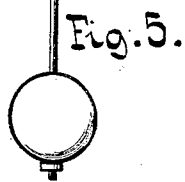
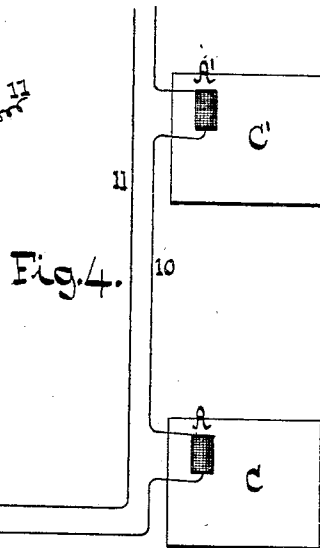
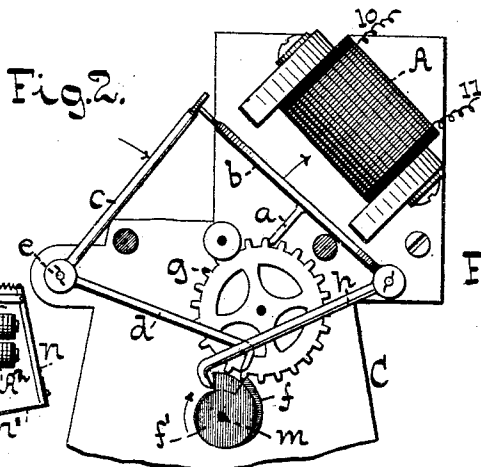
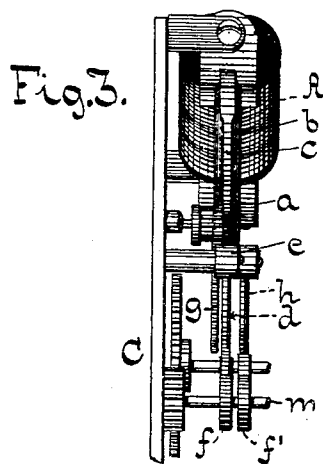
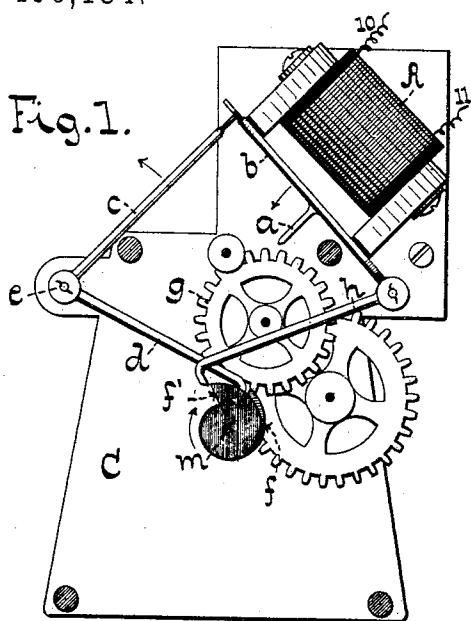


(No Model.)

H. S. PRENTISS.
ELECTRIC SYNCHRONIZER FOR CLOCKS.

No. 496,134.

Patented Apr. 25, 1893.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY J. PRENTISS, OF ELIZABETH, NEW JERSEY.

ELECTRIC SYNCHRONIZER FOR CLOCKS.

SPECIFICATION forming part of Letters Patent No. 496,134, dated April 25, 1893.

Application filed May 21, 1892. Serial No. 433,883. (No model.)

To all whom it may concern:

Be it known that I, HENRY S. PRENTISS, a citizen of the United States, and a resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Synchronizers for Clocks, of which the following is a specification.

My invention has reference to improvements in apparatus for synchronizing time pieces and it consists essentially in regulating the several secondary clocks of a system to run slightly fast, and providing each of the same with a mechanical detent thrown into action at the hour as indicated by the respective clock to arrest the motion of the train, combined with means operated from the primary clock to release the train at the exact hour;—all of which is more fully pointed out in the following specification and claims and illustrated in the accompanying drawings, in which:

Figure 1 represents a sectional elevation of a clock constructed according to my invention. Fig. 2 is a similar view with part broken away, showing the motion of the train arrested. Fig. 3 is a side elevation of Fig. 1. Fig. 4 is a diagram illustrating the clocks arranged in a system. Fig. 5 is a detail view showing means for starting the pendulum.

Similar letters and figures indicate corresponding parts throughout the several views.

In the drawings, referring at present to Figs. 1 and 2, the letter C designates one of the secondary clocks, which may embody any suitable well known movement, such for instance as a pendulum or lever movement, or an electric or electro-mechanical movement.

In the drawings I have shown a pendulum movement in which *m* is the arbor of the minute hand and *g* one of the gears constituting the train.

a is a detent adapted to engage with the gear *g* the same being carried by the pivoted armature *b* of an electro-magnet A. Normally the detent *a* is held out of engagement with the gear *g*, by the arm *c* of a locking lever *c d* pivoted at *e* to the frame, the other arm *d* being in engagement with a cam *f* mounted to turn with the minute arbor. The armature *b* carries a finger *h*, arranged to

ride on a cam *f'* also secured to the arbor of the minute hand and designed similar to the cam *f*. During the greater part of the hour the arm *d* of the locking lever *c d* rides on the depressed portion of the cam *f* (Fig. 1) but toward the end of the hour it is gradually turned until just before the hour it is caused to release the armature *b*. The latter however is prevented from falling by the finger *h* which is now on the raised portion of cam *f'*. Exactly at the hour as indicated by the clock, the finger *h* drops over the nose of the cam *f'* and the motion of the train is arrested by the detent *a*. The lever *c d* now rests against the end of the armature *b* (Fig. 2). At the hour as indicated by the master clock (the secondary clock being fast), the circuit is closed through the electro-magnet by the circuit closer at the master clock, and the detent *a* is withdrawn from the gear *g* and the train is free to operate. The lever *c d* now being released falls into the position shown in Fig. 1, and holds the detent clear of the gear when the circuit through the electro-magnet is broken.

In Fig. 4, I have shown the clocks arranged in a system (series). P is the master clock, F F' the circuit closing device, B the battery, and 10 and 11 the wires including the electro-magnets A A', &c., of the secondary clocks C C', &c.

In the operation of the system, all the secondary clocks are regulated to run a trifle fast, say from one tenth to five seconds per hour, or for the synchronizing period. In an extensive system of clocks where it may be difficult to keep all the clocks constantly running fast, the clocks may be regulated as usual and devices in addition to those described embodied to synchronize slow running clocks. Therefore I do not wish to restrict myself to running the clocks fast.

In general each clock is so regulated that it shall not remain idle a sufficient time to permit the governing member, for instance the pendulum *p*, to come to rest; however to provide for such an event a suitable starting device for the pendulum may be employed. As shown in Fig. 5 this may consist of an electro-magnet A² included in the circuit with the electro-magnet A, the pivoted armature *n*

of which is provided with a spring arm or extension *n'* normally out of the path of the pendulum. When the armature *n* is attracted at the hour the arm *n'* impinges upon the pendulum rod and causes the same to vibrate, should it have been in a state of rest. In case of a lever movement a similar device may be used to start the balance wheel.

I do not wish to restrict myself to the specific arrangement and construction of the several devices, since it is evident that changes could be made in these respects without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. A time piece provided with a self-contained detent actuated from the train of said time piece to engage with the train and arrest the motion thereof at the hour as indicated by said time piece, and an electro-magnet arranged to act on said detent for effecting the release of the train at the exact hour, substantially as described.

2. A master clock provided with a circuit closer thrown into action at the hour to make and break the circuit, combined with a secondary clock having a mechanical detent actuated from the train of the time piece to engage with and arrest the motion of the train

at the hour as indicated by said time piece, and an electro-magnet vitalized by the closing of the circuit at the master clock to withdraw the detent from the train, substantially as described.

3. A secondary clock provided with cams *f* on the arbor of the minute hand, a locking lever actuated from one of said cams, a detent engaging the other cam and an electro-magnet for withdrawing the detent, substantially as and for the purpose set forth.

4. The combination of a master clock provided with a circuit closer, a secondary clock provided with a detent adapted to arrest the motion of the train at the hour as indicated by the said clock, and a starting device arranged to engage with the governing member to impart an impulse to the same on the closing of the circuit by the master clock, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 20th day of May, 1892.

HENRY S. PRENTISS.

Witnesses:

KLAS H. TERUSTEDT,
J. J. MALLE.