

**THE STAGE"  
YEAR  
BOOK**

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## BRISTOL HIPPODROME STAGE.

## ITS MACHINERY AND MECHANICAL EQUIPMENT.

BY F. G. H. MACRAE.

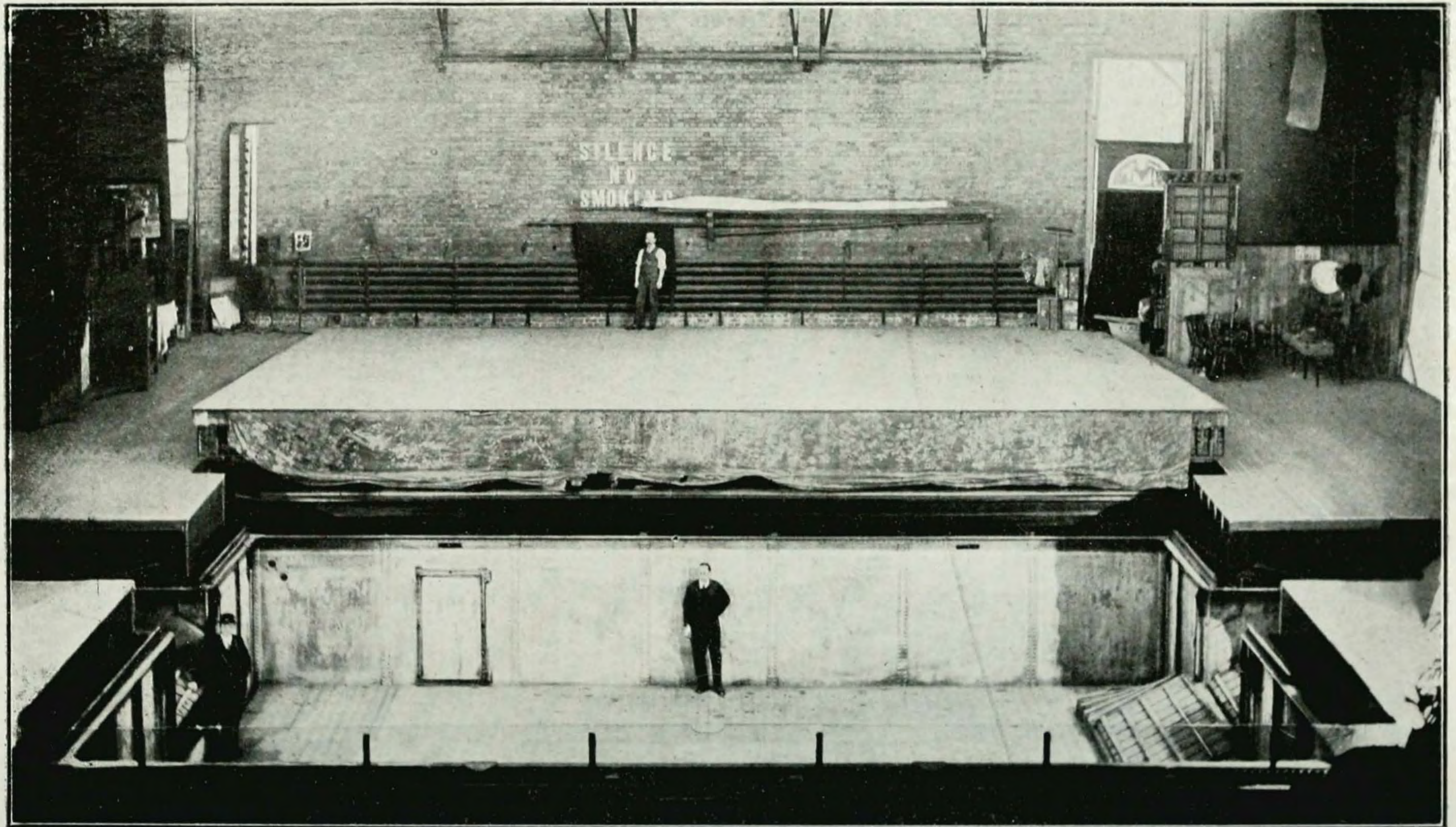
## INTRODUCTORY.

THE music-hall of to-day commands serious consideration from the engineering world. The advancement it has made in mechanical equipment permits of productions being presented to the public which, in olden times, would have been considered impossible. Realism in olden times depended on imitations such as transparencies for waterfalls, etc.; realism of to-day is presented in its literal meaning. To attain this, modern machinery is now utilised to the best advantage, and the Bristol Hippodrome presents one of the finest illustrations of a modern music-hall equipped with a mechanical installation that assist the stage manager to the last degree. To transform an ordinary stage into a lake of water by the movement of two levers can justly be considered the acme of scientific application, and the release of thousands of gallons of water from the roof permits of effects both realistic and astounding. The Bristol Hippodrome stage may broadly be described as being on the hydro-electric principle; part of its machinery being hydraulic and part electric. This is still more interesting when it is known that the hydraulic pressure is "made on the premises," and the same applies to some extent to the electric, although in the latter case the primary source of supply is the Corporation mains. Productions such as "Sands o' Dee," "Redskins," "The Flood," "Mexico," etc., with their raging torrents, waterfalls, storms and diving animals present no difficulties in a house fitted out on these lines. Scenes of river life, with the gay decked throng in punts and canoes, have been presented in all their realism, and there is practically no limit to which such an equipment can be adapted. Ability and enterprise are the keynotes of such an attainment, and Mr. Oswald Stoll is to be congratulated on this fine building.

## STAGE AND WATER TANKS.

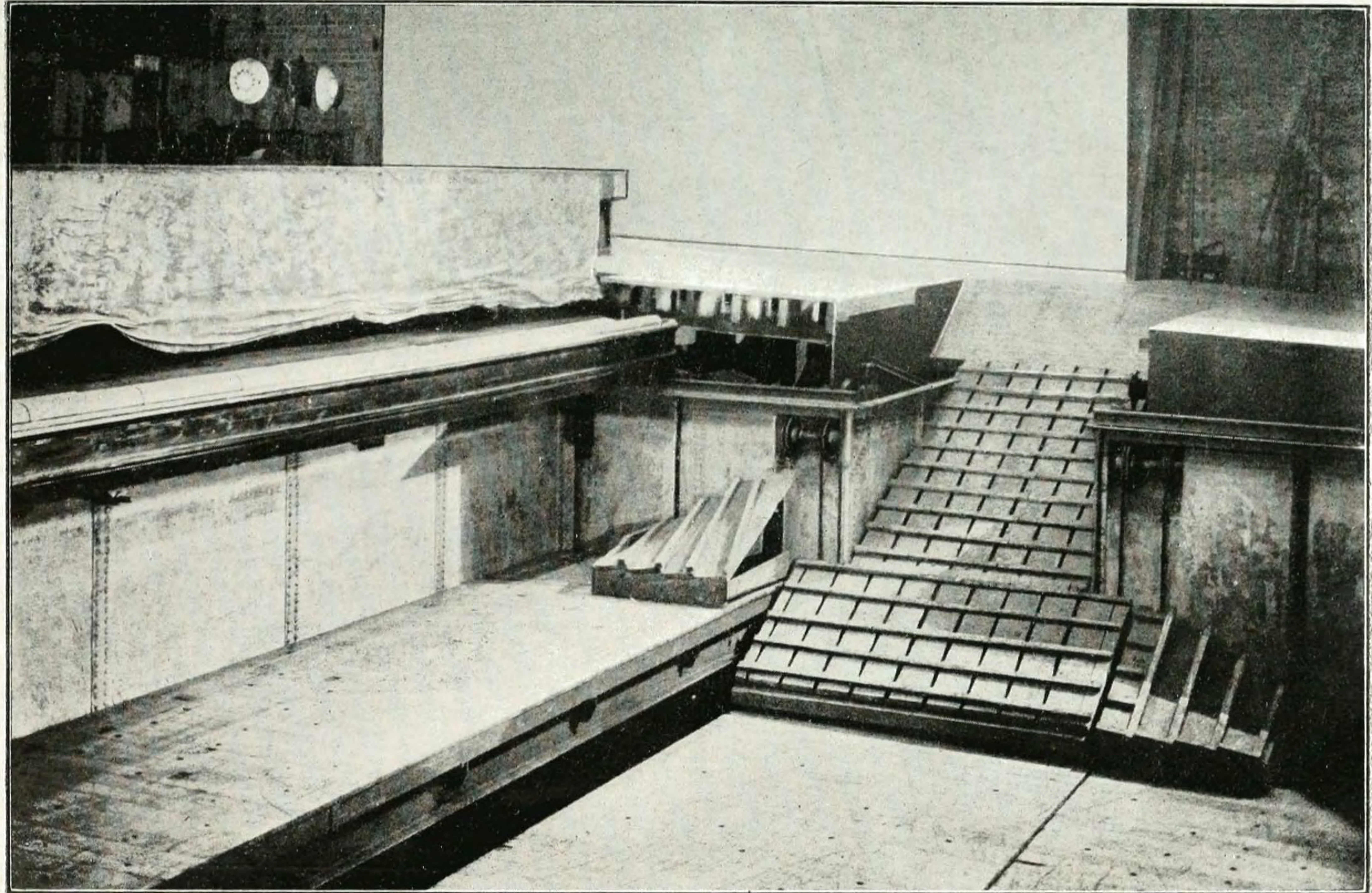
The stage has a depth of 60 feet from footlights to back wall. The proscenium opening is 47 ft. 6 ins., and the width from wall to wall is 81 ft. A scene dock is provided back stage prompt. From a mechanical point of view the stage may be considered as being in two halves—front and back. The back half is lifted through the medium of a 4-in. steel wire rope, operated by an 8-in. hydraulic ram, controlled from the switchboard. The front half, together with the footlights, now travels back on steel rails until underneath the back half. This is accomplished by means of a worm gear, which operates a shaft and drives two sprocket wheels and chains; the whole being driven by an electric motor. The footlights are turned down level with the front stage by means of a handle operating a small worm gear, and they are electrically disconnected by means of a plug in the basement. This discloses the main water tank, 42 ft. by 27 ft. 6 ins., with a maximum depth of water of 7 ft. 6 ins. At the P. and O.P. sides are two bays, each 7 ft. 9 ins. by 10 ft. 6 ins., the stage portions of which open by means of a hand winch. These provide a useful entrance or exit to or from the tank. Rake pieces are sometimes fixed to the table directly under these bays, which are of great assistance to animals leaving the water. Situated in the tank are four tables completely covering the bottom. These tables are capable of being raised to any height up to the top of the tank, and will, therefore, provide either a dry platform or any depth of water up to the maximum. Each table is capable of being moved independently by its own 8-in. hydraulic ram; the power being transmitted to the table by four 2½-in. steel wire ropes operating over pulleys. The tables are controlled from the switchboard by four wheel valves and a

# BRISTOL HIPPODROME STAGE.



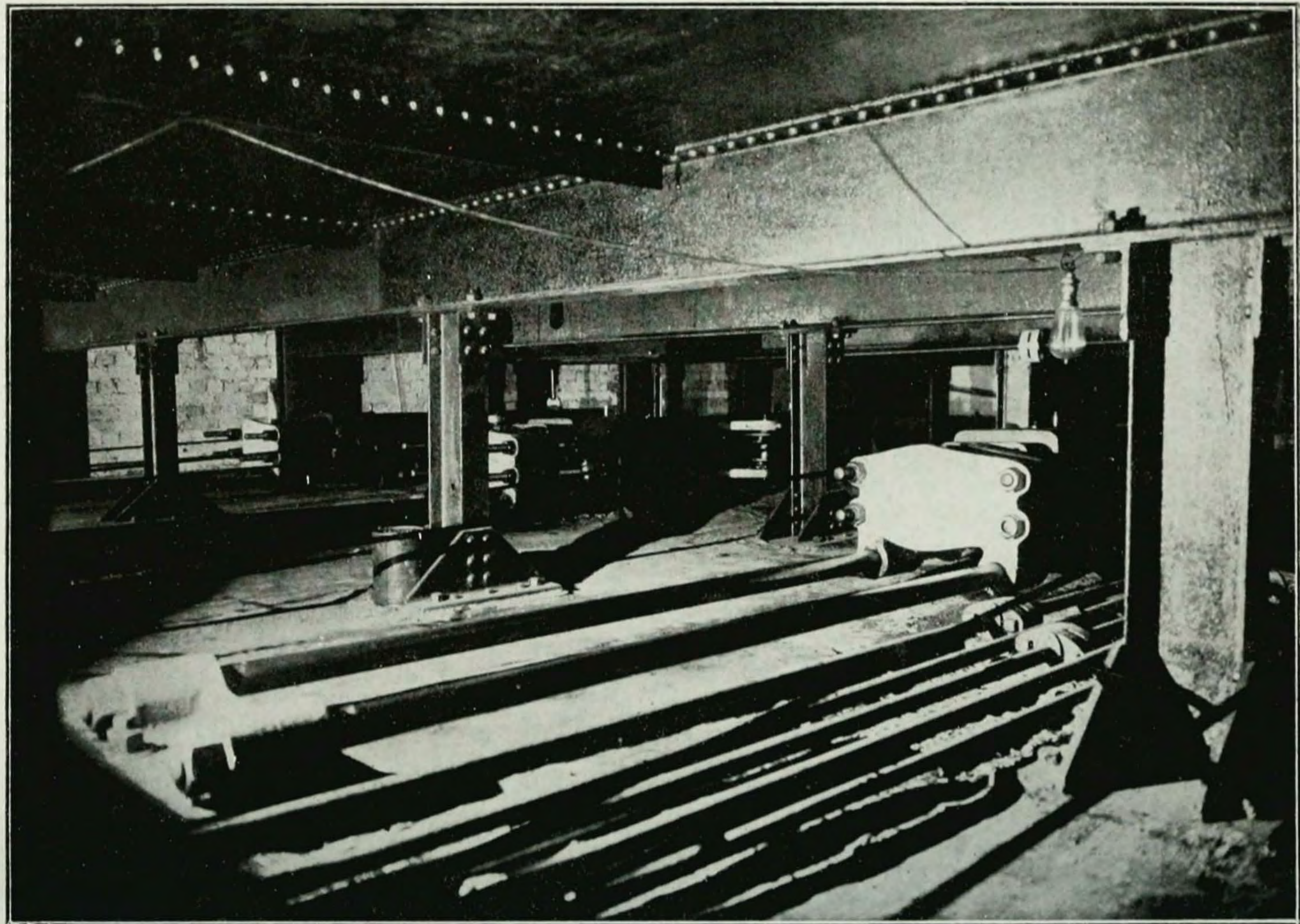
Showing back stage lifted, front stage drawn under, bays open, glass screen partly raised, and water tank exposed.

# BRISTOL HIPPODROME STAGE.



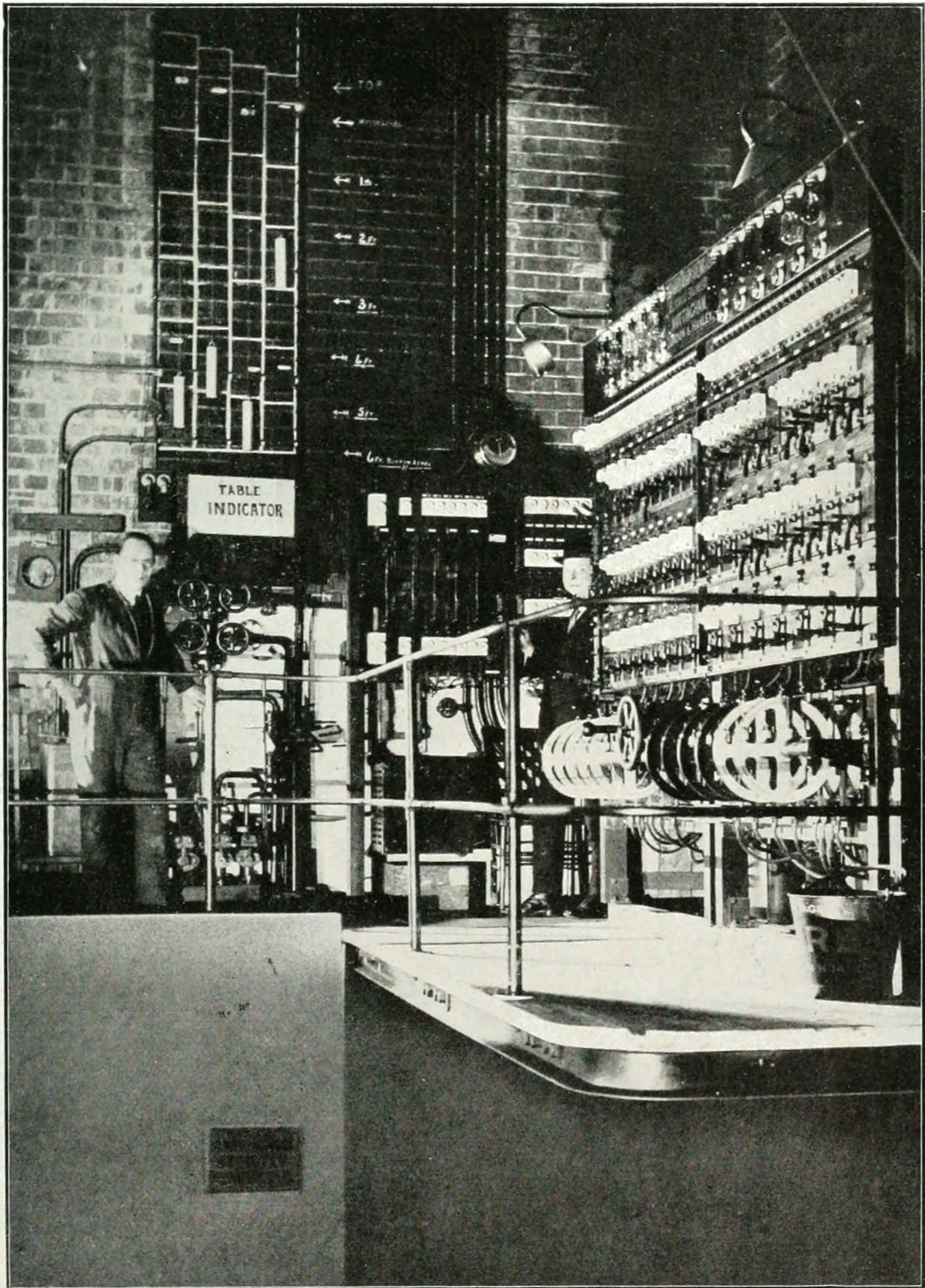
A corner of the water tank, showing three of the four tables, bay and horse rake, front and back stage, and table ropes and pulleys.

BRISTOL HIPPODROME STAGE.



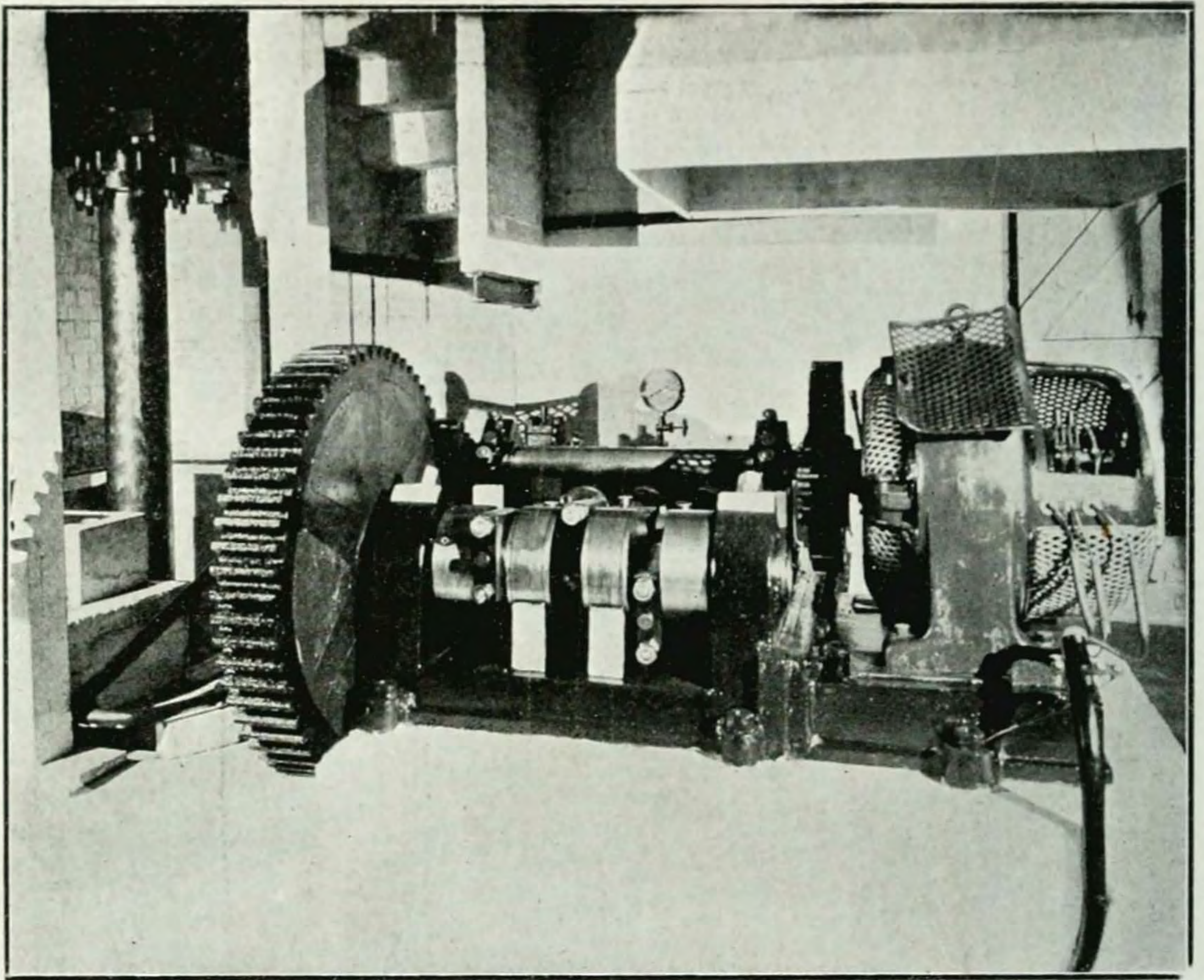
Under the ma'n water tank, showing three of the four hydraulic rams for operating the tank tables.

# BRISTOL HIPPODROME STAGE.

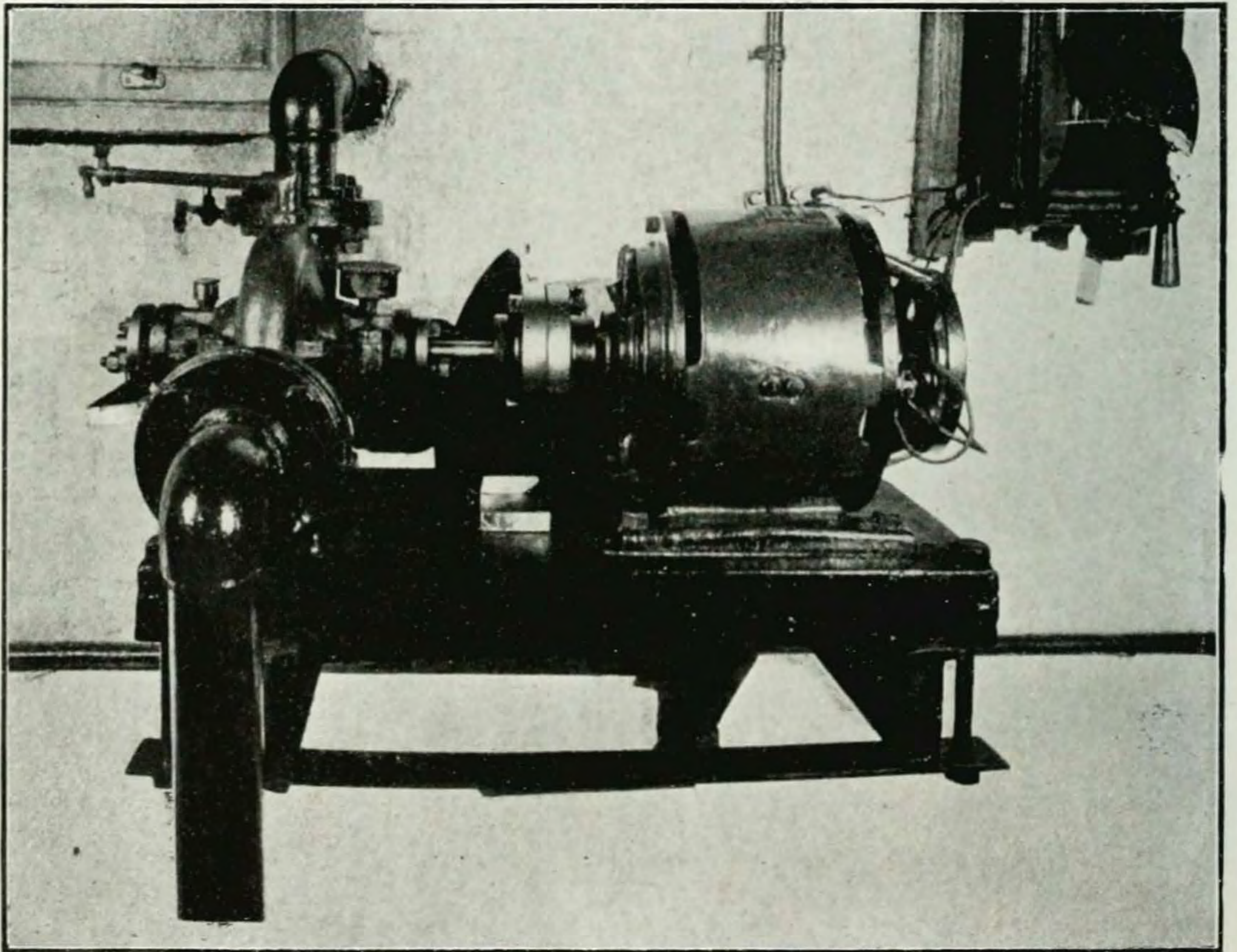


MAIN SWITCHBOARD,

# BRISTOL HIPPODROME STAGE.



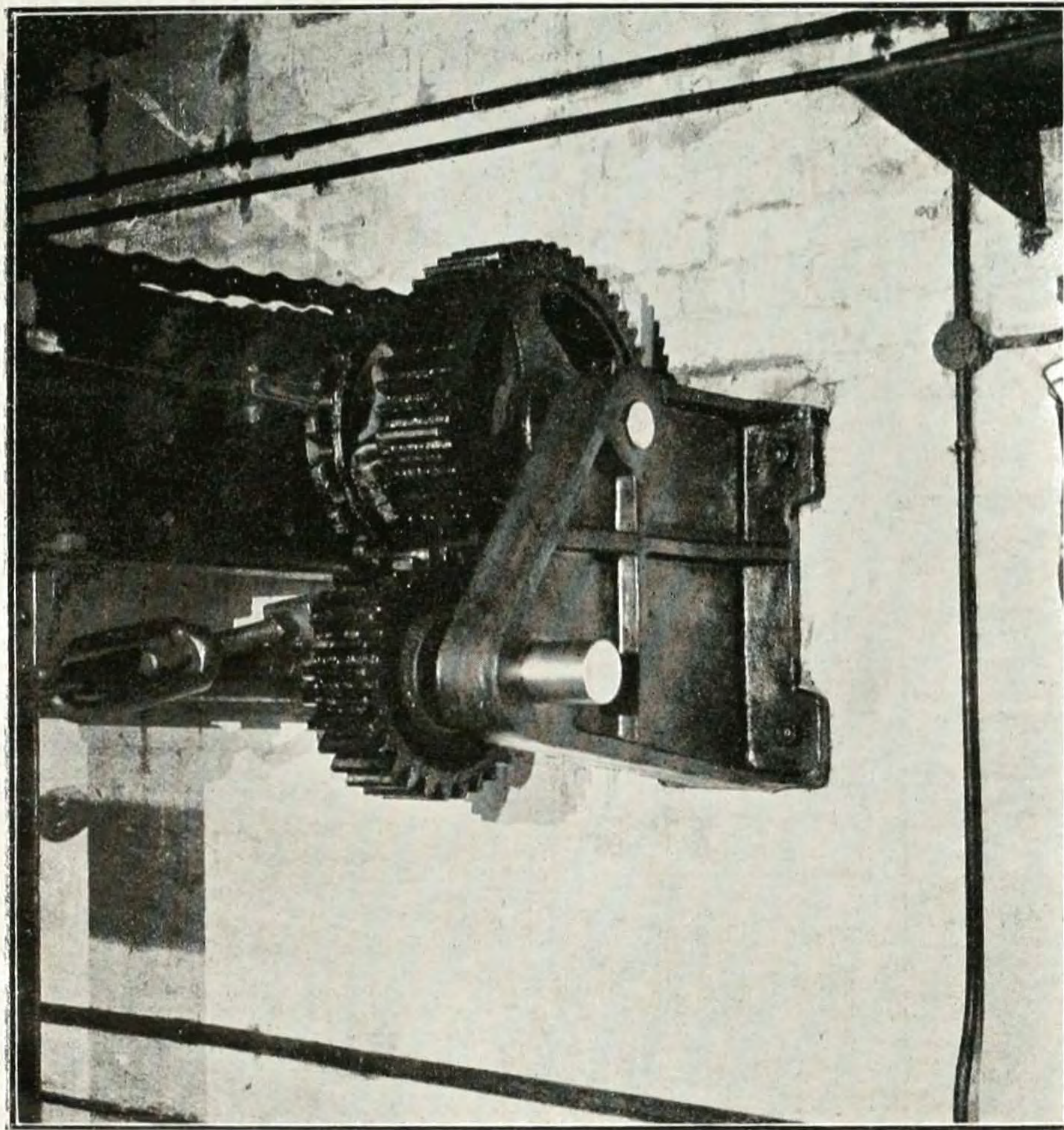
Motor Driven Three-Ram Pump and Hydraulic Accumulator.



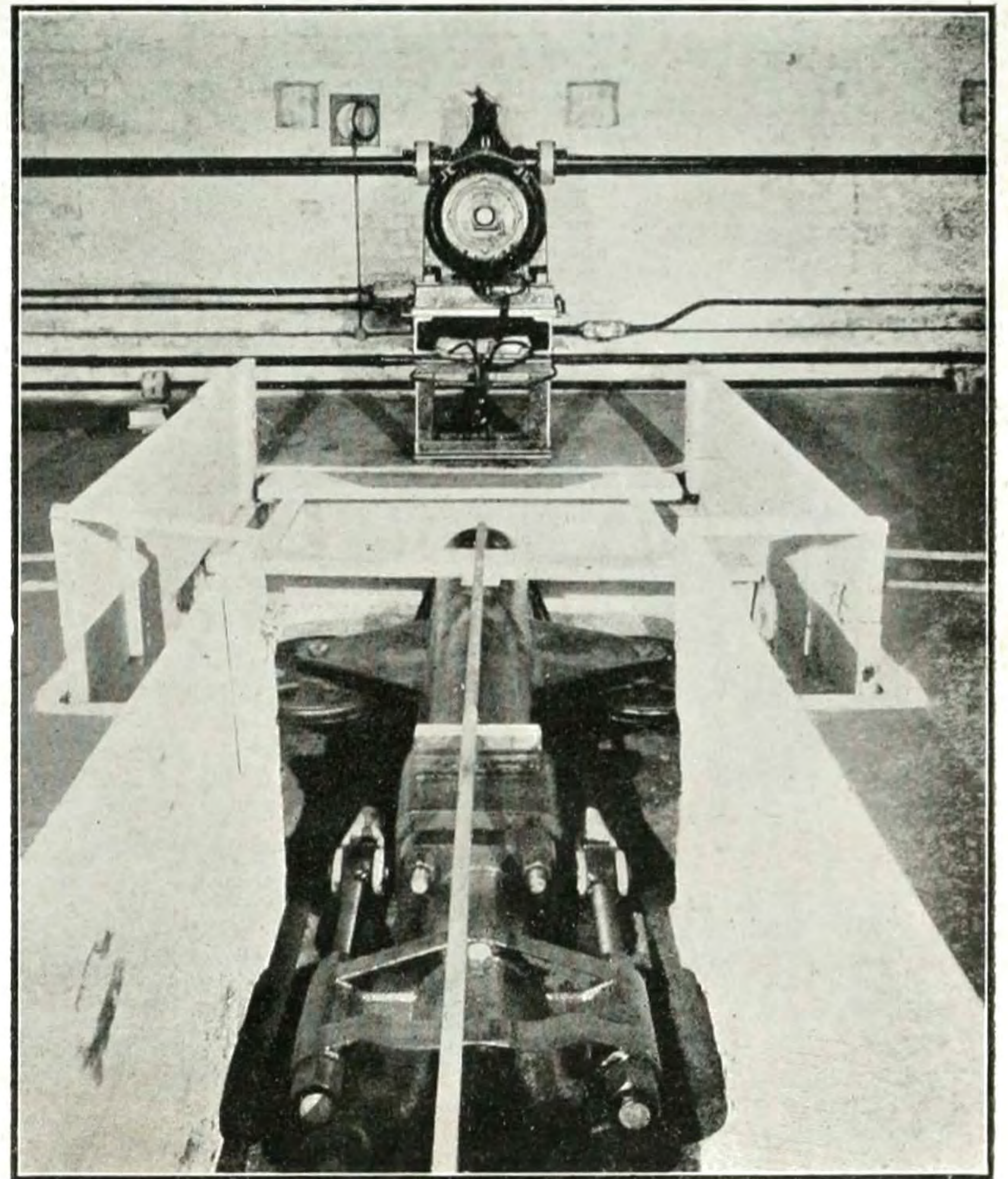
Motor Driven Centrifugal Pump,



# BRISTOL HIPPODROME STAGE.

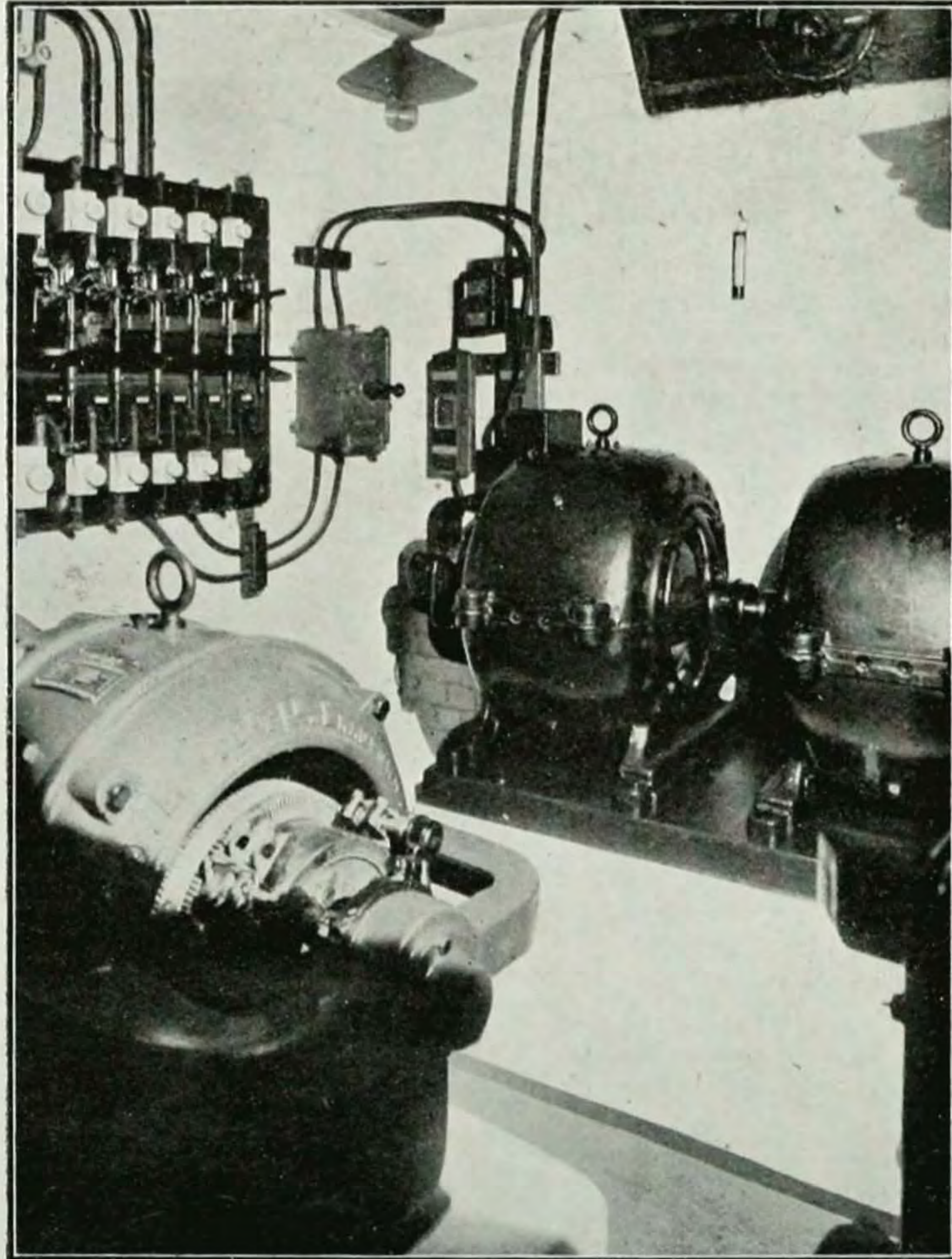


Chain Wheel and Gear for Driving Front Stage.

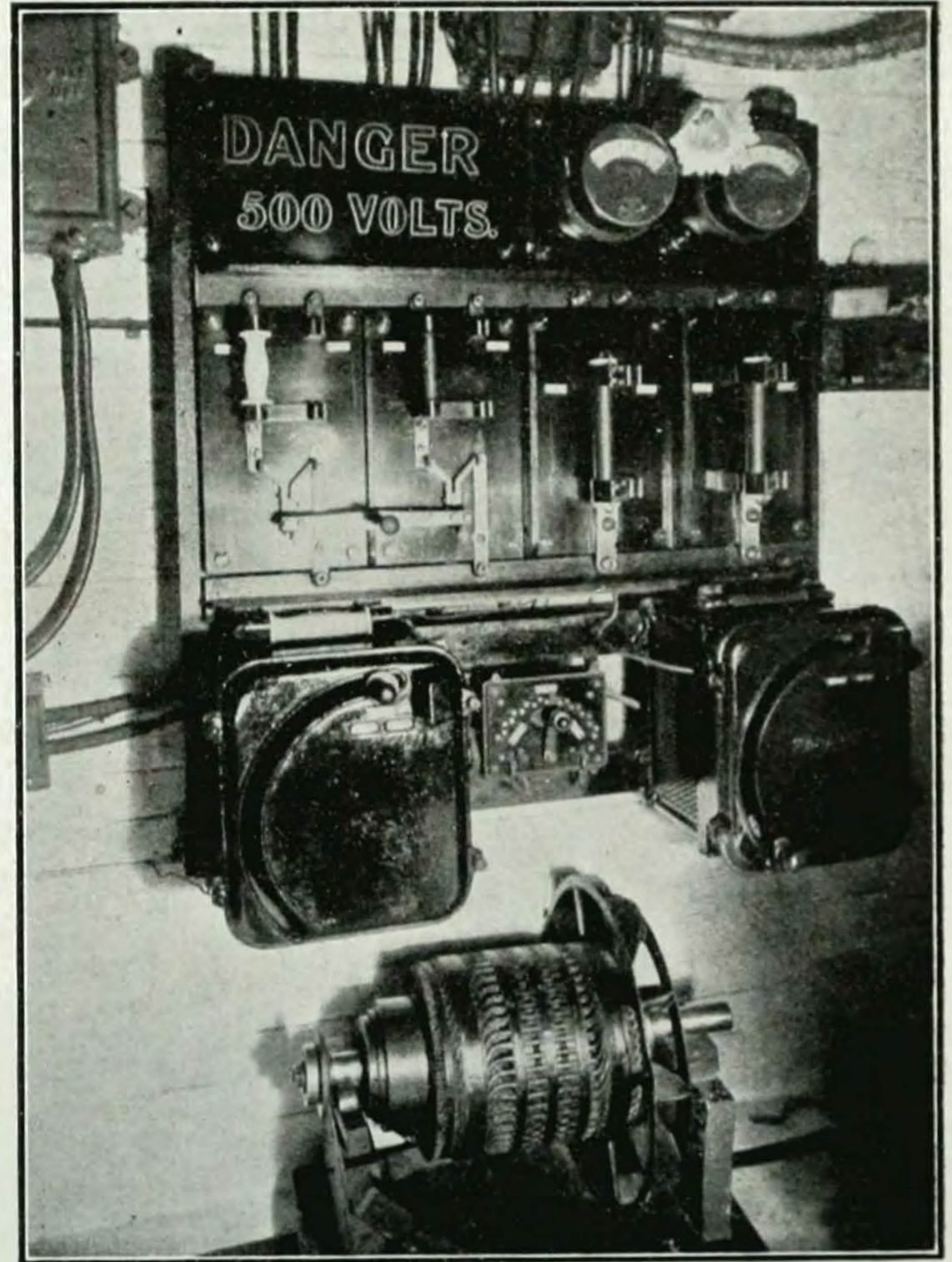


Back Stage Hydraulic Ram, and Front Stage Motor. 3

BRISTOL HIPPODROME STAGE.

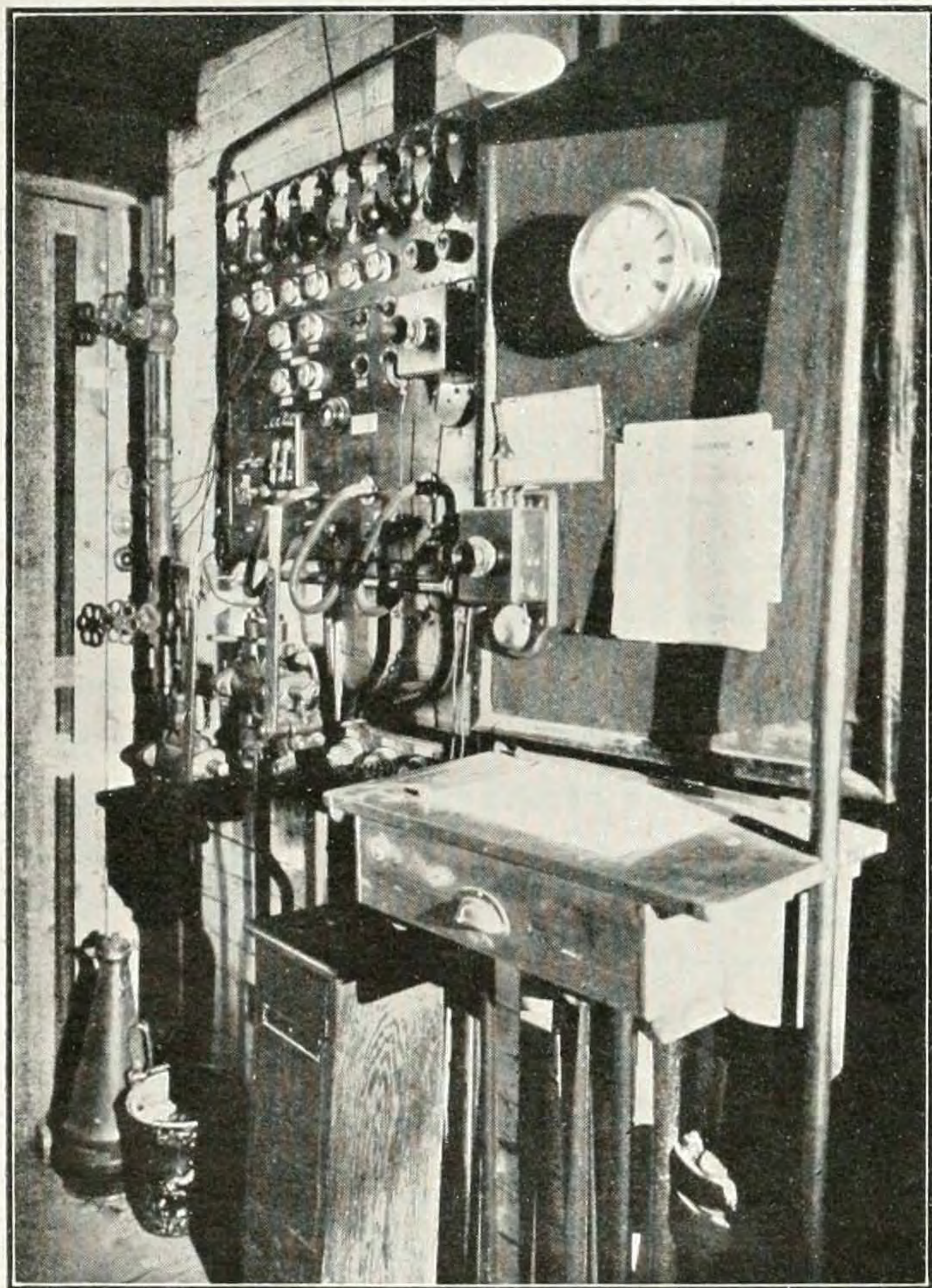


Two Motor Generators for the Arc Lighting.

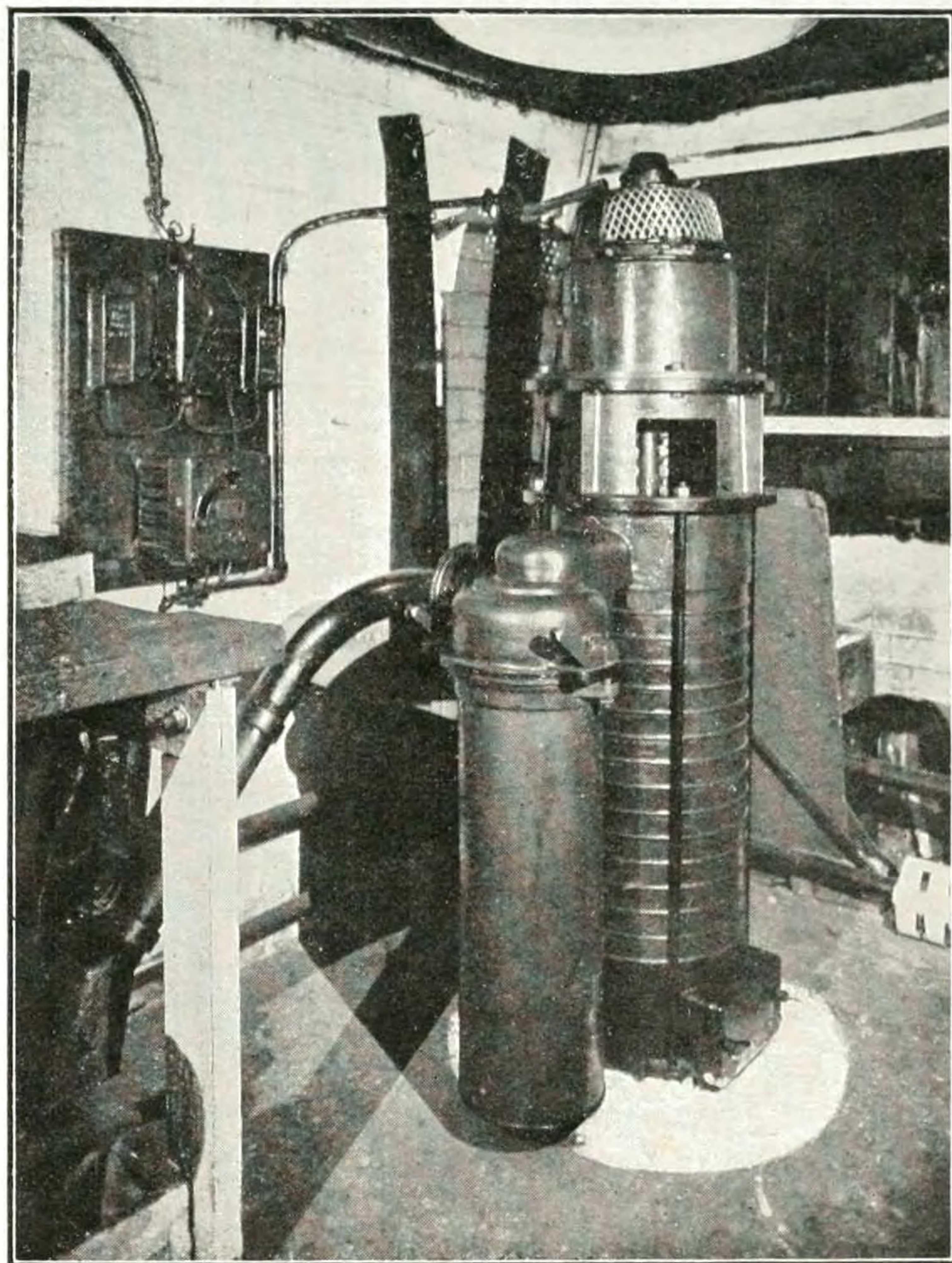


Power Board for Motor Generators, and Spare Armature.

# BRISTOL HIPPODROME STAGE.



Prompt Corner, showing Signal Board, Hydraulic Levers, and Number Regulator.



Vertical Turbine Vacuum Cleaner.

master lever. In front of the tank is a glass screen consisting of seven sections of  $\frac{1}{2}$ -in. plate glass. This is capable of being raised to a maximum height of 6 ft. above the level of the tank, and prevents any water from splashing over into the orchestra. This screen is operated by a 4-in. hydraulic ram controlled from the switchboard. The water in the stage tank is heated through the medium of a cast-iron sectional boiler. On the stage roof are situated two water tanks for "effects." The water from these is led to the stage by 8-in. pipes, and controlled from the fly "bridge" by two wheel valves. This water eventually runs to a sump under the stage tank and is pumped out by an electrically driven centrifugal pump. Water mains are also available in the "flies" and "grid." The water to the stage tank is supplied by a 4-in. main, and the tank is emptied into the basement sump through a 6-in. pipe and wheel valve. This water is then pumped to a drain by means of the centrifugal pump before mentioned.

#### THE HYDRAULIC SYSTEM.

The nucleus of the hydraulic system is the hydraulic accumulator—or compressor—by which water is raised to a pressure and conveyed by pipes to the various rams. This consists of the accumulator and a three-ram hydraulic pump (electrically driven), which supplies eight rams at a pressure of 1,000 lbs. per square inch. The rams in turn operate the back stage, four tank tables, glass screen, tableaux curtains, and fireproof curtain. The 8-in. "back stage" ram is placed horizontally in the floor of the stage basement. The four 8-in. rams for the tank tables are situated horizontally under the stage tank, and the 4-in. ram for the glass screen is in a vertical position in front of the tank. The 5-in. tableaux curtain ram and 6-in. fireproof ram are situated on the wall above the fly-level, P. and O.P. respectively. Emergency gear is fitted to the fireproof curtain, which enables this to be raised by hand. Other emergency gear in the shape of heavy block tackle, spare armatures, and numerous spare parts, are instantly available.

#### THE ELECTRIC SYSTEM.

The electricity supply for the stage is taken from the Bristol Corporation. The lighting is alternating current, single phase, 210 volts. The power is 500 volts D.C. The stage intake-room is between the stage and basement levels, the main circuits being controlled by Berry-Skinner switches. Apart from the ordinary stage lighting the electric system consists of a motor driving the three-ram pump, a motor driving the front half of stage, an electrically driven centrifugal pump, an electrically driven vacuum cleaner, and two motor generators. All these motors are of the D.C. type, and run at 500 volts. The motor generators supply the bioscope and stage arc lighting at a pressure of 80 volts. They consist of two machines; one with an output of 250 ampères, and the other with an output of 280 ampères. They are situated in a room between the stage and basement, and feed a separate board on the main switchboard, from which the various arc circuits are controlled. The three-ram pump motor, centrifugal pump motor and vacuum cleaner motor are all in the stage basement; the first has a speed of 965 R.P.M., and transmits its power through gearing. The latter two are direct coupled. The centrifugal pump motor runs at a speed of 1,600 R.P.M., and the speed of the back stage motor varies according to the position of the controller, which is situated on the main switchboard. The vacuum cleaner is of the vertical turbine type, and runs at 3,500 R.P.M.

#### THE SWITCHBOARD.

The main switchboard may be described as consisting of: the stage lighting board, arc board, hydraulic levers and front stage electrical controller. The lighting board is fitted with liquid dimmers, which can be operated together or independently. The pots are situated on the lighting gallery directly behind the board, there being ample room for accessibility. The incandescent lighting of the stage consists of seven battens, proscenium lights and floats, together with lengths and bunches. The stage arc lighting consists of six automatic arcs (four being of the flame type), together with the ordinary hand-fed arcs on the perches and stage. There is also provision for three arcs from the auditorium. The stage has provision for a total of twenty-five arc lamps. A novel feature of the stage arc lighting is a lighting gallery immediately behind the top of the proscenium which permits a fine concentration of light; this is particularly useful for illuminating the water. A table indicator has been installed by Mr. Campbell, the resident electrician, which indicates on the board the height of the tank tables, thereby enabling the

operator to know the position of these, and consequently the depth of water. This indicator is in the form of weights fixed to a small steel wire rope, which in turn is connected to the rope of the table. The weights move vertically on a scale on the switchboard wall, and the depth of the water is shown in feet. The hydraulic levers for the "tabs," and "fireproof," and the signal board are situated in the prompt corner. The signalling system consists of lights, bells, and telephones; and a second signal board is available for large productions consisting of coloured lamps wired in series. Two 100 ampère "special effect" boards are provided on the stage for any electrical effects requiring a large amount of current. The circuits feeding these boards are entirely independent of any other stage circuit. Each board is fitted with three D.P. switches and fuses.

#### HEATING.

The heating of the theatre is on the low-pressure hot-water system, and consists of radiators and pipes situated at points calculated to give the maximum efficiency, and governed by a cast-iron sectional boiler. There is also a sectional boiler for heating the water in the main stage tank, and a separate boiler for supplying the water to the dressing-rooms.

### GENERAL MEETINGS OF SOCIETIES, FUNDS, ETC.

- January 24.—The annual general meeting of the Variety Artists' Federation was held at the Criterion Restaurant. The chair was occupied by the late Mr. W. H. Clemart, Chairman of the Federation.
- February 12.—The twenty-first annual general meeting of the Theatrical Managers' Association was held at Gatti's Restaurant. The chair was occupied by Mr. J. F. Elliston.
- February 16.—The annual general meeting of the Actors' Benevolent Fund was held at the New Theatre. The chair was occupied by Sir Charles Wyndham, the President.
- February 24.—The annual general meeting of the Variety Artists' Benevolent Fund and Institution was held at the "Bedford Head" Hotel. The chair was occupied by Mr. Eugene Stratton.
- March 2.—The twenty-fourth annual general meeting of the Actors' Association was held at His Majesty's Theatre. The chair was occupied by Sir H. Beerbohm Tree, the President.
- March 26.—The annual general meeting of the Royal General Theatrical Fund was held on the stage of the St. James's Theatre, the President, Sir George Alexander, occupying the chair.
- April 23.—The Annual general meeting of the Critics' Circle was held in the Hall of the Institute of Journalists, with the President, Mr. J. T. Grein, in the chair.
- May 6.—Annual Meeting of the trustees and guardians of Shakespeare's birthplace.
- June 10.—The Annual General Meeting of the Rehearsal Club was held at the St. James's, with Mr. Gerald du Maurier in the chair.
- July 6.—The fourth annual meeting of the Catholic Stage Guild was held at the Savoy Theatre, presided over by Mr. Lister Drummond.
- July 16.—The Annual Conference of the Actors' Church Union was held at the Savoy. The Bishop of Birmingham, Vice-President of the Union, presided.
- July 22.—A meeting was held at the Savoy under the auspices of the Actors' Association, which was open to all members of the profession, for the discussion of professional matters as affected by the war. Mr. H. B. Irving presided.
- August 23.—The Annual General Meeting of the Travelling Theatre Managers' Association was held at 7, Wellington Street, Strand, with Mr. A. E. Drinkwater in the chair.
- September 30.—The annual General Meeting of the O.P. Club was held, with Mr. Carl Hentschel in the chair.
- October 27.—The annual general meeting of the Music Hall Artists' Railway Association took place at the "Bedford Head" Hotel, with the President, Mr. Joe Elvin, in the chair.
- October 31.—The Annual Meeting of the Showmen's Guild was held at Rotherham.
- November 5.—The Annual Meeting of the Actors' Orphanage was held on the stage at Wyndham's Theatre, Mr. Gerald du Maurier presiding.
- November 5.—The Annual General Meeting of the Music Hall Ladies' Guild was held at the Boulogne Restaurant, Mrs. Charles Coborn presiding.
- November 26.—The annual general meeting of the Concert Party Proprietors' Association was held at the offices of the Association, with Mr. Charles Heslop in the chair.
- December 3.—The annual general meeting of the Theatrical Ladies' Guild took place at the St. James's Theatre, with Miss Irene Vanbrugh in the chair.