

(No Model.)

2 Sheets—Sheet 1.

C. PRAHL.
REPEATING WATCH.

No. 602,036.

Patented Apr. 5, 1898.

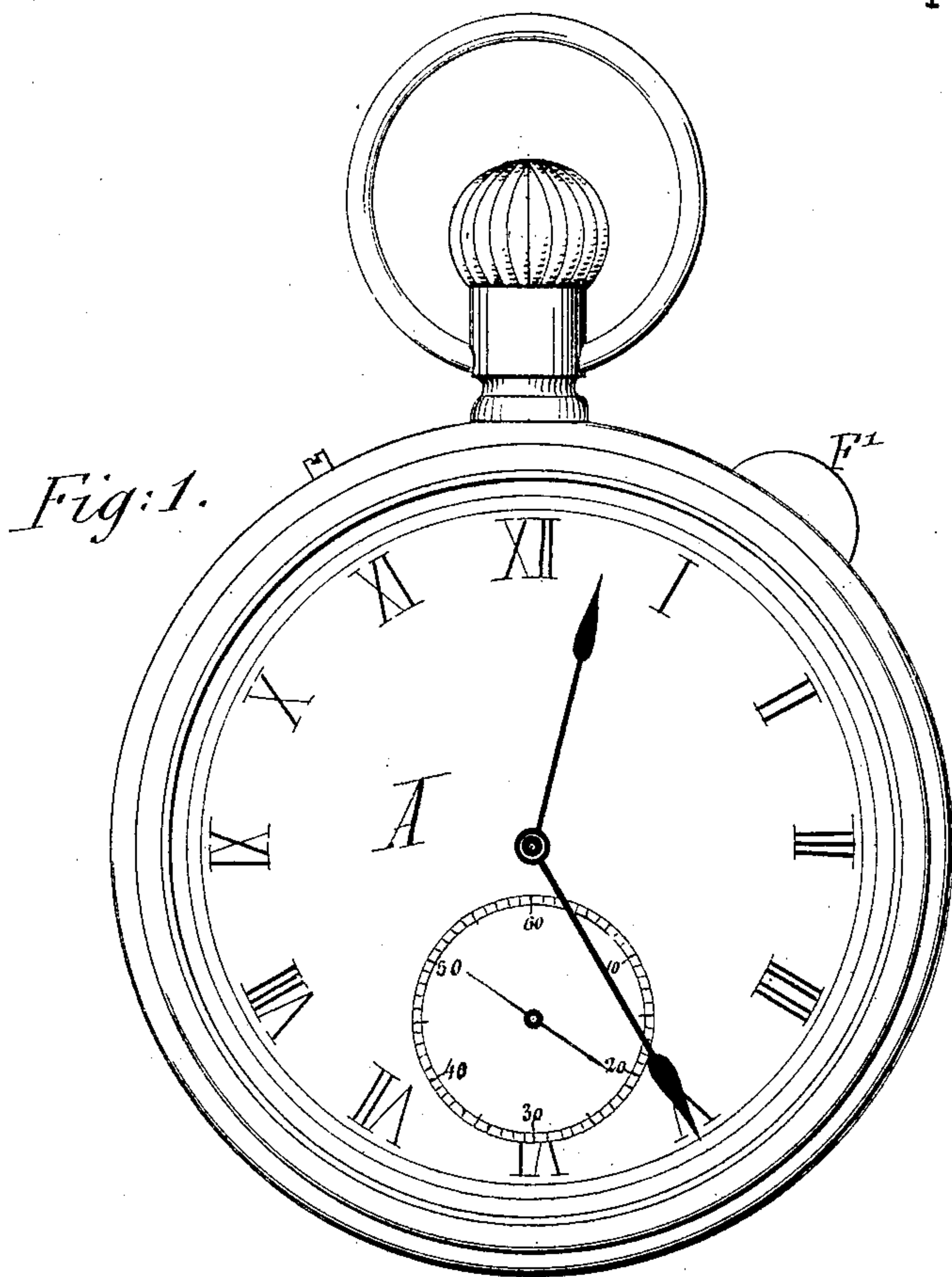
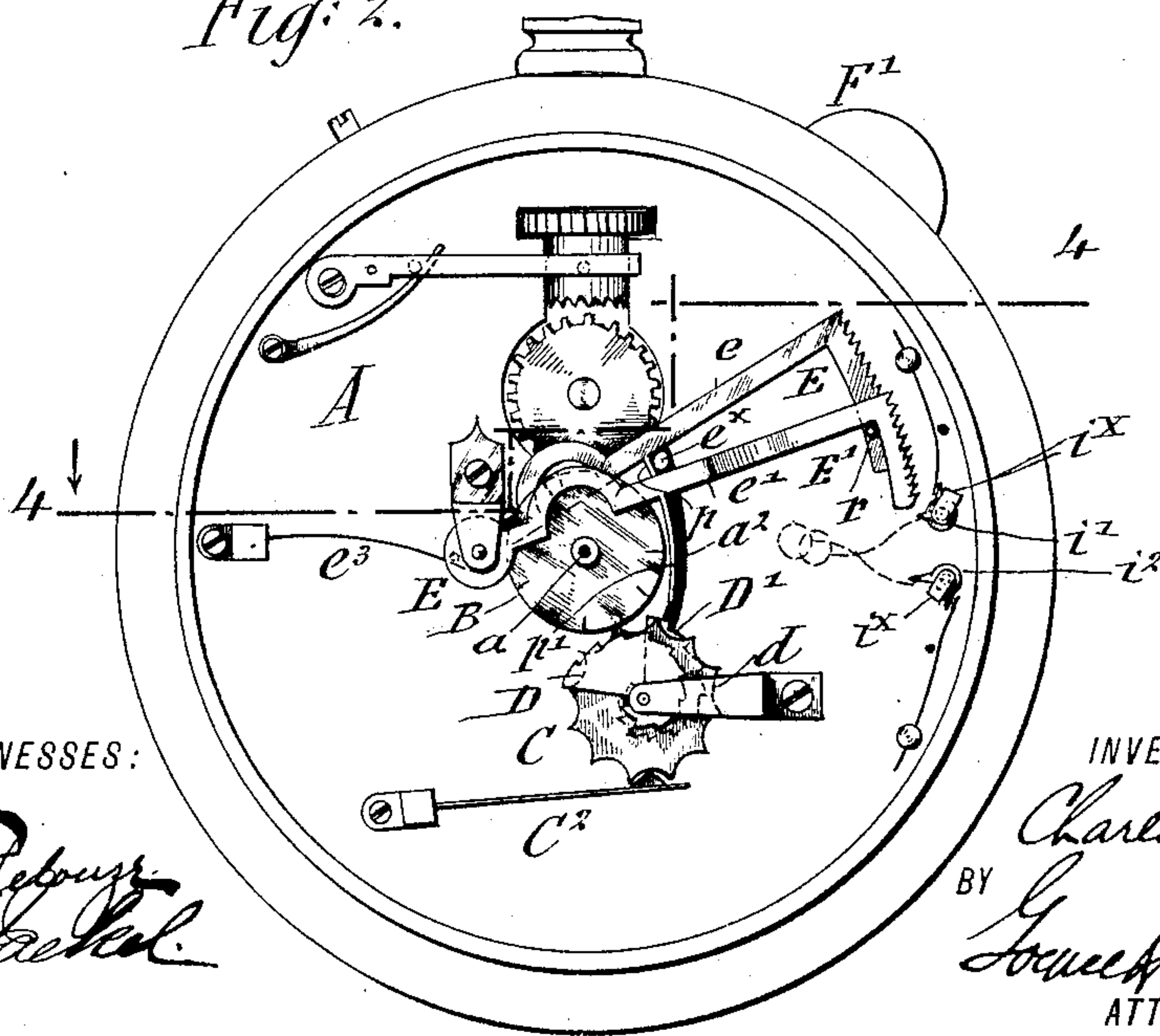


Fig: 2.



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ATTORNEYS.

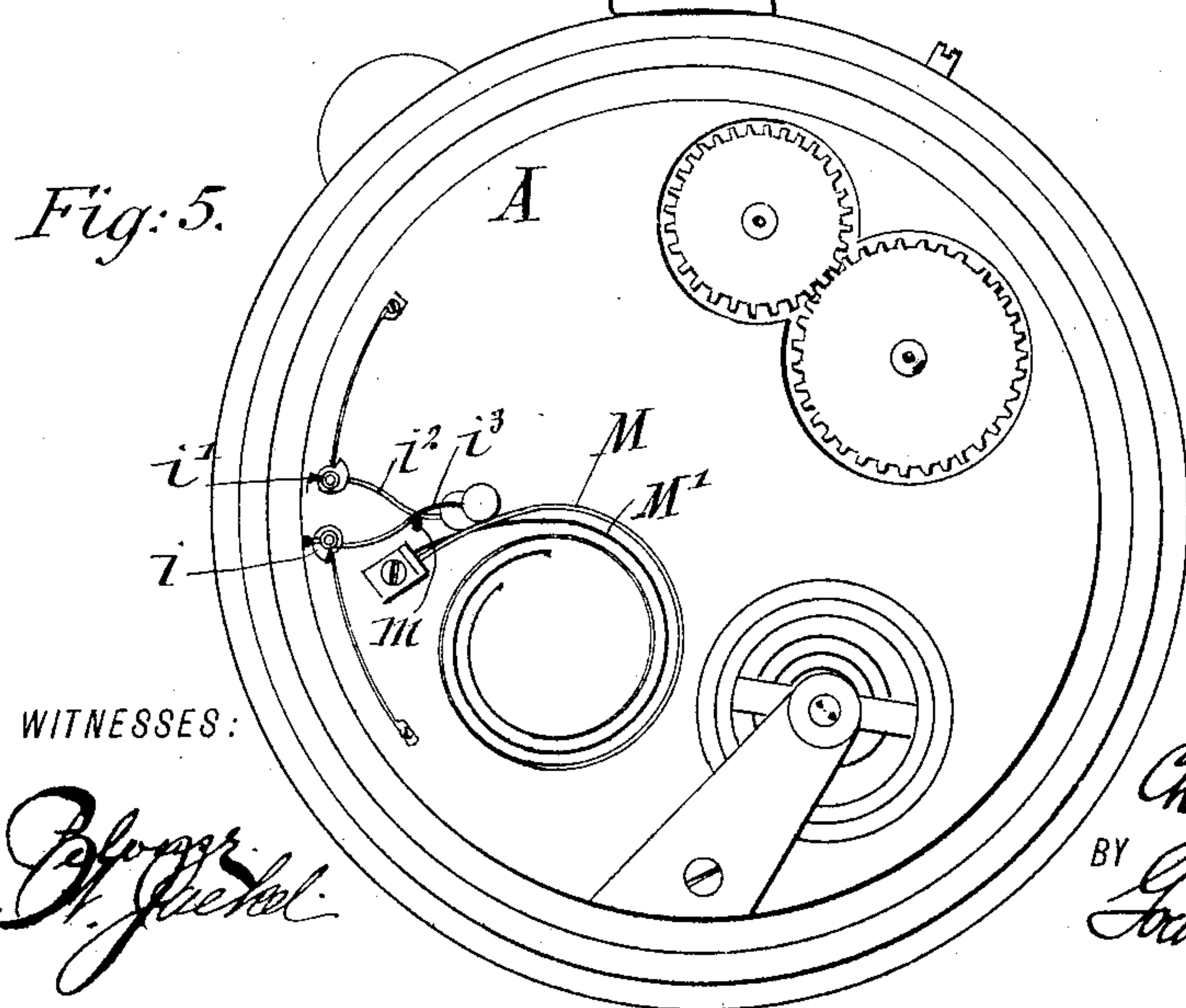
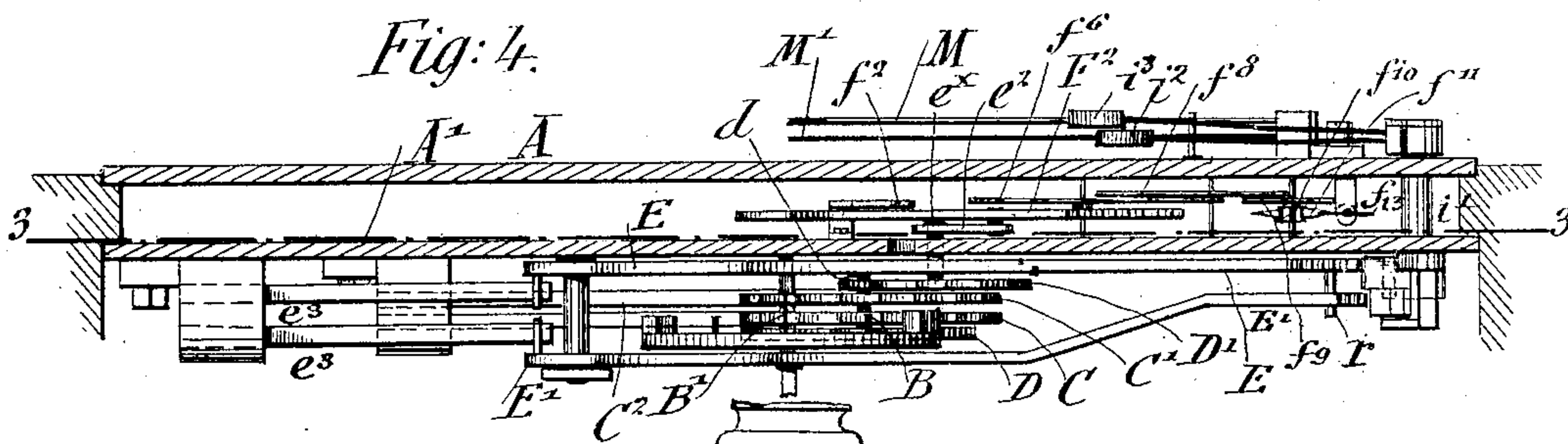
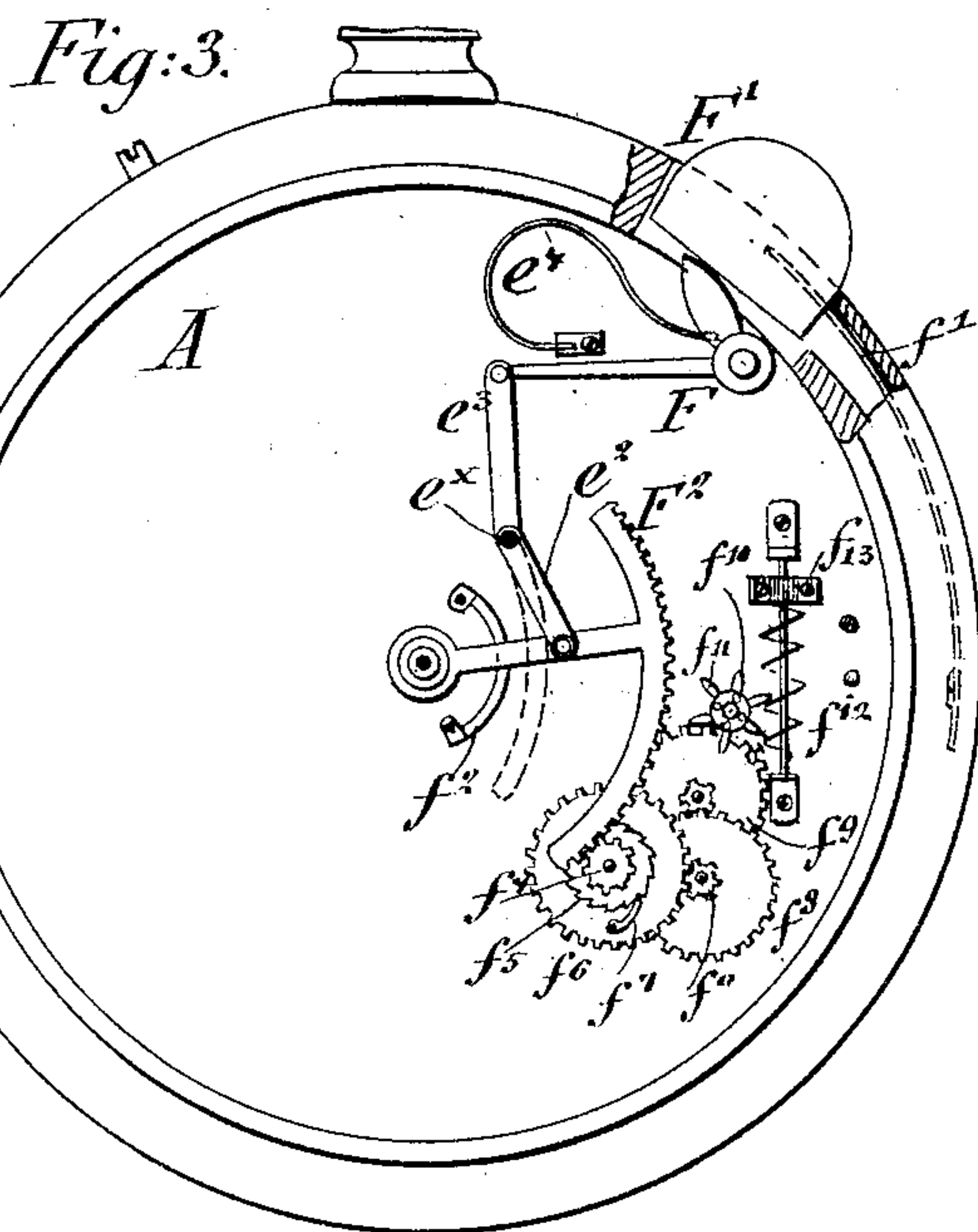
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2 Sheets—Sheet 2.

C. PRAHL.
REPEATING WATCH.

No. 602,036.

Patented Apr. 5, 1898.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES PRAHL, OF NEW YORK, N. Y., ASSIGNOR OF THREE-FOURTHS TO
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REPEATING WATCH.

SPECIFICATION forming part of Letters Patent No. 602,036, dated April 5, 1898.

Application filed October 24, 1896. Serial No. 609,890. (No model.)

To all whom it may concern:

Be it known that I, CHARLES PRAHL, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Repeating Watches, of which the following is a specification.

This invention relates to certain improvements in repeating watches in which the general features of construction described and claimed in Letters Patent No. 560,926, dated May 26, 1896, for repeating clocks, are utilized and applied to watches, so that the repeating mechanism is greatly simplified and so arranged that it can be easily applied to the watch-movement without rendering the same unnecessarily complicated.

The invention consists of certain features of construction and combinations of parts, to be hereinafter described and then particularly claimed.

In the accompanying drawings, Figure 1 represents a front elevation of my improved repeating watch. Fig. 2 is a front elevation of the watch-movement with the dial-plate removed, so as to show the parts of the repeating attachment arranged back of the same. Fig. 3 is a section on line 3 3 of Fig. 4, showing that portion of the repeating attachment located behind the plate A' of the movement, said plate being removed. Fig. 4 is a vertical transverse section on line 4 4, Fig. 2, drawn on a larger scale, so as to show the different parts of the repeating mechanism of the watch; and Fig. 5 is a rear elevation of the watch-movement, showing the striking mechanism of the same.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a watch-movement of any approved construction. To the minute-arbor *a* of the same is applied a crown-wheel B, which is formed of a disk provided with twelve teeth arranged equidistantly from each other, eleven teeth being shorter than the twelfth tooth B', which is made double the length of the shorter teeth. The crown-wheel B rotates with the minute-arbor, all the teeth of the same engaging the teeth of a star-wheel C, arranged adjacent thereto, while the longer tooth alone engages

the teeth of a second star-wheel C', which is arranged back of the star-wheel C. The star-wheel C carries a step-shaped cam or snail D, while the star-wheel C' carries a step-shaped cam or snail D', said star-wheels being applied to an arbor *d*, that is attached to the bottom plate of the watch-movement A. A split spring C² acts on the teeth of both star-wheels C C', so as to retain said wheels without preventing the rotation of the same when engaged by the teeth of the crown-wheel B.

To the bottom plate of the watch-movement A are pivoted the shanks *e e'* of two toothed segments E E', which shanks are provided with semicircular bends, as shown in Figs. 1 and 2, so as to clear the minute-arbor. The shank *e* of the toothed segment E rests normally on a pin *e^x*, which passes through an arc-shaped slot *a²* in the bottom plate A, said pin *e^x* being applied to a pivot-link *e²*, that is arranged adjacent to the opposite face of the bottom plate A'. The pivot-link *e²* is connected by a second pivot-link *e³* with the longer arm of a spring-actuated elbow-lever F, that is fulcrumed to the supporting-plates of the watch-movement near the circumference of the same and acted upon by a flat spring *e⁴*, which engages the shorter arm of the elbow-lever F, as shown in Fig. 3. The shorter arm or heel of the elbow-lever F is acted upon by a pusher F', which is applied to a flat spring *f¹*, attached to and located in the watch-casing, as shown in Fig. 3. The spring *e⁴* serves for returning the motor mechanism of the repeating mechanism after it has been actuated by the pusher. The opposite end of the pivot-link *e²* is pivoted to the shank of a toothed motor-segment F², that is retained in position by an arc-shaped keeper *f²*, as shown in Figs. 3 and 4. The toothed motor-segment F² engages a pinion *f⁴*, that is attached to a ratchet-wheel *f⁵*, which is placed loosely on the sleeve or arbor of a gear-wheel *f⁶*, said ratchet-wheel *f⁵* being engaged by a check-pawl *f⁷* on the gear-wheel *f⁶*. The pawl *f⁷* passes over the teeth of the ratchet-wheel *f⁵* when the pinion *f⁴* is turned by the oscillating motion of the toothed segment F²; but it engages the teeth of the ratchet-wheel, so as to carry the gear-wheel *f⁶* along, when the

segment F^2 is oscillated in opposite direction under the action of the spring e^4 of the motor mechanism. The gear-wheel f^6 engages a pinion f^0 on the gear-wheel f^8 , which again meshes with the pinion of a third gear-wheel f^9 , which latter engages a lantern-wheel f^{10} on a spur-wheel f^{11} . This spur-wheel engages the worm f^{12} , the shaft of which is supported in suitable bearings of the top plate of the movement and provided with wings f^{13} , which form with the worm a fly, said fly, with the transmitting mechanism and the toothed segment, forming the so-called "moderating-gear," by which the return motion of the motor mechanism and of the hour and minute segments operated by the same is retarded. The moderating-gear is not operated when the motor mechanism is depressed, as the pinion f^4 and its ratchet-wheel f^5 are then turned on the shaft of the gear-wheel f^6 without influencing the remaining gear-wheels of the moderating-gear. By the return motion of the toothed segment F^2 the moderating-gear is operated, as the ratchet-wheel f^5 on the pinion f^4 is then engaged by the pawl f^7 on the gear-wheel f^6 , so that the transmitting gear-wheels are operated and the return motion of the motor mechanism slackened by the retarding action imparted by the moderating-gear described.

On the toothed hour-segment E is located a stop-pin r , which serves for returning the toothed minute-segment E' whenever during the return motion of the hour-segment E the pin r engages the shank e' of the minute-segment E' . As the shank of the hour-segment E rests upon the actuating-pin e^x , the toothed segments E and E' are moved on their pivots, as soon as the motor mechanism is actuated, by the action of two flat springs e^3 , which engage pins at the inner ends of the shanks e e' , as shown in Figs. 2 and 4. The segments E E' are returned by the action of the strong spring e^4 into their normal position as soon as the actuation in one direction under the influence of the motor mechanism is interrupted. The segments E E' are returned together under the influence of the motor mechanism, the segment E under the direct influence of the pin e^x of the motor mechanism and the other segment by the pin r on the segment E . The shanks e e' of the segments E E' are provided with arms h h' , which are respectively arrested by one of the steps of the eccentric cams or snails D D' . When the segments E E' are moved in forward direction by the motor mechanism, the teeth on the circumference of the same pass by spring-actuated trip-pawls I I' , of bell-crank shape, which are loosely placed on separate arbors i i' , which pass through openings in the bottom and top plates of the movement to the under side of the same, said arbors carrying at their opposite ends spring-actuated hour and minute hammers i^2 i^3 , that strike, respectively, the hour and minute gongs M M' , which are attached to a suitable bracket on the top plate

of the watch-movement, as shown clearly in Fig. 5. The striking-hammers i^2 i^3 are arranged sidewise of each other and are arrested by a stop-pin m when in their normal position of rest. When the segments E E' move in forward direction, they move over the inwardly-projecting arms of the trip-pawls without actuating the striking-hammers, but during their return motion the teeth of the segments E E' engage successively the inwardly-projecting arms of the trip-pawls and cause the other arms to engage fixed keepers i^x on the arbors i i' , so as to oscillate the hammers against the action of their springs and cause them to strike the hours and minutes on the gongs. The keepers i^x are shown in Fig. 2 and are arranged at the ends of the short transverse arbors i i' , so that no motion is imparted to the trip-pawls I I' when the segments E E' are moved in forward direction by the motor mechanism, while during the return motion of the segments E E' the teeth of the latter engage the trip-pawls, so that they take the keepers on the arbors i i' along and actuate thereby the striking-hammers, so that the latter are lifted and dropped again as soon as each tooth of the segment E or E' has passed the point of the trip-pawl I or I' .

In both the description and the claim I desire it understood that the term "striking mechanism" refers simply to the parts I I' i i' i^2 i^3 M M' or equivalent mechanism, inasmuch as said parts form the striking mechanism.

The operation of my improved repeating watch is as follows: Whenever the time of the day is to be ascertained, the motor mechanism is actuated by depressing the pusher projecting from the casing of the watch, so that the hour and minute segments are moved forward under the influence of their springs e^3 until arrested by the steps of their respective snails. When the pusher F' is then released and returned by its spring into normal position, the toothed segments are also returned by the action of their motor-spring into normal position and actuate during the return motion successively the trip-pawls, which actuate the striking-hammers and cause the striking of the hour and minute gongs in a manner analogous to the operation of the repeating clock described in my prior patent referred to. The repeating attachment is so arranged that each stroke of the minute-bell indicates five minutes, which has the advantage that the snails D D' and the toothed segments E E' can be made of equal size and shape, whereby the manufacture of the repeating attachment is considerably simplified and cheapened. During the return motion of the toothed segments the hour-bell strikes first, and after the hour-strokes are sounded the minute-bell is sounded and thereby the minute-strokes indicated, which strokes, however, have to be multiplied by five, so as to ascertain the correct number of minutes.

The repeating attachment can be applied to the watch-movements after the parts of the same are assembled, the hand-setting mechanism forming connection with the crown-wheel on the minute-arbor, so as to permit the motion of the hands, crown-wheel, and snails independently of the movement.

The parts of the repeating mechanism can all be made cheaply by machinery in the same manner as the gear-wheels and other parts of the movement, so that thereby my improved repeating watch can be placed upon the market at a much less price than the repeating watches heretofore in use.

The main features of my improved repeating watch are covered by the claims of my prior patent referred to, the new features consisting, mainly, in the construction of the motor mechanism of the moderating-gear and other minor details.

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

In a repeating watch, the combination of a pusher projecting outside of the watch, a spring-actuated elbow-lever actuated by said pusher, an oscillating motor-segment pivoted to the movement-plate, a pivot-link connecting the elbow-lever with the toothed segment, a pawl and ratchet-wheel, a pinion arranged between the pawl and ratchet-wheel and said motor-segment, said pinion being engaged by said motor-segment, a train of transmitting gear-wheels operated by the pawl and ratchet-wheel, a spur-wheel actuated by the last gear-wheel of the train of transmitting gear-wheels, a worm engaged by the teeth of said spur-wheel, and a fly on the worm-shaft, 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.

CHARLES PRAHL.

Witnesses:

PAUL GOEPEL,
GEORGE W. JAEKEL.