, Ohio.
Copper Alloy Steel Doors. Catalog 110. Booklet, 48 pp., 8½ x 11 ins. Illustrated.

DOORS, SOUNDPROOF

Irving Hamlin, Evanston, Ill.
The Evanston Soundproof Door. Folder, 8 pp., 8½ x 11 ins. Illustrated. Deals with a valuable type of door.

DRAINAGE FITTINGS

Josam Mfg. Co., Michigan City, Ind.
Josam Products. Booklet, 73 pp., 8½ x 11 ins. Illustrated. A valuable line of accessories.
Josam-Marsh Grease, Plaster, Sediment and Hair Interceptors. Brochure. 7 pp., 8½ x 11 ins. Illustrated.
Josam New Saw Tooth-Roof Drain. Folder, 4 pp., 8½ x 11 ins. Illustrated.

REQUEST FOR CATALOGS

To get any of the catalogs described in this section, put down the title of the catalog desired, the name of the manufacturer and send coupon to THE ARCHITECTURAL FORUM, 521 Fifth Avenue, New York.

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 111*

DUMBWAITERS

Sedgwick Machine Works, 151 West 15th St., New York, N. Y.
Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4¼ x 8¼ ins., 60 pp. Illustrated.
Catalog and pamphlets, 8½ x 11 ins. Illustrated. Valuable data on dumbwaiters.

ELECTRICAL EQUIPMENT

Bryant Electric Co., Bridgeport, Conn.
Catalog No. 30. Complete catalog of wiring devices 8⅝ x 10½ ins. 152 pp.
An Electrical Specification. Contains information and data useful in connection with the writing of electrical specifications. Illustrated. 8½ x 11 ins. 12 pp.
The Bryant Home of Ideas. Contains data and suggestions useful in connection with residence wiring. 8½ x 10 ins. 16 pp.
"KeNeX" and "HooKeX" Bulletin No. 5129. Contains data and specifications pertaining to devices for use in connection with the hanging of lighting fixtures, making such fixtures portable or removable, soldered joints being eliminated. 8½ x 10 ins. 6 pp.
Hospital Signal Devices. Bulletin HS-622-RP. Complete information on hospital signal devices. Pull Control Type. 8½ x 10 ins. 46 pp.
Hospital Signal Devices. Bulletin HS-1023. Magnetic Control Type. 8½ x 10 ins. 26 pp.

The Electric Storage Battery Co., Philadelphia.
Emergency Lighting and Emergency Power Data. Booklet. 12 pp., 8½ x 11 ins. Illustrated.

General Electric Co., Merchandise Dept., Bridgeport, Conn.
Wiring System Specification Data for Apartment Houses and Apartment Hotels. Booklet, 20 pp., 8 x 10 ins. Illustrated.
Electrical Specification Data for Architects. Brochure, 36 pp., 8 x 10½ ins. Illustrated. Data regarding G. E. wiring materials and their use.
The House of a Hundred Comforts. Booklet, 40 pp., 8 x 10½ ins. Illustrated. Dwells on importance of adequate wiring.

Ward Leonard Electric Co., Mt. Vernon, N. Y.
Mobile Color Lighting. Booklet, 46 pp., 8½ x 11 ins. Illustrated. Valuable work on the subject.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Electric Power for Buildings. Brochure, 14 pp., 8½ x 11 ins. Illustrated. A publication important to architects and engineers.
Variable-Voltage Central Systems as Applied to Electric Elevators. Booklet, 12 pp., 8½ x 11 ins. Illustrated. Deals with an important detail of elevator mechanism.
Modern Electrical Equipment for Buildings. Booklet, 8½ x 11 ins. Illustrated. Lists many useful appliances.
Electrical Equipment for Heating and Ventilating Systems. Booklet, 24 pp., 8½ x 11 ins. Illustrated. This is "Motor Application Circular 7379."
Westinghouse Panelboards. Catalog 224. Booklet, 64 pp., 8½ x 11 ins. Illustrated.
Beauty; Power; Silence; Westinghouse Fans. (Dealer Catalog 45.) Brochure, 16 pp., 8½ x 11 ins. Illustrated. Valuable information on fans and their uses.
Electric Range Book for Architects (A. I. A. Standard Classification 31 G-4). Booklet, 24 pp., 8½ x 11 ins. Illustrated. Cooking apparatus for buildings of various types.
Westinghouse Commercial Cooking Equipment (Catalog 280). Booklet, 32 pp., 8½ x 11 ins. Illustrated. Equipment for cooking on a large scale.
Electric Appliances (Catalog 44-A). 32 pp., 8½ x 11 ins. Deals with accessories for home use.

ELEVATORS

Otis Elevator Company, 260 Eleventh Ave., New York, N. Y.
Otis Push Button Controlled Elevators. Descriptive leaflets, 8½ x 11 ins. Illustrated. Full details of machines, motors and controllers for these types.
Otis Geared and Gearless Traction. Elevators of All Types. Descriptive leaflets, 8½ x 11 ins. Illustrated. Full details of machines, motors and controllers for these types.
Escalators. Booklet, 8½ x 11 ins., 22 pp. Illustrated. Describes use of escalators in subways, department stores, theaters and industrial buildings. Also includes elevators and dock elevators.

Richards-Wilcox Mfg. Co., Aurora, Ill.
Elevators. Booklet, 8½ x 11 ins., 24 pp. Illustrated. Describes complete line of "Ideal" elevator door hardware and checking devices, also automatic safety devices.

ELEVATORS—Continued

Sedgwick Machine Works, 151 West 15th St., New York, N. Y.
Catalog and descriptive pamphlets, 4¼ x 8¼ ins., 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.
Catalog and pamphlets, 8½ x 11 ins. Illustrated. Important data on different types of elevators.

ESCALATORS

Otis Elevator Company, 260 Eleventh Ave., New York, N. Y.
Escalators. Booklet, 32 pp., 8½ x 11 ins. Illustrated. A valuable work on an important item of equipment.

FIREPROOFING

Concrete Engineering Co., Omaha, Neb.
Handbook of Fireproof Construction. Booklet, 54 pp., 8½ x 11 ins. Valuable work on methods of fireproofing.

National Fireproofing Company, Fulton Building, Pittsburgh.
Natco; The Complete Line of Structural Clay Tile. Booklet. 48 pp., 8½ x 11 ins. Illustrated.
Make the Facing Bear Its Share. Folder, 8½ x 11 ins. Illustrated.
Unibacker, The Tile That Binds. Folder, 8½ x 11 ins. Illustrated.
Face Tile Walls. Folder, 8½ x 11 ins. Illustrated.
Meeting Every Need. Folder, 8½ x 11 ins. Illustrated.
Natco Vitritile. Folder, 8½ x 11 ins. Illustrated.
Natco Double Shell Load Bearing Tile. Folder, 8½ x 11 ins. Illustrated.

FLOODLIGHTING

National Terra Cotta Society, 230 Park Avenue, New York, N. Y.
Terra Cotta Buildings Are Superior for Floodlighting. Brochure, 16 pp., 8½ x 11 ins. Illustrated.

FLOOR HARDENERS (CHEMICAL)

Minwax Company, 11 West 42nd Street, New York, N. Y.
Concrete Floor Treatments. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Toch Brothers, New York, Chicago, Los Angeles.
Handbook of R.I.W. Protective Products. Booklet, 40 pp., 4½ x 7½ ins.

FLOORS—STRUCTURAL

Truscon Steel Co., Youngstown, Ohio.
Truscon Floretyle Construction. Booklet, 8½ x 11 ins., 16 pp. Illustrations of actual jobs under construction. Lists of properties and information on proper construction. Proper method of handling and tables of safe loads.

Structural Gypsum Corporation, Linden, N. J.
Gypsteel Pre-cast Fireproof Floors. Booklet, 36 pp., 8½ x 11 ins. Illustrated. Data on flooring.
Service Sheet No. 3. Specifications and Details of Design and Construction for Gypsteel Pre-Cast Floors and Ceilings. Folder, 8½ x 11 ins. Illustrated.

FLOORING

Armstrong Cork Co. (Flooring Division), Lancaster, Pa.
Armstrong's Linoleum Floors. Catalog, 8½ x 11 ins., 44 pp. Color plates. A technical treatise on linoleum, including table of gauges and weights and specifications for installing linoleum floors.
Armstrong's Linoleum Pattern Book. Catalog, 6 x 9 ins., 80 pp. Color plates. Reproduction in color of all patterns of linoleum and cork carpet in the Armstrong line.
Linoleum Layer's Handbook. 5 x 7 ins., 36 pp. Instructions for linoleum layers and others interested in learning most satisfactory methods of laying and taking care of linoleum.
Public Floors of Enduring Beauty. Booklet, 9 x 12 ins., 32 pp. Illustrated in color. Explains use of linoleum for offices, stores, etc., with reproductions in color of suitable patterns, also specifications and instructions for laying.

Blabon-Sandura Company, Inc., Finance Building, Philadelphia.
Blabon's Linoleum Styles for 1930. Booklet, 64 pp., 6¾ x 8½ ins. Illustrated.
Detailed Instructions for Handling and Laying Linoleum. Brochure, 40 pp., 3¼ x 5¾ ins. Illustrated.
Blabon's Linoleum Floors and Where You Will Find Them. Booklet, 8 pp., 8½ x 11 ins. Illustrated.
Comparison of Tests. Folder, 8½ x 11 ins. Illustrated.

REQUEST FOR CATALOGS

To get any of the catalogs described in this section, put down the title of the catalog desired, the name of the manufacturer and send coupon to THE ARCHITECTURAL FORUM, 521 Fifth Avenue, New York.

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2 Chicago Daily News
3 Chicago Union Station
4 Palmolive Bldg.
5 Trustees System Service
6 Willoughby Tower
7 Mather Tower
8 Chicago Evening Post
9 Engineers' Bldg.
10 Navy Pier
11 Carson, Pirie, Scott & Co.
12 Chicago Art Institute
13 First National Bank
14 Northwestern University
15 Drake Hotel
16 Allerton House
17 Tribune Tower
18 Chicago Temple
19 Hotel Sherman
20 Chicago Motor Club
21 Illinois Naval Reserve Armory
22 Standard Club
23 American Fore Bldg.

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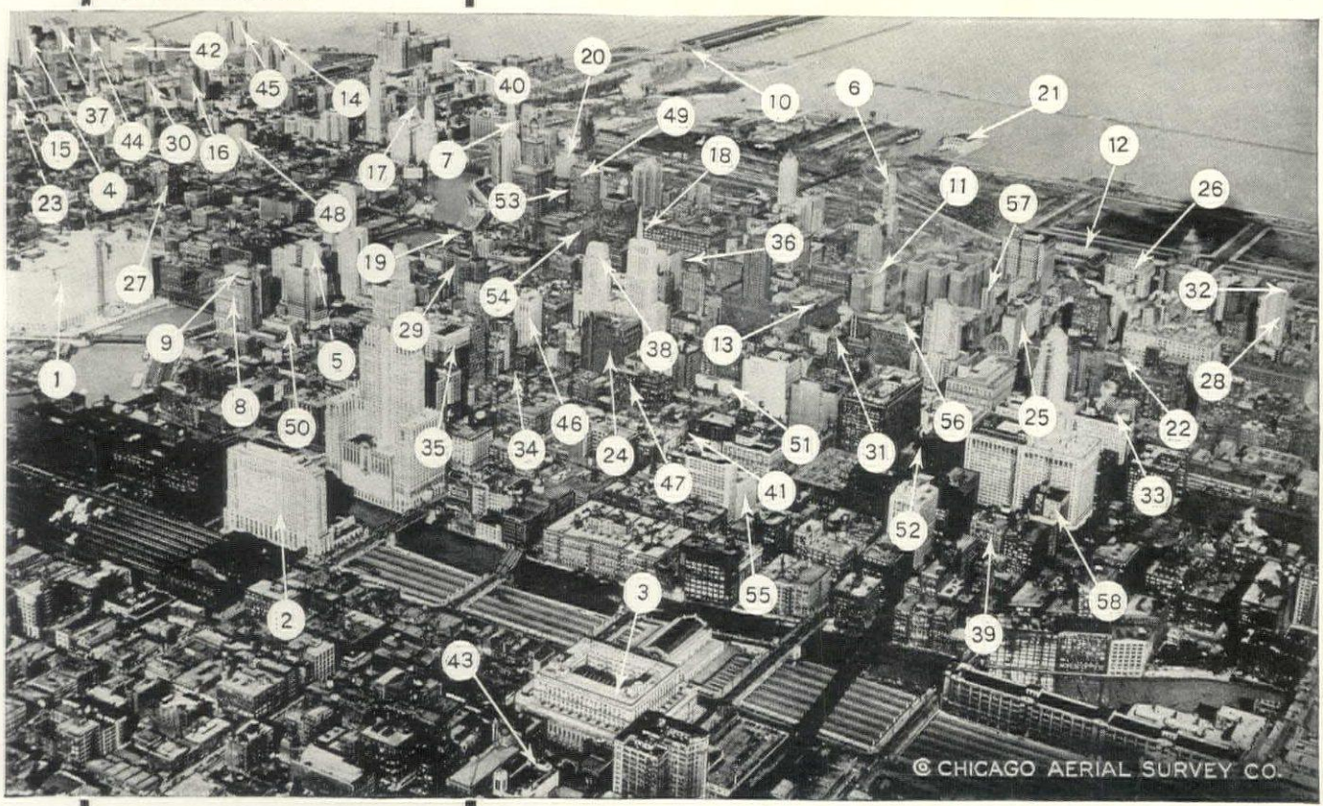

24 Goodman Theatre
25 Adams Express Bldg.
26 Ampico Hall
27 Boyce Bldg.
28 Buckingham Bldg.
29 Burnham Bldg.
30 Central Life Insurance Co.
31 Chicago Trust Co.
32 Chicago Club
33 Chicago Engineers Club
34 Chicago Eye, Ear, Nose & Throat Hosp.
35 Chicago Mercantile Exchange
36 Chicago Title & Trust Co.
37 201 E. Delaware Apts.
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47 Madison-Square Bldg.
48 McCormick Hotel
49 Medical & Dental Arts Bldg.
50 North Loop Motor Ramp Garage
51 Northern Trust Co.
52 Old Colony Life Ins.
53 Old Dearborn Bank Bldg.
54 Passavant Hospital
55 Shetnitz Bldg.
56 Singer Bldg.
57 A. G. Spalding
58 Wells Van Buren Bldg.

Airplane photograph of Chicago's business section.

THE confidence which Chicago architects, engineers and building owners place in Jennings Pumps is evident from the large number of buildings visible in the above photograph which are Jennings-equipped.

Jennings Pumps for building service . . . Vacuum Steam Heating Pumps, Condensation Pumps, House Service Pumps, Suction Sump Pumps and Suction Sewage Pumps . . . can be relied upon for years of good service.

Jennings Pumps

THE NASH ENGINEERING CO 12 WILSON ROAD, SOUTH NORWALK CONN.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 112*

FLOORING—Continued

Congoleum-Nairn, Inc., 195 Belgrove Drive, Kearny, N. J.
Facts you should know about Resilient Floors. A series of booklets on floors for (1) schools, (2) hospitals, (3) offices, (4) stores, (5) libraries, (6) churches, (7) clubs and lodges, (8) apartments and hotels. Illustrated.

Specifications for Resilient Floors. Booklet, 12 pp. A reprint from Sweet's.

A New Kind of Floor Service. Brochure, 8 pp. Data on Bonded Floors.

Sealex Battleship Linoleum. Booklet, 12 pp. Illustrated. Shows typical installations.

Sealex Treadlite Tiles. Two booklets, 8 and 16 pp. Illustrated.
Colonial Planks. Brochure, 8 pp. Illustrated.

Goodyear Tire & Rubber Co., Inc., Akron, Ohio.
Beautiful Floors, Architects' Reference Book. Brochure, 32 pp., 8½ x 11 ins. Illustrated. Valuable data on flooring.

Rubber Flooring News Monthly publications. 8½ x 11 ins. Illustrated. Giving data on flooring for buildings of many types.

Manual of Goodyear Rubber Tile Installation Booklet. 7¾ x 10¾ ins. Illustrated.

C. Pardee Works, 101 Park Ave., New York, N. Y., and 1600 Walnut St., Philadelphia, Pa.

Pardee Tiles. Bound Volume, 48 pp., 8½ x 11 ins. Illustrated.

Stedman Rubber Flooring Company, South Braintree, Mass.
Stedman Ray-Proof Rubber. Booklet, 12 pp., 5½ x 8 ins. Illustrated. For X-ray Rooms.

Stedman Tile, The Original Reinforced Rubber Floor. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Valuable data on flooring.

FURNITURE

American Seating Co., 14 E. Jackson Blvd., Chicago, Ill.
Art Ecclesiastical Booklet, 6 x 9 ins., 48 pp. Illustrations of church fitments in carved wood.

Theatre Chairs. Booklet, 6 x 9 ins., 48 pp. Illustrations of theatre chairs.

Kittinger Co., 1893 Elmwood Ave., Buffalo, N. Y.
Kittinger Club & Hotel Furniture. Booklet, 20 pp., 6¼ x 9½ ins. Illustrated. Deals with fine line of furniture for hotels, clubs, institutions, schools, etc.

Kittinger Club and Hotel Furniture. Booklet, 20 pp., 6 x 9 ins. Illustrated. Data on furniture for hotels and clubs.

A Catalog of Kittinger Furniture. Booklet, 78 pp., 11 x 14 ins. Illustrated. General Catalog.

GLASS CONSTRUCTION

Libbey-Owens Sheet Glass Co., Toledo, Ohio.
Flat Glass. Brochure, 12 pp., 5⅛ x 7⅝ ins. Illustrated. History of manufacture of flat, clear, sheet glass.

GREENHOUSES

King Construction Company, North Tonawanda, N. Y.

King Greenhouses for Home or Estate. Portfolio of half-tone prints, varnishes, 8¼ x 10½ ins.

William H. Lutton Company, 267 Kearney Ave., Jersey City, N. J.
Greenhouses of Quality. Booklet, 50 pp., 8½ x 11 ins. Illustrated. Conservatories making use of Lutton Patented Galvanized Steel V-Bar.

HARDWARE

P. & F. Corbin, New Britain, Conn.
Early English and Colonial Hardware. Brochure, 8½ x 11 ins. An important illustrated work on this type of hardware.

Locks and Builders' Hardware. Bound Volume, 486 pp., 8½ x 11 ins. An exhaustive, splendidly prepared volume.

Colonial and Early English Hardware. Booklet, 48 pp., 8½ x 11 ins. Illustrated. Data on hardware for houses in these styles.

Corbin Door Closers, 8½ x 11 ins. A description of the principles of design and performance of Corbin door closers.

Automatic Exit Fixtures, 8½ x 11 ins. A catalog of hardware for exit and entrance doors to auditoriums.

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet, 4 x 9¼ ins., 8 pp. Illustrated.

HARDWARE—Continued

Richards-Wilcox Mfg. Co., Aurora, Ill.
Distinctive Garage Door Hardware. Booklet, 8½ x 11 ins., 66 pp. Illustrated. Complete information accompanied by data and illustrations on different kinds of garage door hardware.

Distinctive Elevator Door Hardware. Booklet, 90 pp., 10½ x 16 ins. Illustrated.

Russell & Erwin Mfg. Co., New Britain, Conn.
Hardware for the Home. Booklet, 24 pp., 3½ x 6 ins. Deals with residence hardware.

Door Closer Booklet. Brochure, 16 pp., 3½ x 6 ins. Data on a valuable detail.

Garage Hardware. Booklet, 12 pp., 3½ x 6 ins. Hardware intended for garage use.

Famous Homes of New England. Series of folders on old homes and hardware in style of each.

Todhunter, Inc., 119 East 57th St., New York, N. Y.
Colonial Hardware. Booklet. 12 pp., 8½ x 11 ins. Illustrated. Deals with hardware of the best type for exterior and interior use.

HEATING EQUIPMENT

American Blower Co., 6004 Russell St., Detroit, Mich.
Heating and Ventilating Utilities. A binder containing a large number of valuable publications, each 8½ x 11 ins., on these important subjects.

American Radiator Company, The, 40 West 40th St., N. Y. C.
Ideal Boilers for Oil Burning. Catalog 5½ x 8½ ins., 36 pp. Illustrated in 4 colors. Describing a line of Heating Boilers especially adapted to use with Oil Burners.

Corto—The Radiator Classic. Brochure, 5½ x 8½ ins., 16 pp. Illustrated. A brochure on a space-saving radiator of beauty and high efficiency.

Ideal Arcola Radiator Warmth. Brochure, 6¼ x 9½ ins. Illustrated. Describes a central all-on-one-floor heating plant with radiators for small residences, stores, and offices.

How Shall I Heat My Home? Brochure, 16 pp., 5¾ x 8½ ins. Illustrated. Full data on heating and hot water supply.

New American Radiator Products. Booklet, 44 pp., 5 x 7¾ ins. Illustrated. Complete line of heating products.

A New Heating Problem. Brilliantly Solved. Broadside, 4 pp., 10¾ x 15 ins. Illustrated. Data on the IN-AIRID invisible air valve.

In-Airid, the Invisible Air Valve. Folder, 8 pp., 3½ x 6 ins. Illustrated. Data on a valuable detail of heating.

The 999 ARCO Packless Radiator Valve. Folder, 8 pp., 3½ x 6 ins. Illustrated.

Bryant Heater & Mfg. Co., 17825 St. Clair Ave., Cleveland, Ohio.
Handbook on Heating Buildings with Bryant Gas Furnaces. Booklet, 12 pp., 8½ x 11 ins. Illustrated.
Handbook on Heating Water with Bryant Gas Boilers. Brochure, 20 pp., 8½ x 11 ins. Illustrated.
Handbook on Heating Buildings with Bryant Gas Boilers. Booklet, 20 pp., 8½ x 11 ins. Illustrated.

James B. Clow & Sons, 534 S. Franklin St., Chicago, Ill.
Clow Gasteam Vented Heating System. Brochure, 24 pp., 8½ x 11 ins. Illustrated. Deals with a valuable form of heating equipment for using gas.

D.G.C. Trap & Valve Co., 1 East 43rd St., New York, N. Y.
Cryer Radiator Control Valve. Bulletin, 8½ x 11 ins. 12 pp. Illustrated. Explains operation and advantages of this radiator control valve on two-pipe vapor, vacuum or gravity steam systems.

C. A. Dunham Company, 450 East Ohio St., Chicago, Ill.
Dunham Radiator Trap. Bulletin 101, 8 x 11 ins., 12 pp. Illustrated. Explains working of this detail of heating apparatus.

Dunham Packless Radiator Valves. Bulletin 104, 8 x 11 ins., 8 pp. Illustrated. A valuable brochure on valves.

Dunham Return Heating System. Bulletin 109, 8 x 11 ins. Illustrated. Covers the use of heating apparatus of this kind.
Dunham Vacuum Heating System. Bulletin 110, 8 x 11 ins., 12 pp. Illustrated.
The Dunham Differential Vacuum Heating System. Bulletin 114. Brochure, 12 pp., 8 x 11 ins. Illustrated. Deals with heating for small buildings.
The Dunham Differential Vacuum Heating System. Bulletin 115. Brochure, 12 pp., 8 x 11 ins. Illustrated. Deals with heating for large buildings.
Dunham Built Dwyer Unit Heaters. Booklet, 31 pp., 8½ x 11 ins. Illustrated.

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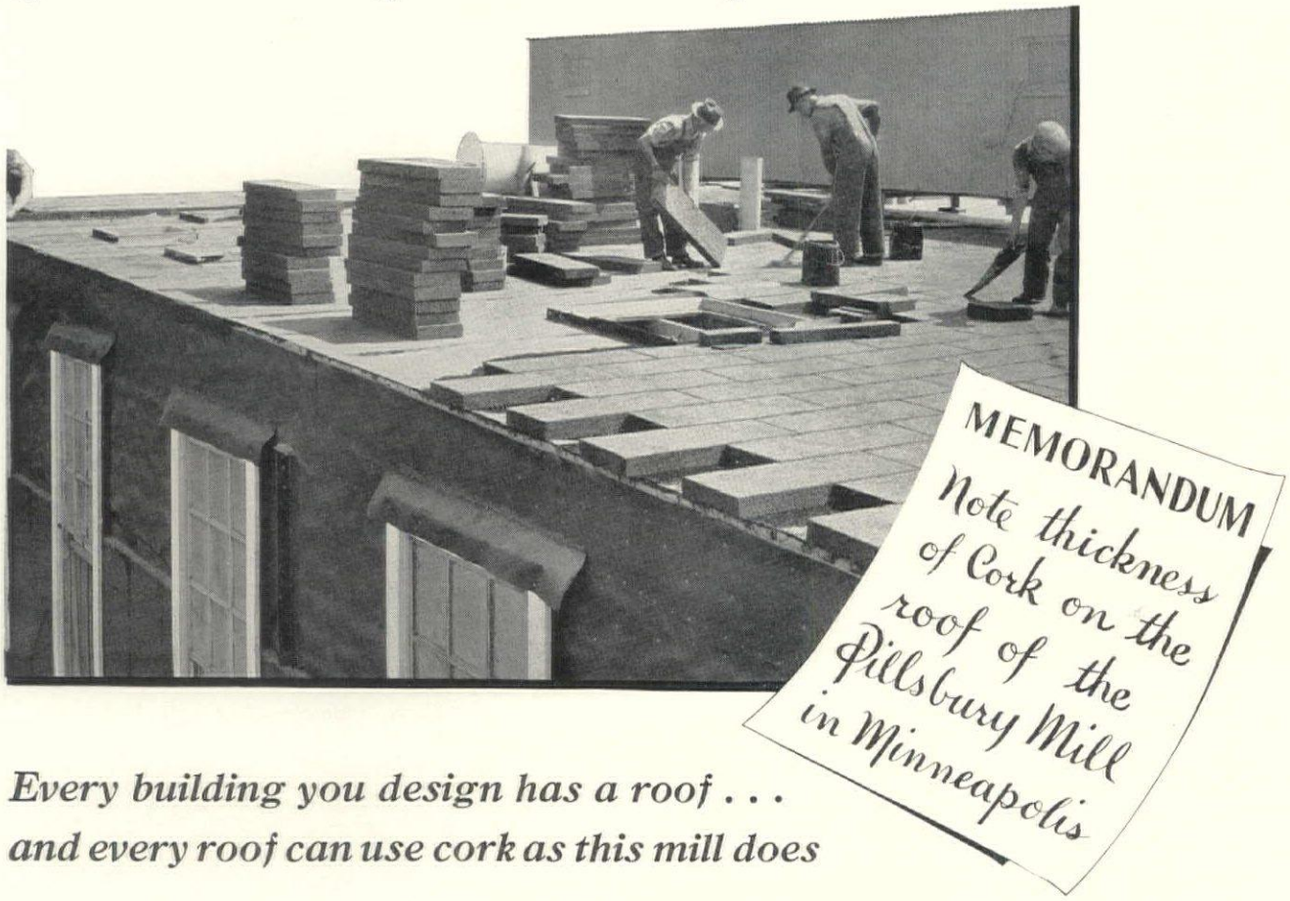
PILLSBURY FLOUR MILL
gives a tip on roof insulation



Every building you design has a roof . . . and every roof can use cork as this mill does

IN a flour mill, the roof must do more than just shed water. In every building, a really good roof stops heat almost as completely as it shuts out rain.

Take the Pillsbury Flour Mill, for example. Where flour is made, the moisture contained in the grain produces a high relative humidity in the mill building. If heat leaks through the roof, the inside surface temperature drops. Moisture in the air condenses, and the condensate drops into the milling machinery. So Pillsbury has insulated the roof with three inches of Armstrong's Corkboard, an effective barrier to the passage of heat.

For office buildings and others where there is no condensation, 1½ or 2 inches of insulation suffices to cut fuel costs and increase tenants' comfort. In any thickness from one inch up, Armstrong's Corkboard supplies an easily laid, permanent insulation.

Cork Products are playing an increasing part in every type of building use. In addition to roof insulation, Armstrong's Corkboard is ideally suited for insulating walls of buildings. Cork serves, too, where low temperatures must be maintained. The new quick-freeze industry relies on Corkboard in thicknesses from 6 to 12 inches to hold temperatures as low as sixty degrees below zero. Armstrong's Corkoustic, the insulating acoustical material, absorbs sound and reduces noise in schools, churches, and public buildings. Cork Machinery Isolation eliminates noise and vibration from all types of machinery. Cork Pipe Covering prevents loss of refrigeration from cold lines. Armstrong's and Nonpareil Insulating Brick line stacks in hotels, apartment houses, and public buildings to keep heat from adjoining rooms.

Architects are continually finding new uses for Armstrong's Cork Products. Cork may be just the material you are looking for to fit some unusual installation. Armstrong engineers are available for insulation advice, and Armstrong research facilities will gladly be placed at your disposal on new and unusual uses. Write to Armstrong Cork & Insulation Co., 900 Concord St., Lancaster, Pa.

Armstrong's (A) *Product*

Armstrong's Cork Products

CORKBOARD . . CORK COVERING . . CORKOUSTIC . . CORK MACHINERY ISOLATION . . INSULATING BRICK

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 114*

HEATING EQUIPMENT—Continued

The Fulton Sylphon Company, Knoxville, Tenn.

Sylphon Temperature Regulators. Illustrated brochures, 8½ x 11 ins., dealing with general architectural and industrial applications; also specifically with applications of special instruments.

Sylphon Heating Specialties. Catalog No. 200, 192 pp., 3½ x 6¾ ins. Important data on heating.

Hoffman Specialty Company, Inc., 25 West 45th St., New York, N. Y.

Heat Controlled With the Touch of a Finger. Booklet, 46 pp., 5¾ x 8¾ ins. Illustrated.

How to Lock Out Air, the Heat Thief. Brochure, 48 pp., 5 x 7¼ ins. Illustrated.

Janette Manufacturing Company, 556 West Monroe Street, Chicago.

More Heat from Any Hot Water System on Less Fuel. Folder. 4 pp., 8½ x 11 ins. Illustrated. Deals with use of the "Hydrolator."

S. T. Johnson Co., Oakland, Calif.

Johnson Oil Burners. Booklet, 9 pp., 8½ x 11 ins. Illustrated.
Bulletin No. 4A. Brochure, 8 pp., 8½ x 11 ins. Illustrated. Data on different kinds of oil-burning apparatus.
Bulletin No. 31. Brochure, 8 pp., 8½ x 11 ins. Illustrated. Deals with Johnson Rotary Burner with Full Automatic Control.

Kewanee Boiler Corporation, Kewanee, Ill.

Kewanee on the Job. Catalog, 8½ x 11 ins., 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators. etc.
Catalog No. 78, 6 x 9 ins. Illustrated. Describes Kewanee Firebox Boilers with specifications and setting plans.
Catalog No. 79, 6 x 9 ins. Illustrated. Describes Kewanee power boilers and smokeless tubular boilers with specifications.

McQuay Radiator Corporation, 35 East Wacker Drive, Chicago, Ill.

McQuay Visible Type Cabinet Heater. Booklet, 4 pp., 8½ x 11 ins. Illustrated. Cabinets and radiators adaptable to decorative schemes.

McQuay Concealed Radiators. Brochure, 4 pp., 8½ x 11 ins. Illustrated.

McQuay Unit Heater. Booklet, 8 pp., 8½ x 11 ins. Illustrated. Gives specifications and radiator capacities.

Modine Mfg. Co., Racine, Wisc.

Modine Copper Radiation. Booklet, 28 pp. 8½ x 11 ins. Illustrated. Deals with industrial, commercial and domestic heating.

A Few Short Years. Folder. 4 pp. 8½ x 11 ins. Illustrated. Heating for garages.
Dairy Plant Heating. Folder. 4 pp., 8½ x 11 ins. Illustrated.
Industrial Heating. Folder. 4 pp., 8½ x 11 ins. Illustrated.
Modine Unit Heater. Folder. 6 pp., 8½ x 11 ins. Illustrated.

Nash Engineering Company, South Norwalk, Conn.

Bulletin 85. Booklet. 12 pp. 10¾ x 7½ ins. Illustrated in color. Describes construction and operation of the Jennings Return Line Vacuum Heating Pump.

Bulletin 87. Brochure. 8 pp. 10¾ x 7½ ins. Illustrated in color. Deals with Sizes T and U Jennings Vacuum Heating Pump for 2500 and 5000 square feet equivalent direct radiation.

Bulletin 63. Booklet. 4 pp. 10¾ x 7½ ins. Illustrated. Describes in detail the Unit Type Motor Driven Jennings Condensation Pump.

National Radiator Corporation, Johnstown, Pa.

The Crimson Flame. Folder, 6 pp., 4½ x 7 ins. Illustrated.
Contento Brings Contentment to Your Home. Folder, 12 pp., 3½ x 6 ins. Illustrated.

National Jacketed Boiler. Folder, 4 pp., 8½ x 11 ins. Illustrated.
National Super-Smokeless Boiler. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Aero, the National Radiator Sizes and Ratings. Booklet, 16 pp., 5 x 7⅞ ins. Illustrated.

Sarco Company, Inc., 183 Madison Ave., New York City, N. Y.

Steam Heating Specialties. Booklet, 6 pp., 6 x 9 ins. Illustrated. Data on Sarco Packless Supply Valves and Radiator Traps for vacuum and vapor heating systems.

Equipment Steam Traps and Temperature Regulations. Booklet, 6 pp., 6 x 9 ins. Illustrated. Deals with Sarco Steam Traps for hospital, laundry and kitchen fixtures and the Sarco Self-contained Temperature Regulation for hot water service tanks.

B. F. Sturtevant Company, Hyde Park, Boston, Mass.

Tempervane Heating Units. Catalog 363. Booklet, 44 pp., 8½ x 11 ins. Illustrated. Data on "Heating Every Corner with Maximum Economy."

U. S. Blower & Heater Corporation, Minneapolis, Minn.

Blowers, Heaters and Washers. Booklet, 64 pp., 8½ x 11 ins. Illustrated.

HOISTS, TELESCOPIC

Gillis & Geoghegan, Inc. 535 West Broadway, New York.

G & G Telescopic Hoist. Booklet. 24 pp. 8½ x 11 ins. Illustrated complete data on hoists.

Ash Removal. Folder. 8½ x 11 ins. Illustrated. Hoists for removing ashes from basements.

HOSPITAL EQUIPMENT

Bryant Electric Co., Bridgeport, Conn.

Hospital Signal Devices. Bulletin HS-622-RP. Complete information on hospital signal devices. Pull Control Type. 8½ x 10 ins. 46 pp.

Hospital Signal Devices. Bulletin HS-1023. Magnetic Control Type. 8½ x 10 ins. 26 pp.

The Frink Co., Inc., 369 Lexington Ave., New York City.

Catalog 426. 7 x 10 ins., 16 pp. A booklet illustrated with photographs and drawings, showing the types of light for use in hospitals, as operating table reflectors, linolite and multilite concentrators, ward reflectors, bed lights and microscopic reflectors, giving sizes and dimensions, explaining their particular fitness for special uses.

The International Nickel Company, 67 Wall St., New York, N. Y.

Hospital Applications of Monel Metal. Booklet, 8½ x 11½ ins., 16 pp. Illustrated. Gives types of equipment in which Monel Metal is used, reasons for its adoption, with sources of such equipment.

John Van Range Co., Cincinnati, Ohio.

Practical Planning for Hospital Food Service. Brochure, 62 pp., 8½ x 11 inches. Illustrated.

Wilmot Castle Company, Union Trust Bldg., Rochester, N. Y.

The Hospital Sterilizer Data Sheets. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Data on planning sterilizer installations.

HOTEL EQUIPMENT

Pick-Barth Company, Inc., Albert, 1200 West 35th St., Chicago, and 34 Cooper Square, New York.

Some Thoughts on Furnishing a Hotel. Booklet, 7½ x 9 ins. Data on complete outfitting of hotels.

INCINERATORS

Josam Mfg. Co., Michigan City, Ind.

Josam-Graver Incinerators. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Kerner Incinerator Company, 715 E. Water St., Milwaukee, Wis.

Incinerators (Chimney-fed). Catalog No. 18 (Architects' and Builders' Edition). Size 8½ x 11 ins., 20 pp. Illustrated. Describes principles and design of Kernerator Chimney-fed Incinerators for residences, apartments, hospitals, schools, apartment hotels, clubs and other buildings. Shows all standard models and gives general information and working data.

Sanitary Elimination of Household Waste. Booklet, 4 x 9 ins. 16 pp. Illustrated. Gives complete information on the Kernerator for residences.

Garbage and Waste Disposal for Apartment Buildings. Folder, 8½ x 11 ins., 16 pp. Illustrated. Describes principle and design of Kernerator Chimney-fed Incinerator for apartments and gives list of buildings where it has been installed.

Sanitary Disposal of Waste in Hospitals. Booklet, 4 x 9 ins., 12 pp. Illustrated. Shows how this necessary part of hospital service is taken care of with the Kernerator. Gives list of hospitals where installed.

Estate Type Kernerator. For Estates and Country Homes. Booklet, 8 pp., 8½ x 11 inches. Illustrated.

INSULATION

Armstrong Cork & Insulation Co., Pittsburgh, Pa.

The Insulation of Roofs with Armstrong's Corkboard. Booklet. Illustrated. 7½ x 10½ ins., 32 pp. Discusses means of insulating roofs of manufacturing or commercial structures.

Insulation of Roofs to Prevent Condensation. Illustrated booklet, 7½ x 10½ ins., 36 pp. Gives full data on valuable line of roof insulation.

Filing Folder for Pipe Covering Data. Made in accordance with A. I. A. rules.

The Cork-lined House Makes a Comfortable Home. 5 x 7 ins. 32 pp. Illustrated.

Armstrong's Corkboard. Insulation for Walls and Roofs of Buildings. Booklet, 66 pp., 9½ x 11¾ ins. Illustrates and describes use of insulation for structural purposes.

Cork Import Corporation, 345 West 40th Street, New York.

Novoid Cork Covering for Cold Pipes, Coolers and Tanks. Folder 8½ x 11 ins. Illustrated.
Novoid Corkboard Insulation. Folder 8½ x 11 ins. Illustrated.

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And HUMPY HEAT Means Fuel Waste

First "too hot" and then "too cold!" That is the daily temperature record of rooms and offices in many buildings where hand control valves are employed on steam radiators. Sylphon Automatic Radiator Valves assure temperatures automatically kept just as desired by the room occupants. Their use makes for steady, even heat—personal comfort, health and more efficiency.

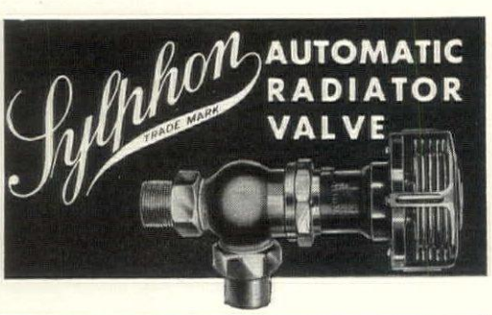
Once set at the desired marking, they turn the steam "on" or "off" and hold the room temperature exactly at the predetermined point. Actuated by the dependable Sylphon Thermostat, Sylphon Automatic Radiator Valves respond to the slightest air temperature changes, but are not affected by heat from the radiator or pipes.

INSTALLATION
EASY *and* INEXPENSIVE

The Sylphon Radiator Valve is a combination packless valve and thermostatic control unit without electrical or mechanical accessories. Know all about this controlling device of lasting efficiency. Our printed matter fully describing both the angle and globe types will be gladly sent. Write today for Bulletin CA 250.

30 Day Free Trial

In order that you may be convinced of its positive action, we will gladly send one or more of these Sylphon Automatic Radiator Valves on a 30 day free trial, and you incur no obligation. Try them while the heating season is on.



FULTON SYLPHON CO.
KNOXVILLE, TENN., U.S.A.

European Representatives, Crosby Valve and Eng. Co., Ltd., 41-2 Foley St., London, W. I., Eng.
Canadian Representatives, Darling Brothers, Ltd., 140 Prince St., Montreal, Que., Canada.

REPRESENTATIVES IN ALL THE PRINCIPAL U. S. A. CITIES

Other Sylphon Products

For a quarter of a century Sylphon Instruments for the accurate control of temperatures and pressures of Air, Liquids and Gases have attained wide and diversified employment.

SYLPHON REGULATORS for many industrial processes, refrigerating machines, and building temperature regulation.

SYLPHON DAMPER REGULATORS.

PACKLESS EXPANSION JOINTS for Steam Risers and many other thermostatic instruments have long been favorably known.

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 116*

JOISTS

Kalman Steel Company, Chicago, Ill.
Steel Joists. Brochure, 20 pp., 8½ x 11 ins. Joists and accessories.
Firesafe Floor and Roof Construction. Booklet, 8 pp., 8½ x 11 ins. Joists, lath and accessories.

KITCHEN EQUIPMENT

The International Nickel Company, 67 Wall St., New York, N. Y.
Hotels, Restaurants and Cafeteria Applications of Monel Metal. Booklet, 8½ x 11 ins., 32 pp. Illustrated. Gives types of equipment in which Monel Metal is used, with service data and sources of equipment.

John Van Range Co., Cincinnati.
Practical Planning for Church Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

Practical Planning for Club Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

Practical Planning for School Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

Planning Restaurants That Make Money. Booklet, 78 pp., 8½ x 11 ins. Illustrated. Excellent work on equipment.

Practical Planning for Hospital Food Service. Brochure, 62 pp., 8½ x 11 inches. Illustrated.

LABORATORY EQUIPMENT

Alberene Stone Co., 153 West 23rd Street, New York City.
Booklet, 8¾ x 11¼ ins., 26 pp. Stone for laboratory equipment, shower partitions, stair treads, etc.

Duriron Company, Dayton, Ohio.
Duriron Acid, Alkali and Rust-proof Drain Pipe and Fittings. Booklet, 8½ x 11 ins., 20 pp. Full details regarding a valuable form of piping.

LANTERNS

Todhunter, Inc., 119 East 57th St., New York, N. Y.
Lanterns. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Deals with a fine assortment of fixtures for exterior and interior use.

LATH, METAL AND REINFORCING

Kalman Steel Company, Chicago, Ill.
Firesafe Building Products. Booklet, 20 pp., 8½ x 11 ins. Lath, fireplace accessories, beads, etc.

Milcor Steel Co., Milwaukee.
The Milcor Manual. Booklet, 96 pp., 8½ x 11 ins. Illustrated. Data on metal lath and similar materials.

Milcor Metal Ceiling Catalog. Booklet, 288 pp., 8½ x 11 ins. Illustrated. Data on metal ceiling and wall construction.

National Steel Fabric Co., Pittsburgh, Pa.
Better Walls for Better Homes. Brochure, 16 pp., 7¾ x 11¾ ins. Illustrated. Metal lath, particularly for residences.

Steeltex for Floors. Booklet, 24 pp., 8½ x 11 ins. Illustrated.

Combined reinforcing and form for concrete or gypsum floors and roofs.

Steeltex Data Sheet No. 1. Folder, 8 pp., 8½ x 11 ins. Illustrated. Steeltex for floors on steel joists with round top chords.

Steeltex Data Sheet No. 2. Folder, 8 pp., 8½ x 11 ins. Illustrated. Steeltex for floors on steel joists with flat top flanges.

Steeltex Data Sheet No. 3. Folder, 8 pp., 8½ x 11 ins. Illustrated. Steeltex for folders on wood joists.

Truscon Steel Company, Youngstown, Ohio.
Truscon ¾-inch Hy-Rib for Roofs, Floors and Walls. Booklet, 8½ x 11 ins., illustrating Truscon ¾-inch Hy-Rib as used in industrial buildings. Plates of typical construction. Progressive steps of construction. Specification and load tables.

LAUNDRY MACHINERY

American Laundry Machinery Co., Norwood Station, Cincinnati, O.
Functions of the Hotel and Hospital Laundry. Brochure, 8 pp., 8½ x 11 ins. Valuable data regarding an important subject.

Laundry Equipment of Small Hotels, Hospitals and Institutions. Booklet, 36 pp., 8½ x 11 ins. Illustrated.

Troy Laundry Machinery Co., Inc., 9 Park Place, New York City.
Laundry Machinery for Large Institutions. Loose-Leaf booklet, 50 pp., 8½ x 11 ins. Illustrated.

LAUNDRY MACHINERY—Continued

Laundry Machinery for Small Institutions. Loose-leaf brochure, 50 pp., 8½ x 11 ins. Illustrated.

Accessory Equipment for Institutional Laundries. Leather bound book, 50 pp., 8½ x 11 ins. Illustrated.

Dry Cleaning Equipment for Institutional Purposes. Brochure, 50 pp., 8½ x 11 ins. Illustrated.

LIGHTING EQUIPMENT

The Frink Co., Inc., 369 Lexington Ave., New York, N. Y.
Catalog 415, 8½ x 11 ins., 46 pp. Photographs and scaled cross-sections. Specialized bank lighting, screen and partition reflectors, double and single desk reflectors and Polaralite Signs.

Gleason Tiebout Glass Company, 67 West 44th St., New York, N. Y.
Fragment of Celestialite. Booklet, 24 pp., 7 x 10 ins. Illustrated. Data on lighting for offices, schools, hospitals, etc.
Celestialite Catalog 727. Booklet, 18 pp., 8½ x 11 ins. Illustrated. Valuable brochure on lighting.

Smyser-Royer Co., 1700 Walnut Street, Philadelphia, Pa.
Catalog "J" on Exterior Lighting Fixtures. Brochure, illustrated, giving data on over 300 designs of standards, lanterns and brackets of bronze or cast iron.

Todhunter, 119 East 57th St., New York, N. Y.
Lighting Fixtures, Lamps and Candlesticks. 24 pp., 8½ x 11 ins. Illustrated. Fine assortment of lighting accessories.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
Industrial Lighting Equipment. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

Commercial Lighting. Brochure, 24 pp., 8½ x 11 ins. Illustrated.
Airport and Floodlighting Equipment. Booklet, 20 pp., 8½ x 11 ins. Illustrated.

MAIL CHUTES

Cutler Mail Chute Company, Rochester, N. Y.
Cutler Mail Chute Model F. Booklet, 4 x 9¼ ins., 8 pp. Illustrated.

MANTELS

Henry Klein & Co., Inc. 40-46 West 23rd Street, New York.
Driwood Mantels. Booklet. 12 pp. 8½ x 11 ins. Illustrated. Fine line of eighteenth century English and American mantels.

Todhunter, Inc., 119 East 57th St., New York, N. Y.
Georgian Mantels. Brochure, 12 pp., 8½ x 11 ins. Illustrated. Illustrates and describes an excellent assortment of fine mantels based on Georgian precedent.

MARBLE

The Georgia Marble Company, Tate, Ga.; New York Office, 1328 Broadway.
Why Georgia Marble Is Better. Booklet, 3⅜ x 6 ins. Gives analysis, physical qualities, comparison of absorption with granite, opinions of authorities, etc.

Convincing proof. 3⅜ x 6 ins., 8 pp. Classified list of buildings and memorials in which Georgia Marble has been used, with names of Architects and Sculptors.

Hurt Building, Atlanta; Senior High School and Junior College, Muskegon, Mich. Folders, 4 pp., 8½ x 11 ins. Details.

METALS

The International Nickel Company, 67 Wall St., New York N. Y.
Monel Metal Primer. 8 folders, 4 pp., 8½ x 11 ins. Illustrated. Valuable data on use of monel in kitchens, laundries, etc.

MILL WORK—See also Wood

Curtis Companies Service Bureau, Clinton, Iowa.
Your Dream Kitchen, Booklet, 11 pp., 7¾ x 10½ ins. Illustrated. Fine line of fittings for kitchens, breakfast alcoves, etc.

Hartmann-Sanders Company, 2155 Elston Ave., Chicago, Ill.
Column Catalog, 7½ x 10 ins., 48 pp. Illustrated. Contains prices on columns 6 to 36 ins. diameter, various designs and illustrations of columns and installations.

The Pergola Catalog. 7½ x 10 ins., 64 pp. Illustrated. Contains illustrations of pergola lattices, garden furniture in wood and cement, garden accessories.

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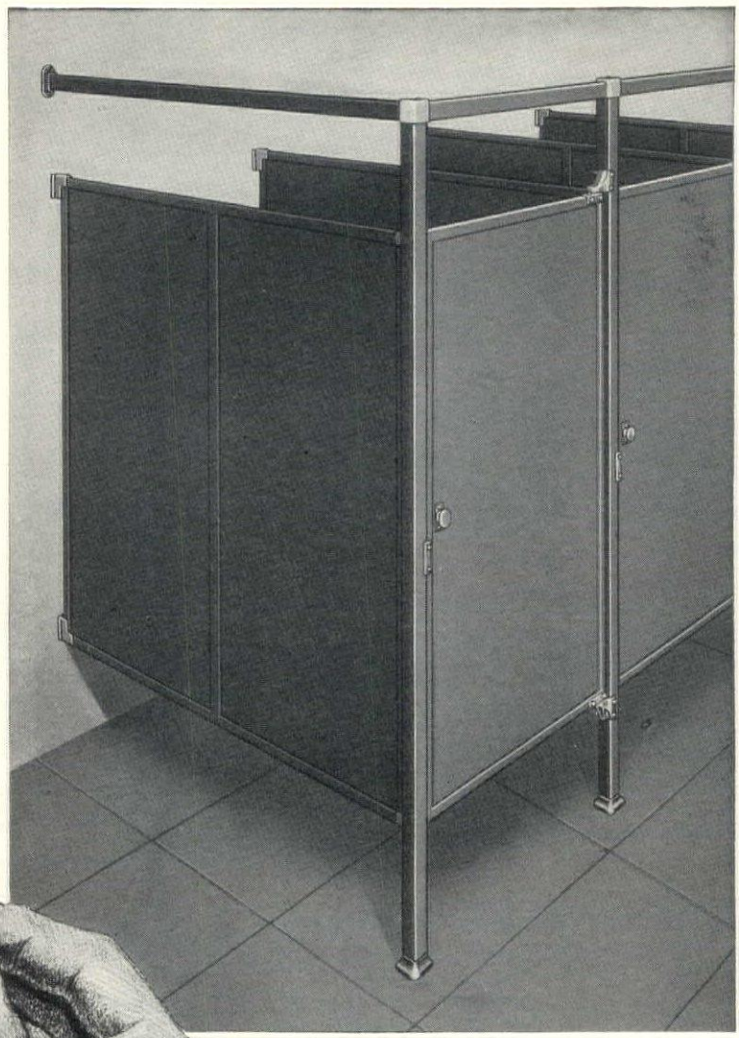

A Masterstroke of Design

THROWING PRECEDENT to the winds and thinking only in terms of betterment at lower and still lower prices, the design and construction of this new Mills Metal Toilet Partition is a challenge to the imagination of every buyer and to the ingenuity of him who would design better!

A design that permits for the first time panels and doors with the narrow stile so much desired for beauty and harmony of present day architecture, and without in any way sacrificing the strength, utility and sanitary features for which Mills Metal toilet partitions have always been noted.

Other outstanding features are a hinge with only two parts, entirely new type of panel clip and new wall bracket all adding to simplicity of erection and reducing cost.

Besides these there are numerous other features that make this a remarkable partition and at the lowest price we ever put on a toilet partition. Descriptive literature on request. Complete Mills Metal Catalog in Sweets.

THE MILLS COMPANY

Manufacturers of a complete line of toilet partitions and interchangeable partitions for office and factory

904 WAYSIDE ROAD · CLEVELAND, OHIO

MILLS METAL

TOILET PARTITIONS

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 118*

MILL WORK—Continued

Klein & Co., Inc., Henry, 11 East 37th St., New York, N. Y.
Two Driwood Interiors. Folder, 4 pp., 6¼ x 9 ins. Illustrated. Use of moulding for paneling walls.

A New Style in Interior Decoration. Folder, 4 pp., 6¼ x 9 ins. Illustrated. Deals with interior woodwork.

Driwood Period Mouldings in Ornamented Wood. Booklet, 28 pp., 8½ x 11 ins. Illustrated.

How Driwood Period Mouldings in Ornamented Wood Set a New Style in Decoration. Folder.

Roddis Lumber and Veneer Co., Marshfield, Wis.
Roddis Doors. Brochure, 24 pp., 5¼ x 8½ ins. Illustrated price list of doors for various types of buildings.

Roddis Doors, Catalog G. Booklet, 184 pp., 8½ x 11 ins. Completely covers the subject of doors for interior use.

Roddis Doors for Hospitals. Brochure, 16 pp., 8½ x 11 ins. Illustrated work on hospital doors.

Roddis Doors for Hotels. Brochure, 16 pp., 8½ x 11 ins. Illustrated work on doors for hotel and apartment buildings.

ORNAMENTAL PLASTER

Jacobson & Company, 239 East 44th Street, New York.
A Book of Modern Design. Booklet, 44 pp., 9 x 12 ins. Illustrated. Decorative plaster, particularly for ceilings.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Medusa Portland Cement Co., 1002 Engineers' Building, Cleveland.
"How to Paint Concrete and Masonry Surfaces." Booklet, 16 pp., 8½ x 11 ins. Illustrated.

Minwax Company, Inc., 11 West 42nd St., New York.
Color Card and Specifications for Minwax Brick and Cement Coating. Folder, 4 pp., 8½ x 11 ins. Illustrated.

National Lead Company, 111 Broadway, New York, N. Y.
Handy Book on Painting. Book, 5½ x 3¾ ins., 100 pp. Gives directions and formulæ for painting various surfaces of wood, plaster, metals, etc., both interior and exterior.

Red Lead in Paste Form. Booklet. 6¼ x 3½ ins., 16 pp. Illustrated. Directions and formulæ for painting metals.

Came Lead. Booklet, 6 x 8¾ ins., 12 pp. Illustrated. Describes various styles of lead cames.

Toch Brothers, New York, Chicago, Los Angeles.
Architects' Specification Data. Sheets in loose leaf binder, 8½ x 11 ins., dealing with an important line of materials.

PARTITIONS

Circle A. Products Corporation, New Castle, Ind.
Circle A. Partitions Sectional and Movable. Brochure. Illustrated. 8½ x 11¼ ins., 32 pp. Full data regarding an important line of partitions, along with Erection Instructions for partitions of three different types.

Irving Hamlin, Evanston, Ill.
Hamlinized Folding Partitions Made from Hamlin's Evanston Soundproof Doors, Sectional and Movable. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Hauserman Company, E. F., Cleveland, Ohio.
Movable Steel Partitions for sub-dividing office and industrial space. Folders on complete line, 8½ x 11, giving full data on the different types of steel partitions with details, elevations and specifications. Also 40-page Architects' Portfolio AIA—28A3, containing 20 full page plates of practical office layouts.

Hollow Steel Standard Partitions. Various folders, 8½ x 11 ins. Illustrated. Give full data on different types of steel partitions, together with details, elevations and specifications.

Henry Klein & Co., 25 Grand Street, Elmhurst, L. I., N. Y.
Telesco Partition. Catalog, 8¼ x 11 ins., 14 pp. Illustrated. Shows typical offices laid out with Telesco partitions, cuts of finished partition units in various woods. Gives specifications and cuts of buildings using Telesco.

Detailed Instructions for Erecting Telesco Partitions. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Complete instructions, with cuts and drawings, showing how easily Telesco Partition can be erected.

PARTITIONS—Continued

Improved Office Partition Co., 25 Grand St., Elmhurst, L. I., N. Y.
(See Henry Klein & Co.)

Richards-Wilcox Mfg. Co., Aurora, Ill.
Partitions. Booklet, 7 x 10 ins., 32 pp. Illustrated. Describes complete line of track and hangers for all styles of sliding parallel, accordion and flush-door partitions.

Telesco Office Partition, 25 Grand St., Elmhurst, L. I., N. Y.
(See Henry Klein & Co.)

PIPE

The American Brass Company, Waterbury, Conn.
Bulletin B-1, Brass Pipe for Water Distribution. A.I.A. File No. 29B4. 8½ x 11 ins., 32 pp. Illustrated. Discusses the economic advantages of permanent plumbing and the suitability of Anaconda 67 Brass Pipe for normally corrosive waters, and Anaconda 85 Red-Brass Pipe for highly corrosive waters. Contains schedule of weights and sizes of seamless brass and copper pipe, recommended specifications and installation suggestions.

American Rolling Mill Company, Middletown, Ohio.
How ARMCO Dredging Products Cut Costs. Booklet, 16 pp., 6 x 9 ins. Data on dredging pipe.

Bethlehem Steel Company, Bethlehem, Pa.
Bethlehem Wrought Steel Pipe, Catalog P. Booklet, 20 pp., 4¼ x 7¼ ins. Illustrated.

Clow & Sons, James B., 534 S. Franklin St., Chicago, Ill.
Catalog A. 4 x 16½ ins., 700 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

Duriron Company, Dayton, Ohio.
Duriron Acid, Alkali, Rust-proof Drain Pipe and Fittings. Booklet, 20 pp., 8½ x 11 ins. Illustrated. Important data on a valuable line of pipe.

Maurice A. Knight, Akron, Ohio.
Knightware in the Princeton Chemical Laboratory. Booklet, 16 pp., 6¾ x 8½ ins. Illustrated.

National Tube Co., Frick Building, Pittsburgh, Pa.
"National" Bulletin No. 2. Corrosion of Hot Water Pipe, 8½ x 11 ins., 24 pp. Illustrated. In this bulletin is summed up the most important research dealing with hot water systems. The text matter consists of seven investigations by authorities on this subject.

"National" Bulletin No. 3. The Protection of Pipe Against Internal Corrosion, 8½ x 11 ins., 20 pp. Illustrated. Discusses various causes of corrosion, and details are given of the deactivating and deareating systems for eliminating or retarding corrosion in hot water supply lines.

"National" Bulletin No. 25. "National" Pipe in Large Buildings. 8½ x 11 ins., 88 pp. This bulletin contains 254 illustrations of prominent buildings of all types, containing "National" Pipe, and considerable engineering data of value to architects, engineers, etc.

Modern Welded Pipe. Book of 88 pp., 8½ x 11 ins., profusely illustrated with halftone and line engravings of the important operations in the manufacture of pipe.

Walworth Company, Statler Office Building, Boston, Mass.
Approved Valves and Fittings for Fire Lines in New York. Folder, 6 pp., 8½ x 11 ins. Illustrated.
C. N. I. Pipe Manual. Booklet, 18 pp., 4½ x 7½ ins. Illustrated.

PLASTER

Best Bros. Keene's Cement Co., Medicine Lodge, Kans.
Information Book. Brochure, 24 pp., 5 x 9 ins. Lists grades of plaster manufactured; gives specifications and uses for plaster.

Plasterers' Handbook. Booklet, 16 pp., 3½ x 5½ ins. A small manual for use of plasterers.

Interior Walls Everlasting. Brochure, 20 pp., 6¼ x 9¼ ins. Illustrated. Describes origin of Keene's Cement and views of buildings in which it is used.

PLUMBING EQUIPMENT

Clow & Sons, James B., 534 S. Franklin St., Chicago, Ill.

Catalog M. 9¼ x 12 ins., 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

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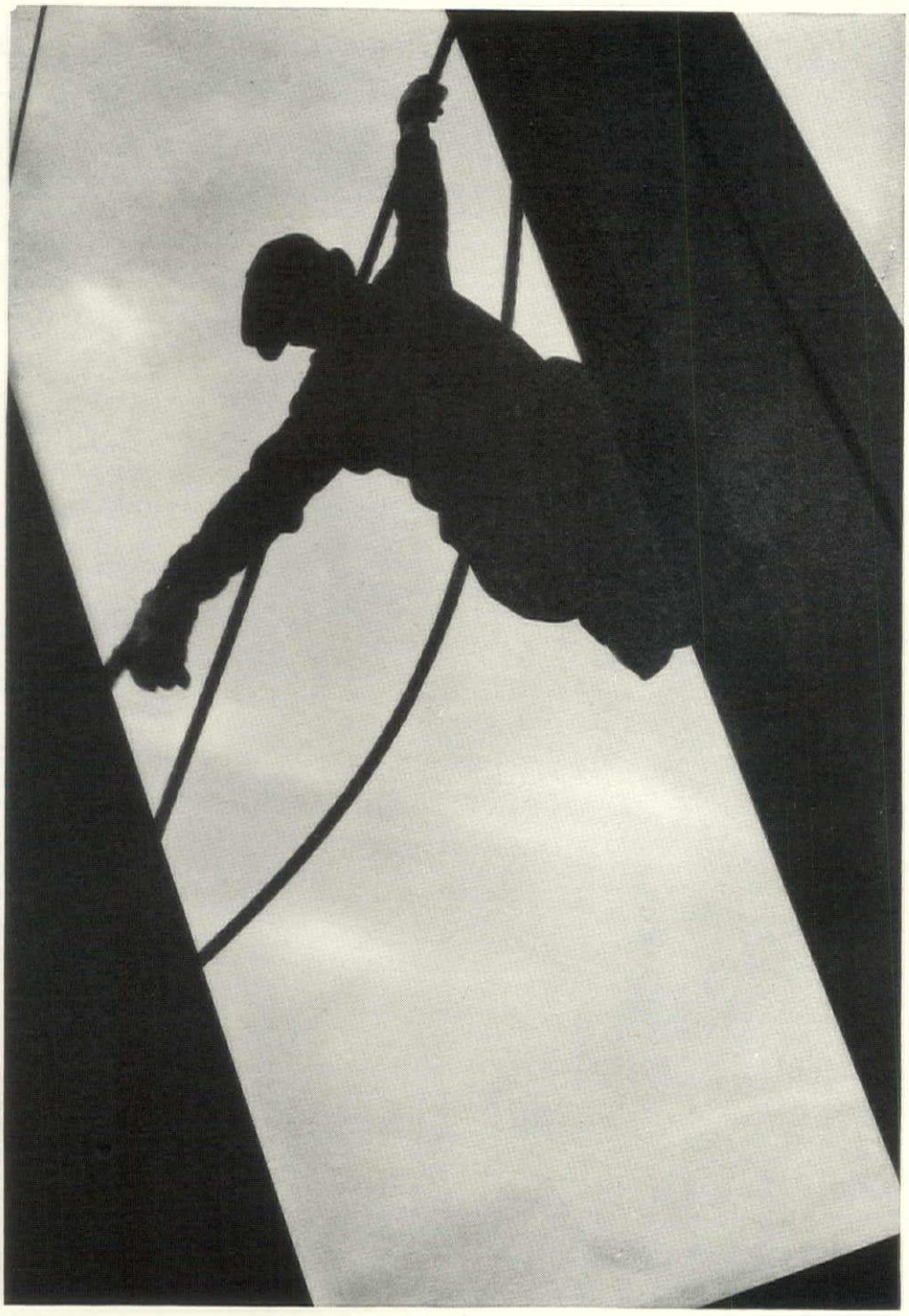

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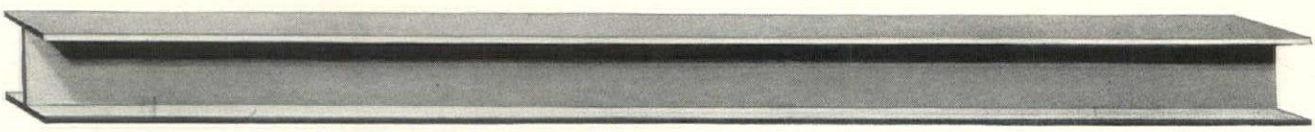

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 120*

PLUMBING EQUIPMENT—Continued

Crane Company, 836 S. Michigan Ave., Chicago, Ill.

Plumbing Suggestions for Home Builders. Catalog, 3 x 6 ins., 80 pp. Illustrated.

Plumbing Suggestions for Industrial Plants. Catalog, 4 x 6½ ins., 34 pp. Illustrated.

Planning the Small Bathroom. Booklet, 5 x 8 ins. Discusses planning bathrooms of small dimensions.

Duriron Company, Dayton, Ohio.

Duriron Acid, Alkali and Rust-Proof Drain Pipe and Fittings. Booklet 8½ x 11 ins., 20 pp. Full details regarding a valuable form of piping.

Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.

Watrous Patent Flush Valves, Duojet Water Closets, Liquid Soap Fixtures, etc. 8½ x 11 ins., 136 pp., loose-leaf catalog, showing roughing-in measurements, etc.

Kohler Company, Kohler, Wis.

Catalog K. 322 pp., 8½ x 11 ins. Illustrated. Loose-leaf catalog showing complete line of plumbing fixtures and accessories.

New Beauty and Utility in Plumbing Fixtures. Booklet, 36 pp., 6 x 9 ins. Illustrated. Shows well-arranged bathrooms, kitchens, etc.

Speakman Company, Wilmington, Del.

Catalog K. Booklet, 150 pp., 8½ x 10⅞ ins. Illustrated. Data on showers and equipment details.

PNEUMATIC TUBE SYSTEMS

G & G Atlas Systems, Inc., 544 West Broadway, New York.

12 pp., 8½ x 11. Illustrated booklet of tube systems for retail stores and other buildings.

4 pp., 8½ x 11. Data Sheet showing schematic diagrams for hotel, bank, factory and wholesale buildings, table of sizes, space requirements and preliminary layout steps. A. I. A. 35h21.

PUMPS

C. A. Dunham Co., 450 East Ohio Street, Chicago, Ill.

Dunham Vacuum Pump. Booklet, 16 pp., 8½ x 11 ins. Illustrated.

Kewanee Private Utilities Co., 442 Franklin St., Kewanee, Ill.

Bulletin E. 7¾ x 10¾ ins., 32 pp. Illustrated. Catalog. Complete descriptions, with all necessary data, on Standard Service Pumps, Indian Brand Pneumatic Tanks, and Complete Water Systems, as installed by Kewanee Private Utilities Co.

Nash Engineering Company, South Norwalk, Conn.

Bulletin 52. Brochure. 6 pp., 10½ x 7¾ ins. Illustrated in color. Devoted to Jennings Standard Centrifugal Pumps for house service, boosting city water pressure to supply top stories, for circulating warm water, etc.

Bulletin 97. Booklet. 16 pp., 10½ x 7¾ ins. Illustrated in color. Describes the design, construction and operation of the Jennings Suction Sump Pump.

Bulletin 11. Brochure. 8 pp., 10½ x 7¾ ins. Illustrated in color. Deals with Nash Hytor Vacuum Pumps for air and gases.

REFRIGERATION

The Fulton Syphon Company, Knoxville, Tenn.

Temperature Control of Refrigeration Systems. Booklet, 8 pp., 8½ x 11 ins. Illustrated. Deals with cold storage, chilling of water, etc.

REINFORCED CONCRETE—See also Construction, Concrete

Kalman Steel Company, Chicago, Ill.

Building for Permanence. Booklet, 8 pp., 8½ x 11 ins. Reinforced concrete products.

Truscon Steel Company, Youngstown, Ohio.

Shearing Stresses in Reinforced Concrete Beams. Booklet, 8½ x 11 ins., 12 pp.

RESTAURANT EQUIPMENT

John Van Range Company, Cincinnati.

Planning Restaurants That Make Money. Booklet, 78 pp., 8½ x 11 ins. Illustrated. Excellent work on equipment.

ROOFING

Federal Cement Tile Co., 608 S. Dearborn Street, Chicago.

Catalog and Roof Standards. Booklet, 36 pp. 8½ x 11 ins. Illustrated. Describes Featherweight Concrete Insulating Roof Slabs, including complete data, weights and dimensions, specifications and detail drawings. Also includes complete information on Featherweight Nailing Concrete Roof Slabs for use with ornamental slate or copper covering. The catalog is profusely illustrated and contains also a partial list of users.

Examples of Theaters and Theater Roofs. Brochure, 16 pps., 8½ x 11 ins., Illustrated. Contains views of theaters designed by some of the country's leading architects.

Federal Interlocking Tile and Glass Tile. 4 pp., 8½ x 11 ins. Illustrates and describes complete roof or precast concrete slabs requiring no composition covering.

Heinz Roofing Tile Co., 1925 West Third Avenue, Denver, Colo.

Plymouth-Shingle Tile with Sprocket Hips. Leaflet, 8½ x 11 ins. Illustrated. Shows use of English shingle tile with special hips.

Italian Promenade Floor Tile. Folder, 2 pp., 8½ x 11 ins. Illustrated. Floor tiling adapted from that of Davanzati Palace.

Mission Tile. Leaflet, 8½ x 11 ins. Illustrated. Tile such as are used in Italy and Southern California.

Georgian Tile. Leaflet, 8½ x 11 ins. Illustrated. Tiling as used in old English and French farmhouses.

Johns-Manville Corporation, New York.

The New Book of Roofs. Brochure, 24 pp., 8½ x 11 ins. Illustrated. Roofing from the Architect's point of view.

Ludowici-Celadon Company, 104 So. Michigan Ave., Chicago, Ill.

"Ancient" Tapered Mission Tiles. Leaflet, 8½ x 11 ins., 4 pp. Illustrated. For architects who desire something out of the ordinary this leaflet has been prepared. Describes briefly the "Ancient" Tapered Mission Tiles, hand-made with full corners and designed to be applied with irregular exposures.

Milcor Steel Co., Milwaukee.

Milcor Architectural Sheet Metal Guide. Booklet. 72 pp., 8½ x 11 ins. Illustrated. Metal tile roofing, skylights, ventilators, etc.

Milcor Sheet Metal Handbook. Brochure. 128 pp., 8½ x 11 ins. Illustrated. Deals with rain-carrying equipment, etc.

SCHOOL EQUIPMENT

John Van Range Co., Cincinnati.

Practical Planning for School Food Service. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.

Specification Sheets. 7¾ x 10¾ ins., 40 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

Nash Engineering Company, South Norwalk, Conn.

Bulletin 67. Booklet. 16 pp. 10¾ x 7½ ins. Illustrated in color. Describes Type A Jennings Sewage Ejector for handling Unscreened sewage and raising it from basements below sewer level.

Bulletin 103. Brochure. 16 pp. 10¾ x 7½ ins. Illustrated in color. Deals with small size Type B Jennings Sewage Ejector.

SCREENS

American Brass Co., The, Waterbury, Conn.

Facts for Architects About Screening. Illustrated folder, 9½ x 11¾ ins., giving actual samples of metal screen cloth and data on fly screens and screen doors.

Athey Company, 6015 West 65th St., Chicago, Ill.

The Athey Perennial Window Shade. An accordion pleated window shade, made from translucent Herringbone woven Coutil cloth, which raises from the bottom and lowers from the top. It eliminates awnings, affords ventilation, can be dry-cleaned and will wear indefinitely.

Orange Screen Company, Maplewood, N. J.

Orsco Screens and Other Products. Booklet, 20 pp., 7¾ x 11 ins. Illustrated.

SHELVING-STEEL

David Lupton's Sons Company, Philadelphia, Pa.

Lupton Steel Shelving. Catalog E. Illustrated brochure, 40 pp., 8½ x 11 ins. Deals with steel cabinets, shelving, racks, doors, partitions, etc.

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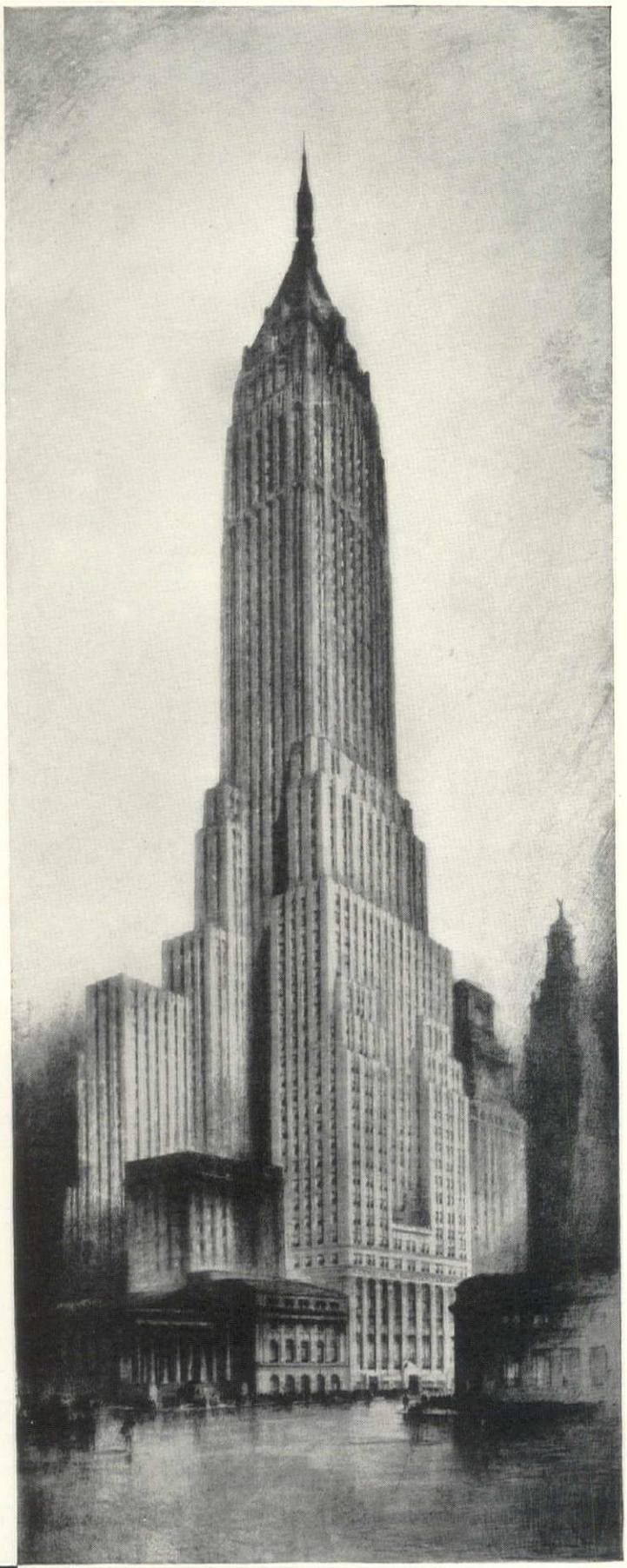

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Export Distributor: Bethlehem Steel Export Corporation, 25 Broadway, New York City.

BETHLEHEM

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 122*

STEEL PRODUCTS FOR BUILDING

Bethlehem Steel Company, Bethlehem, Pa.
Steel Joists and Stanchions. Booklet, 72 pp., 4 x 6¾ ins. Data for steel for dwellings, apartment houses, etc.

Bethlehem Structural Shapes Bound Volume, 368 pp., 4¼ x 6¾ ins. Illustrated.

The Kawneer Company, Niles, Mich.
Folder with A.I.A. File No. featuring new Shower Door, furnished in Solid Bronze, Chromium Plated or Solid Nickel-silver.

Lincoln Electric Company, Cleveland, Ohio.
Studies in Structural Arc Welding. Series of plates, 8½ x 11 ins. Illustrated. Deals with design of arc-welded buildings, details and specifications.

Steel Frame House Company, Pittsburgh, Pa. (Subsidiary of McClintic-Marshall Corp.)

Steel Framing for Dwellings. Booklet, 16 pp., 8½ x 11 ins. Illustrated.

Steel Framing for Gasoline Service Stations. Brochure, 8 pp., 8½ x 11 ins. Illustrated.

Steel Frame Standard Gasoline Service Stations. Booklet, 8 pp., 8½ x 11 ips. Illustrated. Three standard designs of stations.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
The Arc Welding of Structural Steel. Brochure, 32 pp., 8½ x 11 ins. Illustrated. Deals with an important structural process.

STONE, BUILDING

Indiana Limestone Company, Bedford, Ind.
Volume 3, Series A-3. Standard Specifications for Cut Indiana Limestone work, 8½ x 11 ins., 56 pp. Containing specifications and supplementary data relating to the best methods of specifying and using this stone for all building purposes.

Volume 1. Series B. Indiana Limestone Library, 6 x 9 ins., 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.

Volume 4. Series B. Booklet. New Edition, 8½ x 11 ins., 64 pp. Illustrated. Indiana Limestone as used in Banks.

Volume 5. Series B. Indiana Limestone Library. Portfolio, 11⅛ x 8¾ ins. Illustrated. Describes and illustrates the use of stone for small houses with floor plans of each.

Volume 6. Series B. Indiana Limestone School and College Buildings. 8½ x 11 ins., 80 pp. Illustrated.

Volume 12. Series B. Distinctive Homes of Indiana Limestone. 8½ x 11 ins., 48 pp. Illustrated.

Old Gothic Random Ashlar. 8½ x 11 ins., 16 pp. Illustrated.

STORE FRONTS

Brasco Manufacturing Co., 5025-35 South Wabash Ave., Chicago, Ill.
Catalog No. 33. Series 500. All-Metal Construction. Brochure, 20 pp., 8½ x 11 ins. Illustrated. Deals with store fronts of a high class.

Catalog No. 34. Series 202. Standard construction. Booklet, 16 pp. 8½ x 11 ins. Illustrated, complete data on an important type of building.

Detail Sheets. Set of seven sheets, 8½ x 11 ins., printed on tracing paper, giving full-sized details and suggestions for store front designs.

Davis Solid Architectural Bronze Sash. Set of six sheets, 8½ x 11 ins., printed on tracing paper. Full-sized details and suggestions for designs of special bronze store front construction.

The Kawneer Company, Niles, Mich.
Catalog M, 1929 Edition, 64 pages, 8½ x 11 ins., with the A.I.A. File No., profusely illustrated. General Catalog.

Detail Sheet and descriptive folder, 8½ x 11 ins., with A.I.A. File No. featuring "B" Store Front Construction, designed along modernistic lines.

Book of Installations featuring modern fronts. Booklet, 32 pp., 8½ x 11 ins.

Detail Sheets. Set of seven sheets in Portfolio, 8½ x 11 inches. A.I.A. File No.

Detail Sheet and descriptive folder, 8½ x 11 inches, with A.I.A. File No., featuring "B" Store Front Construction, designed along modernistic lines.

National Terra Cotta Society, 230 Park Avenue, New York, N. Y.
Terra Cotta Stores and Store Fronts. Booklet, 15 pp., 8½ x 11 ins. Illustrated.

TELEPHONE SERVICE ARRANGEMENTS

All Bell Telephone Companies. Apply nearest Business Office, or American Telephone and Telegraph Company, 195 Broadway, New York.

Planning for Home Telephone Conveniences. Booklet, 52 pp., 8½ x 11 inches. Illustrated.

Planning for Telephones in Buildings. Brochure, 74 pp., 8½ x 11 inches. Illustrated.

TERRA COTTA

National Terra Cotta Society, 19 West 44th St., New York, N. Y.
Standard Specifications for the Manufacture, Furnishing and Setting of Terra Cotta. Brochure, 8½ x 11 ins., 12 pp. Complete Specification, Glossary of Terms Relating to Terra Cotta and Short Form Specification for incorporating in Architects' Specification.

TIMBREL TILE VAULTS

R. Guastavino Co., 40 Court Street, Boston.
Timbrel Arch Construction. Booklet, 8 pp., 8½ x 11 ins.

TILE, STRUCTURAL CLAY

National Fireproofing Corporation, Fulton Building, Pittsburgh, Pa.
Natco. The Complete Line of Structural Clay Tile. Booklet, 48 pp., 8½ x 11 ins. Illustrated. A General Catalog.
Natco Vitritile Bulletin No. 164. 40 pp., 8½ x 11 ins. Illustrated. Shows color charts, sizes and shapes, actual installations, etc.
Natco Header Backer Tile Bulletin. 8½ x 11 ins. 4 pp. Illustrated.

Natco Unibacker Tile Bulletin. 8½ x 11 ins. 4 pp. Illustrated.

Natcoflor Bulletin. 8½ x 11 ins., 6 pp. Illustrated.

Natco Double Shell Load Bearing Tile Bulletin, 8½ x 11 ins., 6 pp. Illustrated.

TILES

Flint Faience & Tile Co., Flint, Mich.
Vitocraft Tiles, Unglazed. Folder, 4 pp., 8½ x 11 ins. Illustrated. Details of patterns in full color. Ask for Form A-322.

Faience Tiles for Bathrooms. Folder, 4 pp., 8½ x 11 ins. Illustrated. Ask for Form A-303.

Faience and Vitocraft, Unglazed. Folder, 4 pp., 8½ x 11 ins. Illustrated. Views of installations. Ask for Form A-304.

Flintcraft Files. Folder, 4 pp., 8½ x 11 ins. Illustrated. Machine-made floor or wall tile. Ask for Form A-363.

Hanley Company, Bradford, Pa.
Hanley Quarry Tile. Folder. 4 pp., 5 x 8 ins. Illustrated.

C. Pardee Works, 101 Park Ave., New York, N. Y., and 1600 Walnut St., Philadelphia, Pa.
Pardee Tiles. Bound volume, 48 pp., 8½ x 11 ins. Illustrated.

TRUSSES

McKeown Bros. Company, 523 South Keeler Avenue, Chicago.
Truth in Architecture. Folder, 4 pp., 8½ x 11 ins. Illustrated. Deals with use of trusses of wood.

Factory Built Bowstring Trusses. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Timber Trusses. Folder, 4 pp., 8½ x 11 ins., Illustrated.

VALVES

Crane Co., 836 S. Michigan Ave., Chicago, Ill.
No. 51. General Catalog. Illustrated. Describes the complete line of the Crane Co.

C. A. Dunham Co., 450 East Ohio St., Chicago, Ill.
The Dunham Packless Radiator Valve. Brochure, 12 pp., 8 x 11 ins. Illustrated. Data on an important type of valve.

Jenkins Brothers, 80 White Street, New York.
Office Buildings Yesterday and Today. Folder, 8½ x 11 ins. Illustrated. Valves for use in office buildings.

Walworth Company, Statler Office Building, Boston, Mass.
Walworth Valves, Fittings and Tools, Catalog 88. Bound Volume giving data on a wide variety of details.

VENETIAN BLINDS

Columbia Mills, 225 Fifth Avenue, New York.
A Manual for Architects. Booklet, 6 pp., 8½ x 11 ins. Illustrated.

VENTILATION

American Blower Co., Detroit, Mich.
American H. S. Fans. Brochure, 28 pp., 8½ x 11 ins. Data on an important line of blowers.

Duriron Company, Dayton, Ohio.
Acid-proof Exhaust Fans. Folder, 8 x 10½ ins., 8 pp. Data regarding fans for ventilation of laboratory fume hoods.

Specification Form for Acid-proof Exhaust Fans. Folder, 8 x 10½ ins.

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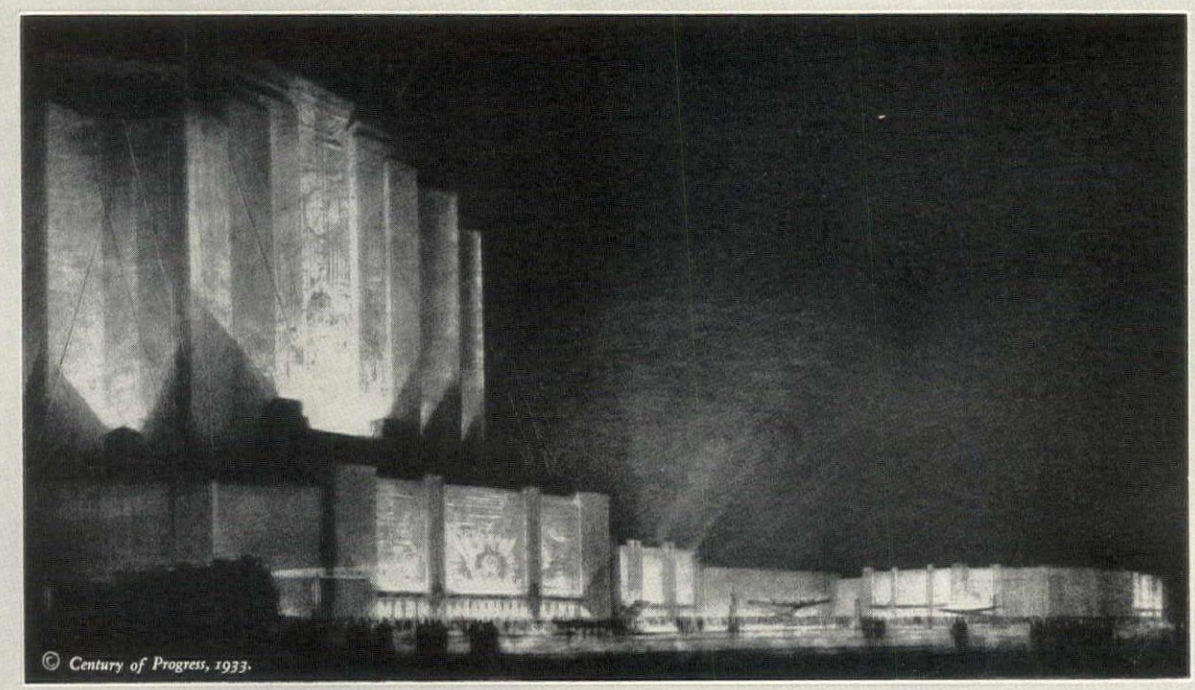

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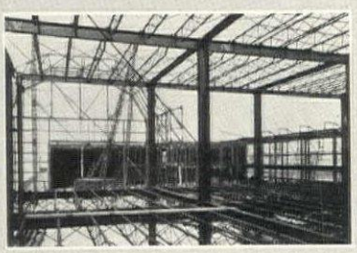

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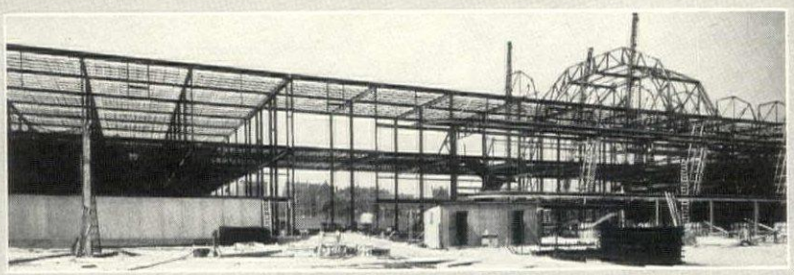

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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—*Continued from page 124*

VENTILATION—Continued

Orange Screen Company, Maplewood, N. J.
Window Ventilator, Filters the air. Folder 4 pp., 8½ x 11 ins. Illustrated.

Herman Nelson Corporation, Moline, Ill.
Univent Ventilation; The Modern Safeguard of Youth in the Schoolroom. Booklet, 63 pp., 8½ x 11 ins. Illustrated.

Herman Nelson System of Ventilation. Brochure. 103 pp., 8½ x 11 ins. Illustrated.

WATERPROOFING

Medusa Portland Cement Co., 1002 Engineers' Building, Cleveland.
Medusa Waterproofed Gray Portland Cement. Booklet, 30 pp., 8½ x 11 ins. Illustrated.

Minwax Company, Inc., 11 West 42nd St., New York.
Waterproofing Stadia. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Transparent Waterproofings for All Masonry Walls and Surfaces. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Data Sheet on Membrane Waterproofing. Folder, 4 pp., 8½ x 11 ins. Illustrated.

Toch Brothers, New York, Chicago, Los Angeles.
Architects' Specification Data. Sheets in loose leaf binder, 8½ x 11 ins., dealing with an important line of materials.

WEATHER STRIPS

Athey Company, 6035 West 65th St., Chicago, Ill.
The Only Weatherstrip with a Cloth to Metal Contact. Booklet, 16 pp., 8½ x 11 ins. Illustrated. Data on an important type of weather stripping.

WINDOW GLASS

Pittsburgh Plate Glass Company, Grant Building, Pittsburgh, Pa.
Pennvernon Window Glass With the New Flatter Surface. Booklet, 16 pp., 8½ x 11 ins. Illustrated.

WINDOWS

William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Pivoted Windows. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Sections, hardware, and other details, and illustrations of installations.

Detroit Steel Products Co., 2250 E. Grand Boulevard, Detroit.
Fenestra Blue Book. Brochure, 75 pp., 8½ x 11 ins. Illustrated. Data on steel windows.

The Kawneer Company, Niles, Michigan.
Circular, 8½ x 11 ins., with A.I.A. File No. featuring full size details and specifications of Sealair In-swinging windows. The above to be furnished in non-ferrous metals and steel.

David Lupton's Sons Company, Philadelphia, Pa.
Lupton Pivoted Sash. Catalog 12-A. Booklet, 48 pp., 8⅝ x 11 ins. Illustrates and describes windows suitable for manufacturing buildings.

Lupton Commercial Projected Windows. Brochure. 24 pp., 8½ x 11 ins. Illustrated. Details and specifications.

WINDOWS, CASEMENT

Detroit Steel Products Co., 2250 E. Grand Boulevard, Detroit.
Fenestra Casements. Booklet, 14 pp., 8½ x 11 ins. Illustrated. Discusses casements, particularly for residences.

Fenestra Screen Casements. Brochure, 16 pp., 8½ x 11 ins. Illustrated.

Decorating With Casements. Booklet, 18 pp., with inserts in color 6 x 8½ ins. Deals with use of decorations, particularly draperies, with casement windows.

David Lupton's Sons Company, Philadelphia, Pa.
Lupton Casement of Copper Steel. Catalog C-217. Booklet, 24 pp., 8⅝ x 11 ins. Illustrated brochure on casements, particularly for residences.

Lupton Creates a Complete Casement. Folder, 8½ x 11 ins. Illustrated data on a casement providing for screens, shades and draperies.

Lupton Heavy Casements. Detail Sheet No. 101, 4 pp., 8½ x 11 ins. Details and specifications only.

WINDOWS, CASEMENT—Continued

Richards-Wilcox Mfg. Co., Aurora, Ill.
Casement Window Hardware. Booklet, 24 pp., 8½ x 11 ins. Illustrated. Shows typical installations, detail drawings, construction details, blue-prints if desired. Describes AIR-way Multifold Window Hardware.

Architectural Details. Booklet, 8½ x 11 ins., 16 pp. Tables of specifications and typical details of different types of construction.

List of Parts for Assembly. Booklet, 8½ x 11 ins., 16 pp. Full lists of parts for different units.

WINDOW SCREENS

William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Pivoted Windows Screened. Booklet, 8 pp., 8½ x 11 ins. Data on screening and window ventilation.

Orange Screen Company, Maplewood, N. J.
Orsco Screens and Other Products. Booklet, 20 pp., 7¾ x 11 ins. Illustrated.

Details and Data for Screen Installations. Booklet, 22 pp., 8½ x 11 ins. Illustrated.

Detroit Steel Products Co., 2250 E. Grand Boulevard, Detroit.
Fenestra Screen Casements. Brochure, 16 pp., 8½ x 11 ins. Illustrated.

WINDOWS, STEEL AND BRONZE

William Bayley Co., 147 North Street, Springfield, Ohio.
Bayley Steel Window Inserts. Brochure, 8 pp., 8½ x 11 ins. Illustrated. Suggestions on correct use of inserts.

David Lupton's Sons Company, Philadelphia, Pa.
A Rain-shed and Ventilator of Glass and Steel. Pamphlet, 4 pp., 8⅝ x 11 ins. Deals with Pond Continuous Sash. Sawtooth Roofs, etc.

How Windows Can Make Better Homes. Booklet, 3⅞ x 7 ins., 12 pp. An attractive and helpful illustrated publication on use of steel casements for domestic buildings.

Truscon Steel Company, Youngstown, Ohio.
Drafting Room Standards. Book, 8½ x 11 ins., 120 pages of mechanical drawings showing drafting room standards, specifications and construction details of Truscon Steel Windows, Steel Lintels, Steel Doors and Mechanical Operators.

Truscon Solid Steel Double-Hung Windows. 24 pp. Booklet, 8½ x 11 ins. Containing illustrations of buildings using this type of window. Designs and drawings of mechanical details.

Continuous Steel Windows and Mechanical Operators. Catalog 126. Booklet, 32 pp., 8½ x 11 ins. Illustrated.

WOOD—See also Millwork

American Walnut Mfrs. Association, 618 So. Michigan Boulevard, Chicago, Ill.
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Wood Conversion Company, Cloquet, Minn.
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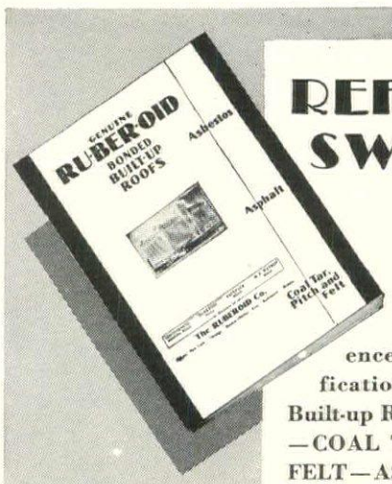

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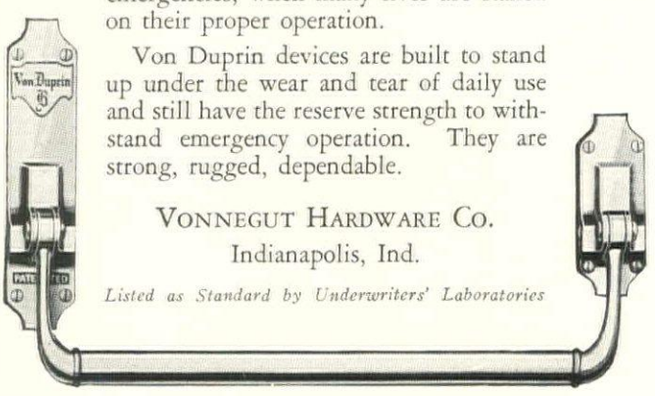

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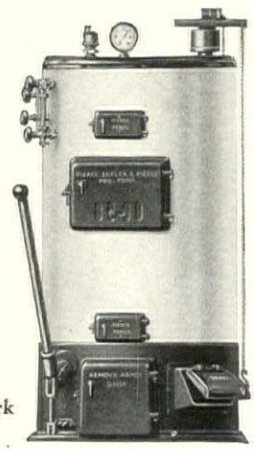

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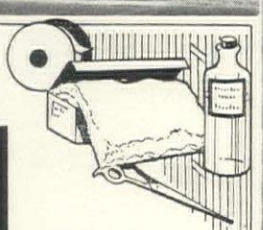

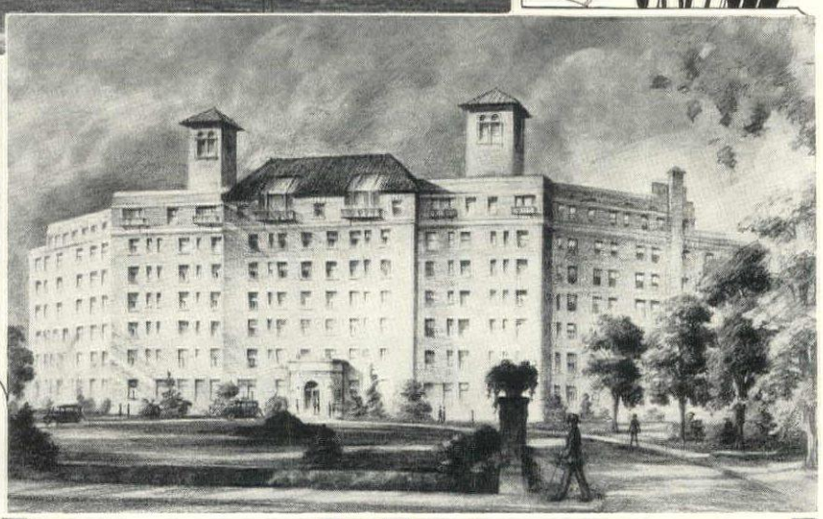

In the Modern Hospital

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De Paul Hospital, St. Louis. Architect, O'Meara & Hills. Plumbing Contractor McNamara Plumbing Co., all of St. Louis.

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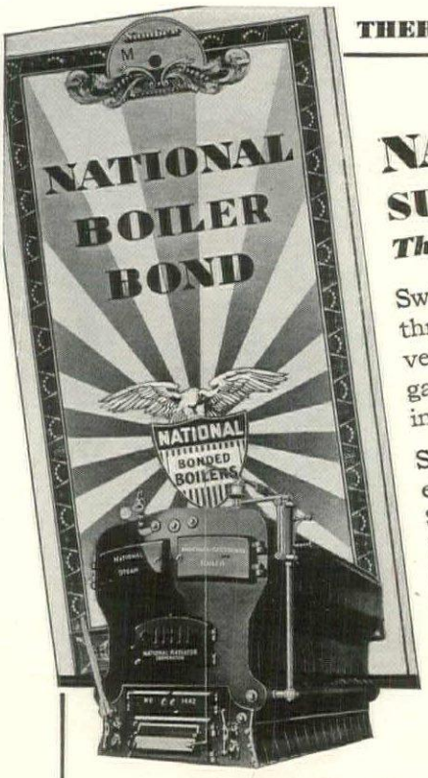

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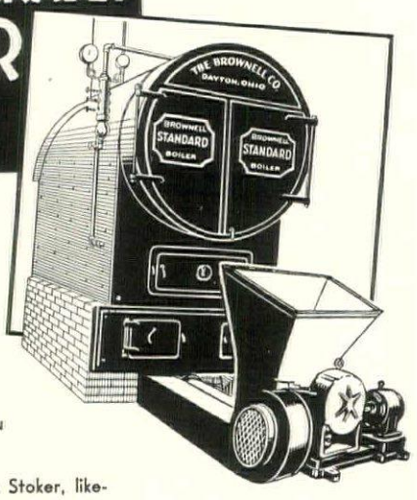

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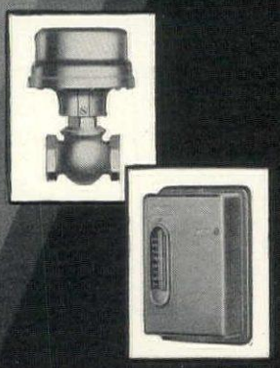


JOHNSON HEAT AND HUMIDITY CONTROL

REVIEWS OF MANUFACTURERS' PUBLICATIONS

NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION, Utica, N. Y. "Safeguarding Wiring for Buildings."

With the beginning of use of electricity upon a large scale for lighting and other purposes, there began a series of experiments with materials for making the raceways for wires from which they could be withdrawn or in which they could be replaced. First trial was made of paper or cardboard, and a little later this same material was wrapped or sheathed with thin layers of brass. Then came tubing of very light steel, which still later gave way to full standard weight pipe, now supplied in the form of Standard Rigid Conduit. "There is something about this evolution which is today of vital interest to architects, engineers, and contractors. During the last two decades in which Standard Rigid Conduit has been proved to be the most satisfactory raceway for the protection of wiring systems, there have been recurrent attempts to introduce methods designed to cheapen electrical construction by substituting other raceways. In considering these, the tendency of the industry has been to forget many of its earlier experiences, and much of the knowledge gained in those days has been lost. As each new material has been brought into the market, code-making authorities, both national and local, have been forced to establish restrictive regulations concerning its use. This has given rise to a complexity of requirements which is most confusing, even to those active in the building industry.

"Architects, builders, and electrical contractors alike need simplified standards based on sound experience. They know that the governing codes and regulations establish minimum requirements merely sufficient to prevent serious hazards for which the public officers and governing bodies responsible for the safety of buildings may be held accountable. They realize that these minimum requirements do not take fully into consideration the economic factors which relate to the ultimate cost of electrical systems, including expenses due to repairs, maintenance, inadequacy, or interruptions in service. Standard Rigid Conduit, described in this booklet, is the type of raceway that best offers the vitally necessary protection to wiring systems, and to the buildings they serve. It is the only type of raceway, the use of which is not limited by restrictive codes and ordinances. It constitutes in itself a simplified standard of the highest economic value.

GENERAL ELECTRIC COMPANY, Schenectady, N. Y. "The Light that Started Sports at Night."

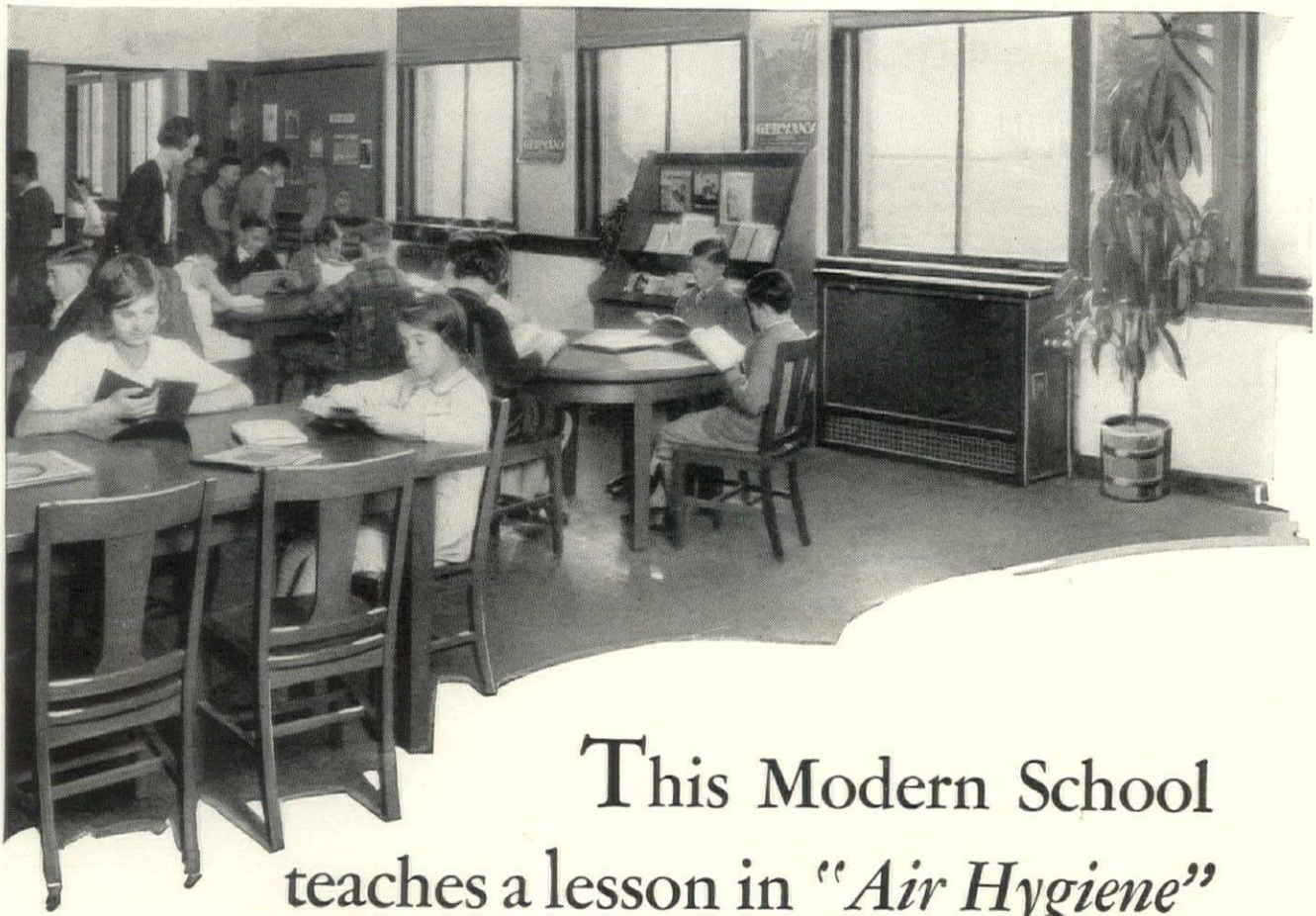
The use of electricity for floodlighting is not confined to buildings. This booklet, one of many being issued by the General Electric Company, deals with such lighting as applied to athletic fields, golf courses, race tracks, skating rinks, swimming pools, stadiums, and other such places, often of considerable extent. This brochure deals fully with the mechanism used for such lighting, and it offers the service of the General Electric Company's engineering staff to those who require it. "General Electric floodlighting equipment is designed by illuminating engineers of wide experience and years of training. General Electric maintains a large illuminating engineering laboratory at Schenectady, devoted solely to the study of lighting problems. This engineering personnel, with its extensive training and unrivaled laboratory facilities, has developed complete plans and specifications for every type of outdoor floodlighting. These are available to G-E representatives in solving any problem of illuminating athletic fields, for baseball, football, and other sports. Any special problems are handled immediately by the laboratory engineers, and individual recommendations on these problems are sent out to representatives in the field. General Electric equipment is outstanding from the viewpoint of illuminating effectiveness as well as from that of design, construction, and materials used. General Electric has prepared a complete line of all the miscellaneous equipment for floodlighting the various types of outdoor sports. These include towers, wire and cable, switches, transformers, and projectors, and are prepared so that contractors or ultimate purchasers may be able to determine at a glance the complete equipment necessary and order all of this apparatus from one source. General Electric has a national organization of commercial offices, warehouses, and service shops, so that the customer can feel that he is in close contact with the manufacturer, regardless of where his installation is made.

BRIDGEPORT BRASS COMPANY, Bridgeport, Conn. "Plumrite Brass Pipe."

There are few details of building which present more vexatious conditions to architects and owners than piping. In many structures, such as laboratories, hospitals, and some types of manufacturing buildings, the pipes are quickly worn away by acids which destroy their fibers, and when the pipes are used to supply water they often corrode to the extent that the water which flows from them is the color of rust. The use of brass piping obviates this difficulty, and there have been many instances where the dismantling or remodeling of a building has brought to light brass piping in quite as good a condition as when it was put in. This valuable booklet, issued by the Bridgeport Brass Company, deals with this. It presents an illustration of the well known Vanderbilt residence which until lately occupied the west side of Fifth Avenue between 57th and 58th Streets. Recently this building was torn down to make way for a business structure. "The Plumrite brass pipe which was installed in 1880 was found to be in virtually perfect condition. Noteworthy is the fact that it was salvaged and used again, after almost a half-century of service. Millions of people have marveled at the vast wealth that made such a palatial city home possible. Thousands of guests must have appreciated its perfection in detail, when they looked upon its silver-plated plumbing fixtures. It remained for a group of callous-handed building wreckers to discover the innate wisdom of its builder, as, breaking through its decorated walls with their sledges, they found 50-year-old Bridgeport Plumrite brass pipe as good as new." Another illustration shows the former Sherry Building, remodeled several years ago for the Guaranty Trust Company, in which Plumrite brass piping was found to be in excellent condition. "The threads were perfect, coming out as bright and clean as when they were cut. The inner surface had but a trace of dirt accumulation. The outer surface showed but the slight amount of tarnish that develops on all unlacquered brass objects after a few days' exposure to the air. The most convincing proof of the absolutely undiminished usefulness of this pipe is the fact that it was re-installed in the building when it was remodeled into a commercial building that same year. This structure stands today, and, after ten more years of service without a sign of trouble, its Plumrite brass pipe is paying handsome returns on the investment made in it something more than 33 years ago."

THE WHEELER, OSGOOD COMPANY, Tacoma. "Laminex Doors Will not Shrink, Swell or Warp."

Often, even in work of a costly nature, it is found that the doors "stick" because, owing to heat, dryness or moisture, they shrink, warp or expand. "Back of all these troubles with doors, is a fault inherent in wood itself. As wood grows, it develops a network of cells called *tracheids.* These constitute the main mass of woody tissues which give the wood its strength. After the wood is cut into lumber the cells or *tracheids,* upon drying, shrink in width but not in length. When they absorb moisture the wood swells. In most uses to which wood is put, this shrinking and swelling are of little importance, but in the construction of a door which should fit an opening to a small fraction of an inch and which gets constant slams, bangs and hard usage, these natural characteristics of wood are the basis of all the trouble. We asked 3,000 architects and contractors in all parts of the country to tell us the most frequent causes of door trouble. 'The principal cause of warping,' they all declared, 'is hanging of doors in new buildings near damp plaster. The trouble is that dampness is often not detectable in a new building until after heat is turned on. Then the building begins to sweat, and moisture goes into the doors. We had to replace 14 doors in one house because it was closed up while damp. The sun came out and drove the heat into the building, splitting all 14 doors.' " This brochure deals with the widely known "Laminex" doors. Since these doors are not built of single thicknesses of wood but of several, this action of heat, moisture or dryness on wood cannot take place. Use of several plys or thicknesses of wood strongly cemented together keeps the doors from swelling, shrinking, or warping. Warping is particularly objectionable in doors in which panes of glass are inserted, because if the warping were in different directions, the glass might easily break.



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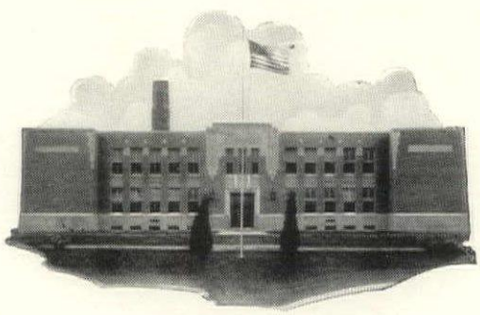
...with 34 Sturtevant Unit Heater-Ventilators

THESE young people are being educated to the value of pure, refreshing air by working in it, every day.

Classroom windows are closed against noise, dust, and drafts... yet the room is always filled with bracing outdoor air, filtered clean and tempered to a constant, comfortable temperature. Here in the Manheim Township School, 34 Sturtevant Unit Heater-Ventilators keep scholars and teachers free from discomfort and distraction. The units are automatically controlled...teachers are free from the constant responsibility of keeping the classrooms "well aired."

Studies of school ventilating problems lead repeatedly to the selection of Sturtevant Unit Heater-Ventilators... for old schools as well as new. Our nearest office would welcome the opportunity to lay all the facts before you.



Manheim Township Grade and Junior High School, Neffsville, Pa. *Architect and Engineer:* Henry Shaub, Lancaster, Pa. *General Contractor:* B. F. Backman, Lancaster, Pa. *Heating and Ventilating Contractor:* C. B. Weitzel, Manheim, Pa.

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REVIEWS OF MANUFACTURERS' PUBLICATIONS

G. I. SELLERS & SONS CO., Elwood, Ind. "Sellers Kitchen Furniture Units; Modern, Colorful Kitchens."

Something of the vastly improved appearance of the present-day kitchen may be due to the fact that the difficulty of solving the servant problem has driven many housekeepers into their own kitchens. Something may likewise be due to the popularity of the "breakfast nook" or "dining alcove," which in many instances is really an adjunct of the kitchen, and the kitchen must therefore be made and kept presentable. But much more is undoubtedly due to the resource and ingenuity of the manufacturers who produce the many details which do so much toward making a kitchen attractive. This well produced brochure deals with just this. The G. I. Sellers & Sons Co. has for many years been in the front rank of firms making the kitchen cabinets which do so much toward making a kitchen practical as well as beautiful, such a cabinet containing the sink, refrigerator, range, and numberless drawers, cupboards and shelves, all planned upon highly architectural lines, not nailed together but built upon the mortise and tenon principle, and then enameled in any one of several attractive colors as may be desired. The booklet itself is calculated to interest the most indifferent or jaded architect or housekeeper. In numerous full-color illustrations it sets forth and emphasizes the decorative possibilities of the modern kitchen,—not only as kitchen cabinets are concerned, but likewise with reference to its walls, ceiling, floor, draperies at windows, and whatever furniture there is.

CLAUDE NEON LIGHTS, INC., New York. "Architectural Review of Gaseous Tube Lighting."

Floodlighting, being widely practiced at present, means the illumination of an entire building or part of a building by means of projectors which throw light upon the structure from sources which are concealed in one way or another. Tube lighting a building, on the other hand, means the outlining of certain parts of the structure or certain of its architectural details so that at night they stand out against the surrounding darkness. Both types of illumination are of course exceedingly effective and valuable. This brochure deals with the use of the well known Claude Neon system of lighting. The illustrations show the appearance of quite a number of Neon installations involving use of light of various colors. Part of the brochure deals with the lighting of gardens and of swimming pools, and another part deals with the advantages of using the Neon system as an aid to aviation. On the subject of lighting gardens, the brochure says: "Many ingenious methods of illumination have been devised by landscape architects to keep alive by night the daytime beauty of the landscape and grounds. Claude Neon luminous tubes of green, soft red, or blue, either concealed in a trellis, worked into a bird cage, fitted to the sides of a fountain, or among cascade rocks, give a shadowless glow that harmonizes with the moonlight with charming results. There is neither irritation to the eye nor too brilliant a glare. They are cold lights that do not damage the foliage.

"For subaqueous lighting Claude Neon luminous tubes are ideally adapted. As they are cold lights, no condensation results when they are placed in direct contact with the water in swimming pools. The light is diffused and radiated from the surface of the pool, hiding the source. There is no glare or irritation to the eyes of those in the water. In southern California especially, where the swimming pool holds its appeal during the entire year, many beautiful show places have adopted Claude Neon luminous tubes for illumination. For aviation use, the greater efficiency of the red rays of Claude Neon tubes in penetrating fog, combined with their distant visibility in clear weather, makes them ideal aviation beacons. They have been adopted at many famous airdromes, notably Croydon, near London. They are economical to operate and have extremely long life. In America, many well known buildings have installed aëronautical beacons upon their roofs, as a guide to night pilots and to identify their buildings. Among them are the Greenbaum Building in Chicago; the Penobscot Building in Detroit; Ritz-Carlton Hotel in Atlantic City; Grant Building in Pittsburgh; Rand Building in Buffalo, and so forth."

DAVID LUPTON'S SONS COMPANY, Philadelphia. "Lupton Steel Products."

During the many years of this large firm's career it has been producing steel building accessories of a vast variety, and the house has long occupied a prominent position in the front rank of manufacturers of such details. This brochure, planned in accordance with the recommendations of the American Institute of Architects, might be described as a general catalog, since it deals with the countless steel products which the Lupton firm manufactures,—doors and windows of many kinds; devices for manipulating such windows and doors; skylights; shelving; partitions; factory equipment; and such sheet metal accessories as gutters, pipes, circles, and hooks. The booklet is filled with valuable data.

SEDGWICK MACHINE WORKS, 150 West 15th Street, New York. "Sedgwick Dumbwaiters and Elevators."

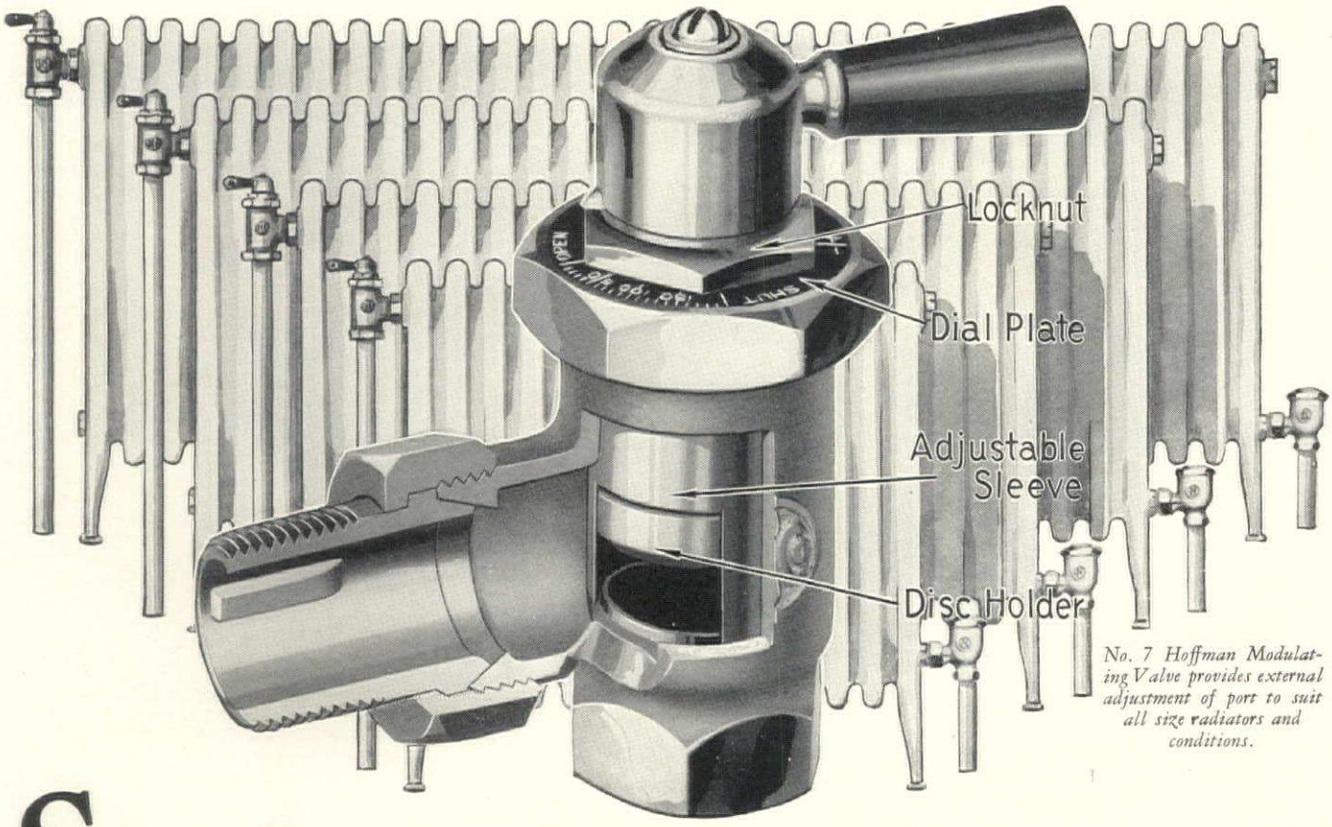
It is difficult to name a type of building in which there does not exist a possibility for using advantageously one or more of the various types of dumbwaiters and elevators. This new 36-page catalog fully describes and illustrates the many types and arrangements of hand-power dumbwaiters and elevators manufactured by the Sedgwick Machine Works. Important features for ready reference include: (1) Method of selecting proper type of equipment for specific requirements; (2) Detailed layouts in blue print form for all standard sizes; (3) Specifications, and (4) A Condensed Reference Chart showing "Application, Uses, Loads and Sizes." Some of the special types of equipment described in this catalog are: Fuel Lifts, Trunk Lifts, Book Lifts, Correspondence Lifts, Hospital Lifts and Invalid Elevators.

AMERICAN BRASS COMPANY, Waterbury, Conn. "Anaconda Pipe for Water Distribution."

There is probably no one item of building upkeep or maintenance more vexatious and troublesome than the wearing out of the pipes which distribute water. "Recent years have witnessed new developments in architectural and plumbing practice directed, for the most part, toward—(a) greater comfort and satisfaction for building occupants, and (b) lowered maintenance costs for building owners. One of the most important of these developments, from the standpoint of beneficial results, has been a pronounced increase in the specification and use of rustless brass pipe for water supply lines. There are, of course, plumbing uses for which iron or steel pipe is adequate, but a growing consensus of engineering opinion and practical experience opposes the use of rustable pipe as uneconomical for water service and distribution lines. The need for permanent water pipe was not as great a generation ago as it is today. The piping was exposed and easy to get at. Labor costs were lower. Replacements were expected, and relatively inexpensive. Nevertheless, there are many authentic records of nineteenth century brass pipe installations that have justified the foresight of their original owners by a half-century and more of continuous water service,—a flow of clear water at all times.

"Rust,—the commonest cause of water pipe troubles,—results in discolored water, reduced flow at the fixtures and leaks in the pipes themselves. With present-day plumbing concealed behind walls and under floors, the repair and eventual replacement of rusted water lines run into serious expense, annoyance and, in the case of commercial buildings, losses of revenue. Such work often involves not only the services of a plumber but those of a carpenter, plasterer and decorator as well. At present-day wage levels, the cost of water pipe renewals can quickly wipe out many times the initial saving that iron or steel pipe seems to offer. Realizing this, it is logical that architects and engineers are turning so generally to use of brass pipe,—to avoid the possibility of future rust troubles in buildings they design." This brochure deals with the excellent line of brass pipe manufactured by this widely known firm. It is a new edition and contains data not included in earlier issues of the publication.

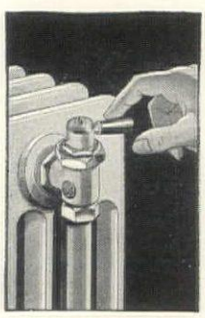
NO. 1 OF A SERIES OF INTERESTING FACTS ON HOFFMAN CONTROLLED HEAT



No. 7 Hoffman Modulating Valve provides external adjustment of port to suit all size radiators and conditions.

Simply turning a dial "Balances" HOFFMAN *CONTROLLED* HEAT

. . . with steam pressure on



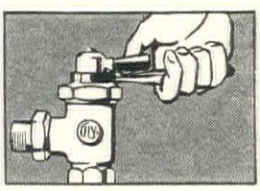
Adjusting the flow of vapor to each radiator on a Hoffman Controlled Heat job is as simple as A B C. You can secure a perfect "balancing up" of the system without time-wasting guesswork — every radiator, regardless of size or distance from the boiler, heats quickly and evenly.

The No. 7 Hoffman Modulating Valve is the reason. It is the *one* valve that's externally adjustable to every individual condition. Because the adjustment is both *external* and *visible,* the valve may be quickly set *with the system in operation.* No need to let radiators cool or take valves apart — no need to break connections. A wrench and a moment's time are all that's needed.

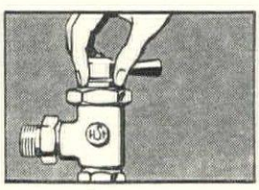
You'll especially appreciate the value of these valves on oil or gas fired jobs. Vapor distribution can be so accurately regulated that the thermostat won't shut off the burner until all radiators are uniformly heated.

The patented externally adjusted sleeve of the No. 7 Hoffman Modulating Valve is the feature that makes "balancing" easy. This sleeve enables you to establish a port area that supplies just the right amount of vapor for each radiator. Just loosen the lock nut, set the graduated dial according to radiator size, and tighten the nut. If oversized or unreamed pipes make vapor distribution irregular, a slight readjustment of the dial brings the radiator to normal.

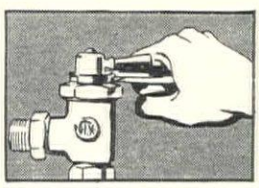
This is one of the many features of Hoffman Controlled Heat that make it superior to all others. Write for our booklet which tells the whole interesting story. Hoffman Specialty Company, Dept. EF-27, Waterbury, Conn.



Loosen the lock nut



Set dial to correspond with size of radiator



Tighten the lock nut

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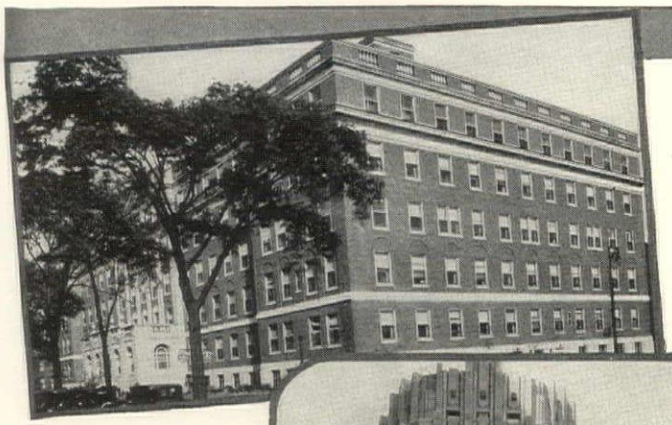

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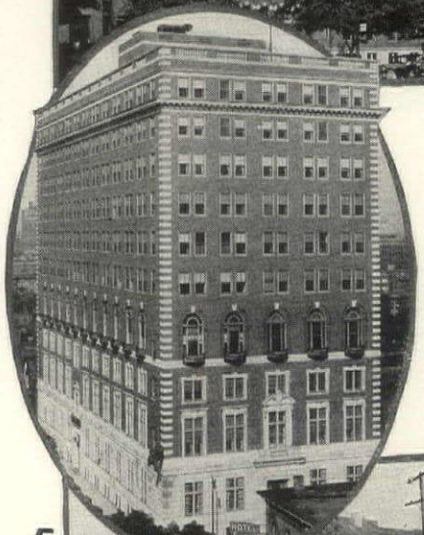

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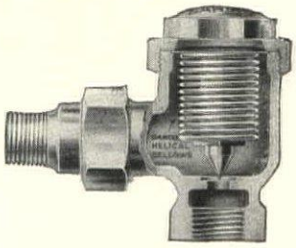

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AUTOMATIC HEAT That Cuts Fuel Bills in Half

Any good boiler will keep a house warm, but there is only one Gable-Grate heater—the Spencer—that will save almost 50% of your client's fuel bill. Spencer Heaters, because of their magazine feed and sloping Gable-Grates, burn No. 1 Buckwheat Anthracite at $7 or $8 a ton, about half the price of larger sizes used in flat grate heaters.

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To many architects the full advantages of Spencer Heaters have been confirmed not only through successful installations for clients, but in their own Spencer-Heated homes.

Spencer Automatic Heat is "The Lowest Cost Heat You Can Buy."

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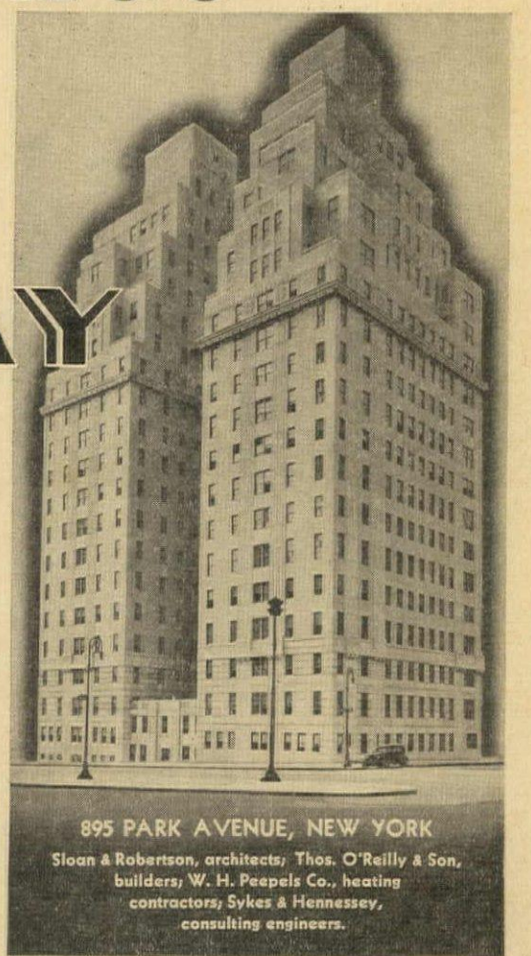
The leading architects of both cities repeatedly specify McQuay All-Copper Radiation for all types of the newer buildings. They choose this modern method of radiation because of its durability, its low upkeep cost, its quick response to the heat supplied, and the fact that the flow of warm air is under constant control. The beauty of McQuay installations is another factor in the selection.



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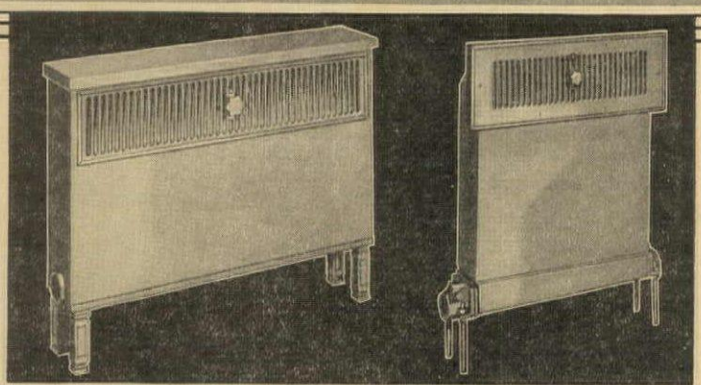

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Planning the laundry layout is more than a one-man job

HERE is an architect engrossed in figures for a hospital project. 10,000 patients per year . . . 24 house physicians . . . 300 nurses . . . 30 maids . . . 300 general employes. And that means 50,000 pieces of linen to be laundered—each week—every week! *How?*

Naturally, the architect, being an expert in his own line, knows the value of calling in an expert in laundry practise; logically, he consults with the Specialist of The American Laundry Machinery Company. Together, they plan a smooth-working, up-to-the-minute department to handle that mammoth "laundry bag." High-quality work, low operating costs. Service so prompt that only four sets of linen per bed are required, instead of the anticipated seven or eight.

Whatever your laundry-layout problems may be, you can save hours of valuable time and dollars of your client's money by conferring with the "American" Specialist. He has helped with the planning of scores of laundries, large and small. He can show you floor plans and layouts—acquaint you with all kinds of "short cuts." His services are at your disposal without obligation; a letter will bring him to your office.

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