2 Sheets—Sheet 1.

J. A. LUND.

Electro-Magnetic Apparatus for Synchronizing Clocks.

No. 201,185. **Patented March 12, 1878.**

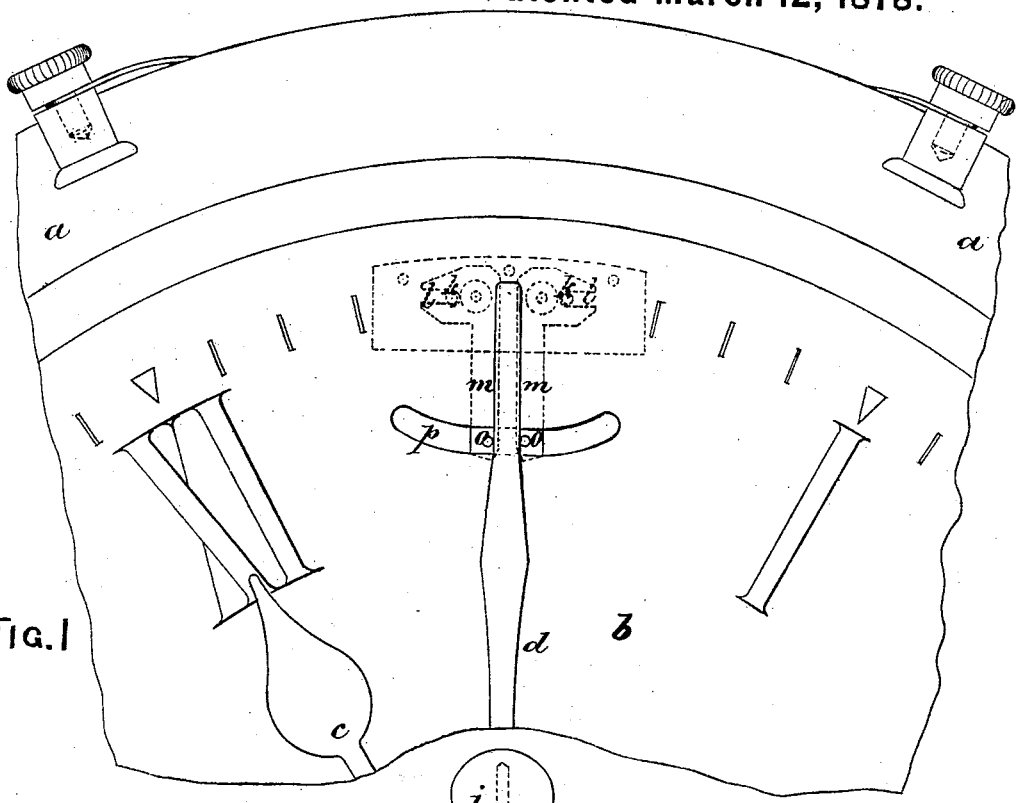

FIG. 1

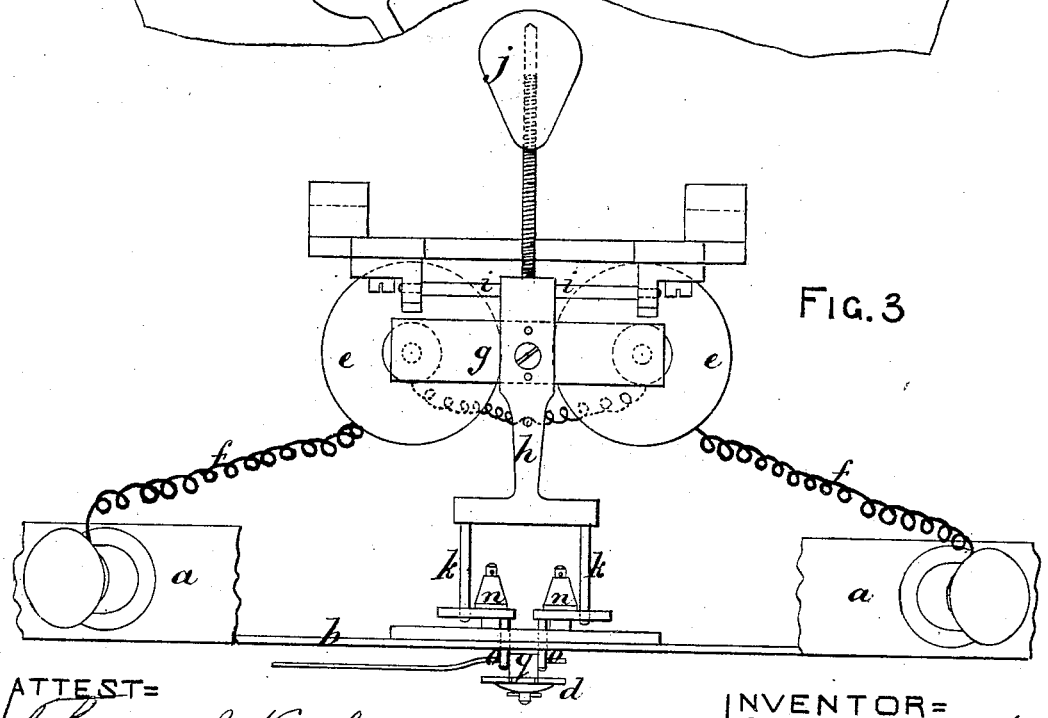

FIG. 3

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2 Sheets—Sheet 2.

J. A. LUND.

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FIG. 2

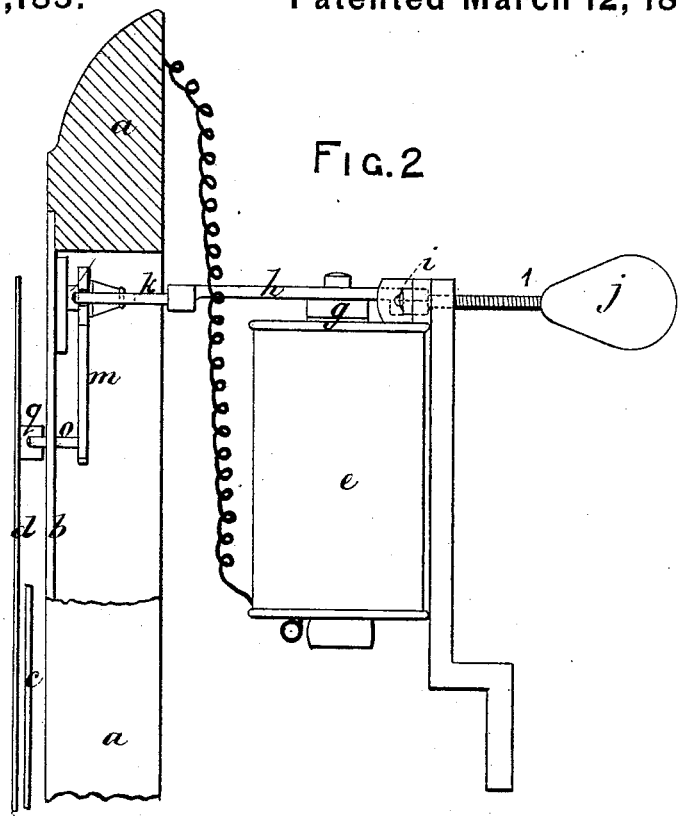


FIG. 5

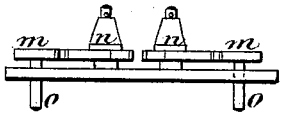


FIG. 6

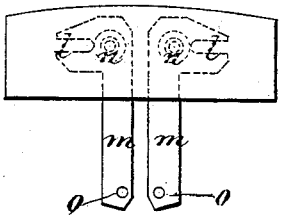


FIG. 7

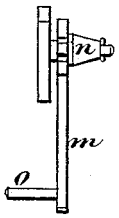
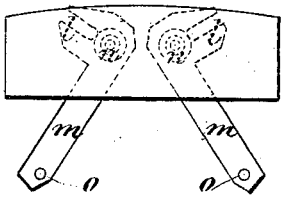


FIG. 4



ATTEST=

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INVENTOR=

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UNITED STATES PATENT OFFICE.

JOHN ALEXANDER LUND, OF LONDON, ENGLAND.

IMPROVEMENT IN ELECTRO-MAGNETIC APPARATUS FOR SYNCHRONIZING CLOCKS.

Specification forming part of Letters Patent No. **201,185**, dated March 12, 1878; application filed April 4, 1877.

To all whom it may concern:

Be it known that I, JOHN ALEXANDER LUND, of London, England, have invented certain Improvements in Apparatus for Synchronizing Clocks, of which the following is a specification:

My invention relates to apparatus or mechanism whereby any number of clocks or other time-pieces may be automatically synchronized, the said mechanism being actuated electrically.

The invention consists in improved arrangements and combinations of mechanism for accomplishing the desired result in a simple and effective manner, as will be hereinafter specifically set forth.

In synchronizing clocks, a time-keeper or regulator is selected which can be relied on to keep correct time, and this regulator is connected electrically with the synchronizing mechanism attached to each clock to be regulated, the connection being in a manner well understood by all electricians.

The drawings will illustrate my improved mechanism. Figure 1 is a front view of a clock provided with my improved apparatus. Fig. 2 is a side view of the same, partly in section. Fig. 3 is a plan of the same. Figs. 4, 5, 6, and 7 are detail views.

Let *a* represent the case, and *b* the dial, of a clock, of which *c* is the hour-hand, and *d* the minute-hand. *e e* are the helices of electro-magnets, connected by wires *f f* with the regulator, in a manner well understood. *g* is the armature of the magnets. This armature is borne by an arm, *h*, which is pivoted at *i*, and bears an adjustable weight, *j*. This weight is adjustable by means of a screw on its rod, and serves to keep the armature habitually raised clear of the magnets. The advantage of an adjustable weight of this kind over a spring is that it may be readily adapted to the attractive force of the magnets and to the work it must perform.

The front end of the arm *h* is forked, and the two prongs *k k* of the same take into slots *l l* in a pair of levers, *m m*, which are pivoted at *n n*. From the long arms of these levers project pins *o o*, which pass through the dial, playing in a curved slot, *p*, in the same. The back of the minute-hand is shown as provided with a block, *q*.

The operation is as follows: At the expiration of every hour, the electric circuit being completed by the arrival of the minute-hand of the regulator at the figure 12 the armature *g* is attracted by the magnets, overcomes the weight *j*, and gives a downward movement to the prongs *k k*. These, acting in their downward movement upon the levers *m m*, move them from the position shown in Fig. 4 to that shown in Fig. 6, so that the pins *o o* are brought together, or nearly so. When this occurs, if the minute-hand be not exactly at zero or 12, as in this case, the pins acting on the block *q* set it so. The electric current being then broken at the regulator, the weight *j* returns the parts to their normal position.

If it is desired to avoid making a slot, *p*, in the dial, a false hand behind the dial, fixed on the same center and moving with the hand *d*, may be used.

Having thus described my invention, what I claim is—

1. The combination of the horizontal forked armature-lever *h*, bent levers *m m*, provided with the pins or projections *o o*, and the block or projection *q* on the minute-hand *d*, substantially as and for the purpose herein specified.

2. In combination with the dial-plate *b* of a clock, having a slot, *p*, as described, a synchronizing-magnet and its transmitting-levers *h m m*, arranged behind the dial-plate, and communicating with the minute-hand through the said slot, substantially as and for the purpose herein specified.

In witness whereof I, the said JOHN ALEXANDER LUND, have hereunto set my hand this 9th day of March, 1877.

JOHN ALEXANDER LUND.

Witnesses:

J. C. NEWBURN,
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GEO. MORRISON,
41 *Cornhill, London.*