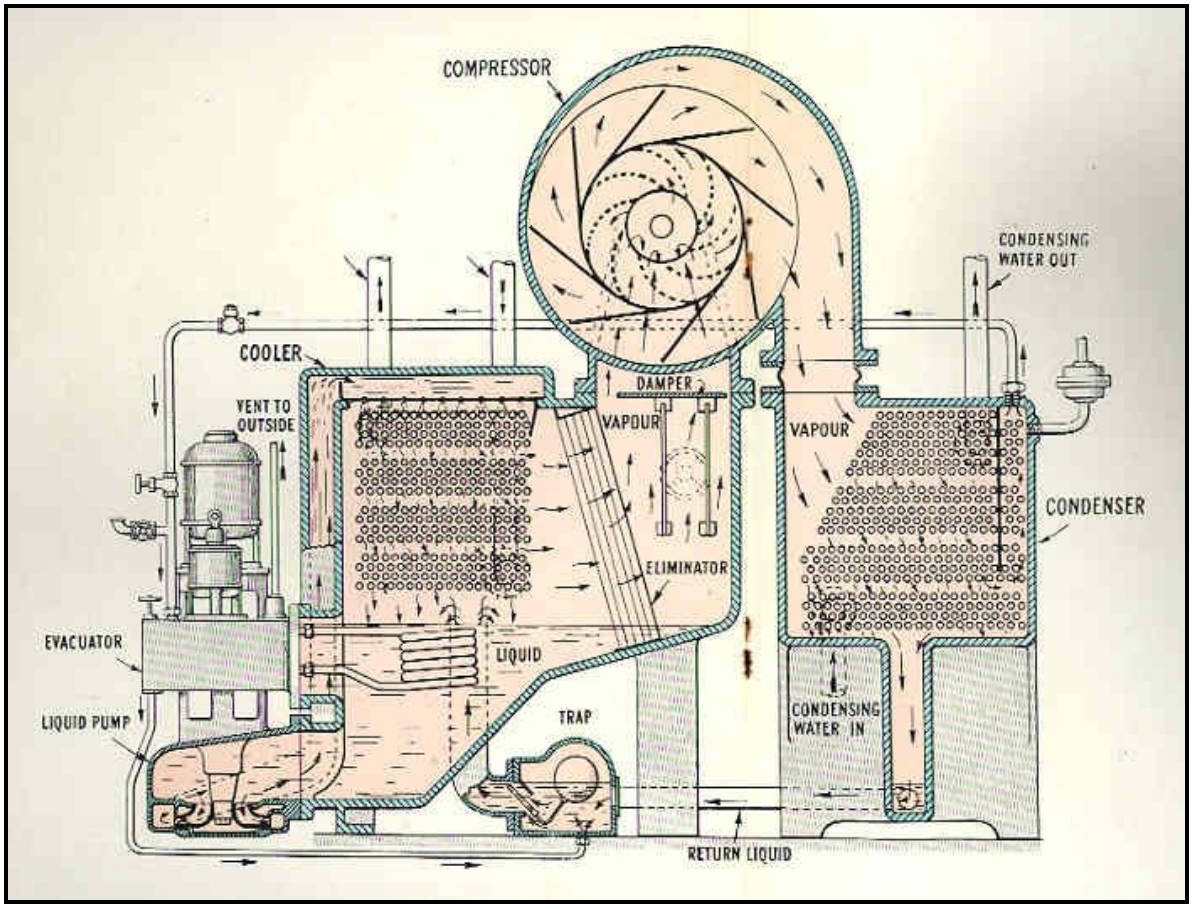
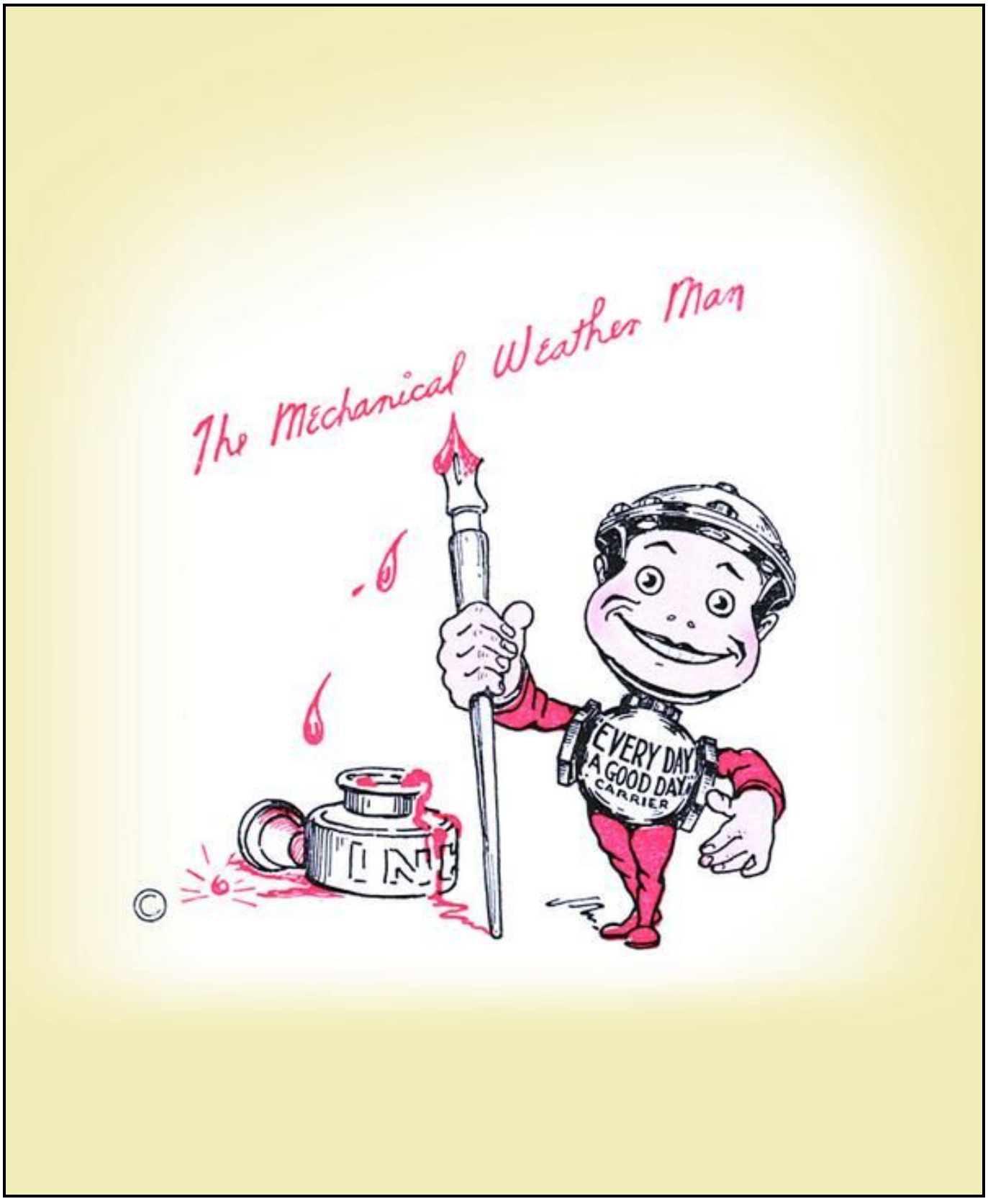
Air Conditioning American Movie Theatres 1917-1932

Carrier Engineering Corporation



Theatres are listed in alphabetical order by name
P-Z



Carrier's Mechanical Weather Man

These Theatres have answered the Public's Demand *for* Comfort

Metropolitan, Los Angeles
Wm. Lee Woollett, Archt.

Palace, Dallas, Texas
D. C. Hill, Archt.

Texan, Houston, Texas
Jonas & Tabor, Archts.

Rivoli, Broadway, N. Y.
Thos. W. Lamb, Archt.

Missouri, St. Louis
Rapp & Rapp, Archts.

Capitol, Chicago
John Eberson, Archt.

Lyric, Indianapolis
Vonnegut, Bohn & Muller, Archts.

Rialto Square, Joliet, Ill.
Rapp & Rapp, Archts.

Olympia, Miami, Fla.
John Eberson, Archt.

New Vaudeville, Atlanta
R. E. Hall-G. Lloyd Preacher & Sons, Archts.

Florida, St. Petersburg
R. E. Hall-Henry L. Taylor, Archts.

Rialto, Broadway, N. Y.
R. E. Hall, Archt.

Howard, Atlanta
Hentz, Reid & Adler, Archts.

Cohan's Grand, Chicaog
A. N. Rebori, Archt.

Saenger, Mobile, Ala.
Emile Weil, Archt.

Capitol, Shamokin, Pa.
Wm. H. Lee, Archt.

Shea's Hippodrome, Buffalo, N. Y.
Leon H. Lempert & Sons, Archts.

Texas, San Antonio
Boller Bros., Archts.

Ambassador, St. Louis
Rapp & Rapp, Archts.

Avalon, Chicago
John Eberson, Archt.

Tampa, Tampa
John Eberson, Archt.

Tivoli, Chattanooga
Rapp & Rapp, Archts.

Paramount, Broadway, N. Y.
Rapp & Rapp, Archts.

Pantages, Memphis, Tenn.
B. Marcus Priteca, Archt.

Iris, Houston, Texas

Eastern, Columbus, Ohio
C. Howard Crane, Archt.

Clinton, Columbus, Ohio
H. C. Holbrook, Archt.

Manufactured Weather makes "Every day a *Good* day"

A Constant Source of Comfort and Satisfaction to the Public and to the Theatre Owner

Check the Box Office Receipts of the Carrier Cooled Theatres. Learn how the system which Cools and Dehumidifies the Air in Summer, also Heats and Humidifies the Air in Winter. Learn of the Simplicity, Safety and Dependability of Carrier Centrifugal Refrigeration. Learn why Real Engineering Experience is Important. Write for the Book, "Theatre Cooling," and ask for a visit from one of our Engineers.

Carrier Engineering Corporation

OFFICES and LABORATORIES
NEWARK, NEW JERSEY

New York Philadelphia Boston Chicago Cleveland Los Angeles Kansas City

Air Conditioning American Movie Theatres 1917-1932

Park Lane Theatre

NEW YORK CITY

Date Built: 1927
Seating Capacity: 2012
Owner: Charles O'Reilly & Al Gould
Architect: Eugene De Rosa
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller

Air Conditioning American Movie Theatres 1917-1932

Polk Theatre

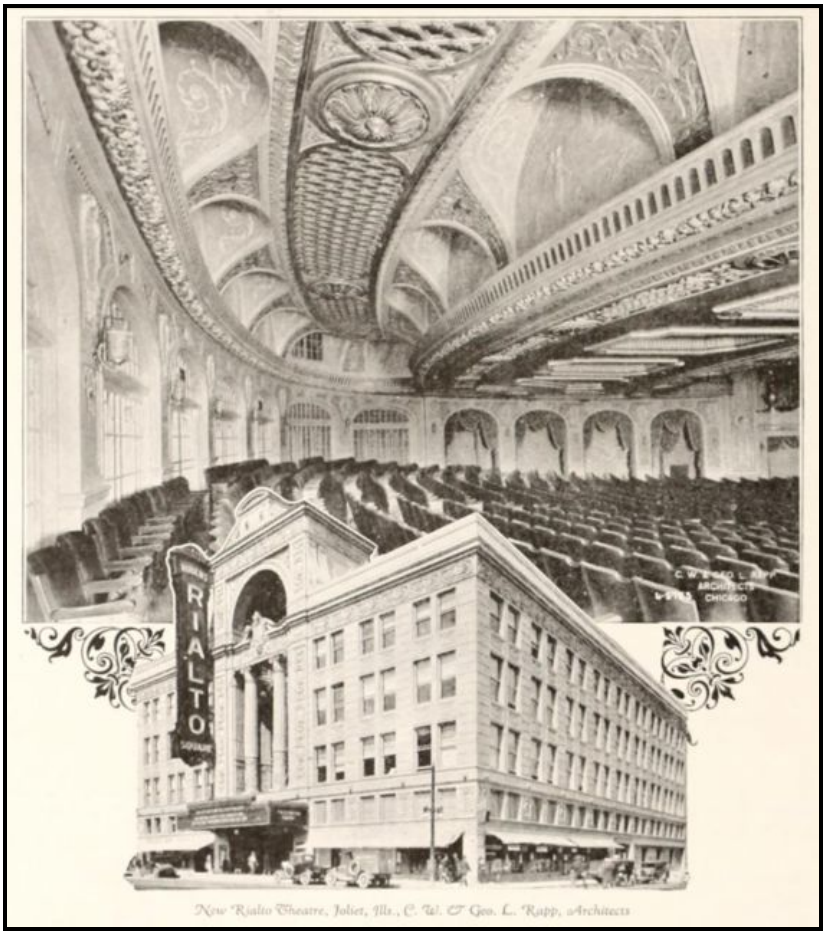
LAKELAND, FLORIDA

Date Built: 1927
Seating Capacity: 1400
Owner: Unknown
Architect: James E Casale
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller

Air Conditioning American Movie Theatres 1917-1932

Rialto Theatre

JOLIET, ILLINOIS



New Rialto Theatre, Joliet, Ills., C. W. & G. L. Rapp, Architects

Date Built: 1926
Seating Capacity: 2087
Owner: Ruben Brothers
Architect: Rapp & Rapp
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller

Air Conditioning American Movie Theatres
1917-1932

Riviera & Riverside

NEW YORK (ADJACENT THEATRES ON BROADWAY)

Date Built: 1913
Seating Capacity: 1718 & 1720
Owner: Skouras circuit
Architect: Thomas Lamb for both
Air Conditioning: Carrier Engineering Corp, 1920s
Refrigeration: Carrier centrifugal chiller
One 200 TR machine serving both theatres

AIR-CONDITIONING & Ventilation

HEATING
INSULATING
FILTERING

" . . today the theatre must assure its public breathing comfort."

■ ■ ■

A Two-Theatre System Served By a Single Refrigeration Plant

• The Riviera and Riverside theatres on upper Broadway, New York, adjoin each other and have a common owner. Here is the way each was successfully air-conditioned with cooling by the same equipment

By ROBERT HAMBURGER

WHEN TWO theatres are located in close proximity to each other, and either are owned by the same interests, or their owners could work out a satisfactory arrangement for joint operation of the system, a dual air-conditioning plant can be designed so as to effect substantial saving in cost. An excellent example is afforded by the air-conditioning of two New York City theatres operated by the Skouras circuit. With cooling supplied by a single refrigeration plant, these two systems were effectively and economically operated throughout the past summer.

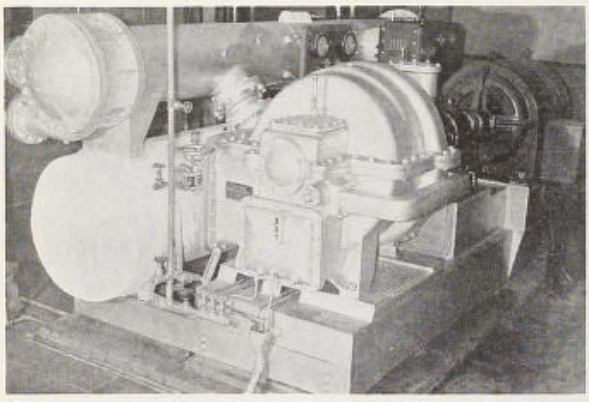
These theatres are located on the west side of Broadway between 96th and 97th Street, each seating approximately 1,700 and separated by an open court 20 feet wide. The Riverside is the southernly one with its side on 96th Street, and its standee space is separated from the Broadway building line by a three-story building some 50 feet deep. The Riviera Theatre, with its north side on 97th Street, is also separated from Broadway by an office building seven stories high, but not as deep as that adjoining the Riverside. The roof of the Riviera theatre is at the height of the seven-story office building.

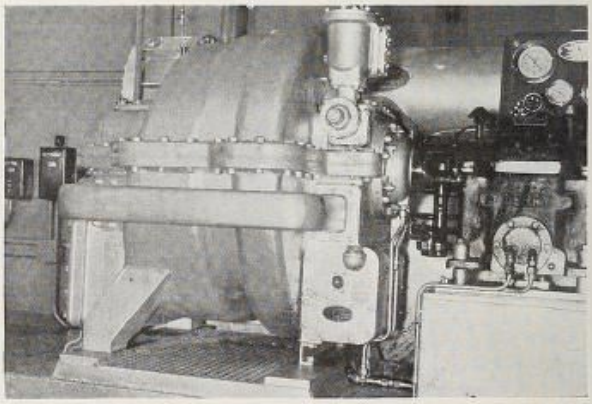
The total available refrigeration load for the two theatres combined is 200 tons. Arrangements had to contemplate, however, the possibility of one theatre being filled to capacity while the other was almost empty, so two separate assemblies are used.

It was difficult to find an advantageous location for the air conditioning assemblies, each of which consists of a large single inlet, single-width fan with two-speed motor, three six-row Aerofin continuous tube cooling coils, two Aerofin non-freeze heating coils, and filters. It was decided to use the space of the 20-foot court separating the two theatres, and a new fireproof enclosure about 20x20 foot in plan, by about 12 feet high, was built across the court, the floor and roof being of steel I-beams bearing on the existing theatre side walls on either side of the court, and the floor and roof slabs being 4-inch cinder-concrete arches reinforced with wire fabric.

Cooling Equipment

For refrigeration, a 200-ton Carrier centrifugal machine was selected. The space chosen for it is in a vacant basement room





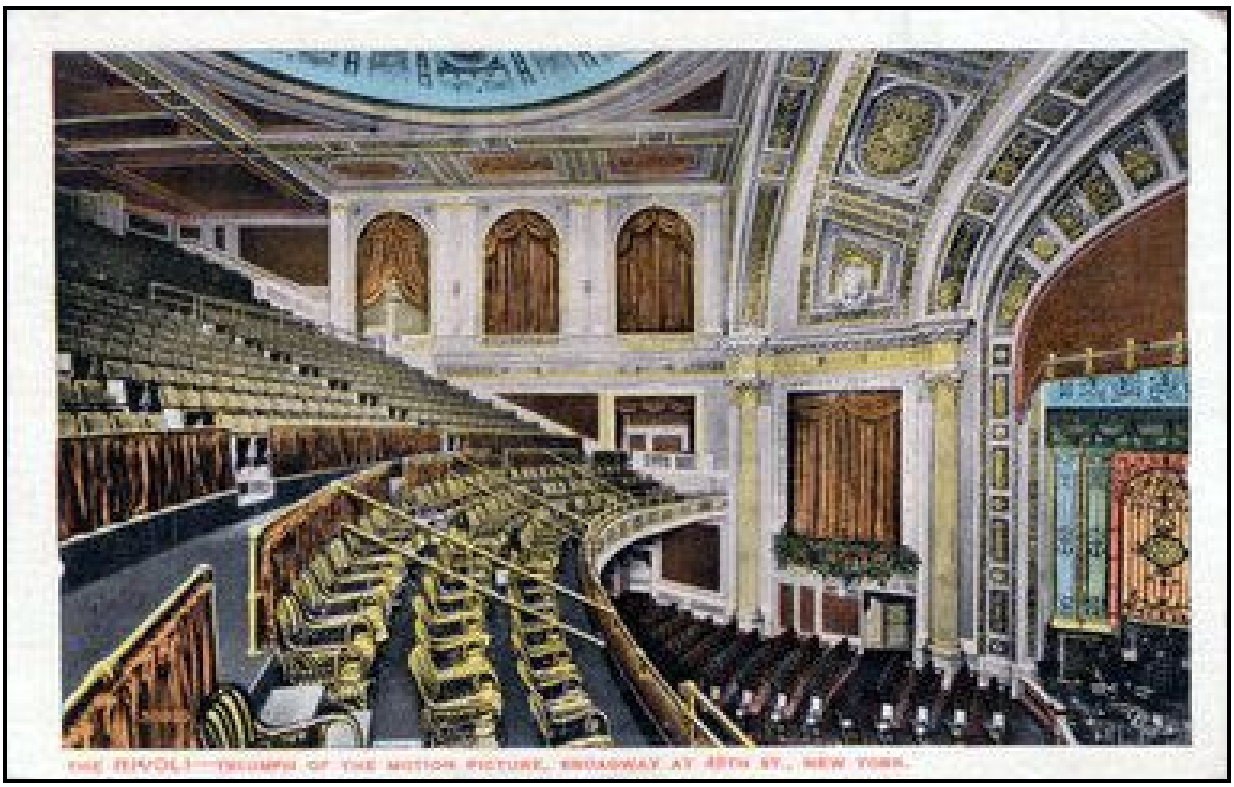
PHOTOS BY STAFF PHOTOGRAPHER

Two views of the compact 200-ton Carrier centrifugal refrigeration machine located in space provided under the lobby of the Riviera.

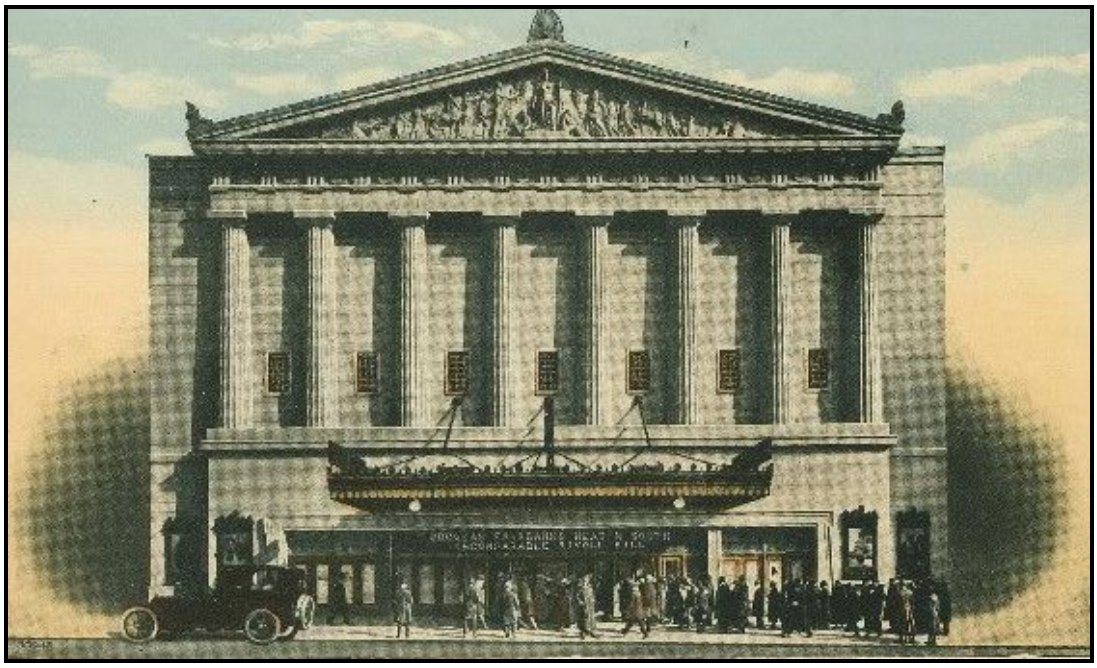
Air Conditioning American Movie Theatres 1917-1932

Rivoli Theatre

NEW YORK



Date Built: 1917, air conditioning installed 1925
Seating Capacity: 2092
Owner: Paramount/Adolph Zukor
Architect: Thomas Lamb
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller 133 TR




REFRIGERATING PLANT
AL JAZZ
THOMAS SAX-O-TET
COOLED BY REFRIGERATION

1925

The real opening of the "comfort" market came, however, when centrifugal systems were introduced into motion-picture theaters. Carrier later said:

> Movies closed during hot weather or showed to such small audiences that they operated at a loss. Even on cool days the inside of the theater was hot if there were many people in the audience. The heat from the people was enormous. A ventilating system did not help much. We argued that, with air conditioning, the theater need never be dark and would do a box-office business in summer because people would go there to cool off—to be comfortable. With our air conditioning, we believed we could sell the theater market without much resistance.

So, with Carrier and Lyle encouraging them, the company's sales engineers began concentrating on theater owners. The engineers not only had Carrier's new, safe, and simple refrigerating system, but also a method for introducing cleaned, cooled, and dehumidified air into a theater, without causing drafts or cold feet. This no-draft feature was achieved through a system of by-pass down-draft air distribution which Logan Lewis had designed in 1922 for Grauman's Metropolitan Theater in Los Angeles. Designed, sold, and installed before Carrier's centrifugal refrigerating machine was available, this installation used a carbon dioxide refrigerating system to cool the air. The air flowed through outlets located in the ceiling, diffused slowly downward, then entered return grilles located in the floor. Thus, Lewis accomplished the seemingly impossible feat of circulating a large volume of cooled and dehumidified air without the audience being aware of any air movement. This has caused many persons to refer to Grauman's Metropolitan Theater as "the birthplace of theater air conditioning." However, the crucial test of theater air conditioning, and one of the most decisive moments in all

air conditioning history, was to come at the New York Rivoli Theater in 1925.

This test was preceded and to some degree produced by air conditioning sales to three Texas theaters owned by Will Horwitz, Jr.—the Palace in Dallas and the Texan and Iris in Houston. In the Palace Theater between June and August of 1924, Carrier's centrifugal refrigerating apparatus was installed for the first time in any theater, combined with Lewis's by-pass downdraft system. The theater advertised "cool and clear" weather and a consulting engineer on the job later reported that "as proof that it was easy to operate, the man who had previously been a sort of janitor was taught to run this unit and did it well."

In Houston the two Horwitz theaters were cooled by one large centrifugal machine, located in the Texan. Chilled water was pumped to a storage tank in the Iris across the street. Horwitz wrote:

> The cooling plant is revolutionizing picture show attendance in Houston. Each patron exclaims with delight when he gets inside the doorway. The plant is working perfectly. Our engineer says he has nothing to do on the job but loaf.

Word of the Texas installations spread. The Rivoli in New York decided to discard its ventilating system and install air conditioning. On November 20, 1924, the Rivoli contracted for a 133-ton machine and the Carrier Engineering Corporation was faced with a critical test. The company's whole future in theater air conditioning was at stake. To be sure nothing was overlooked that would affect results, Carrier himself and the company's top engineers all worked on the job, drawing up layouts, checking, and re-checking—aiming at the finest comfort air conditioning system that could be designed.

Meanwhile, it developed that the New York City Building Code barred this type of installation because dielene was not

listed as an approved refrigerant. In fact, it was not listed at all. The Carrier engineers undertook to get a permit. They called on the safety chief, told him of fifteen machines then in operation, all with no-accident records, showed him reports from independent consulting chemists and engineers who had run three types of tests on dielene. The safety chief was unconvinced. Later Carrier said:

> I then tried an experiment. Right in his office I poured some dielene into a container and dropped a lighted match in it. Well!—the safety chief got mad—and scared, too, I think. He said if we were going to try such stunts, we would have to go elsewhere. All the while the dielene burned downward very slowly, no flare-up, no explosion. Finally he was sufficiently convinced that dielene was safe, and granted the permit with the stipulation to isolate the machine and take many precautions beyond the code requirements.

The Rivoli was scheduled to open on Memorial Day in 1925. Partly because of the delay in getting a permit, there was difficulty in meeting the deadline. Carrier and three other top men stayed up practically the whole night of May 29 seeing that everything was set up and ready to go. An unsigned, undated memorandum in Carrier's files, presumably written by him, records:

> Typical of show business, the opening of the Rivoli was widely advertised and its air conditioning system heralded along Broadway. Long before the doors opened, people lined up at the box office—curious about "cool comfort" as offered by the managers. It was like a World Series crowd waiting for bleacher seats. They were not only curious, but skeptical—all of the women and some of the men had fans —a standard accessory of that day. . . .
>
> Among the spectators was Adolph Zukor. I recall dis-

tinctly how quiet and reserved he was when he walked in and took a seat in the balcony. Zukor may have come from California, but he was there to be shown!

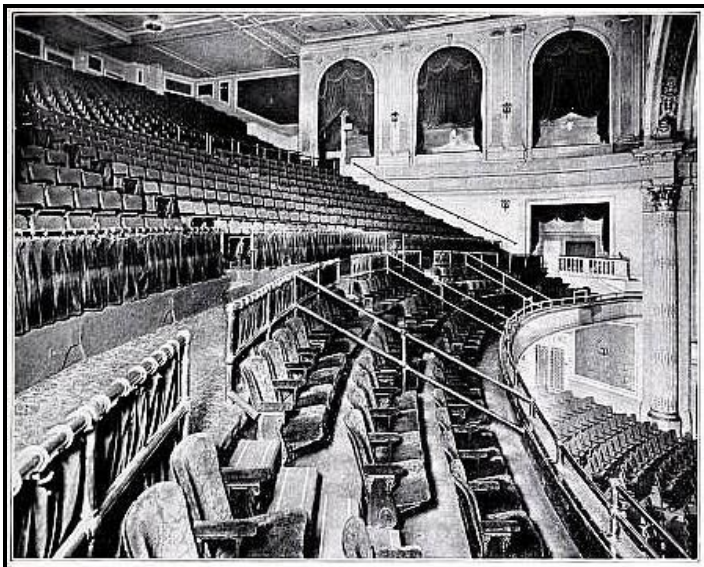
Final adjustments delayed us in starting up the machine, so that the doors opened before the air conditioning system was turned on. The people poured in, filled all the seats, and stood seven deep in the back of the theater. We had more than we had bargained for and were plenty worried. From the wings we watched in dismay as two thousand fans fluttered. We felt that Mr. Zukor was watching the people instead of the picture—and saw all those waving fans!

It takes time to pull down the temperature in a quickly filled theater on a hot day, and a still longer time for a packed house. Gradually, almost imperceptibly, the fans dropped into laps as the effects of the air conditioning system became evident. Only a few chronic fanners persisted, but soon they, too, ceased fanning. We had stopped them "cold" and breathed a great sigh of relief.

We then went into the lobby and waited for Mr. Zukor to come downstairs. When he saw us, he did not wait for us to ask his opinion. He said tersely, "Yes, the people are going to like it." That was a jubilant moment for us—we had passed the "acid test."

On July 3, 1925, the managing director of the Rivoli wrote that, "Although the apparatus has only been in operation four weeks, it is the talk of Broadway."

Text from *Father of Air Conditioning (Willis Haviland Carrier)*, Margaret Ingels, Country Life Press, 1952



Loge of Rivoli Theatre, Broadway and 49th St., New York City.
Recently executed with American Seating Company Ball-Bearing Upholstered Interlocking Loge Theatre Chairs.

The LOGE—

A Neglected Source of Profit

1928

Keep Cool
AT THE
Rivoli

We have invested over $100,000 in a refrigerating cooling plant to keep you cool and comfortable when the world is sweltering. Unseen, unheard, resistless are the huge motors with a combined pulling power of 221 horses—representing but a small part of the marvellous equipment which absolutely assures a temperature that is just right. Delightfully refreshing days and evenings all summer at

The RIVOLI THEATRE
BROADWAY at 49th STREET
THE HOME OF Paramount Pictures

Air Conditioning American Movie Theatres 1917-1932

Roxy Theatre

NEW YORK

Date Built: 1927
Operator: Samuel L Rothafel
Seating Capacity: 6214
Architect: Walter Ahlschlager
HVAC Consulting Engineer: Percival R Moses
Main Contractor: Chanin Construction Company
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Two Carrier centrifugal water chillers with a total capacity of 420 TR
Steam Service: New York Steam Corporation
Status: Demolished 1960

"The Cathedral of the Motion Picture"

WHAT SHALL WE SAY?

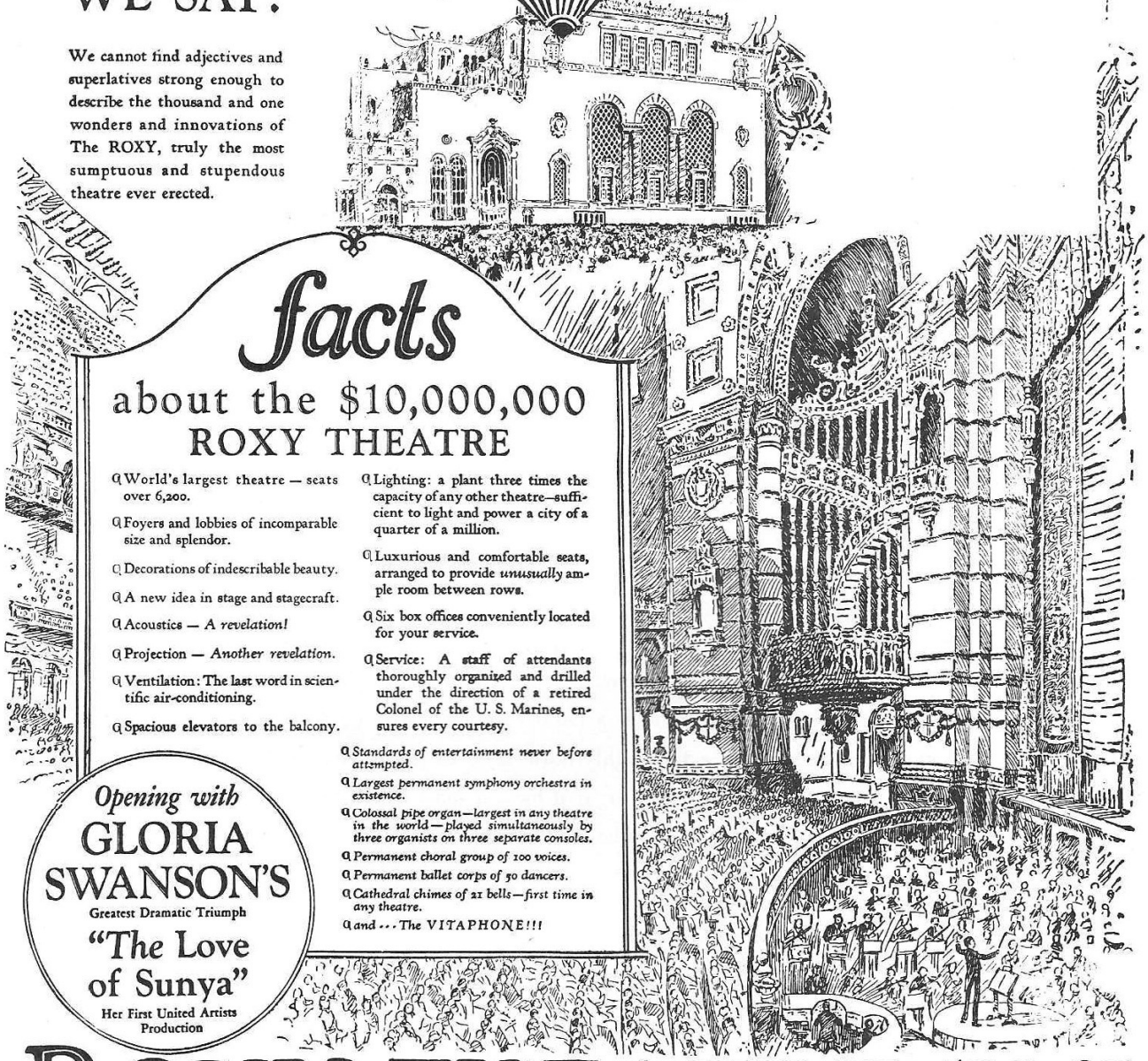
We cannot find adjectives and superlatives strong enough to describe the thousand and one wonders and innovations of The ROXY, truly the most sumptuous and stupendous theatre ever erected.

ROXY THEATRE

Under the personal direction of S. L. Rothafel (Roxy)

Roxy Circuit Inc. Herbert Lubin President

The ROXY will give you an unforgettable thrill. In all the world there is no theatre like it.



facts about the $10,000,000 ROXY THEATRE

- ¶ World's largest theatre — seats over 6,200.
- ¶ Foyers and lobbies of incomparable size and splendor.
- ¶ Decorations of indescribable beauty.
- ¶ A new idea in stage and stagecraft.
- ¶ Acoustics — *A revelation!*
- ¶ Projection — *Another revelation.*
- ¶ Ventilation: The last word in scientific air-conditioning.
- ¶ Spacious elevators to the balcony.
- ¶ Lighting: a plant three times the capacity of any other theatre—sufficient to light and power a city of a quarter of a million.
- ¶ Luxurious and comfortable seats, arranged to provide *unusually* ample room between rows.
- ¶ Six box offices conveniently located for your service.
- ¶ Service: A staff of attendants thoroughly organized and drilled under the direction of a retired Colonel of the U. S. Marines, ensures every courtesy.
- ¶ *Standards of entertainment never before attempted.*
- ¶ *Largest permanent symphony orchestra in existence.*
- ¶ *Colossal pipe organ—largest in any theatre in the world—played simultaneously by three organists on three separate consoles.*
- ¶ *Permanent choral group of 100 voices.*
- ¶ *Permanent ballet corps of 50 dancers.*
- ¶ *Cathedral chimes of 21 bells—first time in any theatre.*
- ¶ and . . . The VITAPHONE!!!

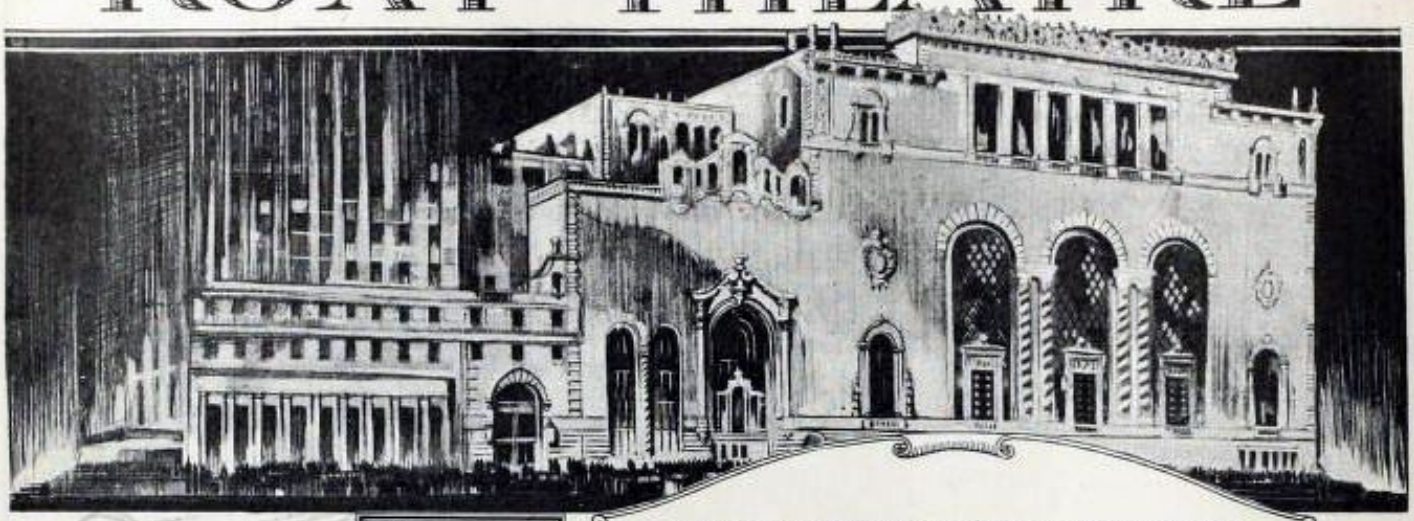
Opening with
GLORIA SWANSON'S
Greatest Dramatic Triumph
"The Love of Sunya"
Her First United Artists Production

ROXY THEATRE 50th ST. & 7th AVE.

Premier FRIDAY MARCH 11th at 8:30 P.M.

New York Times, Sunday 6th March 1927

ROXY THEATRE



a notable Building Achievement of the

CHANIN
CONSTRUCTION · CO·

The Roxy, largest theatre in the world, was built in eleven months, complying with the Chanin slogan —Speed, Economy, Safety.

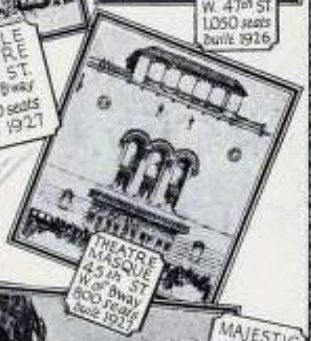
Speed without waste of materials or man-power and Economy without sacrifice of Safety or Utility are distinctive Chanin accomplishments.

"CHANIN-BUILT" is more than a phrase—it is a hall-mark, its own guarantee of building perfection.

The illustrations on this page are Chanin achievements of the past two years in the Times Square District.

CHANIN CONSTRUCTION COMPANY

IRWIN S. CHANIN, *President.*
HENRY I. CHANIN, *Secretary-Treasurer*



Website *Cinema Treasures*

Carrier
AIR CONDITIONING AND DRYING EQUIPMENT

A Carrier Conditioned Theatre

The Roxy

Glistening like a gem in ever changing Manhattan, the creation of master architect and builders for a master showman. To Roxy, to Mr. Walter W. Ahlschlager the Architect, to the Chanin Construction Co., Inc., to Mr. P. R. Moses, the Consulting Engineer, and to the public we extend our greetings, our pleasure in the achievement and the promise of—

"Every day a good day"
in
The Roxy

SIX THOUSAND people are seated comfortably in the Roxy. Other thousands stroll through spacious halls and lobbies awaiting their chance to be carried away by the spirit of entertainment in which Roxy is supreme. ¶So it will be day after day, visitors will come from afar to see this great theatre. And when they enter, they will realize that Roxy has fulfilled one more great obligation to his public. He has included in his theatre the marvel of Manufactured Weather. ¶This is a Carrier Conditioned Theatre providing to the patrons a copious supply of air that is washed and purified, air that is warmed and humidified for ideal comfort in Winter, air that is cooled and dehumidified for invigorating comfort in Summer, air that is gently diffused throughout the theatre without the slightest draught. ¶As specialists in air conditioning, we are proud to have contributed this health-giving comfort to the Roxy and to a rapidly growing list of theatres throughout the country.

Carrier Engineering Corporation

Offices and Laboratories
Newark, N. J.

NEW YORK PHILADELPHIA WASHINGTON BOSTON CHICAGO CLEVELAND KANSAS CITY LOS ANGELES

Website *Cinema Treasures*

DOWNTOWN SERVICE FOR THE FINANCIAL CENTER OF AMERICA

New York Steam Corporation

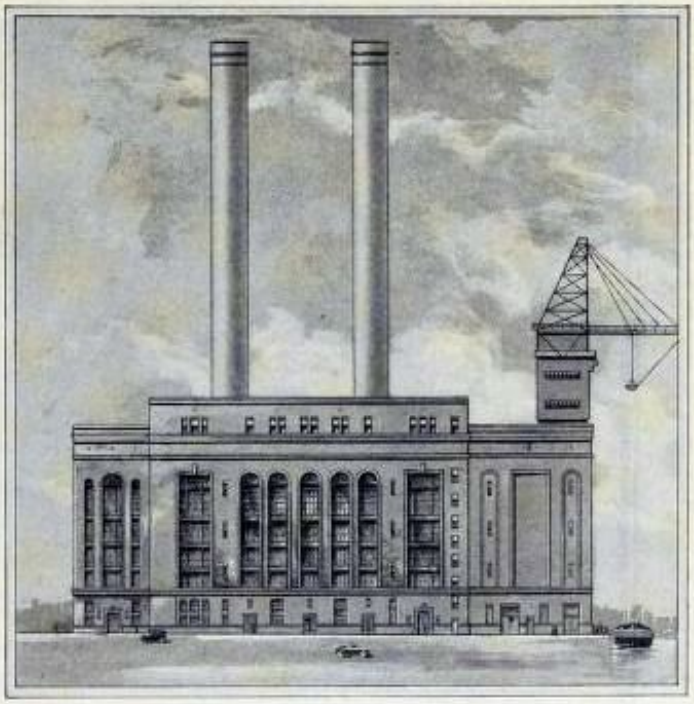
BURLING SLIP STATION

STEAM SERVICE TO ROXY'S THEATRE

1882 **Forty Five Years Continuous Service** 1927

RESULTING IN

ECONOMY, CLEANLINESS, SAFETY AND RELIABILITY TO HUNDREDS OF HOTELS, OFFICE BUILDINGS, APARTMENTS, RESIDENCES, THEATRES, BANKS AND CITY AND FEDERAL BUILDINGS.



NEW KIP'S BAY STATION
Located at 35th St. and the East River
Ultimately 125,000 Horse Power

EAST RIVER AND 59th ST. STATION
(North and South)

A PART OF THE IMPORTANT UPTOWN BUSINESS AND RESIDENTIAL SECTION SERVED

Motion Picture News, 1927

Motion Picture News, 30th December 1927

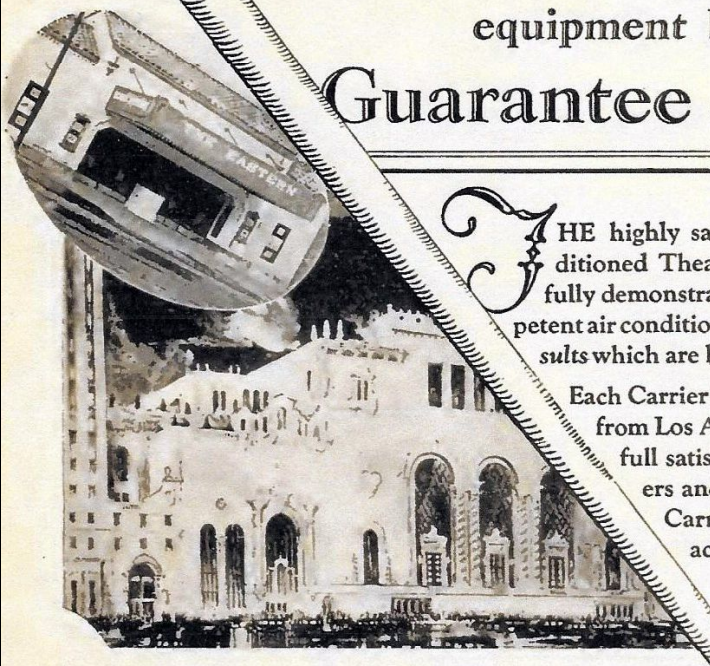
COMPLETE

RESPONSIBILITY - RELIABILITY

The Carrier Contract

not a sale of equipment but a

Guarantee of Results



THE highly satisfactory operation of all Carrier Conditioned Theatres, during the summer of 1927, has fully demonstrated the value of the thorough and competent air conditioning engineering and the *guarantee of results* which are binding clauses in every Carrier contract.

Each Carrier Conditioned Theatre in cities and towns from Los Angeles to Broadway has operated to the full satisfaction and comfort of the theatre owners and the patrons. Each new installation of a Carrier System has been set into operation according to the scheduled time.

These accomplishments are the result of the Carrier acceptance of complete responsibility for all the details of design and installation of air conditioning, refrigeration and control equipment.

THE Roxy in all its magnificence and The Eastern, small neighborhood theatre in Columbus, Ohio, each belongs to the enlarging group of Carrier Conditioned Theatres. Each is completely equipped to maintain a cool, non-humid atmosphere in Summer; temperate healthfully humidified air in Winter; a constant supply of cleansed fresh air perfectly distributed without the slightest draught.

Learn the meaning of Air Conditioning.
Ask for the Book "Theatre Cooling and Conditioning."
Ask for a visit from one of our Engineers.

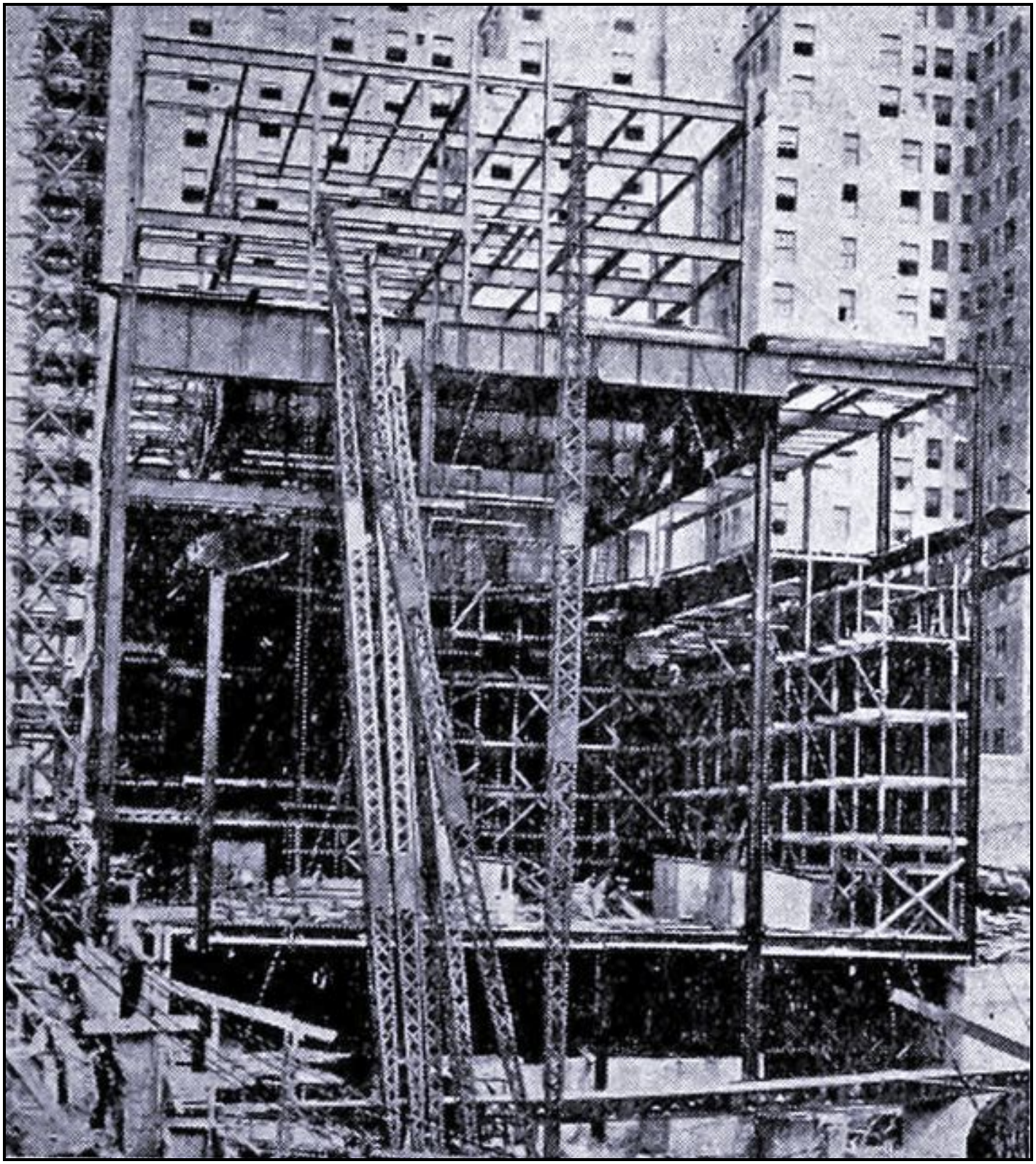
Manufactured Weather
makes
"Every day a good day"

Carrier Engineering Corporation

Offices and Laboratories
Newark, N. J.

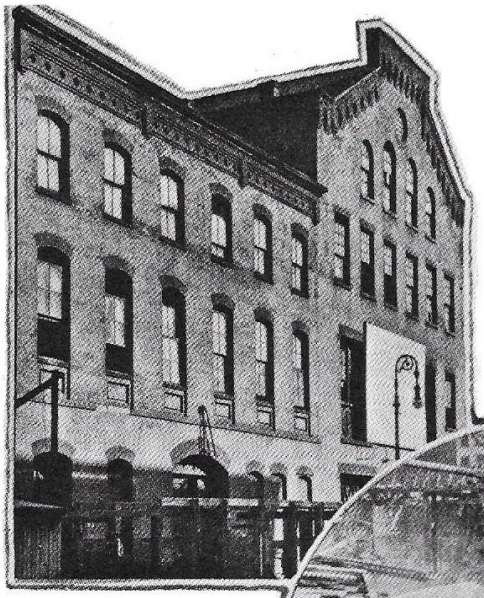
NEW YORK PHILADELPHIA BOSTON CHICAGO WASHINGTON CLEVELAND KANSAS CITY LOS ANGELES

Motion Picture News, 7th October 1927

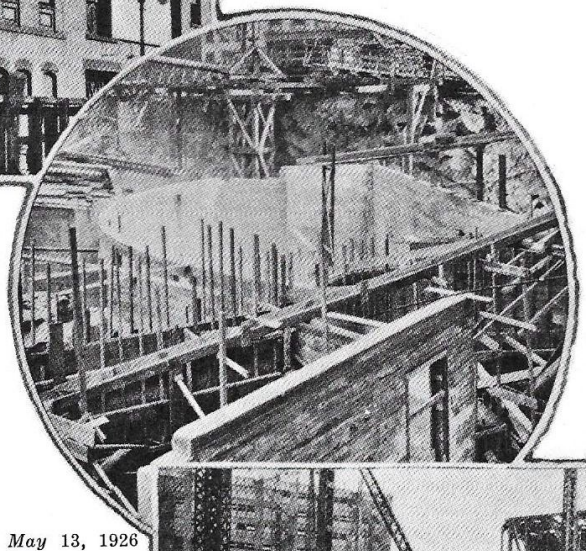


The Roxy under construction in 1927
Website *Cinema Treasures*

ROXY ---

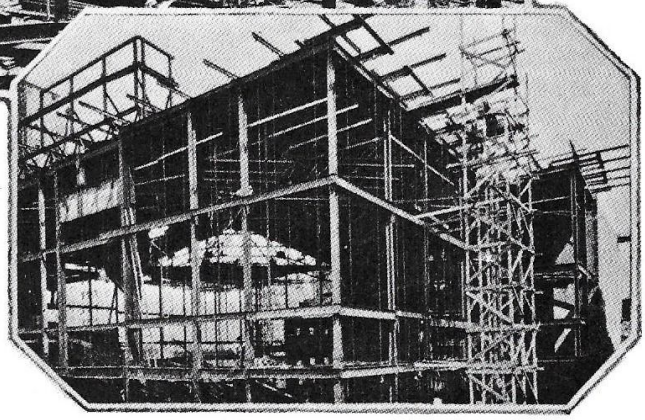


November, 1926



May 13, 1926

June 26, 1926



August 31, 1926

TWO years ago antediluvian car barns occupied the valuable site on which now stands a monument to modern theatre construction — the Roxy Theatre. This transformation was achieved by utilizing every resource of the modern architect, combined with the most advanced developments

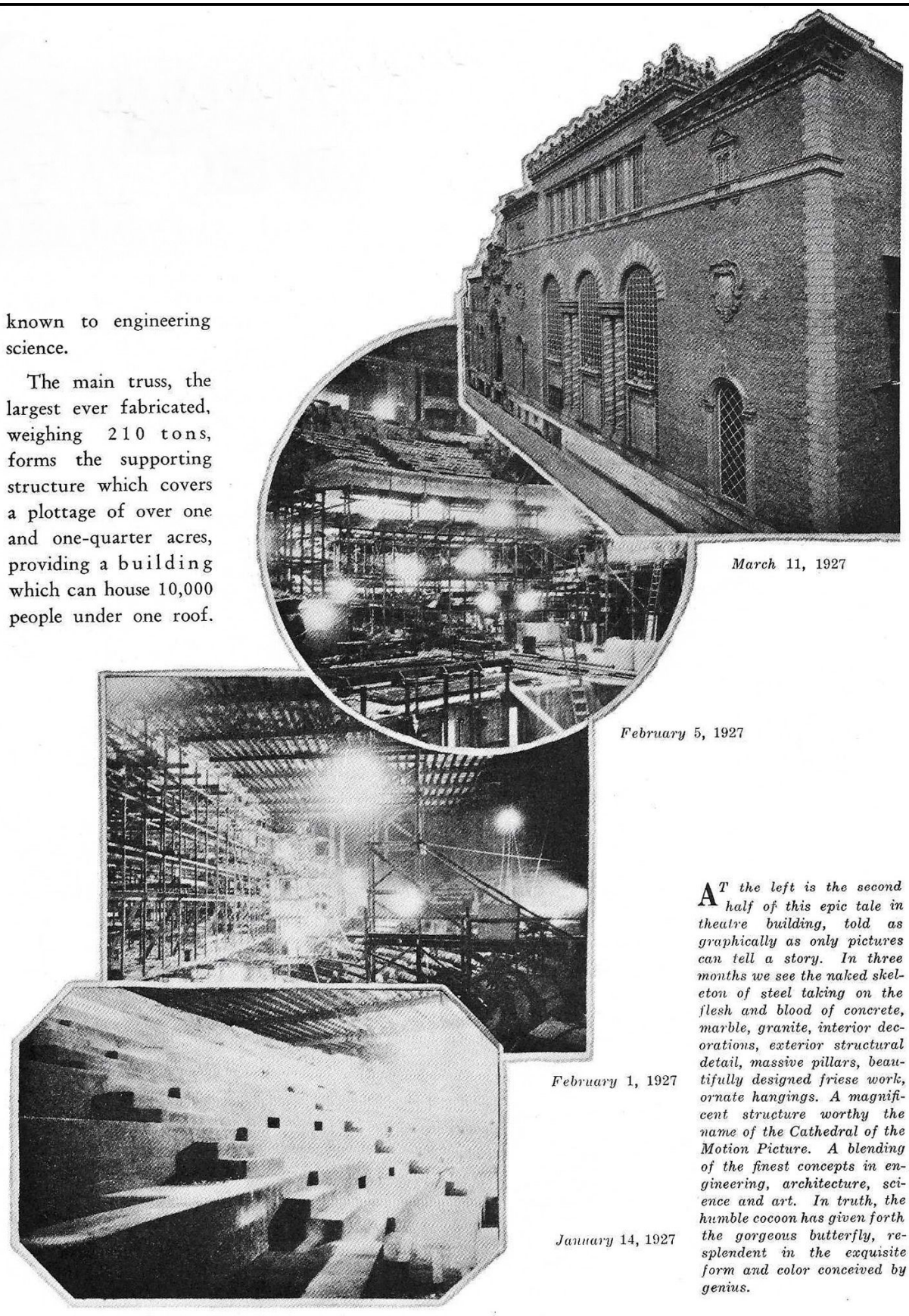
THE story of the wonders of Aladdin's lamp records no stranger magic than that wrought here by the modern hand and brain of man. Starting with the lowly site of a car barn, the four views at the right illustrate the amazing rapidity with which this old eye-sore was razed, a foundation dug and the steel skeleton erected for the new ornate structure that is destined to elicit the admiration and applause of intelligent mankind and to mark the highest point in theatre history. All this, encompassed in practically four short months, bespeaks the stirring enterprise and incredible drive of those behind the project.

The Roxy under construction in 1926

The Best Remaining Seats: The Golden Age of the Movie Palace, Ben M Hall, Da Capo, 1987

known to engineering science.

The main truss, the largest ever fabricated, weighing 210 tons, forms the supporting structure which covers a plottage of over one and one-quarter acres, providing a building which can house 10,000 people under one roof.



March 11, 1927

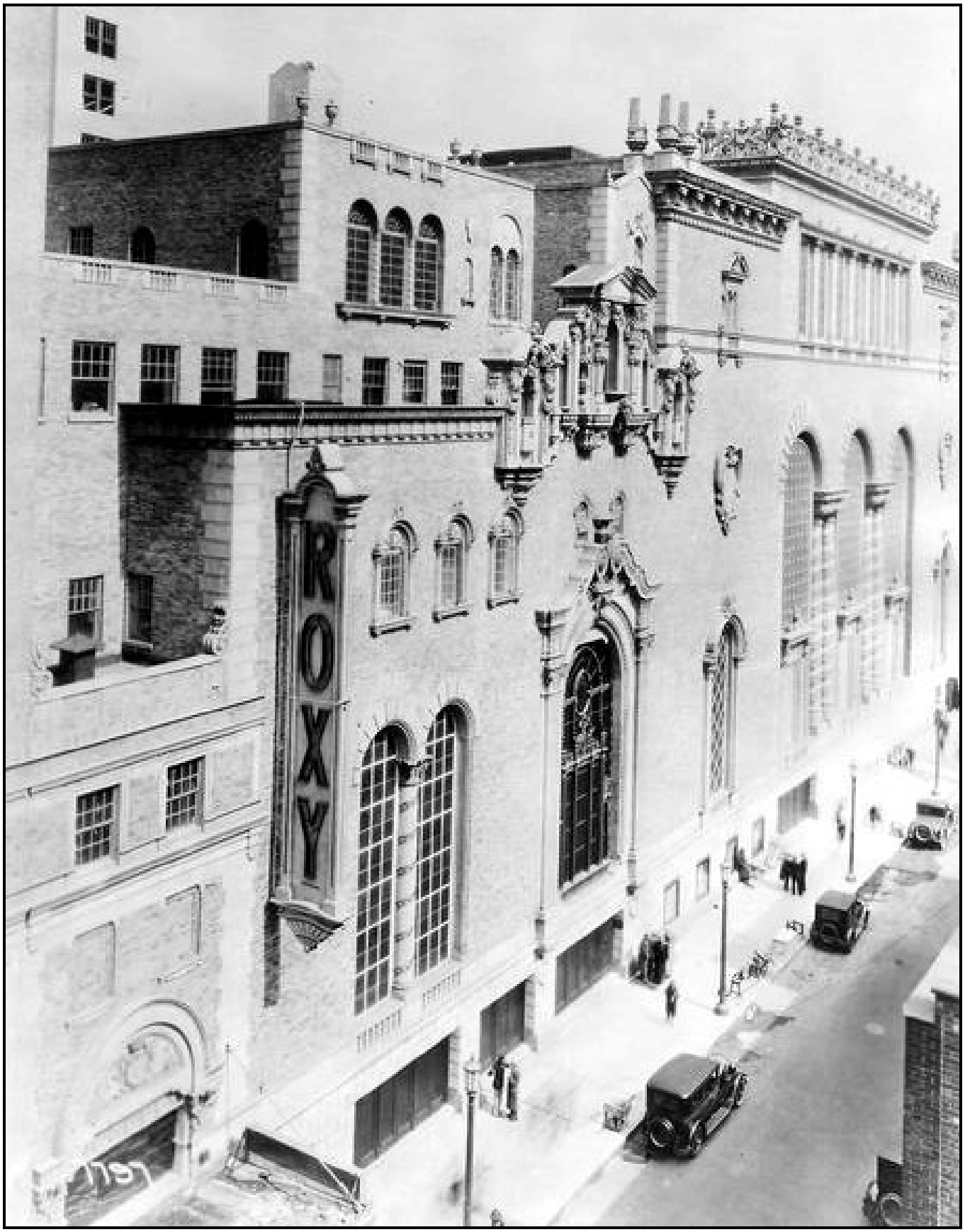
February 5, 1927

February 1, 1927

January 14, 1927

AT the left is the second half of this epic tale in theatre building, told as graphically as only pictures can tell a story. In three months we see the naked skeleton of steel taking on the flesh and blood of concrete, marble, granite, interior decorations, exterior structural detail, massive pillars, beautifully designed friese work, ornate hangings. A magnificent structure worthy the name of the Cathedral of the Motion Picture. A blending of the finest concepts in engineering, architecture, science and art. In truth, the humble cocoon has given forth the gorgeous butterfly, resplendent in the exquisite form and color conceived by genius.

The Roxy under construction in 1927, *The Best Remaining Seats*



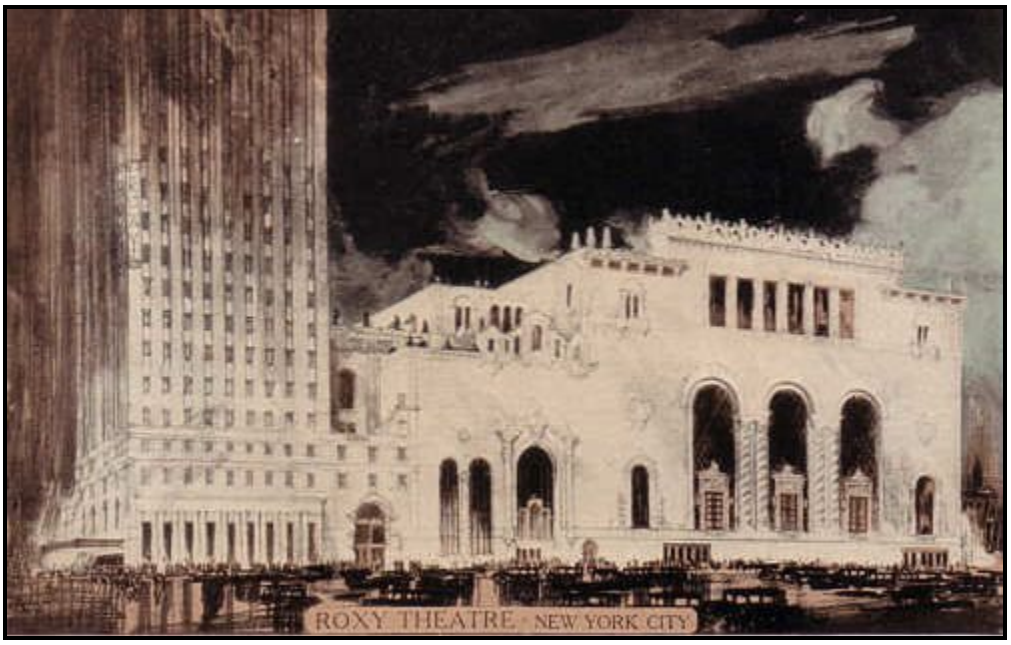
The Roxy Theatre

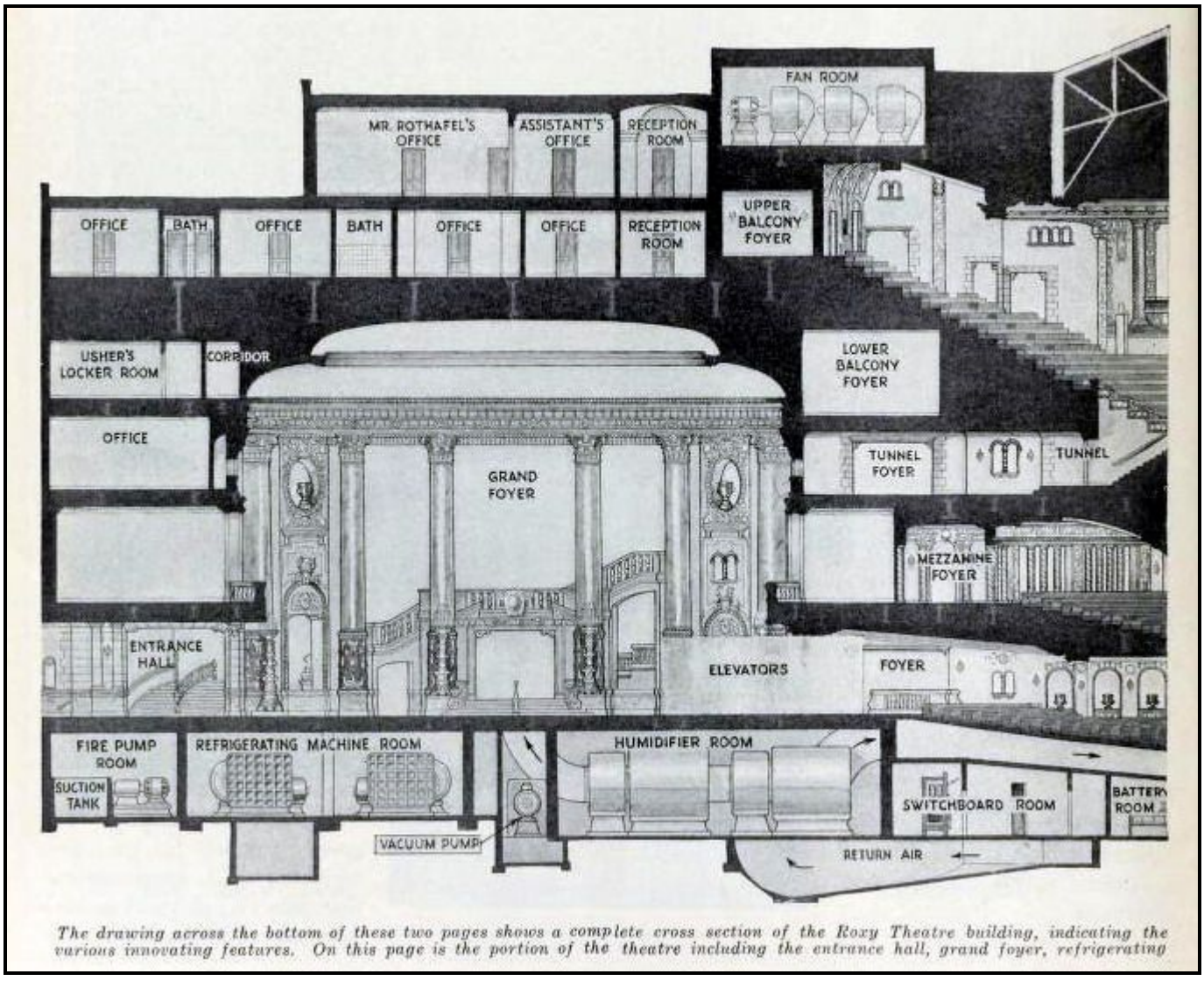
While the Paramount was under construction, Roxy—the noted theater promoter—began negotiations to build America's largest motion-picture house. Carrier later said:

> Roxy's backers, familiar with the year around capacity attendance of the Rivoli, agreed to finance the project only if an air conditioning system designed by us, or its equivalent, be installed in the theater. Ed Heckel, then in our Chicago office, persuaded the architect to specify our equipment. After the plans were completed, the fight for the contract was transferred to New York City. It was a fight, too, in spite of our favorable position. Irvine Lyle and his brother, Ernest, plus Ed Heckel's preliminary efforts, finally landed the job for us. It was a big one—two centrifugal refrigerating machines, each with 210 tons capacity. By that time we had changed our refrigerant from dielene to methylene chloride—Carrene 1. The authorities no longer questioned the safety of our equipment. However, it did take a lot of engineering, arguing, and planning before we filled the command performance to air condition the Roxy, a six-thousand-seat theater.

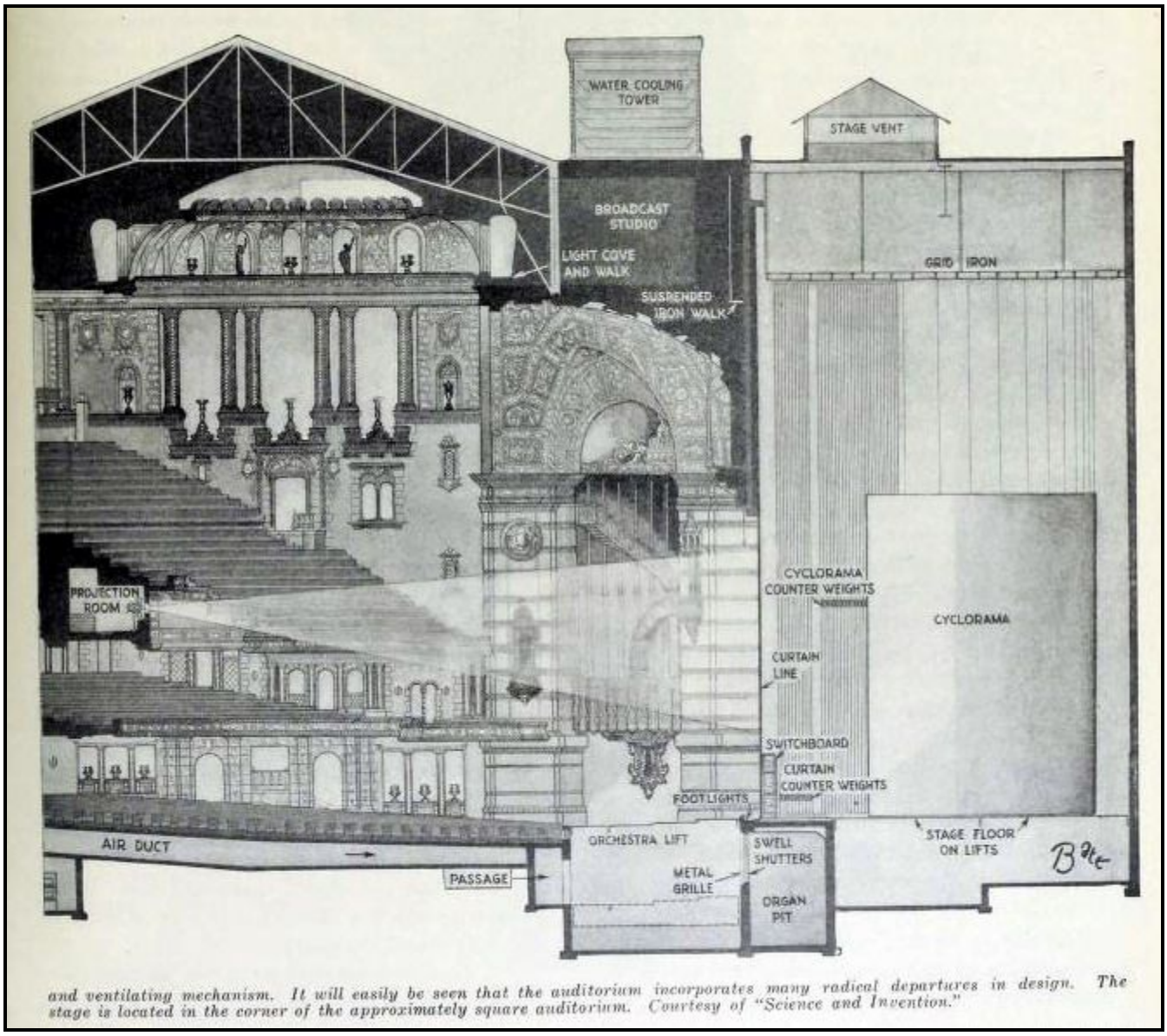
Though theater sales were exceeding their expectations, Carrier and Lyle did not rest on their achievements. The company formed a theater sales organization to concentrate on this market. Irvine Lyle spent much time in Manhattan helping to close contracts. Willis Carrier advised on the unusual engineering problems which arose with each prospect, directed the installations, and supervised try-out runs and acceptance tests. The success at the Rivoli started a demand which spread throughout the motion-picture world. By 1930 the company had air conditioned some 300 theaters.

Text extract from *Father of Air Conditioning (Willis Haviland Carrier),* Margaret Ingels, Country Life Press





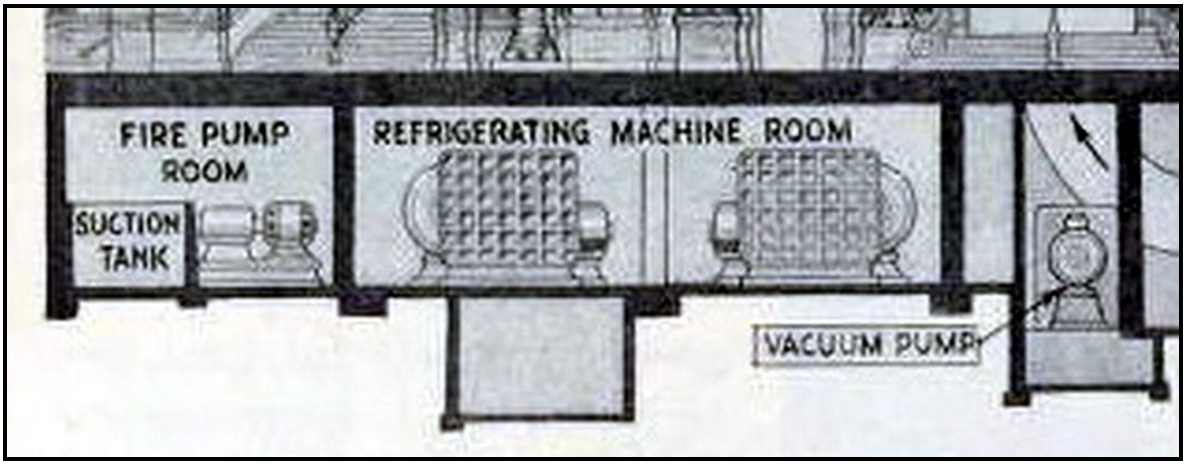
Carrier air conditioning system, 1927 showing centrifugal refrigeration and air handling plant
The Best Remaining Seats: The Golden Age of the Movie Palace, Ben M Hall, Da Capo, 1987



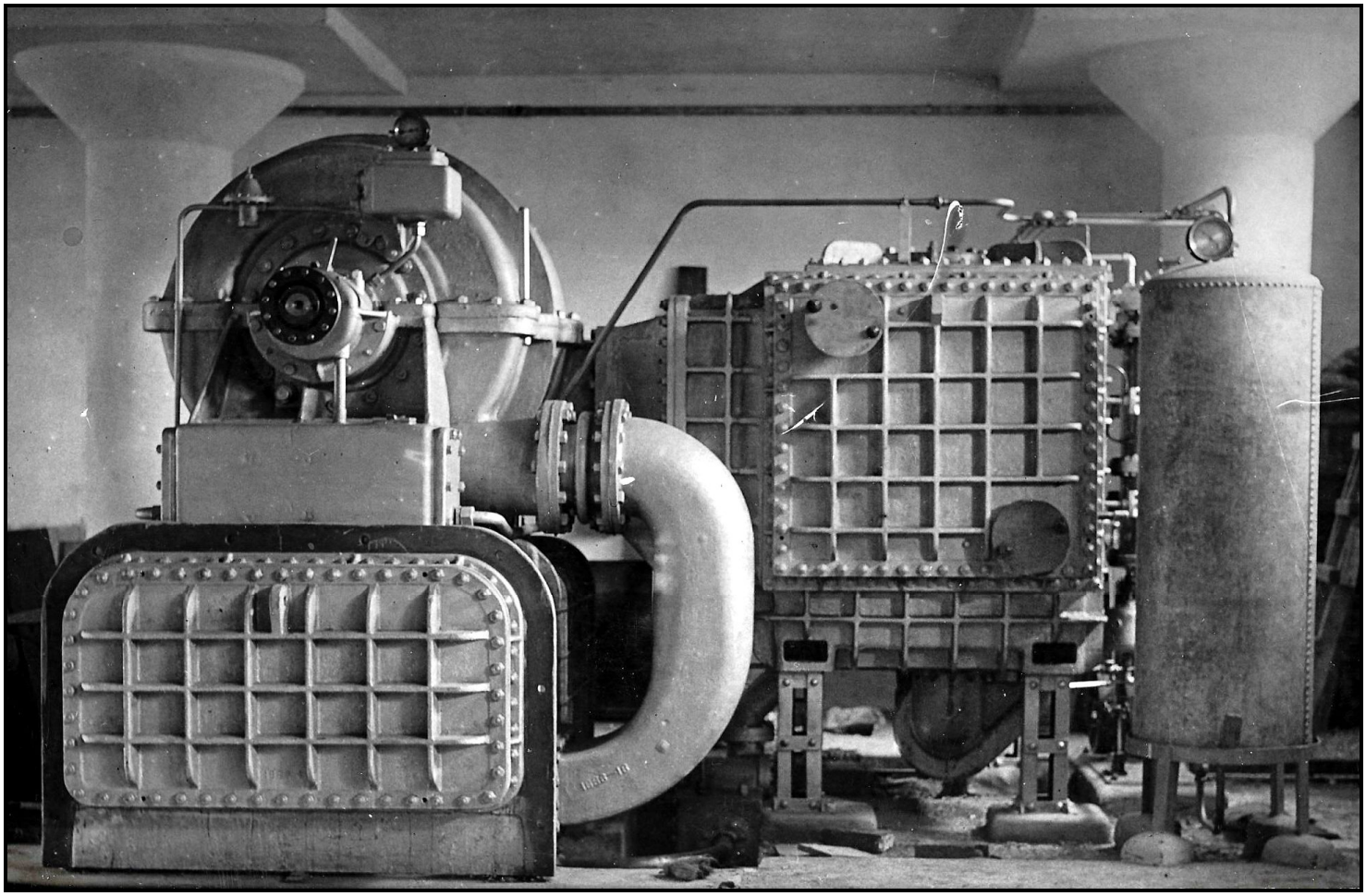
and ventilating mechanism. It will easily be seen that the auditorium incorporates many radical departures in design. The stage is located in the corner of the approximately square auditorium. Courtesy of "Science and Invention."

Carrier air conditioning system, 1927 showing air duct and roof-mounted cooling tower
The Best Remaining Seats: The Golden Age of the Movie Palace, Ben M Hall, Da Capo, 1987

Roxy in 1930, Website *Cinema Treasures*



Detail of Carrier centrifugal chiller from Roxy drawing.
Note the square section heat exchangers which were later of circular shape



Carrier factory photograph from mid-1920s showing the square heat exchangers used in their first centrifugal refrigeration machines. From *CIBSE Heritage Group Archive*

It has been very correctly estimated that when the Roxy Theatre is filled there are 9,000 people under its roof, which volume of people may be grouped approximately as follows:

Roxy Theatre When Filled Contains Nine Thousand People

Seated, 6,076; standees viewing the show, 500; standees in the foyers and rotundas who have purchased tickets and are awaiting vacant seats, 1,750; orchestra and musicians, 100 to 110; ballet, chorus, artists, stage hands, 175; theatre operative department including such departments as ushers, pages, ticket sellers, restroom, smoking room and wardrobe attendants, hospital corps, 300.

To provide complete and proper equipment to scientifically condition the air for an audience so great in number, and to insure the health and comfort of the patrons and staff, presented an engineering problem of unusual proportions. To refrain from boring technical discussions has been the predominating thought in the preparation of this article, but it is difficult to resist the temptation to dwell in short upon some of the more important mechanical features of the theatre, among which the "manufactured weather" of the Roxy is one of the most interesting.

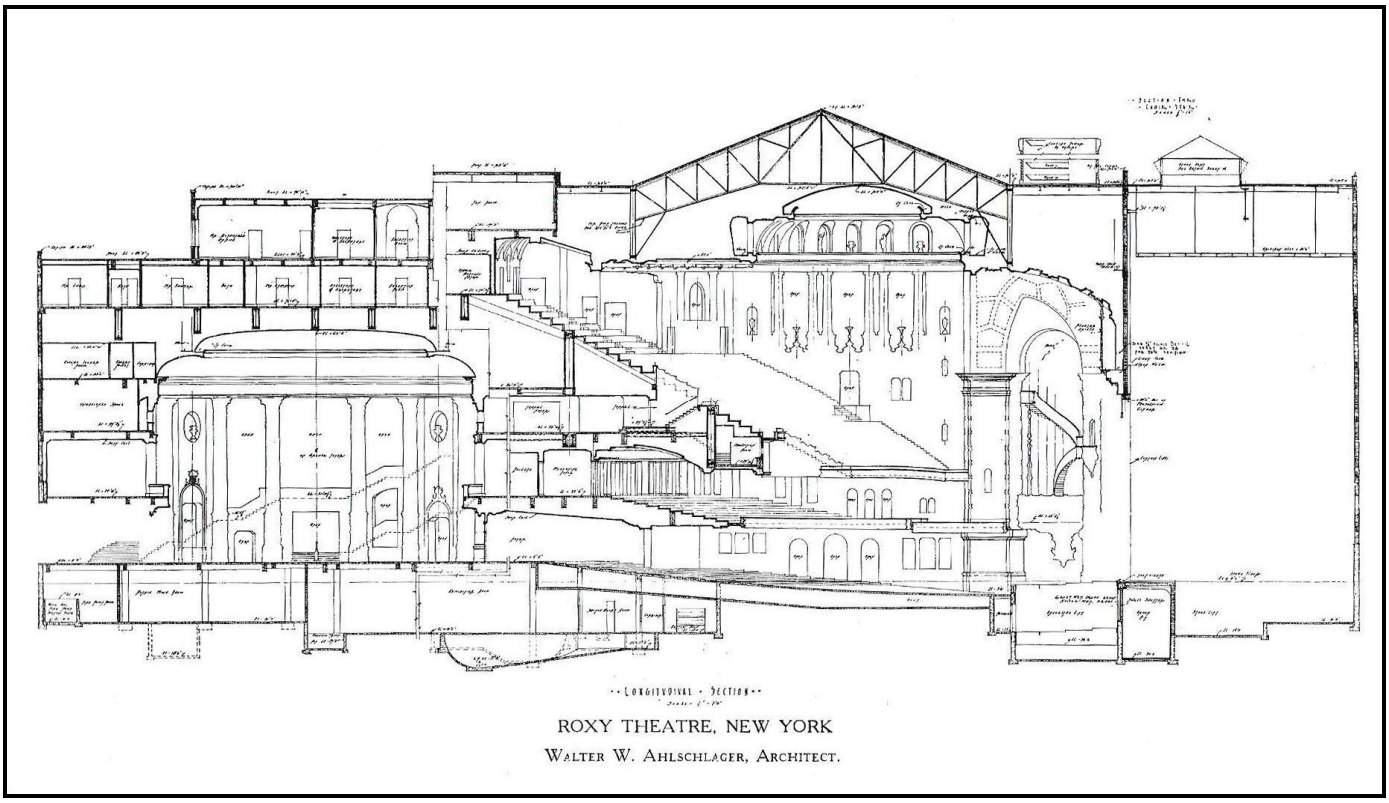
Many new problems were encountered in designing the equipment for a theatre of such large proportions. The size of the auditorium as a single enclosure, its great cantilever balcony and mezzanine overhanging the main floor, the unusually large proscenium opening, the fact that the theatre was to be occupied for nearly eleven hours daily, made the designing of adequate air conditioning equipment extremely interesting. The apparatus itself had to be installed in difficult locations so that it would not interfere with the design and decoration of the building or occupy space more valuable for other uses. Finally, the greatest care had to be exercised to keep the entire system noiseless while in operation.

Air Condition Under Control During All Seasons

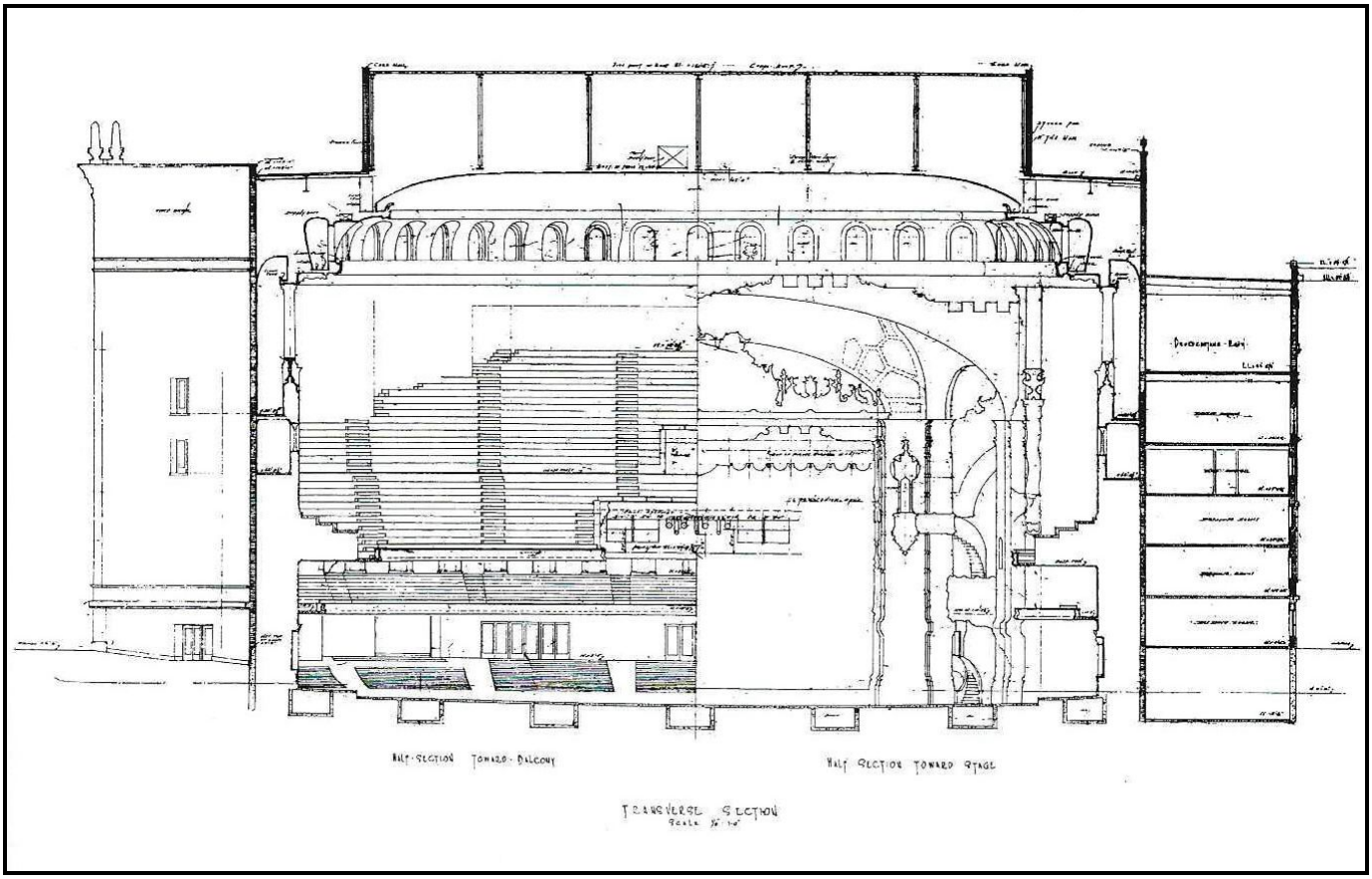
Three huge fans, each a part of a separate air conditioning system, draw air from out of doors through a fresh air intake located above the highest point of the theatre roof. Before reaching the fans, the air passes into a chamber within which a perfect cloud of atomized water is sprayed through hundreds of small nozzles. Within these chambers, the air is completely washed and its state of humidity is fixed. By various processes the air is then mixed with a quantity of warmer air and is discharged into a network of metal ducts through which the air is conveyed to the main ceiling of the theatre, to the soffits of the balcony and the mezzanine and to the various foyers, rest rooms, etc. The air is then discharged through numerous openings in these ceilings which are merged into the architectural design. These openings, or grilles, are so constructed that the air is blown through them without perceptible velocity that would create a sensible draught upon the audience, rather the air is diffused or "poured" into the theatre so gently that one is not conscious of the source of refreshing atmosphere. Mixed with the somewhat warmer air of the theatre, the fresh supply is forced towards the audience until it reaches the breathing zone, at which point the automatic control of the conditioning apparatus is so regulated that the air, as it reaches the audience is at a scientifically correct temperature and relative humidity.

DELICATE SPANISH PLATERESQUE STAGE ENFRAMEMENT OF THE CHORAL STAIR OF THE ROXY THEATRE
WALTER W. AHLSCHLAGER, *Architect*

Roxy postcard

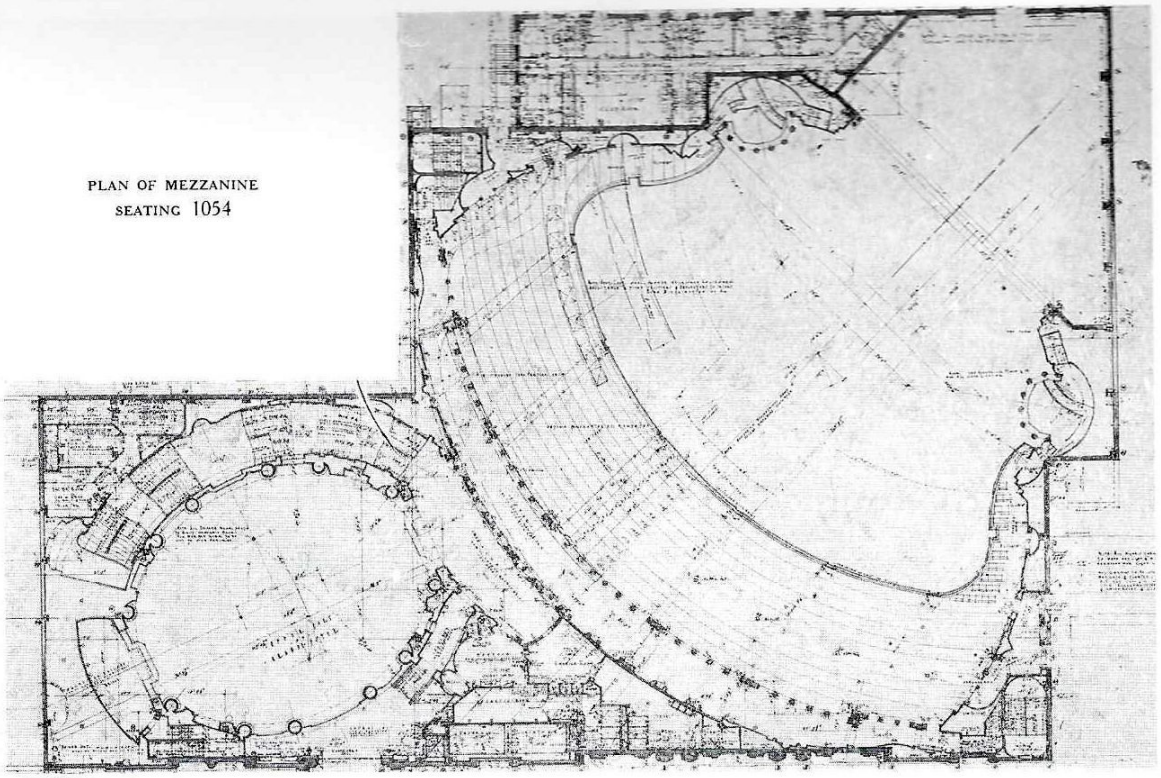


ROXY THEATRE, NEW YORK
WALTER W. AHLSCHLAGER, ARCHITECT.

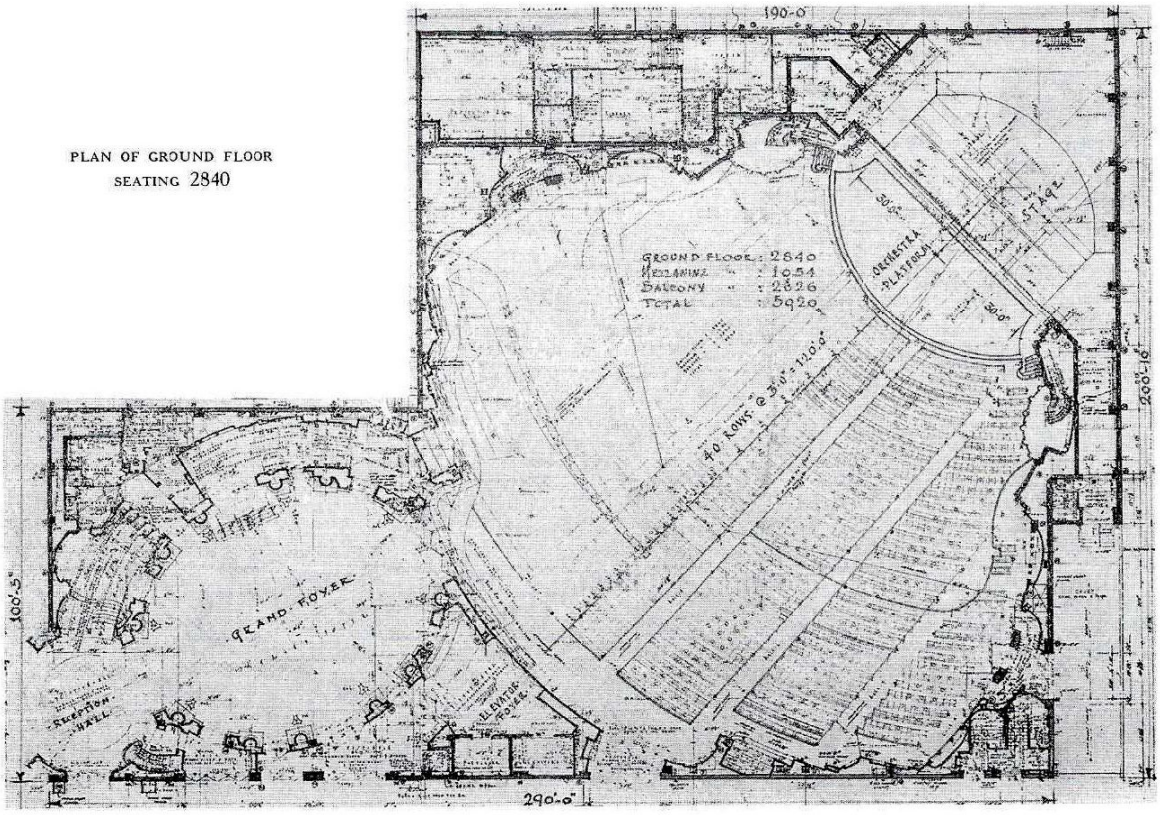


Architect's drawings from *American Theatres of Today*, R W Sexton & B F Betts, Liber Apertus Press, 2009 (reprint of Volume I, 1927)

PLAN OF MEZZANINE
SEATING 1054

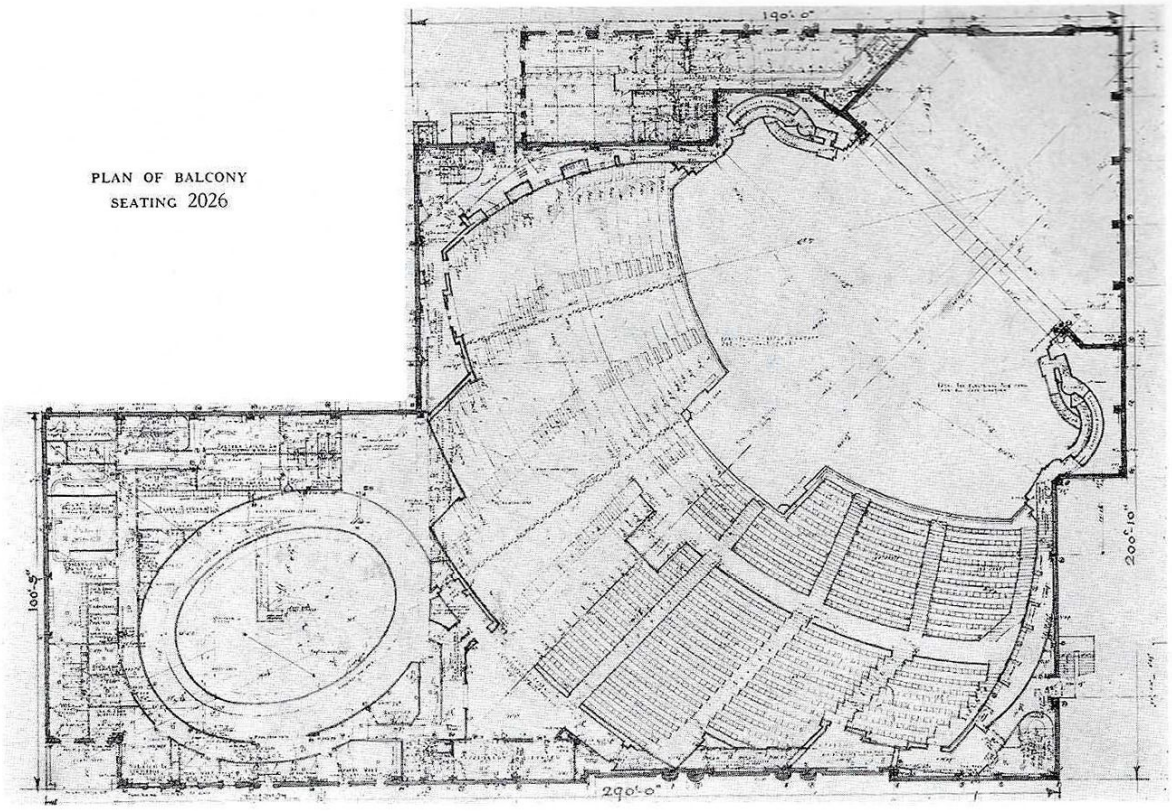


PLAN OF GROUND FLOOR
SEATING 2840



ROXY THEATRE, NEW YORK
WALTER W. AHLSCHLAGER, ARCHITECT.

American Theatres of Today (reprint of Volume I, 1927)



ROXY THEATRE, NEW YORK

WALTER W. AHLSCHLAGER, ARCHITECT.

American Theatres of Today (reprint of Volume I, 1927)

Carrier
AIR CONDITIONING AND DRYING EQUIPMENT

A mutual success

THE NEW PARAMOUNT

A monument to the Art of the silent drama. A monument to the achievement of Adolph Zukor. A masterpiece by the architects—C. W. and G. L. Rapp and R. E. Hall—A Carrier Conditioned Theatre.

Carrier Conditioned Theatres

WITH the public at large we celebrate the opening of the great New Paramount Theatre—a monument to the man, Adolph Zukor, who brought to the screen the first great artist, Sarah Bernhardt, and from that event has guided colleague and competitor alike along the road to the triumphant success which is symbolized in this great theatre.

Hand in hand with the advancement in picture production the motion picture theatre has evolved from the stuffy nickelodeon of yesterday to the airy palace of today. It has been the work of Carrier Engineers, specialists in air conditioning, to contribute to this great development, Manufactured Weather to make "Every day a *good* day" in the theatre. With just pride we point to the Rivoli and Rialto on Broadway, to a rapidly growing list of theatres throughout the country and finally, to the great Paramount Theatre as Carrier Conditioned Theatres.

One of the PUBLIX Theatres

Manufactured Weather makes "Every day a *good* day" in the New Paramount

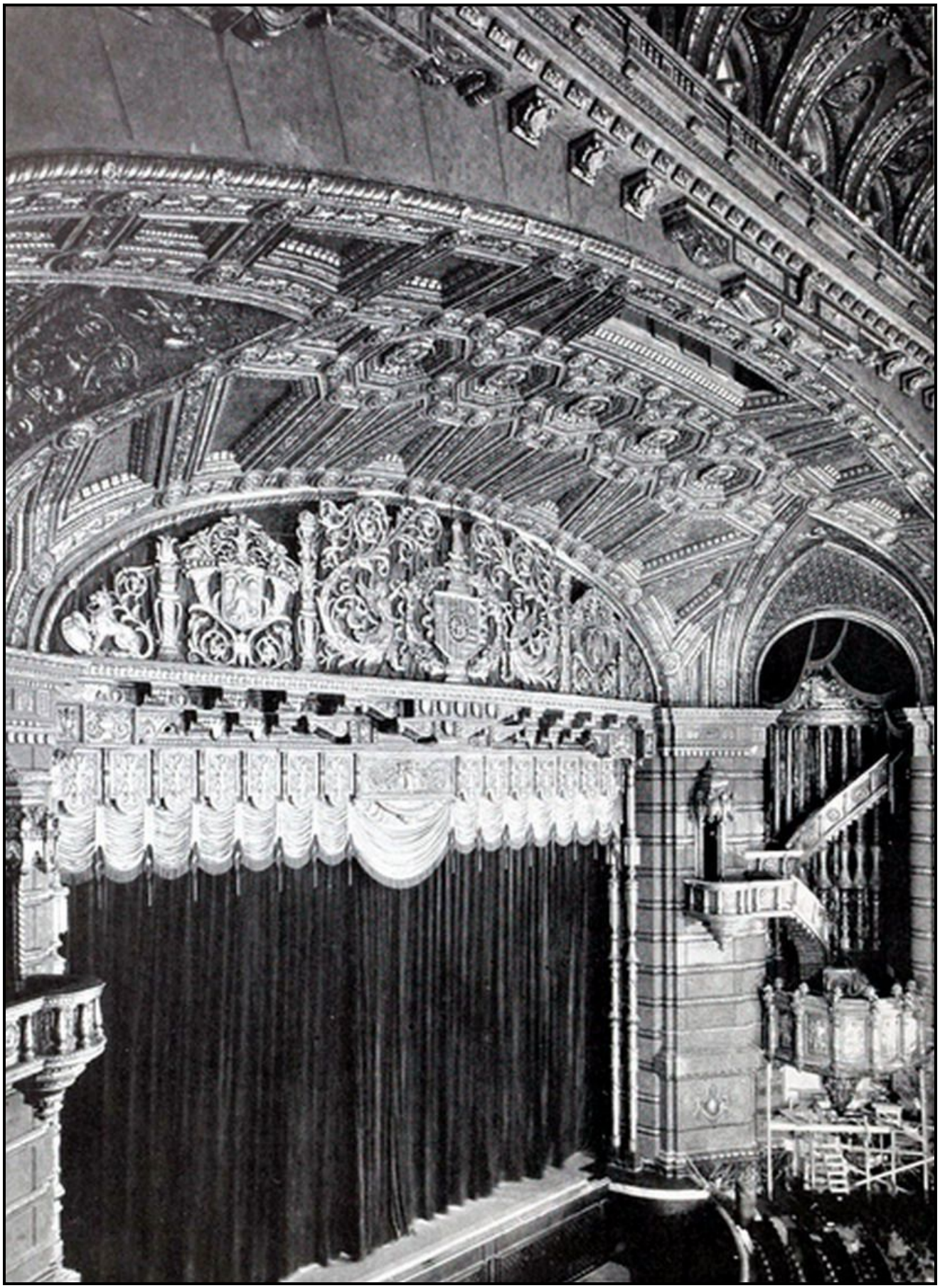
More than 300 tons of perfectly conditioned air each hour are poured into the Theatre and lobbies from three great Carrier systems for Air Conditioning—producing humidified warmth in Winter—cool, invigorating comfort in Summer.

The same complete system, including Carrier Centrifugal Refrigeration, is now available for the fine small theatres. Write for the book, "Theatre Cooling and Conditioning." Describe your theatres. Ask for a visit from one of our Engineers.

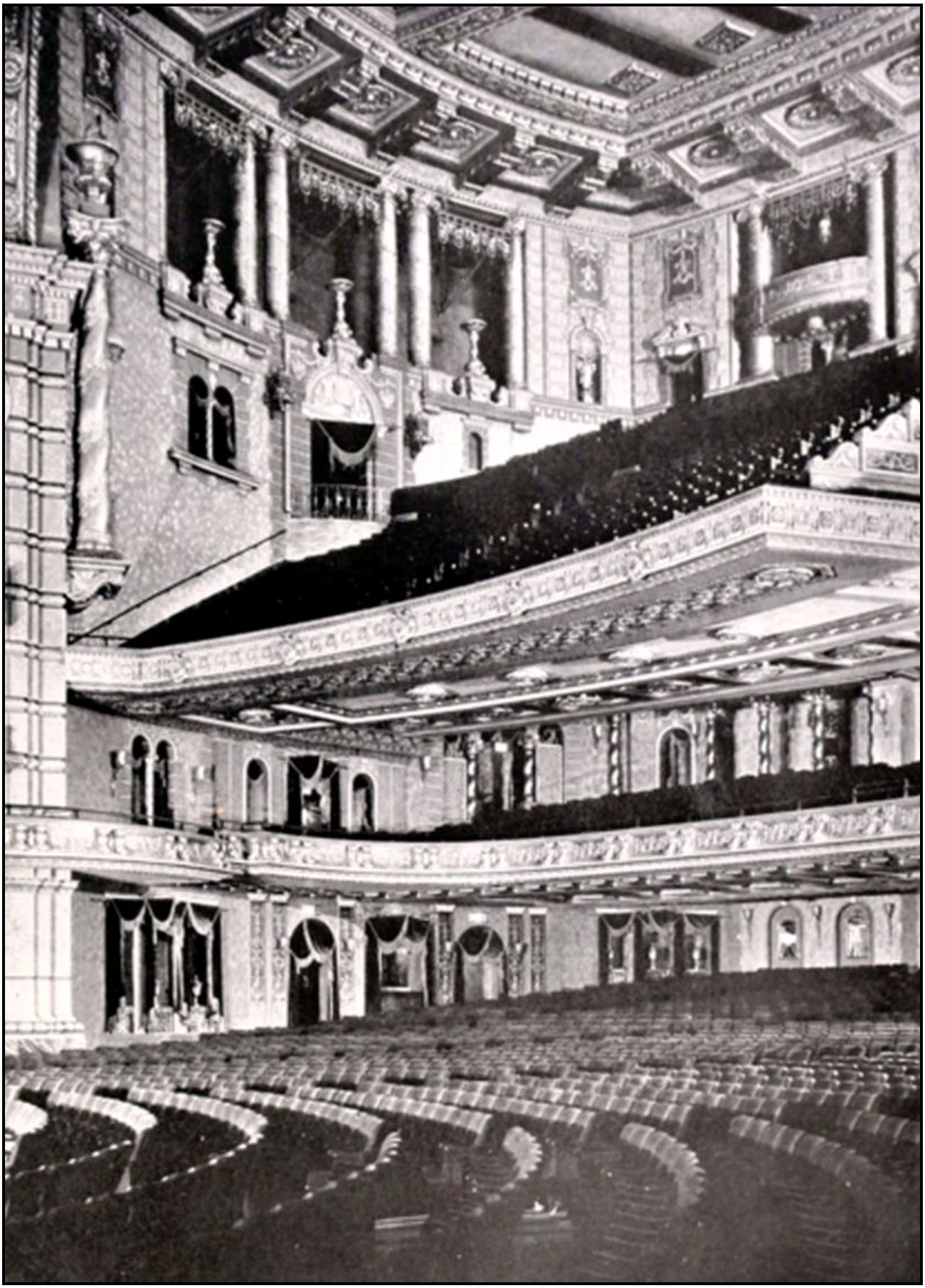
Carrier Engineering Corporation

Offices and Laboratories
Newark, N. J.

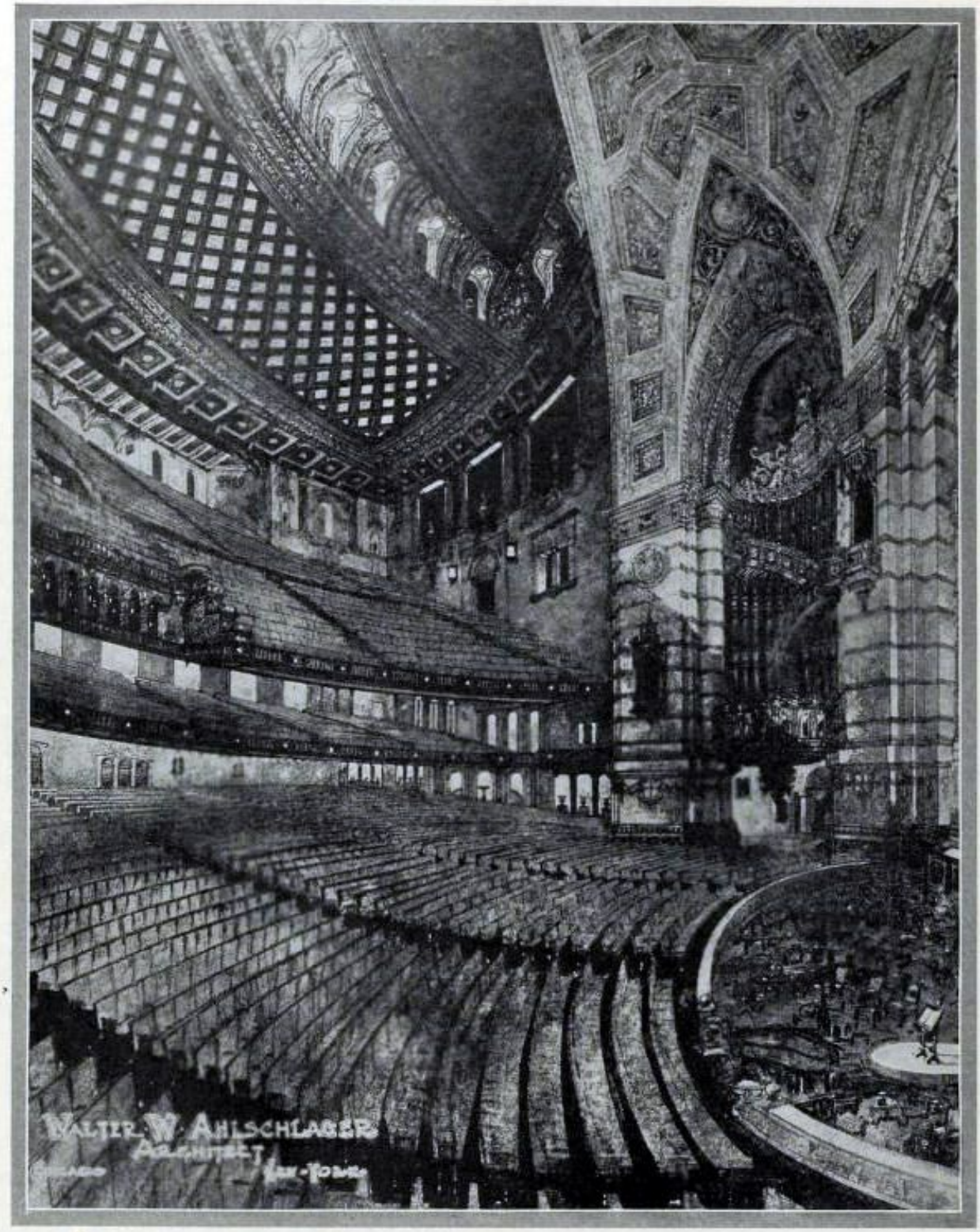
NEW YORK PHILADELPHIA BOSTON CHICAGO CLEVELAND KANSAS CITY LOS ANGELES



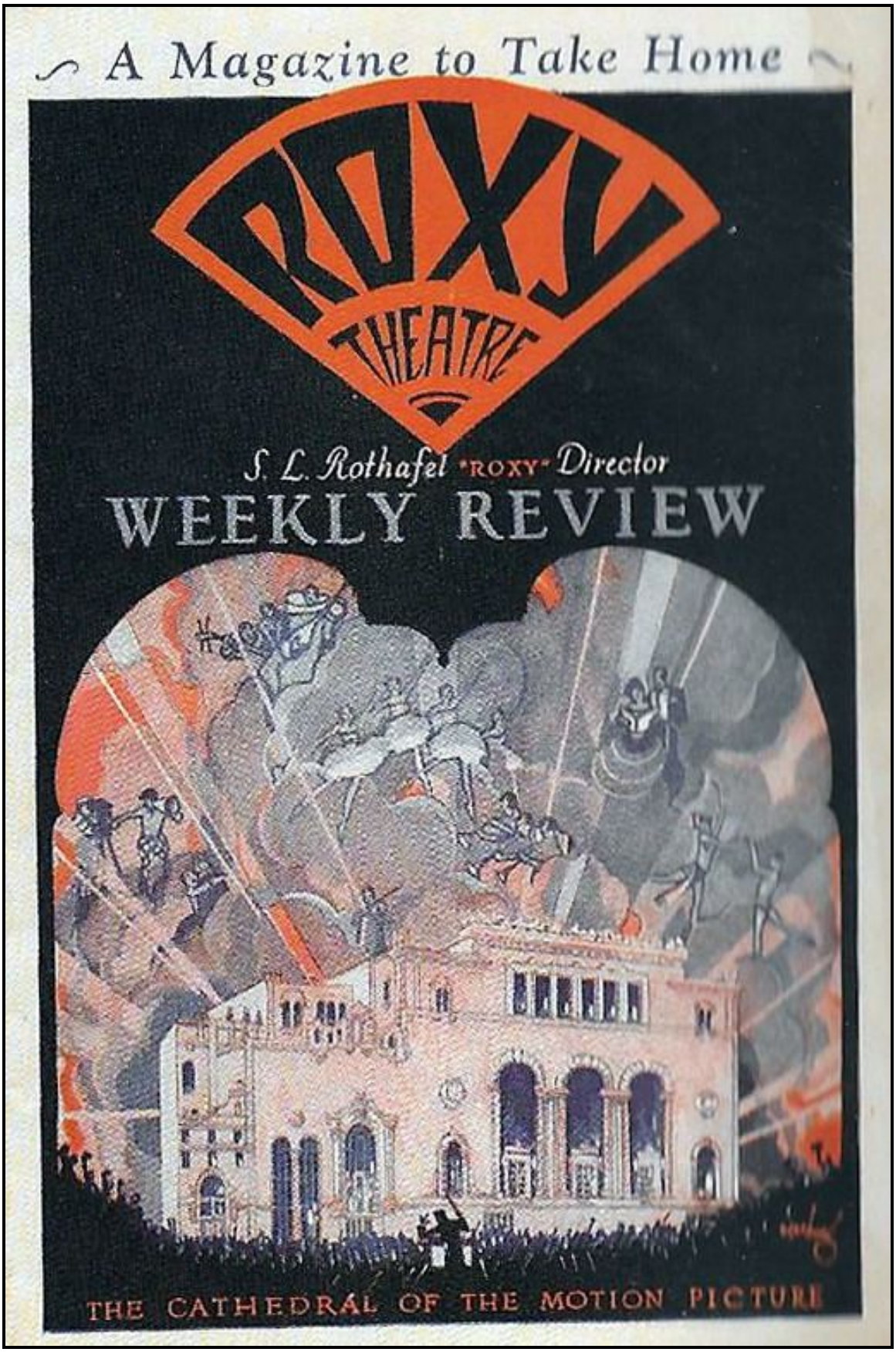
American Theatres of Today (reprint of Volume I, 1927)



American Theatres of Today (reprint of Volume I, 1927)



The Roxy Auditorium—the Last Word in Theatre Architecture



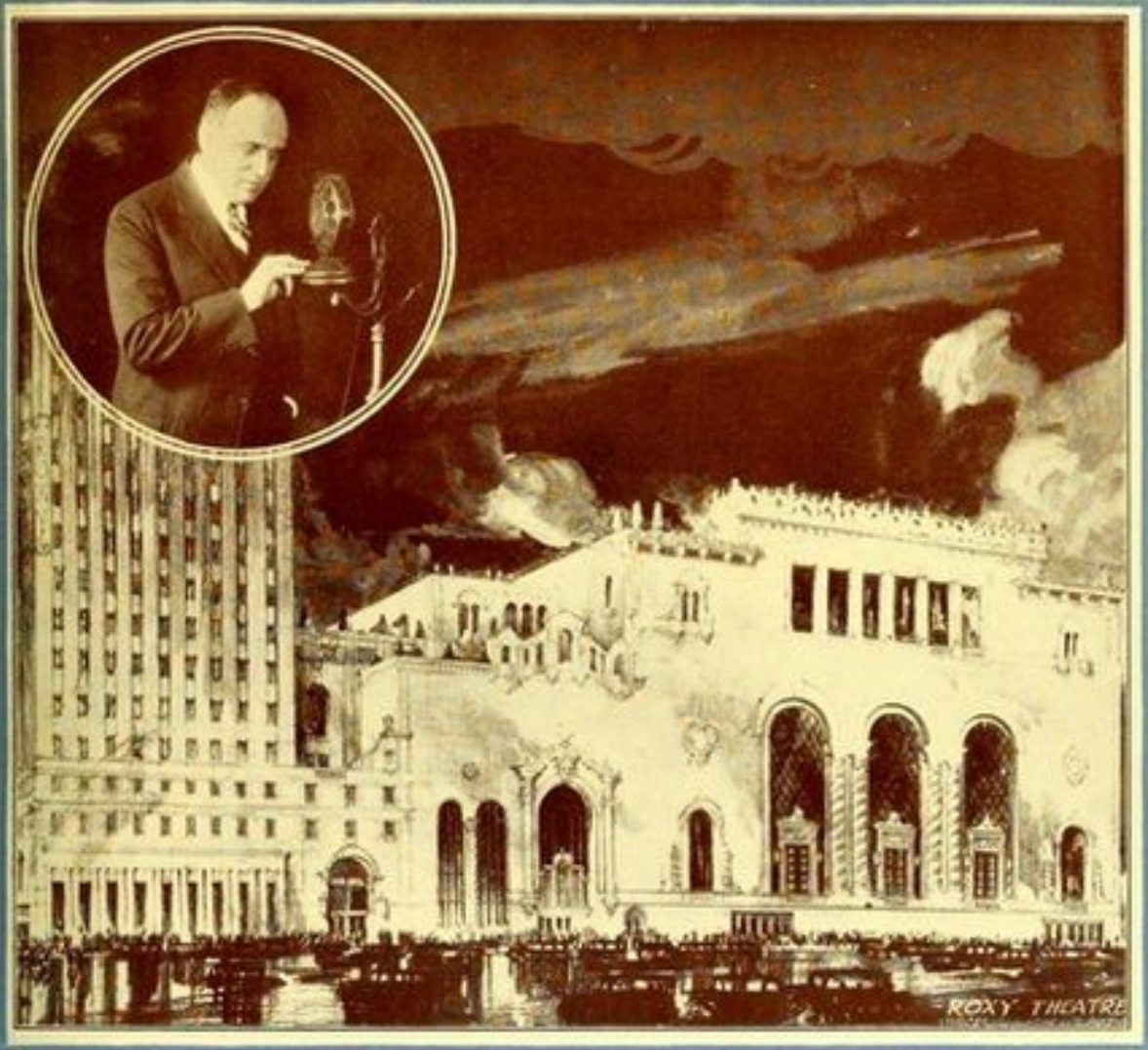
Roxy *Weekly Review*
Ticket to Paradise, Margolies & Gwathmey, Bullfinch, 1991

the NEWSPAPER of FILMDOM

THE Film DAILY

AND WEEKLY FILM DIGEST

VOL. XXXIX No. 60 Sunday, March 13, 1927 Price 25 Cents



THE ROMANCE OF THE ROXY

Notable architects who have seen the Roxy declare it is without equal. This magnificent theater marks a new milestone in the history of American exhibition. Its story in detail is given in this special edition.

ROXY SPECIAL

ROXY— A HISTORY

From backstore, make-shift theater of primitive days to the gorgeous Roxy is the range of S. L. Rothafel's career. His experiences in theater development are as fascinating as they are unique. One of the real romances of the industry.

The Film Daily, Sunday 13th March, 1927

Hollywood film star Gloria Swanson had a special relationship with the Roxy.
She was the star of the opening night silent film *The Love of Sunya* in 1927 and in this photograph she stands in the ruins of the demolished Roxy in 1960 (From *The Best Remaining Seats,* not remaining unfortunately)

Air Conditioning American Movie Theatres 1917-1932

State Theatre

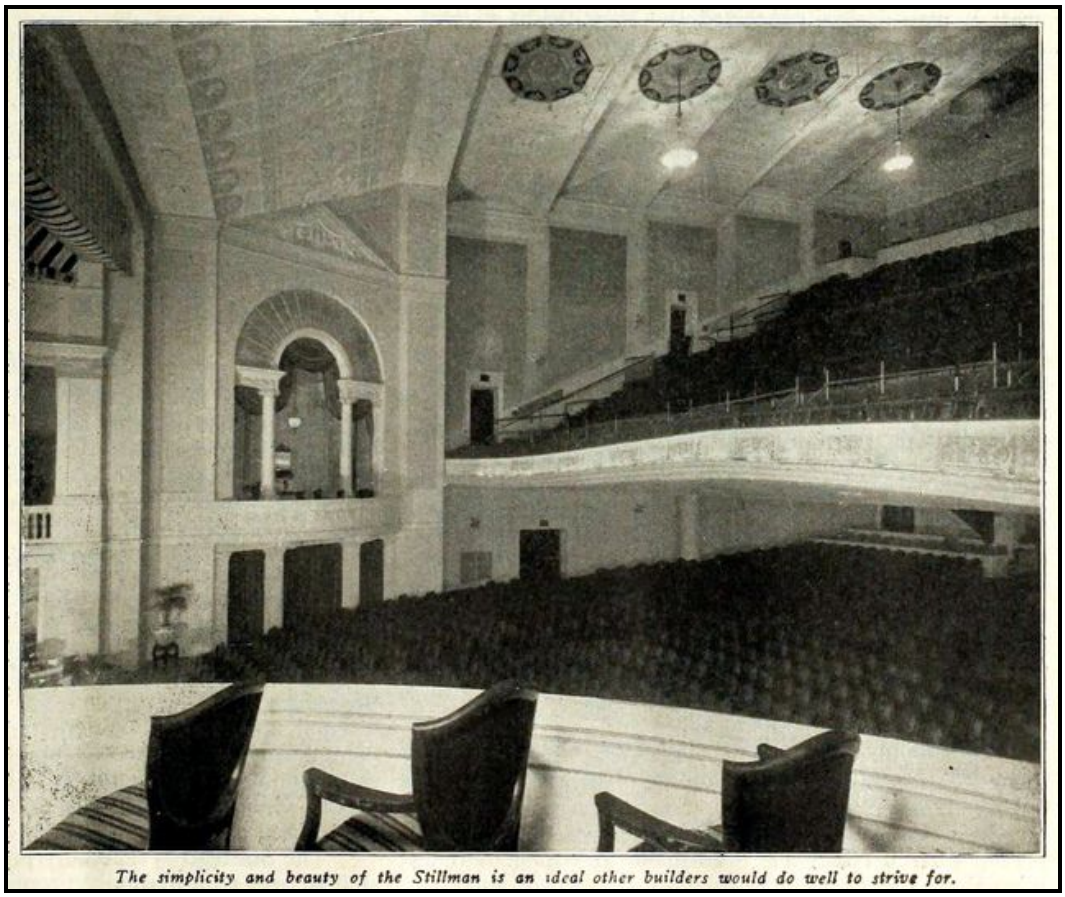
CLEVELAND, OHIO

Date Built: 1921 (air conditioned later)
Seating Capacity: 3518
Owner: Loew's
Architect: Unknown
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller

Air Conditioning American Movie Theatres
1917-1932

Stillman Theatre

CLEVELAND, OHIO



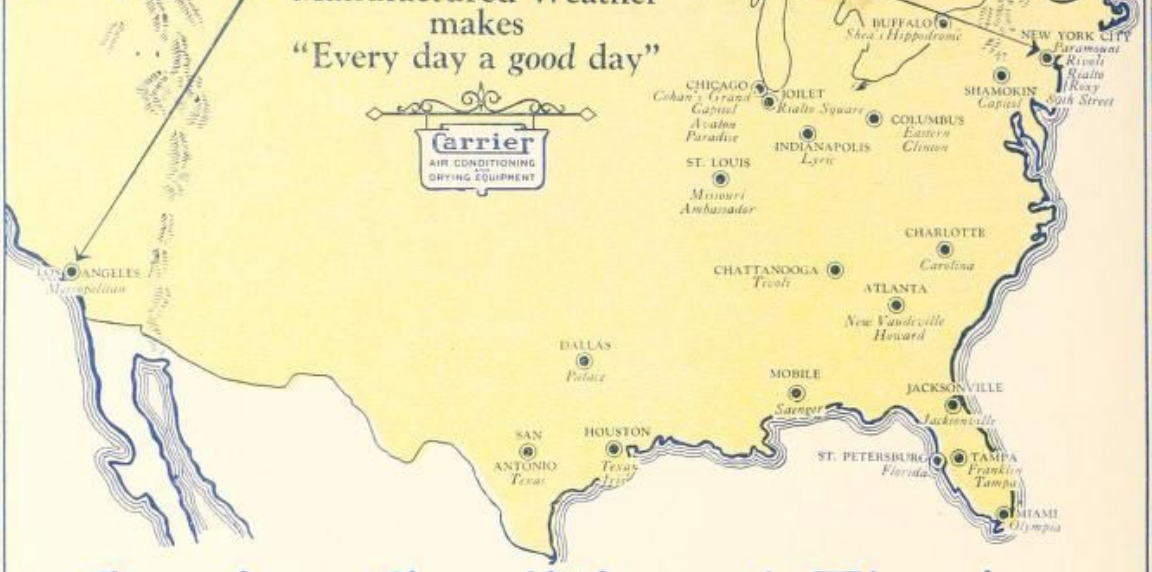
The simplicity and beauty of the Stillman is an ideal other builders would do well to strive for.

Date Built: 1916 (air conditioning later)
Seating Capacity: 1800
Owner: Stillman (?)
Architect: Thomas Lamb
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller

From Los Angeles To Broadway

Manufactured Weather
makes
"Every day a *good* day"

Carrier
AIR CONDITIONING AND DRYING EQUIPMENT



Carrier Conditioned Theatres

Fulfill the Public's Demand for Comfort

PEOPLE have learned to *feel for themselves* and to recognize immediately the delightfully comfortable atmosphere in a Carrier Conditioned Theatre. Proper air conditioning in the theatre now rests on a par with the beauty of the theatre and the quality of the entertainment as an attraction to the public. This explains the remarkable rate at which the fine theatres of the country are adopting Carrier conditioning equipment.

The Carrier system, designed especially for each theatre, is guaranteed to maintain uniform conditions of Temperature, Humidity and Air Purity every day in the year.—It is the developement of more than twenty years of specialized air conditioning experience.—A recent developement provides the same complete system for the fine, small theatres.

Write for the book "Theatre Cooling and Conditioning".—Describe your theatres.

Ask for a visit from one of our Engineers.

Carrier Engineering Corporation

Offices and Laboratories

NEWARK, NEW JERSEY

NEW YORK PHILADELPHIA BOSTON CHICAGO CLEVELAND KANSAS CITY LOS ANGELES

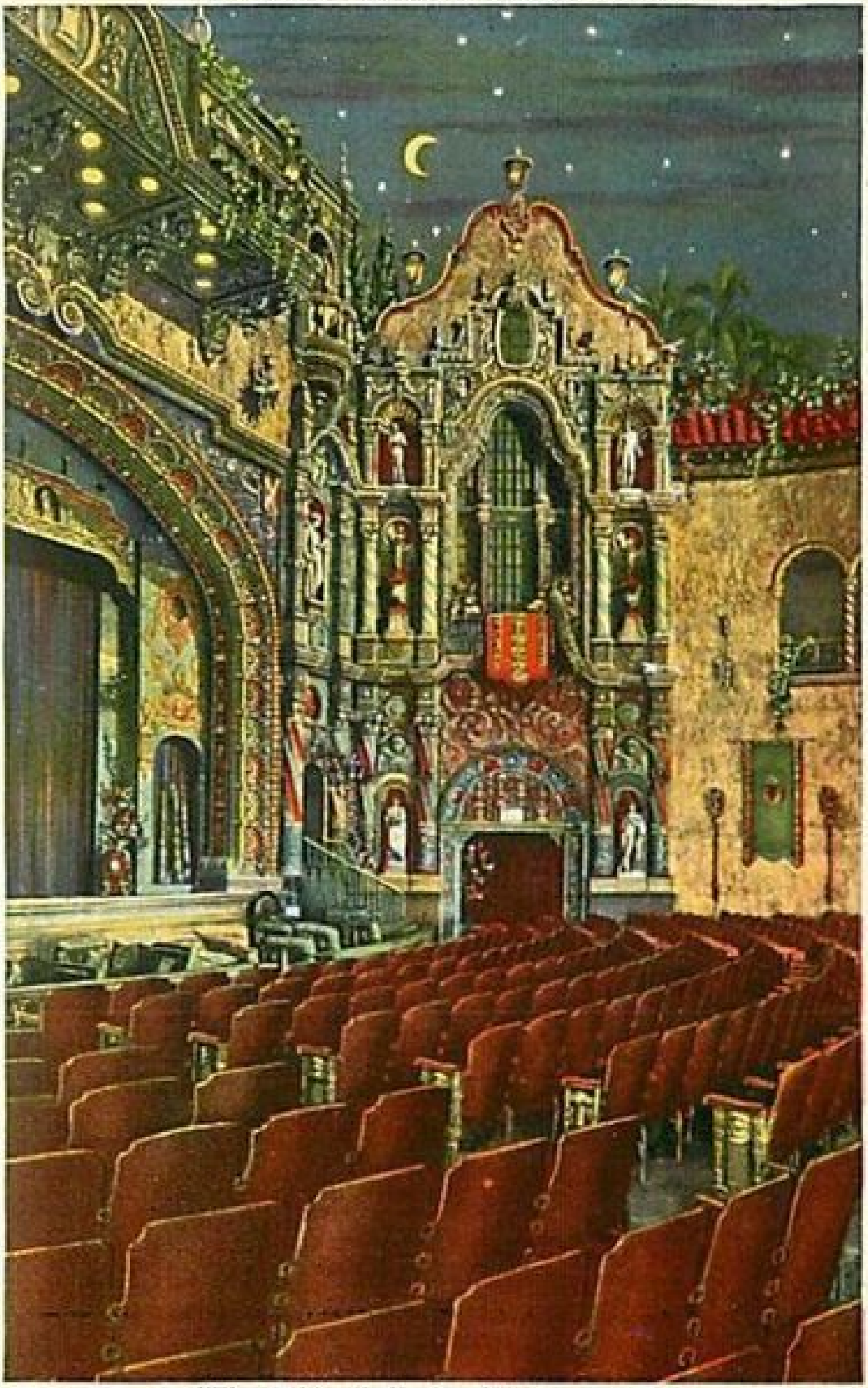
Air Conditioning American Movie Theatres
1917-1932

Tampa Theatre

TAMPA, FLORIDA

Date Built: 1926
Seating Capacity: 1446
Owner: Publix
Architect: John Eberson
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller

17—Interior Scene, the Tampa Theatre,



"The Pride of the South," Tampa, Fla. 121516-H

Tonight's the Night!

One of the PUBLIX Theatres

Grand Opening of The TAMPA Theatre

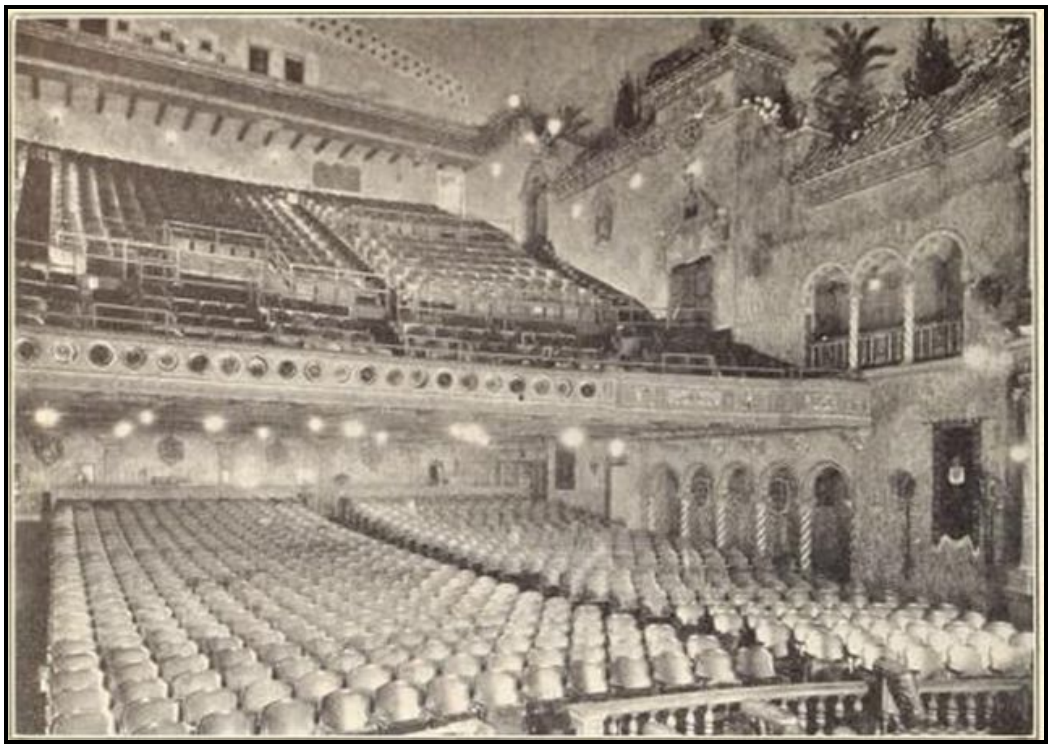
A new page in Tampa's Entertainment History

Tonight a procession of the pleasure-loving people of Tampa will lead to the new Tampa Theatre. They will come away with the news that Tampa has one of the most beautiful theatres in the world! Positively luxurious! Supremely comfortable! Perfectly serviced! And a marvelous show! Much as we have told you about the new Tampa, it is nothing to what you will see tonight. Its beauty will leave you breathless and the entertainment will hold you spellbound!

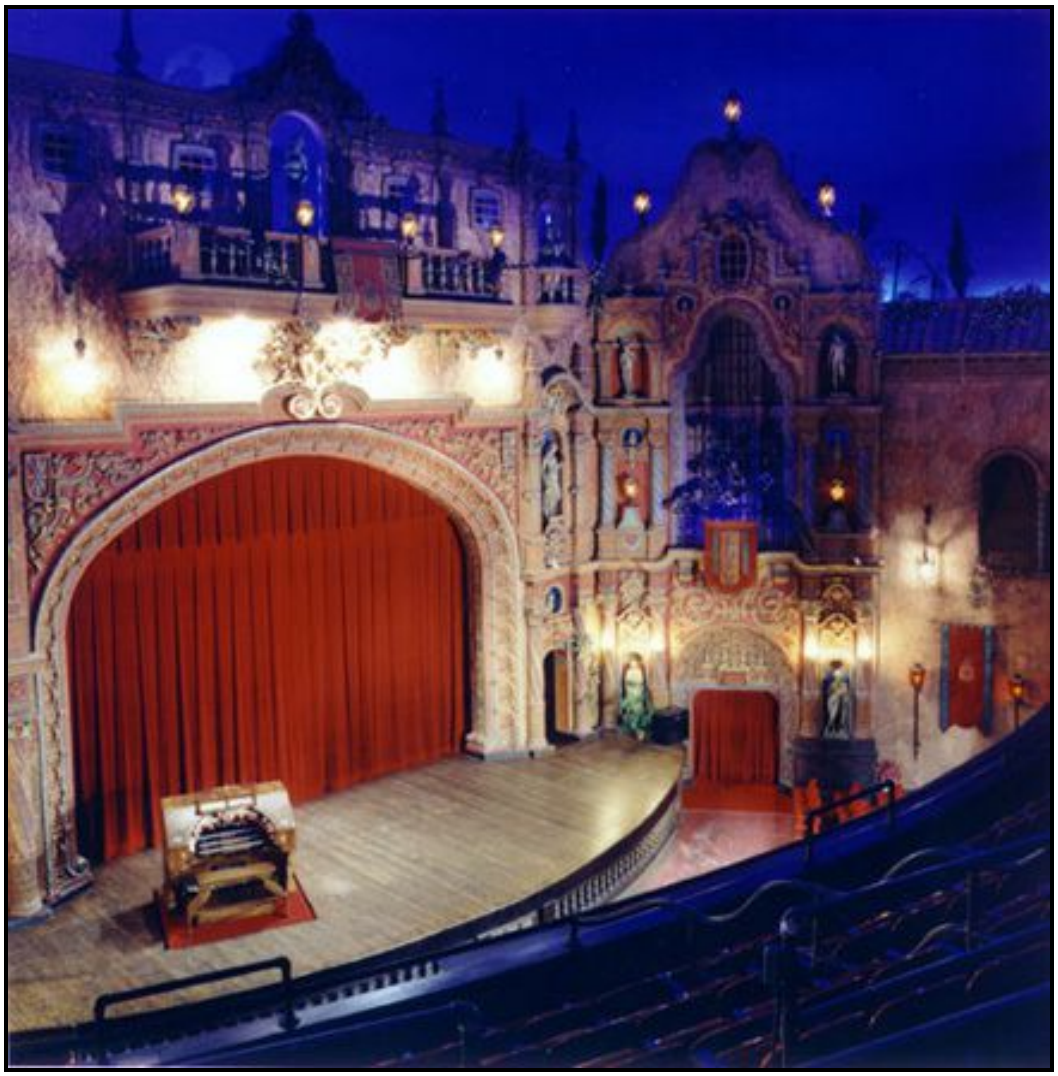
Greatest of all the great "Publix Theatres"!

We who have "Publix Theatres" in 50 cities from New York to San Francisco are proud of the new Tampa as we are of no other theatre in the chain. It is the last word in luxury and splendor—a magnificent jewel of great beauty that we have set in Tampa for your pleasure and pride. Tonight, we turn it over to you. See it—and marvel that Tampa is so fortunate as to possess it. Then enjoy the show that the Publix Chain has provided for your enjoyment—a quality of entertainment possible only because the Tampa is "One of the Publix Theatres" whose activities radiate from coast to coast.

Tonight's the night!



1926



A Spanish Facade

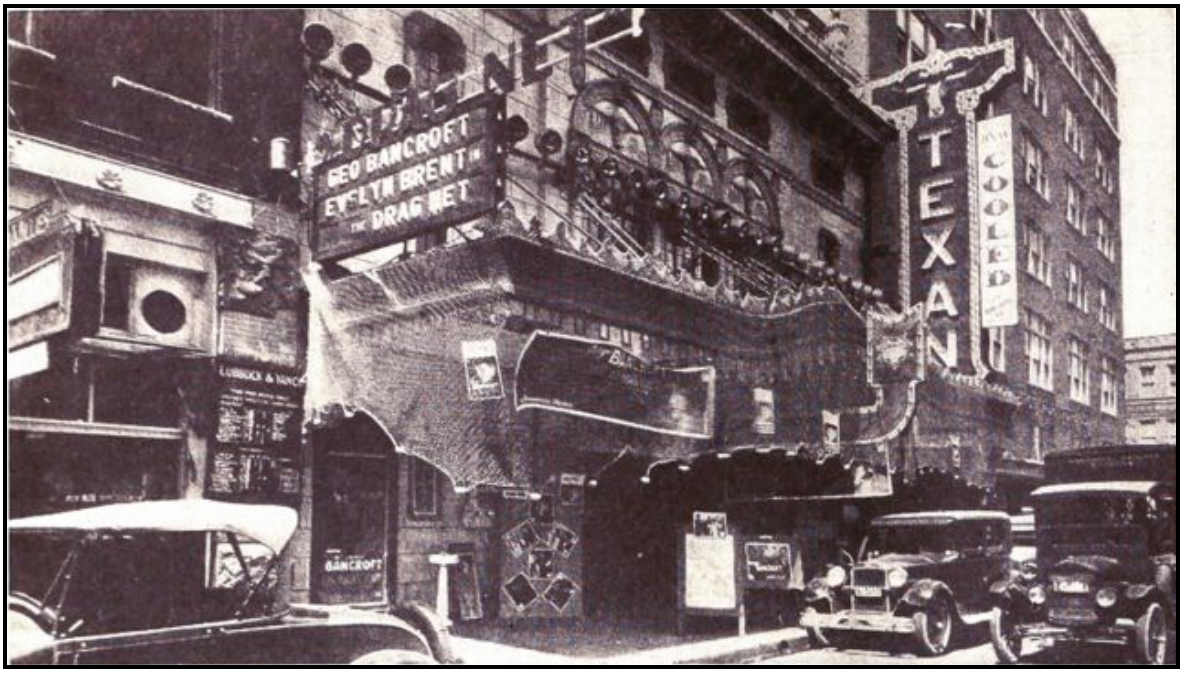
A close-up study of the proscenium and organ loft of the Tampa Theatre, Tampa, Florida. A colorful interpretation with a touch of ecclesiastical feeling.

JOHN EBERSON, ARCHITECT

Air Conditioning American Movie Theatres 1917-1932

Texan Theatre

HOUSTON, TEXAS



Date Built: 1925
Seating Capacity: 1393
Owner: Will Horwitz
Architect: Henry F Jonas & Tabor
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller 1925 also serving chilled water tank in Iris Theatre across street
Status: Demolished

Air Conditioning American Movie Theatres 1917-1932

Texas Theatre

SAN ANTONIO, TEXAS

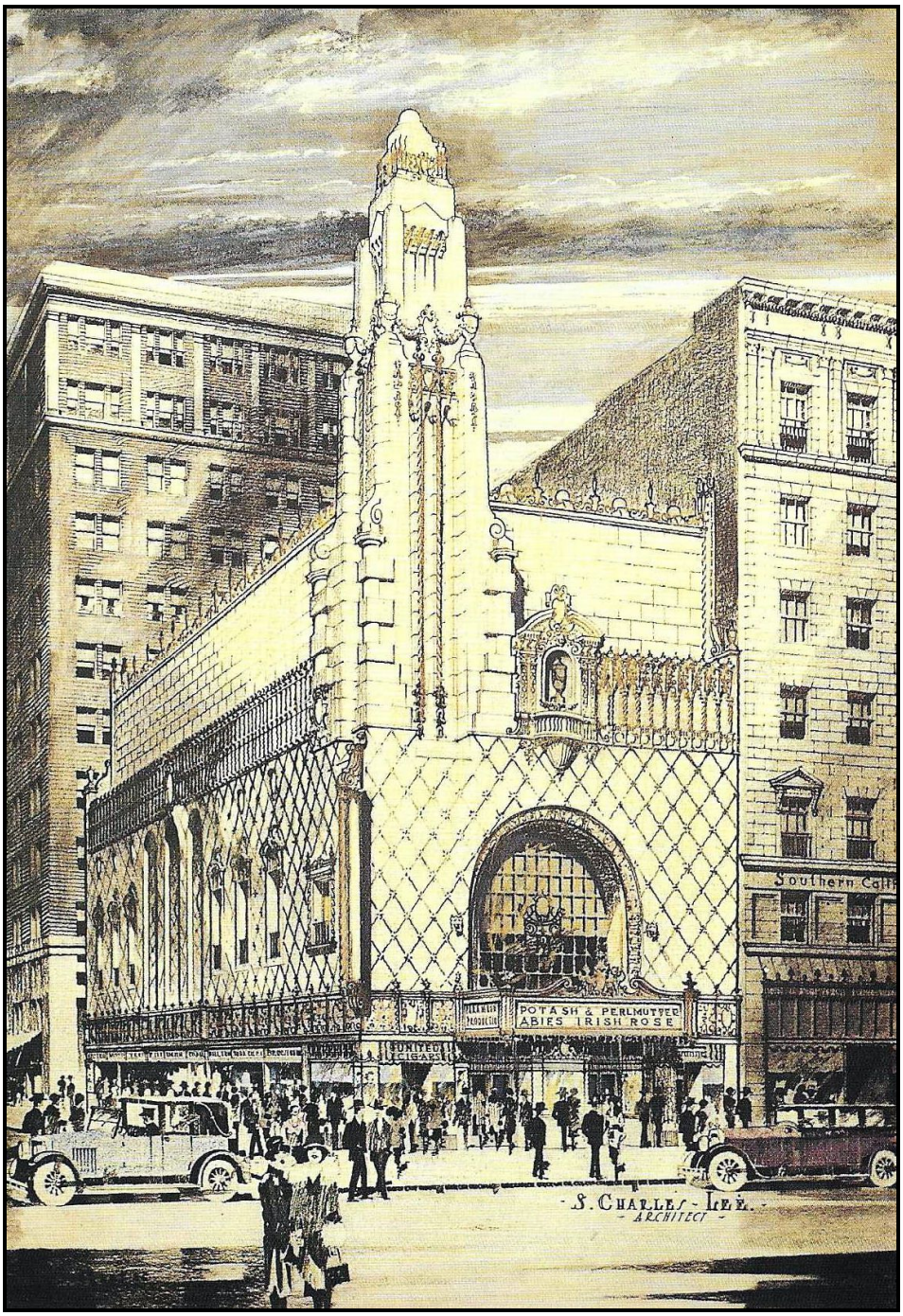
Date Built: 1926
Seating Capacity: 2752
Owner: Publix-Paramount
Architect: Boller Brothers
Consulting Engineer: R E Hall
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller
Status: Demolished

Air Conditioning American Movie Theatres 1917-1932

Tower Theatre

LOS ANGELES, CALIFORNIA

Date Built: 1927
Seating Capacity: 906
Owner: H L Gumbier
Architect: S Charles Lee
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller



Tower Theatre

Ads for the Tower Theatre in 1927 read: Leave Your Fan at Home!

Manufactured Weather makes every day a good day at the Tower Theatre. When you enter you will realise that H L Gumbiner has fulfilled one more great obligation to his public. He has included in this theatre the marvel of manufactured Weather. This is a Carrier Conditioned Theatre providing to the patrons a copious supply of air that is washed and purified, air that is warmed and humidified for ideal comfort in winter, air that is cooled and dehumidified for invigorating comfort in summer, air that is diffused throughout the theatre without the slightest draught.

Eager to promote his investment, Gumbiner had a window installed on the landing between the first floor and the restrooms from which patrons could view the weather machinery.

If your Theatre were among

Carrier Conditioned Theatres

During these Winter Days the air within the house would be just warm enough and *healthfully* humidified and cleansed. There would be no overheating. The Missouri Theatre at St. Louis, a Carrier Conditioned Theatre, operated during the Winter of 1925 on ⅓ of the fuel previously required. The Carrier system of Air Conditioning completely replaces the sluggish radiators which ordinarily line the walls of the theatre. The air is conditioned before entering the theatre. Automatic instruments adjust the temperature and humidity to suit the size of the crowd.

Then Next Summer the same system, combined with Carrier Centrifugal Refrigeration, cools and dehumidifies the air supplied to the theatre. The fact is, the same ideally comfortable conditions of temperature are maintained within the theatre every day in the year regardless of season, crowd or weather. **Do you wonder that we say—**

Manufactured Weather
makes
"Every day a *good* day"

Now is the time for us to prepare your theatre for next Summer. Write for the book, "Theatre Cooling and Conditioning." Describe your theatres. Ask for a visit from one of our Engineers.

Carrier Engineering Corporation

Offices and Laboratories
NEWARK, NEW JERSEY

NEW YORK PHILADELPHIA BOSTON CHICAGO CLEVELAND KANSAS CITY LOS ANGELES

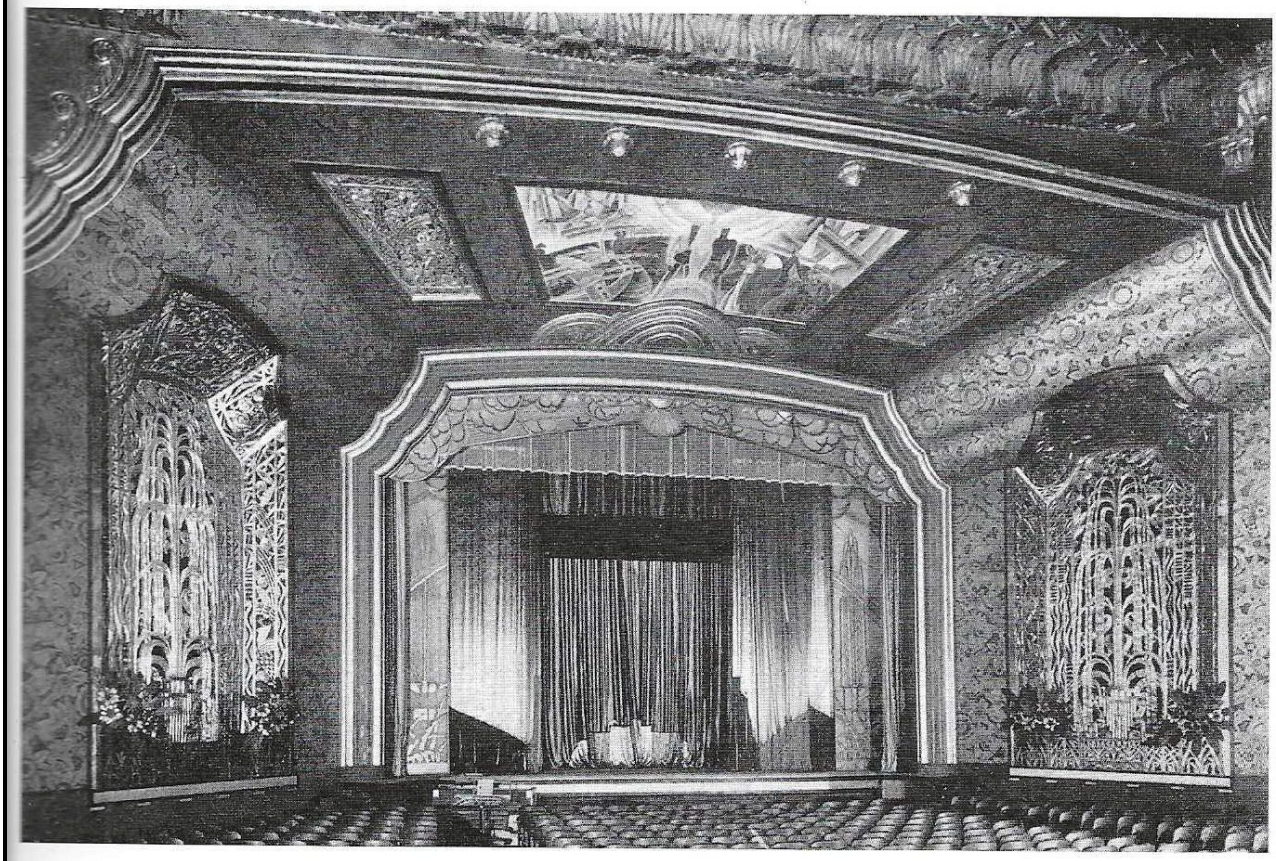
Air Conditioning American Movie Theatres 1917-1932

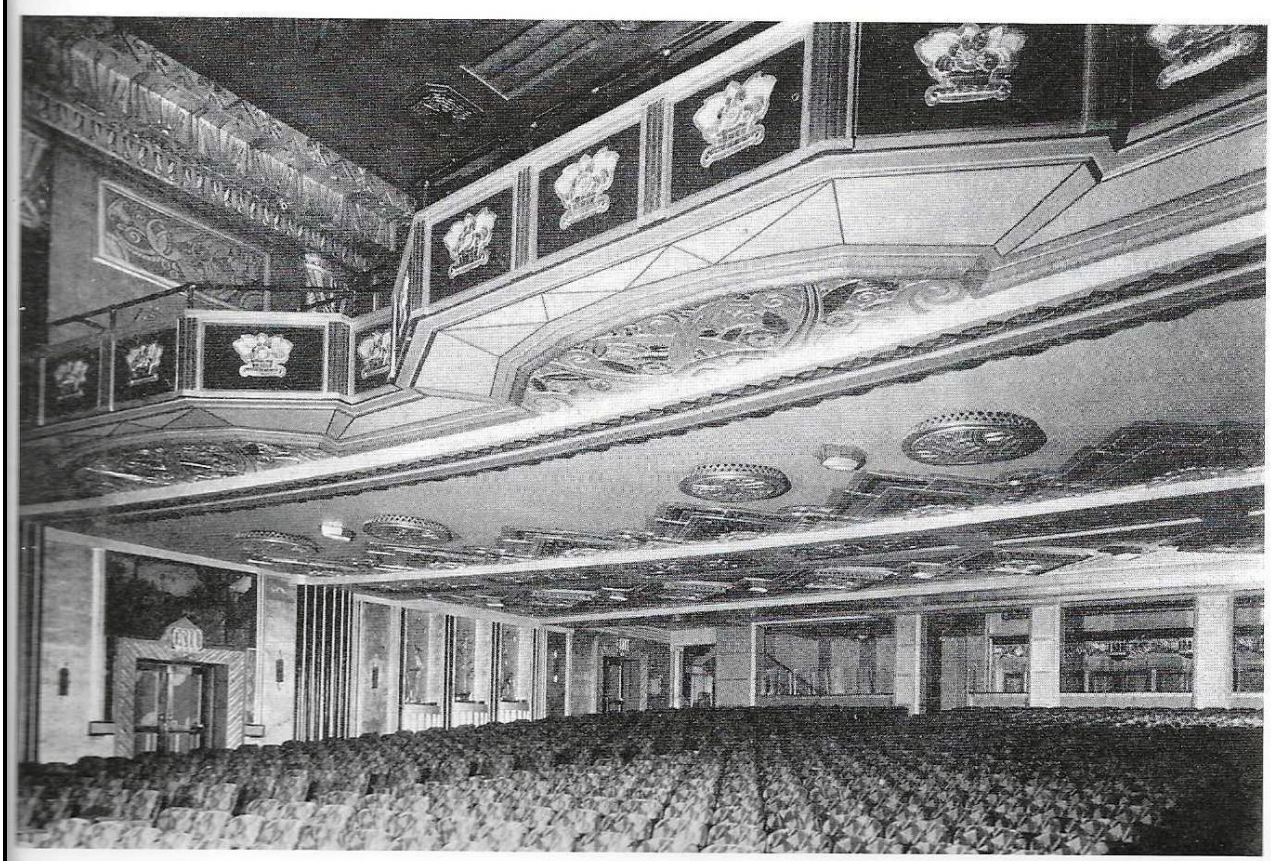
Uptown Theatre

PHILADELPHIA, PENNSYLVANIA

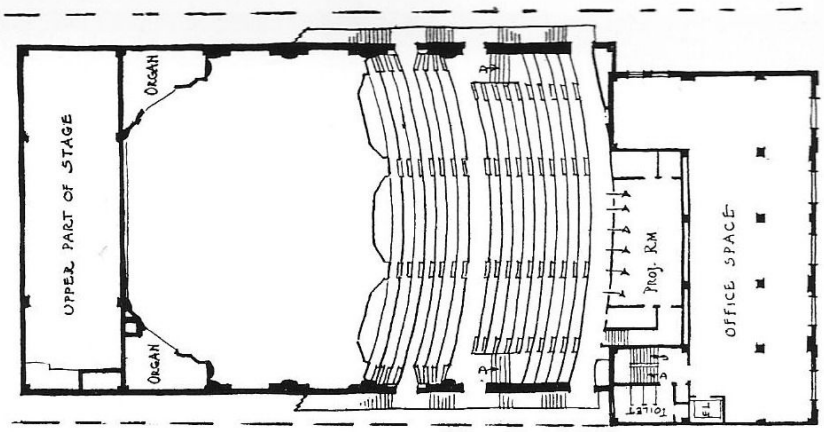
Architects sketch 1928

Date Built: 1929
Seating Capacity: 2146
Owner: Stanley/Warner
Architect: Magaziner, Eberhard & Harris
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller



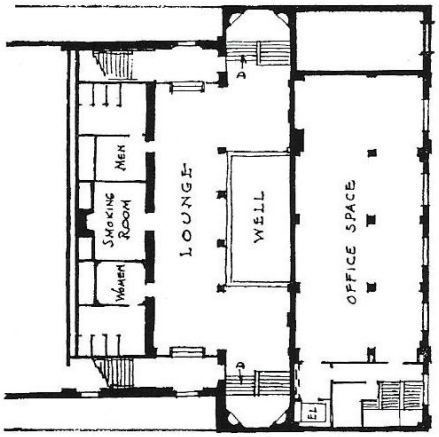


Uptown Theatre, Philadelphia, Pennsylvania
Magaziner, Eberhard and Harris, architects
Two detail views of auditorium

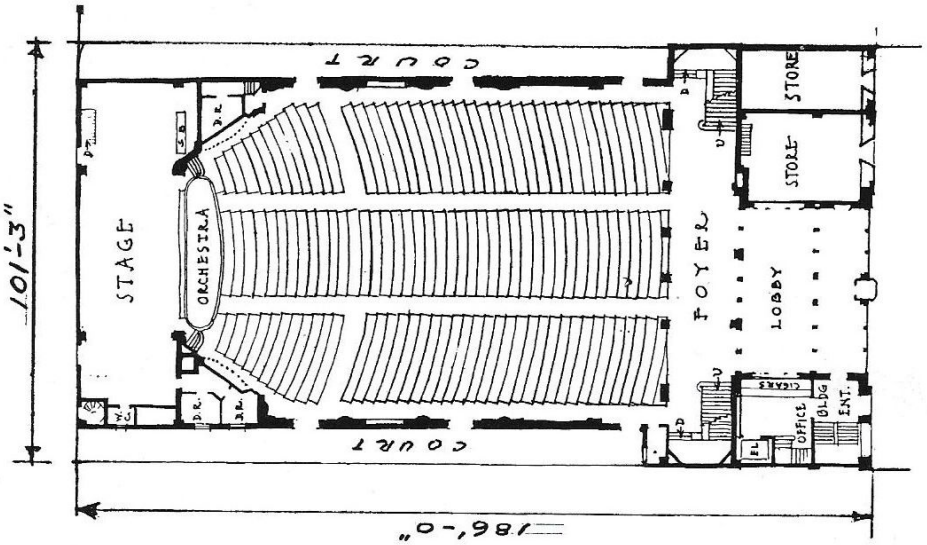


PLAN OF BALCONY

THE BALCONY SEATS 628 AND THE ORCHESTRA 1494, MAKING THE TOTAL SEATING CAPACITY OF THE THEATRE 2122.



PLAN OF MEZZANINE



PLAN OF ORCHESTRA

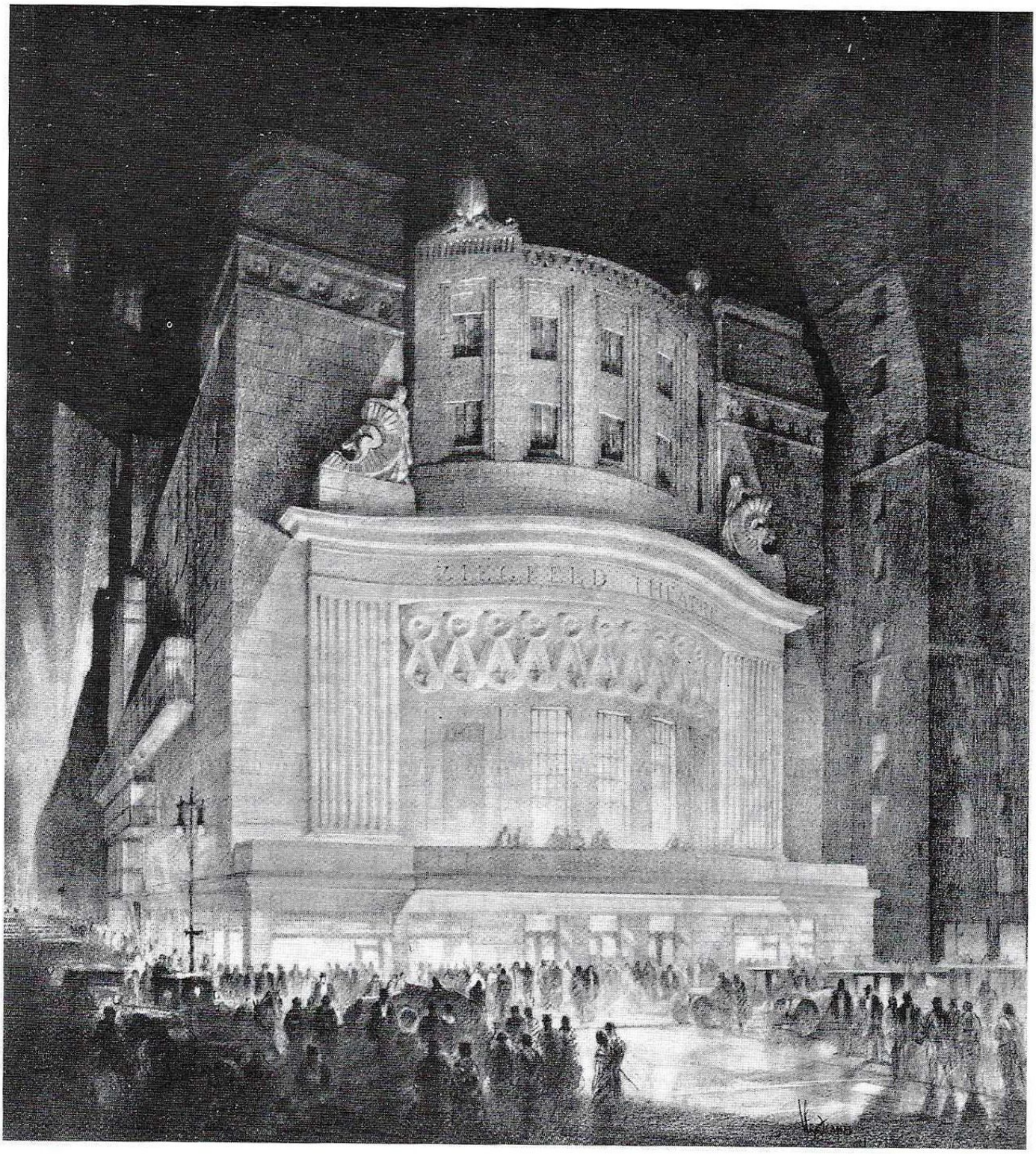
Uptown Theatre, Philadelphia, Pennsylvania
Magaziner, Eberhard and Harris, architects
The size of the lot is 186 feet by 101 feet 3 inches

Air Conditioning American Movie Theatres 1917-1932

Ziegfeld Theatre

NEW YORK

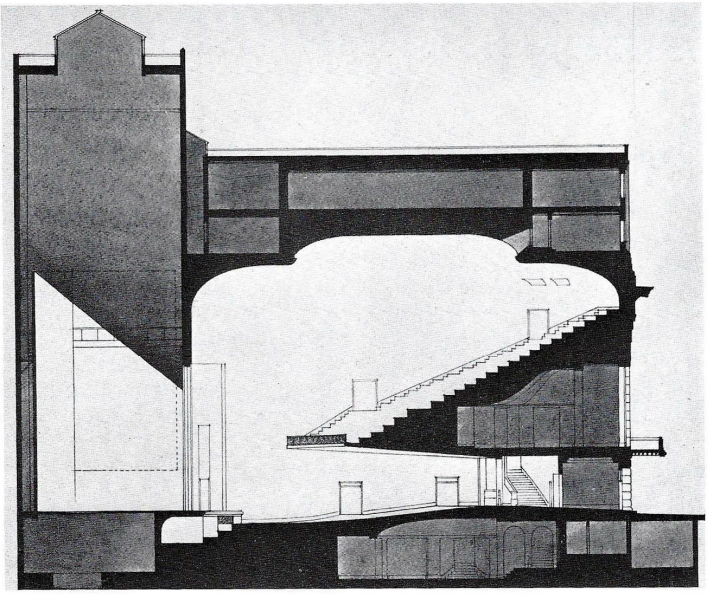
Date Built: 1927
Seating Capacity: 1664
Owner: Financed by William Randolph Hearst
Architect: Joseph Urban & Thomas W Lamb
Air Conditioning: Carrier Engineering Corporation
Refrigeration: Carrier centrifugal chiller



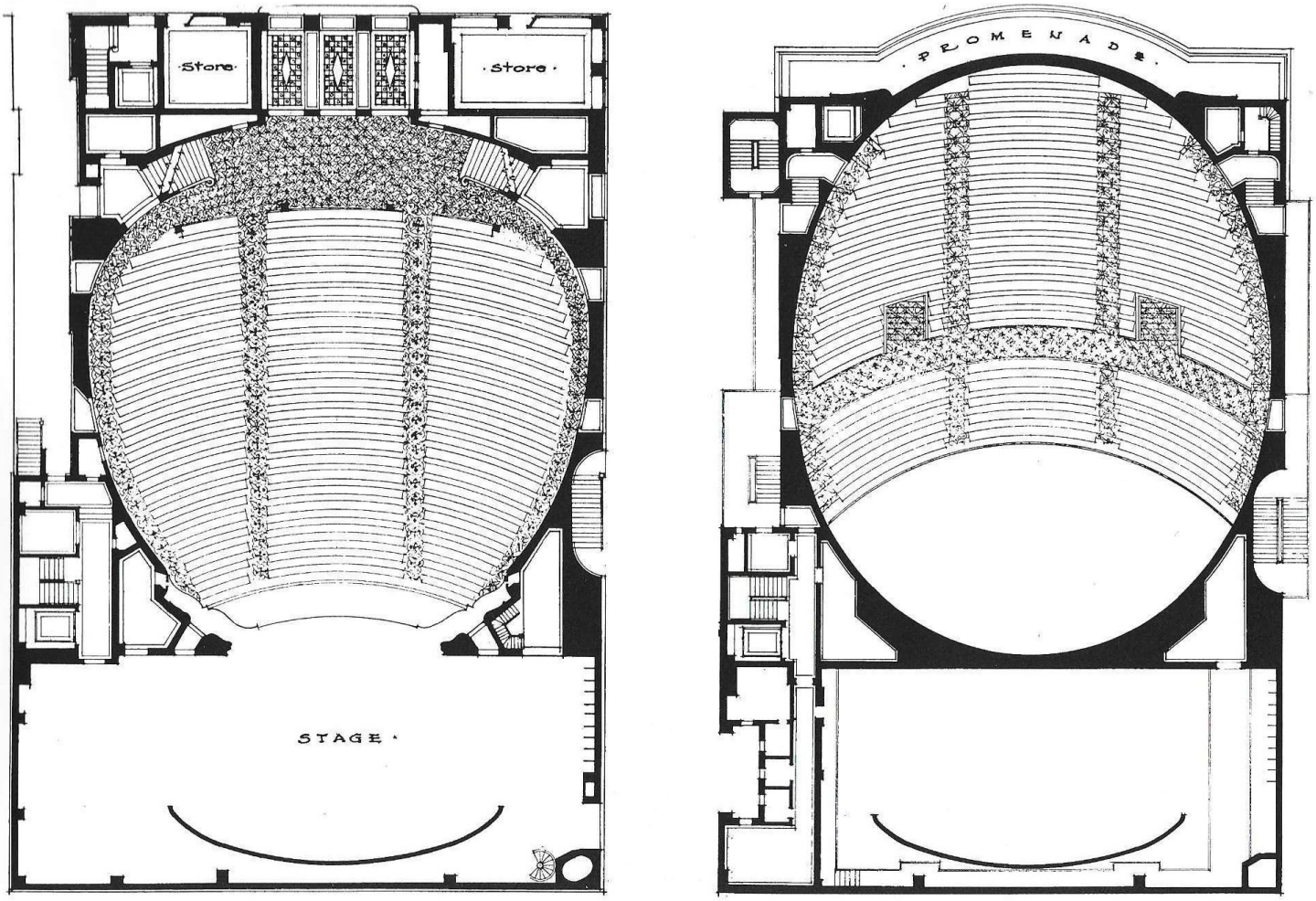
ZIEGFELD THEATRE, NEW YORK, N. Y.

JOSEPH URBAN AND THOMAS W. LAMB, ASSOCIATED ARCHITECTS.

American Theatres of Today (reprint of Volume I, 1927)



LONGITUDINAL SECTION
ZIEGFELD THEATRE, NEW YORK, N. Y.
JOSEPH URBAN AND THOMAS W. LAMB, ASSOCIATED ARCHITECTS.



PLAN OF ORCHESTRA

ZIEGFELD THEATRE, NEW YORK, N. Y.
JOSEPH URBAN AND THOMAS W. LAMB, ASSOCIATED ARCHITECTS.

PLAN OF BALCONY

American Theatres of Today (reprint of Volume I, 1927)

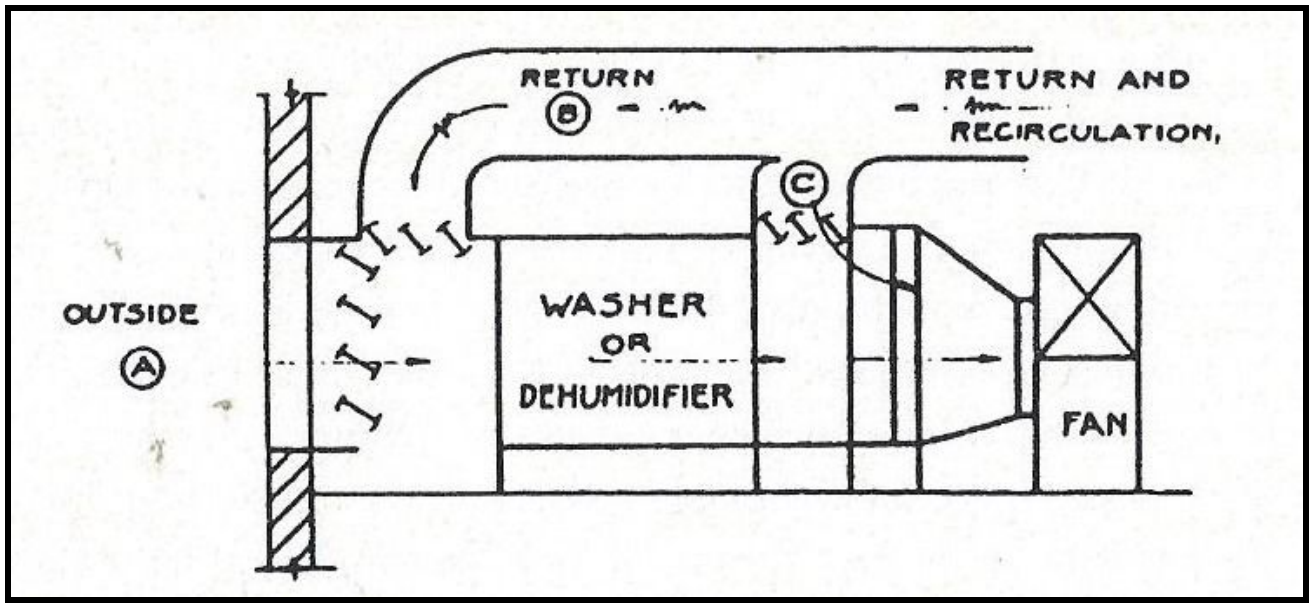
THE CARRIER RETURN AIR BYPASS SYSTEM

There were three possible solutions to the high relative humidity and cold supply air problem resulting from Wittenmeier's pioneering designs in Chicago for the first air conditioned theatres. He had made some improvement by limiting the design dry bulb temperature between inside and outside to 10 degF.

The first option was to reheat the chilled air leaving the direct-expansion coil. Carrier had considerable experience of this method from their design of industrial systems with humidity control requirements. However, the additional capital and running costs made it expensive.

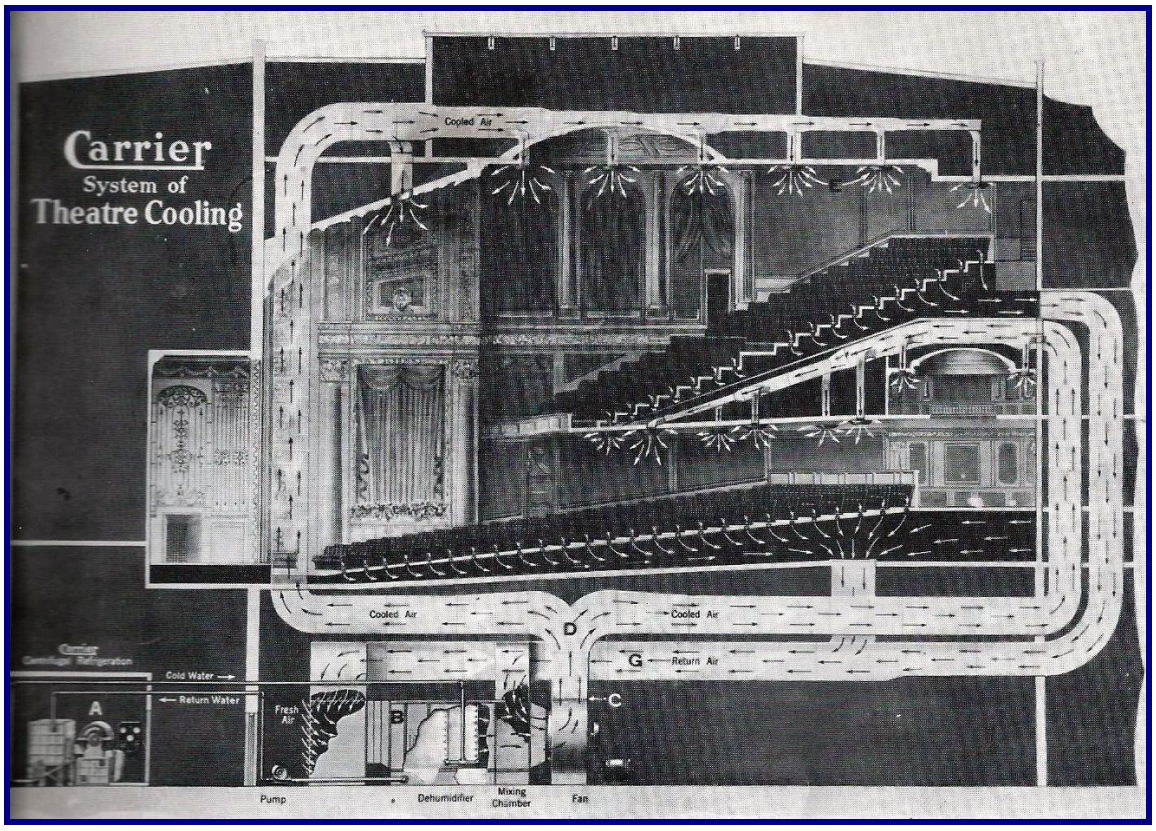
The second option was to reduce the air circulation to about 10 to 15 cfm (cubic feet per minute) per person allowing the audience body heat to raise the temperature and lower the humidity (a possibility with a full audience). However, it was a requirement of the Chicago Health Department that 25 cfm of outside fresh air had to be provided.

A third option was provide 25 cfm per person but mix 50% fresh air with 50% recirculated air which violated regulations but was, in fact, used by Wittenmeier at the Riviera Theatre (and possibly others). Carrier rejected this solution as unacceptable as the desired humidity was not guaranteed. Their proposal was therefore to use a *return air bypass system** (see following diagram) but Wittenmeier continued to provide the air conditioning for Balaban & Katz theatres until his death in 1928.

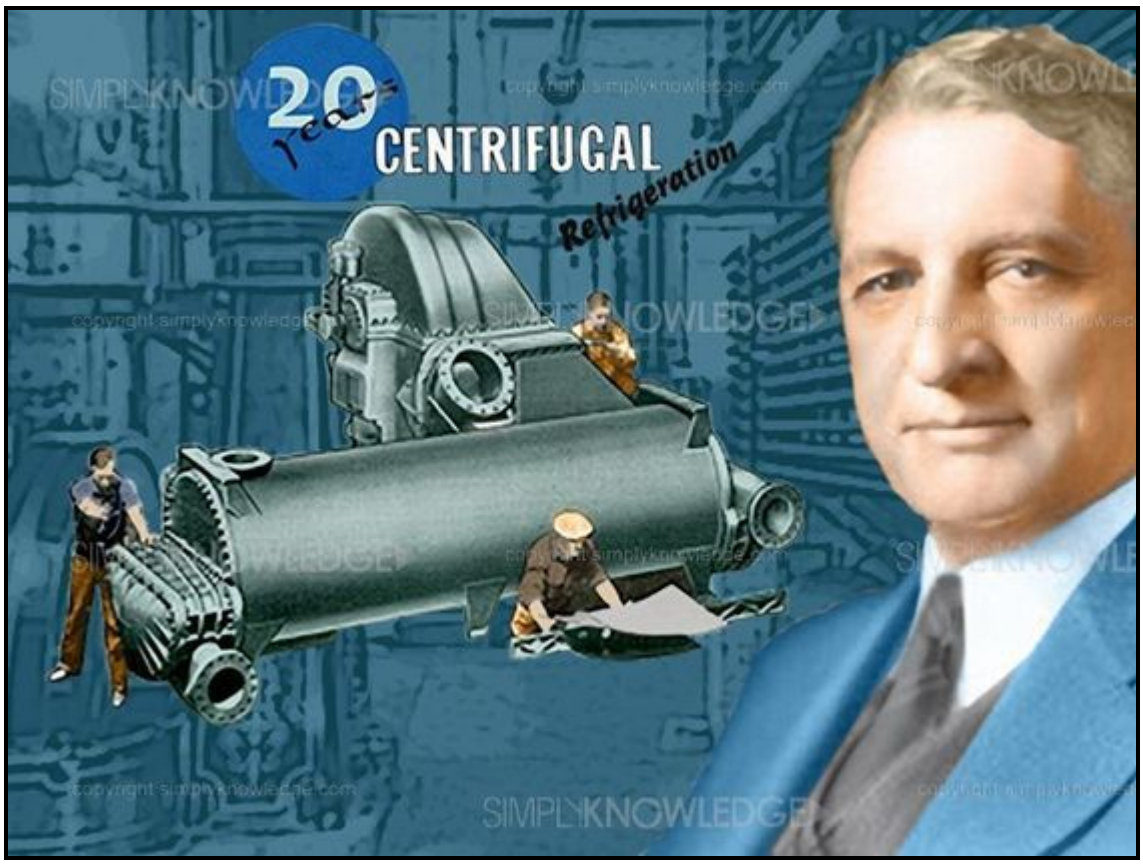


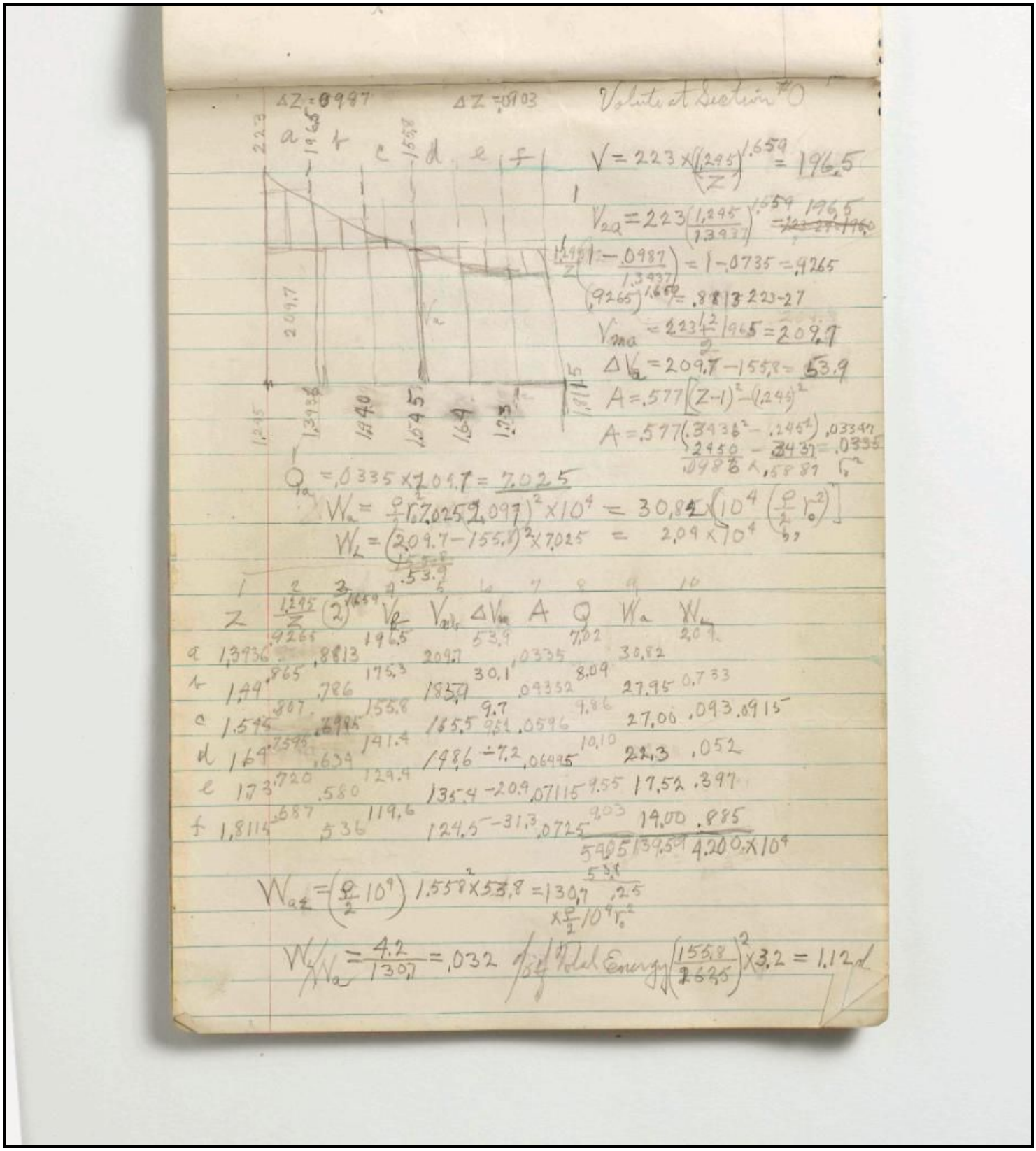
The Return Air Bypass System

*Carrier's first bypass system was not installed until 1921 in the Los Angeles Metropolitan Theatre. In December 1924, Logan Lewis of Carrier made a patent application for the return air bypass system (and upside-down air distribution, i.e. ceiling supply with floor return), but the pioneering air conditioning engineer Walter Fleisher held a patent for a similar design. So he and Carrier joined forces and in 1927 formed the Auditorium Conditioning Corporation which by 1946 had licensed an estimated 90 percent of the comfort air conditioning installations in the USA.



The Carrier diagram of the Metropolitan installation shows the new Carrier *Upside Down* (Overhead Supply) method of air distribution which was to supplant the underfloor "Upward Supply Air" method then in common use by Wittenmeier. The Carrier diagram has replaced the actual Carbondale refrigeration machine with a picture of their own centrifugal water chiller (bottom left of picture).





Wills H Carrier's Notebook

THE UNITED STATES OF AMERICA

PASSPORT

DEPARTMENT OF STATE

To all to whom these presents shall come, Greeting:

I, the undersigned, Secretary of State of the United States of America, hereby request all whom it may concern to permit

Willis H Carrier

a citizen of the United States, safely and freely to pass and in case of need to give him all lawful Aid and Protection.

This passport is valid for use only in the following countries and for objects specified, unless amended.

All Countries
NAME OF COUNTRY
including Sweden and Denmark

Personal Business and Travel
OBJECT OF VISIT

The bearer is accompanied by

Given under my hand and the seal of the Department of State, at the City of Washington, the 11th day of April in the year 1923 and of the Independence of the United States the one hundred and forty seventh.

Charles E. Hughes

PERSONAL DESCRIPTION

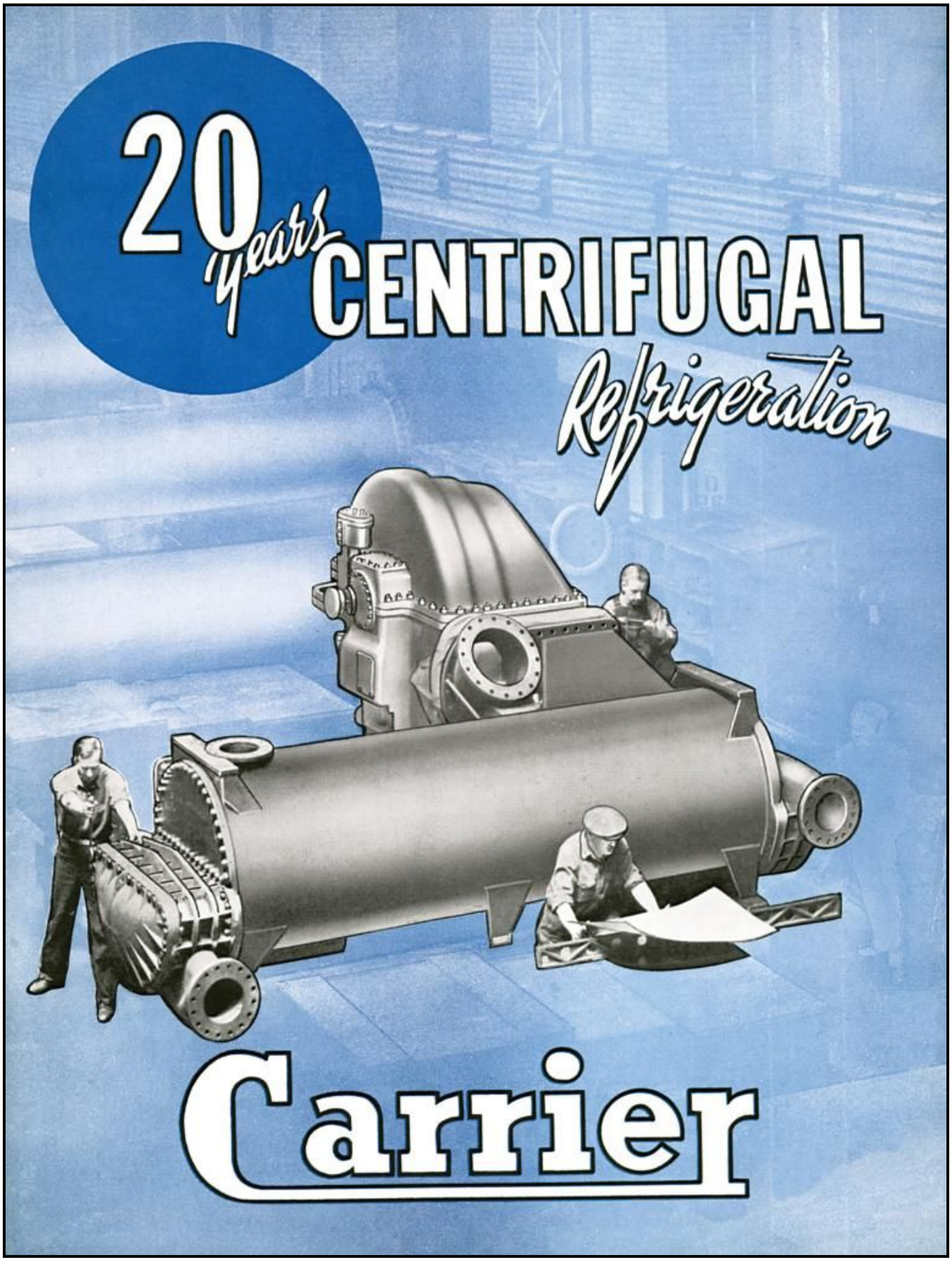
Age	46 years	Mouth	medium
Height	5 ft 9 in	Chin	round
Forehead	broad	Hair	grey
Eyes	brown	Complexion	dark
Nose	large	Face	oval
Distinguishing marks			

Place of birth Angola N Y
Date of birth Nov 26 1876.
Occupation Mechanical Engineer

SIGNATURE OF BEARER

No. 266937

Willis H Carrier's 1922 Passport at age 46



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