

(No Model.)

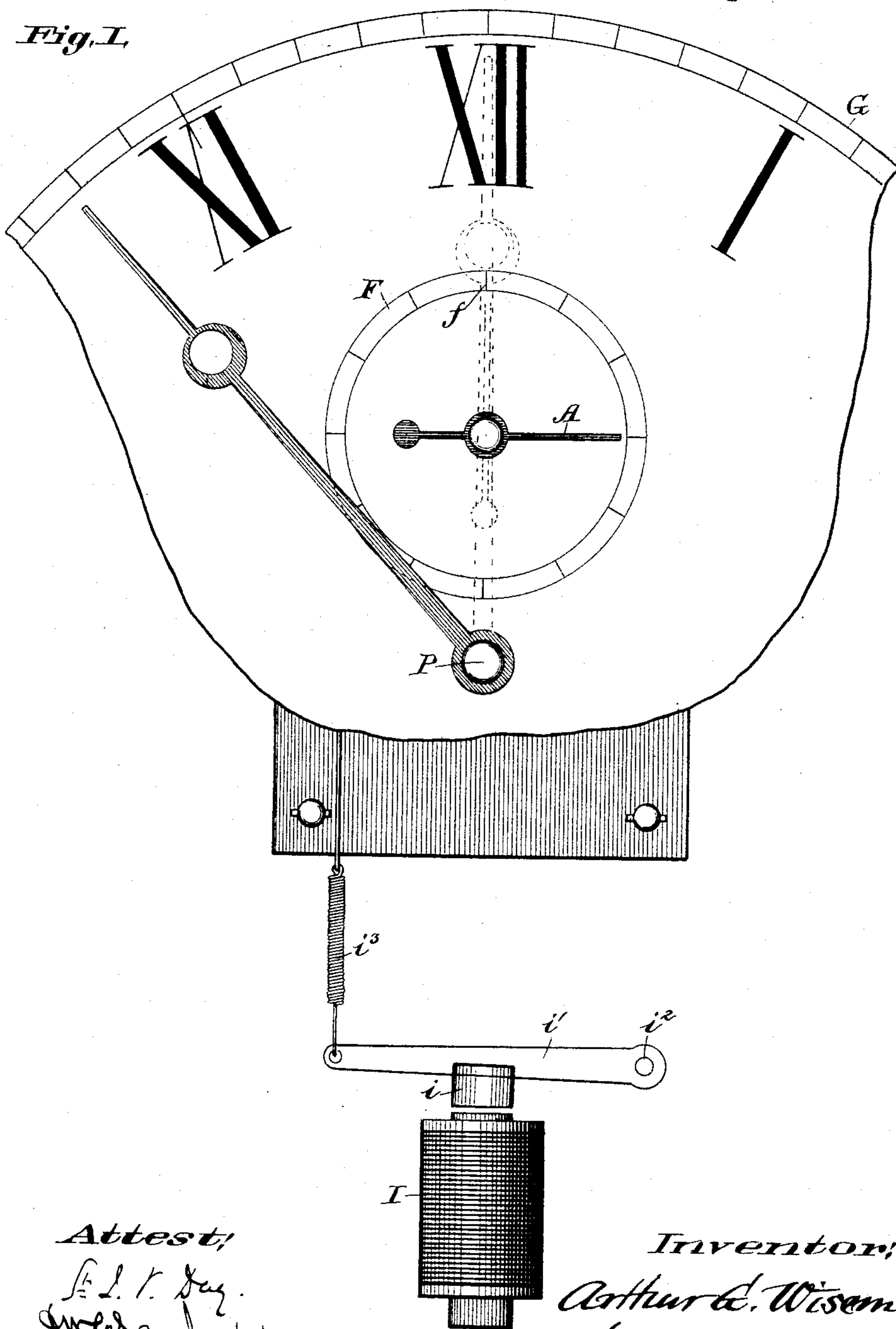
2 Sheets—Sheet 1.

A. G. WISEMAN.  
CLOCK SYNCHRONIZER.

No. 437,168.

Patented Sept. 23, 1890.

*Fig. 1.*



*Attest:*  
*L. L. Day.*  
*Witness*

*Inventor:*  
*Arthur G. Wiseman*  
*by C. D. Moody*  
*his atty*

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

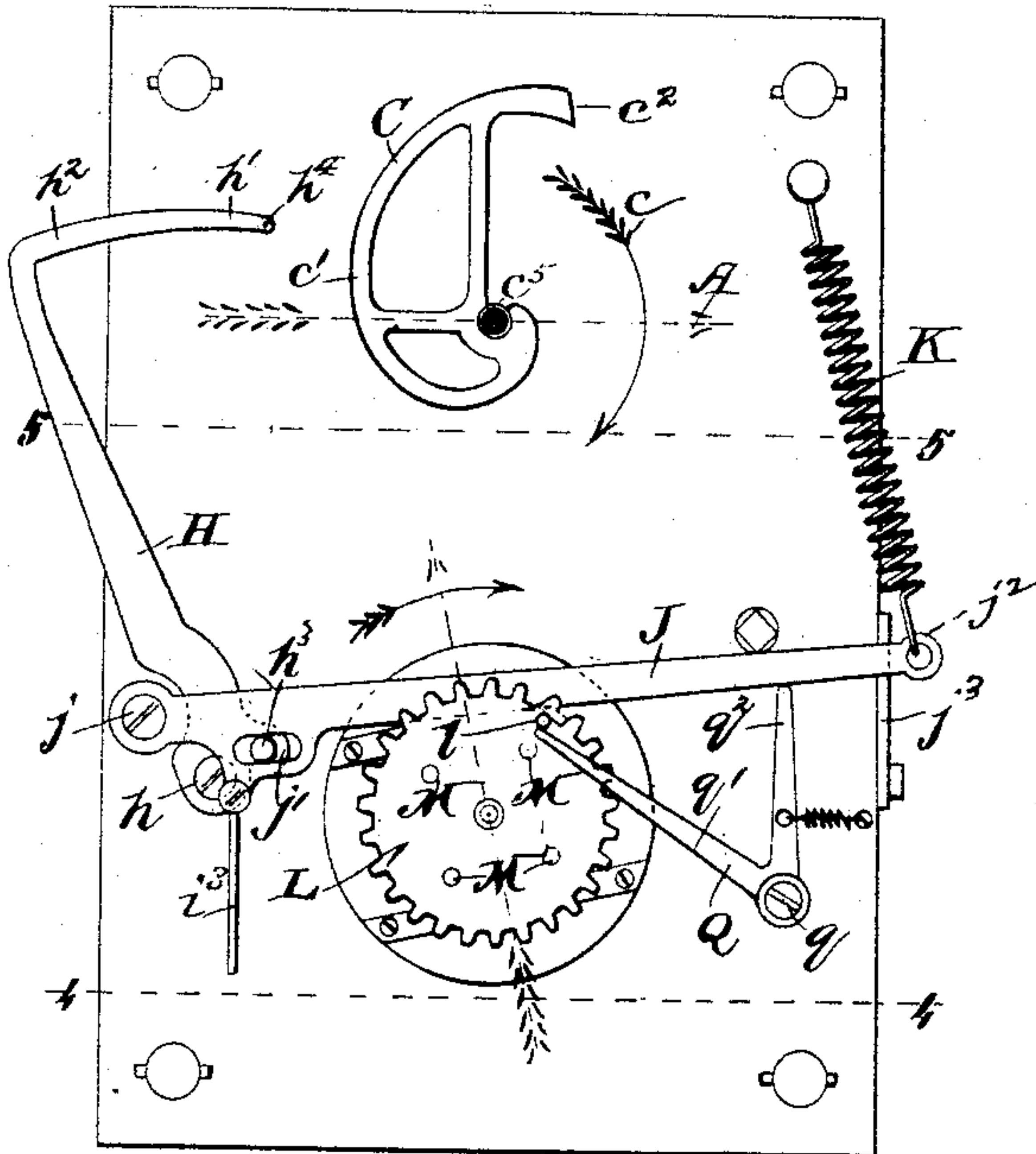


Fig. 3.

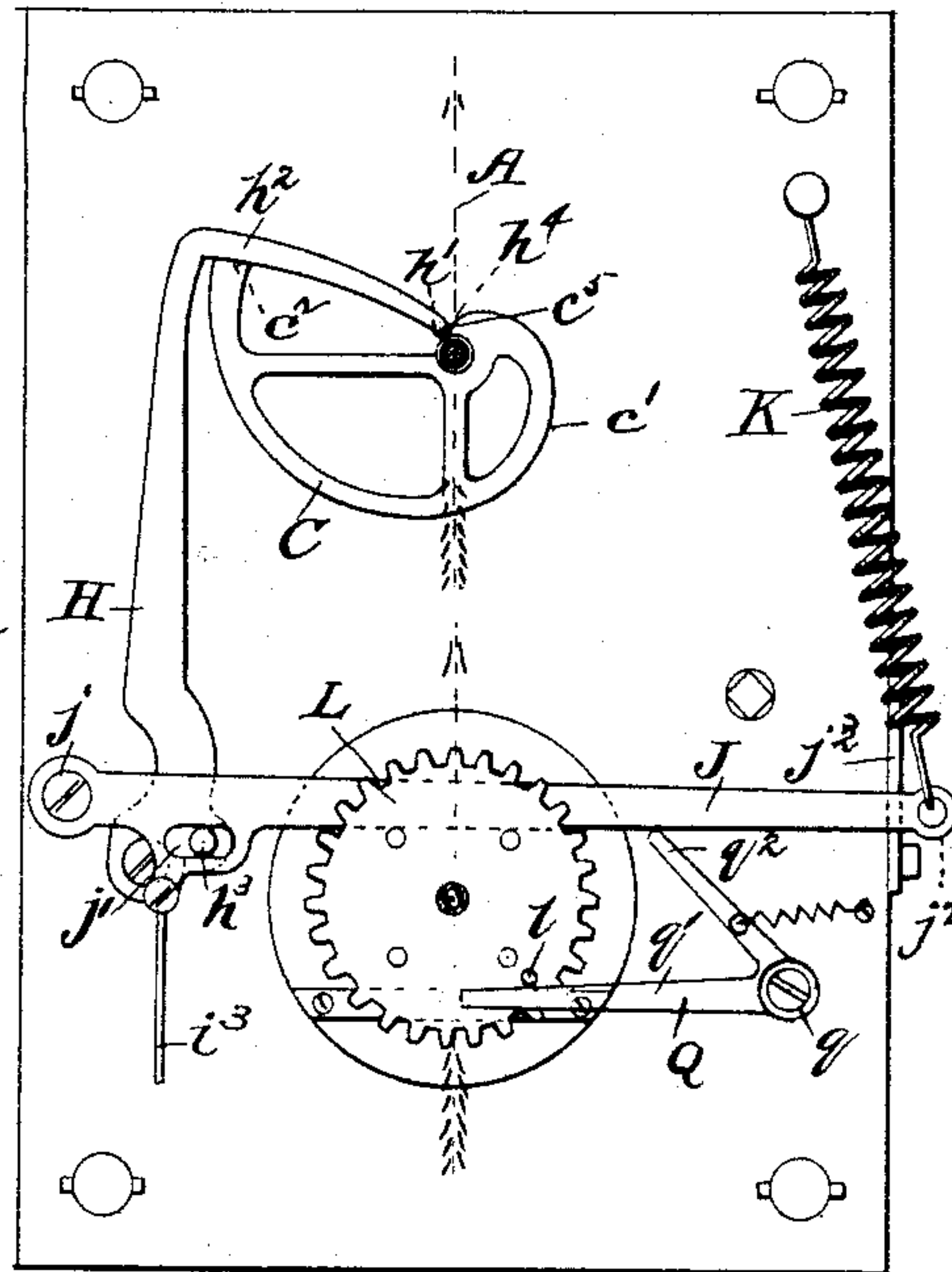


Fig. 4.

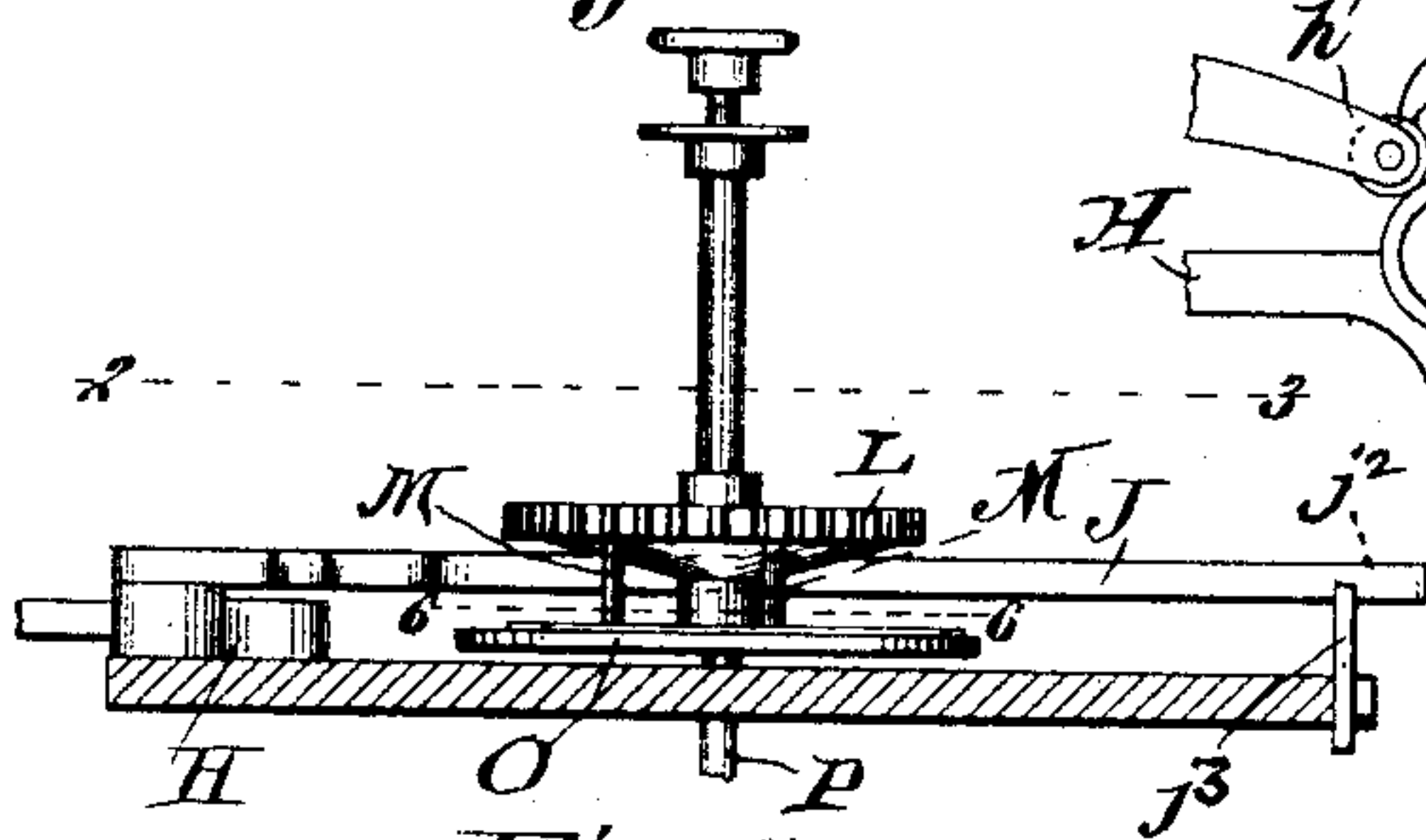


Fig. 11.

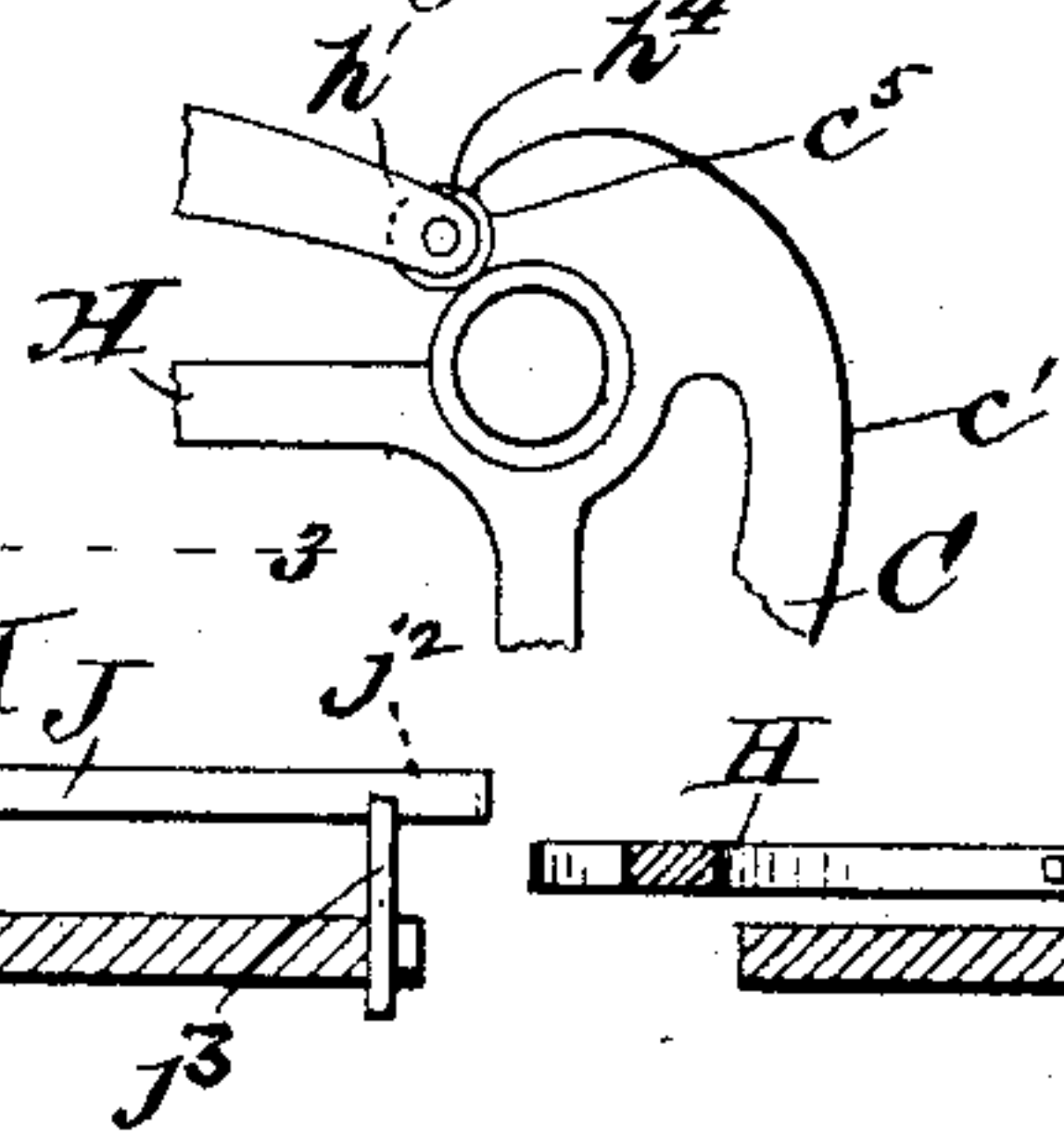


Fig. 5.

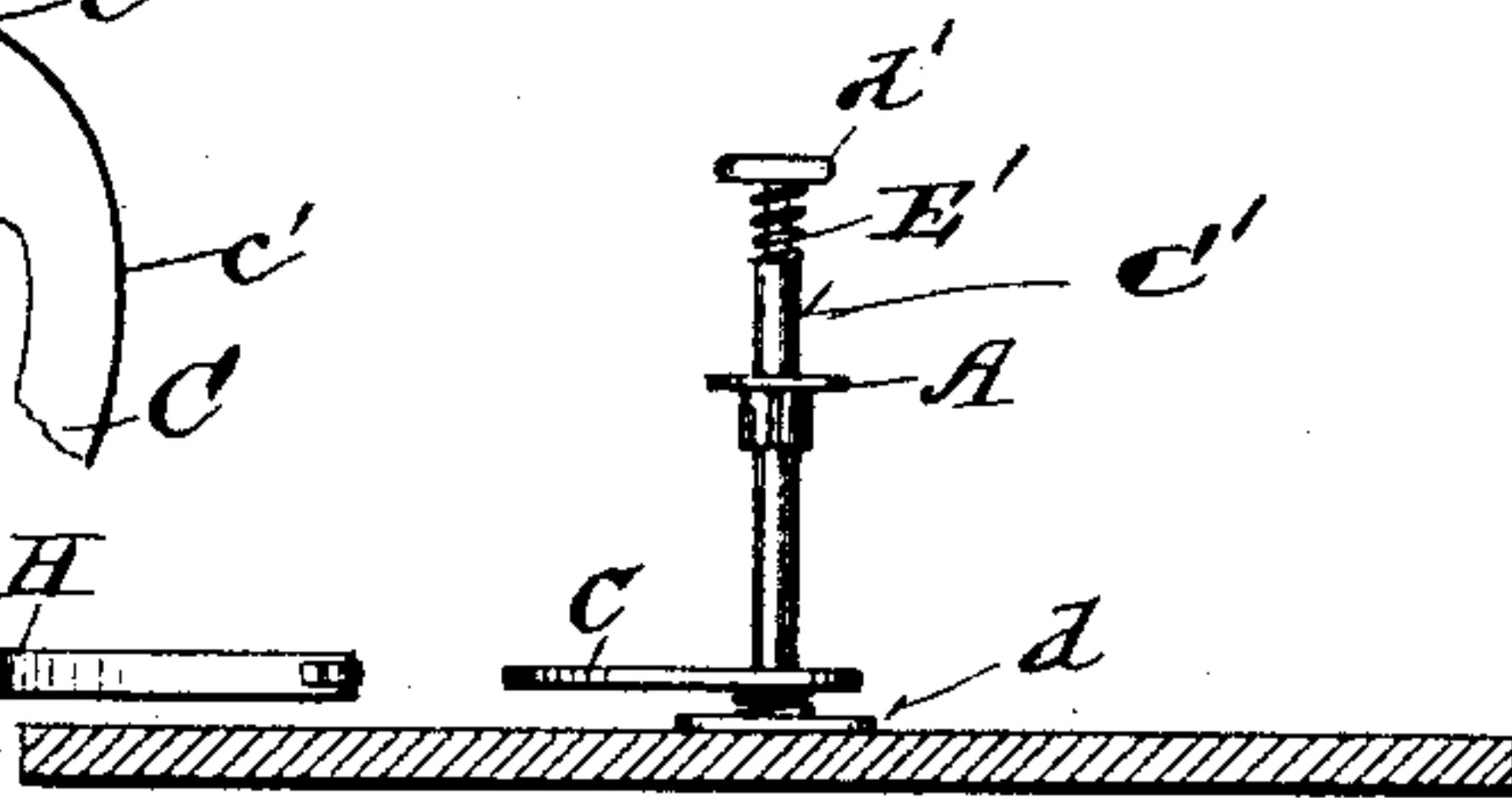


Fig. 6.

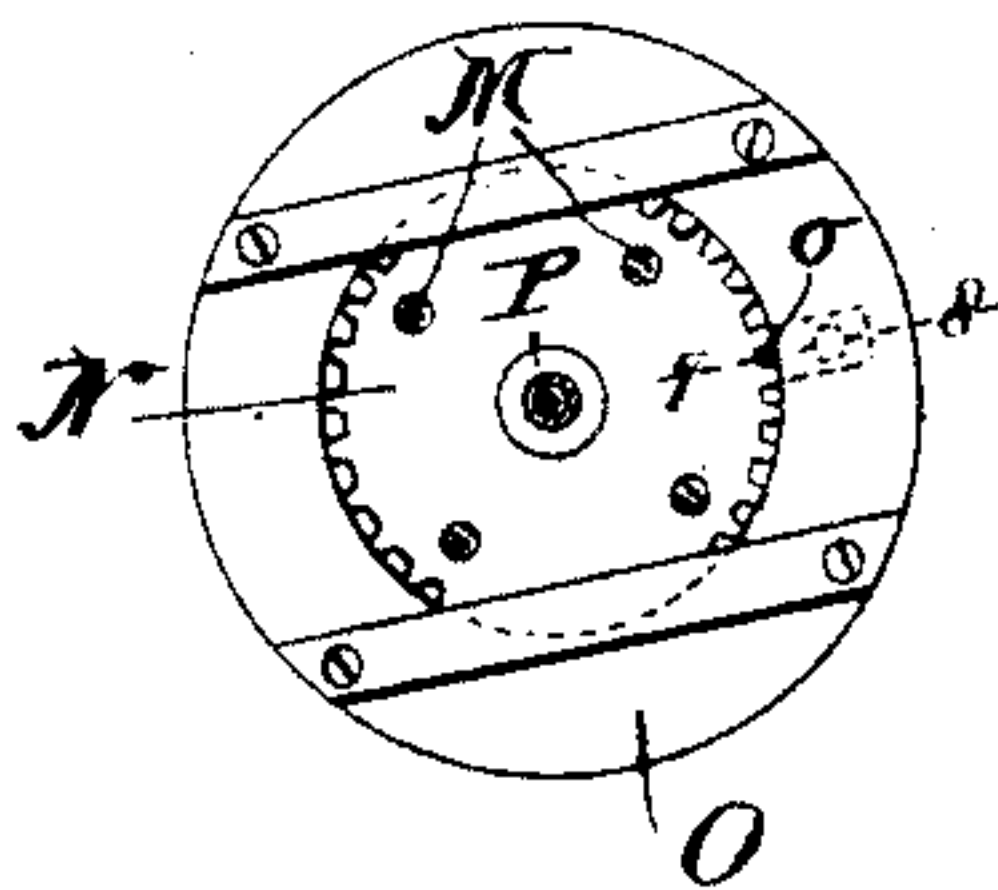


Fig. 9.



Fig. 10.

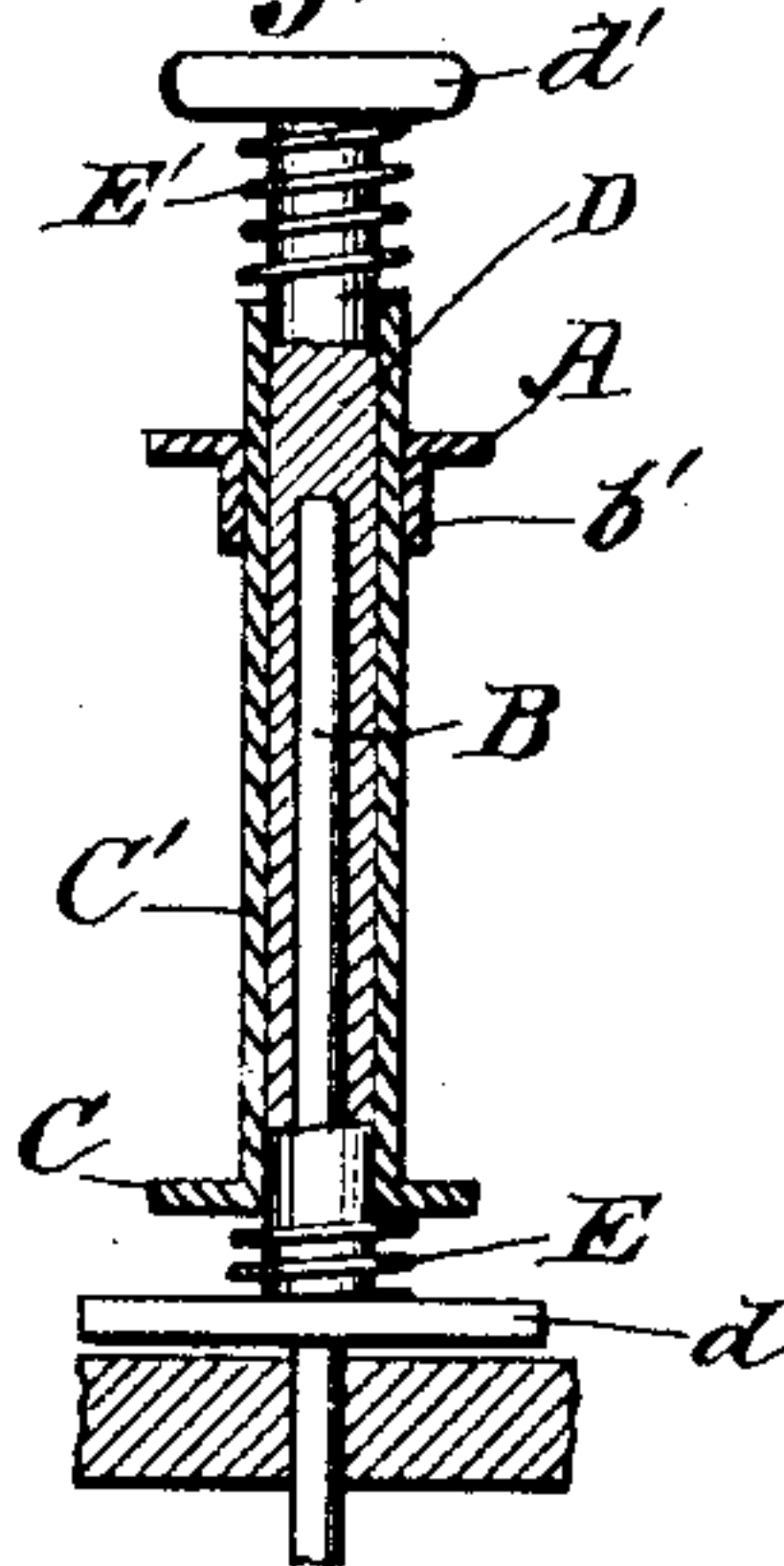


Fig. 7.

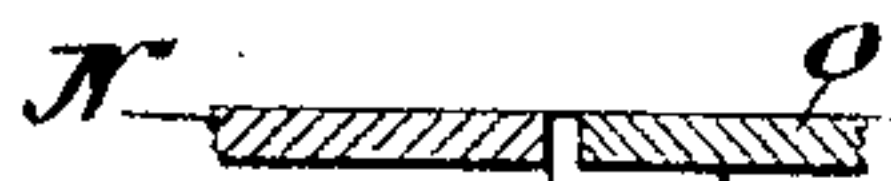


Fig. 8.



Attest:  
J. I. K. Day.  
Witness

Inventor,  
Arthur E. Wiseman  
by C. D. Moody  
his atty



# UNITED STATES PATENT OFFICE.

ARTHUR G. WISEMAN, OF WEBSTER GROVES, MISSOURI.

## CLOCK-SYNCHRONIZER.

SPECIFICATION forming part of Letters Patent No. 437,168, dated September 23, 1890.

Application filed October 19, 1889. Serial No. 327,555. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR G. WISEMAN, of Webster Groves, St. Louis county, Missouri, have made a new and useful Improvement in  
5 Clock-Synchronizers, of which the following is a full, clear, and exact description.

This improvement has for its object the regulation of the seconds-hand of the clock. By means of it the seconds-hand can at once  
10 substantially and without interfering substantially with the ordinary mechanism of the clock be turned to point to any desired mark—say the sixty-seconds mark—upon the seconds graduation, substantially as is hereinafter set  
15 forth and claimed, aided by a reference to the annexed drawings, making part of this specification, in which—

Figure 1 is a face view of a clock in which the improvement is embodied, a portion of the  
20 dial-plate being broken away to exhibit a portion of the mechanism used in carrying out the improvement; Fig. 2, a section on the line 2 3 of Fig. 4 within the dial-plate, the parts being as when the synchronizing mechanism is  
25 not acting; Fig. 3, a similar section, the parts being as when the synchronizing mechanism is acting; Fig. 4, a section on the line 4 4 of Fig. 2; Fig. 5, a section on the line 5 5 of Fig. 2; Fig. 6, a section on the line 6 6 of Fig. 4;  
30 Fig. 7, a section on the line 7 8 of Fig. 6, the parts being in engagement; Fig. 8, a section on the same line, the parts being disengaged; Fig. 9, a side elevation of the support for the free end of the striker-operating lever; Fig. 10,  
35 a sectional view of the seconds-hand pivot; and Fig. 11 a detail, being a view of the inner portion of the seconds-hand arm. The view includes the outer end of the part which coacts with seconds-hand arm. The views are not all  
40 upon the same scale.

The same letters of reference denote the same parts.

The leading feature of the improvement is the means immediately employed to effect the  
45 synchronizing of the seconds-hand A. (Shown in Figs. 1, 5, and 10, and indicated by the arrow A in Figs. 2 and 3.) The clock mechanism other than that portion thereof which is directly associated with the improvement is not shown,  
50 such mechanism being familiar and not substantially modified by the combination there-

with of the improvement under consideration, and the seconds-hand is constructed and operated in the ordinary manner, saving as the construction and operation are modified and  
55 supplemented by the improved synchronizer.

The seconds-hand and seconds-hand shaft B are provided with or have connected with them an arm C, Figs. 2, 3, 5, 10, and 11, which projects to the side of the shaft B. By apply-  
60 ing power to its outer portion the arm C can be rotated, as indicated by the arrow c, Fig. 2. The arm C and seconds-hand are so united that in the ordinary movement of the clock mechanism they are carried around together  
65 with the seconds-hand shaft; but when the movement of the arm C is expedited so that it is carried around in advance of the shaft B the seconds-hand is carried around with it.

The preferable but not the only mode of unit-  
70 ing the parts A B C is shown more distinctly in Figs. 5 and 10. What might be termed a "cap" D is applied to the shaft B, and the arm C is attached to or made part of a sleeve C', which in turn is fitted onto the cap D. The  
75 hub b' of the seconds-hand is slipped onto the sleeve C'. A spring E, interposed between the sleeve C' and the shoulder d of the cap, and another spring E', interposed between the  
80 other end of the sleeve C' and the shoulder d' at the outer end of the cap, exert sufficient pressure upon the sleeve C' to cause it to be carried around with the cap D and shaft B,  
and the seconds-hand is carried around with the sleeve C'; but when, as stated, the arm  
85 C is rotated at a higher rate than that at which the shaft and cap are moving the sleeve carrying the seconds-hand is rotated also upon the cap D. This rotation of the sleeve upon  
90 the cap is in the same direction as that in which the seconds-hand shaft rotates, as there- by no interference with the normal movement of the clock mechanism is liable to occur.

The synchronization of the seconds-hand is effected by relatively adjusting the seconds-  
95 hand and the arm C so that when the arm C is turned around upon the cap D to the desired quarter the seconds-hand shall point to any desired point—say the sixty-seconds mark f upon the graduation F—upon the clock-dial G.  
100 The means for thus turning the arm C around, so that whether the seconds-hand has in syn-



chronizing it to be turned around more or less of an entire circle, are as follows: The arm C, or at least that surface  $c'$  of it to which the moving force is applied, is made substantially in the form of a spiral, as shown. Coacting with this spirally-formed arm is a striker H, Figs. 2, 3, 4, and 5, which has a right-angular shape, substantially as shown, and is pivoted at  $h$  to enable the striker to be turned outward to be out of the field of the movement of the arm C or to be turned inward to strike the arm. The two positions are shown, respectively, in Figs. 2 and 3. The arm C when struck by the striker is thereby turned sharply around upon the cap D until the further movement of the arm C is arrested. Owing to the shape of the arm C, the point  $h'$  of the striker rides upon the arm until the point  $h'$  reaches the inner end of the arm C, substantially as shown in Fig. 3. The parts H C are relatively shaped and arranged so that the striker-point in moving inward moves against the arm C at the side of the bearing upon which the arm C turns, and whether the striker-point encounters the arm C nearer to or farther away from the inner end of the arm the striker-point rides upon the arm C until the inner end of the arm C is reached. The striker is caused to act promptly, and thus the arm and seconds-hand are readily adjusted and the desired synchronization effected irrespective of the extent of the variance of the seconds-hand.

The part  $h^2$  of the striker forms a convenient stop for the outer end  $c^2$  of the arm C to encounter, and to that end the striker is suitably shaped, substantially as shown, so that the arm shall be stopped by the striker as the point  $h'$  reaches the inner end of the arm C. The striker can be caused to thus turn on its pivot by any suitable means. In Fig. 1 is shown a magnet I, whose armature  $i$  is attached to a lever  $i'$ , pivoted at  $i^2$ , and having its free end connected by means of the tie  $i^3$  with a lever J, Figs. 2 and 3, which in turn is pivoted at  $j$ , and is slotted at  $j'$  to receive a stud  $h^3$  upon the striker H, and at its free end connected with a spring K. When the magnet acts upon its armature, the lever J is thereby turned on its pivot  $j$  and the striker H moved inward, as described. When the armature is released, the spring K acts to restore the lever J and striker to their original respective positions.

The lever J is substantially similar to the one described by me in Letters Patent No. 387,276, granted to me August 7, 1888, as I desire to use the present improvement in connection with the improved clock-synchronizing mechanism therein described—that is, the lever J is utilized for two purposes: to operate the herein-described seconds-hand-synchronizing mechanism and the minute-hand-synchronizing mechanism described in said Letters Patent. In this last-referred-to mechanism the lever J when drawn downward operates to lift the gear L, and that in turn and by means of the pins M (the pins

M unite the gears L N) causes the gear N to be disengaged from the surrounding ring O, having the tooth  $o$ . When the gear N is thus disengaged, the gears L N and the minute-hand shaft P are free to be turned around and synchronized, which is accomplished by causing the lever J to bear upon the pins M, and thereby cause the minute-hand to point to the desired quarter. The ring O and its tooth are employed to transmit the motion of the ordinary gearing (not shown) of the clock to the gear L and to the minute-hand. The ring and gear are shown in engagement in Fig. 7 and disengaged in Fig. 8.

To prevent the synchronizing from occurring at irregular intervals by reason of the battery operating for other purposes, and to enable it to occur when desired, a stop Q is employed. This stop is pivoted at  $q$ . The gear L is provided with a stud  $l$ , which in the rotation of the gear encounters the arm  $q'$  of the stop and causes it to be turned on its pivot and its other arm  $q^2$  thereby dislodged from under the lever J. As soon as this occurs, the lever J is free to be drawn downward and the synchronizing to take place. After the stud  $l$  has passed the arm  $q'$  the stop Q turns back again and upholds the lever J, as before.

To cause the lever J to act more effectively upon the gear L, its outer end  $j^2$  is caused to ride upon the inclined plane  $j^3$ .

The striker-point is provided with a roller  $h^4$ , which is the preferable means for forming the contact with the spiral arm, and at the inner end of the spiral arm there is preferably a recess  $c^5$  formed to receive the roller or striker, point and thereby steady the striker and enable it to act to better advantage at the inner limit of its stroke.

I am aware a heart-shaped cam, in combination with a striker, has been used for adjusting the hands of a clock, and hence do not here claim such a construction; nor would such a cam serve my present purpose, which is to provide for adjusting the seconds-hand by an operation which does not interfere with the escapement of the clock—that is, by always moving the hand in a forward direction to the desired point of adjustment irrespective of its position upon the dial at the moment the synchronization is to be effected.

I claim—

1. In a time-piece, the combination of the seconds-hand shaft, the seconds-hand, and the spiral arm and striker, said spiral arm curving around a complete circuit and in its operation always moving in a forward direction, substantially as described.

2. A time-piece whose seconds-hand is united with a spiral arm, said spiral arm curving around a complete circuit and in its operation always moving in a forward direction, substantially as and for the purpose described.

3. The combination, in a time-piece, of the



spiral arm, the striker, and the lever J, said spiral arm curving around a complete circuit and in its operation always moving in a forward direction, substantially as described.

5 4. The combination, in a time-piece, of the seconds-hand, the seconds-hand shaft, and an arm united with said shaft, to which movement is imparted to effect the synchronization of said hand, said hand, shaft, and arm  
10 in such synchronization always moving in a forward direction, for the purpose described.

5. In a time-piece, the combination of the spiral arm, the striker, the pivoted arm J, and the adjustable stop, substantially as described.

Witness my hand this 16th day of October, 1889. <sup>15</sup>

ARTHUR G. WISEMAN.

Witnesses:

C. D. MOODY,

D. W. C. SANFORD.