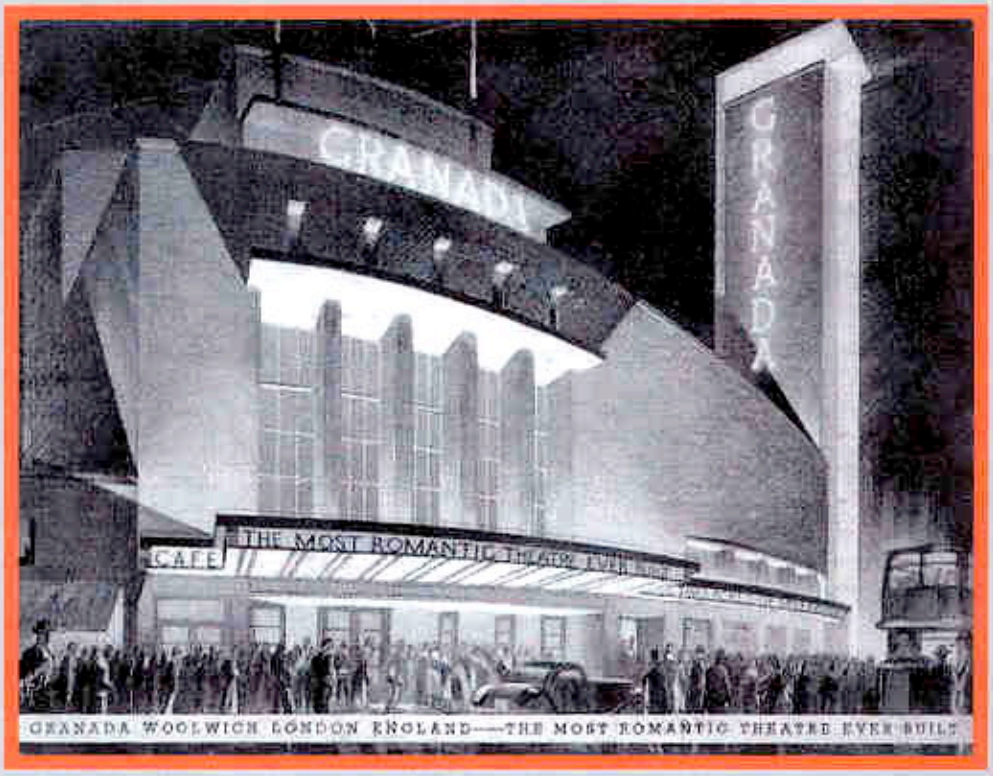


4. Early Twentieth Century British Cinemas

Early Twentieth Century British Cinemas

HVAC engineer where known listed in brackets

1927 The Broadway, Stratford, London [Carrier]
1927 Carlton Theatre, Haymarket, London [Carrier]
1927 New Victoria, London *lighting featured*

1928 The Regent Cinema, Bristol [Haden]
1928 Davis Theatre, Croydon [Jeffreys]
1928 Empire, Leicester Square, London [Carrier]

1929 Commodore Theatre, Hammersmith [Jeffreys]
1929 The Beaufort Cinema, Birmingham [Wm Griffiths]
1929 Northfield Cinema, Birmingham [Brightside]
1929 The Mayfair Cinema, Hull [A J Snelling]
1929 Astoria, Brixton, London [Carrier]

1930 Astoria, Finsbury Park, London [Carrier]
1930 Astoria, Streatham, London [Carrier]
1930 The Tivoli, Portsmouth [Haden]
1930 Paramount Theatre, Manchester [Carrier]

1931 The Regal Cinema, Manchester [Elliot, Ellis]
1931 Paramount Theatre, Newcastle [Carrier]

1932 Paramount Theatre, Leeds [Carrier]

1933 Troxy Cinema, Stepney, London [Jeffreys]
1933 Astoria, Brighton [Carrier]

1934 Gaumont Palace, Chelsea, London
1934 Mayfair Cinema, Chadwell Heath [S Mulliner]
1934 Granada Cinema, Maidstone [Jeffreys]

1935 Gaumont, Manchester [Jeffreys]

1936 Paramount, Tottenham Court Road, London [Carrier]
1936 Studios 1 & 2, London [Heywood & Bryett]
1936 Gaumont, Bromley [Haden & Jeffreys]

1937 Odeon, Leicester Square, London [Vacuum Refrigeration]

1938 Gaumont Cinema, Holloway, London [John Evans]

1939 Warner, Leicester Square, London [Carrier]

Early Twentieth Century Cinemas

The Broadway, Stratford, London

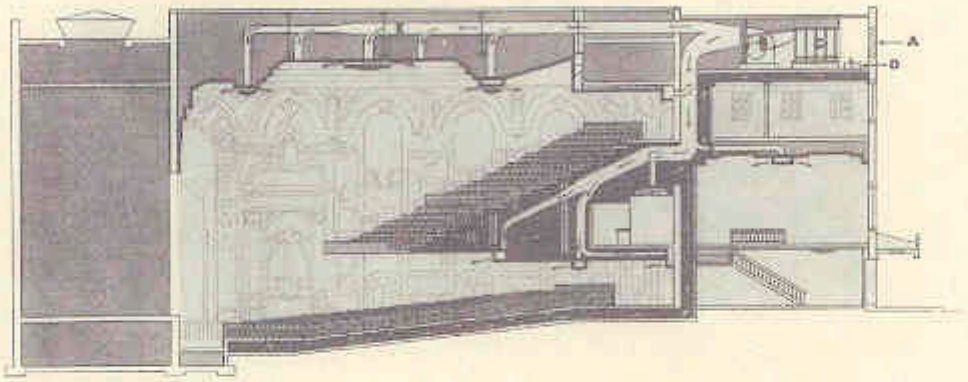


Diagram of Theatre Ventilated by Carrier Air Conditioning System

A *Fresh Air Inlet*
B *Fan*
C *Carrier Air Conditioning Machine*
D *Return Air Damper*
E *Main Supply Duct*
F *Return Air Duct*
G *Void under Balcony used for Return Air Duct*

Date Built/Opened: 1927
Seating Capacity: 2576
Architect: George Coles
HVAC Engineer: Carrier Engineering Company
HVAC System: Mechanical ventilation with air washer. The first cinema installation by Carrier, London and one on which the above diagram is thought to be based
Status: Bomb damaged 1940, re-opened 1941, closed 1960, demolished 1990
References: *Indoor Air by Carrier,* catalogue 1930s

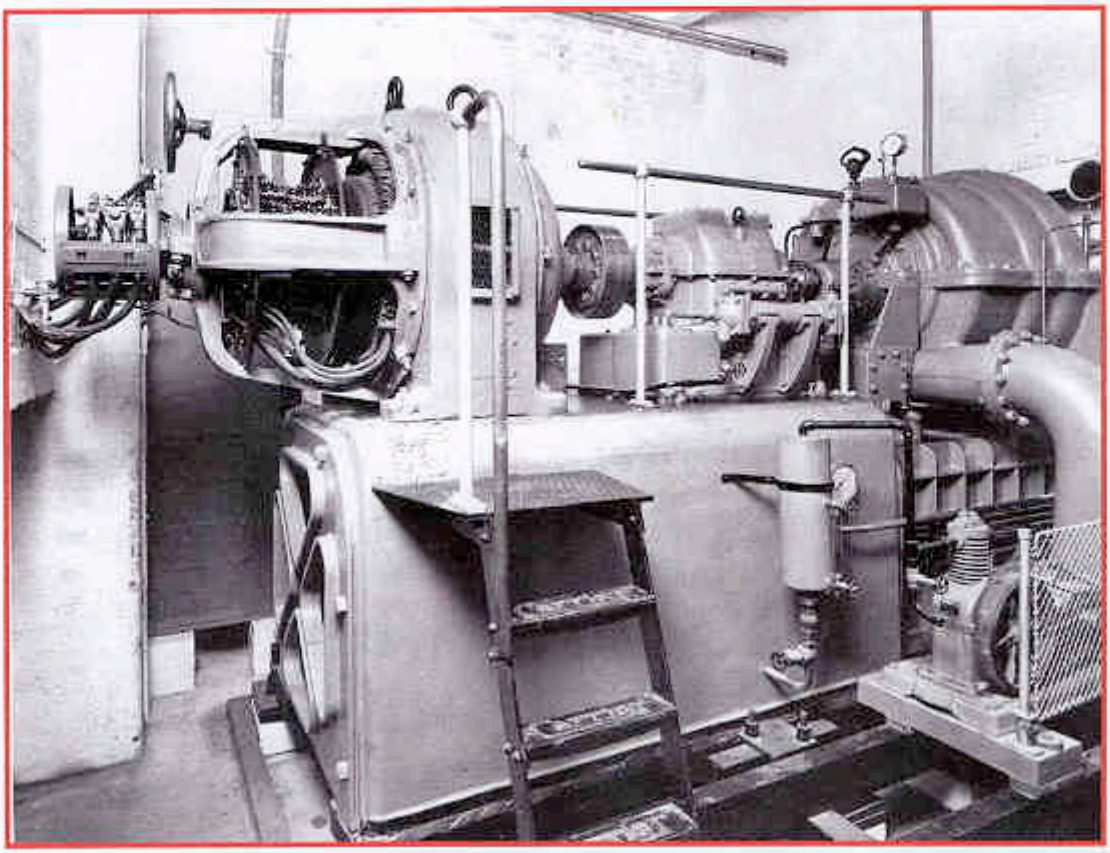
Early Twentieth Century Cinemas

Carlton Theatre, Haymarket, London

Date Built/Opened: 1927
Seating Capacity: 1159
Architect: Frank T Verity
HVAC Engineer: Carrier Engineering Company Ltd, London
HVAC System: Air conditioning, with Carrier centrifugal chiller, the 4th to be installed in the UK. This was the first fully air conditioned cinema in Britain
Status: 1985 became a Cannon multiplex
References: CIBSE Heritage Group Collection

Early Twentieth Century Cinemas

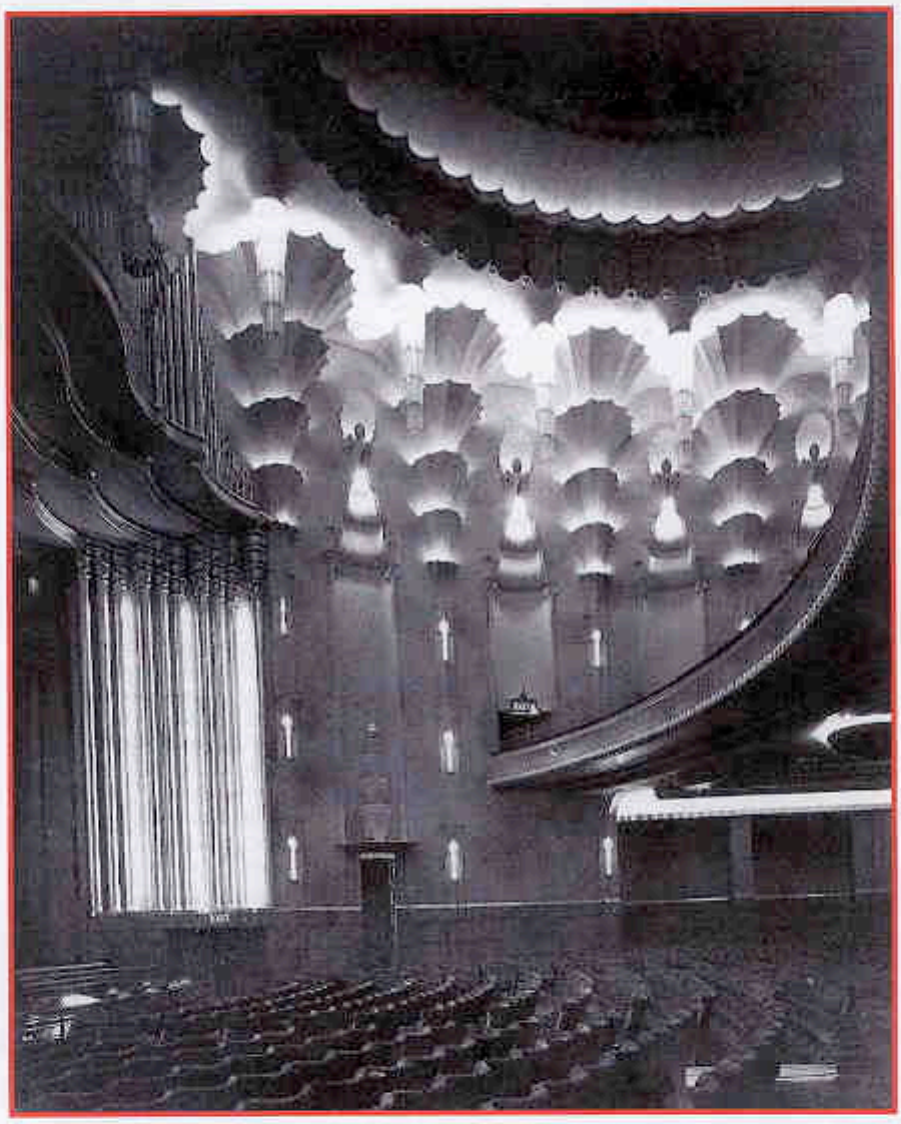
Carlton Theatre, Haymarket, London



Carrier centrifugal chiller

Early Twentieth Century Cinemas

New Victoria, London



Date Built/Opened: 1927, exterior named Sing-Sing by taxi drivers
Seating Capacity: 2786
Architect: E Wamsley Lewis & W E Trent
Lighting Engineer: unknown
Lighting System: Exterior featured 6000 ft of neon tubes. Auditorium described as a fairy cavern under the sea with plaster "stalactites" concealing a variety of dimmer-controlled colour lights
Status: In use
References: *Cinemas in Britain*, Richard Gray, 1996

Early Twentieth Century Cinemas

The Regent Cinema, Bristol, 1928

	£	s.	d.
The Drop System	14	8	3
The Two-Pipe System	15	10	11
The Ladder System	18	9	11

These prices cannot yet be taken as comparisons until the prices of the radiators are included, for as must be obvious, the one-pipe system requires more radiator surface. Where the mean temperature of a system is 165° F. for a two-pipe system the coefficient for one type of radiator may be taken as 168 B.T.U. per square foot, if the room temperature is 60° F. Then the radiator surface required if the sixteen radiators have an emission of 5,000 B.T.U.

$$\frac{80{,}000}{168} = 476 \text{ square feet.}$$

The radiators on the one-pipe system will not have a mean temperature of 165 ° F. as the water in the radiators drops to a lower temperature than the water in the main pipe. For example, a radiator with a 30° drop, that is, theoretically in the centre of the system would have water flowing into it of about 166° F. and would drop to a temperature of approximately 136° F., therefore having a mean temperature of 151° F. Consequently the co-efficient for a radiator of a similar pattern to that chosen in the two-pipe system would be 139 B.T.U. per square foot. Then the radiator surface required for this system is

$$\frac{80{,}000}{139} = 575 \text{ square feet.}$$

So we see that this system requires 99 square feet in radiator surface more than the two-pipe system, thus making the two-pipe system for this case the cheaper. The radiator valves on the one-pipe system will be larger. This is another item which causes the two-pipe system to work out cheaper. There is another thing which greatly influences the price of these systems, and that is the temperature drop. If the job is to be cheap a large temperature drop that would still have a high mean temperature must be used, in order to avoid the decrease of pipe sizes at the expense of the radiator sizes.

THE REGENT CINEMA, BRISTOL.

THIS imposing building, capable of accommodating 2400 people, was recently opened by Provincial Cinematograph Theatres, Limited. The architect was Mr. W. H. Watkins, F.R.I.B.A., of Bristol.

Owing to the proximity of the river adjacent to the boiler house, the boiler house had of necessity to be a long narrow chamber, and in order to economise in the space occupied by the heating battery, it was decided to instal steam boilers to supply the heating battery for the warm air. There are two 12-ft. 6-in. by 6-ft. horizontal tubular steam boilers working at a pressure of 50 lbs. per square inch, and each capable of carrying two-thirds of the total load, these boilers supply steam to the boiler feed pump, the air heating battery of the vento type and a separate heating calorifier.

They are fired by oil fuel on the compressed air system and fed with oil from three storage tanks having a total capacity of 18 tons.

In addition there is a small wrought iron domestic boiler also oil fired, with a thermostatic cut-out, which maintains the temperature at 150° F. This small boiler is coupled to a storage cylinder which supplies hot water to the fitments in the dressing rooms.

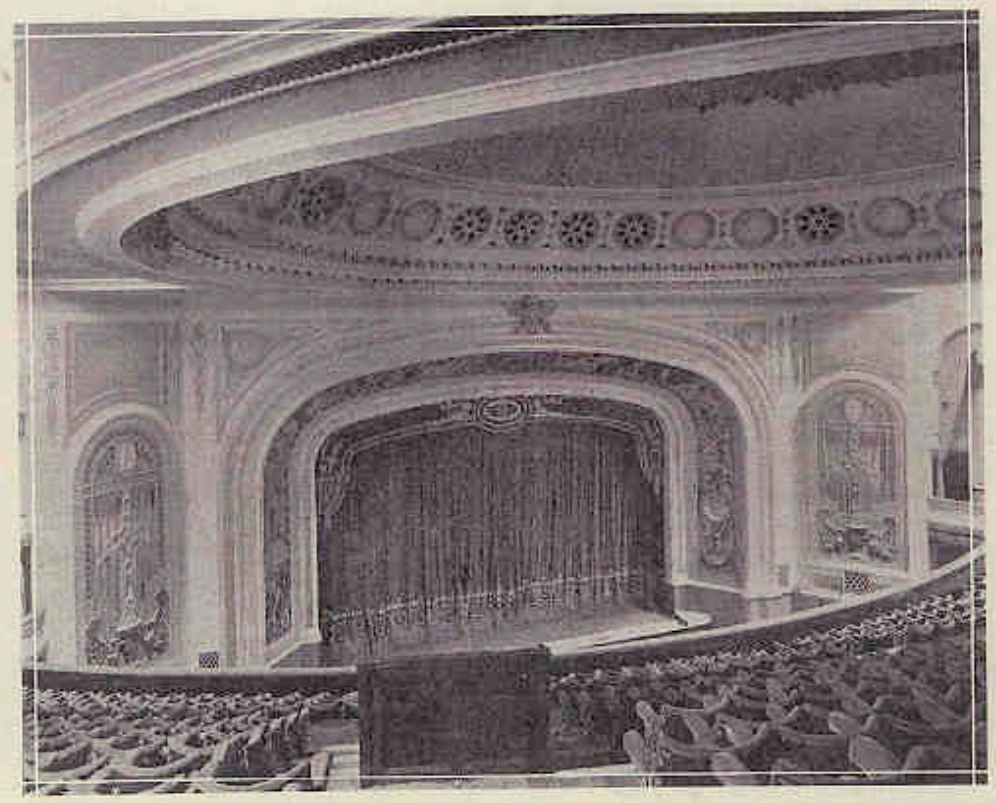
For the heating apparatus the cold air is drawn through louvres from the riverside of the boiler house, passing through an air washing plant and eliminator plates, through the Vento heating battery which is arranged in six sections, each controlled, and is then delivered by a 50-in. belt driven centrifugal fan to a series of ducts constructed under the floor, through vertical ducts and gratings into the auditorium and balcony. 40,000 cubic feet of air per minute is delivered into the building by this means.

The various offices, entrances, dressing rooms and back of stage are heated by means of radiators, supplied with hot water from a calorifier in the boiler house. This hot water system is accelerated by means of one of "Haden's" patent Turbo Accelerators with automatic by-pass for gravity circulation.

A unique feature of the plant is the forming of a grid in the floor of the auditorium, consisting of approximately 3,000-ft. of piping in order to minimise centre down draughts due to the extreme width of the building in comparison to the depth. This grid is supplied with water from the heating calorifier at a temperature of 160° to 170° F., but by means of an independent cylinder, thermostatically controlled, the temperature of the water in the grid is kept low enough to limit the floor temperature in the auditorium to a maximum of 70° F.

Early Twentieth Century Cinemas

The Regent Cinema, Bristol



THE REGENT CINEMA, BRISTOL.

Architect—W. H. Watkins, F.R.I.B.A. *Warming and Ventilation by G. N. Haden & Sons, Ltd.*

The extraction system consists of four 40-in. propeller fans, fixed in the roof space, drawing the air through plaster medallions round the dome. As it was found impossible to fix a fan at the back of the stage for extraction, two galvanised sheet metal ducts were carried from the back of the stage into the dome. At the stage end of these two ducts a grating is fixed fitted with a damper, held open by a fusible link, so that in case of fire the damper would close the opening. The main dome has a smaller dome superimposed, fitted with plaster gratings and open to atmosphere. By a special system of baffling these gratings are used to extract the air on the ejector principal according to the direction of the wind, thus keeping the air in the building sweet, when the house is closed.

The Café is ventilated through three gratings into a false ceiling, which in turn is connected through a vertical brick duct to the roof level.

The whole of the engineering work was carried out by Messrs. G. N. Haden and Sons, Ltd., Orchard Street, Bristol.

□

"STUFFY" TOWN HALL.—A letter from the rector's daughter protesting against the lack of ventilation in the Town Hall caused a breeze at a meeting of the Wem (Shropshire) Urban Council.

Miss Violet Parker, the writer, said they had just concluded a health week—and it was perfectly ludicrous to sit and listen to speeches about the value of fresh air in a room which, containing 400 people, had two tiny windows admitting sufficient air for four persons only. She said she spoke on behalf of many who were suffering from an excess of carbon dioxide.

Dr. Dallewy (Medical Officer), said the room was certainly at times very stuffy. The trouble was that when the windows were opened, other people, feeling draught, immediately went and shut them.

The Clerk (Mr. Rotter): There are five windows.

Dr. Dallewy: Yes, but they are all on the one side.

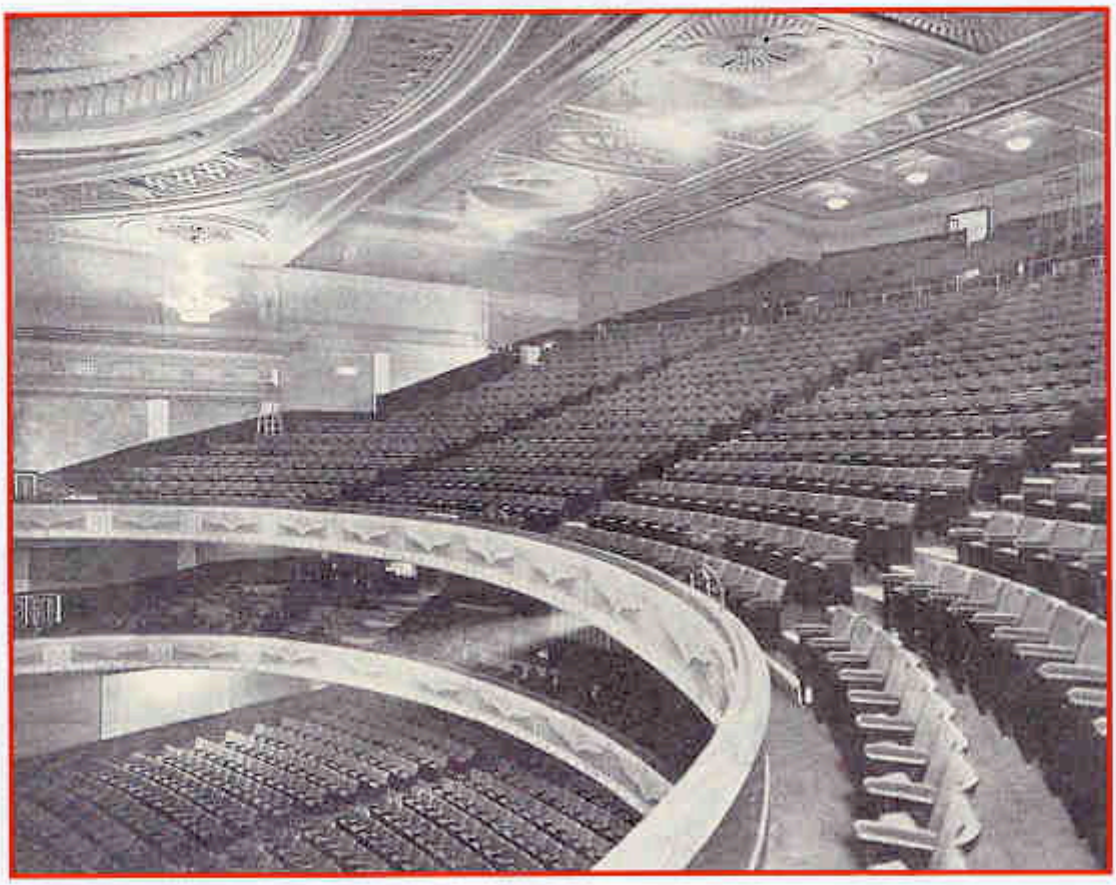
Early Twentieth Century Cinemas

Davis Theatre, Croydon

Date Built/Opened: 1928
Seating Capacity: 3725, for a time the greatest in England
Architect: Robert Cromie
HVAC Engineer: J Jeffreys & Company Ltd
HVAC System: Mechanical ventilation, believed with air washer, not known if refrigeration included
Status: Closed May 1959
References: The Heating and Ventilating Engineer, January 1929

Early Twentieth Century Cinemas

Davis Theatre, Croydon



Early Twentieth Century Cinemas

Empire, Leicester Square, London

Date Built/Opened: 1928
Seating Capacity: 3226
Architect: Thomas W Lamb with F G M Chancellor of the Frank Matcham practice
HVAC Engineer: Carrier Engineering Company Ltd, London
HVAC System: Air conditioning, with Carrier centrifugal chiller of 250 TR capacity
Status: Remodelled 1962, by George Coles
References: *Carrier Centrifugal Refrigeration*, catalogue, 1930s
London's West End Cinemas, Allen Eyles & Keith Skone, 1984.
Cinemas in Britain, Richard Gray, 1996

Early Twentieth Century Cinemas

Empire, Leicester Square, London

THE NEW "EMPIRE," LONDON.

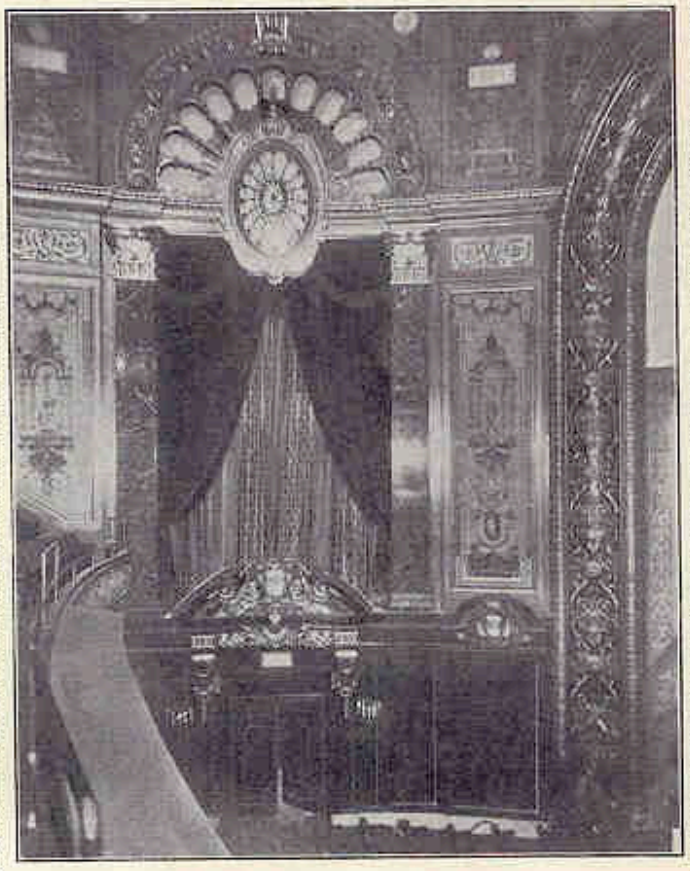
THIS palatial Super-Cinema erected on the site of the old "Empire" Music Hall, in Leicester Square, was recently opened. It has a seating capacity of 3,500, and is the most luxurious and completely fitted cinema theatre in London.

The ventilation, warming and cooling is on a most elaborate and efficient scale.

The capacity of the Theatre is approximately one million cubic feet, and for ventilation purposes 250 tons of clean, invigorating air per hour are continually and evenly distributed throughout the Theatre to keep it cool and comfortable, both winter and summer. The air is warmed or cooled to suit the requirements of the moment, the temperature in the Theatre being automatically controlled, keeping constant conditions of both temperature and humidity.

The air is cooled by refrigeration equal to 250 tons of ice per day, this representing a block of ice 22-ft. cube.

The large modern Cinema Theatre does not need warming, but cooling, once the theatre is fully occupied; therefore, refrigeration which will require a 250 H.P. motor has been included in the ventilating equipment. The atmospheric conditions inside the theatre will be more comfortable than those prevailing outside, be it either winter or summer, afternoon or evening.



THE NEW "EMPIRE" CINEMA, LONDON.
Architects: Frank Matcham & Co., and Thomas W. Lamb.
Ventilation, Warming and Cooling by Carrier Engineering Co., Ltd.

The greatest source of heat in the theatre is the audience, each group of 50 human beings radiating constantly a quantity of heat equivalent to that emitted by an average sized steam radiator. Then again, there is the moisture given off by the people, every ten human beings giving off 1 lb. of moisture per hour. Therefore, approximately 1,000 lb. of moisture are given off by the people during the showing of one

Early Twentieth Century Cinemas

Empire, Leicester Square, London

programme. This moisture is the chief cause of the uncomfortable atmosphere experienced in most theatres. The air, therefore, must not only be cooled, but dried, *i.e.*, dehumidified, in order that a crisp invigorating and healthy atmosphere is at all times maintained, the patron leaving the theatre after the performance feeling refreshed both mentally and physically.

Uniform conditions throughout the whole of the house are maintained and the atmosphere at the back of the balcony is as good as that in the stalls.

The air is introduced at ceiling level, diffuses downwards and is finally exhausted through openings at the floor level.

Bearing in mind that the ventilating plant in a cinema theatre is called upon for cooling during 90 per cent. of the time, it is necessary that the entering air should be introduced at ceiling level. The cool, dry air must, of course, be admitted to the theatre at a temperature much lower than the temperature it is desired to maintain in the occupied zone, so that this air as it absorbs the heat from the occupants, the lights, etc., will be "warmed" to the temperature it is desired to maintain.

The fresh, cool air which enters overhead quickly absorbs the heat and becomes slightly warmer as it descends until it meets the hottest zone, directly above the heads of the audience. Mingling with the hottest air, the temperature of the downward stream is at once brought up to that desired and passes the audience at the predetermined temperature and humidity, finally passing through the exhaust openings at the floor level. Thus the occupants of the seats are never subjected to "cold" air, but are always surrounded by cool, dry air at precisely the temperature desired and this temperature does not vary, no matter how much it may be necessary to vary the temperature of

the entering air in order to meet the changing conditions within the theatre or the outside atmosphere.

The system employed in this theatre affords perfect cooling during the summer, dehumidifies the air and takes out the surplus moisture and warms the air as and when required, maintaining always health and comfort and an invigorating atmosphere.

The whole of the Ventilating, Warming and Cooling plant in the "Empire" was designed and installed by the Carrier Engineering Company, Limited, 24, Buckingham Gate, London, S.W.

□

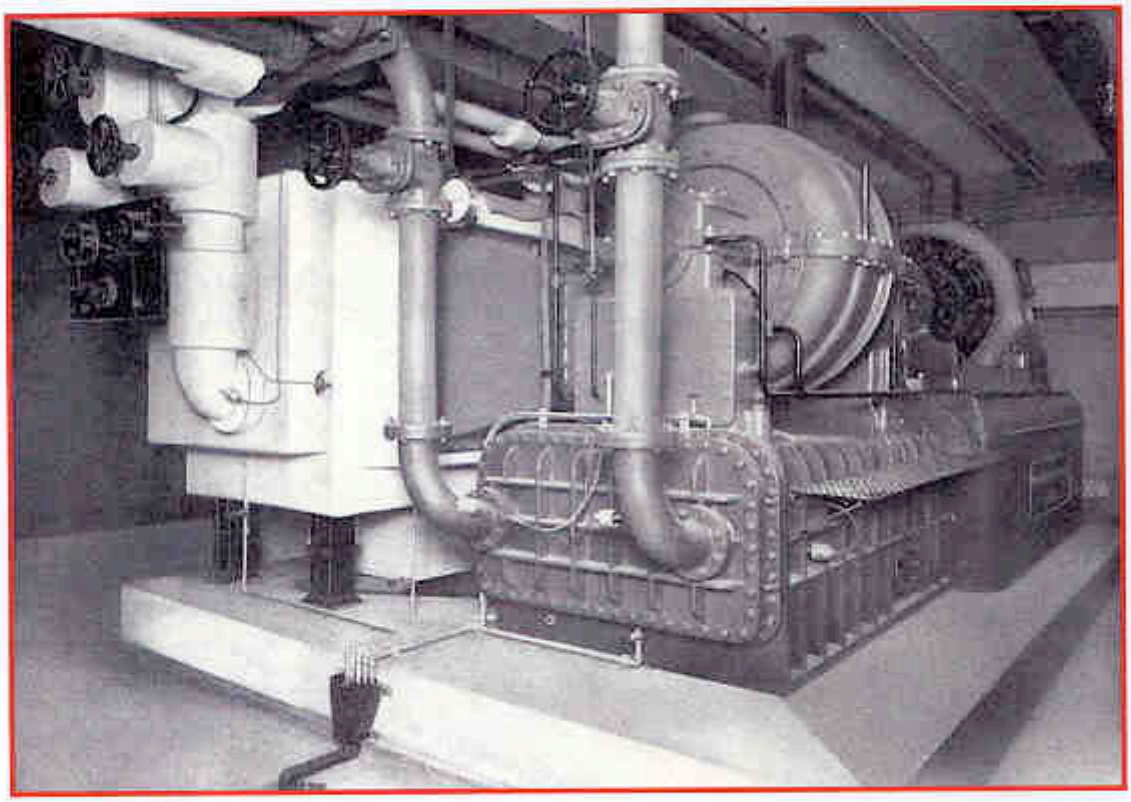
a pipe vice, with an adjustable head which enables the work to be set in the position best suited for the operator, and this position changed as frequently as required without removal from the jaws. Besides greater convenience and saving of time, the vice will accommodate jobs for which the usual fixed head vice is practically useless. By dispensing with the necessity for *both* a fitter's and a pipe vice is saved, frequently an important consideration.

Messrs. Mathew Ellis Ltd., showed a large selection of brass valves and tubes for gas, water and steam, also gas ovens and fires and circulating water cylinders.

On this stand was also shown the "Speedy"

Early Twentieth Century Cinemas

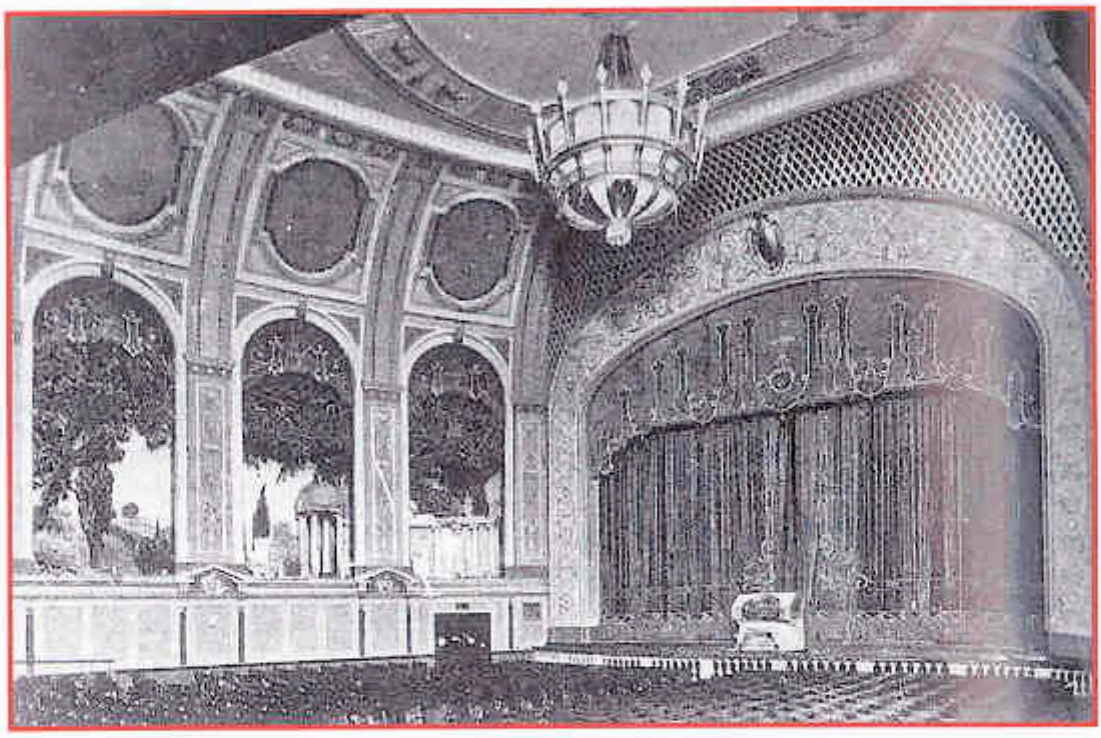
Empire, Leicester Square, London



250 TR chiller, Carrier Centrifugal Refrigeration, catalogue, 1930s

Early Twentieth Century Cinemas

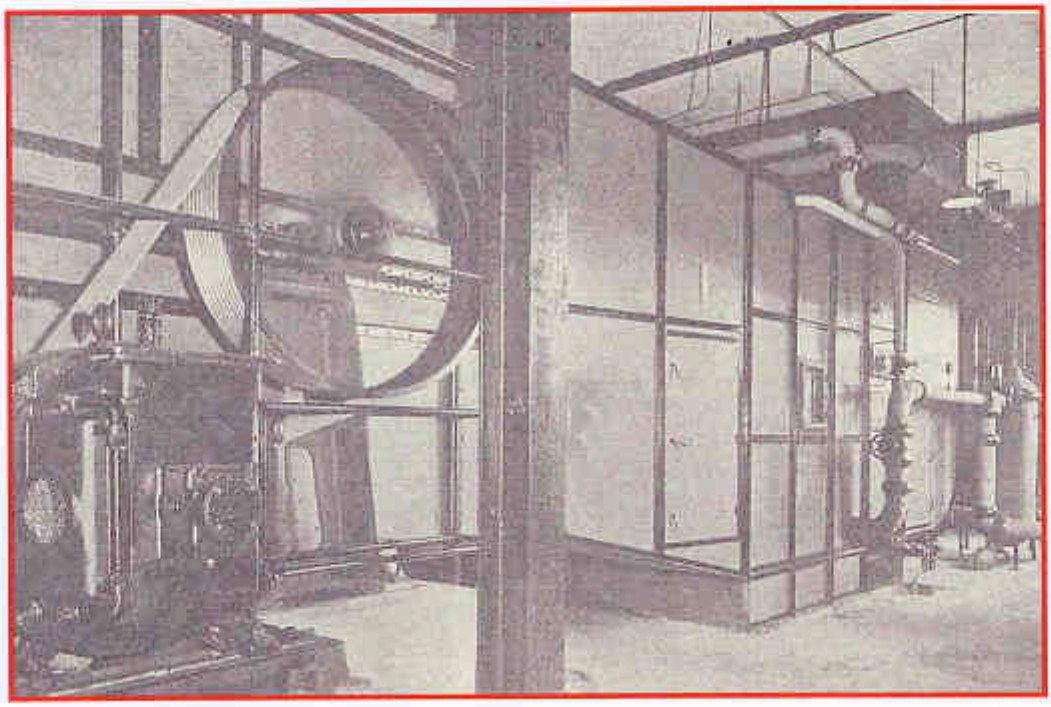
Commodore Theatre, Hammersmith, London



Date Built/Opened: 1929
Seating Capacity: 2884
Architect: George Coles
HVAC Engineer: J Jeffreys & Company Ltd
HVAC System: Mechanical ventilation with air washer, not known if refrigeration included
Status: Demolished
References: The Heating and Ventilating Engineer, January 1931

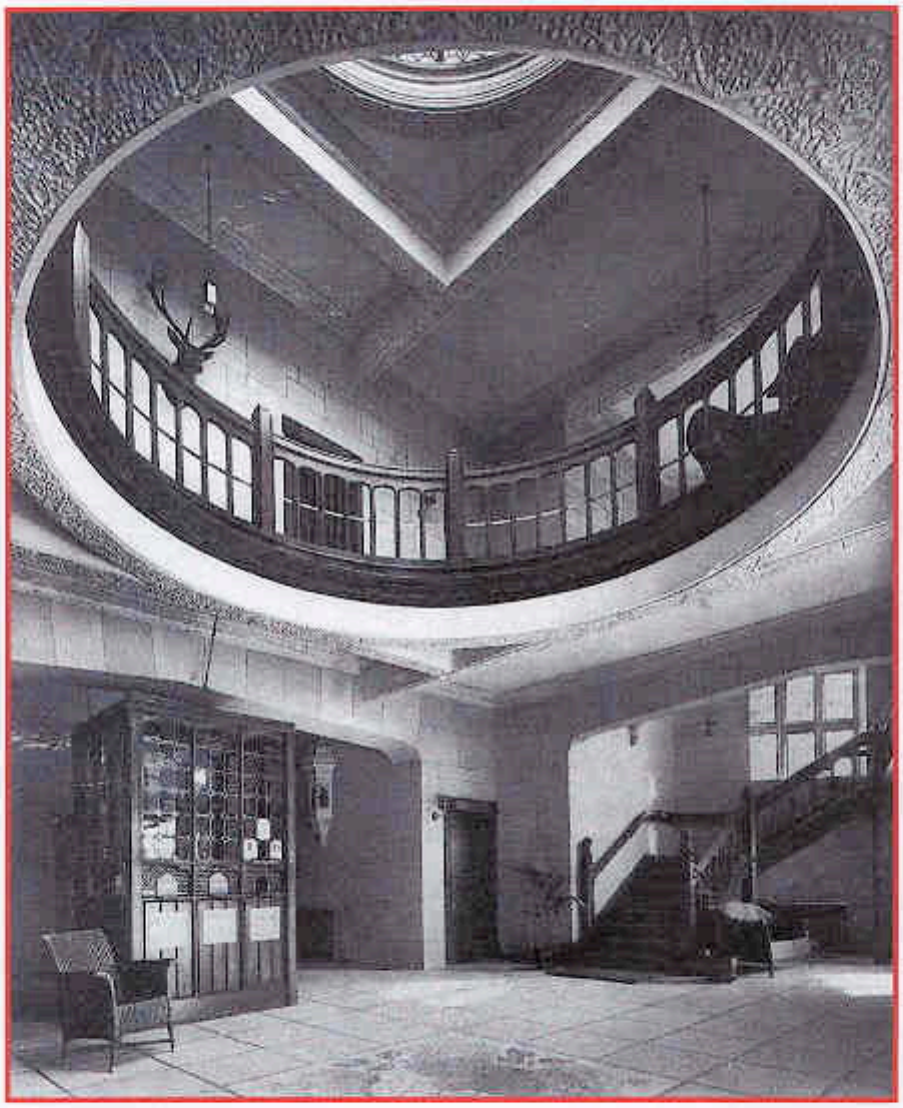
Early Twentieth Century Cinemas

Commodore Theatre, Hammersmith, London



Early Twentieth Century Cinemas

The Beaufort Cinema, Birmingham



Date Built/Opened: 1929
Seating Capacity: 1250
Architect: Hurley Robinson
HVAC Engineer: Wm Griffiths, Sons & Cromwell Ltd, Liverpool & London
HVAC System: Low pressure hot water heating
Status: unknown
References: The Heating & Ventilating Engineer, November 1929

Early Twentieth Century Cinemas

The Beaufort Cinema, Birmingham

Rees tied for the runner-up prizes with cards of 81, each winning a spoon.

After tea, the prizes were presented by Mr. W. W. Nobbs (Captain), who mentioned that the Society is well provided for in the way of Cups and prizes, the "Utz" Cup presented by Mr. Utz before he left England still remaining to be played for, plus another fine Cup just presented very kindly by Mr. J. Boyce. Many Members have also kindly contributed towards the prize fund, so that this part of the Tournament is in a very pleasing position.

A special vote of thanks was accorded Mr. Harry Merrin for again arranging for the Competition to be held at his Club, Coulsdon Court. Some difficulty has been experienced in obtaining a Course for these Saturday Competitions, and this makes the third occasion on which Mr. Merrin has kindly helped the B.T.U. Society in this way, a fact fully appreciated by all Members.

The fifth Tournament will take place next Spring, probably during May.

□

THE BEAUFORT CINEMA, BIRMINGHAM.

THIS Picture Theatre at Ward End, is a recent addition to the already substantial list of cinemas recently built in the Birmingham area. Occupying a commanding corner site, both exterior and interior are of mediæval design, a somewhat unusual style in places of amusement. The Beaufort was designed by Mr. Hurley Robinson, F.R.I.B.A., A.I.S.E., of Birmingham, and has a seating capacity of 1,250.

The Heating Apparatus in this theatre was designed and installed by Wm. Griffiths, Sons and Cromwell, Ltd., of Liverpool and London, and is on the Low Pressure Hot Water System.

An Ideal "Britannia" Boiler is fixed in the Boiler House, and from there two ring mains are run, one to serve the main hall and the gallery, and the other to warm the stage and adjoining rooms.

The system has been designed to eliminate as far as possible all branches, and the position of the Boiler House made it possible for the main to be effective heating surface for practically the entire length of each side. While the return main itself is carried round the pit of the Orchestra, again providing effective heating surface.

The result of this design is that the boiler plant is reduced to a minimum in size, owing to the fact that very little of the pipe work is non-effective.

The Radiators in the Theatre itself are of the Ideal "Classic" type, whilst those at the back of the Theatre under the gallery are of the "Wall" type, this type being installed with a view to saving space.

The design of the apparatus, whilst very simple, is rather unique for the type of building, but has proved very satisfactory.

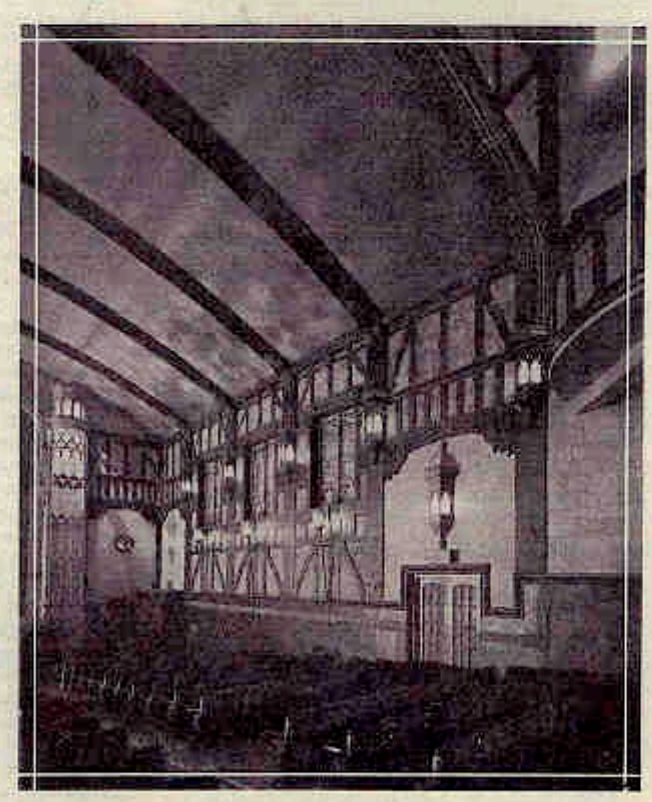


Photo by courtesy of Allied Arts and Crafts Guild, Ltd.
THE BEAUFORT CINEMA, BIRMINGHAM.
Architect: Hurley Robinson, F.R.I.B.A., A.I.S.E.
Heating by Wm. Griffiths, Sons and Cromwell, Ltd.

Early Twentieth Century Cinemas

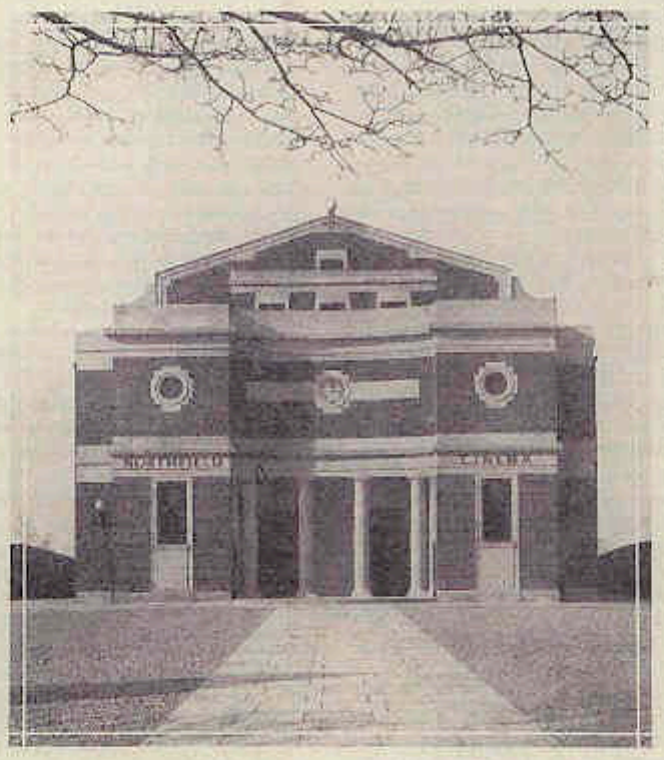
Northfield Cinema, Birmingham, 1929

NORTHFIELD CINEMA.

A MOST unique and up-to-date Cinema has just been completed in this suburb of Birmingham, from plans prepared by Major Lewis R. McFarlane, of the firm of J. H. Hawkes and Son, of Birmingham.

The building is a handsome one of Grecian design, and has a seating capacity of 1,300.

The heating installation is carried out on the low pressure hot water "Drop" system, a rising main being carried to the roof space from which drop pipes are taken feeding radiators, fixed in recesses (thereby saving seating accommodation) in the balcony, auditorium, entrance halls, ante-rooms, etc.



Northfield Cinema, Birmingham.

Architect: Major L. R. McFarlane. Warming & ventilation by Brightside Foundry & Engineering Co., Ltd.

The boiler is of the Robin Hood "New Senior" pattern, and the radiators of the "Classic" pattern.

The ventilation is mechanical, in conjunction with the heating apparatus, two extract fans being fixed in the roof space and connected to air outlets in the ceiling by means of sheet steel trunking. There is also one extract fan fixed in the false ceiling under the balcony to deal with the back portion of the auditorium. Fresh air inlets are fixed behind each radiator.

The heating and ventilating installation was carried out by the Brightside Foundary and Engineering Co., Ltd., of Birmingham.

Early Twentieth Century Cinemas

The Mayfair Cinema, Hull, 1929

THE MAYFAIR CINEMA, HULL.

THIS new cinema, situated in Beverley Road, is a well proportioned building with a seating capacity for 1,850 people, and possesses many interesting features. Designed by Mr. H. F. Wharf, A.R.I.B.A., of Freeman, Son & Gaskell, the well-known Hull architects, the building has a tasteful interior, and, with plenty of spare ground on the site, a motor park of considerable dimensions for the use of patrons. The heating installation is a two-pipe low-pressure system with ordinary radiators as heating units, the

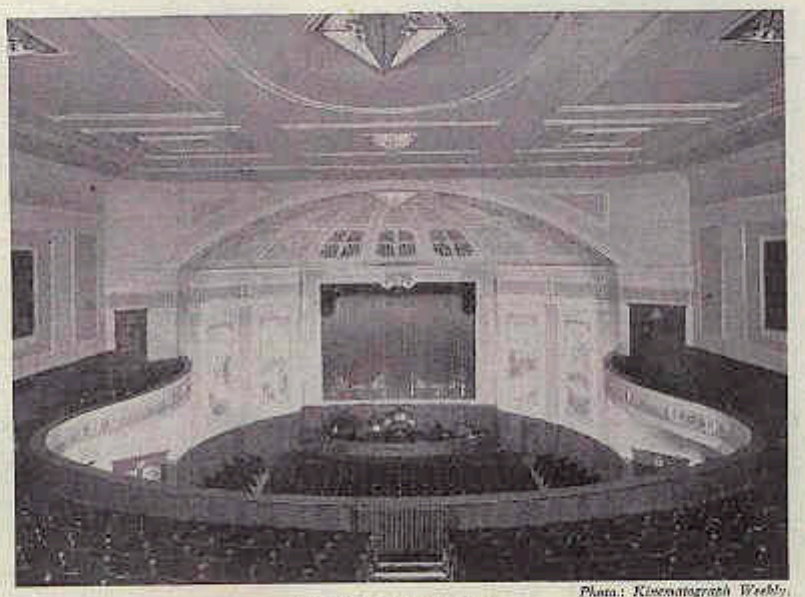


Photo: Kinematograph Weekly.

MAYFAIR CINEMA, HULL.

Architects: H. F. Wharf, A.R.I.B.A. *Heating by A. J. Snelling & Co.*

system being designed for a temperature of 65 deg. when outside temperature is 32 deg., with five air changes per hour. A noteworthy feature of the installation is that nothing is exposed in the building except the radiators, the whole of the piping being run under the floors. This is good practice where every inch of space is a consideration from the point of view of seating capacity. The boiler is a No. 49 Britannia, and the heating surface aggregate about 3,600 square feet of radiators, the latter being of "Ideal" classic type, and the circulation is assisted by an accelerator. The heating installation was designed and installed by A. J. Snelling & Co., of Hull.

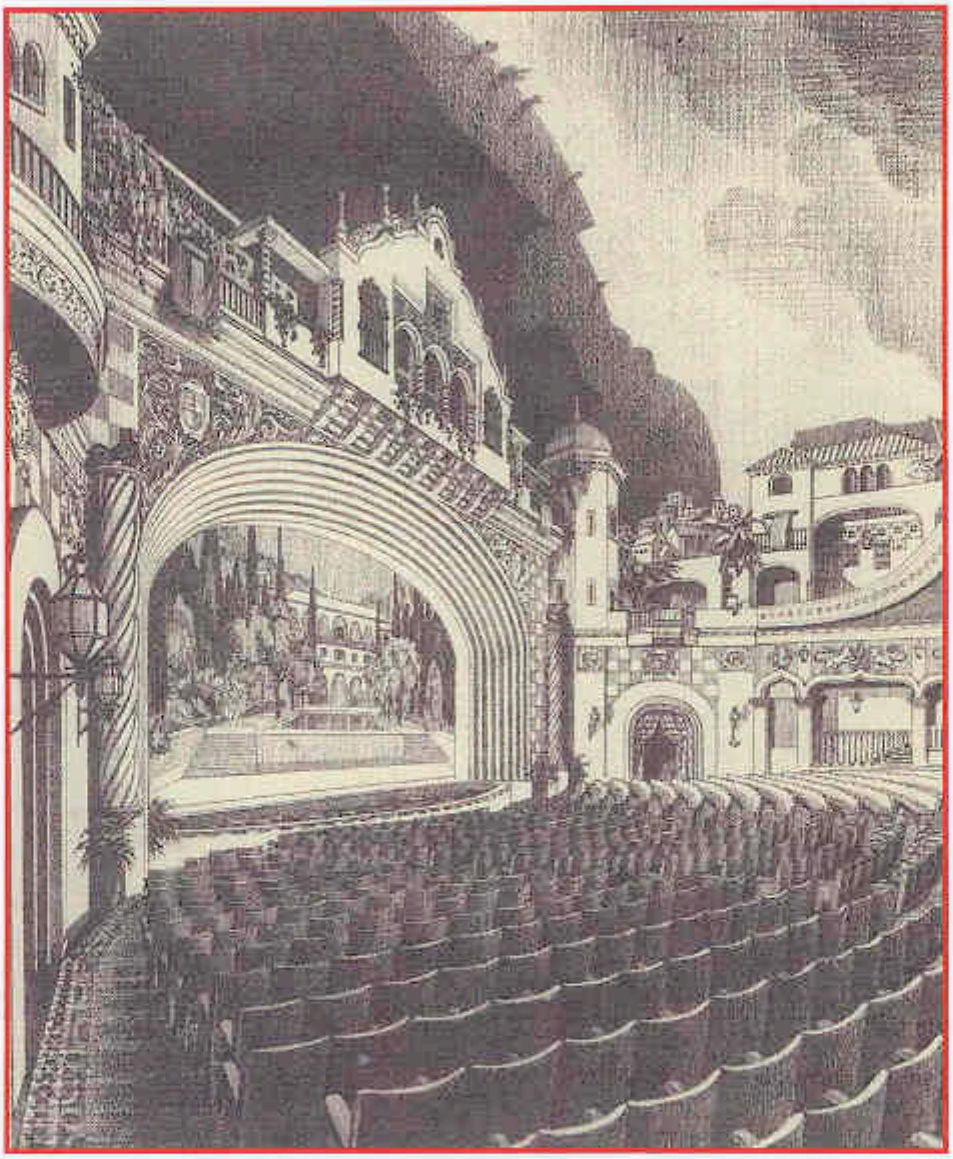
Early Twentieth Century Cinemas

Astoria, Brixton, London

Date Built/Opened: 1929
Seating Capacity: nearly 3000
Architect: Edward A Stone
HVAC Engineer: Carrier Engineering Company
HVAC System: Mechanical ventilation, believed with air washer, no evidence discovered of refrigeration
Status: In use as a rock venue, listed building
References: *Cinemas in Britain,* Richard Gray, 1996

Early Twentieth Century Cinemas

Astoria, Finsbury Park, London



Date Built/Opened: 1930
Seating Capacity: 3300
Architect: Edward A Stone (a Spanish Moorish "atmospheric" design)
HVAC Engineer: Carrier Engineering Co Ltd, London
HVAC System: Mechanical ventilation with washer, believed without refrigeration
Status: Converted to church
References: *Indoor Air by Carrier,* catalogue, 1930s

Early Twentieth Century Cinemas

The Tivoli, Portsmouth, 1930

THE TIVOLI, PORTSMOUTH.

THE TIVOLI CINEMA, PORTSMOUTH.
Architects: Thomas and Wilkins. *Warming and Ventilation by G. N. Haden & Sons, Ltd.*

SITUATED in Copnor Road, Copnor, this new Cinema makes a welcome addition to places of amusement in Portsmouth. It is planned to seat 1,500, and is built without a gallery to ensure the perfect acoustic properties demanded in the modern all-talkie theatre. The interior is decorated in the Spanish open-air style, and the lighting is in keeping with the general scheme of decoration.

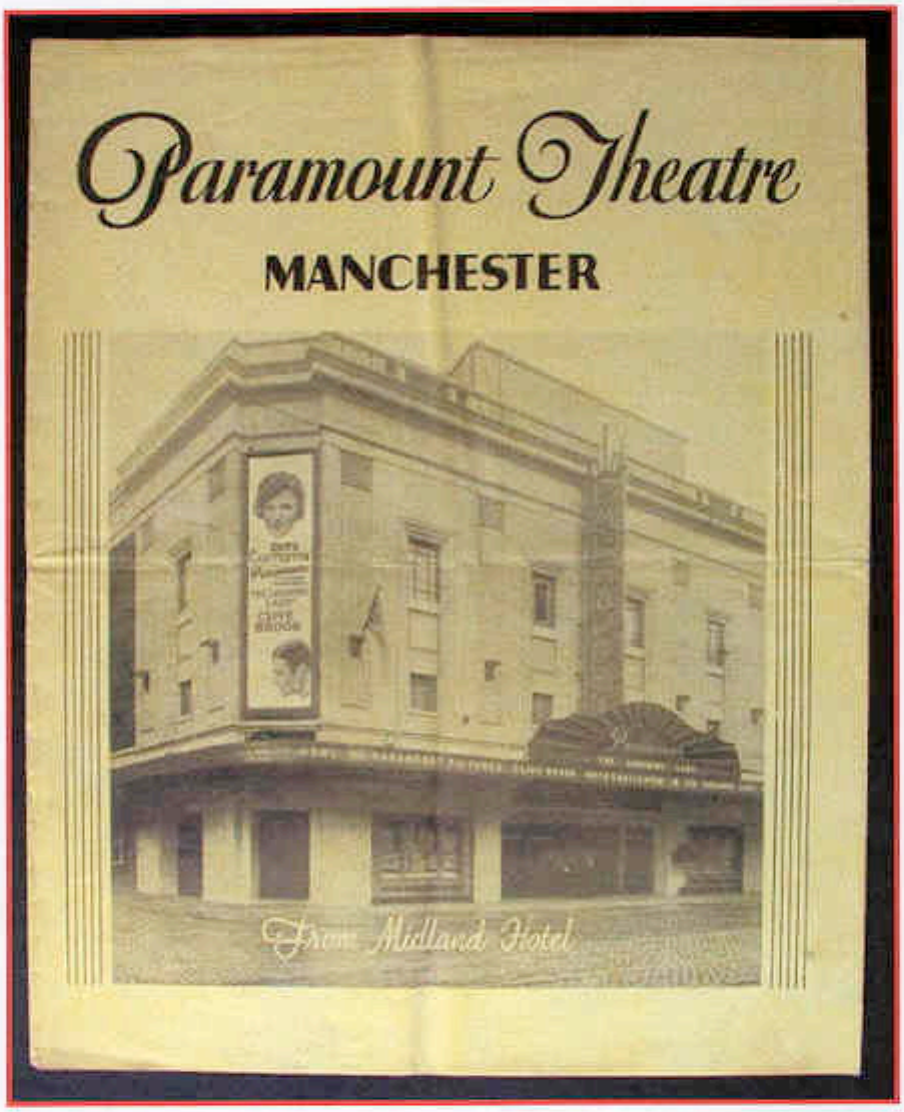
The Heating is designed on the Low Pressure Accelerated system, the whole of the pipes being concealed. Ideal "Classic" Radiators are placed in recesses in the Auditorium and Crush Hall. The Boiler is a No. 37 Britannia Boiler, equipped with Oil-O-Matic Burner, which is automatic in operation, the principle of the burner being that it operates until the temperature has reached the predetermined limit, and then cuts out and comes into operation again when the temperature has fallen below the prescribed limit. The Burner is also fitted with other automatic devices, including an automatic safety cut-out, so that should the flame cease to ignite or the oil supply fail, the burner will automatically cease to operate. The Oil storage is contained in one pressed steel sectional tank, placed in the heating chamber, and the circulation in the heating system is maintained by one of Haden's patent "Turbo" Accelerators, which embodies an automatic bye-pass connection. The radiators were supplied by the National Radiator Co., Ltd.

The Ventilation is maintained by two extract fans fitted in the roof, extracting through grids concealed above the ceiling arch, and in the decoration on the ceiling and walls. The fans were supplied by Messrs. James Keith and Blackman Co., Ltd.

The Architects of the "Tivoli" were Thomas and Wilkins, of Havant, and the Warming and Ventilation was installed by G. N. Haden and Sons, Limited, of Bournemouth.

Early Twentieth Century Cinemas

Paramount Theatre, Manchester



Built/Opened: 1930
Seating Capacity: 2920
Architect: Frank T Verity & Samuel Beverly
HVAC Engineer: Carrier Engineering Co Ltd, London
HVAC System: Air conditioning with Carrier centrifugal water chiller [model 8.E.R7.7, number 02037]
Status: Renamed Odeon 1939
References: CIBSE Heritage Group Collection