SCIENCE

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THE WESTERN ELECTRIC INCANDESCENT LIGHTING SYSTEM.

ALTHOUGH it has not the capacity of the arc system for producing large lights, and is inferior to it in economy, the incandescent light demonstrates daily its ability to compete successfully with gas and other systems of lighting, and has supplanted gas for purposes of general illumination in many places.

Figs. 1 and 2 illustrate a complete dynamo as made for the incandescent system of the Western Electric Company, while Fig. 3 shows a field-magnet and pole-pieces only. The whole iron base is cast in one piece. The cores of the field-magnets are made of soft iron, and pole-pieces are cast upon the upper ends of the cores. The lower ends of the cores are bolted to the cast-iron base: there are therefore only two magnetic joints in the whole system.

The type of field-magnet frame used in their well-known arc-lighting system is not used for this incandescent apparatus; but a simpler form, and one better adapted to this class of work, has been adopted. The peculiar form of the cast-iron base results in bringing the armature-shaft at a convenient height from the floor, but not so high as is usually the case in dynamos having this type of field-magnet, while at the same time it permits the use of the sliding carriage for adjusting belt-tension without raising the dynamo or rendering it unstable. The field-magnet coils are con-

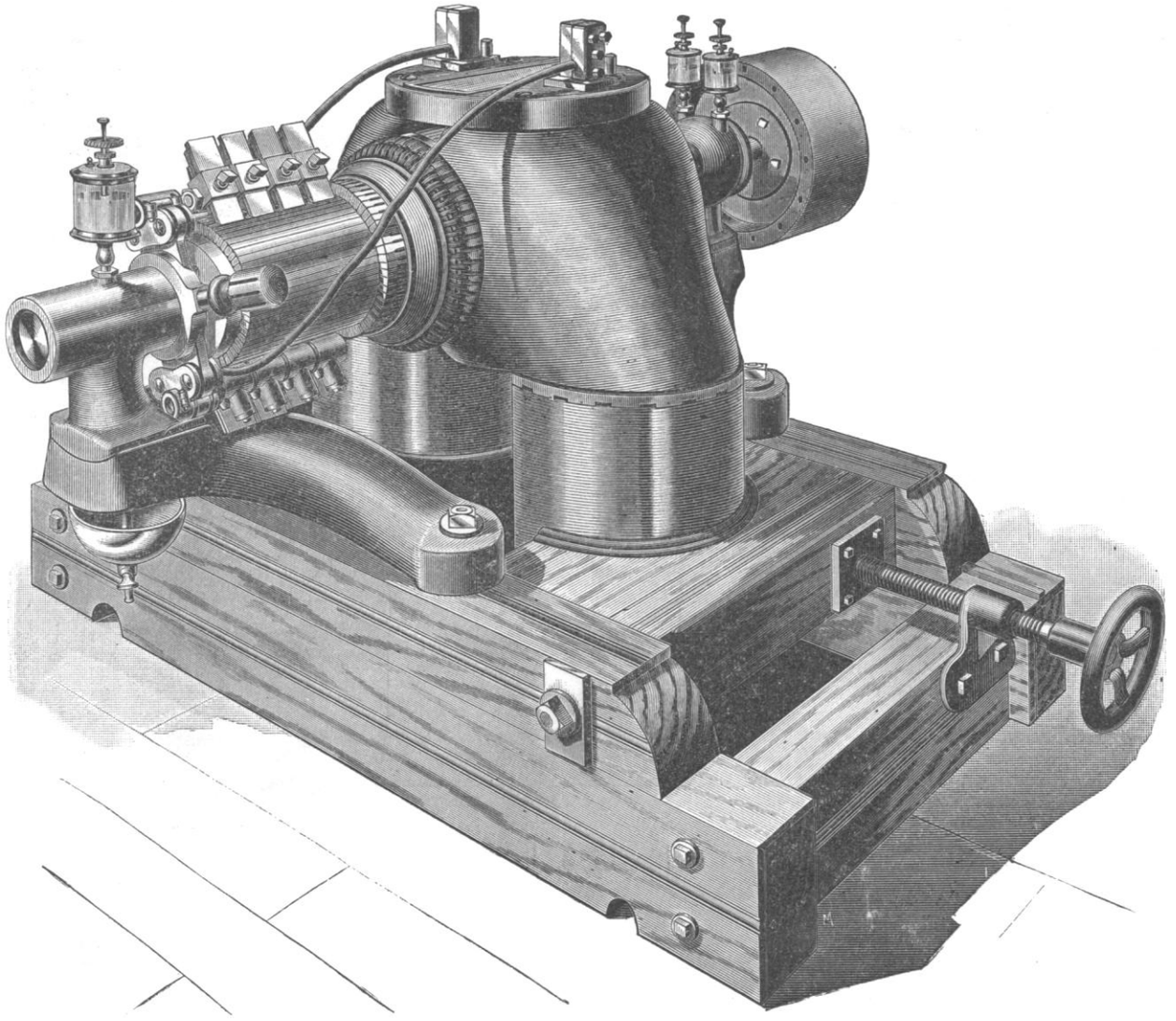

FIG. 1.—END VIEW OF INCANDESCENT DYNAMO OF WESTERN ELECTRIC COMPANY.

nected, shunting the armature. The automatic regulation thus secured is practically perfect. Any number of lamps may be cut in or out without visibly affecting the candle-power or brilliancy of the lamps throughout the system.

The terminals of the thin field-wires are not exposed to injuries, as in so many systems, but are led in channels through the pole-pieces to the field binding-posts. Both these posts and the main binding-posts are mounted on a hard-wood board, which is secured on the top of the pole-pieces. This board has an oblong slot covered with wire gauze, allowing the warm air from the armature to ascend, and at the same time preventing any thing from falling on the armature. The armature is of the drum type, and is wound in a very simple and peculiar way, avoiding all joints in the wires but two. The commutator is very massive, and will last for many years. From two to six sets of brushes, according to the size of the dynamo, carry the current from the commutator to the cables without the least heating or sparking, — a fault so common in many other systems.

Although the dynamo is automatic in its action, a variation in the speed of the engine or water-wheel might cause the lamps to burn above or below candle-power. An instrument is therefore needed to indicate at all times to the engineer or dynamo-tender whether the lamps burn at normal candle-power, or, what is practically the same, at normal electrical pressure. The voltmeter (Fig. 4) used for this purpose is simple in construction, dead beat, and may be left in the circuit permanently without overheating. It needs no recalibration, as it has no permanent magnets, and is considered reliable.

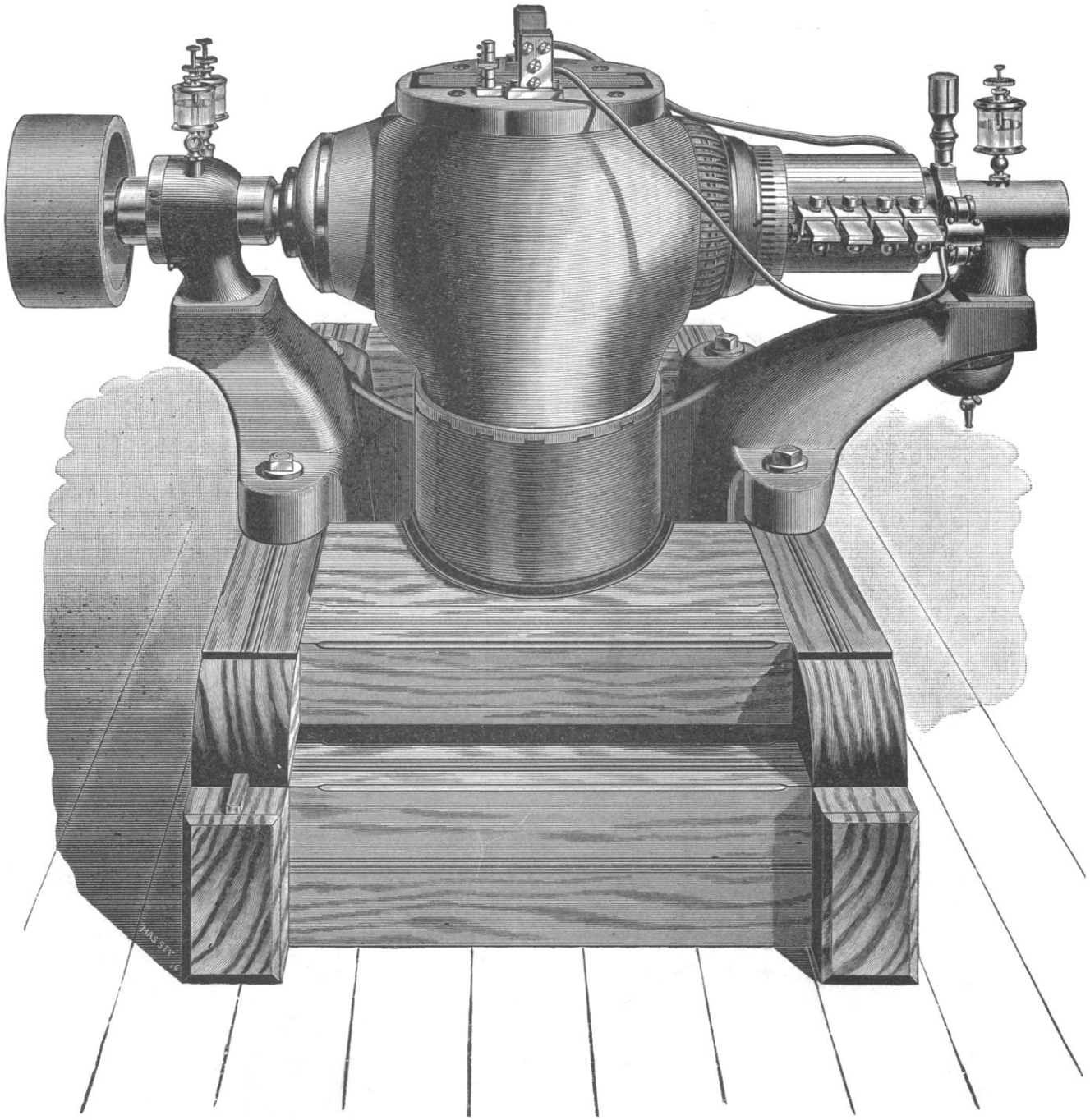

FIG. 2. — NEW INCANDESCENT DYNAMO OF THE WESTERN ELECTRIC COMPANY.

The rheostat or hand-regulator (Fig. 5), used to keep the electrical pressure constant by increasing or decreasing the strength of the field, is non-combustible. It consists of a cast-iron frame provided with porcelain insulators, to which german-silver wire coils

FIG. 3.

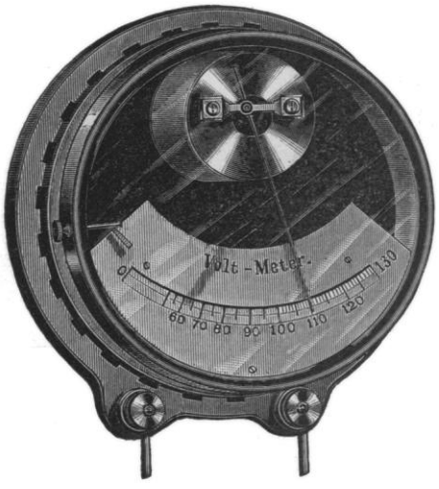

FIG. 4.

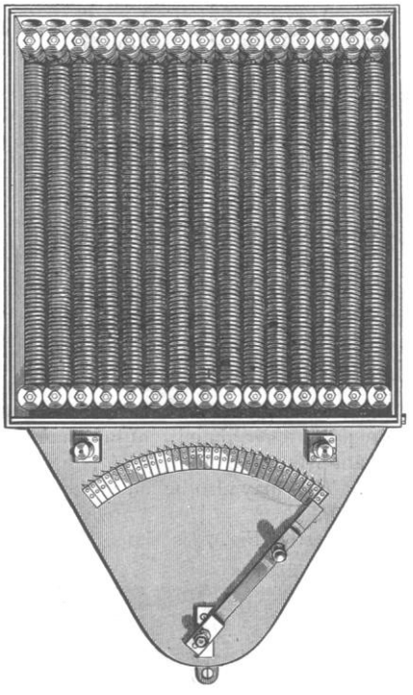

FIG. 5.

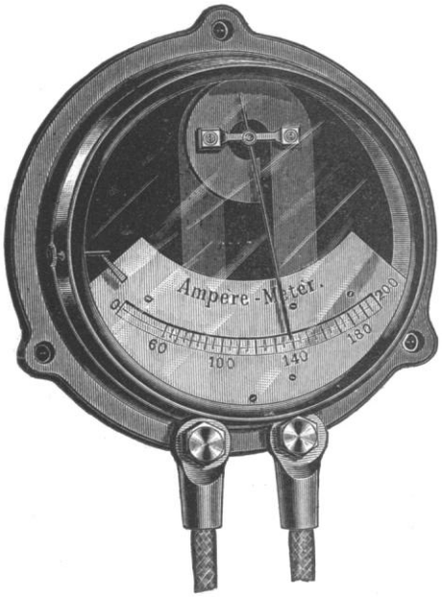

FIG. 6.

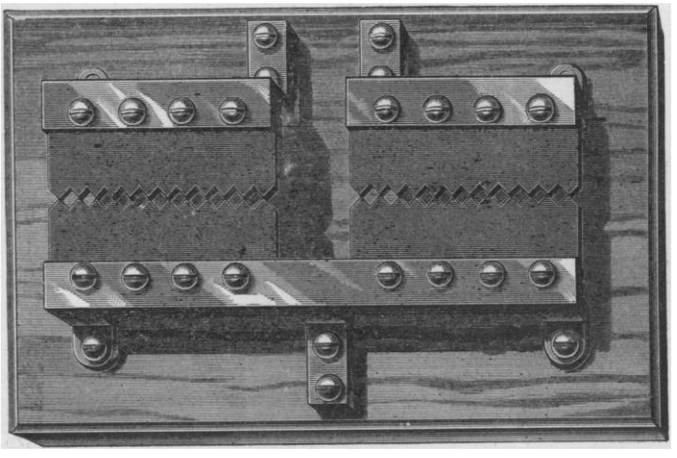

FIG. 7.

are attached. The front of the rheostat-box is covered with glass, preventing the dirt and dust from getting into the box, and at the same time allowing ready inspection.

The ampère-meter, or ammeter (Fig. 6), is an instrument to indicate the number of ampères which the dynamo is generating

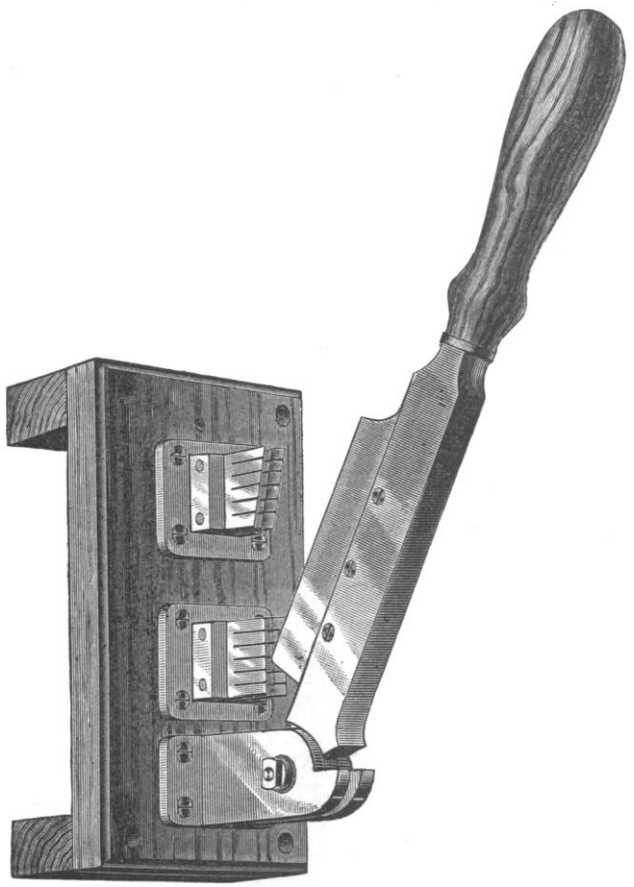

FIG. 8.

As each lamp requires a certain current in ampères, from the indications of the ammeter, the number of lamps burning may be easily computed. This may also be left in the circuit permanently without overheating.

The lightning-arrester (Fig. 7) is simple in its operation. The jaws of this lightning-arrester are made of carbon plates. In case the dynamo-current should follow a discharge of atmospheric electricity, an arc may be set up; but this will burn away some of the carbon points, and thus free the dynamo of the short circuit. Such a carbon lightning-arrester can, of course, only be used for low-tension dynamos.

Fig. 8 represents a main switch of the Western system for 150 and 300 ampères capacity.

Fig. 9 represents a multiple safety cut-out board. These boards are convenient where a number of branches terminate in a closet, and are useful to connect up a number of single cut-outs in multiple arc. These boards are made for any number of circuits from four to twelve. The safety-strips may be replaced in a few seconds, and, while current is on, without danger.

FIG. 10.

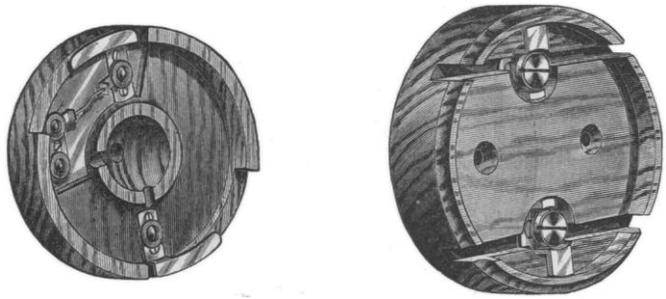

FIG. 11.

Figs. 10 and 11 represent ceiling cut-outs, to be used when lamps are to be suspended by means of flexible cable.

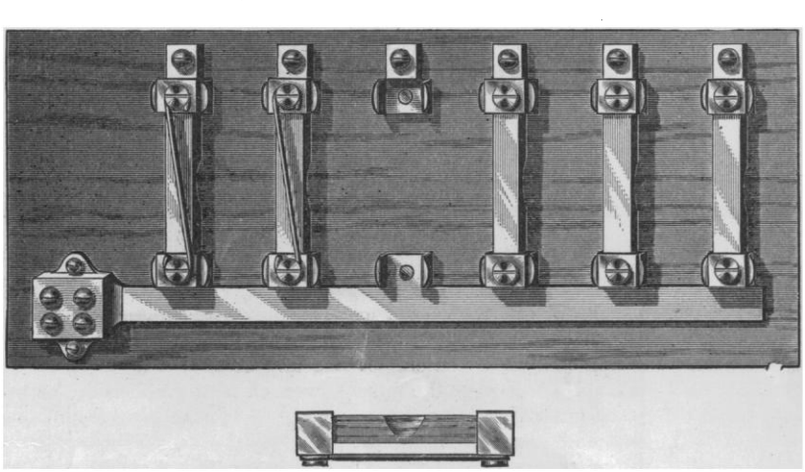

FIG. 9.

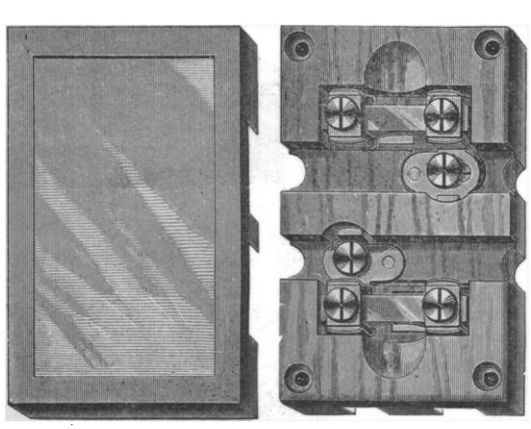

FIG. 12.

Fig. 12 represents a double pole branch-block.

WE learn from *Nature* that Dr. Schweinfurth arrived at Aden on March 23, on his return from a three months' stay in Central South Arabia. He has started for Europe, taking a very interesting botanical collection with him.