H. M. & O. REINER.

REPEATING WATCH.

APPLICATION FILED AUG. 9, 1909.

959,165.

Patented May 24, 1910.

2 SHEETS—SHEET 1.

Fig: 1.

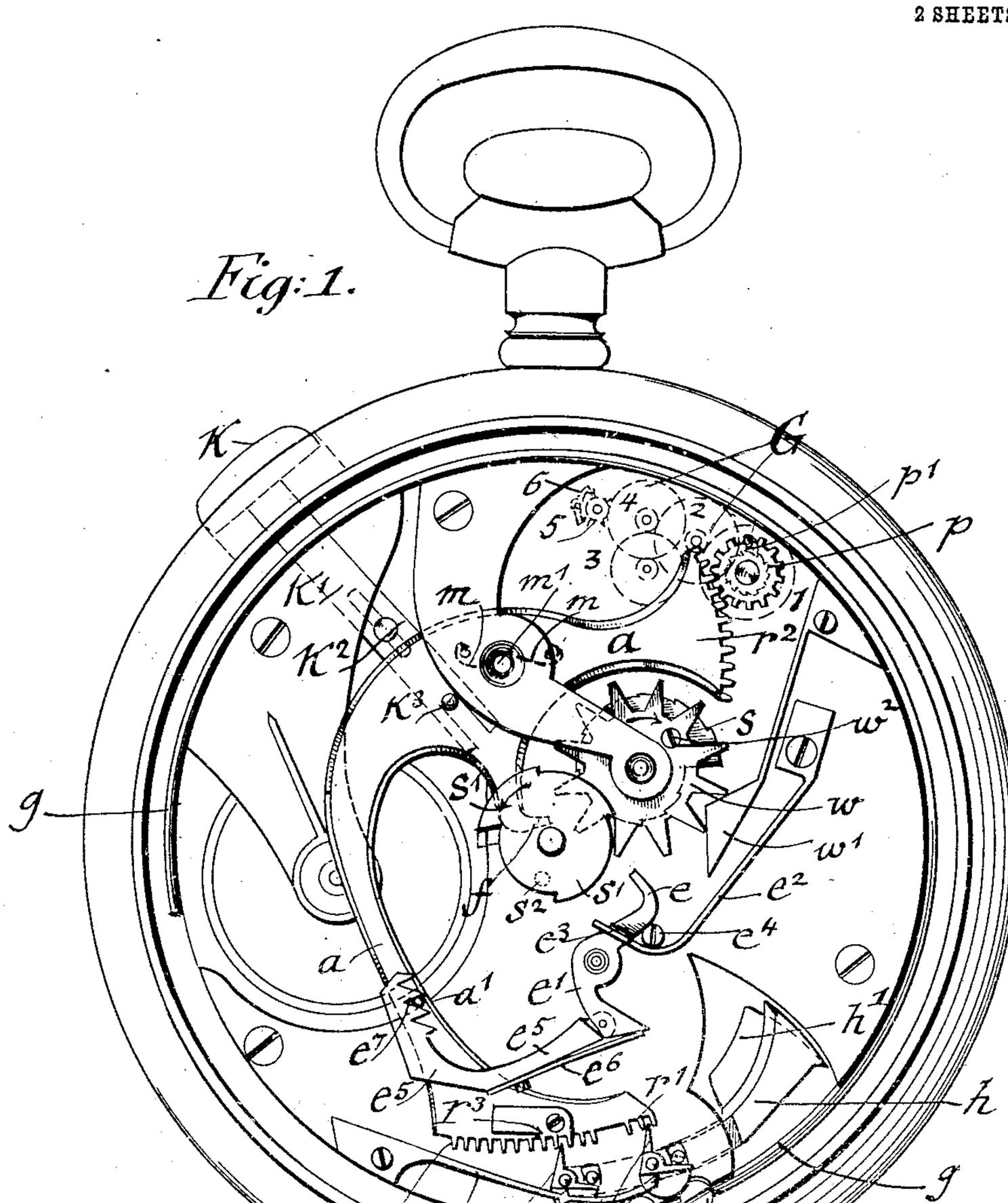
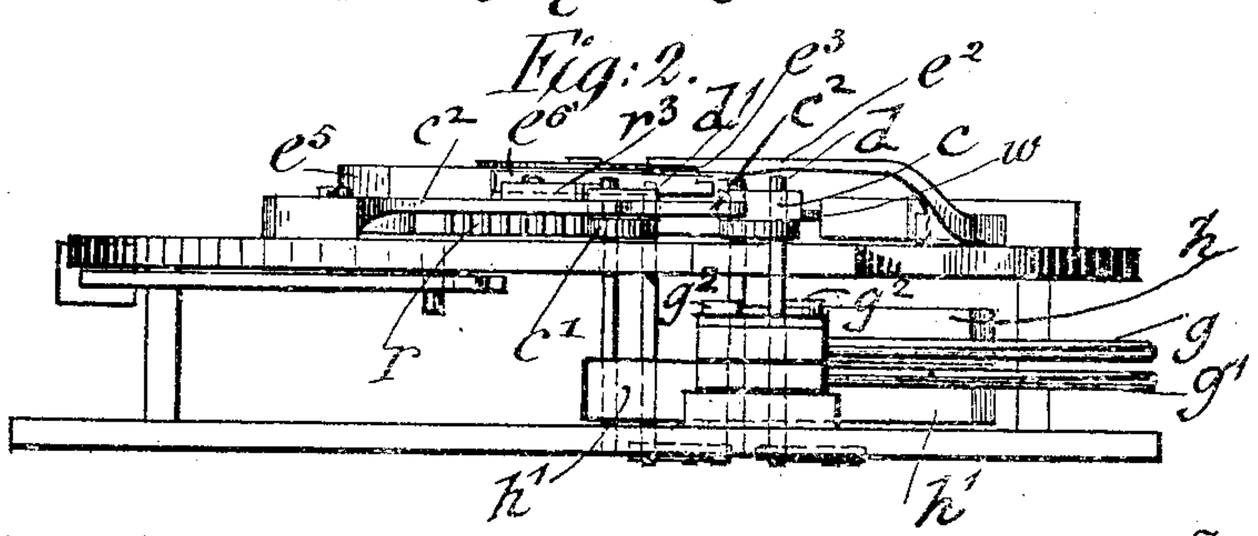


Fig: 2.



Witnesses:
J. A. Cook
J. H. M. Kilpatrick

Inventors
Harry M. Reiner and Oscar Reiner
By their Attorneys
Fogwell & Hogwell

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Fig: 3.

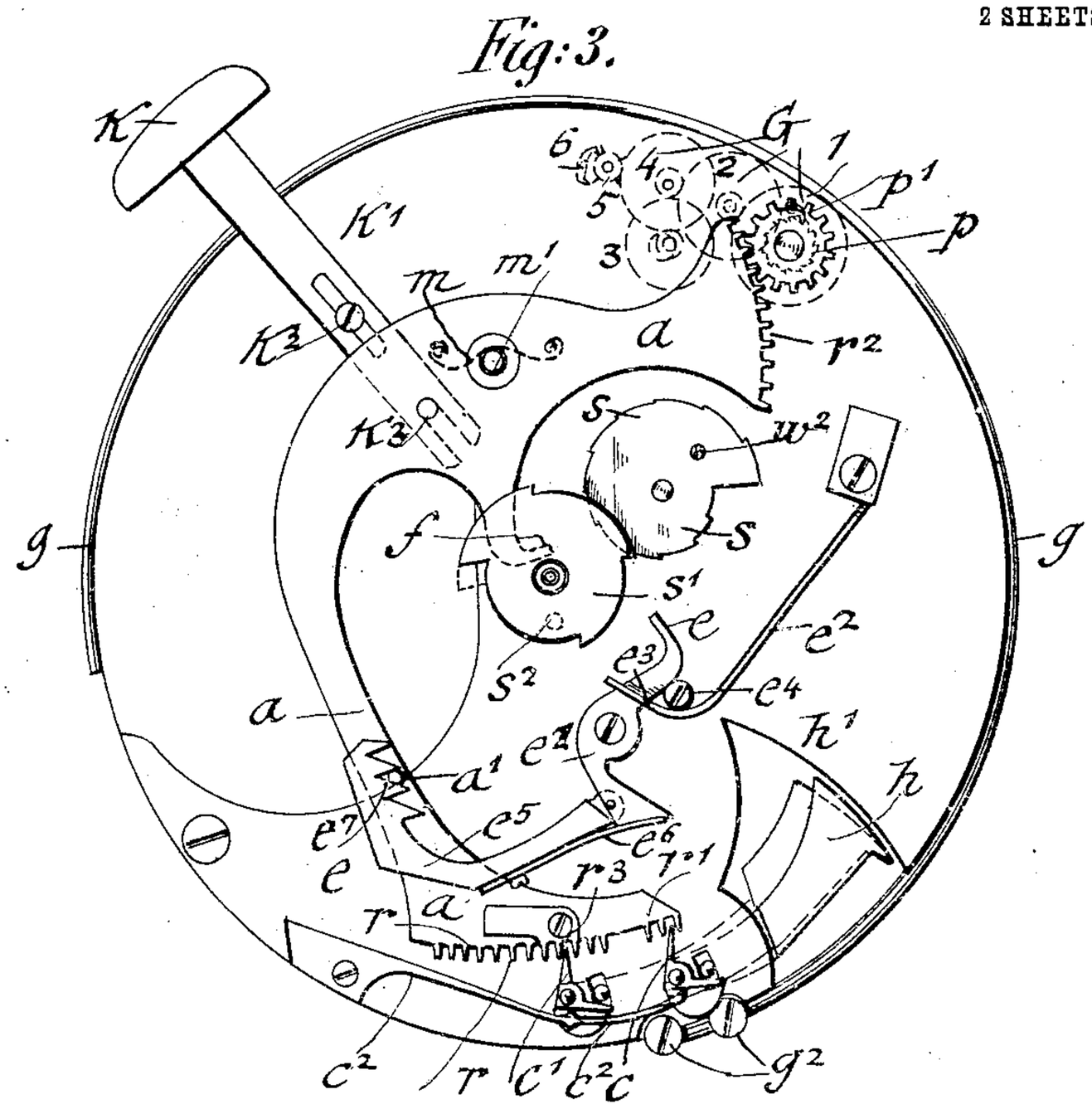
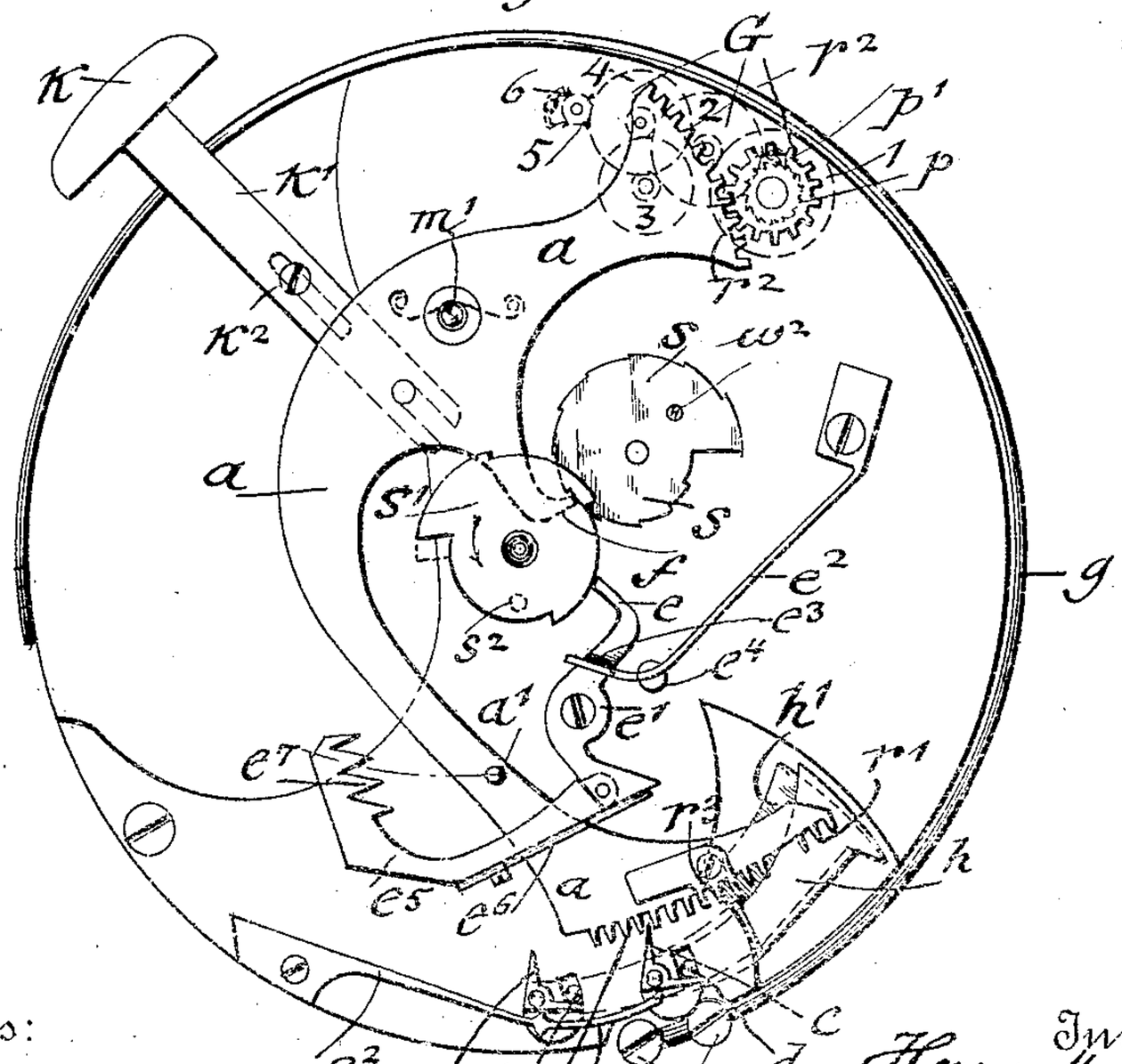


Fig: 4.



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J. A. Cook
H. M. Kilpatrick

Inventors
Harry M. Reiner
and Oscar Reiner
By their Attorneys
Goepel & Goepel

UNITED STATES PATENT OFFICE.

HARRY M. REINER AND OSCAR REINER, OF NEW YORK, N. Y.

REPEATING WATCH.

959,165. Specification of Letters Patent. Patented May 24, 1910.

Application filed August 9, 1909. Serial No. 512,069.

To all whom it may concern:

Be it known that we, HARRY M. REINER and OSCAR REINER, both citizens of the Empire of Austria-Hungary, residing in New York, in the borough of Manhattan, 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 an improved repeating attachment for watches which is intended to be applied to lower priced watches so as to popularize the repeating principle, which could not be done heretofore, owing to the high prices at which repeating watches had to be sold heretofore.

Our improved repeating watch belongs to that type in which a separate motor-spring is used for actuating the repeating mechanisms by which the hours and quarter-hours are sounded, independently of the main-spring of the movement, the hours being sounded by single strokes and the quarter hours by double strokes from two gongs of different pitch, the repeating mechanism being of simple construction as compared with the complicated repeating mechanisms heretofore in use, so that repeating watches can be made at a price that is within the reach even of people in moderate circumstances; and for this purpose the invention consists of a repeating watch which comprises a pusher-knob, a fulcrumed main-lever operated by the shank of the knob, a motor-spring for said main-lever, racks at one end of said main-lever for successively actuating the hour and quarter-hour sounding mechanism and a rack at the opposite end of the main-lever for permitting the action of a moderating gear. The main-lever is provided with an hour-heel that forms contact with the hour snail, while a separate fulcrumed and spring-actuated heel forms contact with the quarter-hour snail that is placed on the arbor of the hour-hand, said quarter-hour heel being located at the end of a fulcrumed and spring actuated lever connected with a curved arm having a toothed end interlocking with a pin on the main-lever so as to be disconnected therefrom and connected with the same by the actuation of the main-lever. Above the rack for the hour-striking mechanism is arranged an auxiliary quarter-hour rack, which, in connection with the regular quarter-hour rack on the main-lever and the sounding mechanism, produces a double stroke for the quarter-hours. The quarter-hour snail operates by a pin a star-wheel that is placed on the arbor of the hour-snail for rotating the same in the usual manner.

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 a watch with our improved repeating attachment applied thereto, Fig. 2 is a side-elevation of a watch-movement with our repeating attachment, shown as removed from the case, and Figs. 3 and 4 are top-views, showing the parts of the repeating attachment respectively in normal position of rest and in position for actuation, the supporting bridge for the main-lever and the motion-transmitting star-wheel being removed for the sake of clearness.

Similar characters of reference indicate corresponding parts throughout the several figures.

Our improved repeating watch is intended to strike the full and quarter-hours. The mechanisms for striking the hour and quarter-hours are located on the top of the movement so as to be readily accessible for inspection and repairs. The striking mechanisms are operated by an actuating main-lever a which is operated by a pusher-knob k and returned by a motor-spring m which is coiled around the arbor m^1 of the actuating main-lever a and applied at its ends to split posts m^2, said motor-spring being set to tension by the movement of the actuating main-lever imparted by the inward pushing of the knob k, the shank k^1 of which is slotted and guided on a screw-stud k^2 on the bottom-plate of the watch-movement. The end of the knob-shank k^1 is recessed and engages a pin k^3 on the actuating main-lever a, so that by the inward pushing of the knob k the main-lever a is turned on its arbor from its normal position, shown in Fig. 3, to its second position, shown in Fig. 4. The actuating main-lever a is provided at one end with two racks r, r^1, one composed of twelve teeth, the other composed of three teeth, for striking respectively the hours and quarter-hours. Adjacent to the hour and quarter-hour racks r, r^1 are arranged fulcrumed clicks c, c^1 which are engaged by the hour and quarter-hour racks r, r^1 on the return-

movement of the main-lever a due to the influence of the motor-spring m. The clicks c, c^1 are acted upon by the free end of a spring c^2, attached to the top-plate of the movement, said clicks being made of elbow-shape. The inwardly projecting ends being engaged by the racks r, r^1, while the outwardly projecting ends engage pins d, d^1 on the shanks of hammers h, h^1 which are pivoted to the top and bottom-plates and by which respectively the hours and quarter-hours are sounded on two gongs g, g^1 that are attached to the bottom-plate of the movement by screw-posts g^2, said gongs extending in the usual manner around the circumference of the movement and being made of different thicknesses of steel wire so that sounds of different pitch are obtained. To the hour-rack r is attached, on the top of the same, and approximately at the same distance from the teeth of the quarter-hour rack as the distance between the clicks c, c^1, and auxiliary quarter hour-rack r^3 which is composed of three teeth like the quarter hour-rack r^1, and which serve to engage the click c almost simultaneously with the engagement of the quarter hour-rack r^1 with the click c^1, so that thereby both hammers and gongs are actuated one quickly after the other, and thereby a double stroke sounded for the quarter hours in a clear contradistinction to the full hour strokes. The click c^1 responds only to the auxiliary quarter-hour rack r^3, as it is placed above the teeth of the hour and quarter hour-racks, so that the click c^1 and its hammer h^1 can only be actuated and its gong g^1 sounded when the auxiliary quarter-hour rack engages it, so that thereby the clear and distinct striking of the quarter-hours by two successive strokes is obtained. The opposite end of the actuating main-lever a is provided with a rack r^2 for the moderating gear G by which the return-motion of the actuating main-lever and the sounding of the striking mechanism is retarded. The moderating gear is made of the usual well-known construction, and consists of a pinion p intermeshing with the rack r^2, the pinion being located above the top-plate of the movement and connected by a pawl and ratchet-device p^1 with the first gear-wheel 1 of the train of wheels forming the moderating gear. The first gear-wheel meshes with a pinion on the arbor of a second gear-wheel 2, the latter with a pinion on the arbor of the third gear-wheel 3, the latter with a pinion on the fourth gear-wheel 4, and the fourth gear-wheel with a spur-wheel 5 that is engaged by the teeth of an oscillating escapement-lever 6 in the usual manner. The moderating gear G is placed between the top and bottom plates of the movement. When the main-lever a is moved outwardly, the rack r^2 turns the gear-wheel p meshing therewith on its arbor without actuating the moderating gear G owing to its pawl and ratchet connection with the arbor of the first gear-wheel, but when the actuating main-lever is moved inwardly and returned to its normal position, the moderating gear-wheel acts on the rack r^2 of the same and causes the retardation of the return-movement of the actuating main-lever a so as to permit the clear and distinct ringing of the gongs for the hours and quarter-hours by the racks r, r^1 at its other end in the well-known manner.

The actuating main lever a is further provided intermediately of its ends with an inwardly-projecting hour-heel f which forms contact with the steps of a cam or hour-snail s, the hour-snail being rotated once for every twelve hours by means of a star-wheel w, having as many teeth as the steps of the hour-snail and being attached thereto by a fastening screw w^2. The teeth of the star-wheel w are engaged by a pin s^2 on a quarter-hour snail s^1 that is keyed to the arbor of the hour-hand. The teeth of the spur-wheel w are engaged by the obtusely-angled end of a spring check-pawl w^3. As the star-wheel w is engaged by the pin s^2 on the quarter-hour snail s^1, the hour snail s is moved every hour for the distance of one of the twelve steps on the same. The steps of the quarter-hour snail s^1, are placed in contact with the heel e of a separate quarter-hour heel-lever e^1 which is fulcrumed to the top-plate of the movement and actuated by a spring e^2. The quarter-hour lever rests against a stop-pin e^4 when the lever e is in normal position while the free end of its spring presses by a shoulder e^3 on the quarter-hour heel-lever e^1. To the opposite end of the quarter-hour lever e^1 is pivoted a curved arm e^5 which is held in position on the enlarged and flattened end of the quarter hour heel lever e^1 by means of a flat spring e^6 which is attached to said arm, the arm being provided with four inwardly-projecting teeth e^7 at its outer end that engage a pin a^1 on the actuating main-lever so as to hold thereby the quarter-hour heel against the tension of the spring e^2 out of contact with the quarter-hour snail. As soon as the actuating main-lever a is moved in the second or actuating position, the pin a^1 is moved out of engagement with the teeth of the curved arm e^5, so that the quarter-hour heel is instantly moved by its spring e^2 into contact with one of the steps on the quarter-hour snail, while the hour-heel f is placed in contact with the corresponding step of the hour-snail, as shown in Fig. 4. During the oscillating motion of the actuating main-lever a, the racks r, r^1 pass freely over the hammer-actuating clicks which oscillate on their pivots by the contact with the teeth of the racks without actuating the striking mechanisms. Simultaneously, the

rack r^2 at the opposite end of the main-lever a rotates the intermeshing pinion p of the moderating gear G without exerting any effect on the latter. As soon as the return-motion of the main-lever commences, the moderating gear is called into action the movement of the main-lever retarded and the hour-strokes and quarter hour-strokes sounded clearly and distinctly by the successive actuations of the hammers and gongs according to the steps of the hour and quarter-hour snails with which the hour and quarter-heels are placed in contact. Every depression of the pusher-knob imparts the required oscillating movement to the actuating main-lever, so that on the return-motion of the same, due to its motor-spring, the moderating gear is called into action and the striking of the hours and quarter-hours accomplished by the racks r, r^1, and the auxiliary quarter hour-rack r^2. On the full return of the actuating main-lever, the toothed end of the curved arm e^5 is reëngaged by the pin a^1, so that simultaneously with the removal of the hour-heel from the hour-snail, the removal of the quarter-hour heel from the quarter-hour snail is accomplished and the motor springs as well as the spring of the quarter-hour heel reset to tension. On every inward pressure of the knob the repeating mechanisms are actuated and the hour and quarter hour sounded by the gongs during the return motion of the actuating lever.

As the repeating mechanism is composed of an extremely small number of parts, the repeating watch can be furnished at a comparatively low price, so that even lower priced watches can be provided with the same and thereby the conveniences of a repeating watch supplied to a much larger number of people than was the case with the expensive repeating watches heretofore.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. In a repeating watch, the combination of a pusher-knob, a fulcrumed actuating main-lever operated thereby, a motor-spring for said actuating main lever, hour and quarter-hour racks at one end of said lever, a rack at the opposite end of the lever, a moderating gear operating upon the latter, an hour-heel on the actuating main-lever, an hour-snail, a star-wheel on said hour-snail, a quarter-hour snail, means for turning the star-wheel from the quarter hour-snail, a fulcrumed and spring-actuated quarter-hour heel-lever, and locking means for connecting the quarter-hour heel-lever with or releasing it from the actuating main-lever and sounding devices operated by the hour and quarter-hour racks on the actuating main-lever.

2. In a repeating watch, the combination, with an oscillating main-lever provided with hour and quarter-hour racks at one end and a moderating gear operating rack at the opposite end, of a motor spring for said main-lever, a quarter hour snail on the hour hand arbor, an hour-snail, means between the quarter-hour and hour-snails for turning the latter, an hour-heel on the main-lever contacting with the steps of the hour-snail, a spring-actuated heel and heel-lever acting in conjunction with the quarter-hour snail, locking means between the quarter-hour heel-lever and the main-lever, striking devices for the hour and quarter-hour, and an auxiliary quarter-hour rack for sounding the quarter-hours by double strokes.

3. In a repeating watch, the combination, with a spring-actuated main-lever provided with hour and quarter-hour racks at one end and a rack at the opposite end, of a moderating gear engaging with the latter rack, hour and quarter-hour striking devices operated by the hour and quarter-hour racks, an hour snail, a quarter-hour snail, means for connecting the quarter-hour snail with the hour-snail for actuating the latter, an hour-heel on the main-lever, a quarter-hour heel-lever contacting with the quarter-hour snail, a curved spring-actuated arm pivoted to the quarter-hour heel-lever and provided with teeth at its outer end and adapted to engage by its toothed end a pin on the main-lever for locking the main-lever and quarter-hour heel-lever when in normal position or releasing the heel-lever from the main-lever for moving the latter in striking position.

4. In a repeating watch, the combination, with an actuating main-lever provided with an hour and quarter-hour rack, of an auxiliary rack attached on top of the hour-rack, spring-actuated clicks operated by the hour and quarter-hour racks and the auxiliary rack, spring-actuated hammers actuated successively by said clicks, and gongs actuated by said hammers.

5. In a repeating watch, the combination, with the spring-actuated main lever provided with an hour-rack, a quarter-hour rack and an auxiliary rack on top of the hour-rack, the teeth of the hour and quarter-hour rack being approximately at a distance from each other equal to the distance between the hammer-operating clicks, of spring-actuated clicks engaging the hour, quarter-hour and auxiliary racks, and striking devices actuated by said clicks.

In testimony, that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

HARRY M. REINER.
OSCAR REINER.

Witnesses:
PAUL GOEPEL,
SEYMOUR DRUCKER.