

(No Model.)

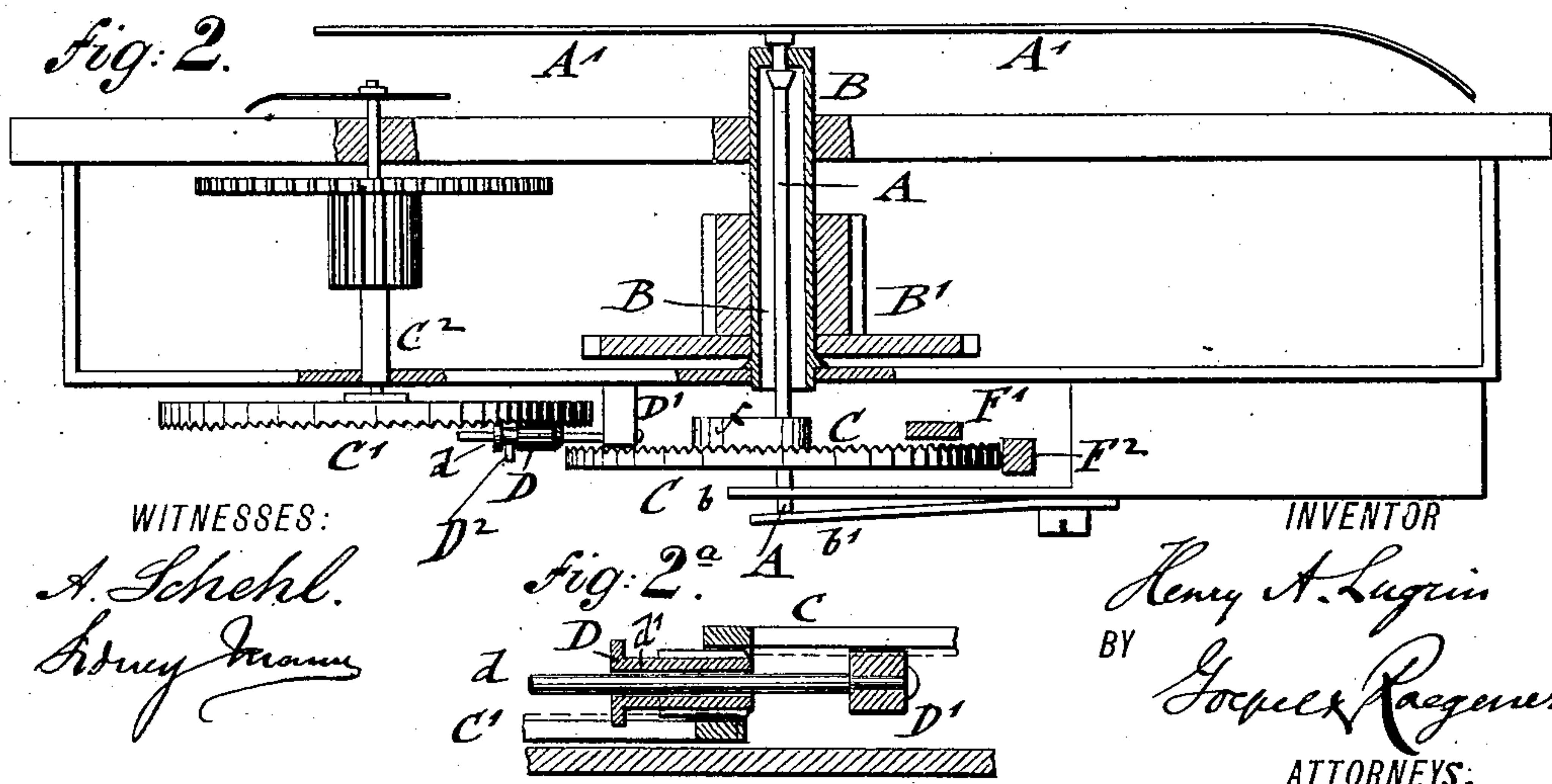
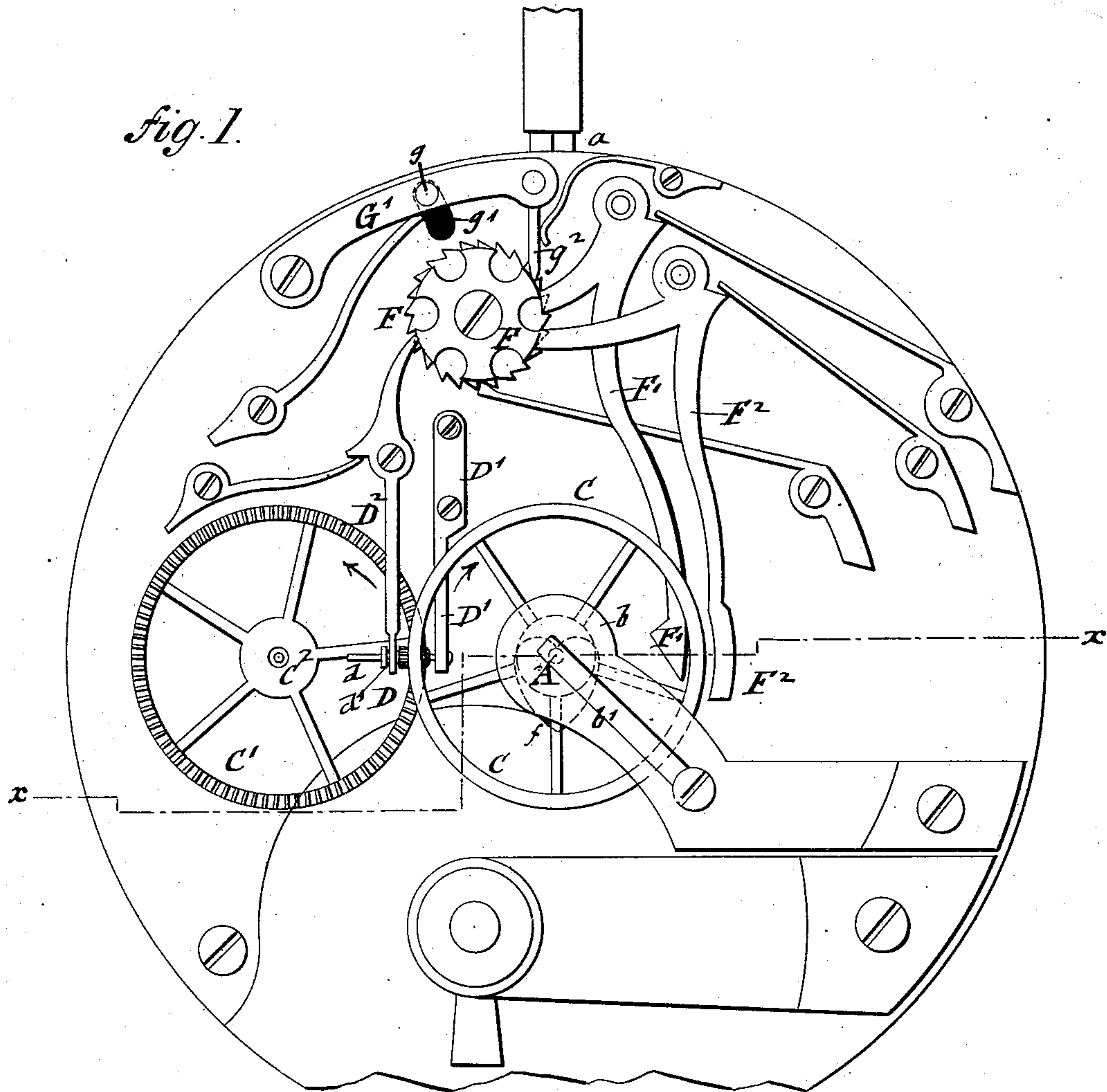
2 Sheets—Sheet 1.

H. A. LUGRIN.

STOP WATCH.

No. 360,777.

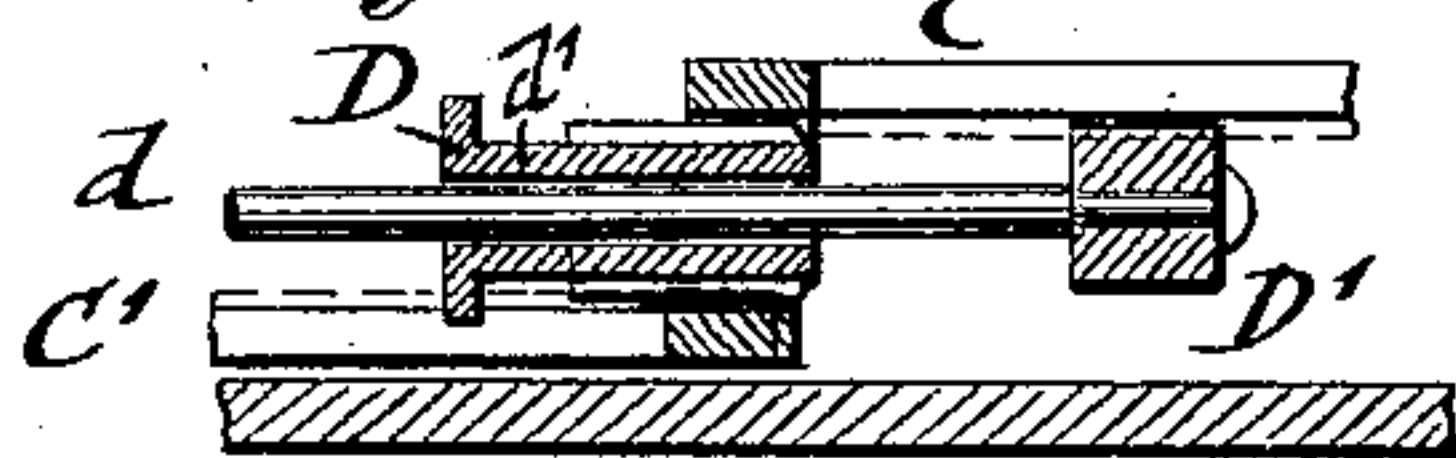
Patented Apr. 5, 1887.



WITNESSES:

A. Schehl.  
Henry Mann

*fig. 2<sup>a</sup>*



INVENTOR

Henry A. Lugin  
BY Joseph R. Ruggier  
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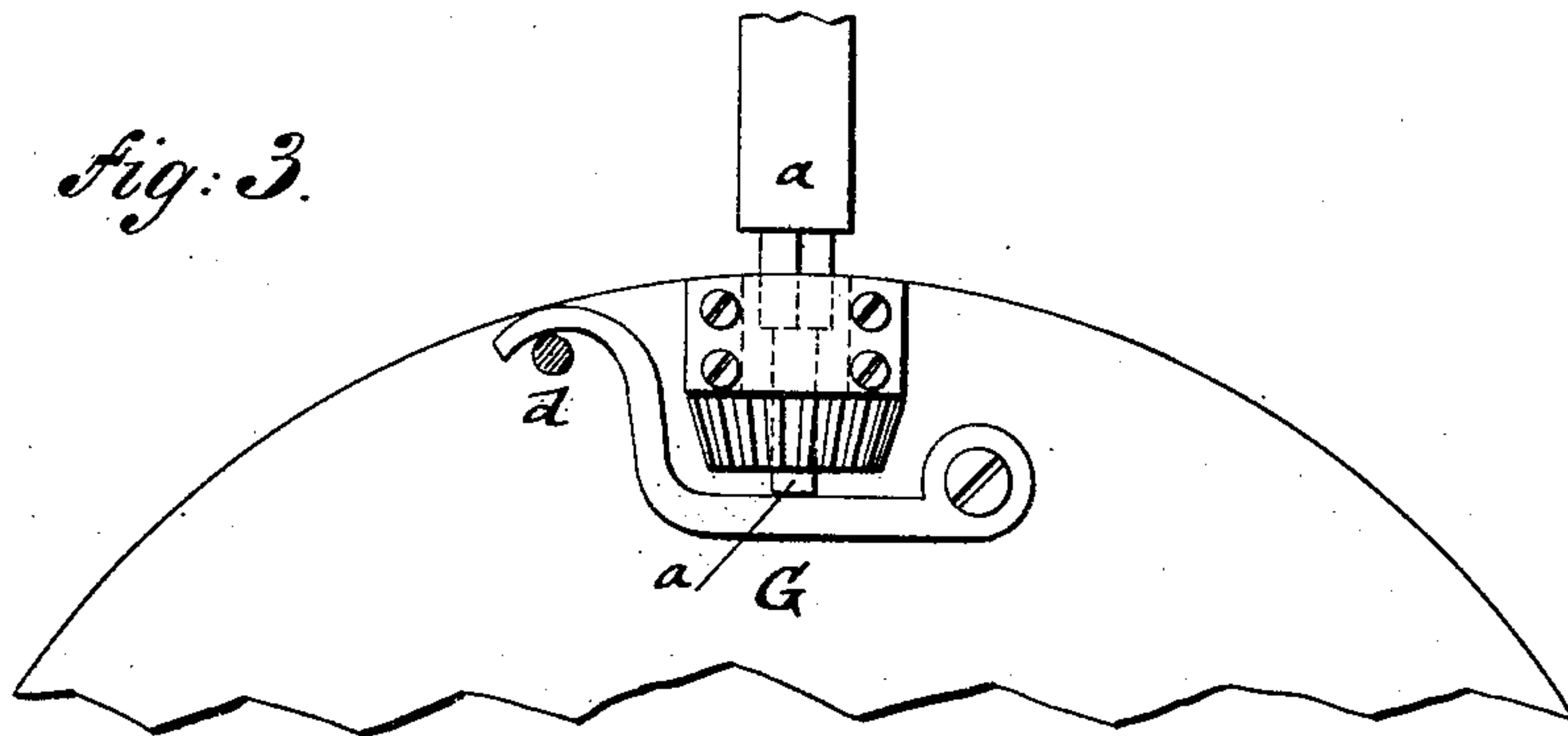
H. A. LUGRIN,

STOP WATCH.

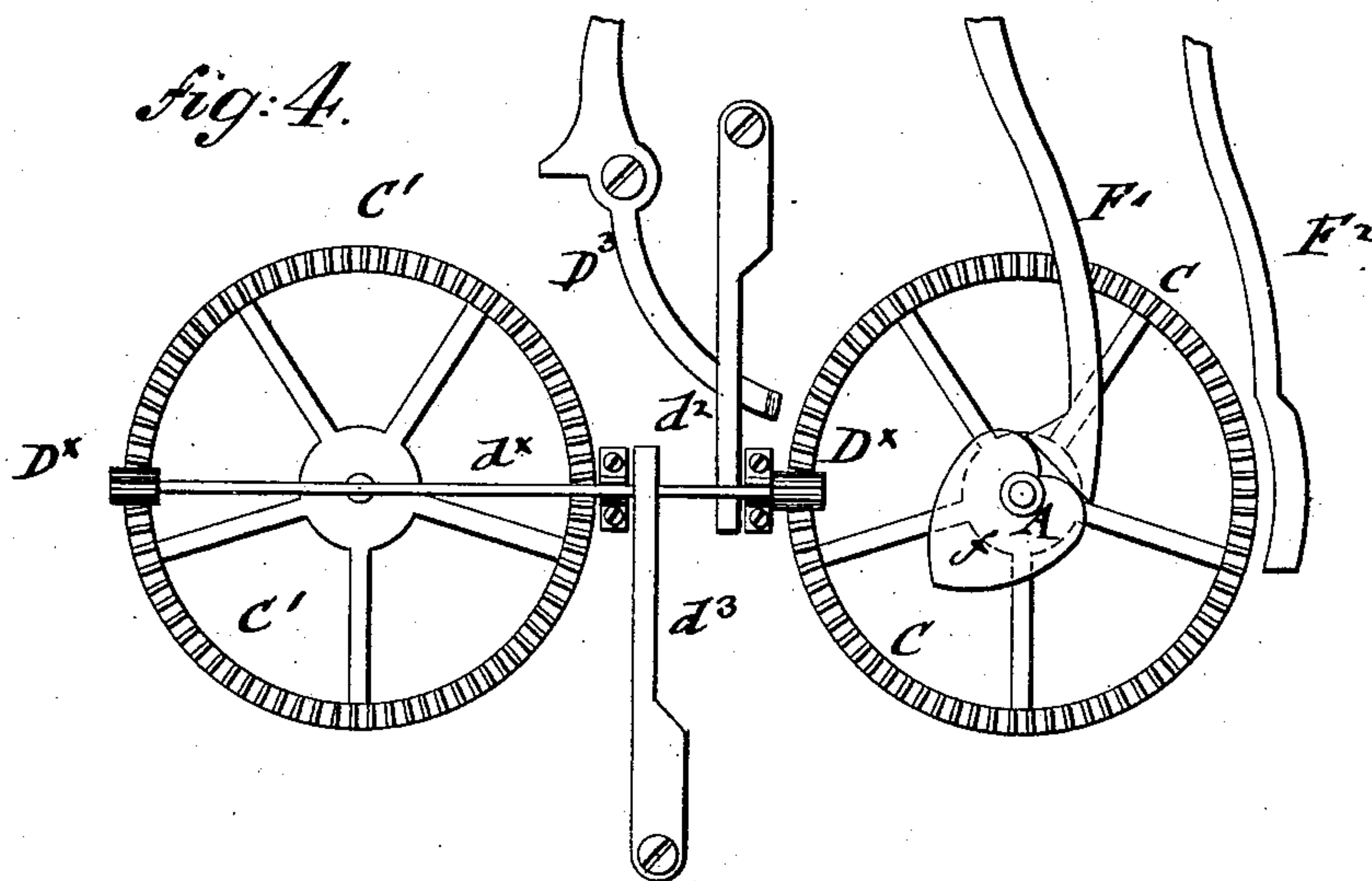
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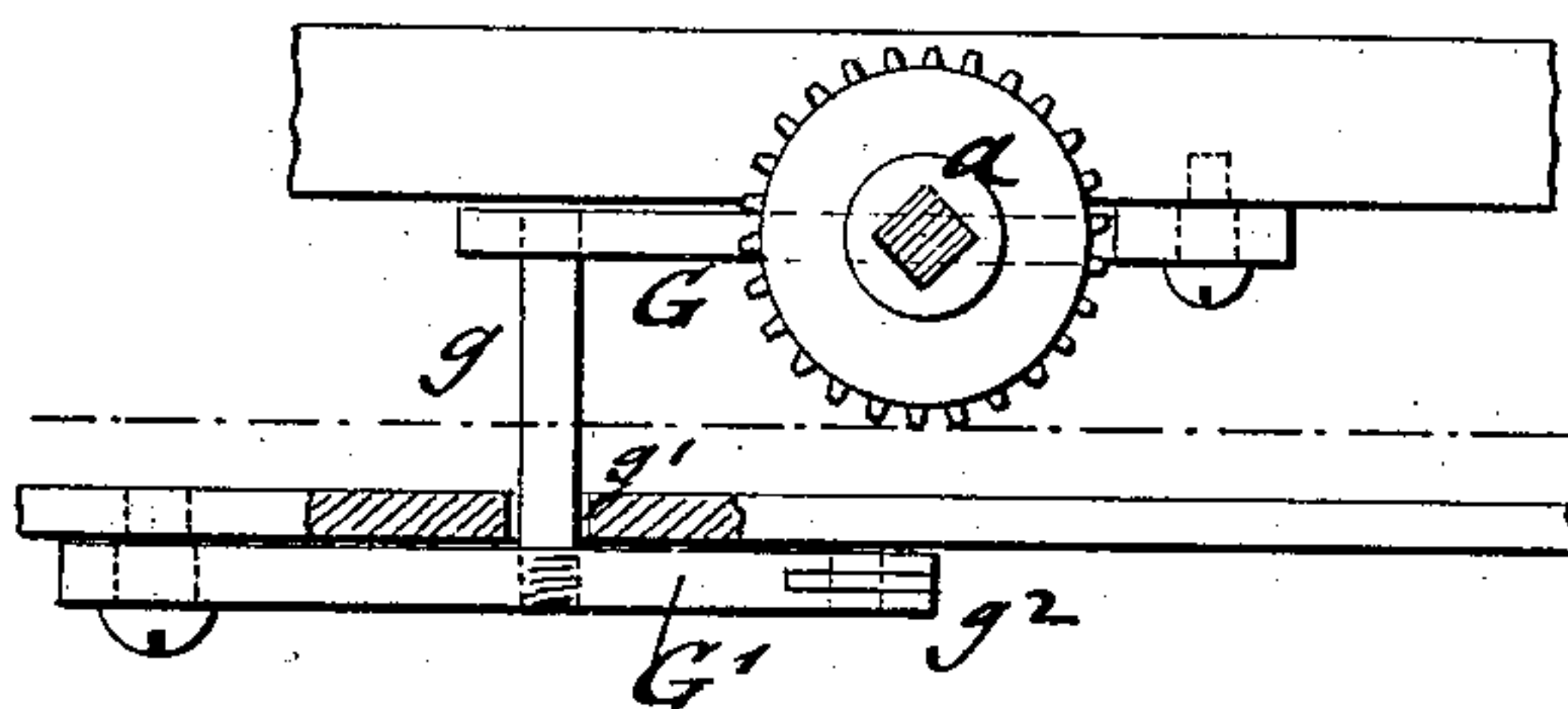
*fig: 3.*



*fig: 4.*



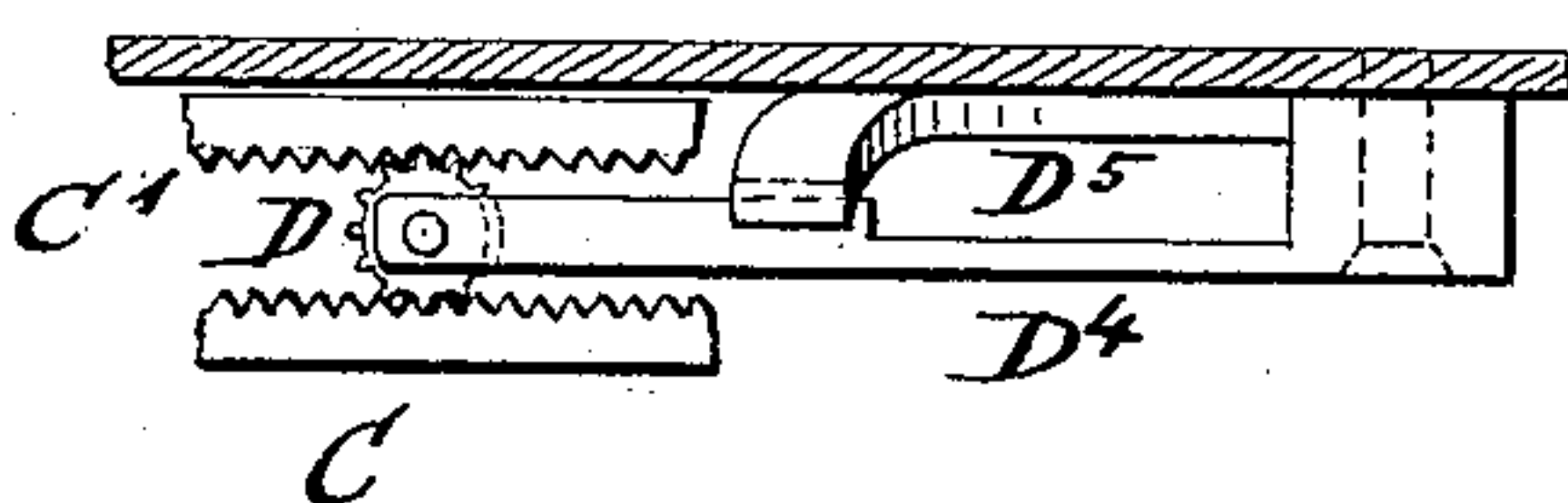
*fig: 5.*



*fig: 6.*

WITNESSES:

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# UNITED STATES PATENT OFFICE.

HENRY A. LUGRIN, OF BROOKLYN, NEW YORK.

## STOP-WATCH.

SPECIFICATION forming part of Letters Patent No. 360,777, dated April 5, 1887.

Application filed July 28, 1886. Serial No. 209,275. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY A. LUGRIN, of the city, county, and State of New York, have invented certain new and useful Improvements in Stop-Watches, of which the following is a specification.

This invention relates to an improved stop-watch used for timing purposes in horse-races and similar applications; and the invention consists of a stop-watch in which the arbor of the fourth wheel is provided with a minutely-gear wheel, while a similar crown-wheel is applied to the arbor of the center seconds-hand. A toothed cylindrical pinion is interposed between the crown-wheels on the arbor of the center seconds-hand and the arbor of the fourth wheel, said pinion being actuated by suitable mechanism operated by the winding-arbor of the stem or pendant so as to be thrown in or out of mesh with said crown-wheels, and produce thereby the starting or stopping of the center seconds.

The invention consists, further, of certain details of construction, which will be fully described hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a top view of my improved stop-watch, drawn on a larger scale. Fig. 2 is a vertical transverse section of the same on line *x x*, Fig. 1. Fig. 2<sup>a</sup> is a detail section of the motion-transmitting pinion and crown-wheels, drawn on a still larger scale. Fig. 3 is a detail view of the upper part of the movement, taken from the opposite side and showing the connection of the actuating mechanism with the winding-arbor in the pendant or stem. Fig. 4 is a modified arrangement of the crown-wheels and intermediate transmitting-pinion. Fig. 5 is a sectional top view of Fig. 3, and Fig. 6 is a detail side view showing another modified arrangement of the transmitting-pinion.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the arbor of the center seconds-hand, A', which arbor is passed through the hollow arbor B of the center wheel, B', of the watch-movement. The arbor A rests by a shoulder on the face-collar of the hollow arbor B, and carries at the

opposite end a crown-wheel, C, which is cut with minute teeth and provided with the usual heart-cam, *f*, by which the center seconds-hand is returned to zero. The top end of the arbor A of the center seconds-hand, A', is guided in bearings of a bridge, *b*, of the movement and acted upon by a spring, *b'*, (shown in Fig. 2,) by which a certain play is imparted to the arbor A and its crown-wheel C. A minutely-toothed crown-wheel, C', is applied to the end of the arbor C' of the fourth wheel of the watch-movement, the teeth of said crown-wheels facing each other.

The crown-wheels C C' are at such a distance from each other that a cylindrical pinion, D, may be readily interposed between the same, so as to mesh with both crown-wheels. The pinion D is beveled at that end next to the teeth of the crown-wheels, so as to pass easily and without jarring into mesh with the same. The pinion D is arranged to slide on a fixed pin or axis, *d*, of a fixed arm, D', and moved along said pin by a fulcrumed shifting-lever, D<sup>2</sup>, that engages by its forked end a groove, *d'*, of the pinion D. The shifting-lever D<sup>2</sup> is actuated by the usual double ratchet-wheel, F, usually employed in stop-watches. The double ratchet-wheel F also actuates the usual return-lever, F', which, in connection with the heart-cam *f*, returns the center seconds-hand to the starting-point. It also operates a stop-lever, F<sup>2</sup>, which is pressed against the circumference of the crown-wheel C when the center seconds-hand is to be stopped.

The double ratchet-wheel F is actuated by the arbor *a* of the winding-pinion, which arbor is pushed in by the pressure on the crown of the stem or pendant, said winding-arbor *a* pressing on a lever, G, pivoted to the main plate of the movement, as shown in Figs. 3 and 5, so as to move it in downward direction. The arbor *a* passes through the hollow shank of the winding-pinion, which shank turns in suitable bearings, and is provided with a square socket for receiving the square portion of the arbor, as shown in Figs. 3 and 5. This lever engages a pin, *g*, of a pivoted and spring-actuated lever G', applied to the lower plate of the watch-movement, said pin passing through a slot, *g'*, of the top plate of the movement, as shown in Figs. 1 and 5. A spring-actuated



pawl,  $g^2$ , of the lever  $G'$ , engages the lower part of the double ratchet-wheel  $F$ , so as to actuate the same, and impart thereby, by its upper part, the required motion to the shifting, return, and stop levers, as usual in stop-watches.

The first depression of the winding-arbor produces the shifting of the pinion  $D$  on the pin  $d$  by the shifting-lever  $D^2$ , and simultaneously therewith the moving away of the return and stop levers  $F'$   $F^2$ , respectively, from the heart-cam  $f$  and the crown-wheel  $C$ . The pinion  $D$  is moved by the shifting-lever  $D^2$  into mesh with the crown-wheels  $C$  and  $C'$ , and imparts thereby motion to the center seconds-hand. The second depression of the winding-arbor imparts a slight forward motion to the double ratchet-wheel  $F$ , and produces the shifting of the pinion  $D$  out of mesh with the teeth of the crown-wheels, and simultaneously the application of the stop-lever  $F^2$  to the circumference of the crown-wheel  $C$ , so as to produce the instant stopping of the center seconds-hand. The next depression of the winding-arbor again moves the double ratchet-wheel  $F$  and applies the return-lever  $F'$  to the heart-cam  $f$ , so as to return thereby the center seconds-hand to the starting-point.

The timing attachment described may also be worked by any other arbor of the watch-movement, and in case the arbor from which the motion is received rotates in opposite direction to the arbor of the fourth wheel it requires the arrangement of two cylindrical pinions,  $D^x$   $D^x$ , which are placed on an arbor,  $d^x$ , that extends from the crown-wheel  $C$  diametrically across the crown-wheel  $C'$ , as shown in Fig. 4, said arbor being guided in slotted bearings and acted upon by a lifting and depressing spring,  $d^2$   $d^3$ , that press on opposite sides of the arbor. The lifting-spring  $d^2$  is raised or lowered by a fulcrumed lever,  $D^3$ , so as to produce the unmeshing of the pinions  $D^x$   $D^x$  with the teeth of the crown-wheels  $C'$  and  $C$ , or the intermeshing of the same, as the case may be.

Instead of imparting a shifting motion to the intermediate transmitting-pinion,  $D$ , as shown in Figs. 1 and 2, the same may be supported on a spring-arm,  $D^4$ , and acted upon by a wedge-shaped lifting-lever,  $D^5$ , so that the pinion is lifted out of gear with the transmitting crown-wheel  $C'$  against the tension of a spring-arm,  $D^4$ , as shown in Fig. 5. In this case the crown-wheel  $C$  on the arbor of the quarter-second hand requires to have sufficient play to follow the lifting motion imparted by the lever  $D^5$  to the pinion  $D$ , and to be lowered again by the spring  $b'$ , so that the pinion  $D$  and either crown-wheel  $C$  are placed either in or out of gear with the crown-wheel  $C'$ . The lifting or lowering motion of the pinion  $D$  is a full equivalent to the laterally-shifting motion of the same, as in both cases the meshing or unmeshing of the crown-wheels with the pinion is obtained.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a crown-wheel attached to the arbor of the center seconds-hand, a crown-wheel attached to the arbor of the fourth wheel, an intermediate cylindrical pinion capable of meshing with both crown-wheels, and a shifting mechanism by which the cylindrical pinion is thrown in or out of mesh with said crown-wheels, substantially as set forth.

2. The combination of the spring-pressed arbor of the center seconds-hand, a crown-wheel on said arbor, a crown-wheel on the arbor of the fourth wheel, the teeth of which crown-wheel face the teeth of the first crown-wheel, an intermediate cylindrical pinion having a tapering end, said pinion being adapted to mesh with the teeth of both crown-wheels, and a shifting mechanism by which said pinion may be thrown in or out of gear with said crown-wheels, substantially as set forth.

3. The combination of the arbor of the center seconds-hand, a crown-wheel keyed to the same, a crown-wheel on the arbor of the fourth wheel, an intermediate cylindrical pinion meshing with both crown-wheels, said pinion sliding on a fixed post or axis, a shifting-lever engaging said pinion, and a double ratchet-wheel actuated by the winding-arbor, whereby the pinion is shifted so as to be thrown in or out of mesh with the crown-wheels, substantially as set forth.

4. The combination of the winding-arbor, an intermediate lever actuated by the same, a spring-pressed lever pivoted to the top plate of the watch-movement and provided with a pin passing through a slot of said plate into the path of the intermediate lever, and a timing attachment actuated by said winding-arbor and intermediate levers so as to produce the starting, stopping, or returning of the center seconds-hand of the same, substantially as set forth.

5. The combination of a center seconds-hand, a transmitting-gearing for actuating said hand, a double ratchet-wheel, levers connecting said ratchet-wheel with the transmitting-gearing for starting, stopping, or returning said center seconds-hand, a lever having a spring-pawl for engaging said double ratchet-wheel and a pin, said pin passing through a slot of the top plate of the movement, and an intermediate transmitting-lever pivoted to the lower plate of the movement and engaging said pin, and a winding-arbor actuating said intermediate lever and passing through the hollow shank of the winding-pinion, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

HENRY A. LUGRIN.

Witnesses:

PAUL GÖPEL,  
SIDNEY MANN.