

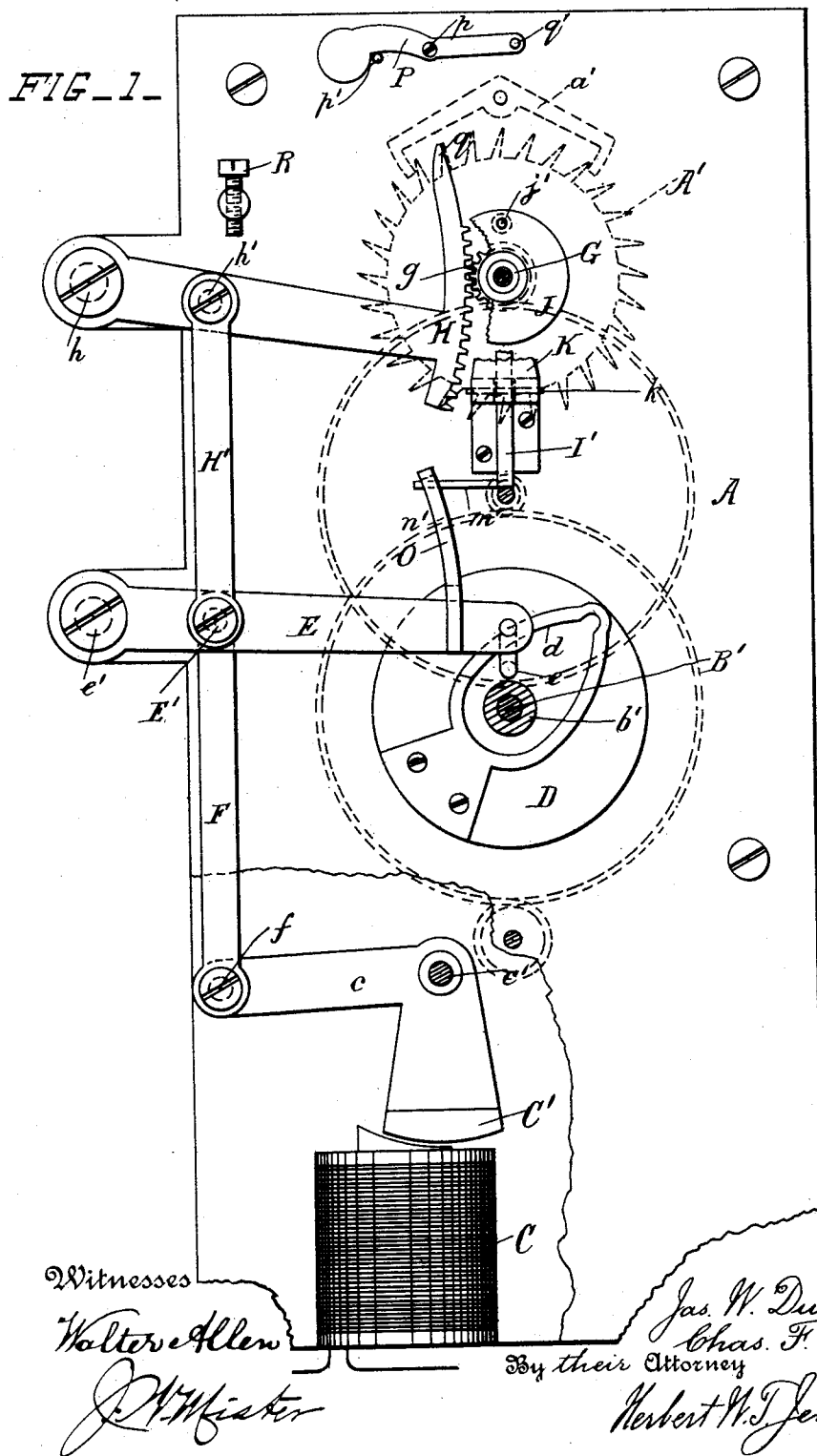
(No Model.)

2 Sheets—Sheet 1.

J. W. & C. F. DU LANEY.
ELECTRIC CLOCK SYNCHRONIZER.

No. 477,049.

Patented June 14, 1892.



(No Model.)

2 Sheets—Sheet 2.

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FIG. 2.

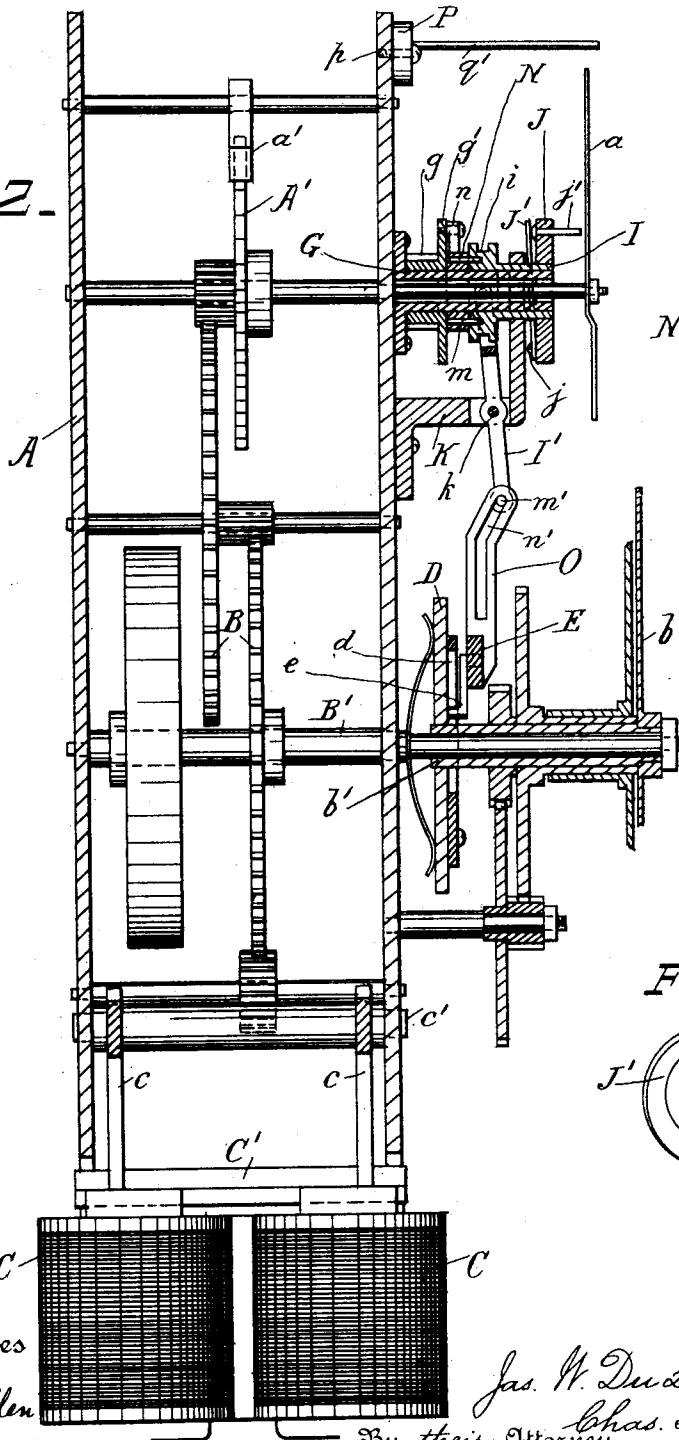


FIG. 3.

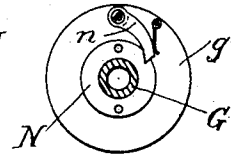


FIG. 4.

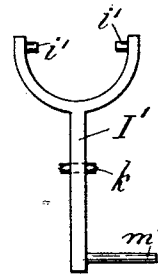
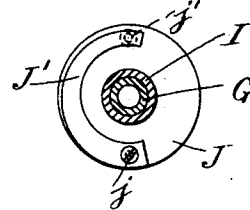


FIG. 5.



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UNITED STATES PATENT OFFICE.

JAMES W. DU LANEY AND CHARLES F. DU LANEY, OF CANTON, OHIO.

ELECTRIC CLOCK-SYNCHRONIZER.

SPECIFICATION forming part of Letters Patent No. 477,049, dated June 14, 1892.

Application filed September 4, 1891. Serial No. 404,723. (No model.)

To all whom it may concern:

Be it known that we, JAMES W. DU LANEY and CHARLES F. DU LANEY, citizens of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Electric Clock-Synchronizers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to devices for synchronizing clocks; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the drawings, Figure 1 is a front view of a clock provided with synchronizing devices according to this invention. Fig. 2 is a side view of the clock, showing the synchronizing devices in section. Figs. 3, 4, and 5 are respectively detail views of the notched disk and pawl, the forked lever, and the spring for holding up the pin which sets the seconds-hand.

A is the frame of a clock. A' is the escapement-wheel. *a* is the seconds-hand, and *a'* is the escapement-pallet. B is the train of driving-wheels, and B' is the barrel-shaft. A sleeve *b'* is journaled on the barrel-shaft and carries the minute-hand *b*. All of these parts and their connections are of any ordinary approved construction.

C are electro-magnets secured to the frame, and C' is an armature secured to one end of the bell-crank lever *c*, which is pivoted on the pin *c'*.

D is the disk, secured upon the sleeve *b'*, and *d* is a cam-shaped loop secured to the said disk.

E is a lever pivoted to the frame at one end by the pin *e'* and provided at the other end with the bent pin *e*, which engages with the said loop.

F is a link, which is pivoted to the lever E by the pin *E'* and to the bell-crank lever by the pin *f*.

The electro-magnets of each clock in the series of clocks to be synchronized are simultaneously placed in circuit with a battery at periodic intervals by mechanism which does not form a part of the present invention, and is therefore not described herein. Each time the

magnets are excited the armature is attracted and the lever E is raised. The pin *e* bears against the loop *d* and turns it and sets the minute-hand, provided the minute-hand is not more than fifteen minutes too fast or too slow. The loop is preferably arranged to set the hand at the hour; but a setting of oftener than once each hour can be had by duplicating the cam-shaped loop.

The seconds-hand is set at the same time with the minute-hand in the following manner: A sleeve G is secured to the frame and surrounds the escapement-wheel shaft without touching it, so that the action of the escapement is not interfered with. A toothed pinion *g* is journaled on this sleeve and is provided with a flange *g'*. A toothed sector H is pivoted to the frame by the pin *h* and gears into the pinion *g*. H' is a link, which is pivoted to the sector H by the pin *h'* and to the lever E by the pin *E'*. The sector turns the pinion one revolution each time the lever E is raised by the electro-magnets to set the minute-hand.

I is a tube sliding on the sleeve G and provided with a groove *i* at one end for the pins *i'* of the forked lever I' to engage with. A disk J is secured to the other end of the tube I and is provided with a sliding pin *j'*, which projects from the face of it.

J' is a curved spring, which is secured to the disk J by the screw *j* and bears against the head of said pin.

K is a cranked bracket secured to the frame. The upper end of this bracket forms a bearing, which supports the tube I, and the forked lever I' is pivoted on the pin *k*, which projects from the bracket K.

The tube I is provided with long pins *m*, which slide back and forth in holes in the notched disk N, which is journaled on the sleeve G, so that the tube I and disk N always revolve together. A spring-actuated pawl *n* is pivoted to the flange *g'* of the pinion *g*. The lower end of the forked lever I' is provided with a projecting pin *m'*, which engages with the inclined upper portion of the slot *n'* in the vertical arm O, which projects from the lever E.

P is a lever pivoted on the pin *p* at the upper part of the frame and normally resting on the stop *p'*. When the sector H is raised, a

projection *q* on its upper end trips up the heavy end of the lever *P* and lowers the pin *q'*, which projects from the other end of the lever into the path of the seconds-hand.

5 The action of the device is as follows: When the lever *E* is raised, the inclined portion of the slot *n'* turns the forked lever on its pivot and thrusts the pin *j'* into the path of the seconds-hand, at the same time partially with-
10 drawing the pins *m* from the holes in the disk *N*. The sector, which is coupled to the lever *E*, turns the pinion *g*, and the pawl *n* turns the disk *N* and tube *I* and causes the pin *j'* to describe a circle and to set the seconds-
15 hand. When the sector and the lever *E* are lowered, the pin *j'* is withdrawn from the path of the seconds-hand and remains stationary, because the pawl *n* permits the pinion *g* to be revolved backward without revolving the disk *N*. The lever *P* is tripped to
20 bring the pin *q'* in front of the seconds-hand just before it is set, so that the momentum of the seconds-hand may not carry it past the correct position, and the pin *q'* is automati-
25 cally raised out of the path of the seconds-hand as soon as the setting is accomplished. The pin *j'* is made retractible and is provided with a spring, so that the seconds-hand may
30 not be injured if the hand should happen to be in front of the said pin at the moment of setting the clock. When the pin *j'* is pushed out against the hand, the spring permits the pin to slide back until it has been moved
35 past the hand by the sector and pinion.

R is an adjustable stop secured to the frame and adapted to prevent the sector from being raised too high.

What we claim is—

1. In a clock-synchronizer, the combina-
40 tion, with the cam-shaped loop operatively connected with the minute-hand, of the pivoted lever provided with a setting-pin engaging with the said loop, the electro-magnets, the pivoted bell-crank lever carrying the arma-
45 ture at one end, and the link connecting the other end of the said bell-crank lever with the aforesaid lever, substantially as and for the purpose set forth.

2. In a clock-synchronizer, the combina-
50 tion, with the electro-magnets and the pivoted toothed sector operatively connected with the armature of the said magnets, of the stationary sleeve encircling the shaft of the seconds-hand, the pinion journaled on the said
55 sleeve and gearing into the said sector, and the revoluble sliding tube operatively connected with the said pinion and provided with a pin adapted to be thrust forward into the path of the seconds-hand, whereby the said
60 hand may be set, substantially as set forth.

3. In a clock-synchronizer, the combina-
tion, with the electro-magnets and the pivoted toothed sector and the pivoted lever operatively connected together and to the arma-

ture of the said magnets, of the cam-shaped 65
loop for setting the minute-hand, adapted to be operated by a pin projecting from the said lever, the stationary sleeve encircling the
70 shaft of the seconds-hand, the pinion journaled on the said sleeve and gearing into the said sector, the revoluble sliding tube operatively connected with the said pinion and
75 provided with a pin for setting the second-hand, and a lever operated by the minute-hand lever and adapted to thrust the said pin forward into the path of the seconds-hand, substantially as set forth.

4. In a clock-synchronizer, the combina-
80 tion, with a stationary sleeve encircling the shaft of the seconds-hand, of a revoluble sliding tube journaled on the said sleeve and provided with a retractible spring-pressed pin adapted to set the hand and to be pushed
85 back when pressed against the hand, substantially as set forth.

5. In a clock-synchronizer, the combina-
90 tion, with the pivoted toothed sector for setting the seconds-hand, of a pivoted trip-lever provided with a projecting pin and adapted to be raised by the said sector, whereby the
95 said pin may be momentarily placed in front of the seconds-hand to prevent it from being carried past the setting-point, substantially as set forth.

6. In a clock-synchronizer, the combina-
95 tion, with the stationary sleeve encircling the shaft of the seconds-hand, of the driving-pinion provided with a pawl, the notched disk engaging with the said pawl, and the sliding
100 tube provided with long pins sliding in holes in the said disk and a pin for setting the seconds-hand, the said pinion, disk, and tube being journaled on the said sleeve, substantially
as and for the purpose set forth.

7. In a clock-synchronizer, the combina-
105 tion, with the stationary sleeve encircling the shaft of the seconds-hand, of the driving-pinion and the revoluble sliding tube operatively connected together and journaled on the said
110 sleeve, the said tube being also provided with a pin for setting the seconds-hand, a toothed sector for revolving the said pinion and tube, a pivoted lever provided with pins engaging
115 with a groove in the said tube, and the lever for setting the minute-hand, provided with an arm having an inclined slot adapted to engage with a pin on the said pivoted lever
and to cause it to slide the tube upon the said sleeve, substantially as and for the purpose
120 set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES W. DU LANEY.
CHARLES F. DU LANEY.

Witnesses:

CHARLES S. PERRY,
ARTHUR S. WHEELER.