HOLLYWOOD & LOS ANGELES THEATRES 1917-31

Part One: HVAC & R

1917-1926

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HOLLYWOOD & LOS ANGELES THEATRES 1917-31

Part One: HVAC & R

1917-1926

The colour illustrations and photographs featured on opening & closing pages are of Grauman's Egyptian Theatre

CIBSE HERITAGE GROUP


GRAUMANS
EGYPTIAN
Los Angeles
23RD ANNUAL
RECENT SPANISH CINEMA 2017
"CAN YOU SEE WHAT I SEE?"

)

HOLLYWOOD & LOS ANGELES THEATRES

Part One

1917 Quinn's Rialto Theatre

1918 Million Dollar Theatre

1921 Loew's State Theatre

1922 Grauman's Egyptian Theatre

1923 Metropolitan Theatre

1926 El Capitan Theatre

1926 Orpheum Theatre

Part Two

1927 Grauman's Chinese Theatre

1927 United Artists Theatre

1931 Tower Theatre

1928 Warner Theatre

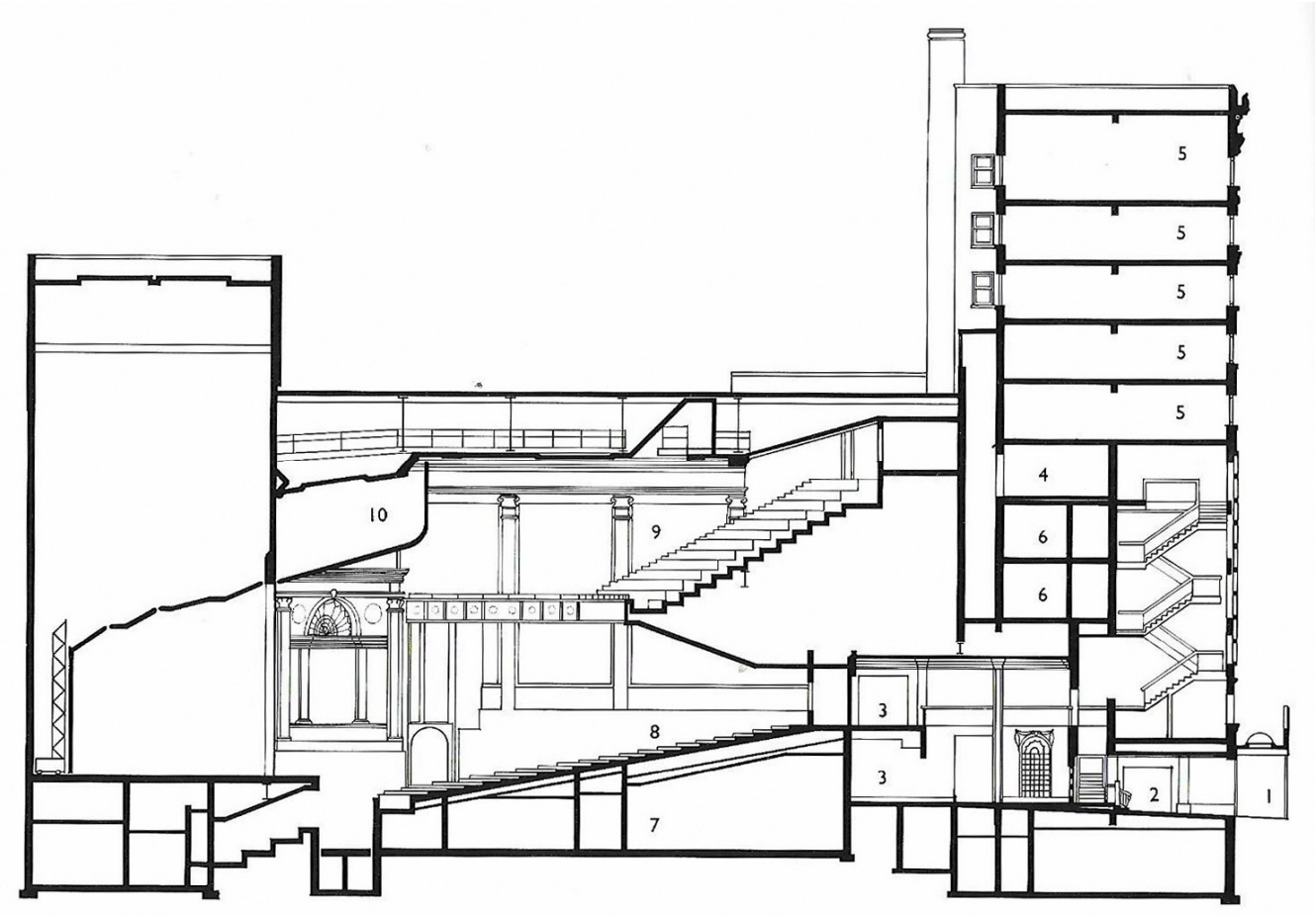
1930 Pantages Theatre

1931 Los Angeles Theatre

Note that theatres often changed use, names and seating numbers

THEATRE ARCHITECTURE

Architectural elements of a movie palace. Legend: 1, marquee; 2, outer lobby; 3, inner lobbies; 4, mechanical systems (heating, ventilating, and lighting equipment and panels); 5, mixed use (rental offices, apartments, commercial space); 6, theater administrative offices; 7, artists warm-up, costume and scene shops; 8, orchestra seating; 9, balcony seating; 10, sound reflector; 11, orchestra pit; 12, stage; 13, rigging and fly loft; 14, proscenium arch.



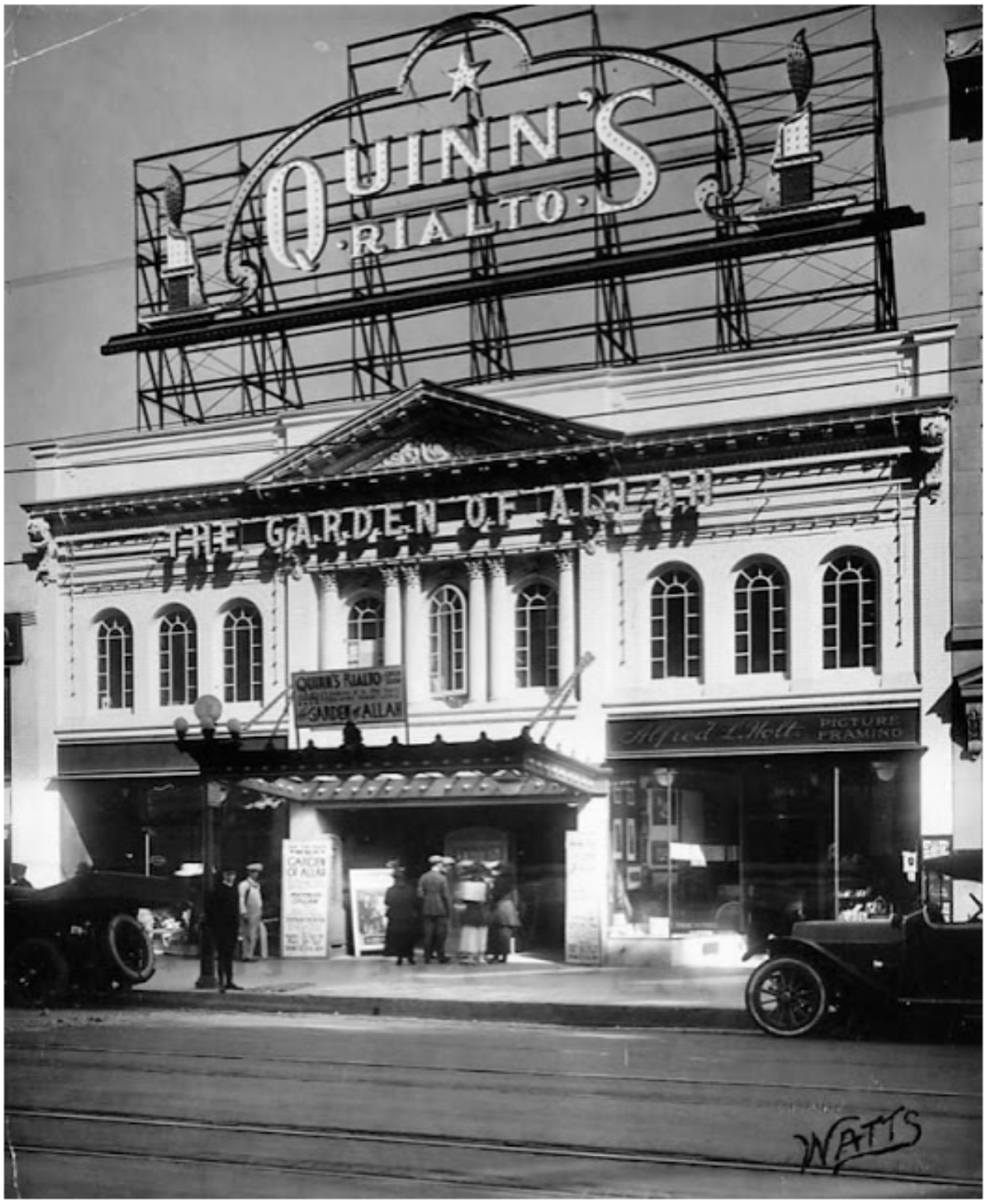
(Movie Palaces)

SURVEYING ENGINEERING SERVICES

Every aspect of theater design and operation is supported by an elaborate technological system. In older theaters, technology is particularly vulnerable to age. Heating, ventilating, and air-conditioning systems are usually antiquated. Behind every light bulb in the theater (expect to encounter thousands, if not tens of thousands), a 50-year-old wire may be hiding. Stage lighting is often inadequate, if usable. The stage is a veritable science of rigging with its pinrails, ropes, lines, and catwalks. The rigging, vulnerable to age, is usually inadequate for modern productions. Most theaters adapted for multiple-purpose performing arts activities will also require acoustical amplification and sound systems.

The restoration or replacement of technology—the heart of the secrets of theater—is a high-cost category with a long list of line items on any restoration budget. Technical diagnosis, therefore, must be particularly attentive to detail. In assessing a theater's mechanical systems, for instance, determine the condition of ductwork, intake and supply vents, and the boiler. In reviewing auditorium and circulation electrical systems, determine the number and type of fixtures, and location of controls, wiring, and emergency circuits. In reviewing stage electrical systems, determine the condition of the control board, work lighting, stage electrical loft, balcony rail lighting, spotlight booth and orchestra pit fixtures, and auditorium ante-proscenium sidewall lighting capacity. In assessing the condition of stage rigging, inspect the gridiron, loading bridges, head block and beam, fly gallery, pipe battens, and pinrails. By necessity, this is a cursory suggestion list. A theater consultant can prove invaluable in helping you and your architect determine theater condition.

QUINNS RIALTO THEATRE

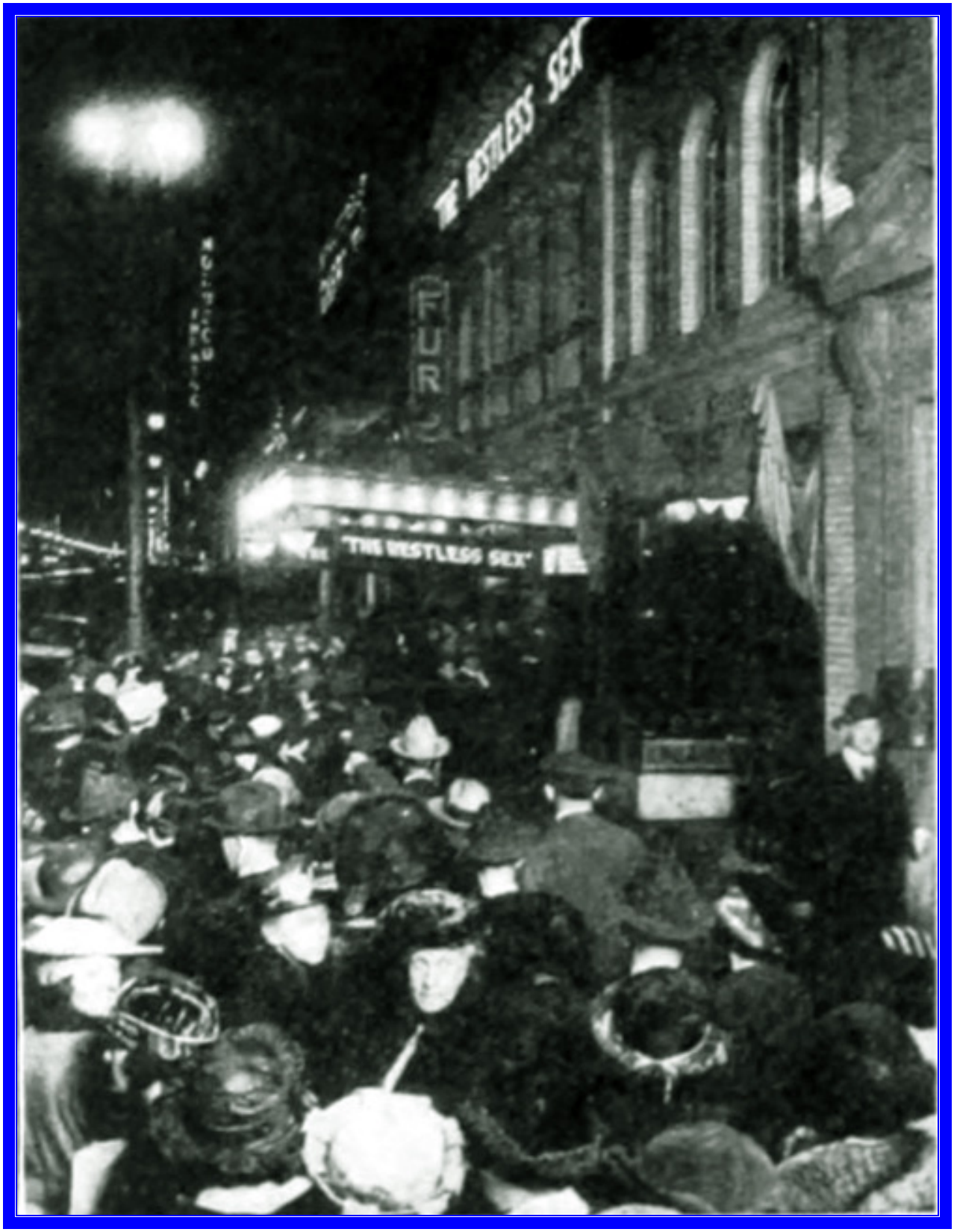


QUINNS RIALTO THEATRE

Opened 1917 Seats 1000
Architect: Oliver P Dennis
Remodelled 1919 by William Lee Woollett
Became Grauman's Rialto

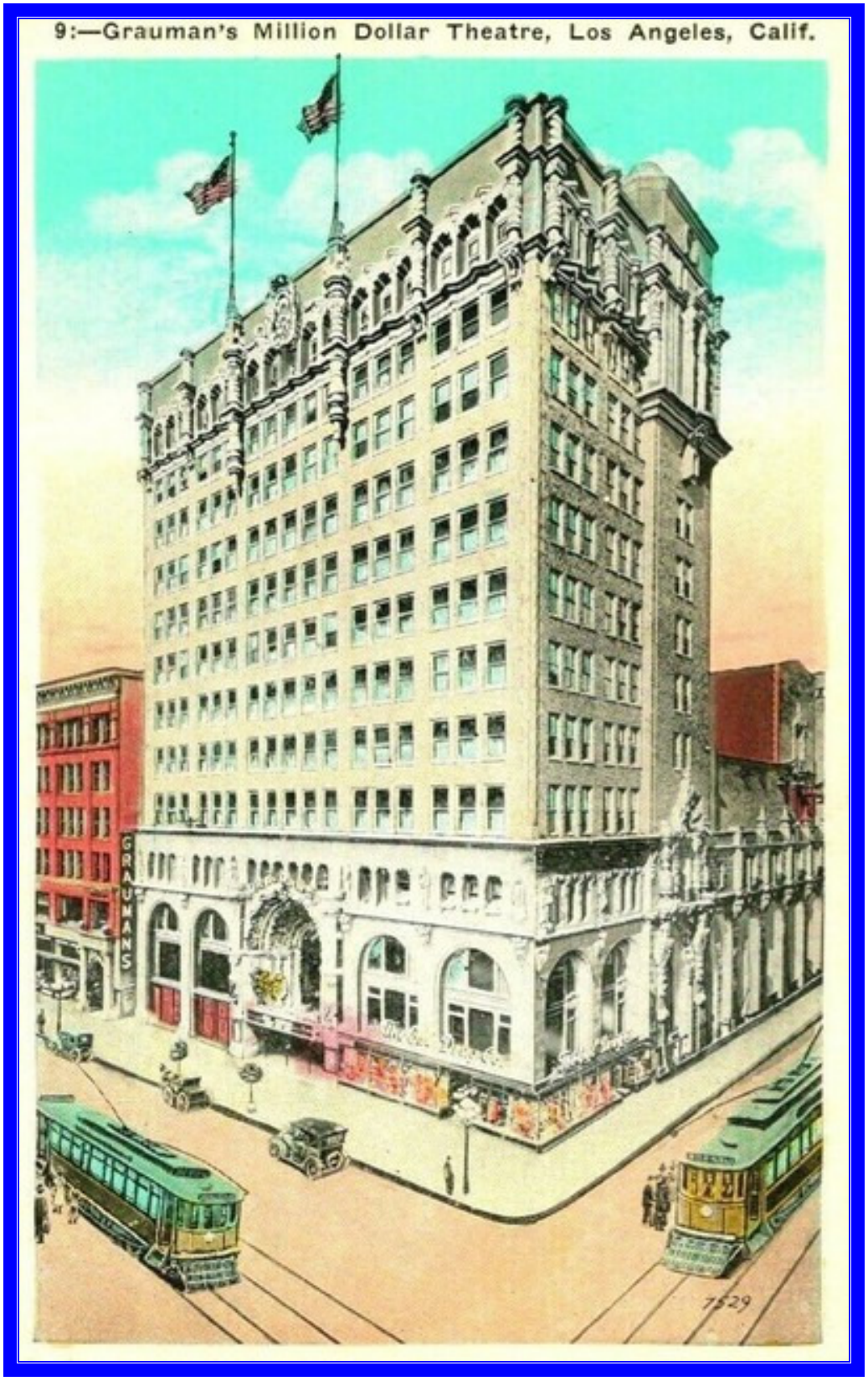
Evaporative cooling system
Mechanical ventilation with air washer.
No refrigeration.

QUINNS RIALTO THEATRE



QUINNS RIALTO THEATRE

MILLION DOLLAR THEATRE



MILLION DOLLAR THEATRE

Opened 1918 **Seats** 2345
Architect: William Lee Woollett

Evaporative cooling system
Mechanical ventilation with air washer.
No refrigeration.

MILLION DOLLAR THEATRE

Million Dollar Theatre 1923 (Theatres in Los Angeles)

LOEW'S STATE THEATRE

LOEW'S STATE THEATRE

(Theatres in Los Angeles)

Opened 1921 Seats 2450
Architect: Weekes & Day

Air Conditioned by Wittenmeier-Vitolyzed-Air Washer system with CO_2 refrigeration

LOEW'S STATE THEATRE

GRAUMAN'S EGYPTIAN THEATRE

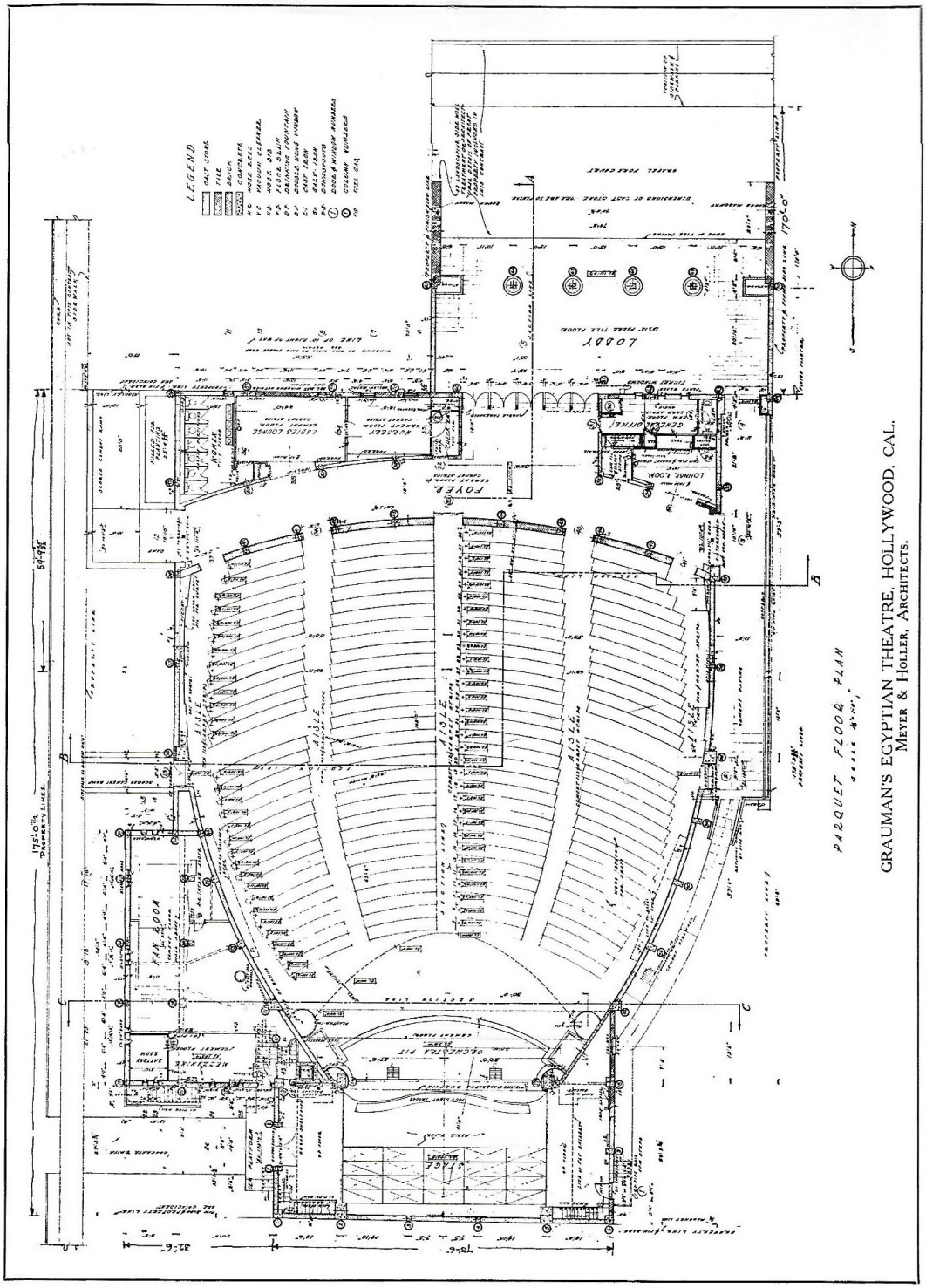
GRAUMAN'S EGYPTIAN THEATRE

Opened 1922 **Seats** 1771
Architect: Meyer & Holler

Evaporative cooling system
Mechanical ventilation with air washer.
No refrigeration.

GRAUMAN'S EGYPTIAN THEATRE

GRAUMAN'S EGYPTIAN THEATRE



(American Theatres of Today)

Fan room located left of stage in this view

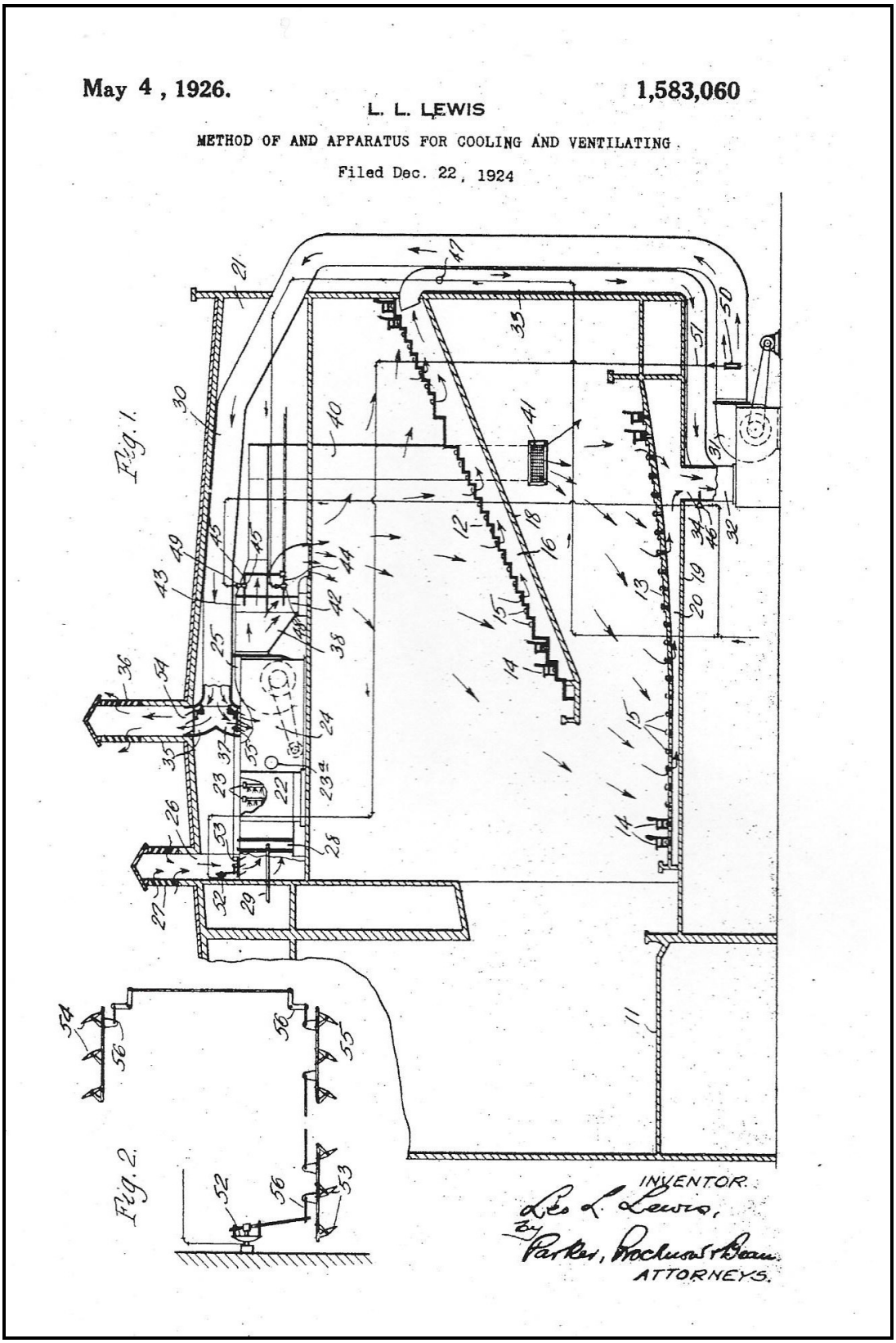
METROPOLITAN THEATRE

Opened 1923 Seats 3485
Architect: William Lee Woollett

Demolished 1961

Air Conditioned by Carrier Engineering Corporation
First theatre installation to use Logan Lewis' downward air distribution (initially called the "Upside Down" system) with return air bypass at the main plant

METROPOLITAN THEATRE



Patent drawing of the Logan Lewis scheme of “upside down” ventilation for a theatre auditorium, i.e. overhead ceiling supply with under-seat low level extract

METROPOLITAN THEATRE

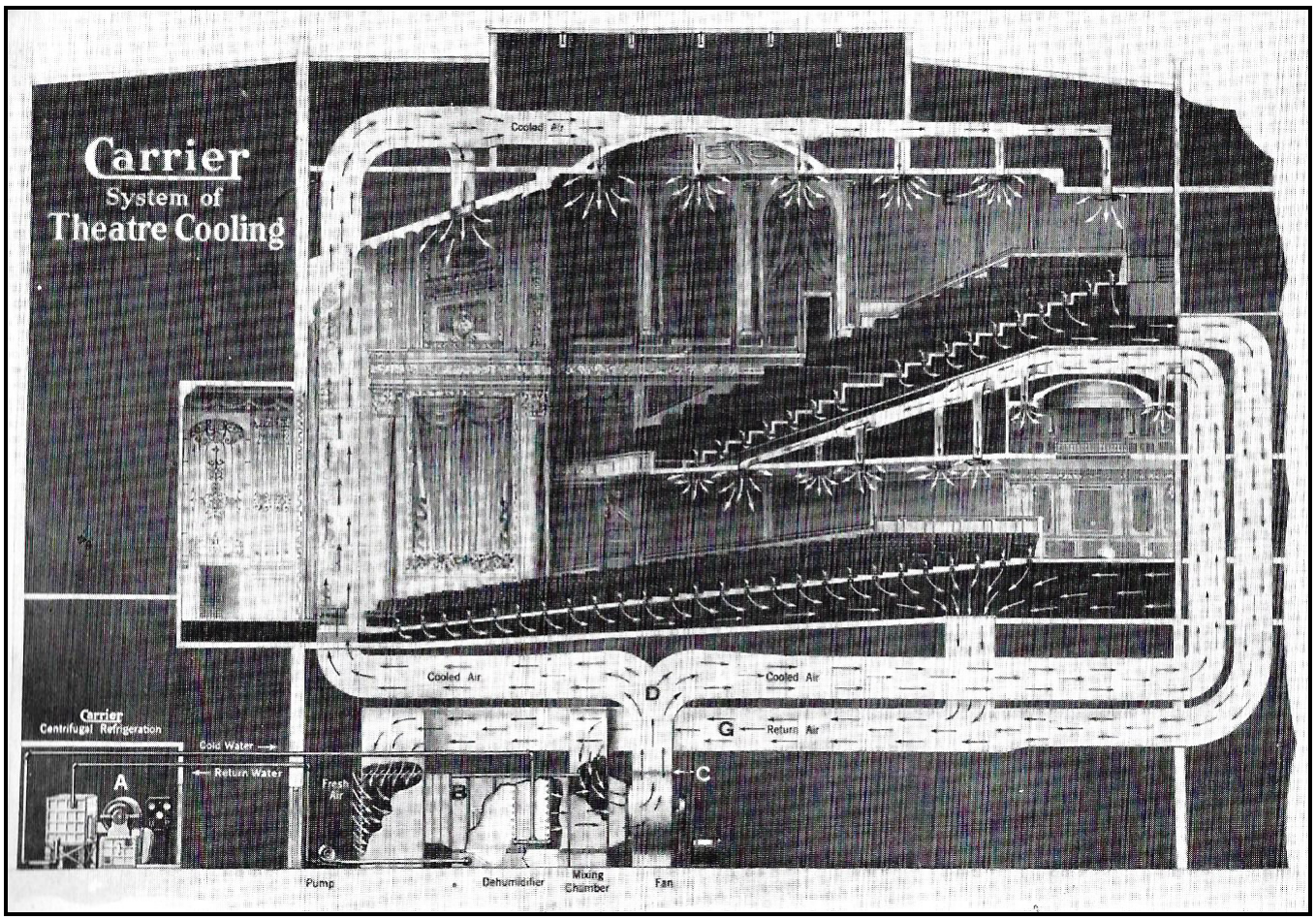
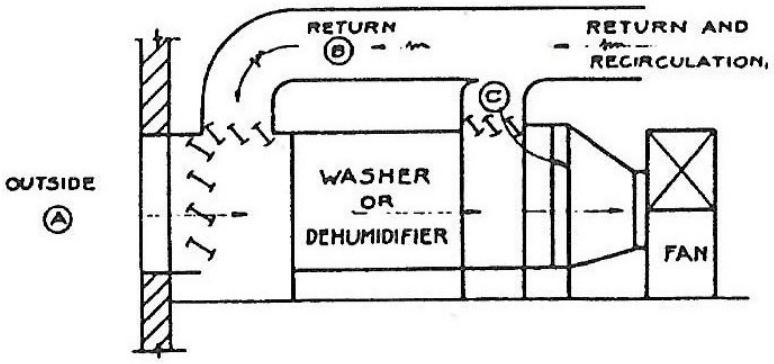


Diagram from *The Romance of Air Conditioning*, Logan Lewis, Carrier Corporation, c.1960s
A picture of a Carrier centrifugal chiller (bottom left corner) has been substituted for the actual refrigeration machine used, believed to be a carbon dioxide type by the Carbondale Machine Company

Despite this early recognition of its potential, CEC's first bypass system was not installed until 1921, in Sid Grauman's Metropolitan Theatre in Los Angeles. L. L. Lewis sketched out his ideas for the system in a company memo of 9

Text extract from *Air Conditioning America*, Gail Cooper, John Hopkins UP, 1960

METROPOLITAN THEATRE



Bypass. As depicted here, in bypass circulation, air is returned from the air-conditioned room and bypassed around the air washer at C. *This warmer, recirculated air raises the temperature of the treated air to bring it up to a proper level of humidity and comfort before it is reintroduced into the room. Bypass circulation proved to be the most economical way to achieve humidity control in comfort air conditioning, and consequently the patent holders captured an estimated 90 percent of the comfort air-conditioning market.* (*Refrigeration Engineering* 15 [May 1928]: 122)

September 1921 to E. P. Heckel, who went to Los Angeles to estimate the job.[79] Then, on 22 December 1924, Lewis filed a patent application on his ideas.[80] Essentially, the system supplied the full 30 cfm per person mandated by law, yet only 25 percent of that air was outside air that had been washed and cooled, while 75 percent was air recirculated from the theater auditorium that bypassed the air washer. The reduction in the volume of air sent through the air washer meant that the refrigeration machinery, an expensive part of the installation, could be greatly reduced in size.

The Metropolitan Theatre epitomized the combination of innovative mechanical systems and extravagant architecture. It was Grauman's third large Los Angeles theater, built after the Chinese Theatre and the Million Dollar Theatre (1919). Designed by architect William Lee Woollett, it has been described as an "exotic jumble of Middle Eastern ornament and geometric patterning."[81] Three years in the planning, it was part of Grauman's ambitious plans for a theater–office tower complex on Pershing Square that were never entirely realized, despite the formation of a partnership with Paramount Publix to give him greater financial resources.[82] Nevertheless, the house that opened in January 1923 was spectacular for its size (3,500 seats), its lavish decoration, and not least, its air-conditioning system.

The Metropolitan was expensive, reputedly costing $3 million, and one

Text extract from *Air Conditioning America*, Gail Cooper, John Hopkins UP, 1960

METROPOLITAN THEATRE

newspaper reported that the air-conditioning system accounted for $115,000 of that total.[83] Construction costs were only part of the expense of air-conditioning the theater. Operating costs for the installation ran $500 per month during the winter and rose to $2,200 in the summer, even with bypass recirculation.[84] To some such an expenditure was an essential part of a new theater, for as one engineer noted, "builders of new theatres would no more leave out cooling than they would neglect heating, for the public demands it and experience has demonstrated that it pays."[85] But for Grauman in 1920, when planning for the theater began, including air conditioning was an innovative step. In 1923 he told a Los Angeles publicist, "The public doesn't *demand* anything . . . It is only after a thing is created that the public demands it. If it were possible to consult the public and discover what it wants, the showman's job would be easy."[86] Indeed, Grauman's Million Dollar, Egyptian, and Rialto theaters were all equipped with evaporative cooling systems without refrigeration.[87] The operating engineers at the Million Dollar Theatre created extra cooling during hot weather by carrying cakes of ice on their backs to deposit in the water tank of the air washer. Despite the high costs of purchase and operation, Lewis calculated that in any theater an increase of slightly less than 2 percent in attendance would pay the cost of an installation.[88]

If CEC struggled to make air conditioning affordable, the company also attempted to make it comfortable. By controlling the relative humidity, the company believed it would be possible to allow the temperature to rise and still achieve comfortable conditions. Indeed, CEC let temperatures rise as high as 78–80 degrees in its installations but kept the relative humidity between 45 percent and 55 percent. This combination appears to reflect Carrier's industrial experience with the "sweat point." The firm claimed that under such conditions "a person will not feel a shock entering from the outside and yet the perspiration will be gradually removed from the body and from the clothing."[89]

To achieve greater comfort, Lewis also designed a new distribution system for the Metropolitan Theatre that was specially adapted to air conditioning. Many theaters traditionally used an "upward" method of air distribution that proved poorly suited to the new technology. In such a system, air was introduced into the auditorium through "mushroom" ventilators (so named because of their shape) located underneath the seats. Theoretically, the air rose to the breathing zone where it was gradually warmed by body heat. This vitiated air rose upward and was exhausted through ducts in the ceiling by an exhaust fan. It was then replaced by fresh air rising from the mushroom ventilators. "The upward method," one fan manufacturer wrote enthusiastically, "is to be

Text extract from *Air Conditioning America*, Gail Cooper, John Hopkins UP, 1960

METROPOLITAN THEATRE

desired wherever the architectural design makes it permissible . . . the air flows upward in accordance with the natural air currents induced by the heat of the body and the breath."[90] As late as 1922 CEC installed just such a system in the $2 million Granada Theatre in San Francisco.[91]

For the introduction of cold air, however, this method proved disastrous, for the cold air never rose into the breathing zone, but settled on the floor. Air-conditioning engineers noted with dismay that moviegoers carried newspapers into the theater to wrap around their feet during the show.[92] To counter this problem, Lewis installed a distribution system that introduced the conditioned air from the ceiling, which wags promptly dubbed the "upside down" system. Officially, the system was called a down-draft method of distribution.

The Metropolitan down-draft system was not a complete success. Lewis joked that the new down-draft distribution system exposed the engineer to criticism from "all of the types from red-heads to bald-heads."[93] And apparently he received plenty of criticism over this system. He admitted later that "Grauman's proved the generally accepted point that the first of revolutionary jobs is not always perfect."[94] For *Boxoffice* magazine, Lewis explained the problems of the Metropolitan discreetly: "Factory experience found itself in the anticipated conflict with architectural and decorative features, and handicapped by the obstacles which they imposed," he wrote.[95] The problem appears to have been a reluctance by the architect to use distributors, trumpet-shaped outlets that diffused the cold air gently over a wide area. Distributors proved effective in factory practice, but architects found their appearance objectionable in these elaborate movie palaces. In a memo to company engineers Lewis described the conflict more bluntly: "I doubt if you will work on a job with any architect or engineer who will not, sooner or later, suggest that we blow directly downward through a grille work. We tried this on the Metropolitan, the Palace, the Rivoli, the Texas, the Miami, and maybe one or two other theatres. It has failed completely on all those theatres which we name."[96] Eventually, engineers learned how to reconcile aesthetics and technical requirements. The pan outlet, a panel hung below the discharge over which the cold air diffused, was one solution. A rival engineer acknowledged in 1926 that "at the present moment the system which is predominating is the downward system of ventilation."[97]

By 1922 CEC had adopted two important innovations for the successful adoption of comfort air conditioning: down-draft distribution and bypass circulation. Carrier recalled that "the successful application of the downward ventilation with independent temperature and humidity control, without the

Text extract from *Air Conditioning America*, Gail Cooper, John Hopkins UP, 1960

METROPOLITAN THEATRE

necessity of reheating, made it practicable for the first time in 1922 to air-condition theatres, both acceptably and economically."[98]

Bypass circulation was essential to any economical comfort air-conditioning system. Carrier Engineering Corp. owned Lewis's bypass patent, while rival Walter Fleisher held a patent on a similar design.[99] Despite this legal division of rights, Carrier acknowledged that his firm installed approximately 300 air-conditioning systems that infringed upon Fleisher's patent. In the midst of the resulting litigation over the infringement of bypass rights, Carrier and Fleisher agreed to form a patent pool. In 1927 they formed the Auditorium Conditioning Corporation with the Lewis and Fleisher inventions as a core, and eventually acquired thirty-one more related patents.

The centrality of the bypass patents excited a great deal of resistance to the new corporation. York Ice Machinery Corporation filed the first test case and lost. In 1929 the triumphant Auditorium Conditioning Corporation defined its victory for potential clients:

> It was shown, and agreed by the Court, that the "recirculation" of large volumes of air, by-passed beyond the Conditioning Machine, as in these methods, for the purpose of temperature and humidity control, constituted a new and important improvement in Air Conditioning. Hence, regardless of what may appear to be "different" methods of "recirculation" any form of "recirculation" employing effectively *large* volumes of air recirculated without passage through the Conditioning Machine, may be deemed an infringement of the Auditorium Conditioning Corporation's patents.[100]

The centrality of its system is evident in the fact that by 1946 Auditorium Conditioning Corporation had licensed an estimated 90 percent of the comfort air-conditioning installations in the United States.

Text extract from *Air Conditioning America*, Gail Cooper, John Hopkins UP, 1960

METROPOLITAN THEATRE

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."

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

METROPOLITAN THEATRE

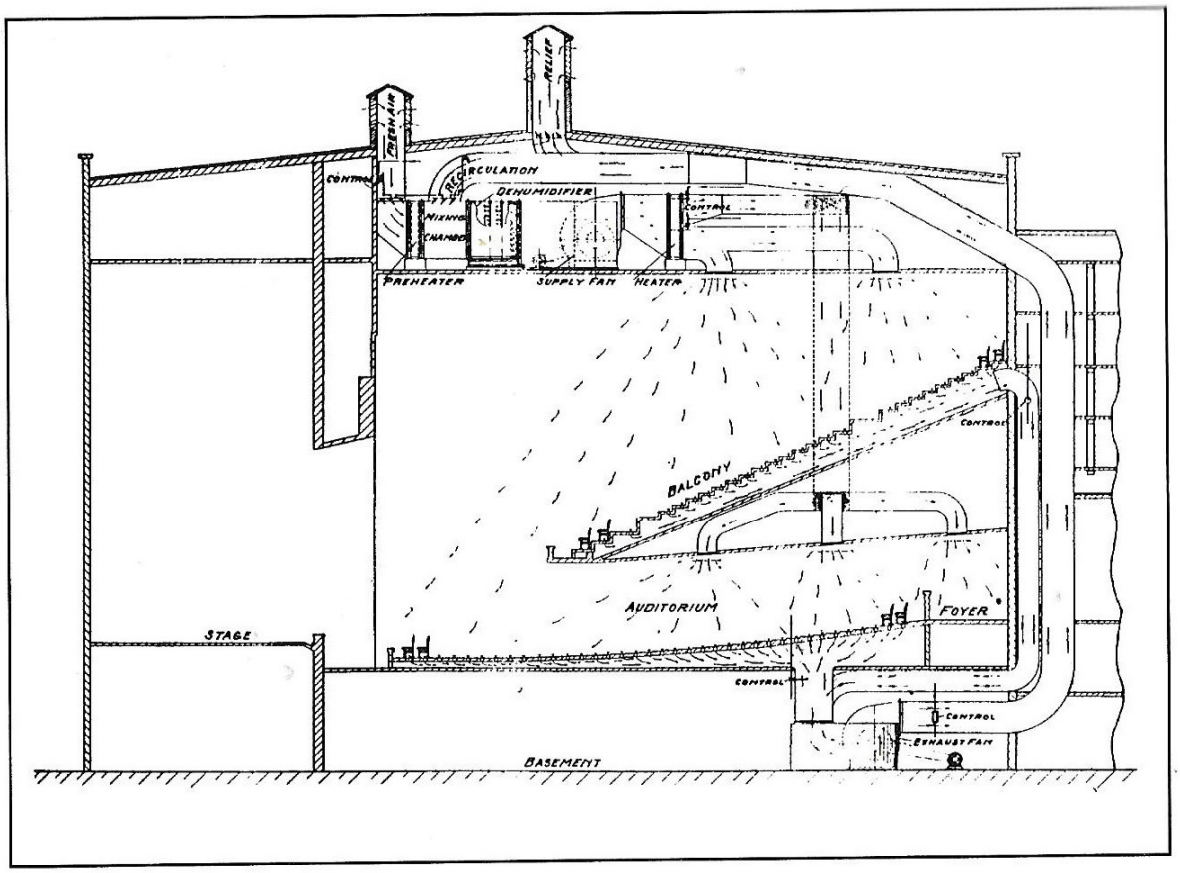


Figure 11-45 *Grauman's Metropolitan Theater in Los Angeles was the site in 1922 for the first air-conditioning system to combine downward distribution of supply air, recirculation of some of the return air, and a bypass of some supply air around the cooling coil, later remixing it to afford better humidity control. Although these individual design elements had been proposed and used before, it was the design by Leo Logan Lewis of Carrier Engineering Corporation that combined all three with automatic control to set a new standard for theater air conditioning (from* The Heating and Ventilating Magazine, *March 1924, p. 58).*

(Heat & Cold: Mastering the Great Indoors)

METROPOLITAN THEATRE

Most of the early U.S. theater systems were designed to optimize heating and so used upward distribution from floor outlets (Figure 11-44). Some of them were retrofitted with cooling systems, the previously mentioned Central Park and Riviera theaters being examples, with poor results. The first example of a well-engineered theater system seems to have been provided by Carrier Engineering Corporation. This firm designed and installed an air-washer-type cooling system in 1922 at the Metropolitan Theater in Los Angles using carbon dioxide refrigeration equipment manufactured by the Carbondale Machine Company.[90] L. Logan Lewis designed the system, which incorporated several advances. Lewis had apparently inspected the two Chicago theater cooling installations, which used upward distribution from under the seats. The result was hot, stuffy conditions at upper levels, while the orchestra level became so cold that patrons had to sit on their feet or wrap them in newspapers. Upward distribution also stirred up dirt and dust off the floor.[91] Lewis, possibly unaware of previous discussions and application of downward distribution, observed the bad results of the upward system and independently developed a downward system specifically engineered for theaters. Lewis also applied a design featured in many fan-type heating systems, that is, bypassing some of the airstream around the heat exchanger. When applied to cooling systems, bypassing some of the supply air around the air washer and remixing it before distribution to the theater resulted in better humidity control (Figure 11-45).

(Heat & Cold: Mastering the Great Indoors)

METROPOLITAN THEATRE

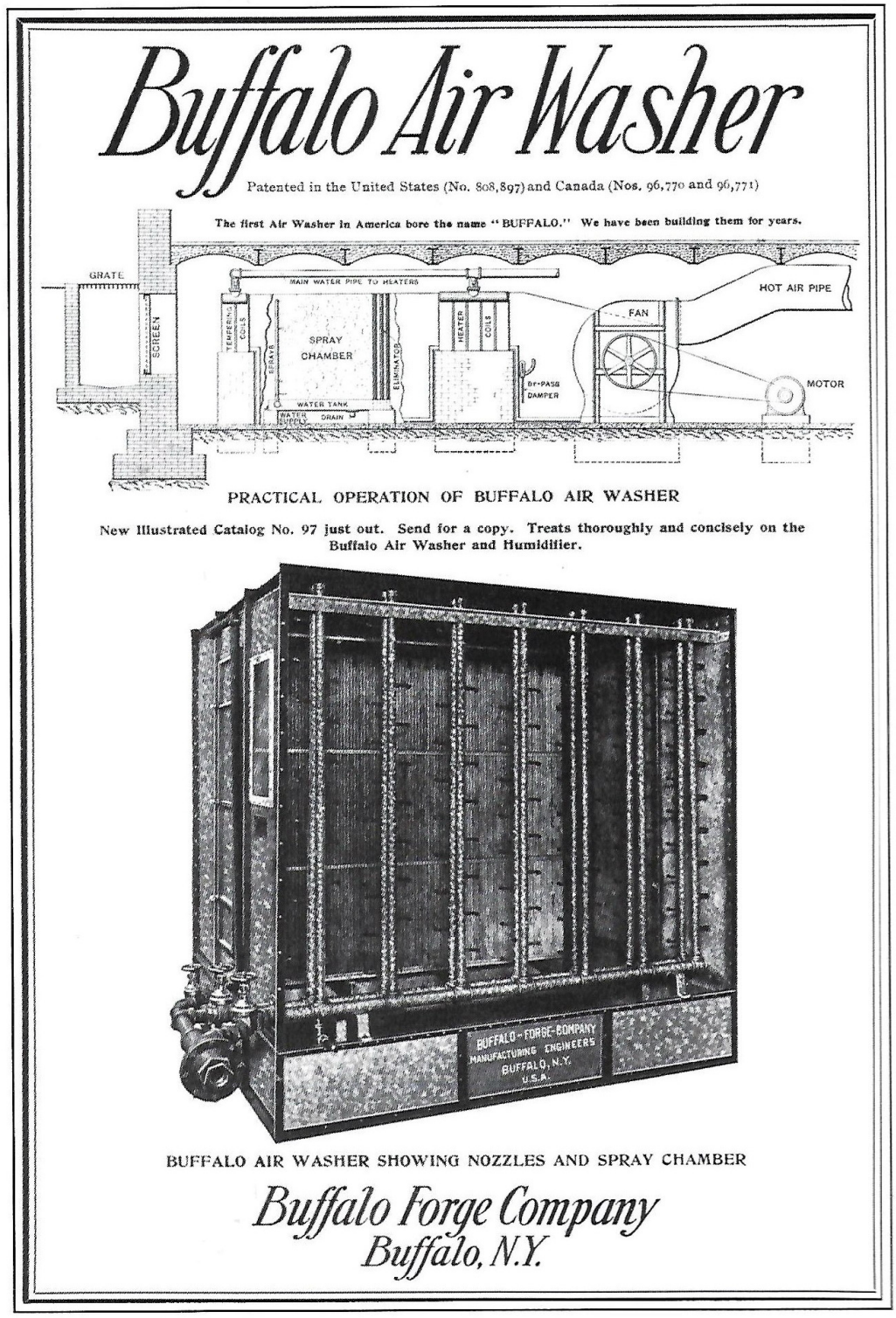


Figure 11-41 *Carrier's spray-type air washer was the basic element for his method of dew-point control of humidity. Carrier's air-conditioning systems were first applied to industrial uses and later to comfort cooling (from* Engineering Review, *June 1906, p. xii).*

METROPOLITAN THEATRE

GRAUMAN'S METROPOLITAN THEATER, LOS ANGELES. ARCHITECT: EDWIN BERGSTROM. PLUMBING CONTRACTOR: J. HORGH

CRANE BEAUTY FOR A "FIRST-RUN" THEATER

One of the most beautiful theaters in America, Grauman's Metropolitan at Los Angeles, fills its house daily with both tourists and regular local patrons. Its impressive architecture, restful foyers and harmonious interior decorations have delighted hundreds of thousands.

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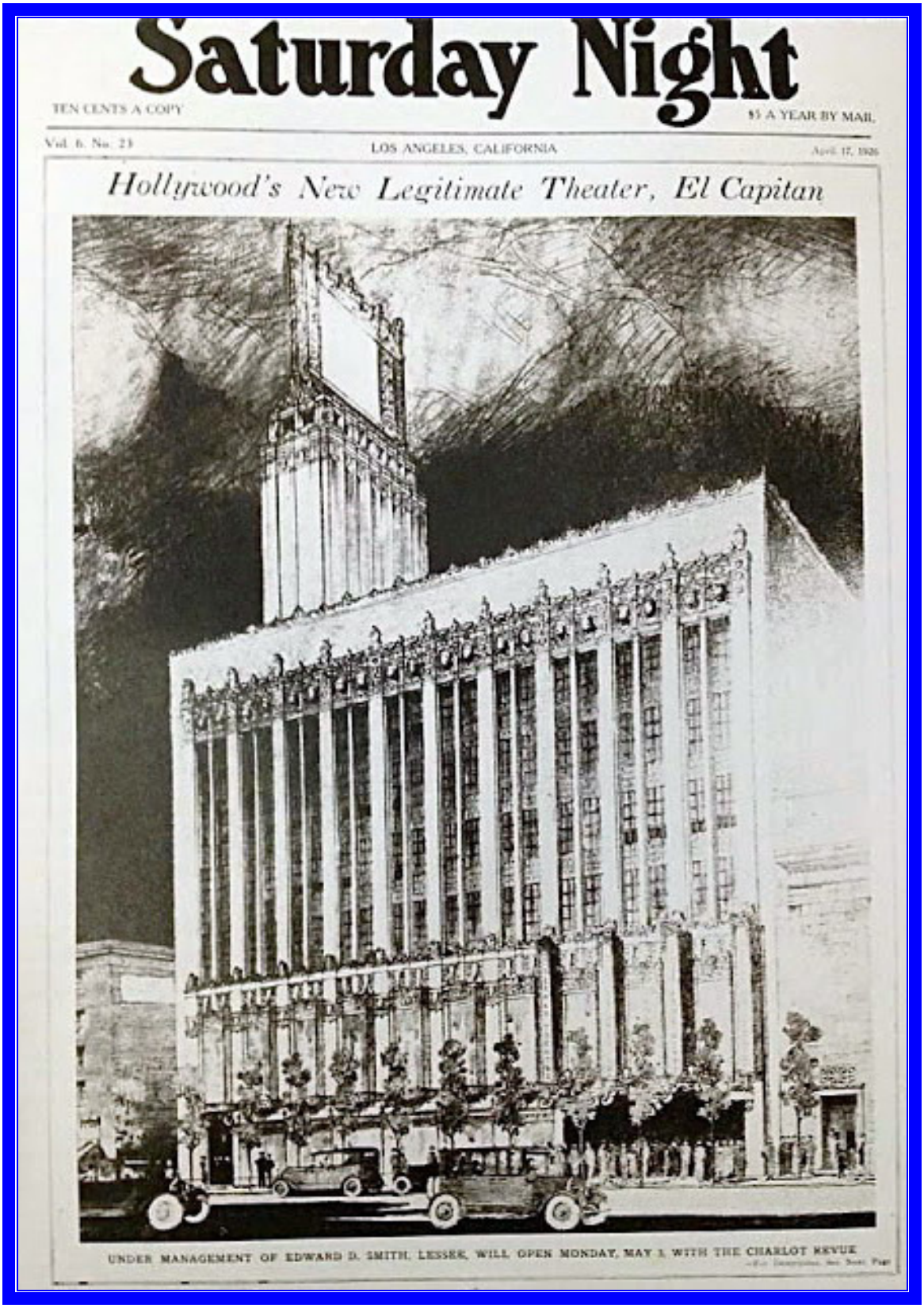
METROPOLITAN THEATRE

Demolished 1961

EL CAPITAN THEATRE



Saturday Night

TEN CENTS A COPY

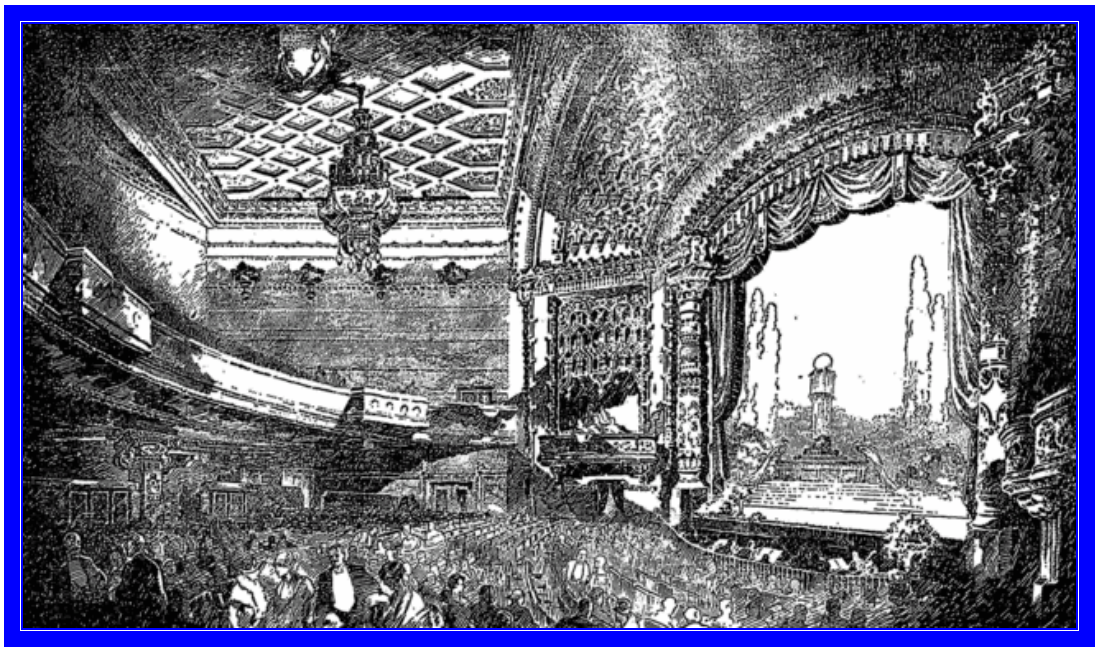
$5 A YEAR BY MAIL

Vol. 6. No. 23 LOS ANGELES, CALIFORNIA April 17, 1926

Hollywood's New Legitimate Theater, El Capitan

UNDER MANAGEMENT OF EDWARD D. SMITH, LESSEE, WILL OPEN MONDAY, MAY 3, WITH THE CHARLOT REVUE

EL CAPITAN THEATRE



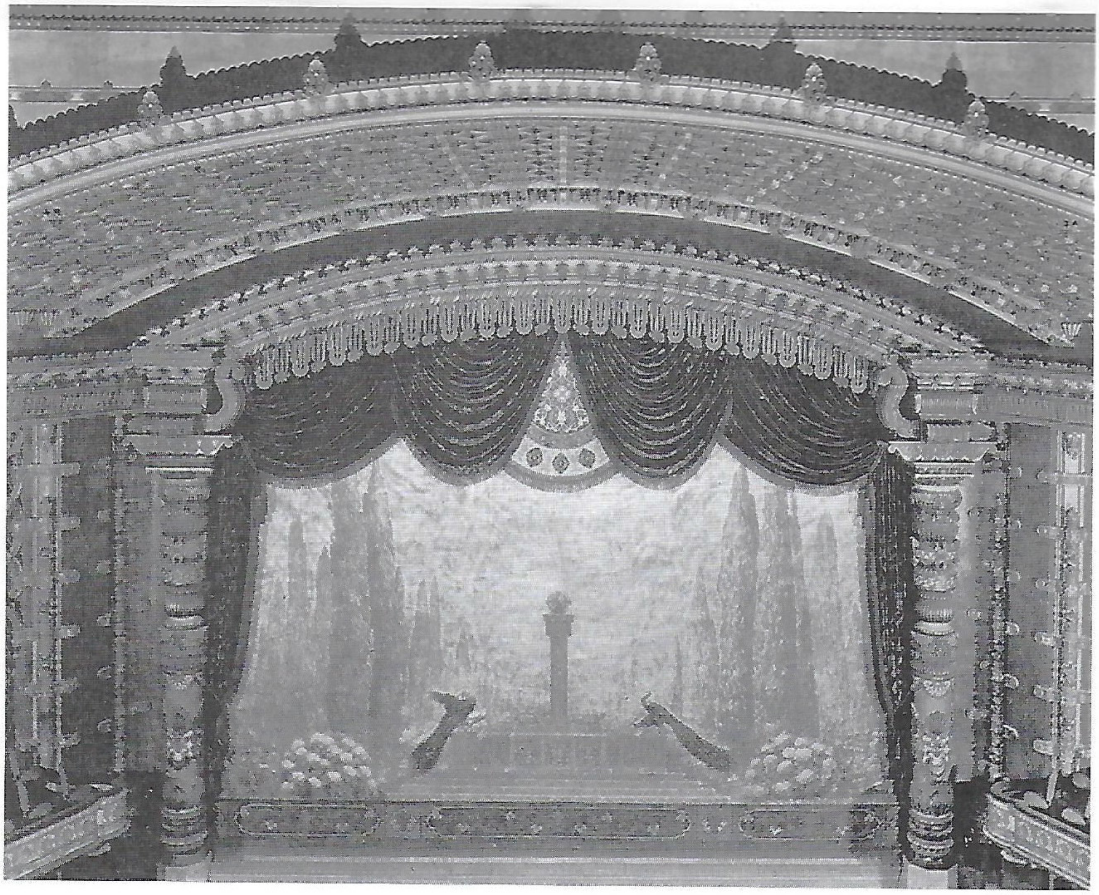
Opening night in 1926

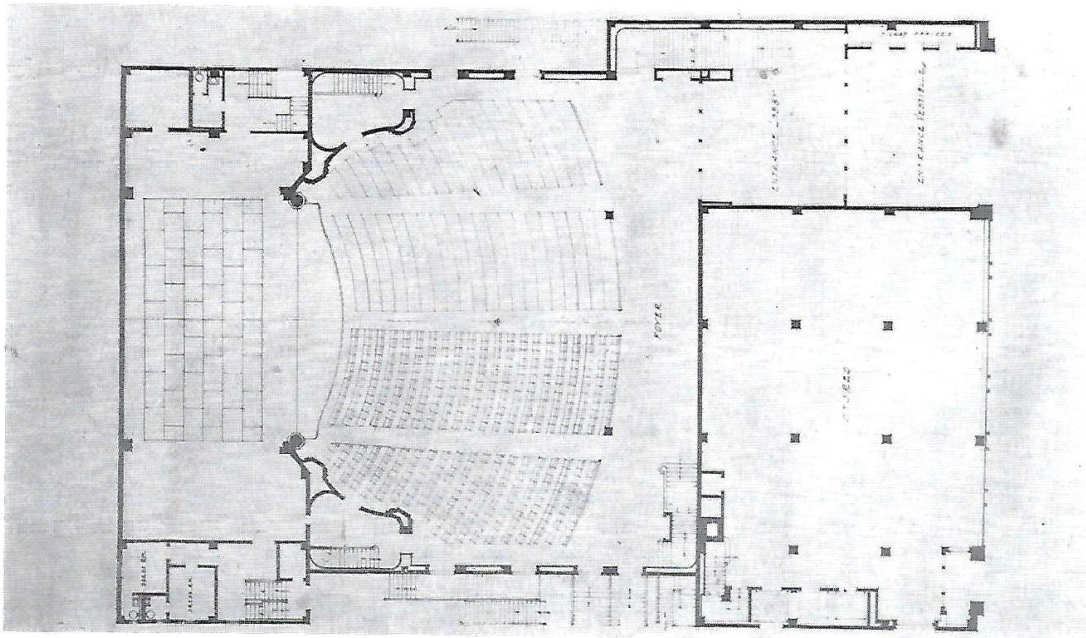
Opened 1926 Seats 1550
Architect: G Albert Landsburgh

The original six storey building in which El Capitan was housed was then the tallest in Hollywood and the first to be air conditioned. So perhaps was the theatre.

EL CAPITAN THEATRE

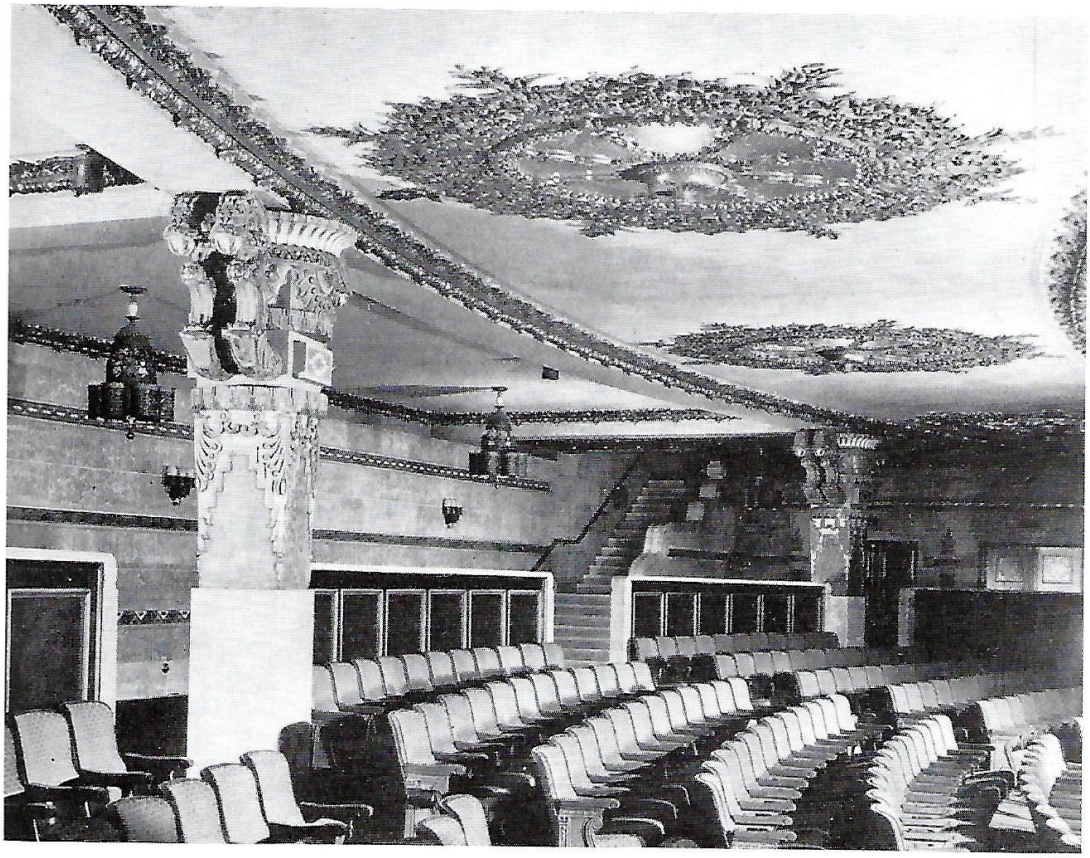
EL CAPITAN THEATRE

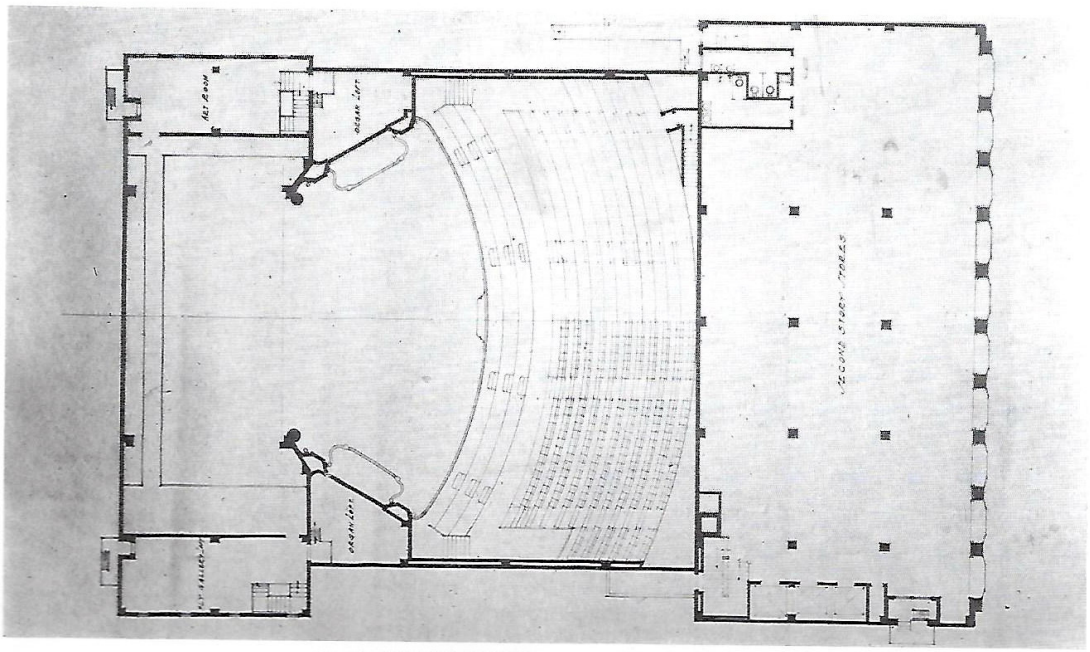




EL CAPITAN THEATRE, HOLLYWOOD, CAL.
G. ALBERT LANSBURGH, ARCHITECT.

EL CAPITAN THEATRE





EL CAPITAN THEATRE, HOLLYWOOD, CAL.
G. ALBERT LANSBURGH, ARCHITECT.

EL CAPITAN THEATRE

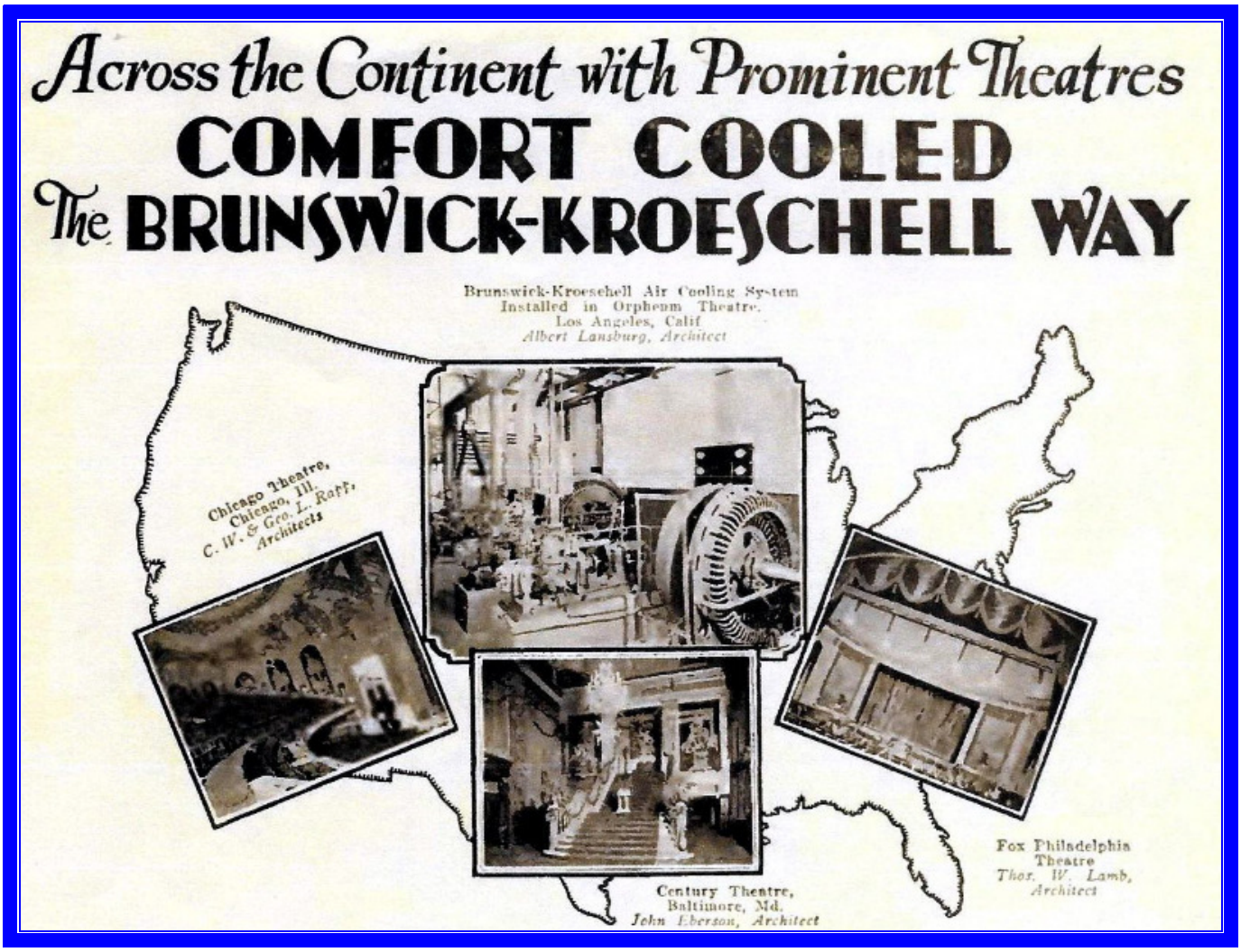
ORPHEUM THEATRE

ORPHEUM THEATRE

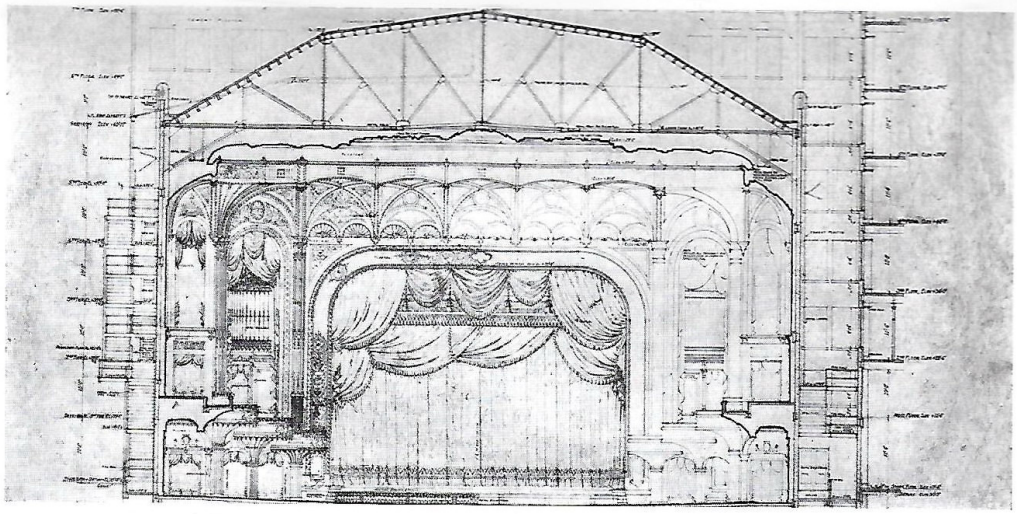
Opened 1926 Seats 2350
Architect: G Albert Landsburgh

Air Conditioned by Brunswick-Kroeschell
Washer system with CO_2 refrigeration

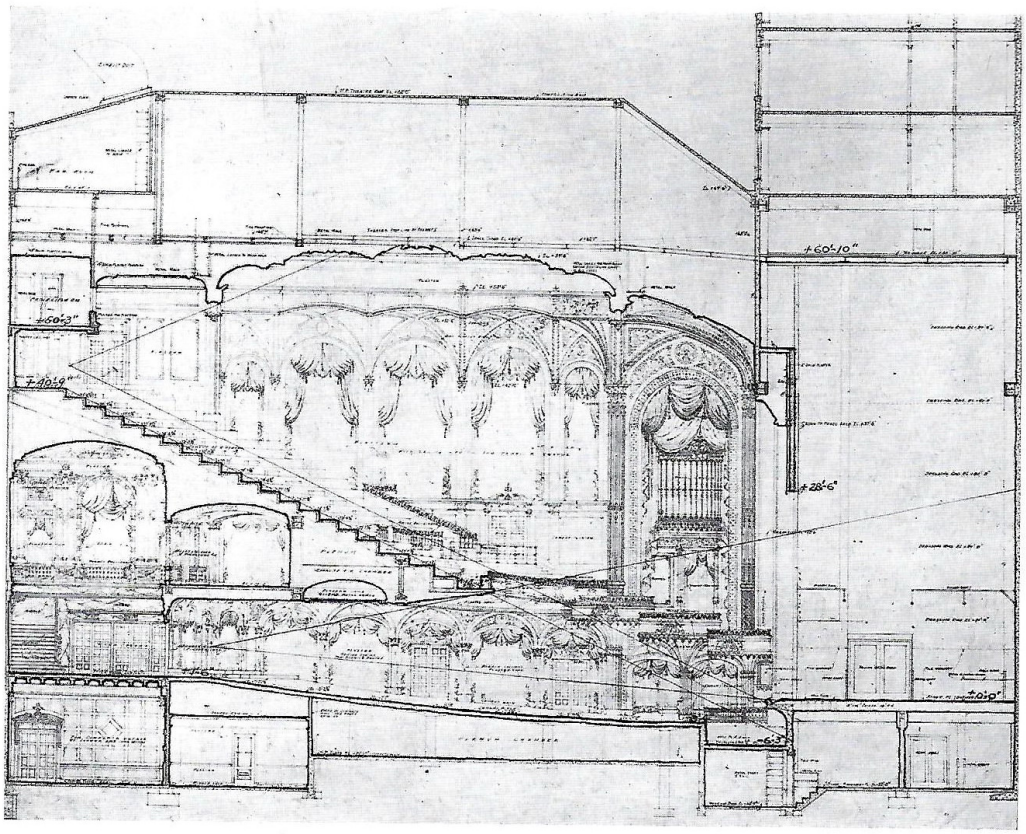
ORPHEUM THEATRE



ORPHEUM THEATRE



TRANSVERSE SECTION



LONGITUDINAL SECTION

ORPHEUM THEATRE, LOS ANGELES, CAL.
G. ALBERT LANSBURGH, ARCHITECT.

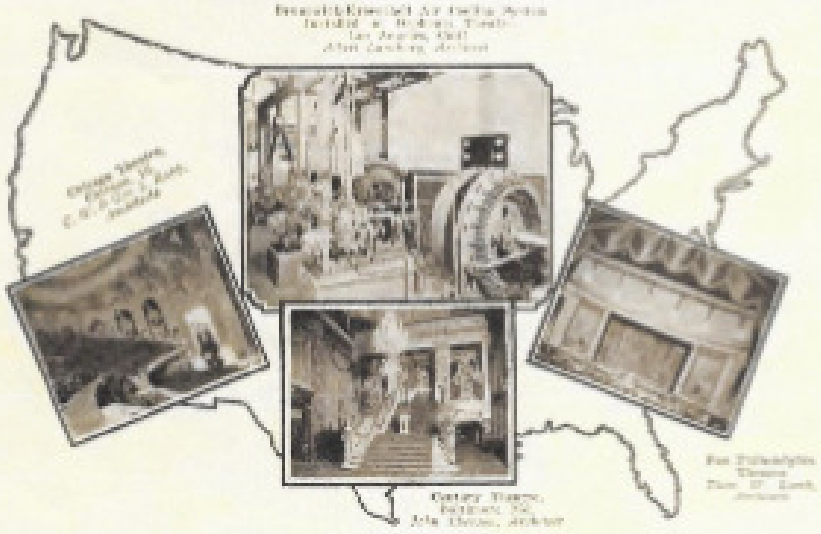
(American Theatres of Today)

Fan room located top floor left in longitudinal section

ORPHEUM THEATRE

Across the Continent with Prominent Theatres

COMFORT COOLED
The BRUNSWICK-KROESCHELL WAY



BRUNSWICK-KROESCHELL COMPANY

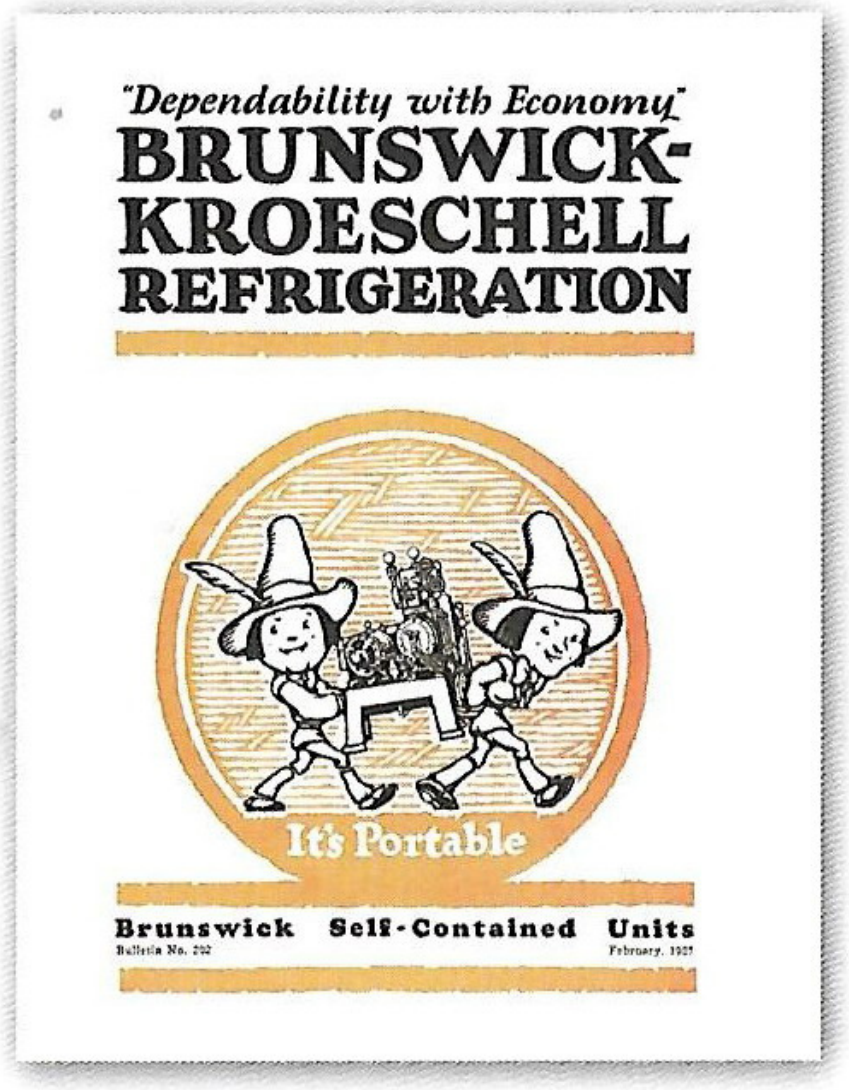
Refrigerating & Ice Making Machinery

NEW BRUNSWICK, N.J. - CHICAGO, ILL.

BRANCHES, AGENCIES AND SERVICE IN PRINCIPAL CITIES

ORPHEUM THEATRE

ORPHEUM THEATRE



In 1930 when Carrier Engineering Corporation merged with York Heating & Ventilating Corp. and Brunswick-Kroeschell Co. to become Carrier Corporation, it acquired manufacturing expertise and several important lines of standalone, portable refrigerators and heaters.

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Papo Geoff '08