

(No Model.)

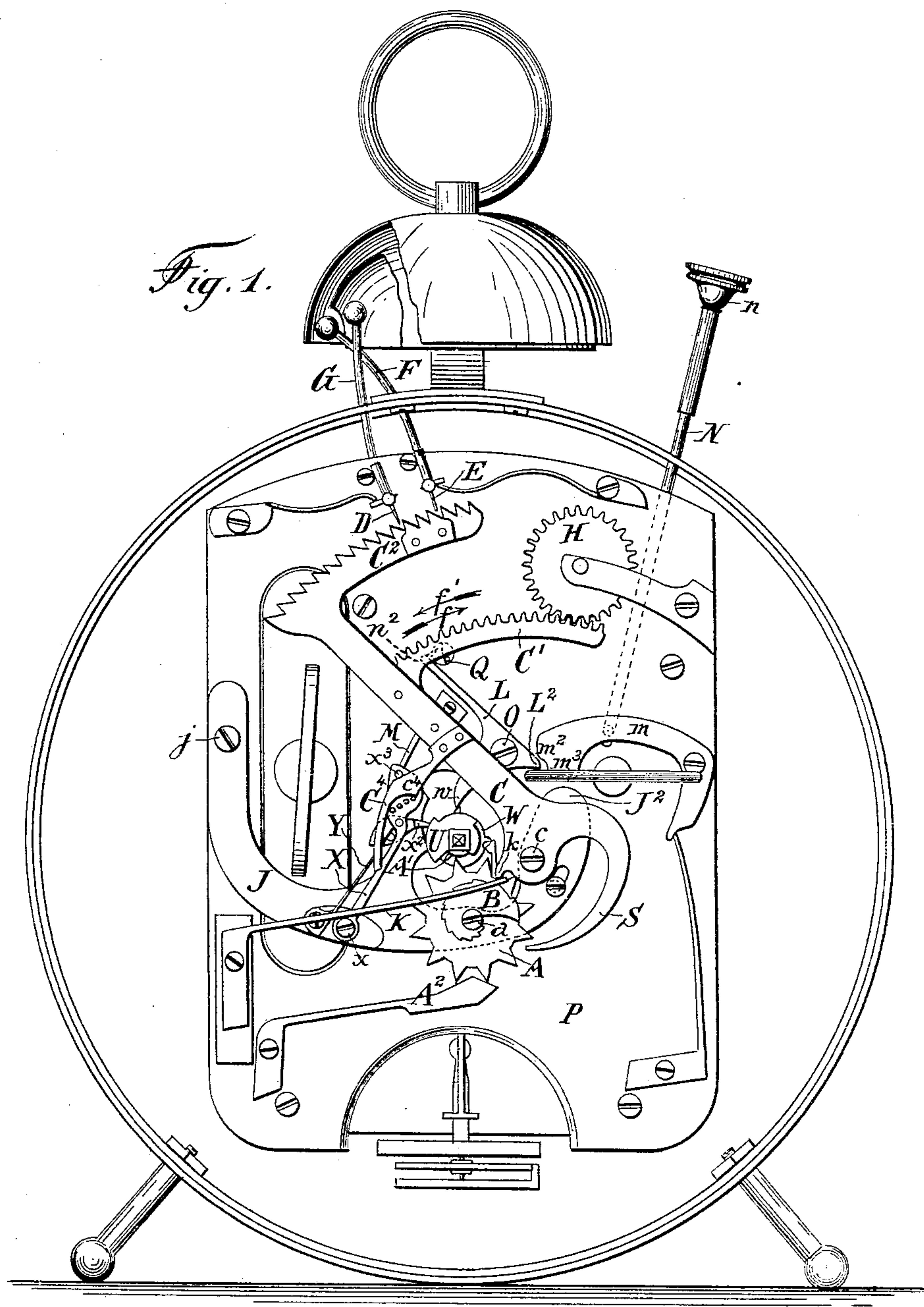
4 Sheets—Sheet 1.

H. AUDEMARS & H. SANDOZ-SANDOZ.

REPEATING MECHANISM FOR TIMEPIECES.

No. 494,727.

Patented Apr. 4, 1893.



Witnesses

Chas. H. Smith

J. Staib

Inventors

Henri Audemars

Henri Sandoz-Sandoz

per Lemuel W. Terrell

Att'y.

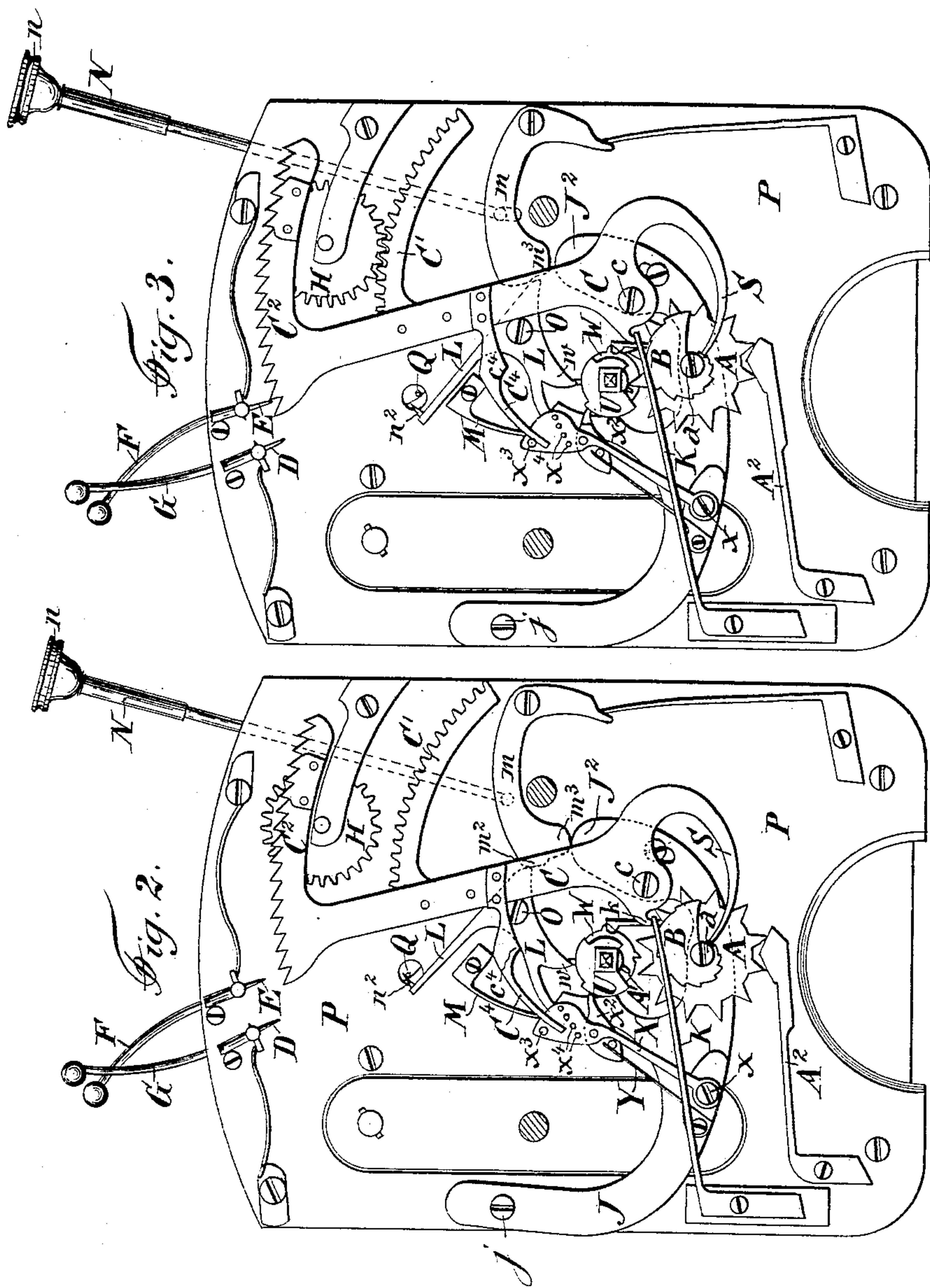
(No Model.)

4 Sheets—Sheet 2.

H. AUDEMARS & H. SANDOZ-SANDOZ.
REPEATING MECHANISM FOR TIMEPIECES.

No. 494,727.

Patented Apr. 4, 1893.



Witnesses

Chas. H. Smith
J. Stait

Inventors
Henri Audemars
Henri Sandoz-Sandoz
per Lemuel W. Serrell

(No Model.)

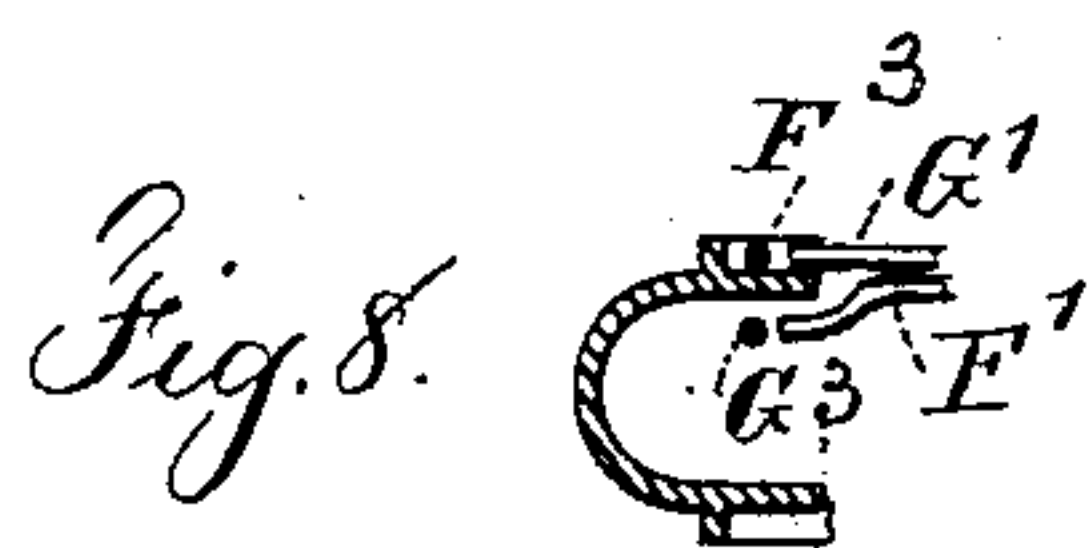
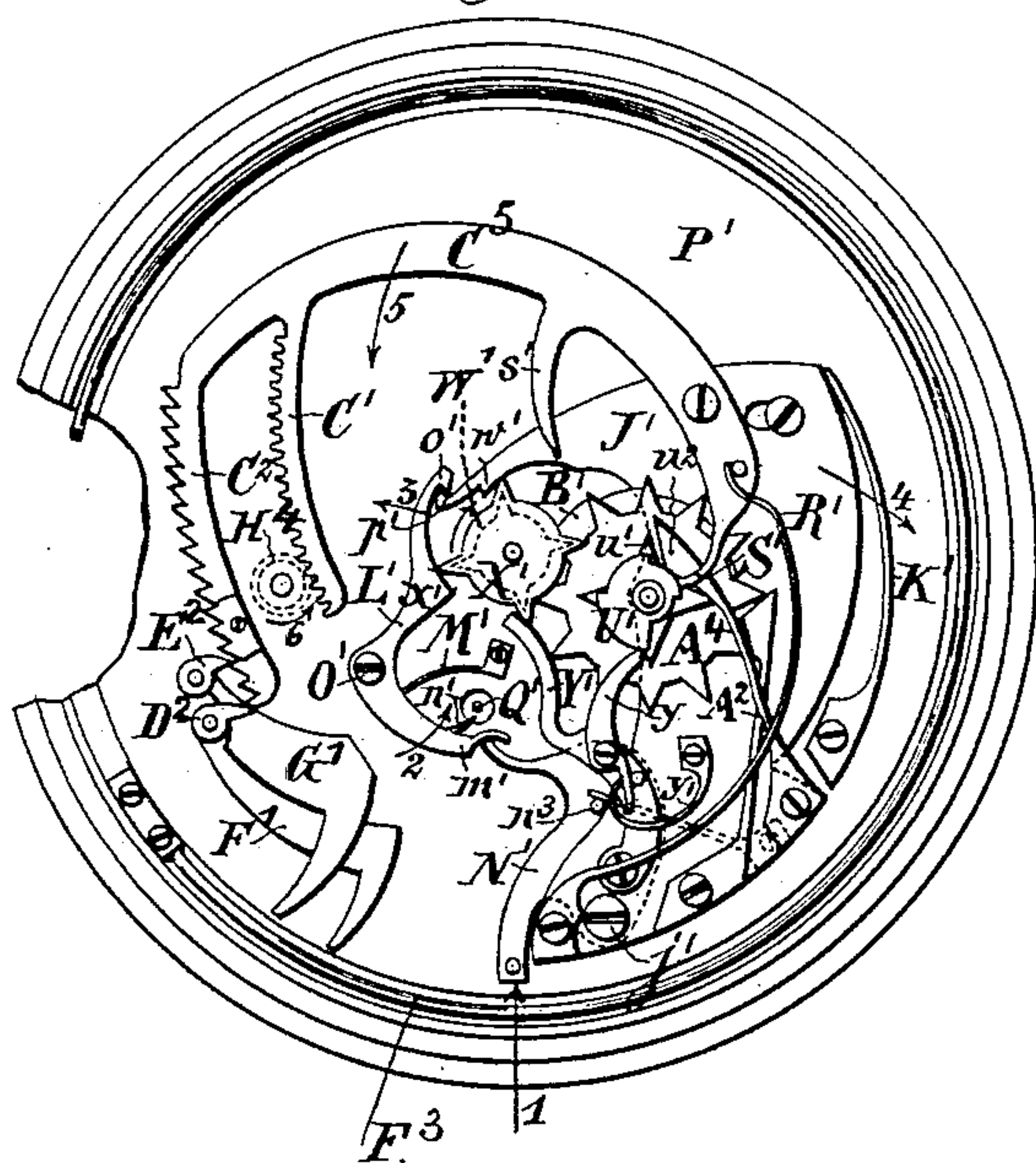
4 Sheets—Sheet 3.

H. AUDEMARS & H. SANDOZ-SANDOZ.
REPEATING MECHANISM FOR TIMEPIECES.

No. 494,727.

Patented Apr. 4, 1893.

Fig. 4.



Witnesses

Chas. H. Smith
J. Stait

Inventors

Henri Audemars
Henri Sandoz-Sandoz
per Lemuel W. Searell
Atty.

(No Model.)

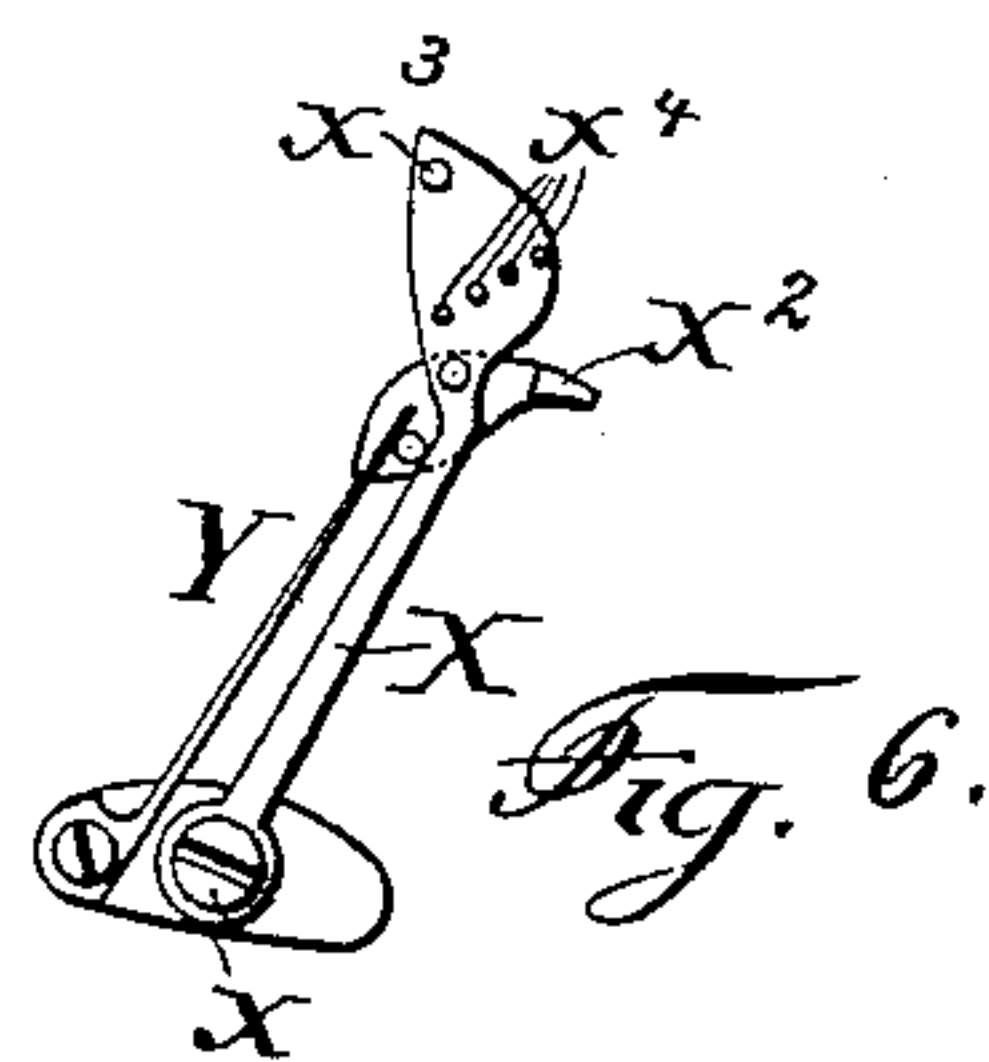
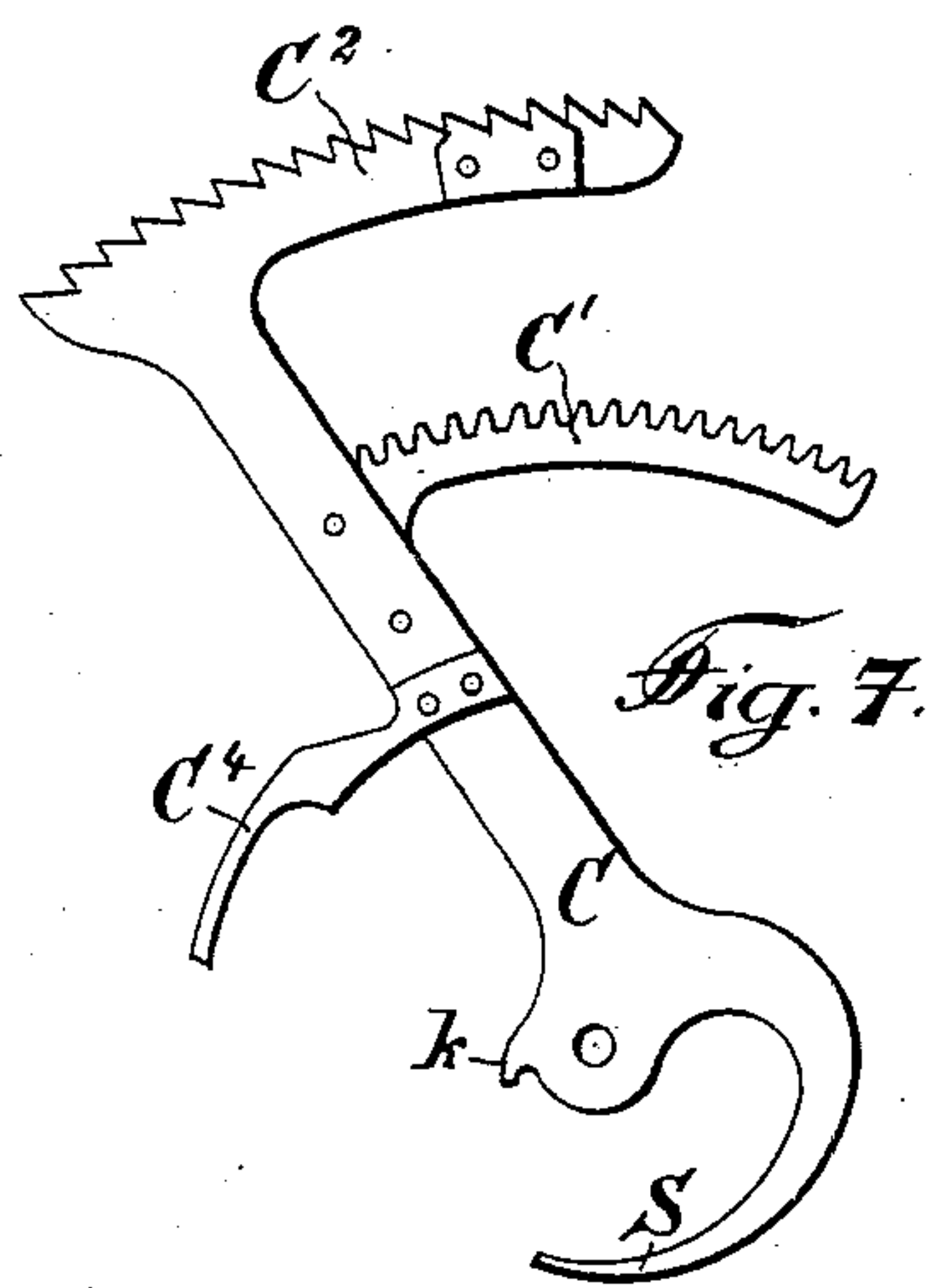
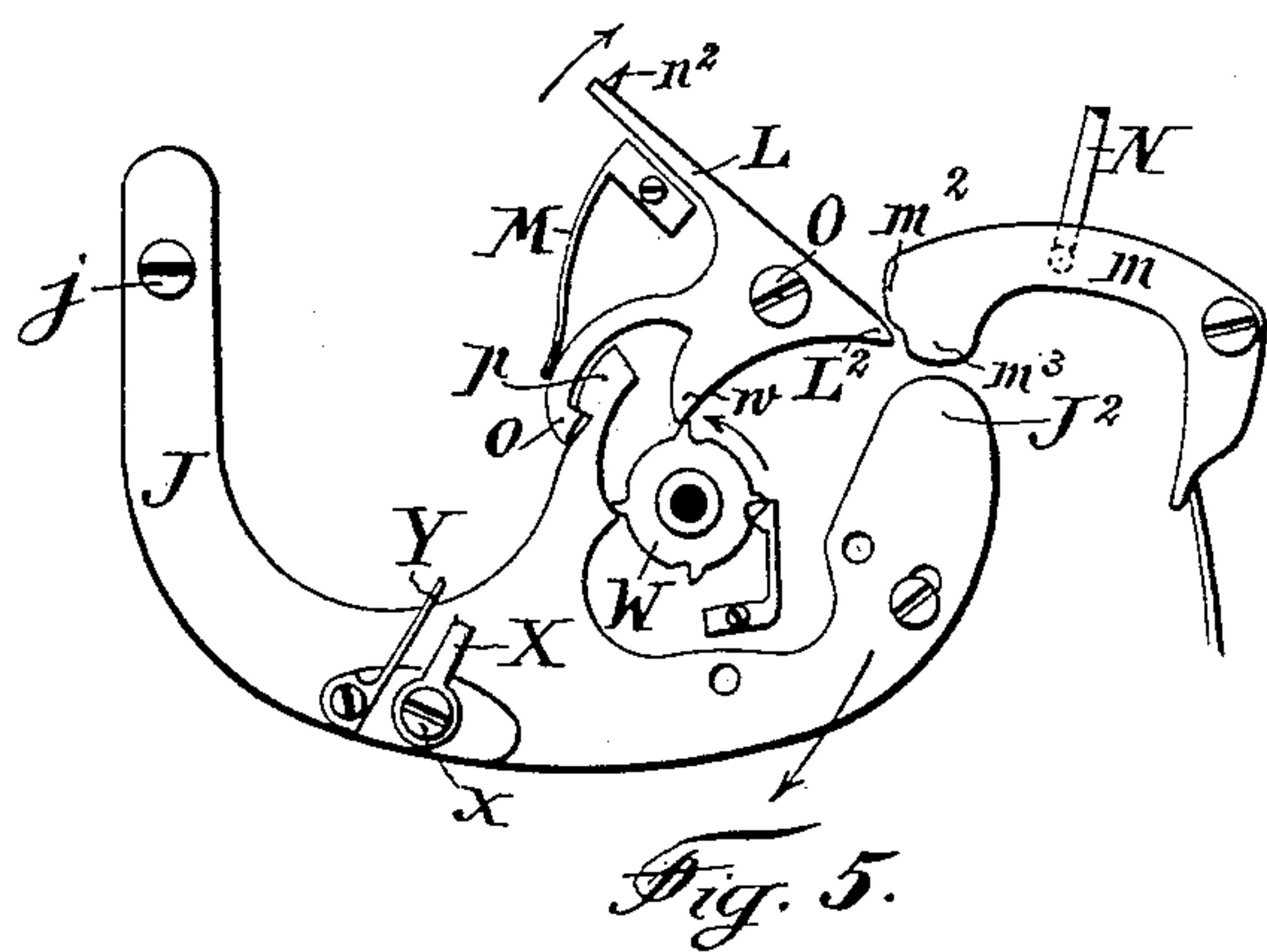
4 Sheets—Sheet 4.

H. AUDEMARS & H. SANDOZ-SANDOZ.

REPEATING MECHANISM FOR TIMEPIECES.

No. 494,727.

Patented Apr. 4, 1893.



Witnesses

Chas. H. Smith
J. Staib

Inventors
Henri Audemars
Henri Sandoz-Sandoz
per Lemuel W. Serrell
Att'y.

UNITED STATES PATENT OFFICE.

HENRI AUDEMARS AND HENRI SANDOZ-SANDOZ, OF TARANNES,
SWITZERLAND.

REPEATING MECHANISM FOR TIMEPIECES.

SPECIFICATION forming part of Letters Patent No. 494,727, dated April 4, 1893.

Application filed October 17, 1892. Serial No. 449,055. (No model.)

To all whom it may concern:

Be it known that we, HENRI AUDEMARS and HENRI SANDOZ-SANDOZ, Swiss citizens, residing at Tarannes, Switzerland, have invented
5 a new and useful Repeating Mechanism for Timepieces, of which the following is a specification.

The invention consists of an improved mechanism for sounding the hours, quarters and
10 minutes in watches or clocks, the motive power producing said sounding being of any desired character (generally a mainspring) and the said mechanism being put into action either
15 automatically each hour, quarter or every five minutes, or caused to repeat when one acts upon a suitable lever or pusher provided for that purpose.

In the accompanying drawings, Figures 1, 2 and 3 are elevations showing the invention
20 applied to a clock and Fig. 4 is an elevation showing the same at an exaggerated scale applied to a watch. Fig. 5 shows separately the rocking-levers J^m and L. Fig. 6 represents the lever X, its arm x^2 and spring Y. Fig. 7
25 shows separately the rocking piece C with its racks C' and C² and arm C⁴. Fig. 8 is a section showing the sounding springs.

In all the figures the same letters refer to the same parts.

30 A is the hours star wheel and B the hours step cam or staff fixed to the wheel.

A' is a cam or finger fixed to the minute wheel of the clock and causing at each revolution of the same the star wheel A to be moved
35 one tooth.

A² is a brake spring preventing the jumping of more than one tooth of the star wheel A at a time and u^2 is a brake spring preventing the jumping of more than one tooth at a
40 time of the star wheel u' of the watch shown in Fig. 4.

C is a rocking lever pivoted at c to a movable piece. In the mechanism shown in the drawings it is formed of a rocking piece J
45 pivoted at j to the plate of the work.

The rocking lever C is provided with two racks or segmental racks C' and C² the first one being provided with teeth to be acted upon by a driving pinion H, rotated by the motor
50 of the watch or clock, and the rack C² being provided with teeth to act upon the levers E

and D of the hammers F and G to cause the hours, quarters and minutes to be sounded.

The purpose of the just described construction, and especially of the pivot c of the lever C being upon a rocking lever, is to allow the
55 racks or toothed segments C' and C² to be temporarily thrown out of reach, the one of the pinion H and the other of the hammer levers D and E. This is necessary to be done at the
60 moment in which the sounding or repeating is acted upon, that is to say at the moment in which the rack C² is thrown into position corresponding to the time marked by the
65 watch or clock, the said position being determined as usual by means of a suitable step cam B for the hours and U for the quarters.

In the construction shown in Figs. 1, 2 and 3, a spring K fixed to the plate P bears against a projection k of the lever C which is
70 pivoted at c to the rocking piece J as specified above. The said spring K therefore tends to cause the lever C to move to the right, and in the direction of the arrow f in Fig. 1, and the rocking piece J is raised into
75 its upper position, Fig. 1, in which the rack C is driven by the pinion H and the rack C² actuates the hammer levers D and E. The said rocking piece J is held when the sounding work is at rest, in one position, by means
80 of a rocking piece L pivoted at O to the movement plate and provided with a clasp, o into which is hooked a clasp p of the rocking piece J. The rocking piece L is acted upon
85 by a suitable spring M which tends to press the same into the position shown in Figs. 1 and 5 in which the clasp p of the rocking piece J is hooked to the clasp o of the rocking piece L. There is provided a lever m to
90 which is connected a pusher N having a button or knob n intended to be depressed when the clock is to be caused to sound the hours. Said lever m when out of action bears neither against the rocking piece L nor against the rocking piece J, but it is intended to act upon
95 both of them when the pusher N is depressed. The projection m^2 of the lever m meets then first the projection L² of the piece L and causes this latter to oscillate into the position shown in Fig. 2, in which the hook p of
100 the piece J is no longer engaged with the hook o of the piece L. Said piece L is further

provided with a hook or projection n^2 intended to stop the sounding mechanism during the time the toothed segment C' is out of gear of the pinion H, by catching the pin Q fixed to the escapement anchor piece of said mechanism. Then the projection m^3 of the lever m meets the end J^2 of the piece J and depresses the same, thus causing the toothed segment C' to be moved away from the pinion H and the rack C^2 from the levers D and E. The rack teeth C' getting out of reach of the pinion H, the lever C will be rocked by its spring K until the projection or finger S of said lever C meets the snail or step cam U marking the hours. According to the position in which said step cam is at that moment, so the rack C^2 will cause more or less hour strokes to be struck when the pusher is abandoned to itself and the rocking piece J lifted by the spring K. The point n^2 of the piece L then leaves the pin Q to itself so that the striking mechanism revolves and the pinion H will cause the lever C to be rocked in the direction of the arrow f' of Fig. 1, and to strike the hours, quarters and minutes until the said lever meets the device hereinafter described.

The stopping of the lever C is effected by means of a lever X Fig. 6, pivoted at x to the rocking piece J, and caused to move with its small arm x^2 toward and against the quarters snail U, Fig. 3. This lever X carries a pin x^3 which does not hinder the movement of the lever X toward the snail U when the lever C is out of action, that is to say, in the position of Fig. 2, but which meets the inclined plane, and then the arched portion of the arm C^4 of said lever C, when the same is moved from the position of Fig. 1 to that of Fig. 2 by the sounding mechanism being started. The meeting of the pin x^3 and of the arm C^4 causes the lever X and its arm x^2 to be raised out of reach of the snail U; but as soon as the lever C has accomplished the necessary motion for the sounding of the hours, and when the toothed segment C^2 is about to begin the sounding of the quarters, the pin x^3 is in front of the inclined plane of the arm C^4 and the lever X moves freely to the snail U by the spring Y. Now said lever X carries four pins x^4 so arranged, that according to the position given to the lever X by the snail U the heel c^4 of the arm C^4 meets the pin which stops said lever C in the position required by the toothed segment C^2 for striking the number of quarters (0, 1, 2 or 3) corresponding to the position in which the staff U is placed at that time. The before described function, that is to say, the unhooking of the sounding mechanism by the action of the pusher N, may also be automatically produced by the watchwork by means of a star wheel W, fixed upon the minute wheel and acting upon the projection w of the rocking piece L, as indicated in Fig. 5, to move the same and separate the clasp o from p .

In the construction shown in Fig. 4 the

quarters snail U' m the star wheel A^4 and the hours snail B' are all pivoted to one and the same axis, fixed to the rocking piece J' pivoted at j' to the plate P' . N' is a pushing lever pivoted to the screw j' and provided with a pin n^3 which imparts the motion of the pushing lever N' to the rocking piece J' when said pusher is moved in the direction shown by an arrow 1. The rocking piece is generally maintained in its position of rest shown in Fig. 4 by means of its projection p' being hooked to the tooth o' of a rocking lever L' pivoted at O' to the plate. Said rocking lever L' has an arm m' which is acted upon by the pushing lever N' and a hook n' is provided to stop the escapement of the sounding mechanism by catching the pin Q' fixed to the anchor of the same. A spring K' tends to maintain the mechanism in the position shown in the drawings in which its tooth p' engages with the tooth o' of the rocking lever L' , but if one depresses the lever N' in the direction of the arrow 1, the rocking piece L' is rocked in the direction of the arrows 2 and 3, thus causing the tooth p' to be disengaged from the tooth o' and the piece J' to be rocked in the direction of the arrow 4, that is to say, in such a manner as to displace the piece C^5 in disconnecting the teeth C' from the pinion H^4 and the rack C^2 from the hammer levers D^2 and E^2 , the said piece C^5 being then free to be rocked by the spring R' in the direction of the arrow 5 until its arm s' meets one of the steps of the hour snail B' . The above described rocking of the piece L' causes, together with the described unlocking of the rocking piece J' , the stopping of the escapement of the sounding mechanism by means of a hook n' engaging with the pin Q' , so that the motor of the sounding mechanism is stopped until the rocking lever L' is thrown back into its first position by means of the spring M' . When the pushing lever N' is abandoned to itself, the piece J' is rocked inversely to the direction of the arrow 4, and the toothed segment C' is again put into gear with the pinion H^4 and the hammer levers D^2 and E^2 with those of its teeth C^2 determined by the position in which the lever C^5 has been stopped by the hours staff B' in its above described movement. The pin Q' having been abandoned by the hook n' the motive pinion H will then begin to rotate in the direction of the arrow 6, causing the sounding of the hours and quarters which is stopped as soon as the projection S' of the lever C^5 meets the quarters snail U' .

The star wheel A^4 is caused to revolve by means of a suitable finger or pin fixed to the minute wheel, said finger or pin causing the wheel A^4 to be moved one of its teeth at each revolution of the minutes wheel. The star wheel X' is intended to lift and again abandon to itself every quarter of an hour a lever Y' having a click y and spring y' ; the said click y causes the star wheel u' to which is fixed the quarters snail U' to be rotated tooth by

tooth. A star wheel W' fixed to the minute wheel of the watch work causes the automatic sounding of the hours when its teeth meet with the points w' and x' of the pieces J' and L'. The sounding springs F³ and G³ of the improved watch are arranged inside of the watch case ring as shown in the partial section in Fig. 8 and are struck by the hammers F' G'.

10 Either in the described watch or in the described clock one may combine the teeth of the sounding rack so as to have the quarters struck before or after the hours. The said teeth range may also be combined so as to
15 strike the quarters and the minutes before or after striking the hours. The snails may further be constructed in form of a continuous volute cam, instead of being provided with steps in view of facilitating the automatic
20 sounding of the hours, or five minutes.

We claim as our invention—

1. The combination with the sounding mechanism and a rotating wheel or pinion, of the rocking lever having a toothed segment, the
25 rocking piece to which the rocking lever is pivoted, hooks to hold the parts in their normal position, mechanism for disconnecting the hooks and separating the toothed segment and wheel and allowing the spring of the rock-
30 ing lever to move the same, a snail for arresting the movement, and a rack and sounding mechanism actuated by the rocking lever as it is moved to its normal position by the gear or pinion acting on the tooth segment, sub-
35 stantially as specified.

2. The combination with the sounding mechanism and a rotating wheel or pinion, of the rocking lever having a toothed segment, the

rocking piece to which the rocking lever is pivoted, hooks to hold the parts in their nor- 40 mal position, automatic starting mechanism for disconnecting the hooks and separating the toothed segment and wheel and allowing the spring of the rocking lever to move the same, a snail for arresting the movement, and 45 a rack and sounding mechanism actuated by the rocking lever as it is moved to its normal position by the gear or pinion on the tooth segment, substantially as specified.

3. The combination with the sounding mech- 50 anism and a rotating wheel or pinion, of a rocking lever having a toothed segment engaging such wheel or pinion, a rocking piece to which the rocking lever is pivoted, hooks for holding the parts in their normal position, 55 a push mechanism for disconnecting the hooks and moving the rocking piece to separate the toothed segment and wheel, and a spring to move such rocking lever and a snail for ar-
60 resting the movement, and sounding mechanism for indicating the hours as the rocking lever is moved by its gear or pinion, a second snail and stop for the quarter hour signals, and means for stopping the striking train
65 when the tooth segment is separated from the pinion and the reverse, substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HENRI AUDEMARS.
HENRI SANDOZ-SANDOZ.

Witnesses:

JULES CHAPNY,
E. H. USCHY.