

(No Model.)

3 Sheets—Sheet 1.

G. AUBERT.
REPEATING WATCH.

No. 368,904.

Patented Aug. 23, 1887.

fig:1.

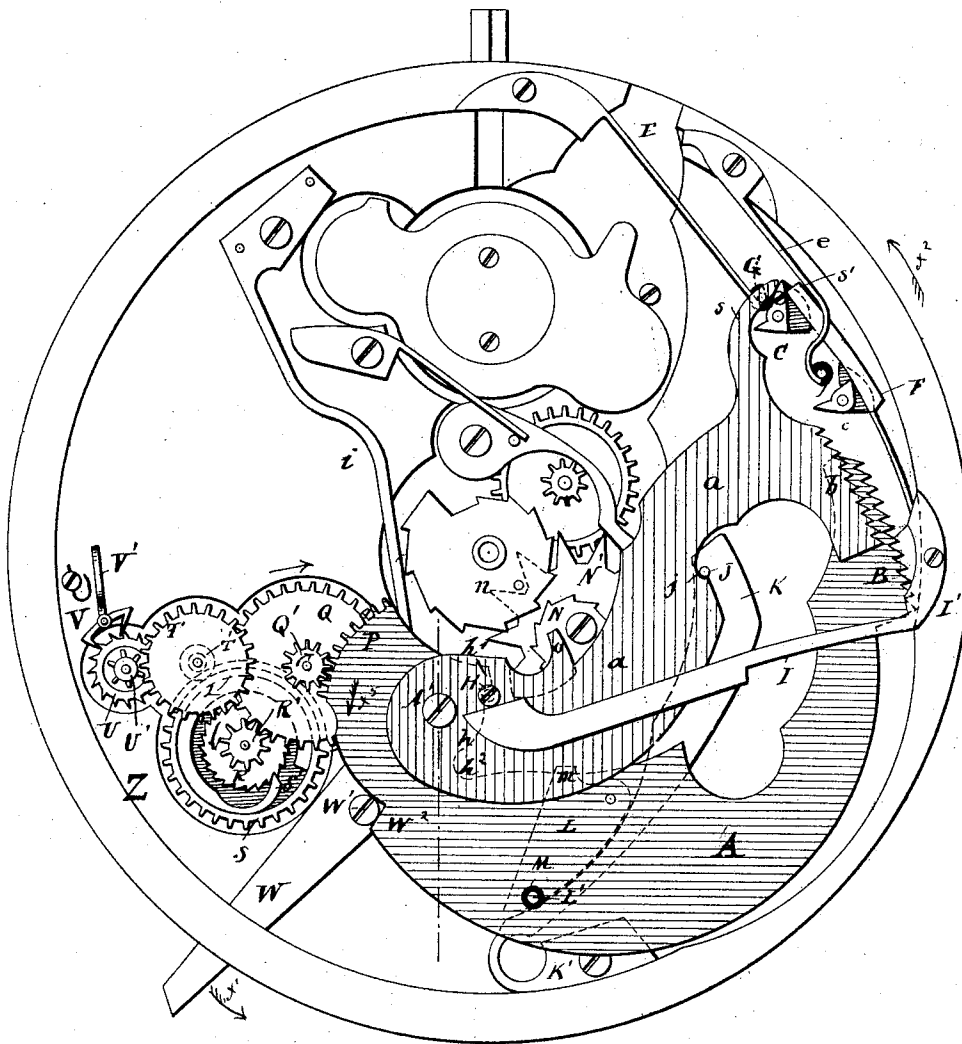
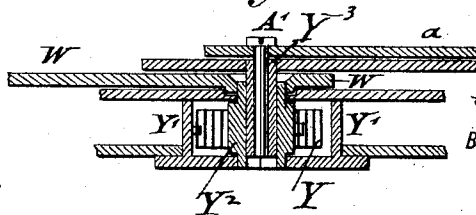


Fig: 1.^a



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(No Model.)

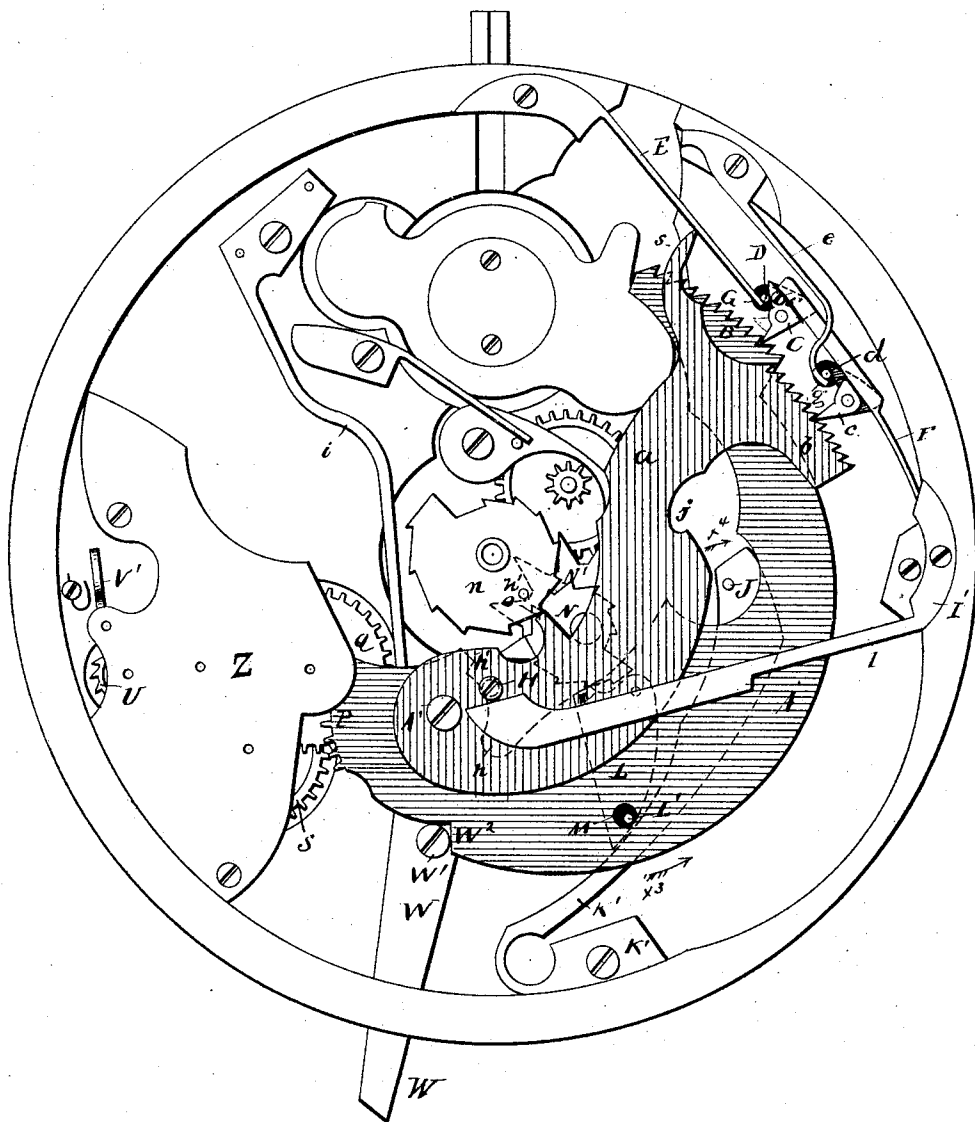
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fig. 2.



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Fig. 3.

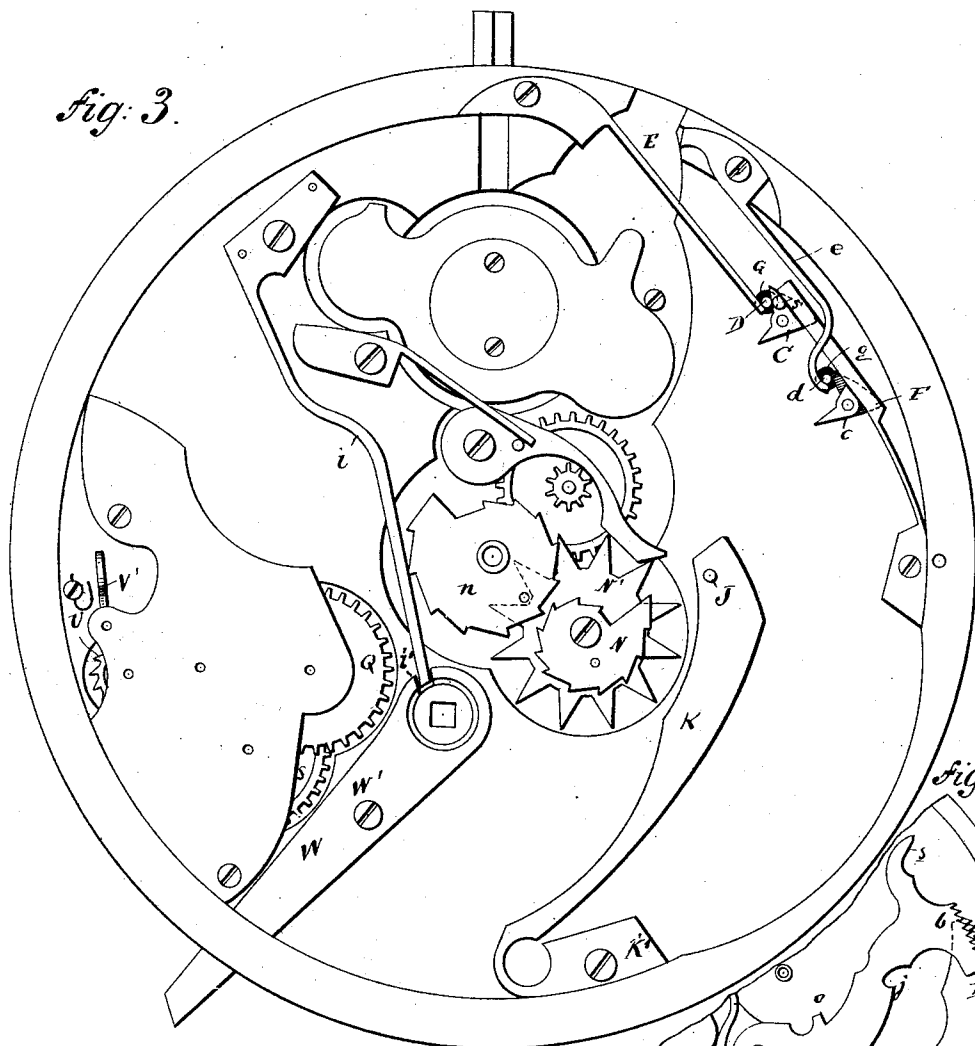


Fig. 5.

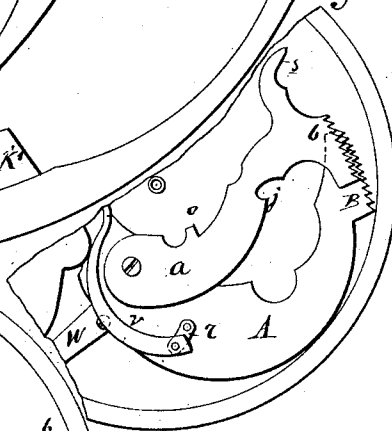
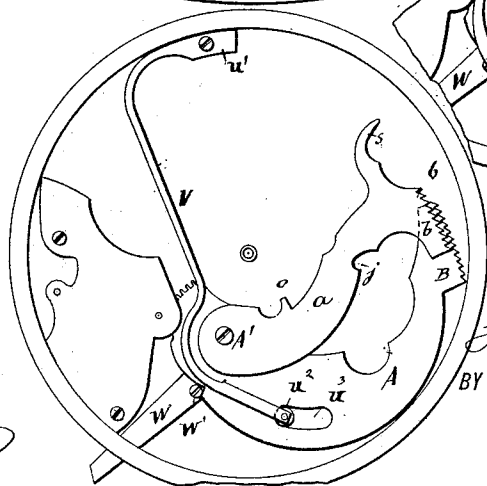


Fig. 4.



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REPEATING-WATCH.

SPECIFICATION forming part of Letters Patent No. 368,904, dated August 23, 1887.

Application filed January 26, 1887. Serial No. 225,524. (No model.)

To all whom it may concern:

Be it known that I, GEORGES AUBERT, of Le Sentier, canton de Vaud, Switzerland, have invented certain new and useful Improvements in Repeating Attachments to Watches, of which the following is a specification.

This invention relates to an improved repeating attachment to watches, and has for its object to simplify the construction of the repeating mechanism and to reduce the liability of the same of getting out of order.

The invention consists of a repeating attachment to watches in which two ratchet-levers are pivoted to a common pivot and returned by a single spring in actuating the striking devices. One of the ratchet-levers is oscillated by a spring-actuated lever, while the other ratchet-lever is operated, after being unlocked, by an independent spring. On the return of the ratchet-levers to their normal position the ratchet ends of the same actuate spring-actuated clicks, which cause the sounding of the striking devices. The oscillating motion of both ratchet-levers is limited by an hour and minute snail, the position of which regulates the striking of the corresponding hour and minute devices. A moderating-gear retards the return motion of the ratchet-levers and produces the striking of the hour and minutes at even intervals.

The invention also consists in the construction and combination of parts and details, as will be fully described and set forth hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a front view of my improved repeating attachments to watches, in which the bridge or plate above the moderating-gear is removed and all the parts in a normal position. Fig. 1^a is a vertical central section, drawn on a larger scale, of the spring by which the ratchet-levers are returned to their normal position of rest. Fig. 2 is a similar view showing the bridge above the moderating-gear in place and the parts in position for action. Fig. 3 is a similar view, the two ratchet-levers being removed. Fig. 4 is a front view of a modified construction of the spring for returning the ratchet-levers. Fig. 5 is a front view of part of another modi-

fication, showing a different arrangement of said spring.

Similar letters of reference indicate corresponding parts.

My repeating attachment consists, essentially, of a ratchet-lever, A, for striking the hours, a second ratchet-lever, *a*, for striking the minutes, a motor-spring, Y, for working both levers and returning them to their normal position of rest, a speed-moderating gear, Z, and an actuating-lever, W, by which motion is imparted to the ratchet-levers A *a*.

The ratchet-lever A is mounted on a square pivot, Y³, which is connected to the motor-spring Y by a square sleeve, Y². (Shown in Fig. 1^a.) The lever A is curved and provided at its outer end with a segmental ratchet, B, which acts upon one arm of a bell-crank-shaped click, C, the other arm of which acts on a pin, D, at one end of a hammer that strikes a circular steel rod, which serves as a bell. The hammer and bell are of the same construction as in the repeating attachments heretofore in use, and are not shown in the drawings, they being located below the bottom plate of the movement and covered by the same. A spring, E, is fastened to the frame of the movement and presses against the pin D, and moves it in the opposite direction to that in which it is pressed by the click C when the same is actuated by the ratchet B of the lever A.

To the pivot Y³ of the ratchet-lever A is applied the pivot A' of the second or minute ratchet-lever, *a*, which is mounted thereto above the ratchet-lever A, said lever *a* being also provided at one end with a ratchet, *b*, which acts on one arm of a second bell-crank click, *c*, the other end of which bears against a pin, *d*, that projects from one end of a second hammer of the usual construction, which hammer strikes a curved wire or bell located at the under side of the bottom plate in the same manner as the hammer and bell of the click C. A spring, *e*, fastened to the frame of the movement, presses the pin *d* in the reverse direction to that in which it is pressed by the click *c*. A spring, F, fastened to the frame of the movement, presses against straight cheeks of both clicks C *c* and retains them in position

by bearing on laterally-extending flanges, as shown in Figs. 1, 2, and 3. The spring F also returns the clicks so as to engage with the teeth of the ratchets B b. As the hammers are
5 attached to the under side of the bottom plate of the movement, openings G g are provided in said plate, through which openings the pins D d project into the path of the clicks, as shown in the drawings.

10 From the under side of the ratchet-lever *a* projects a stop-pin, H, which moves along an arc-shaped portion, *h*, of the ratchet-lever A, a notch, *h'*, being arranged at one end of the arc *h* and a shoulder, *h''*, at the other end of the
15 same, as shown in dotted lines in Figs. 1 and 2, said arc and notch permitting the ratchet-lever *a* to oscillate without obstruction, while the shoulder *h''* serves to carry the same along and return it with the lever A into the normal
20 position. The ratchet-lever *a* is further provided with a notch, *j*, which is engaged by a locking pin or detent, J, that is located at the free end of a spring, K, fastened at K' to the
25 frame of the movement, said spring being located below the ratchet-lever A. The head of the stop-pin H projects above the upper surface of the ratchet-lever *a* and is acted upon by the free end of a lever, I, which is fastened
30 to the frame of the movement at I', said spring causing the lever *a* to oscillate as soon as released from the detent J.

To the under side of the ratchet-lever A is pivoted an abutment, L, which is provided at one end with a pin, L', that passes through an
35 opening, M, in the ratchet-lever A, by which opening the play of the same is confined. The abutment L bears on the spring K, which carries the detent J, and releases the same from the ratchet-lever *a* at the proper moment.
40 The latch L is provided at the end opposite to that to which the pin L' is applied with a projection, *m*, which bears against one of the steps of the cam-shaped hour-snail N, that is actuated in the usual manner by a pin, *n'*, of
45 a minute-snail, *n*, keyed to the arbor of the minute-hand, said pin *n'* engaging the teeth of a spur-wheel, N', on the arbor of the hour-snail N. The ratchet-lever *a* is similarly provided with a projection, *o*, which abuts against
50 one of the steps of the minute-snail *n*, when the lever *a* is oscillated by its spring I.

The ratchet-lever A is provided at that end which is located opposite to the ratchet B with a toothed segment, P, which meshes with a
55 pinion, Q', of the moderating-gear Z, said pinion being mounted on the arbor of a gear-wheel, Q, that meshes with a pinion, R', on the arbor of a ratchet-wheel, R. The ratchet-wheel R is engaged by a spring-pawl, S', at-
60 tached to a gear-wheel, S, which latter is mounted loosely on the arbor of the ratchet-wheel R. When the ratchet-wheel R is moved in one direction, the pawl S' clears the teeth of the same without carrying the gear-wheel S
65 along, while when the ratchet-wheel R is turned in the opposite direction the gear-wheel S is locked to the gear-wheel R by the

spring-pawl S', and thereby enabled to transmit motion to a pinion, T', on the arbor of a gear-wheel, T, which latter meshes with a pin-
70 ion, U, on the arbor of an escapement-wheel, U, that oscillates an escapement, V, while a spring, V', acting on the wing-shaped lever V' of the escapement V, moves it in opposite di-
75 rection. The pinions, gear-wheels, ratchet-wheel, and escapement form together the moderating-gear Z, which serves to regulate or moderate the speed of the ratchet-levers A *a* while they are returned by the motor-spring Y.

The repeating mechanism is operated by the
80 lever W, that is pivoted to the sleeve Y' of the motor-spring Y and extended beyond the watch-casing. The lever W carries a stud or pin, W', which engages a shoulder, W'', of the ratchet-lever A. The lever W is provided
85 at its inner end with a notch, *i'*, (shown in Fig. 3,) that is engaged by the free end of a spring, *i*, the opposite end of which is attached to the bottom plate of the movement. The spring *i*
90 serves to return the lever W whenever it is released, so that it does not exert a retarding action on the return movement of the ratchet-levers.

The motor-spring Y is of sufficient strength to overcome the tension of the springs I, F, E,
95 and *c*. It is arranged in a fixed barrel, Y', located below the lever W, and attached at its inner end to a sleeve, Y'', and at its outer end to the fixed barrel Y', as shown in Fig. 1.
100 The sleeve Y'' has a square socket, into which is fitted the square pivot A' of the ratchet-lever A, said pivot carrying in a central perforation the pivot of the ratchet-lever *a*. The lever W is placed loosely on the upper end of the sleeve Y'', which end projects above the
105 fixed barrel Y', as shown in Fig. 1. In place of the spiral spring Y a straight or bent spring, *v*, may be used, which is fastened at one end, *w*, to the frame of the movement and at its free end to a roller, *u''*, of the hour ratchet-le-
110 ver A, as shown in Fig. 4. In place of providing a roller, *u''*, and slot *u'''*, the connection of the spring *v* with the ratchet-lever A may be made by a link, *v*, that is pivoted to the free end of the spring *v* and to the ratchet-
115 lever A, as shown in Fig. 5.

The minute ratchet-lever *a* is provided at that end where the ratchet *b* is located with a curved hook or prong, *s*, that extends, when
120 in normal position, around a pin, *s'*, of the click C, so as to press the latter back and move it out of the path of the teeth of the ratchet B of the lever A, as shown in Fig. 1. The click *c* is arranged to oscillate above the ratchet-lever A, so that the latter on being oscillated passes
125 below the same without affecting the same. Both clicks are operated by the spring F as they are successively actuated by the ratchets of the hour and minute levers A *a*.

The operation of the repeating attachment
130 is as follows: When the repeating mechanism is to be operated, the ratchet-levers A *a* are moved from their normal position of rest (shown in Fig. 1) into the position shown in

Fig. 2 by moving the projecting end of the lever W in the direction of the arrow x' , Fig. 1. The pin W' acts thereby on the shoulder W² of the ratchet-lever A and moves said lever 5 in the direction of the arrow x'' , Fig. 1, until the projection m of the abutment L, pivoted to the under side of the lever A, strikes one of the steps of the hour-snail N, as shown in dotted lines in Fig. 2. The opposite end or heel 10 of the abutment L is moved simultaneously therewith in the direction of the arrow x^3 , Fig. 2, so that said heel presses the detent-spring K in the direction of the arrow x^4 , Fig. 2, and disengages the detent J from the recess j of the ratchet-lever a . The spring I acts then 15 instantly on the head of the pin or screw H of the ratchet-lever a and moves the ratchet end b of the same in the direction of the arrow x^2 until its stop abuts against one of the steps of the minute-snail n , as shown in Fig. 2. The 20 prong s of the ratchet-lever a releases simultaneously with the unlocking of the lever a by the detent J the pin s' of the click C, so that the latter is moved by the spring F into the 25 path of the ratchet of the lever A. The number of teeth of the ratchets B b correspond exactly to the number of steps of the hour and minute snails N n , which steps determine the extent of motion or strokes of the levers A a and permit a corresponding number of teeth 30 of the ratchets B b to be moved beyond the clicks C c , said teeth actuating the clicks by the return movements of the levers A a , and sounding, consequently, the hour and minute 35 bells in accordance with the time indicated by the watch-movement in the same manner as in the repeating-watches heretofore in use. By the movement of the lever W and ratchet-lever A the spiral motor-spring Y, contained 40 in the barrel, or the motor-spring v is brought in tension and has the tendency to return the ratchet-lever A back to its normal position. During the motion of the ratchet-lever A in the direction of the arrow x^2 , Fig. 1, the moderating-gear is not actuated, while during the 45 return motion of the same it is thrown into action by the spring-pawl S', so that the speed of the levers A a is regulated and the ratchets B b of the same enabled to actuate the clicks C c at regular intervals as often as required, 50 so as to cause the striking of the hammers and bells according to the number of teeth moved past the clicks by the action of the lever W and the relative positions of the hour and minute snails N n . When the last tooth of the hour ratchet-lever A has passed the click C, the shoulder h' of the ratchet-lever A engages the pin H of the ratchet-lever a , and carries thereby the latter along, so as to cause 60 the teeth of the ratchet b to act on the click c , and sound thereby the minute bell. The ratchet b imparts as many strokes to the hammer of the minute-striking device as teeth of the ratchet have passed beyond the click c , 65 each stroke representing five minutes. When the ratchet-lever a has completed its return movement, the detent J re-engages the recess

j and locks the lever a again into its normal position. By the return movement of the lever a the tension of the spring l is re-established and the same ready for oscillating 70 again the ratchet-lever a until the same is returned with the ratchet-lever A by the motor-spring Y or v , which spring serves to turn both ratchet-levers, and produce thereby the actuating of the striking devices. When the 75 ratchet-lever a has completed its return movement, the prong s at its outer end strikes the pin s' of the click C, whereby the said click is moved on its fulcrum out of the path of the 80 ratchet B, so that when the latter is moved in the direction of the arrow x^2 its teeth can pass clear of the click C without engaging therewith. Only after the teeth of the ratchet B have passed beyond the click C the ratchet- 85 lever a is moved in the direction of the arrow x^2 , owing to the release of the detent-spring K and the action of the spring I, and then the prong s is disengaged from the pin s' of the click C, so that the spring F throws the click 90 C into the path of the ratchet B, ready to be engaged by the teeth of the ratchet B when the ratchet-lever A is returned to its normal position by the motor-spring Y. In case the 95 lever W should not move to its full extent, the ratchet-lever A is not completely oscillated, and therefore the ratchet-lever a not released from its detent J, nor its prong s released from the click C, so that consequently the ratchet-lever A is returned into normal position with- 100 out actuating the striking devices. The full oscillation of the lever W, however, produces the full oscillation of the ratchet-lever A, the release and oscillation of the ratchet-lever a , and the return of both levers A a by the action 105 of their common motor-spring, so that thereby the striking devices are operated and the proper time indicated by the number of the strokes of the hour and minute hammers.

If desired, the repeating attachment may be 110 arranged with three striking devices for striking the hours, quarters, and minutes, in which case a third ratchet-lever is arranged above the second ratchet-lever, by which the striking devices are operated to strike minutes in 115 the same manner as in the hour and minute striking devices described.

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

1. A repeating-watch provided with oscillating hour and minute ratchet-levers for operating the striking devices, an actuating-lever for moving the hour ratchet-lever in one direction, a spring-actuated detent for locking the minute ratchet-lever, means operated by 125 the hour ratchet-lever for releasing said detent, a spring for moving the minute ratchet-lever in the same direction as the hour ratchet-lever, and a motor-spring for returning both levers to their normal position, substantially 130 as set forth.

2. A repeating-watch provided with oscillating hour and minute ratchet-levers for operating the striking devices, an actuating-le-

ver for moving the hour ratchet-lever, a spring-actuated detent for locking the minute-lever, means operated by the hour-lever for releasing said detent, a spring for moving the minute ratchet-lever in the direction of the hour-lever, a motor-spring for returning both ratchet-levers to the normal position, and a spring engaging said actuating-lever and returning it independently of the ratchet-levers, substantially as set forth.

3. The combination of pivoted hour and minute ratchet-levers, the hour-lever having a toothed segment opposite to the ratchet end, an actuating-lever for moving the hour ratchet-lever in one direction, a spring-actuated detent for locking the minute-lever, means operated by the hour-lever for releasing said detent, a spring for moving the minute ratchet-lever in the same direction as the hour ratchet-lever, a motor-spring for returning both ratchet-levers to their normal position, and a moderating-gear operated by the toothed segment for regulating the speed of the ratchet-levers during their return movement, substantially as set forth.

4. The combination of pivoted hour and minute ratchet-levers, the hour-lever having a notch and a shoulder and the minute-lever a pin or stud for engagement with said shoulder, an actuating-lever for moving the hour ratchet-lever, a spring-actuated detent for locking the minute ratchet-lever, means operated by the hour-lever for releasing said detent, a spring for moving the minute ratchet-lever in the same direction as the hour-lever, and a motor-spring for returning both ratchet-levers, said hour ratchet-lever carrying the minute-lever along when its shoulder engages the stud of the minute-lever, substantially as set forth.

5. The combination of two pivoted ratchet-levers for operating the striking devices, an abutment pivoted to one of said levers, a spring-actuated detent for locking the other lever, and step-shaped hour and minute snails, said abutment releasing the detent when striking against the hour-snail, substantially as set forth.

6. The combination of the pivoted ratchet-levers A *a*, the former having an aperture, M, and the latter a notch, *j*, and a projection, *o*, an abutment, L, pivoted at the under side of the lever A and provided at one end with a projection, *m*, and at the opposite end with a pin, L', that passes through the aperture M, a spring, K, provided with the detent J, and the hour and minute snails N and *n*, substantially as set forth.

7. In a repeating-watch, the combination of the pivoted ratchet-levers A *a*, the lever *a* having a stud, H, a spring-actuated detent, J, for the lever *a*, a spring, I, resting against the pin or stud H and moving the lever *a* in one direction, and a motor-spring, Y, for returning the ratchet-levers A *a* and re-establishing the tension of the spring I, substantially as set forth.

8. The combination of two oscillating ratchet-levers and their actuating lever and springs, with fulcrumed clicks engaging the ratchet ends of said levers, and a spring that actuates both clicks, substantially as described.

9. The combination of two oscillating ratchet-levers and their actuating lever and springs, with fulcrumed bell-crank-shaped clicks, and a spring for engaging both clicks, said clicks engaging the ratchet ends of the levers and the projecting pins of the spring-hammers of the striking devices, substantially as set forth.

10. The combination of two oscillating ratchet-levers and their actuating lever and springs, one of said levers having a curved arm or hook at its ratchet end, with fulcrumed and spring-pressed clicks, one of said clicks having a pin or stud that is engaged by the curved arm or hook of the ratchet-lever, so as to be moved out of the path of the other ratchet-lever, 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.

G. AUBERT.

Witnesses:

H. GOLAZ,

L. T. ADAMS.