



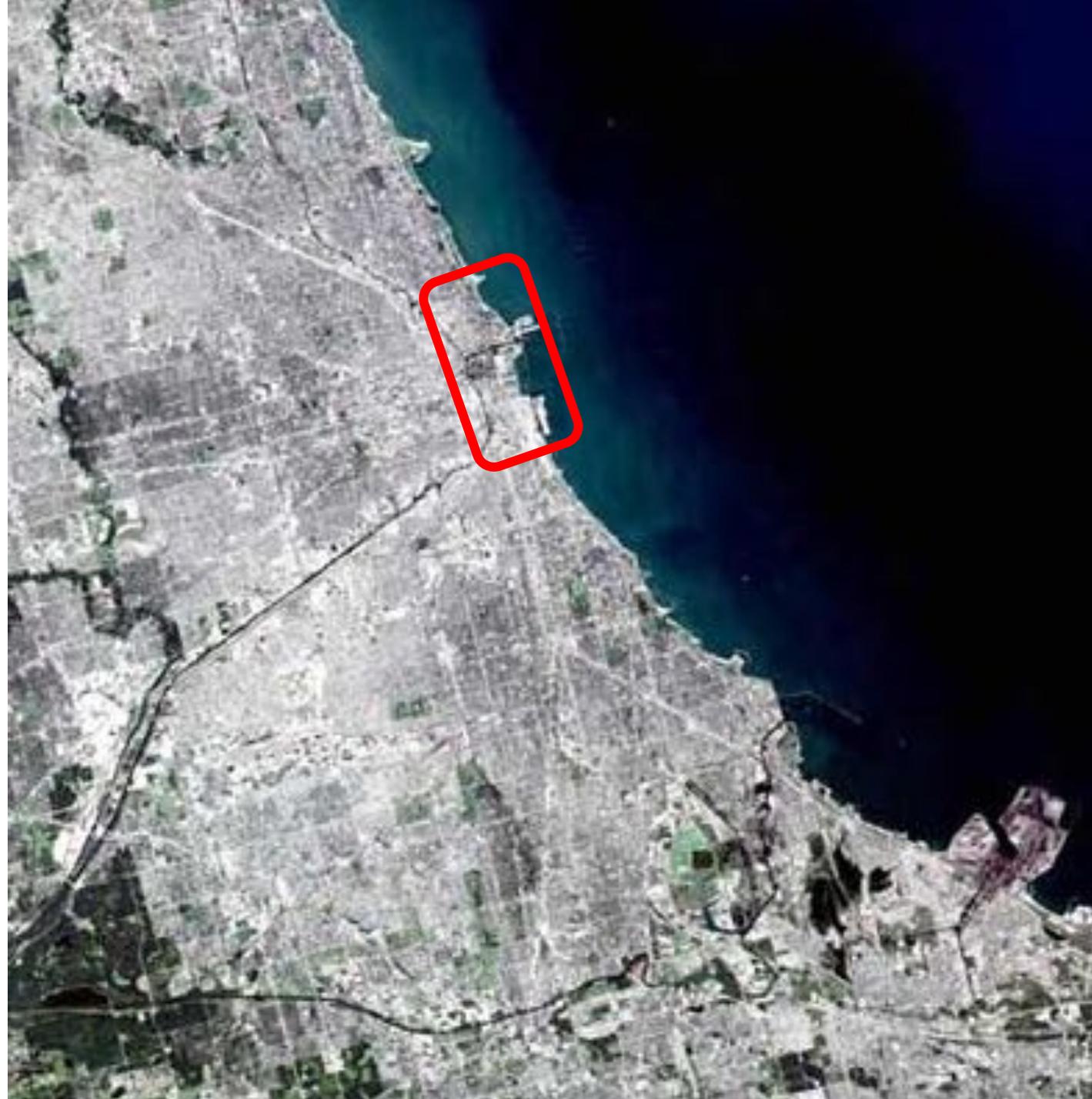
CITTÀ CONTEMPORANEE E SICUREZZA TECNICA

Dall'incendio della Basilica di San Paolo alle città del XXI secolo

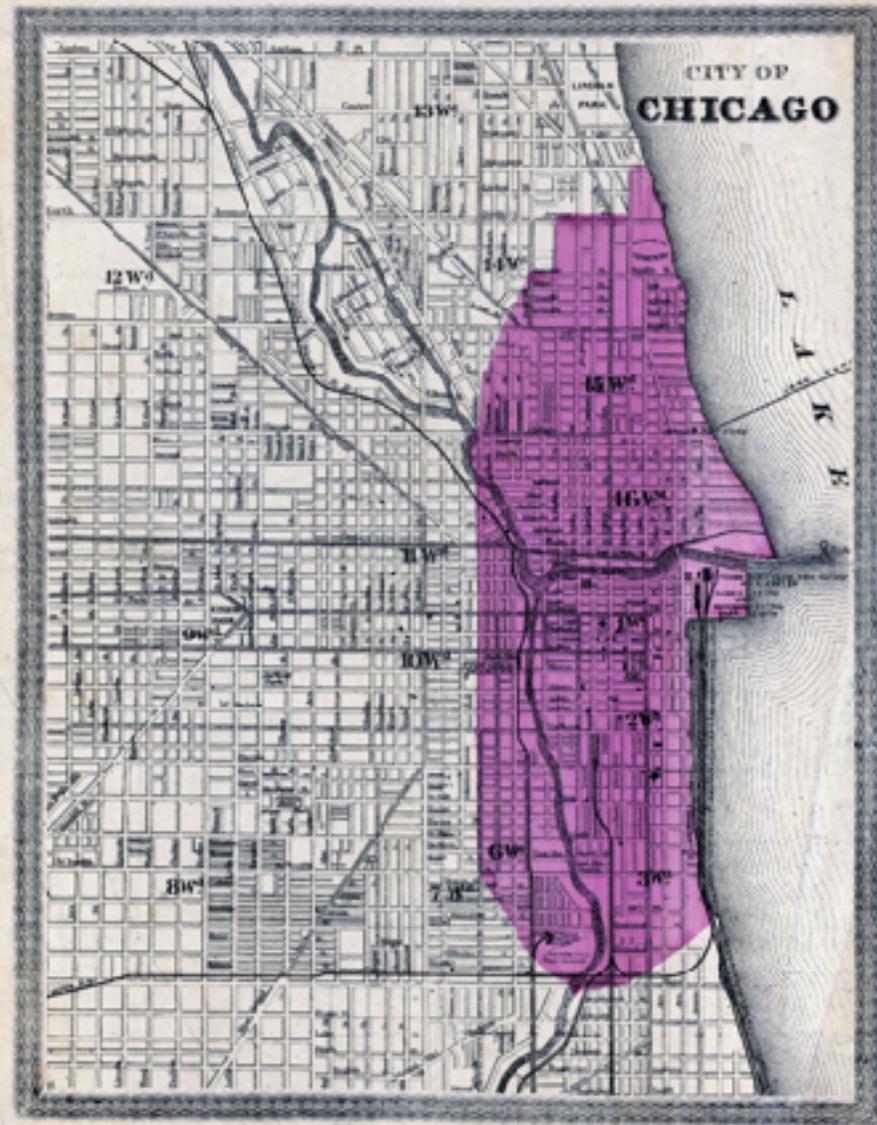
***Chicago 1871. La sua ricostruzione dopo il grande incendio
come paradigma di una cultura della sicurezza tecnica***

FABRIZIO DI MARCO

Sapienza Università di Roma



MAP OF CHICAGO,
SHOWING THE BURNT DISTRICT.



PRESENTED BY
FREEMAN & BURR,
MERCHANT CLOTHIERS,

138 & 140 FULTON STREET, NEW YORK.

RULES for SELF-MEASUREMENT. PATTERN OF GOODS, PRICES, FASHION PLATE, with directions for ordering, to be sent by Mail on Receipt of application.

Annual Fire Losses in the United States. — The follow table gives the aggregate property and insurance losses in United States for the years 1875 to 1909 inclusive, as compi by the National Board of Fire Underwriters.

Year	Aggregate property loss	Aggregate insurance lo
1875	\$78,102,285	\$39,327,400
1876	64,630,600	34,374,500
1877	68,265,800	37,398,900
1878	64,315,900	36,575,900
1879	77,703,700	44,464,700
1880	74,643,400	42,525,000
1881	81,280,900	44,641,900
1882	84,505,024	48,875,131
1883	100,149,228	54,808,664
1884	110,008,611	60,679,818
1885	102,818,796	57,430,709
1886	104,924,750	60,506,564
1887	120,283,055	69,659,508
1888	110,885,665	63,965,724
1889	123,046,833	73,679,465
1890	108,993,792	65,015,465
1891	\$143,784,967	\$90,576,918
1892	151,516,098	93,511,936
1893	167,544,370	105,994,577
1894	140,006,484	89,574,699
1895	142,110,233	84,689,030
1896	118,737,420	73,903,800
1897	116,354,570	66,722,145
1898	130,593,905	73,796,080
1899	153,597,830	92,683,715
1900	180,929,805	95,403,650
1901	165,817,810	100,798,645
1902	161,078,040	94,460,525
1903	145,302,155	92,599,881
1904	229,198,050	127,690,424
1905	165,221,650	103,805,402
1906	518,611,800	230,842,759
1907	215,084,709	117,433,427
1908	217,885,850	135,547,162
1909	188,705,150	126,171,492
Total	\$4.904.620	\$2.830.136



1870



1872



Chg. Bldgs.
 P. B. Greene, Photographer
 315 W. JACKSON ST., CHICAGO.



5 - 2.14
 P. B. Greene, Photographer,
 315 W. JACKSON ST., CHICAGO.

S.W. Cor. Wash. & State St.

First Nat. Bk.

First National Bank, 1868-1869

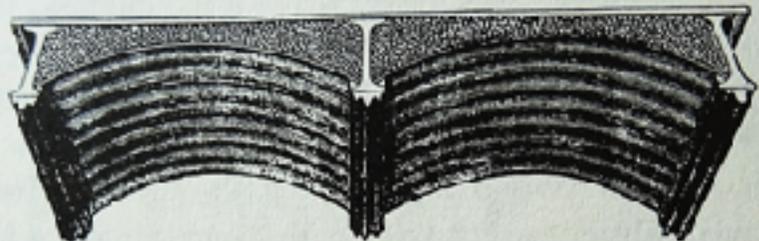


Fig. 3-2. Cross-section through a floor consisting of a corrugated iron arch filled with concrete, patented by Joseph Gilbert in 1867. This kind of floor continued to be used through the end of the nineteenth century. *Architectural Review and American Builders' Journal* 1 (July 1858).

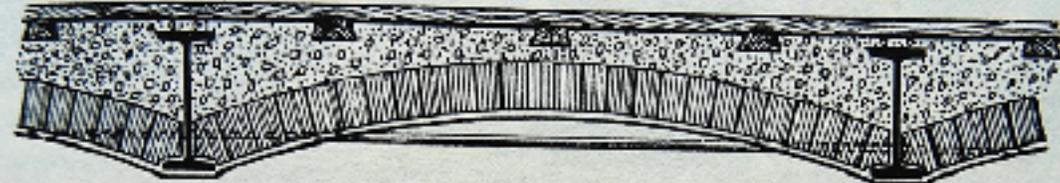
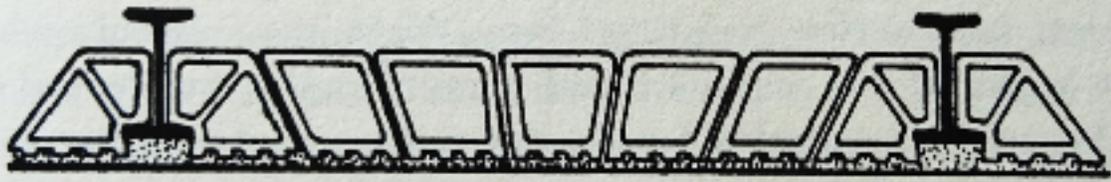


Fig. 2-1. Section through a standard American type of iron and brick arch floor, made of iron I-shaped beams with a shallow brick arch spanning between them. An iron rod tied the lower webs of the beams, to resist the thrust of the arch. The top of the arch is filled with concrete to make a level surface. Wood strips, for nailing down the finish floor, are set in the concrete. J. K. Freitag, *The Fireproofing of Steel Buildings* (New York: John Wiley & Sons, 1899).



Terra-cotta Arch in Kendall (Equitable) Building, Chicago.



Nixon Building, 1871, Solai in ferro-mattoni



Kendall Block (Equitable), 1871, J. Van Osdel,



Chicago - Nelson the Great Fire - and its ruins. 8 West Kinzie Street, Chicago.

Chicago - Nelson the Great Fire - and its ruins. Published by W. A. R. H. H. H. H.

Maxwell building , 1881, adler e sullivan

Archivio materiale da costruzione di elementi recentemente recuperati di pannelli originali in tegole di argilla applicati a colonne e travi strutturali in ghisa all'interno della struttura a cinque piani durante la sua trasformazione in abitazione situata ai piani superiori. I materiali sono stati accuratamente documentati e collocati in un deposito sicuro in loco. I materiali ignifughi estratti dalle colonne e dalle travi sostituite rappresentano probabilmente il primo utilizzo noto delle tegole di argilla di Peter Wight all'interno di un edificio ancora esistente.



The Wight Fireproofing Co.

202 La Salle St., Chicago. 60 Washington St., New York.
Contractors for all kinds of Fireproof Work in

Hollow Fire-Clay Tiles and Porous Terra-Cotta,

BY ALL PARTS OF THE UNITED STATES.

ILLUSTRATION OF POROUS TERRA-COTTA FIREPROOF CEILING.

Patented April 16, 1874, and March 6, 1883.

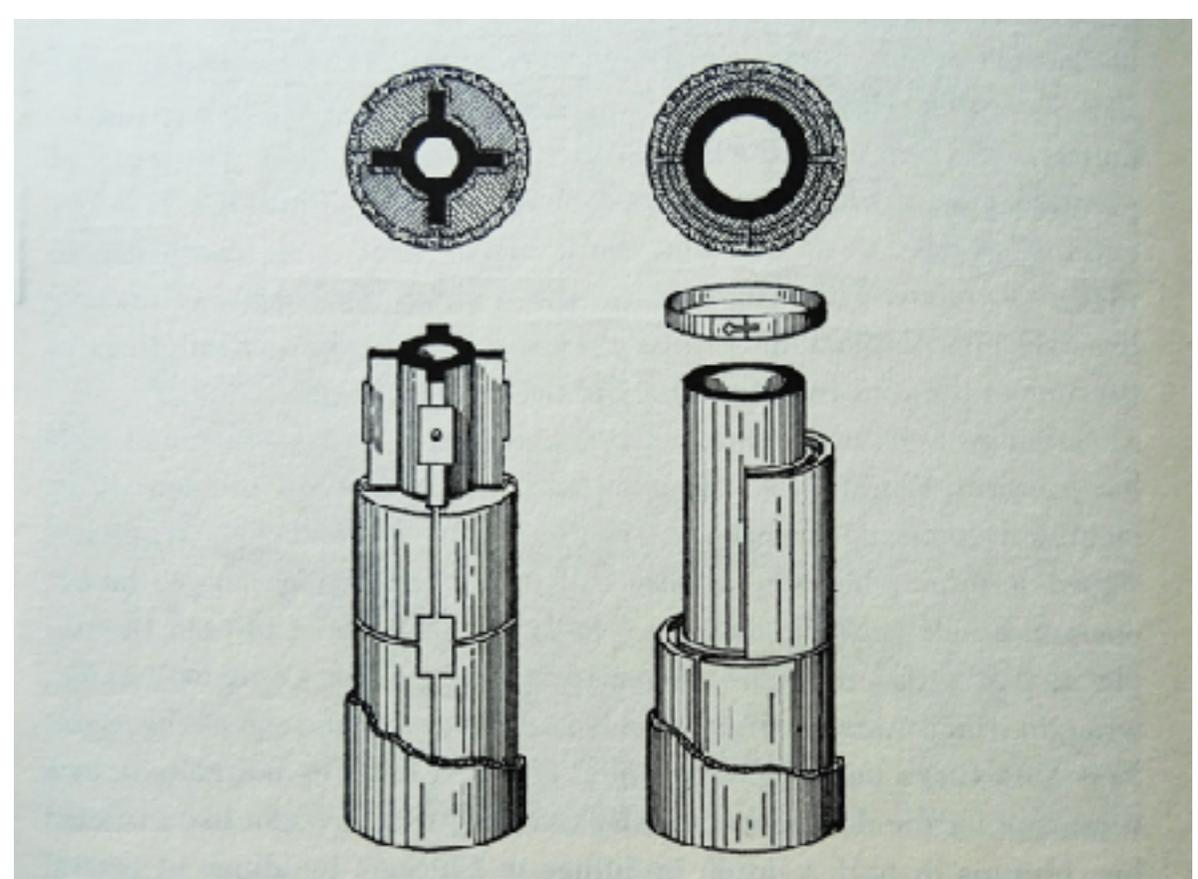
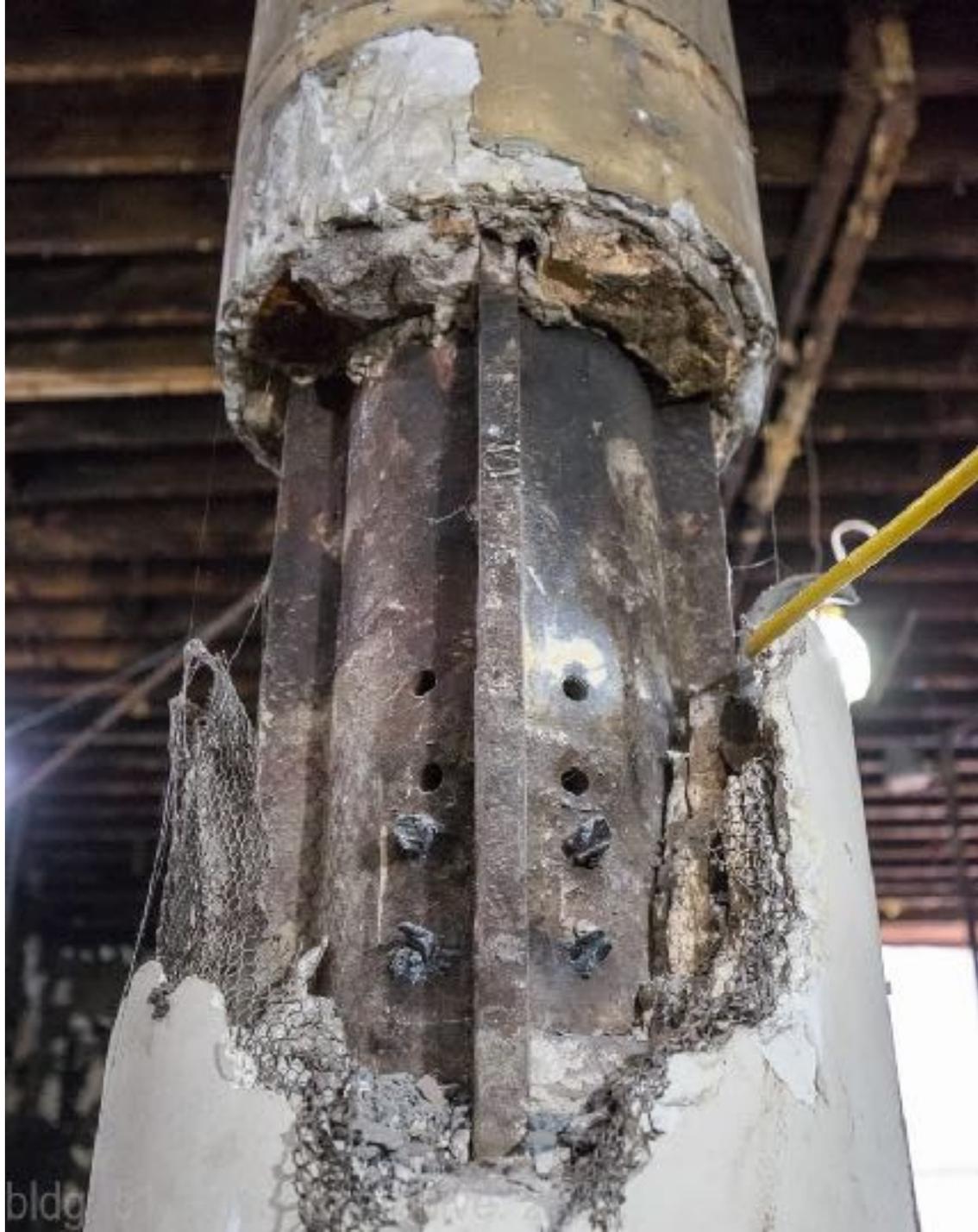
Top of Ceiling Tile.

Bottom of Ceiling Tile.

500,000 feet of this Ceiling have been put up in Chicago, Milwaukee and Cleveland, and it is now being put in the American Bank Note Building, New York.

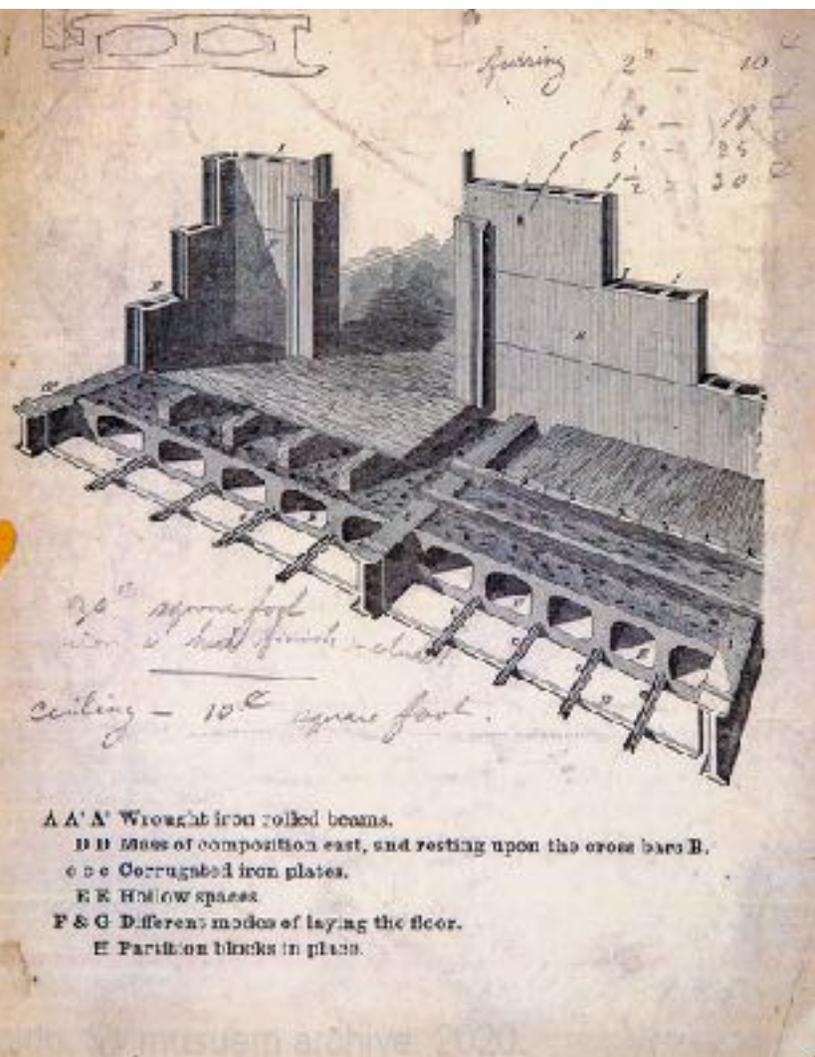
All forms of constructive ironwork, such as Columns, Girders and Roof Trusses, covered with porous Terra-Cotta, and left ready for plastering. Partitions, Furring and Roofing furnished and set.





A sinistra: colonna cava in ghisa con flange. Piccole piastrine rettangolari avvitate nelle flange sostenevano i cunei ignifughi delle tegole.

A destra: blocchi di piastrelle curve progettati per colonne tonde. Fasce di ferro che si inseriscono nelle scanalature nei bordi superiore e inferiore della piastrella tenevano le piastrelle in posizione. Le colonne erano rifinite con uno strato di intonaco o cemento.



THE WIGHT FIRE-PROOFING COMPANY.

Contractors for all kinds of Fire-proof Work

121 DECATUR AVENUE, CHICAGO, ILL. U.S.A.

NEW YORK OFFICE: PLANSBORN, CORNHILL, CORNHILL AND SCOTLAND ST.
 99 WILLIAM STREET.

Office, 73 DEARBORN STREET,
 Chicago, January, 1884

BEAR EAR: You are respectfully invited to examine the system of floor construction now being put in the new building of the Chicago Board of Trade, as shown in the following illustration:

The system of Hollow Flat Arch Construction protects the underside of the iron beams, and makes a continuous Tile Ceiling for plastering. Plastering done under this arch is of uniform density, and will not show the location of the beams when the ceiling has been coated with enamel or dirt. For this reason this is the best kind of arch to use where it is intended to apply valuable Process Painting, or other decorations. Our Beam Protection has been patented, but we contract for Flat Arch Work on this system at the same price as before charged for the old style of arch. We take contracts to furnish and set our own work. Our Arches are of very fine hard clay, much lighter than heretofore used. The regular thicknesses made are 7 inches 9 inches and 12 inches, but any other size will be made. The 7-inch arch weighs 27 lbs. per foot, the 9-inch arch 30 lbs. per foot and the 12-inch arch 38 lbs. per foot.

An inspection of materials of our office is respectfully solicited. Special Estimates will be made in each case for furnishing and setting Flat Arches, Partitions, Furring and Roofing, and for the protection of Iron Columns, Girders and Roof Trusses.

THE WIGHT FIRE-PROOFING COMPANY.

fireproof Building.

THE WIGHT FIRE-PROOFING COMPANY,
 121 DECATUR ST., CHICAGO, ILL. U.S.A. 85 WILLIAM ST., NEW YORK.

Porous Terra-Cotta and Hollow Fire-Clay Tiles
 MANUFACTURED BY THE WIGHT FIRE-PROOFING COMPANY,
 CHICAGO, ILL. U.S.A.

FIRE-PROOF BUILDING MATERIALS.
 MORTON HOLLOW and POROUS BRICK COMPANY,
 MANUFACTURERS OF HOLLOW TERRAZZOLITE BRICKS and POROUS TERRAZZOLITE BRICKS,
 for Floors, Ceilings, Partitions, Furring, Roofing, Girders, Fire-trading and
 OFFICE: 118 BROADWAY, New York. DEPOT: BOSTON, Mass., near Park Square, N. E.
 J. C. BROWN, Prop'r. J. C. BROWN, Prop'r.

FIRE-PROOF HOLLOW BUILDING TILE
 FOR THE STRONG
 CONSTRUCTION OF BUILDINGS
 Of all weights, including very heavy 12 inch, and
 weight, is especially adapted for use in the construction
 of Store, Office, Warehouse, Hotel, Bank, Colleges, Theaters,
 and other buildings for the protection of the interior
 PARTITION, FURRING, CEILING, ROOFING, AND
 OFFICE: 118 BROADWAY, New York. DEPOT: BOSTON, Mass., near Park Square, N. E.
 J. C. BROWN, Prop'r. J. C. BROWN, Prop'r.

THE FIRE-PROOF BUILDING COMPANY,
 117 YORK ST.,
 MANUFACTURERS OF FIRE-PROOF BUILDING MATERIALS.
 Patent Terra-Cotta Tiles, Hollow Fire-Clay Tiles and Hollow Fire-Clay Bricks
 for Floors, Ceilings, Partitions, Furring and
BUILDERS SUPPLIED.
 OFFICE, 117 YORK STREET, BOSTON, MASS., U.S.A.

HENRY MAURER, Manufacturer of
Fire-Proof Material
 of every description. Hollow Brick, Enamelled Clay for Flat Arches, Partitions, Furring, and
 Roofing. OFFICE AND DEPOT, 401 BROADWAY, NEW YORK.

LATEST PATENT FIRE-PROOF
BUILDING MATERIAL.
 TRADE MARK, J. E. B. MANUFACTURER.
 OFFICE: 117 YORK STREET, BOSTON, MASS., U.S.A. DEPOT: 401 BROADWAY, NEW YORK.

FIRE-PROOF
MAGNESIO CALCITE FIRE-PROOF CO.,
BOSTON, MASS.
 Manufacturers of Fire-Proof Material for the
 protection of buildings. Inspected by
 the leading Architects of Boston.
 Send for testimonials of actual use. Every information given for application to
 the principal office.
72 BOSTON STREET, BOSTON.

FIRE-PROOF FOR WOODEN BEAMS.
 Patent right in U.S.A.
 Fire-Proof Tiles for Arches, Partitions, and Furring, also
 for the protection of iron columns and girders.
 JOHN A. WILCOCK, Prop'r. DEPOT: 401 BROADWAY, NEW YORK.

Terra-Cotta.

BOSTON TERRAZZOLITE CO.
 MANUFACTURERS OF
394 FEDERAL STREET
 BOSTON, MASS.

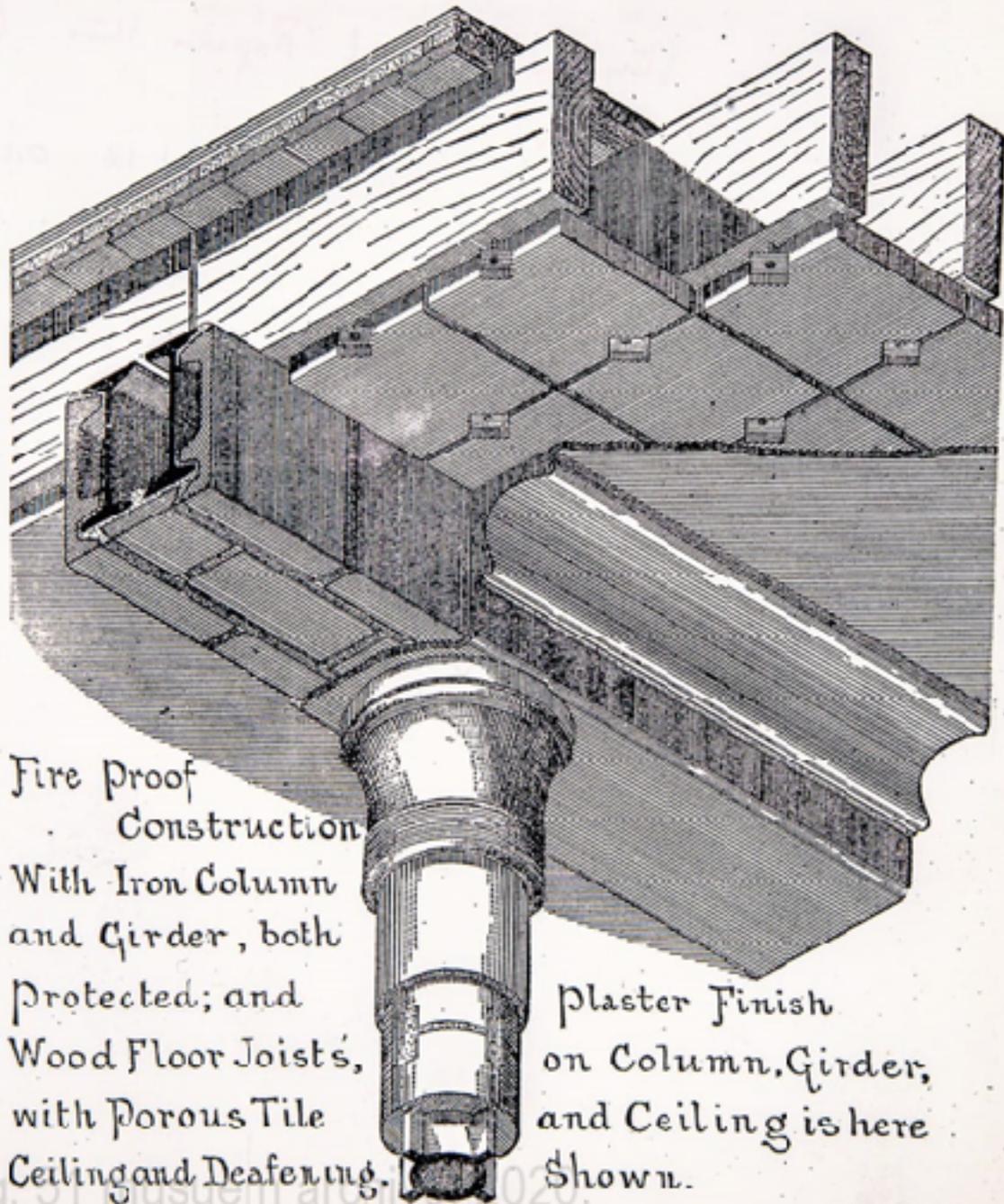
Structural Ceilings of 120 pieces used in
 ARCHITECTS' BUILDINGS and
 OWNERS.
 with application for details and
INDIANAPOLIS
TERRAZZOLITE CO.
INDIANAPOLIS, IND.
 Manufacturers of
 Architectural Terra-Cotta.
 Send for estimates.
BALTIMORE
TERRAZZOLITE CO.
 OFFICE: 201 CALVERT STREET, BALTIMORE, MD.
 MANUFACTURERS OF
 ARCHITECTURAL TERRAZZOLITE
 BRICKS AND TERRAZZOLITE.

TERRAZZOLITE
 394 FEDERAL STREET
 BOSTON, MASS.

ANDREY
TERRAZZOLITE CO.
 Nos. 90 and 91 Acker House, New York.
 MANUFACTURERS OF
 ARCHITECTURAL TERRAZZOLITE
 BRICK AND TERRAZZOLITE BRICK.
A HALL.
TERRAZZOLITE CO.
 Architectural Terra-Cotta,
 Terra-Brick, Terra-Clay Bricks, etc.
 NEW-YORK, W.P.O. AND
 COLORADO BUILDING BRICK.
 Perth Amboy, N. J.

Northwestern Terra-Cotta Works.
TRUE, BRUNNENHORN & CO.,
 ARCHITECTURAL
TERRAZZOLITE CO.
 Works in
 Chicago, Ill. DEPOT: 401 BROADWAY, NEW YORK.
 Manufactured in
 Chicago, Ill. DEPOT: 401 BROADWAY, NEW YORK.
 Manufactured in
 Chicago, Ill. DEPOT: 401 BROADWAY, NEW YORK.

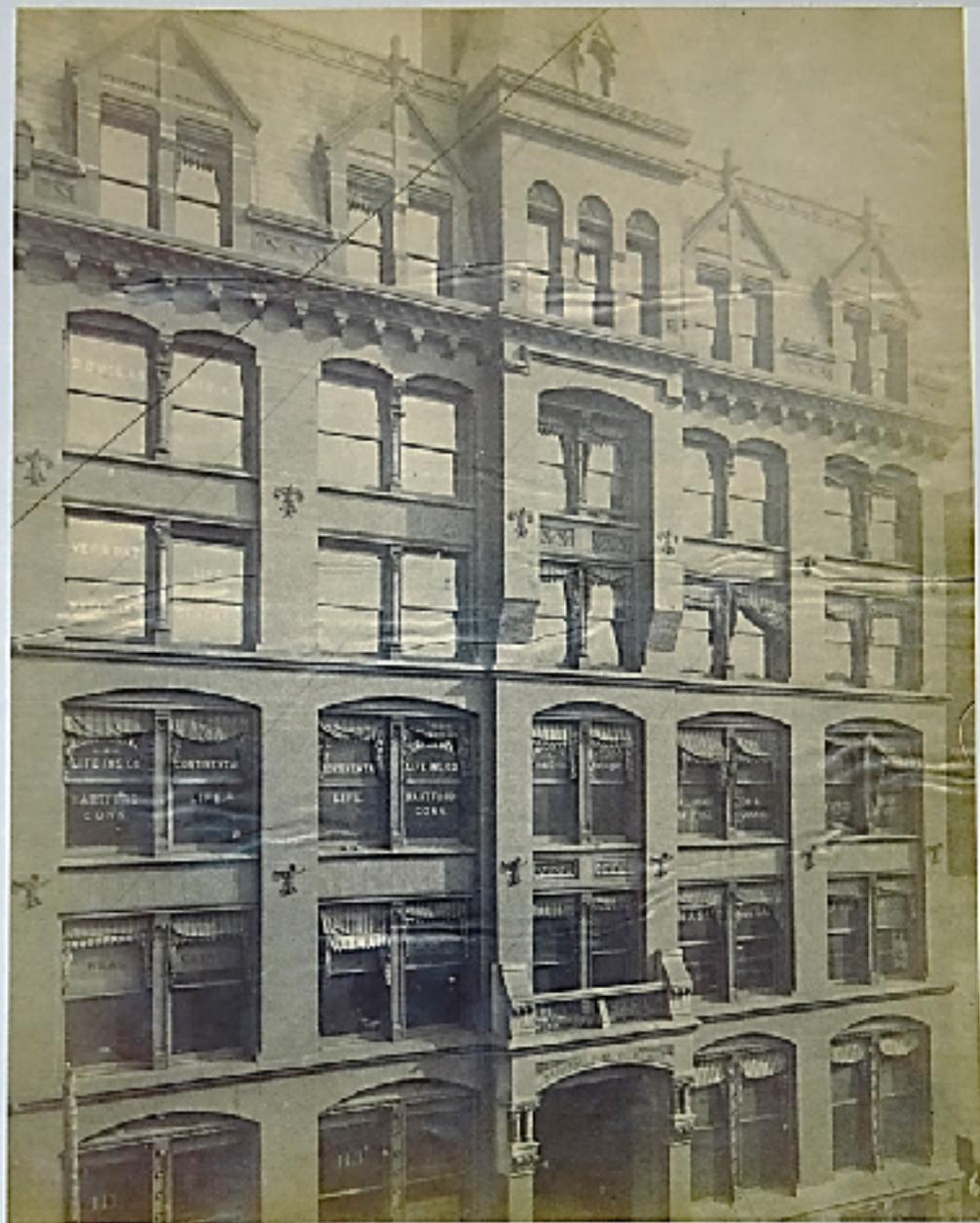
WILCOCK'S Enamelled Bricks,
 Superior to any enameled brick, as
 they are made with perfect water in the
 kiln, and are
YOUNG D. WILSON & SON,
 Manufacturers of
ARCHITECTURAL TERRAZZOLITE.
 The Quality of Plans and Worked
 Plans.
 Office, 117 York Street, Baltimore, Md.
WATER-PROOFING
 FOR WALLS.
 Besides following generally understood, we
 give a complete description of our various plans
 for waterproofing, such as porous masonry, stone walls,
 etc., and for the protection of
TERRAZZOLITE CO., 394 FEDERAL STREET, BOSTON, MASS.



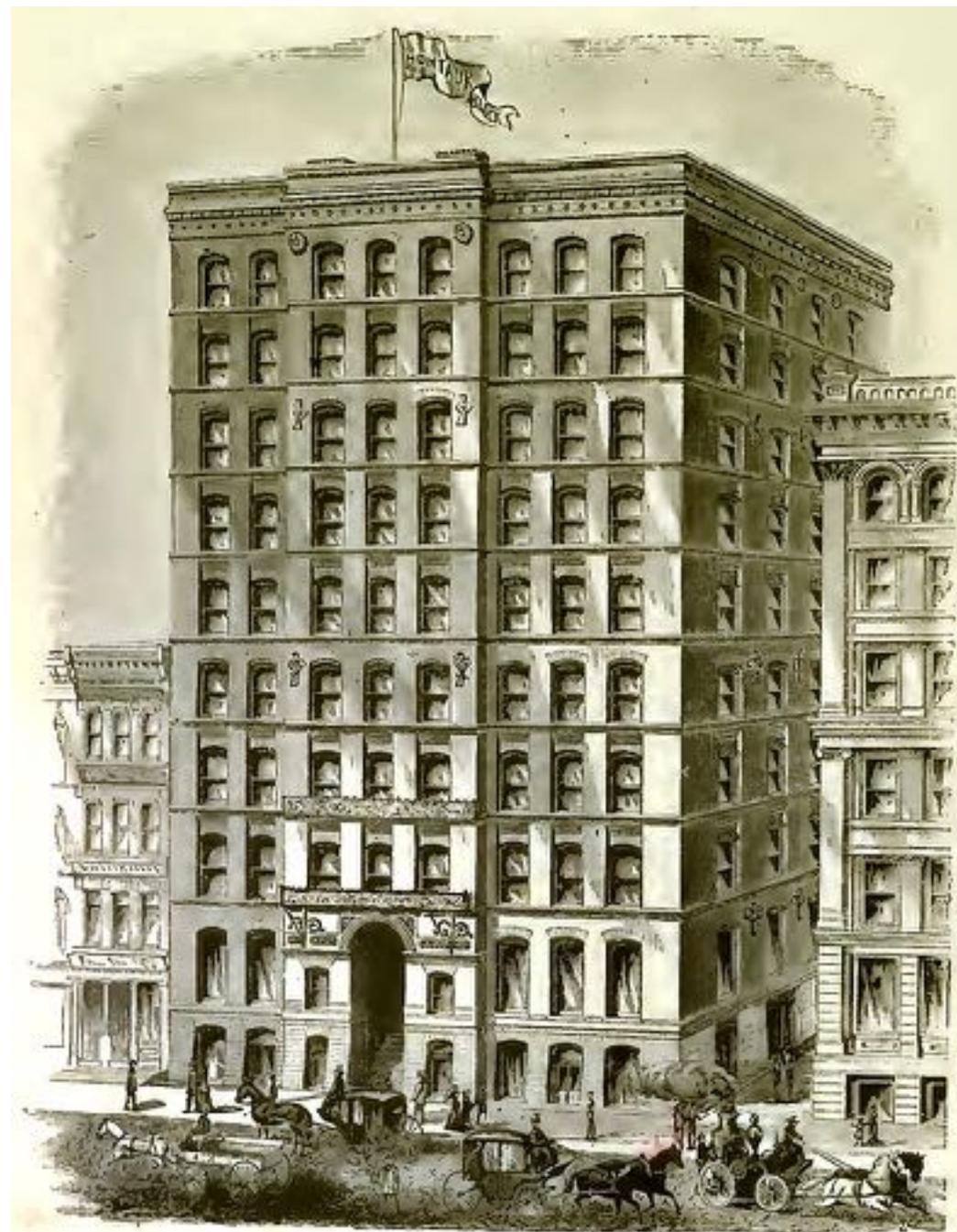
Fire Proof
Construction
With Iron Column
and Girder, both
protected; and
Wood Floor Joists,
with Porous Tile
Ceiling and Deafening.

Plaster Finish
on Column, Girder,
and Ceiling is here
Shown.

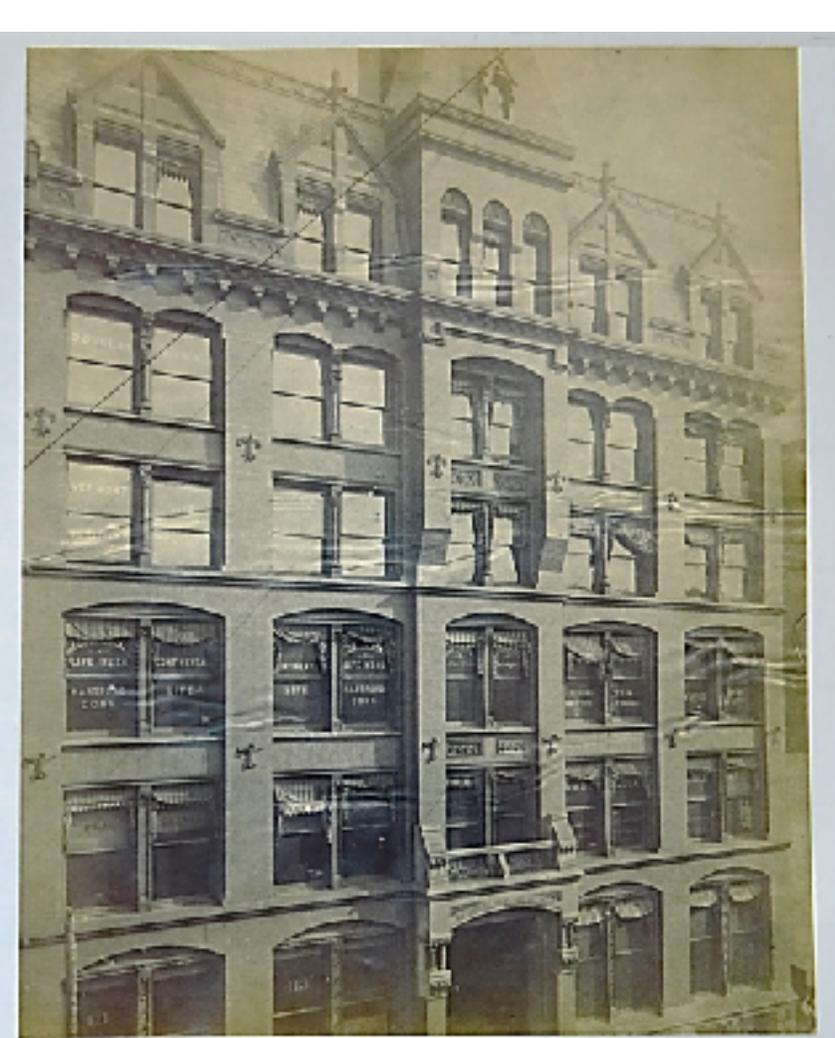




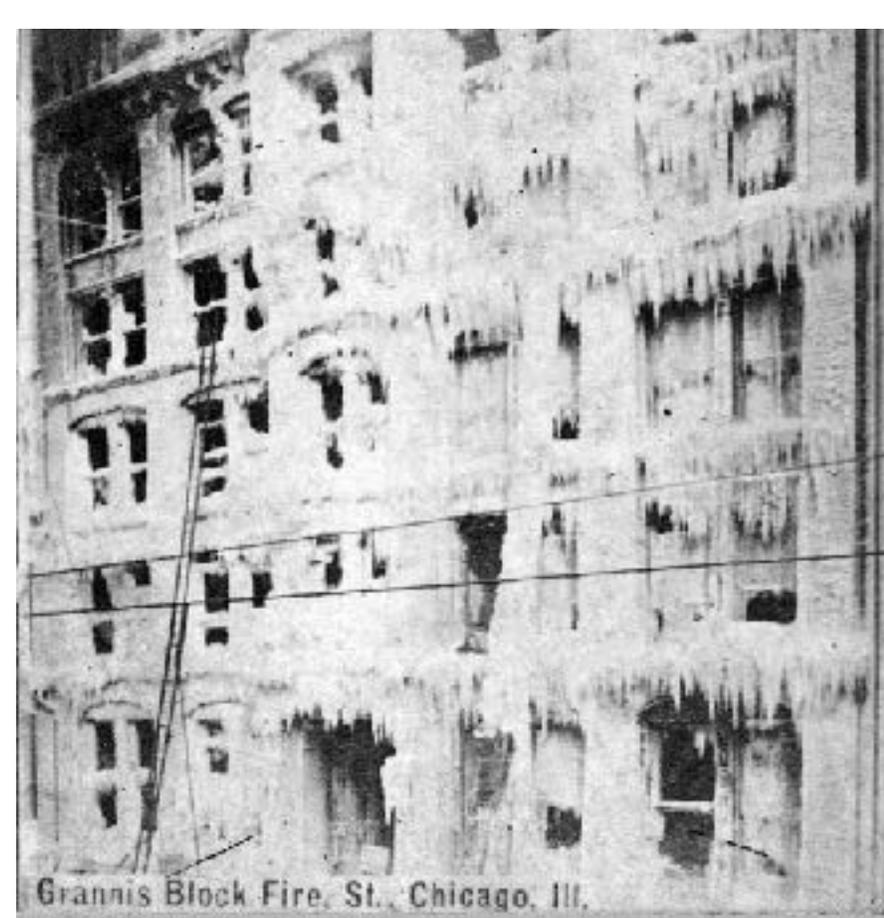
211 Grand Block, 21-29 N. Dearborn, Burnham & Root, 1881 (destroyed, 1885).
(Art Institute of Chicago)



MONTAUK BLOCK.



21 Grannis Block, 21-29 N. Dearborn, Burnham & Root, 1881 (destroyed 1885).
(Art Institute of Chicago)



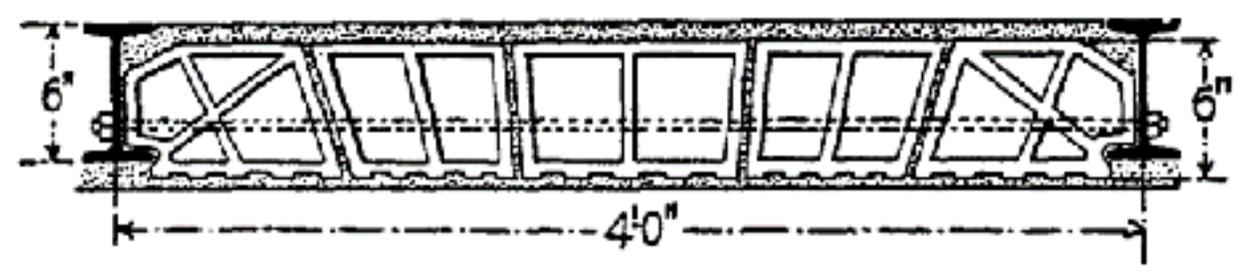
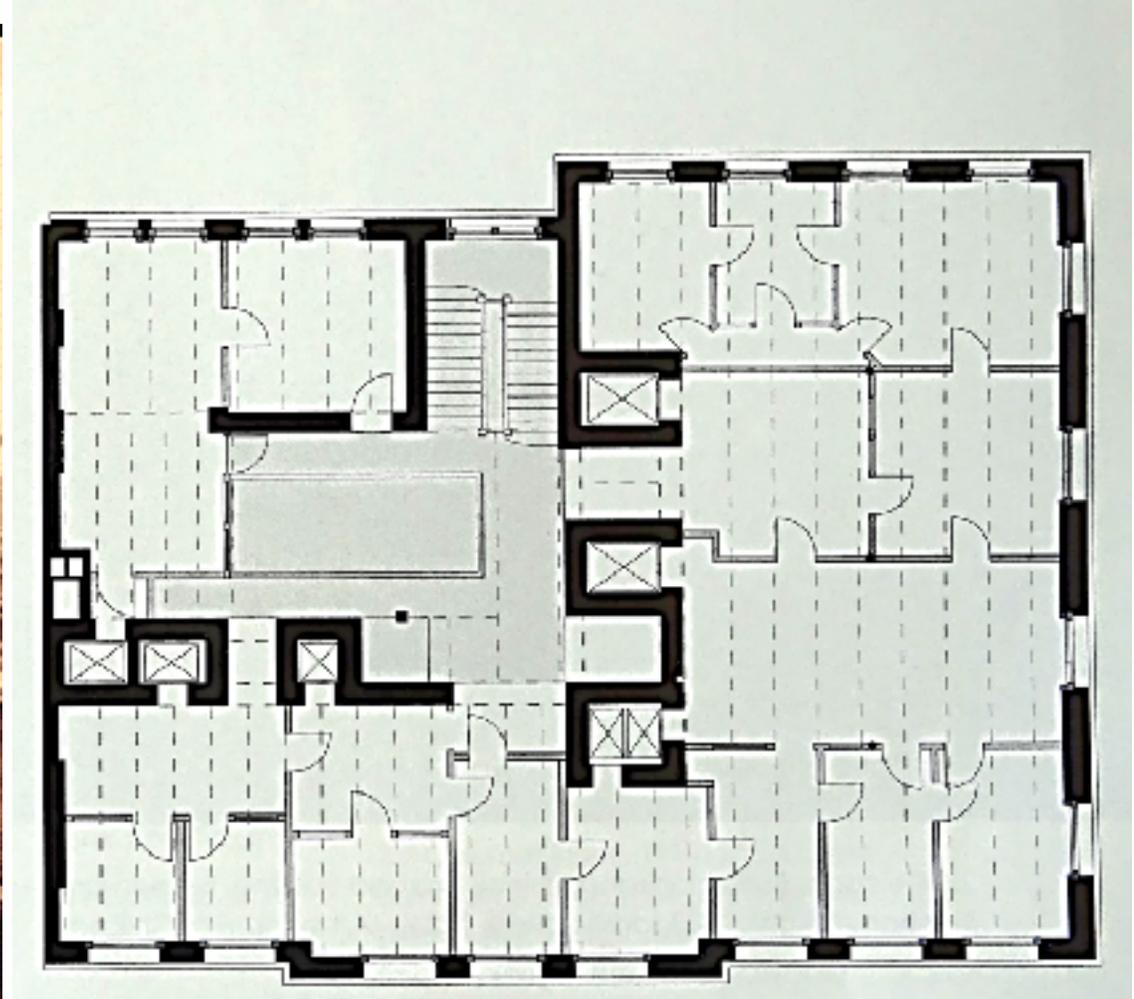
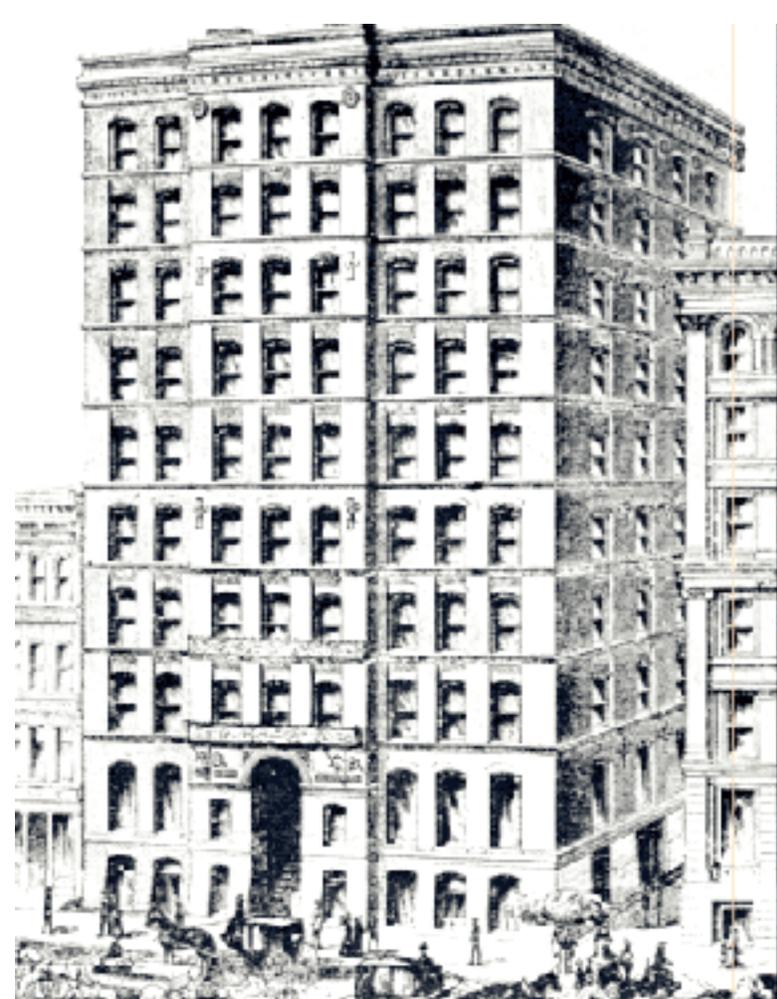


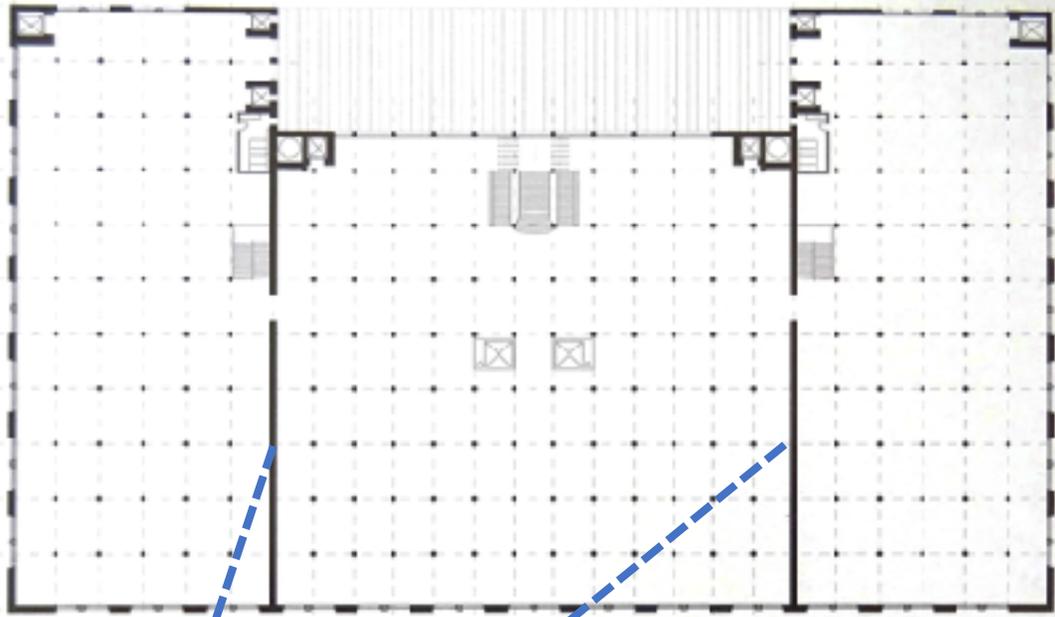
FIG. 4.—Terra-cotta Arch in Montauk Block, Chicago.



Counselman bldg, 1884

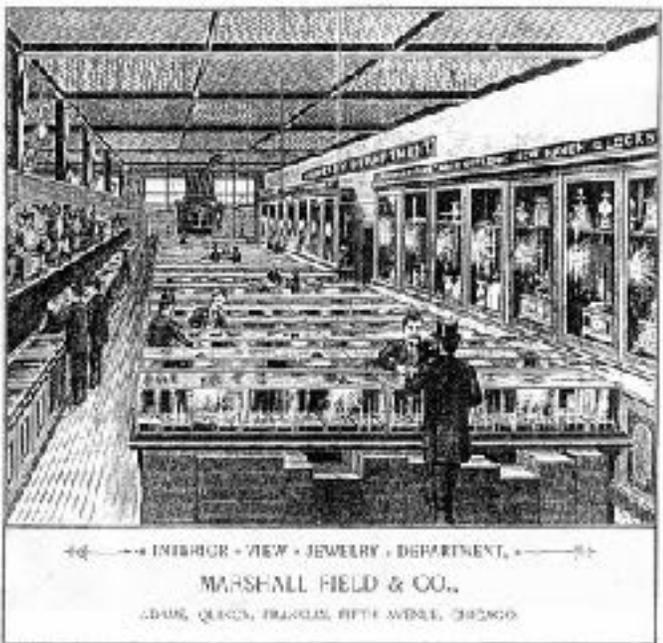


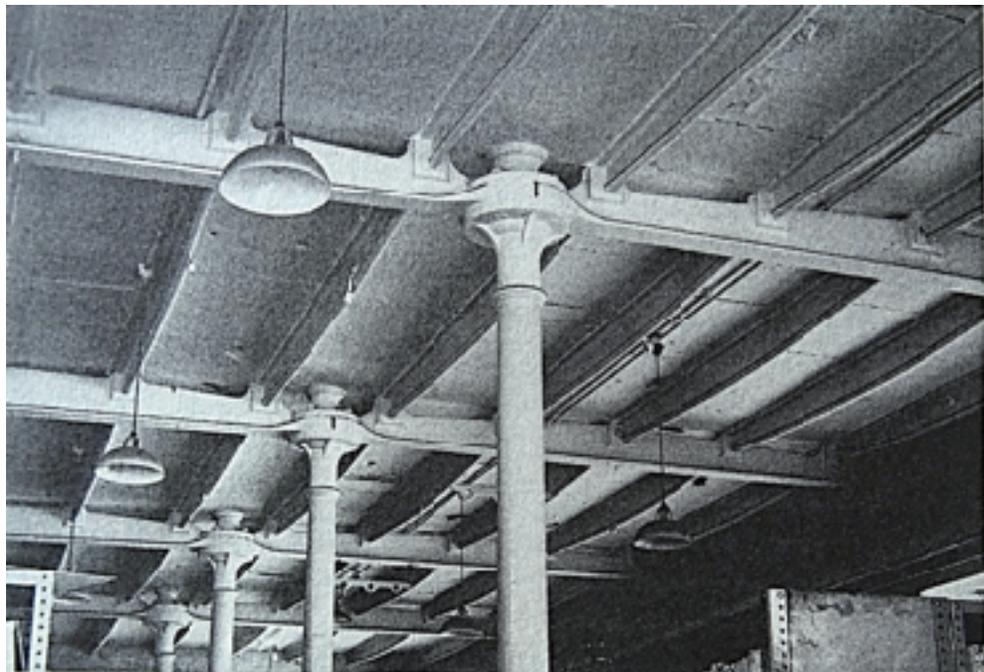
Calumet bldg, 1884



2.9 Marshall Field Warehouse, Adams Street between Wells and Franklin, H. H. Richardson,

Firewalls





Boston Manufacturers Mutual Fire Insurance Company.

STANDARD MILL CONSTRUCTION.

No. 1.

MADE IN U.S.A.
BY
TRCENCOLO
1182 110
1.10.12V

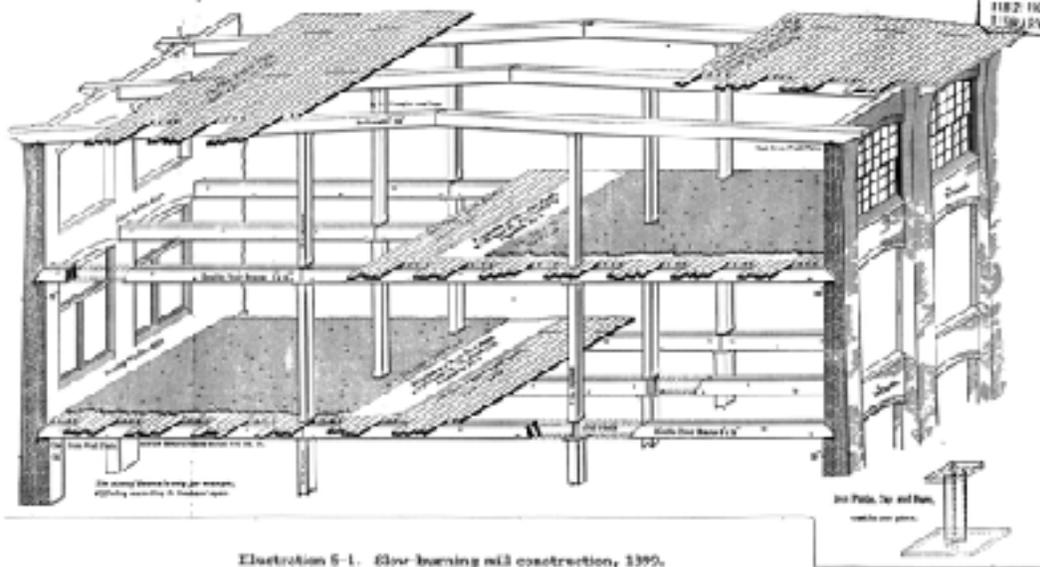


Illustration S-1. Fire-resisting mill construction, 1910.







BEFORE FIRE.



THE BUILDING BEFORE FIRE. — ONE HOUR AND FIFTY MINUTES AFTER FIRE — ONE HOUR AND FIFTY MINUTES AFTER FIRE. — BUILDING REPAIRS DONE.

DEMONSTRATION, BEFORE CHICAGO BOARD OF ENGINEERS, OF FIREPROOF VALUE OF MACKOLITE PLASTER BOARDS AND HOLLOW TILE, JUNE 4, 1894.



Schiller bldg,
1891,
Adler & Sullivan



MACKOLITE FIRE PROOFING COMPANY.

CHICAGO, ILL.

PARTITION TILE,
PLASTER BOARDS,
INSULATING MATERIAL,
GENERAL FIRE-PROOFING.

Phone: Main 4906.

Office,
Rooms 1802 & 1803 Ashland Block.

Factory at Chicago Heights, Illinois.



THE SHADDOCK, BURDECK & ROSE, ARCHITECTS.



MACKOLITE FIRE-PROOFING CO.

Office, Room 1802 Schiller Building,
Chicago.

Our system
of
Fire-Proofing
is especially
adapted
to
the
theater,
Auditorium
and Warehouse
buildings.



ALL THE BEST
MATERIALS
AND
METHODS
EMPLOYED.

MACKOLITE

Special Office:
Grand Rapids, Mich.

Factory:
Chicago Heights, Ill.

Mackolite Fireproofing Company

Office, 1802 Schiller Building,
CHICAGO.

Telephone, Main 4912.

MANUFACTURERS AND CONTRACTORS FOR

Fireproof Floors and Roofs,
Partition Tile,
Furring Tile,
Column and Girder Covering,
Plaster Boards for Fireproofing
and Deafening.

A complete and perfect system
for the fireproofing of
buildings having wooden
floor joists, or having iron
construction.

Estimates given for iron and fireproofing complete.



Champlain, 1894

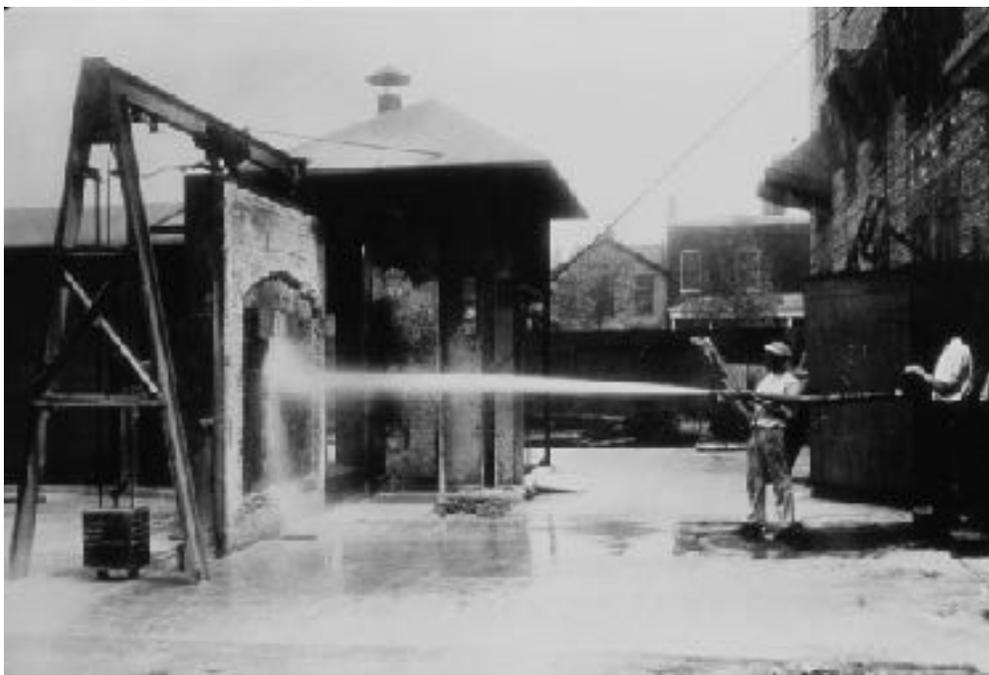


Marquette, 1895



Manhattan, 1891





1903_UL publishes its first Standard for Safety, titled **“Tin Clad Fire Doors.” Rivestite di stagno**, vengono subito usate nei grandi magazzini, nelle scuole, negli ospedali.

1905 _The organization moves to its newly-constructed headquarters on East Ohio Street in Chicago. The building is widely considered a **fireproof fortress, constructed of durable materials including brick, terra cotta, concrete, stone, steel and iron.** The building’s architects call for window frames and sashes of metal to be constructed with wired glass, as well as metal doors and steel desks for the space. Automatic sprinklers hang at the ready, and machines, heating, lighting and power equipment are **“safeguarded with every known precaution”.**



Underwriters Laboratories Inc.



Chicago Building Code 1893

SEC. 66. In describing the construction of the buildings belonging to the
2 various classes before enumerated, the following definitions of terms shall apply
3 throughout this ordinance:

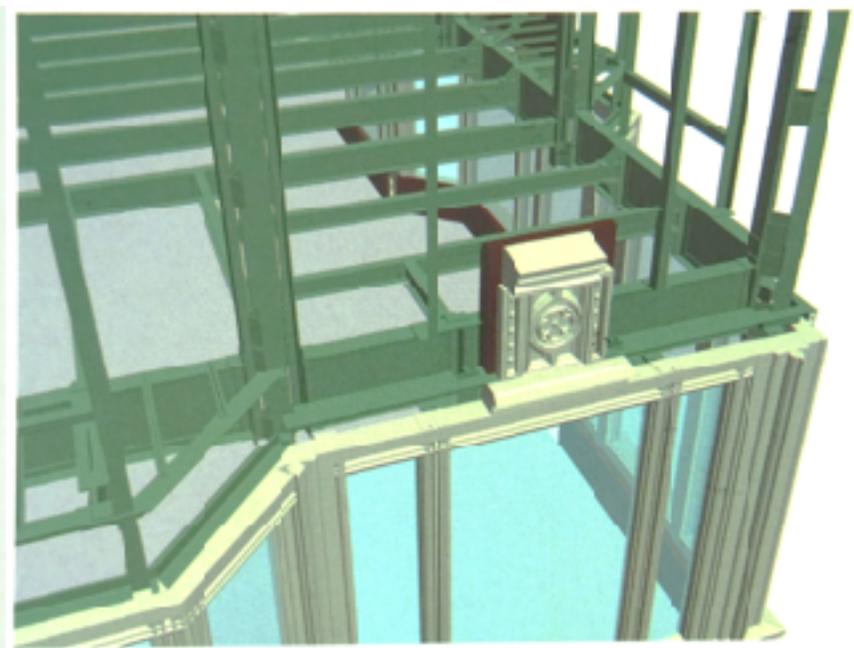
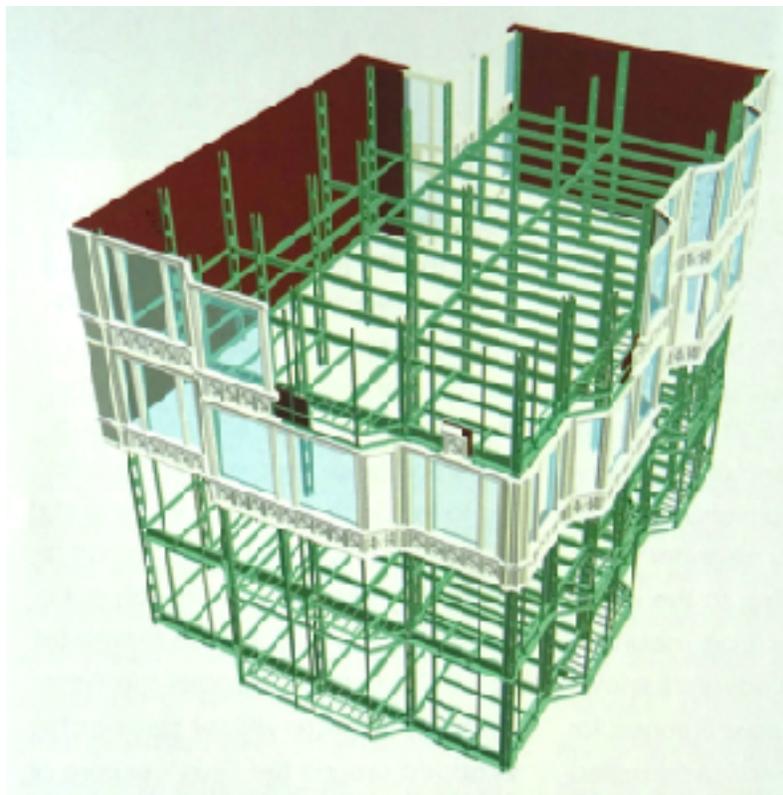
4 **Definition of Terms—** The term "Fireproof Construction" shall apply to all
5 **Fireproof Construction.** buildings in which all parts that carry weights or resist
6 strains, and also all stairs and all elevator enclosures and
7 their contents, are made entirely of incombustible material, and in which all
8 metallic structural members are protected against the effects of fire by coverings
9 of a material which must be entirely incombustible and a slow heat conductor.

10 The materials which shall be considered as fulfilling the conditions of fireproof
11 covering are: First, brick; second, hollow tiles of burnt

12 **Materials for Fire-** clay, applied to the metal in a bed of mortar, and con-
13 **proofing.** structed in such a manner that there shall be two air
14 spaces of at least three-fourths of an inch each by the
15 width of the metal surface to be covered, within the said clay covering; third,
16 porous terra cotta which shall be at least two inches thick, and shall also be
17 applied direct to the metal in a bed of mortar.



RELIANCE bdg, Burnham & Root (but designed by **C.B. Atwood**), 1893-1895



5.18 Reliance Building, digital reconstruction showing corner detail.

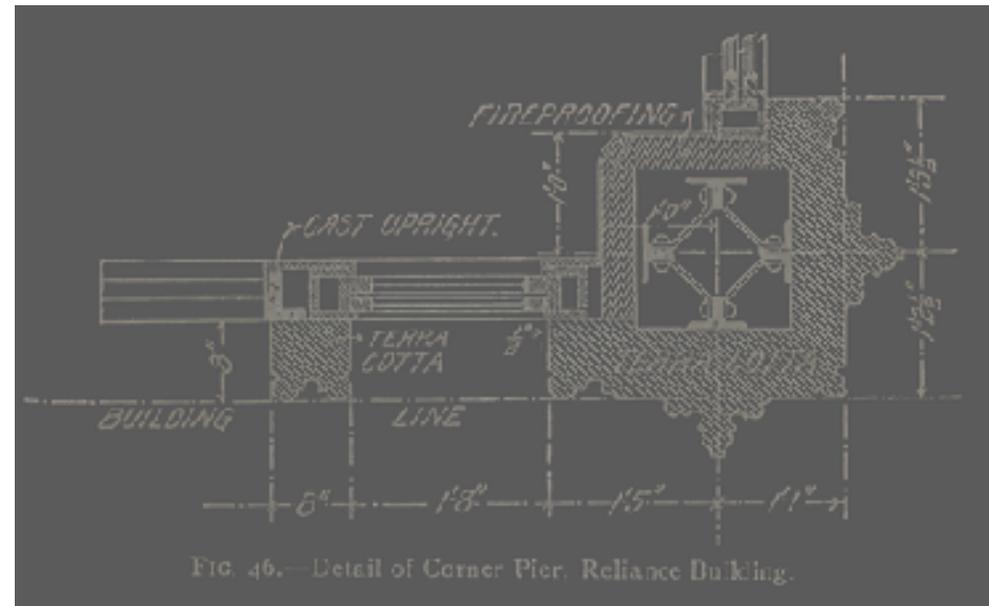


FIG. 46.—Detail of Corner Pier, Reliance Building.



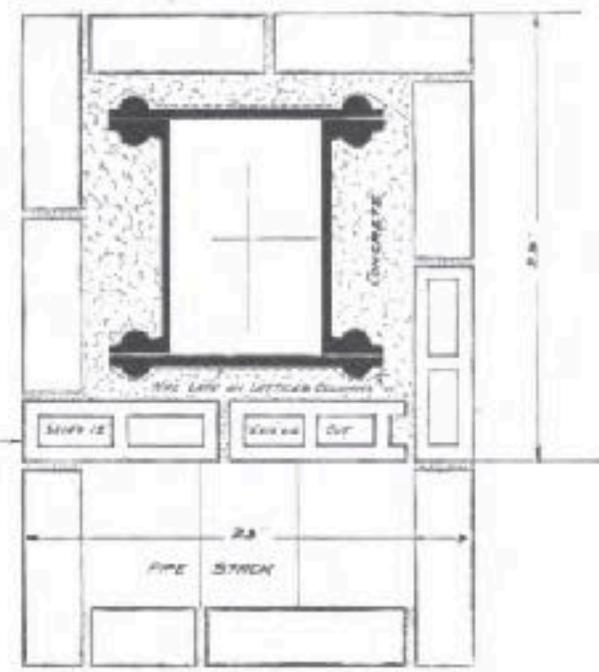
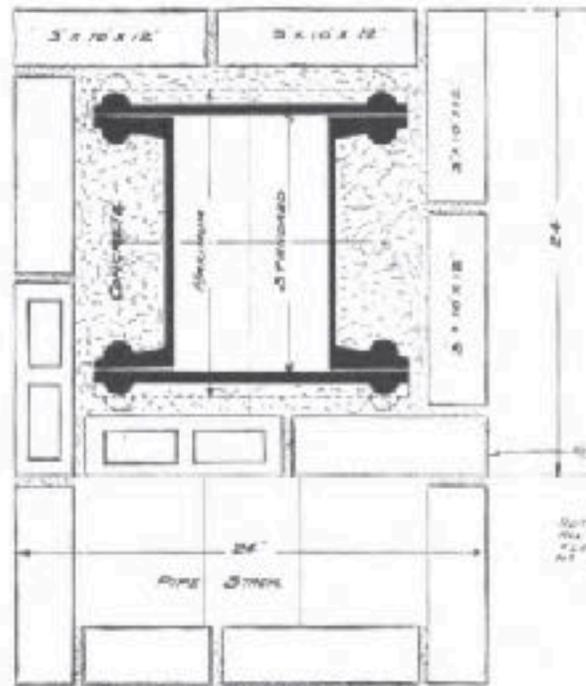
RELIANCE_1895 (licenza ante Code 1893)



RAILWAY EXCHANGE_1904



CHICAGO SAVINGS BANK_1905



NOTE: FIRE STOP TO BE 2 1/2" x 12" x 12" 15% STEEL WIRE

NOTE: FIRE STOP ON COLS 12-15 # 14 ON 1ST FLOOR, ON COLS 10-12 # 18 ON ALL FLOORS 2 FLOOR BASEMENT AND ON COLS 11-15 IN BASEMENT

9th-10th-11th-12th-13th-14th & ATTIC 6 COLS - 11'-0" = 66'-0"

THE ABOVE IS SUBJECT TO CHECK BY CLIENT FOR THE ABOVE IS 27" x 45" x 10"

BASEMENT - 10 COL'S - 14'-0" = 140'-0"
 FIRST FLOOR - 14 " - 14'-0" = 156'-0"
 2nd " - 6 " - 13'-0" = 78'-0"
 3rd " - 6 " - 12'-0" = 72'-0"
 4th-5th-6th-7th-8th-9th-6 " - 11'-0" = 66'-0" COL'S

RECAPITULATION			
	Amount	Rate	Total
Basement	10	14.00	140.00
1 st Floor	14	11.14	156.00
2 nd	6	13.00	78.00
3 rd	6	12.00	72.00
4 th	6	11.00	66.00
5 th	6	11.00	66.00
6 th	6	11.00	66.00
7 th	6	11.00	66.00
8 th	6	11.00	66.00
9 th	6	11.00	66.00
10 th	6	11.00	66.00
11 th	6	11.00	66.00
12 th	6	11.00	66.00
13 th	6	11.00	66.00
14 th	6	11.00	66.00
Attic	6	11.00	66.00
TOTAL	104	11.14	1158.56

DETAILS OF
 COLUMN FIRE-PROOFING
 FOR THE
 CHICAGO SAVING BANK BLDG.
 Date _____ Contract No. _____
 WICKHAM & ROBEY ARCHITECTS
 300 N. W. _____ Street No. 3

SKELETON CONSTRUCTION
IN BUILDINGS.

NUMEROUS PRACTICAL ILLUSTRATIONS
OF HIGH BUILDINGS.

WILLIAM H. BIRKMEIR,

Author of "Architectural Iron and Steel"
and
"Geometrical Principles as Applied to the Construction of Buildings."

SECOND EDITION.

NEW YORK:
JOHN WILEY & SONS,
60 EAST Tenth STREET.
1894.

— KESSINGER'S LEGACY REPRINTS —

Architectural Engineering,
With Especial Reference To
High Building Construction

Including Many Examples Of
Prominent Office Buildings
(1895)

Joseph Kendall Freitag

THE
FIREPROOFING
OF
STEEL BUILDINGS.

Joseph Kendall
J. K. FREITAG, U.S.,
Author of "Architectural Engineering"

FIRST EDITION.

FIRST THOUSAND

NEW YORK:
JOHN WILEY & SONS,
LONDON: CHAPMAN & HALL, Limited.
1899.

FIRE PREVENTION
AND
FIRE PROTECTION

AS APPLIED TO BUILDING CONSTRUCTION

A HANDBOOK
OF
THEORY AND PRACTICE

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Associate Member American Society of C. E., Cor. Member National
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FIRST EDITION
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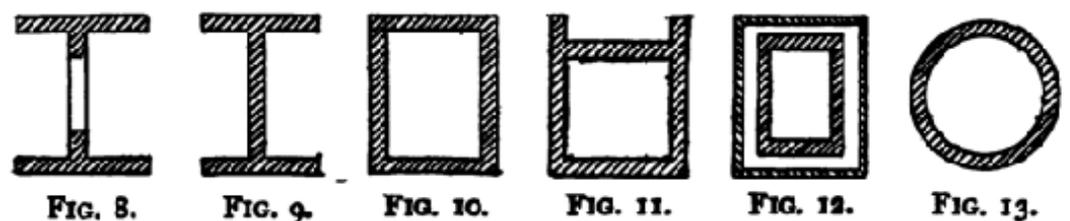
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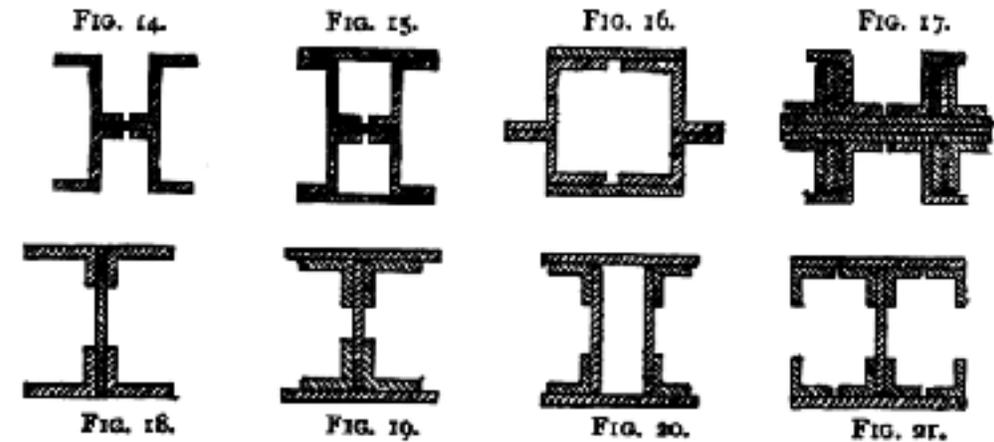
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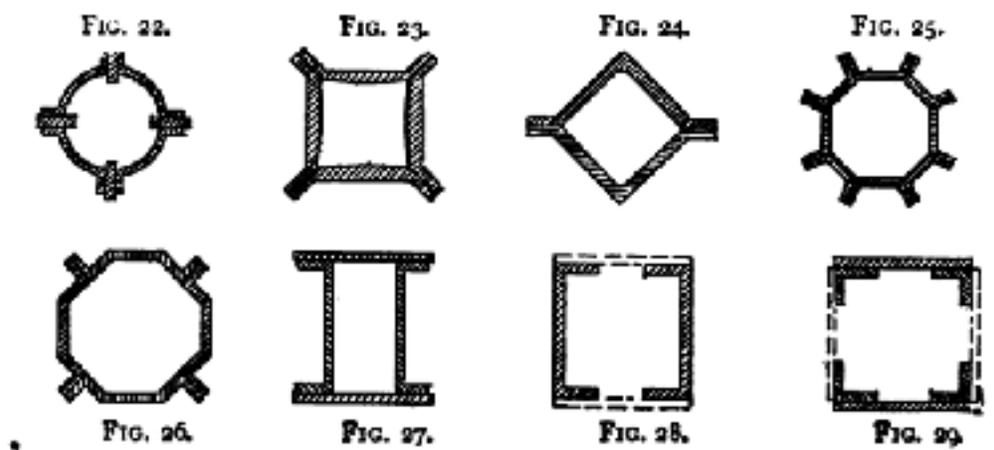
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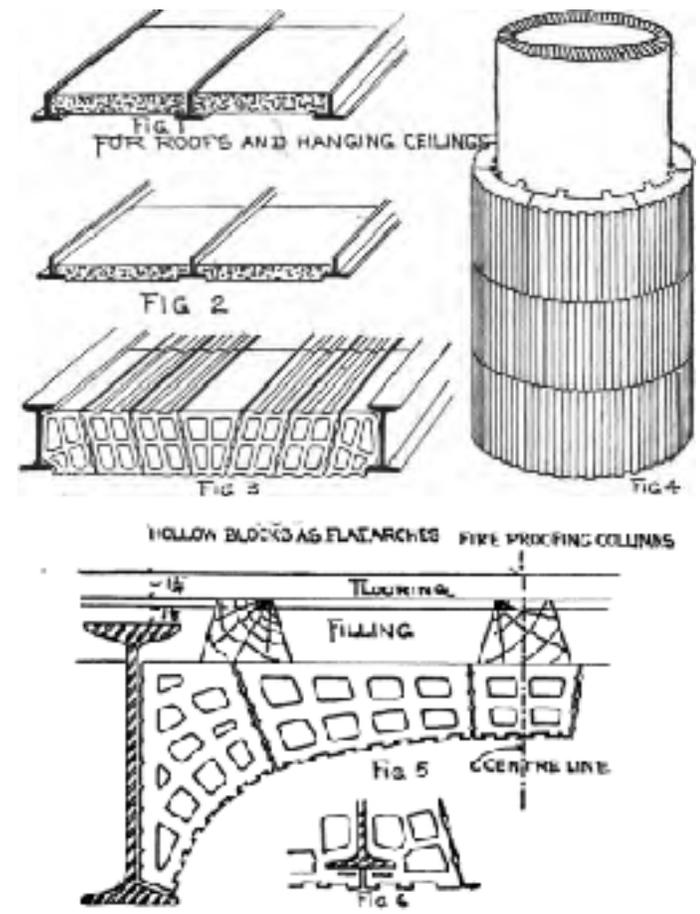
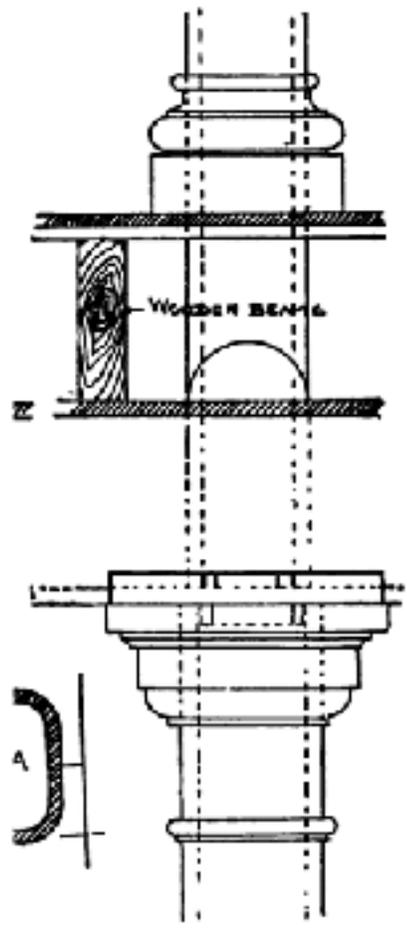
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FIRE PROOF MAGAZINE

JUN 30 1917
 THIRTY-FOURTH YEAR
 PUBLISHED BY THE
 FIRE PROOF PUBLISHING COMPANY

10 CENTS A COPY ONE DOLLAR A YEAR

1905 FIRE PROOF PUBLISHING COMPANY 1905
 CHICAGO JANUARY NEW YORK

**FIREPROOF HOUSES
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FIREPROOF CONSTRUCTION

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 FIFTH EDITION
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