

(No Model.)

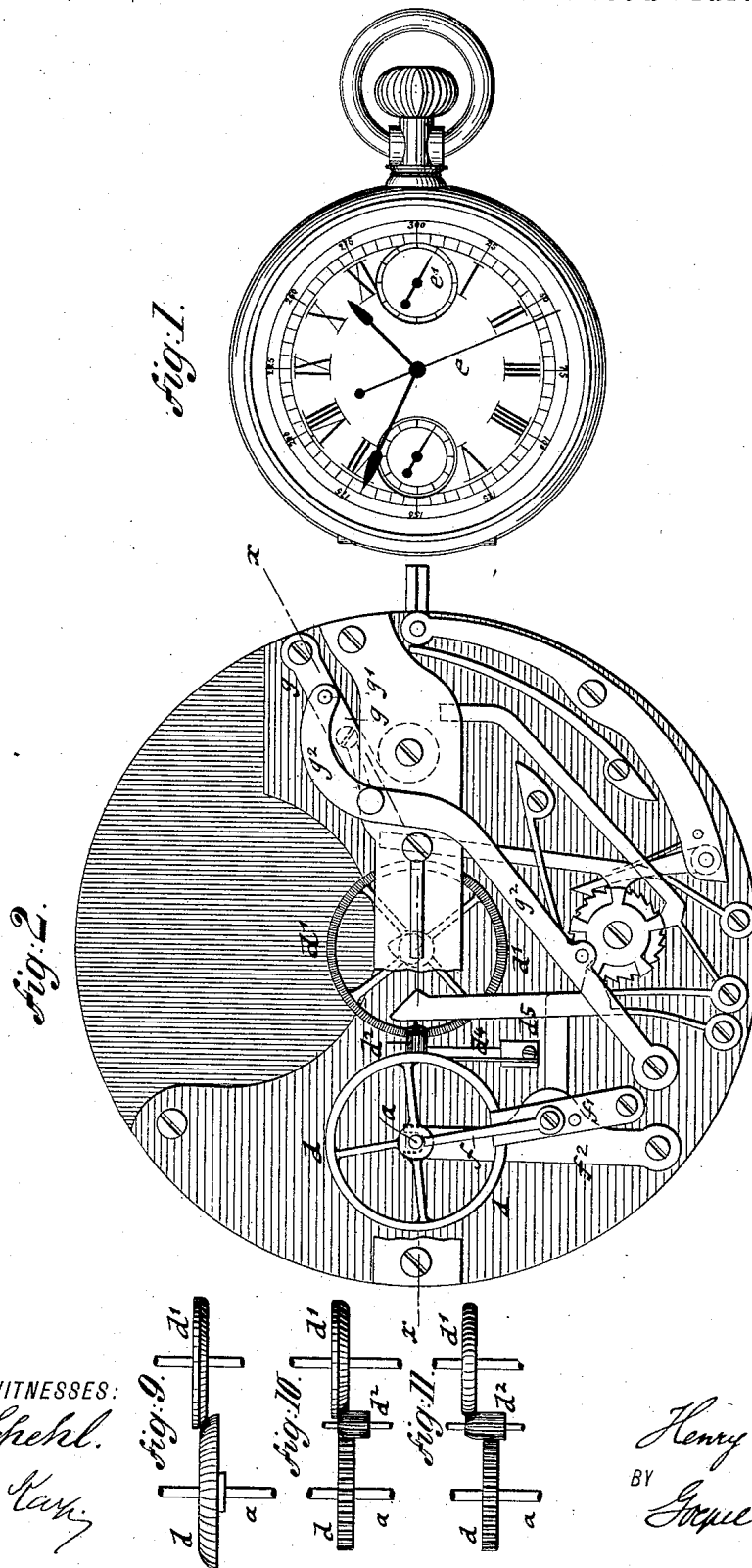
2 Sheets—Sheet 1.

H. A. LUGRIN.

STOP WATCH.

No. 379,075.

Patented Mar. 6, 1888.



WITNESSES:

A. Schehl.
Carl Kary

INVENTOR_

INVENTOR,
Henry A. Lugin

BY *Grover & Regener*

ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

H. A. LUGRIN.

STOP WATCH.

No. 379,075.

Patented Mar. 6, 1888.

Fig. 5.

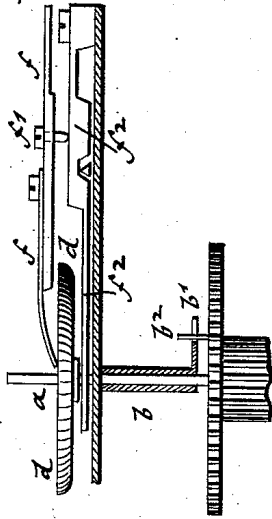


Fig. 8.



Fig. 6.

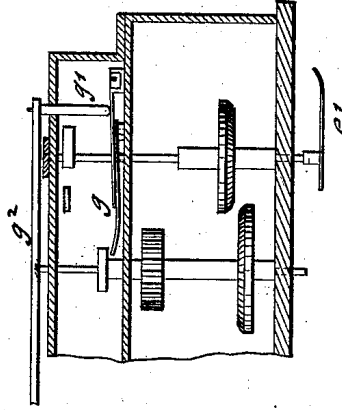


Fig. 3.

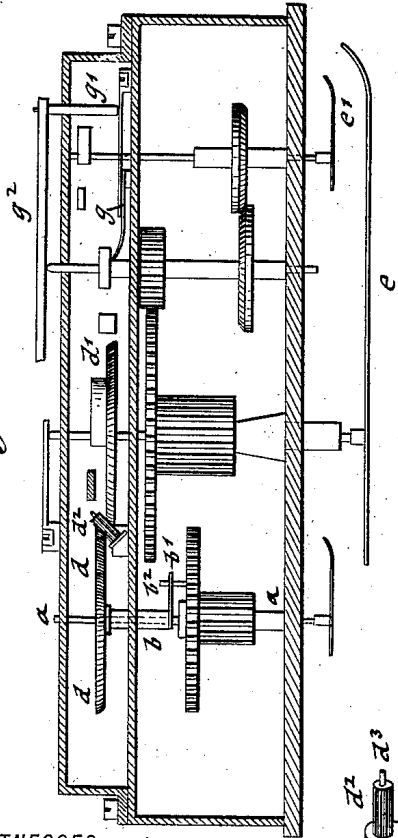
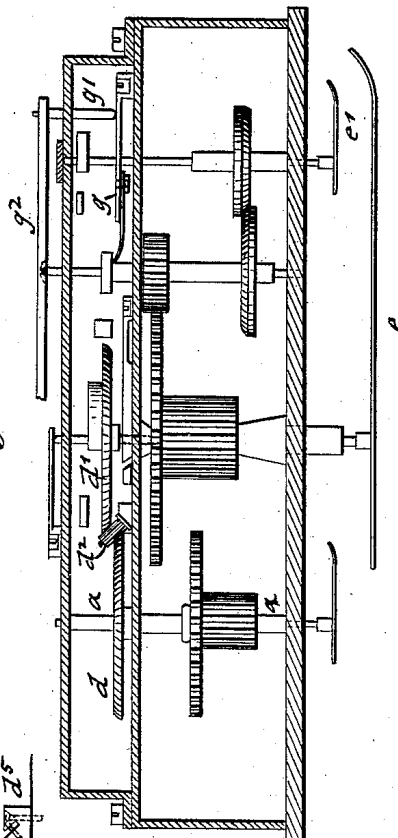


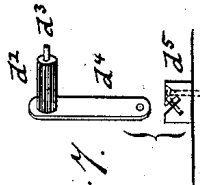
Fig. 4.



WITNESSES:

A. Schehl.
Carl Marx.

Fig. 7.



INVENTOR,

Henry A. Lugin.
BY *Loquex Paegener.*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

HENRY A. LUGRIN, OF BROOKLYN, NEW YORK.

STOP-WATCH.

SPECIFICATION forming part of Letters Patent No. 379,075, dated March 6, 1888.

Application filed June 6, 1887. Serial No. 240,388. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. LUGRIN, of Brooklyn, in the county of Kings 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 improvements in stop-watches of that class in which a quarter-seconds hand and an auxiliary minutes-hand are provided in connection with suitable mechanism for starting, stopping, and returning said hands, the improvements being designed with a view to secure the more reliable functioning of the stop-hands, and with a view to remove entirely the friction of the throwing-in springs with the transmitting gear-wheels, so that the pressure of said springs exerts no disturbing action on the watch-movement itself.

The invention consists of a stop-watch in which motion is transmitted to the quarter-seconds and auxiliary minutes hands by means of minutely-toothed conoidal gear-wheels. The transmitting gear-wheels of the quarter-seconds hand are operated in connection with an intermediate pinion that is supported on an inclined arbor supported in a suitable manner. The friction of the springs by which the motion-transmitting gear-wheels of the quarter-seconds and minutes hands are thrown into mesh is removed, when the timing attachment is at rest, by means of suitable devices for lifting said springs away from the transmitting gear-wheels, as will be fully described hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a front elevation of a watch with my improved timing attachment. Fig. 2 is a top view of the movement with the timing attachment. Fig. 3 is a vertical transverse section on line *x x*, Fig. 2. Fig. 4 is a similar section showing a modified arrangement of the timing attachment. Fig. 5 is a detail section showing the pressure-spring and its releasing device arranged in connection with the transmitting gear-wheel on the arbor of the fourth wheel. Figs. 7 and 8 are details, respectively, of the intermediate transmitting pinion and of the coupling device between the arbor of the fourth wheel and the hollow arbor of one of the transmitting gear-wheels. Fig. 6 is a detail section showing the device for removing the throwing-

in spring from the arbor of the gear-wheel by which motion is transmitted to the auxiliary minutes-hand, and Figs. 9, 10, and 11 are side views showing different modified forms of gear-wheels by which motion may be transmitted to the timing quarter-seconds and auxiliary minutes hands.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, *a* represents the arbor of the fourth wheel, from which motion is imparted to the timing attachment, which is composed of a quarter-seconds hand and an auxiliary minutes-hand and their actuating mechanisms. On the arbor *a* is placed a hollow arbor, *b*, which passes through an opening in the top plate of the movement, said arbor being provided with a minutely-toothed conoidal gear-wheel, *d*. The hollow arbor *b* of the gear-wheel *d* is provided at the lower end with a recessed arm, *b'*, that engages a fixed pin, *b''*, of the fourth wheel, said recessed arm and pin forming a coupling device by which motion is transmitted from the fourth wheel to the minutely-toothed gear-wheel *d*, whether the same is raised or lowered on the arbor of the fourth wheel, so that the gear-wheel *d* always rotates with the said arbor, whatever be its relative position. The arbor of the quarter-seconds hand *e* of the timing attachment passes through the hollow arbor of the minute-hand, as customary in stop-watches of this class. A second minutely-toothed conoidal gear-wheel, *d'*, is applied to that end of the arbor of the quarter-seconds hand which extends above the top plate of the movement, said gear-wheel *d'* being arranged in inverted state and close to the transmitting gear-wheel *d* on the arbor of the fourth wheel. The gear-wheel *d'* may mesh directly with the gear-wheel *d* or with a pinion, *d''*, that is interposed between the minutely-toothed gear-wheels *d* and *d'*, said pinion being supported loosely on an inclined arbor, *d'''*, attached to a plate, *d''''*, which is inserted into a supporting-block, *d'''''*, having an inclined recess, and attached thereto by a suitable pin, as shown in detail in Fig. 7. The rounded off or conoidal shape of the teeth of the transmitting gear-wheels has the advantage of producing an instant intermeshing of the same with the intermediate pinion, *d''*, so

that as soon as the timing-hands are to be started the intermeshing of a portion of the surface of the teeth takes place instantly without producing any vibrating motion on the hands before the same are started. This secures the instant and regular starting of the timing quarter-seconds hand and forms the essential feature of the present application, as thereby the working of the timing attachment of the stop-watches is rendered more accurate and effective.

Conoidal gear-wheels of different forms may be used, such as are shown in Figs. 9, 10, and 11. The intermediate pinion may also be made conoidal, as shown in Fig. 10, and arranged to mesh with a gear-wheel having straight teeth and with a conoidal gear-wheel; or for the auxiliary minutes-hand e' a conoidal gear-wheel may mesh directly with a gear-wheel having beveled teeth, the principle being in all cases the same—namely, the quick intermeshing of the gear-wheels as soon as the timing attachment is to be thrown into operation, so that the hands respond instantly to the motion of the same.

The mechanisms for starting, stopping, and returning the quarter-seconds and auxiliary minutes hands are well known and have been used in stop-watches heretofore, so that no special description of the same is required.

The mechanism for ungearing the motion-transmitting gear-wheel d or d' may be applied either to the gear-wheel d on the arbor of the fourth wheel or to the gear-wheel d' on the arbor of the quarter seconds hand, as shown, respectively, in Figs. 4 and 5.

For the purpose of removing the friction of the pressure-springs by which the transmitting gear-wheels of the quarter-seconds hand e and auxiliary minutes-hand e' are thrown into mesh with each other, means are provided by which they are removed out of contact with said transmitting wheels or arbors when the timing attachment is not in use, so that the friction of the same with said wheels or arbors does not interfere with the proper functioning of the movement. Heretofore these springs rested on the transmitting gear-wheels of the timing attachment and impeded to some extent the motion of the movement. For the purpose of overcoming this objection the so-called "throwing-in spring" f is removed from the transmitting gear-wheel d of the quarter-seconds hand or the spring g from the transmitting-arbor of the auxiliary minutes-hand whenever the timing attachment is at rest and the stop-hands at zero.

In Fig. 5 the throwing-in spring f of the transmitting gear-wheel of the quarter-seconds hand is shown, which spring is provided with a pin, f' , that is engaged by the same lever, f'' , by which the transmitting gear-wheel d is raised out of mesh with the pinion d'' , so as to stop the motion of the quarter-seconds hand, said lever and pin lifting the throwing-in spring f away from the transmitting gear-wheel d ; consequently the same exerts no friction

of any kind on the continuously-moving transmitting gear-wheel d and does not interfere with the proper motion of the movement.

In Figs. 4 and 6 the throwing-in spring g of the auxiliary minutes-hand is shown as applied to a collar on the arbor of the transmitting gear-wheel, and removed from said collar by a pin, g' , applied to the lever g'' , by which the transmitting gear-wheel of the minutes-hand is moved in or out of mesh with the gear-wheel on the arbor of the auxiliary minutes-hand. Whenever the arbor of the intermediate transmitting gear-wheel is lowered, the throwing-in spring g is simultaneously removed from the collar on said arbor by the pressure of the pin g' on the spring g , so that its pressure on the arbor of the transmitting gear-wheel does not exert any retarding influence upon the watch-movement.

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

1. In stop-watches, a motion-transmitting gearing for the quarter-seconds and auxiliary minutes hands, formed of minutely-toothed conoidal gear-wheels, substantially as set forth.

2. In stop-watches, the combination of minutely-toothed conoidal transmitting gear-wheels on the arbors of the fourth wheel and of the quarter-seconds hand, with an intermediate inclined pinion and means for supporting said pinion, substantially as set forth.

3. In stop-watches, the combination, with the motion-transmitting gear-wheels of the quarter-seconds and auxiliary minutes hands, of throwing-in springs and lifting-levers whereby said throwing-in springs are moved out of contact with the said transmitting gear-wheels whenever the timing attachment is in its normal position of rest, substantially as set forth.

4. In a stop-watch, the combination, with the motion-transmitting gear-wheels of the quarter-seconds hand, of the throwing-in spring having a pin attached to its shank, and the lever for raising one of the transmitting gear-wheels, said lever also engaging the pin on the shank of the throwing-in spring, so as to remove the latter from the transmitting gear-wheel whenever the timing mechanism is at rest, substantially as and for the purpose set forth.

5. The combination, with the motion-transmitting gear-wheels of the auxiliary minutes-hand, of a throwing-in spring engaging a collar on the arbor of one of said gear-wheels, a lever for throwing said gear-wheel in or out of mesh, and a pin attached to said lever and engaging the throwing-in spring, so as to remove it from said arbor when the timing attachment is at rest, substantially as and for the purpose set forth.

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

Witnesses: HENRY A. LUGRIN.

PAUL GOEPEL,
SIDNEY MANN.