SCIENCE

[Entered at the Post-Office of New York, N.Y., as Second-Class Matter.]

A WEEKLY NEWSPAPER OF ALL THE ARTS AND SCIENCES.

SEVENTH YEAR.
VOL. XIV. No. 340.

NEW YORK, AUGUST 9. 1889.

SINGLE COPIES, TEN CENTS.
$3.50 PER YEAR, IN ADVANCE.

ELECTRICAL DEVICES OF THE MUTUAL ELECTRIC COMPANY'S SYSTEM.

IN last week's issue we presented illustrations of the Knowles dynamo and storage-battery as used by the Mutual Electric Company of Brooklyn. Several other electrical devices used by the same company are shown in the accompanying illustrations.

The Knowles meter is shown in Fig. 1. It is inserted in the main discharge circuit, and is arranged to record in lamp-hours, or, when preferred, directly in dollars and cents; so that a simple inspection will show the exact amount of current used, or its cost to the consumer. The meter is simple in construction, combining a varying electric device with a constant time device, and is not liable to get out of order under ordinary usage. It has a large range, and records equally well with low or high current strength.

A battery-charging board is shown in Fig. 2. Upon the board, as will be seen, are three switches, each between a pair of binding-posts. In operation, the 30-cell battery is connected to the binding-posts at the middle of the board, the lighting circuit to the upper pair of binding-posts, and the charging circuit to the lower pair. In charging the battery, a current of exactly the right potential to suit the requirements is secured by means of the switch at the head of the board, which throws in resistance sufficient to make the potential, as measured by a voltmeter in the charging circuit, the same as that previously found to exist between the terminals of the battery.

The Knowles current-indicator, as supplied with each dynamo, is shown at Fig. 3. It is arranged either with or without bell attachment for calling attention to excessive variation of the current. A safety cut-out, for use at the entrance of the circuit to buildings, or for loop circuits, is shown at Fig. 4. The Knowles arc-lamps, single and double, are of simple construction, and steady and positive in action. A double lamp and its mechanism are shown in Figs. 5 and 7. The form of voltmeter and ammeter manufactured and used by the Mutual Electric Company is shown at Fig. 6.

This company now claims to have ready for the public a complete storage-battery system, an incandescent-light system, a traction system for street-cars, a car-lighting system, an arc-light system, a combination system, and a fire-alarm system, — all worked out by Mr. Knowles, electrical engineer of the company.

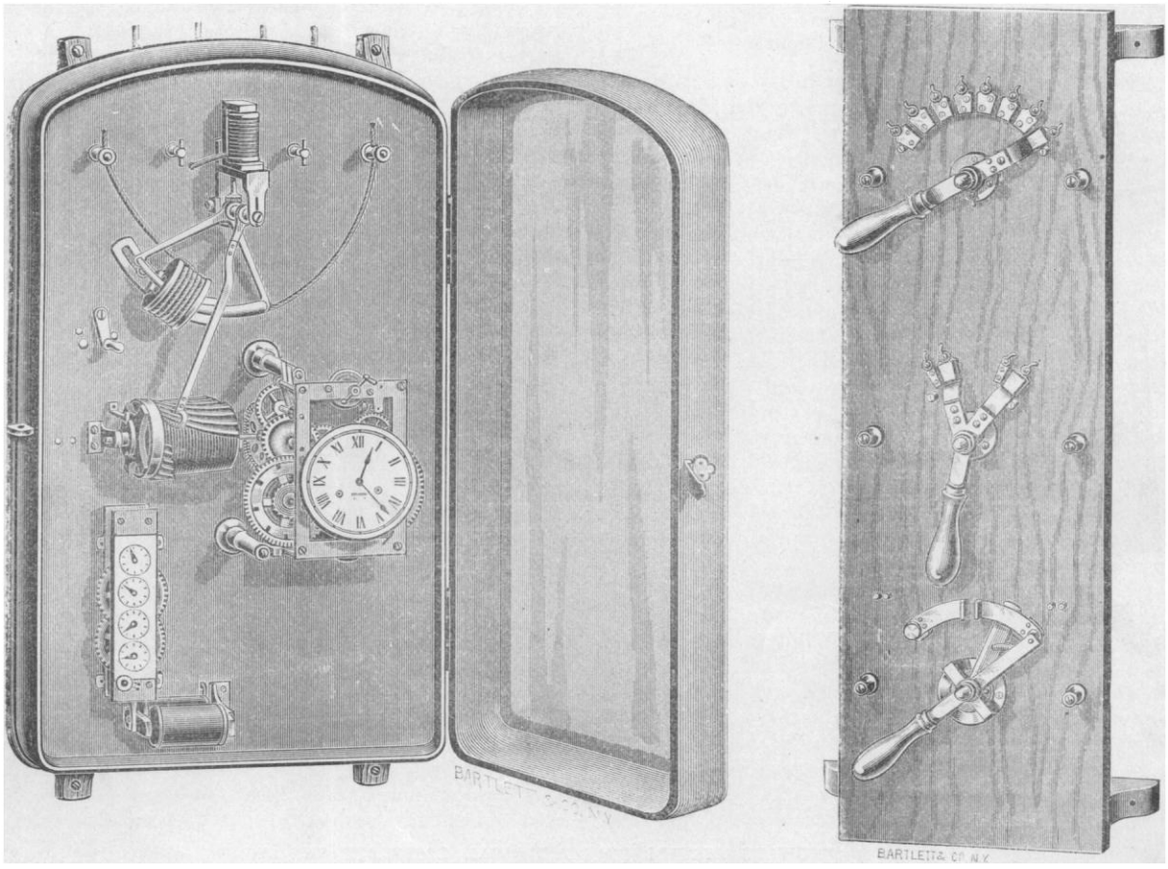

FIG. 1 AND 2. — METER AND BATTERY-CHARGING BOARD.