

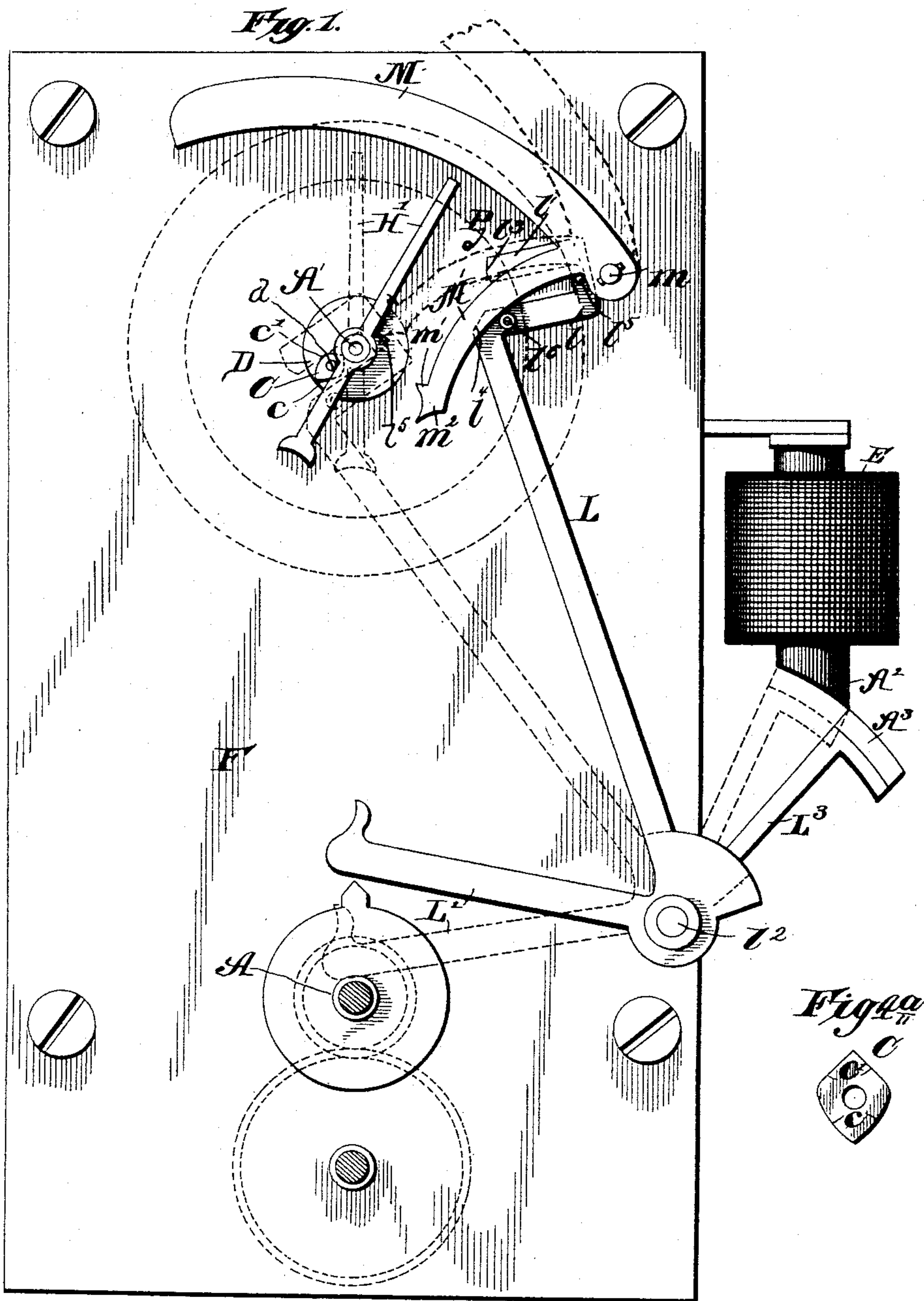
(No Model.)

3 Sheets—Sheet 1.

A. GIPPERICH.
SYNCHRONIZER FOR CLOCKS.

No. 438,314.


Patented Oct. 14, 1890.



Witnesses:

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P. W. Sommers

Inventor:

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per 
Attorney:

(No Model.)

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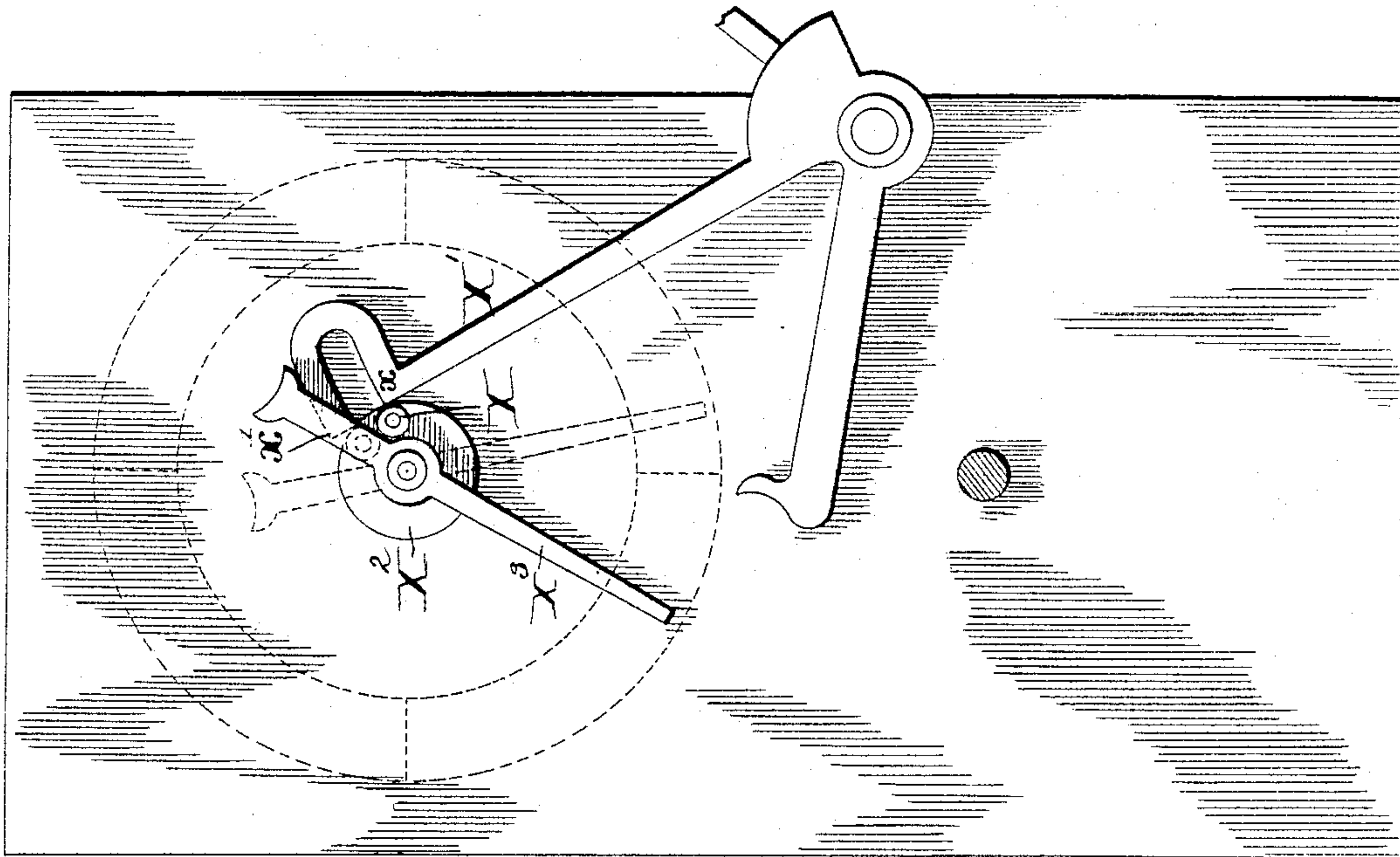


Fig. 5.

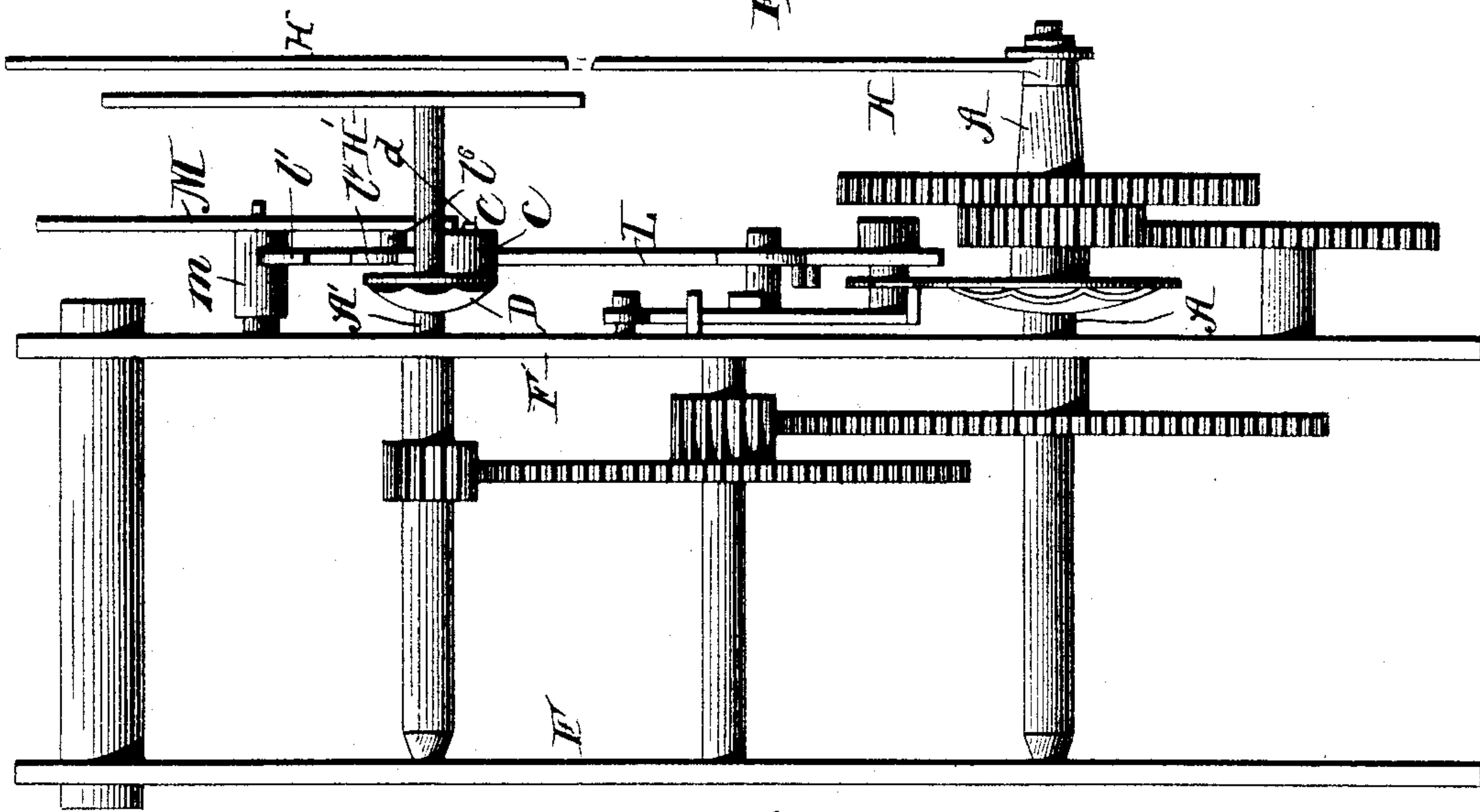


Fig. 2.

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(No Model.)

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Fig. 3.

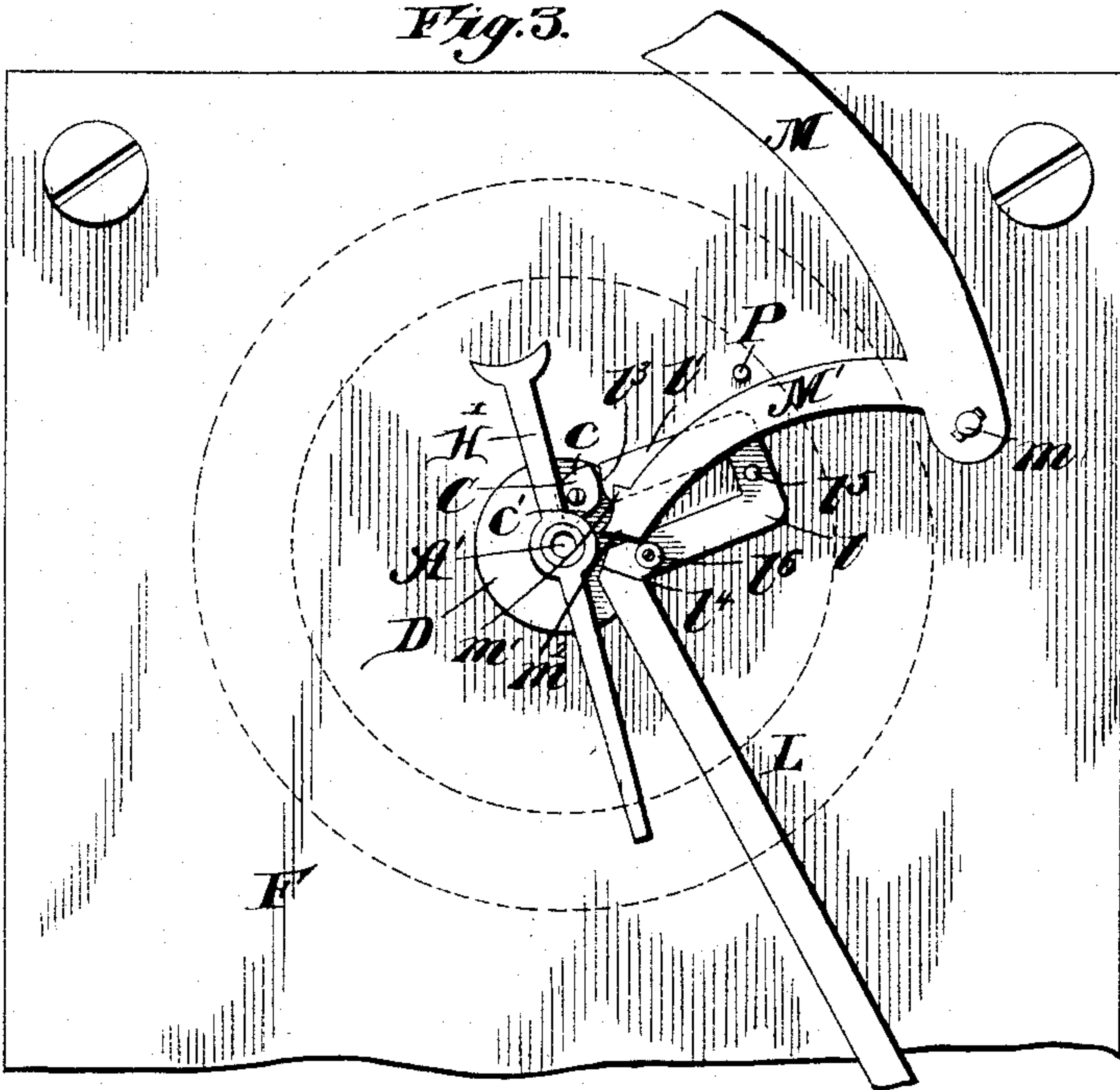
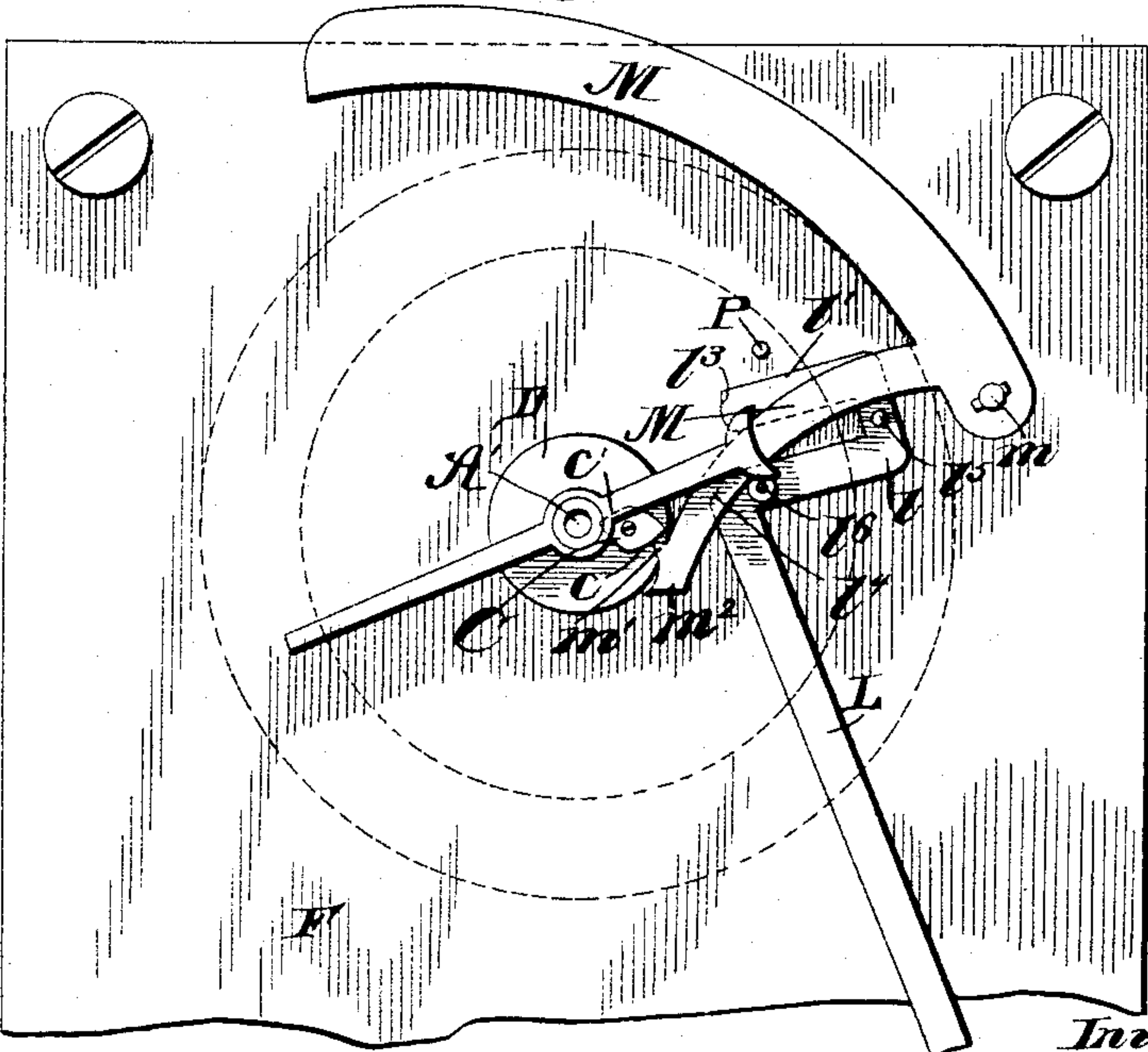


Fig. 4.



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UNITED STATES PATENT OFFICE.

ADOLPHUS GIPPERICH, OF RICHMOND, VIRGINIA.

SYNCHRONIZER FOR CLOCKS.

SPECIFICATION forming part of Letters Patent No. 438,314, dated October 14, 1890.

Application filed August 9, 1889. Serial No. 320,250. (No model.)

To all whom it may concern:

Be it known that I, ADOLPHUS GIPPERICH, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Synchronizers for Clocks; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a face view of so much of a clock as is necessary to illustrate my invention. Fig. 2 is a side elevation. Figs. 3 and 4 are views similar to Fig. 1, illustrating the synchronizing mechanism in different positions. Fig. 4^a is a detail view of the correcting-cam. Fig. 5 is also a face view of a clock illustrating a well-known synchronizing mechanism.

The invention relates to that class of mechanical appliances designed to periodically set the hands of a clock, whether through the agency of a mechanical device or devices controlled by the movements of the clock or through the agency of an electric current.

In synchronizers for clocks, more especially in the synchronizer of Hunter and Gerry, shown and described in Letters Patent of the United States, dated September 21, 1886, Serial No. 349,650, the operation of the synchronizing mechanism depends upon the position of the friction-roller X relatively to the operating-lever X', Fig. 5. Whenever this roller X is in such a position on either side of the axis of the seconds-hand that the arm x' or the end x of the lever X' will strike the roller when said roller and its supporting-disk X² are on a dead-center the said synchronizing mechanism will fail in its operation and no correction will take place. When the eccentric-pin for the rollers X is arranged on the disk X², as described in the said patent—namely, upon the side of the disk remote from the normal position of the setting or correcting lever or lever-arm—the disk and roller will be on their dead-center relatively to the lever when the seconds-hand X³ reaches the point indicated in full and

dotted lines, respectively, in Fig. 5, thus failing in its operation of correcting the gain or loss in the movement of the seconds-hand.

The object of my invention is to overcome this difficulty and provide means whereby the seconds-hand is set or corrected, whatever its position may be on the dial, to the right or left of the noon-hour—that is to say, to provide means whereby the disk is invariably carried over its dead-center.

To these ends the invention consists in the combination, with the correcting-lever or lever-arm, of a cam adapted to revolve about the seconds-hand arbor, in the combination, with such a cam and the correcting-lever, of an auxiliary lever operating to carry the disk over its dead-center when in this position, relatively to the correcting-lever, to allow the latter lever to complete the operation of correcting or setting; also, in the combination, with the disk and the correcting and auxiliary levers, of a substantially double-wedge-shaped cam mounted on the eccentric-pin of the correcting-disk, substantially as hereinafter described, and as set forth in the claims.

The correction of the minute-hand may be effected by any suitable or well-known devices—as, for instance, by the devices shown in the said patent to Hunter and Gerry, hereinbefore referred to, or by other well-known devices connected with the lever for correcting the seconds-hand.

In the drawings, F indicates the clock-frame; A, the minute-hand arbor; A', the seconds-hand arbor; H and H', the minute and seconds hands, respectively.

On the arbor A' of the seconds-hand H' is mounted, so as to revolve therewith, a disk D, that has an eccentric-pin d , to which is rigidly secured a cam C, constructed, preferably, in the form of a double wedge $c c'$, Fig. 4^a. As shown in full lines in Fig 1, the cam C is so set on the pin as that its knife-edge c will lie in a radial plane upon the side of the disk remote from the normal position of the correcting-lever L, though it may be secured to the disk at any other desired point without thereby impairing its function relatively to or its co-operation with said correcting lever or levers.

The correcting-lever L is fulcrumed at l^2 on

the clock-frame F, and its outer end is constructed substantially like the corresponding correcting-lever shown in the said patent to Hunter and Gerry—that is to say, the lever 5 terminating in a yoke or has its free end provided with a U-shaped extension l , and carries a friction-roller l^6 upon the rear limb or member of the yoke. The said lever L may be connected with the lever L^2 by means of 10 a link, or said lever L may form an integral part of the lever L^2 that corrects the minute-hand, as shown, the last-named lever being connected with or forming an integral part of the armature-lever L^3 of the electro-magnet E. 15 The pole-piece A^2 of the electro-magnet E is preferably constructed with a concave face, while the armature A^3 on the lever L^3 has a convex face, the curvatures being segments of circles having for their center the fulcrum 20 of the armature-lever L^2 , as and for the purposes described in said patent to Hunter and Gerry, hereinbefore referred to.

In view of the fact that the cam C is constructed in the form of a double wedge the 25 inclined faces of the wedge c , forming a knife-edge, and in view of the further fact that the striking-faces l^3 l^4 of the correcting-lever L are a substantially wedge-shaped or rounded and an inclined surface, respectively, the 30 probability of the disk D being on its dead-center at the moment the correction takes place, so that a corresponding dead-point on either of said inclined faces will strike the knife-edge of the cam C squarely, is a very 35 remote one; yet to avoid even such a remote contingency I employ an auxiliary weighted or gravity lever M, fulcrumed on the clock-frame at m . The arm M' of lever M is provided near its free end with a laterally-pro- 40 jecting wedge-shaped nose m' , that vibrates in the path of the cam C, and said arm is curved and has a projecting point m^2 , whose front face—that is to say, the face that operates upon the cam C when within reach of the 45 nose m' of the auxiliary lever—is substantially rectilinear, or but slightly curved, while its rear face is curvilinear and lies at an angle to the main curvature of the arm, as shown.

50 When the levers L and M are in their normal position, Fig. 1, the curved face of the arm M' of lever M bears against the pin l^5 and roller l^6 . As the lever L moves toward the axis of the seconds-hand, the pin and roller 55 ride along the curved face of the arm M' of lever M, which sweeps across the disk D in the path of the inclined faces c or c' of cam C until the roller l^6 has passed the curved face of the projecting point, when the pin l^5 60 of lever L will propel the lever M alone until said lever L fully straddles the seconds-hand axis, when the said pin l^5 will lie near the point of the extension m^2 of lever M, and hold the same against backward motion, as shown 65 in dotted lines in Fig. 1.

If at the time of correction the clock is fast and the seconds-hand stands about the posi-

tion indicated in full lines, the curved striking-face (or the inclined striking-face, if the end of the limb l' of lever L is wedge-shaped,) 70 will strike the curved side of cam C, and thereby revolve the disk D in a direction opposite to that of the motion of the seconds-hand and bring the latter back to the standard of correction—say, the noon hour. 75

It will of course be understood that the auxiliary lever M is brought into operation only when the cam lies within reach of its nose m' at the time of correction, and the said lever is used only as an additional or auxil- 80 iary safeguard to prevent all possibility of the correcting-lever striking the cam while on a dead-center.

As soon as the electric current through the electro-magnet is interrupted the correcting- 85 lever returns into its normal position under the influence of the armature-lever L^3 , receding or falling away from the pole-piece A^2 , and as the auxiliary lever M is a gravity or weighted lever, the weight of which tends to 90 maintain said lever in contact with the stop or stops on the correcting-lever, said auxiliary lever will follow the movement of the correcting-lever and return with the latter into its normal position. 95

In Figs. 3 and 4 I have shown the cam C in a position when the disk D is about on a dead-center relatively to the striking-faces l^3 100 l^4 , and consequently in the path of the nose m' of lever M, by which it is engaged, and by which the disk D is revolved until the lever L has approached the axis of the seconds-hand sufficiently to bring either the striking-face 105 l^3 or the striking-face l^4 in contact with the cam on one side of its knife-edge c , whereby the disk D is further revolved until the lever L has completed its movement, when the parts will be in the position shown in dotted lines in Fig. 1.

As the movement of the lever L is a very 110 rapid and sudden one, imparting a like movement to lever M, which is liable to be thrown over completely when the cam C does not lie in the path of the said lever, I provide a stop-pin P in the path of the arm M' of lever M to 115 arrest its motion from right to left.

It will thus be seen that no matter in what position the cam C may be at the time of correction, to one or the other side of its correct position wherever this may be, it will in- 120 variably be brought back to that correct position either by lever L alone or by said lever and the lever M. Inasmuch as the cam is rigidly secured to the correcting-disk D and the said disk to the seconds-hand H', the lat- 125 ter will be set to correct time whatever may be its gain or loss.

Having now described my invention, what I claim is—

1. A device for setting the hands of a clock, 130 consisting of a setting arm or lever having a U-shaped extension or yoke provided with inclined striking-faces l^3 l^4 , in combination with a cam revolving about the arbor of the

hand and engaged by said yoke when the setting device is operated, substantially as and for the purposes specified.

2. A device for setting the hands of a clock, consisting of a setting arm or lever having a U-shaped extension or yoke and a cam revolving about the arbor of the hand and engaged by said yoke when the setting device is operated, in combination with an auxiliary lever having a motion in a plane substantially at right angles to the plane of motion of the setting-lever in the path of the cam and adapted to engage said cam in advance of its being engaged by the setting-lever, substantially as and for the purposes specified.

3. A device for setting the hands of a clock, consisting of a setting arm or lever having a U-shaped extension or yoke and a cam revolving about the arbor of the hand and engaged by said yoke when the setting device is operated, in combination with an auxiliary gravity-lever having a motion in a plane substantially at right angles to the plane of the setting lever or arm in the path of the cam, substantially as and for the purposes specified.

4. A device for setting the hands of a clock, consisting of a setting arm or lever having a U-shaped extension or yoke, an electro-magnet for operating said arm or lever, and a cam revolving about the arbor of the hand and engaged by the yoke of the lever when operated by the electro-magnet, in combination with an auxiliary lever moving substantially in a plane at right angles to the plane of motion of the setting-lever in the path of the cam, substantially as and for the purposes specified.

5. A device for setting the hands of a clock, consisting of a setting arm or lever having a U-shaped extension or yoke provided with the inclined striking-faces l^3 l^4 , an electro-magnet for operating said arm or lever, and a cam revolving about the arbor of the hand, in combination with a gravity-lever having a motion in a plane substantially at right angles to the plane of motion of the setting arm or lever in the path of the cam, substantially as and for the purposes specified.

6. A device for setting the hands of a clock, consisting of a setting arm or lever having a U-shaped extension or yoke and a double-wedge-shaped cam C, said cam revolving about the arbor of the hand and engaged by said yoke when the setting device is operated, substantially as and for the purposes specified.

7. A device for setting the hands of a clock, consisting of a setting arm or lever having a U-shaped extension or yoke and a double wedge-shaped cam, said cam revolving about the arbor of the hand and engaged by said yoke when the setting device is operated, in combination with an auxiliary lever having a motion in a plane substantially at right angles to the plane of motion of said yoke of the setting arm or lever, said auxiliary lever having a wedge-shaped nose m' , moving in the path of the cam, substantially as and for the purposes specified.

8. A device for setting the hands of a clock, consisting of a setting arm or lever having a U-shaped extension or yoke, a cam revolving about the arbor of the hand and engaged by said yoke when the setting device is operated, in combination with an auxiliary gravity-lever operated by the setting-lever and having a motion in a plane substantially at right angles to the plane of motion of the yoke of said setting-lever, and stops to limit the movements of said auxiliary lever in either direction, substantially as and for the purposes specified.

9. The combination, with the lever L, provided with the extension or yoke l , and carrying the pin l^5 and roller l^6 , and the disk D, carrying the cam C, of the auxiliary lever M, having a curved arm M' , provided with an extension m^2 and the wedge-shaped nose m^3 , and the stop P, said parts being arranged and adapted to operate substantially as and for the purposes specified.

In testimony whereof I affix my signature in presence of two witnesses.

ADOLPHUS GIPPERICH.

Witnesses:

CHARLES LUKER,
W. H. MCCARTHY.