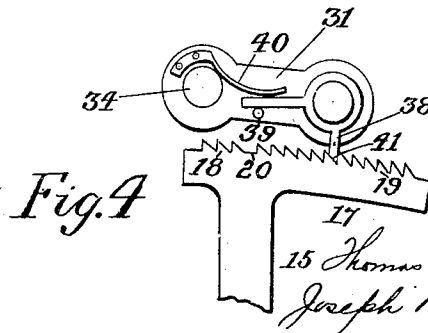
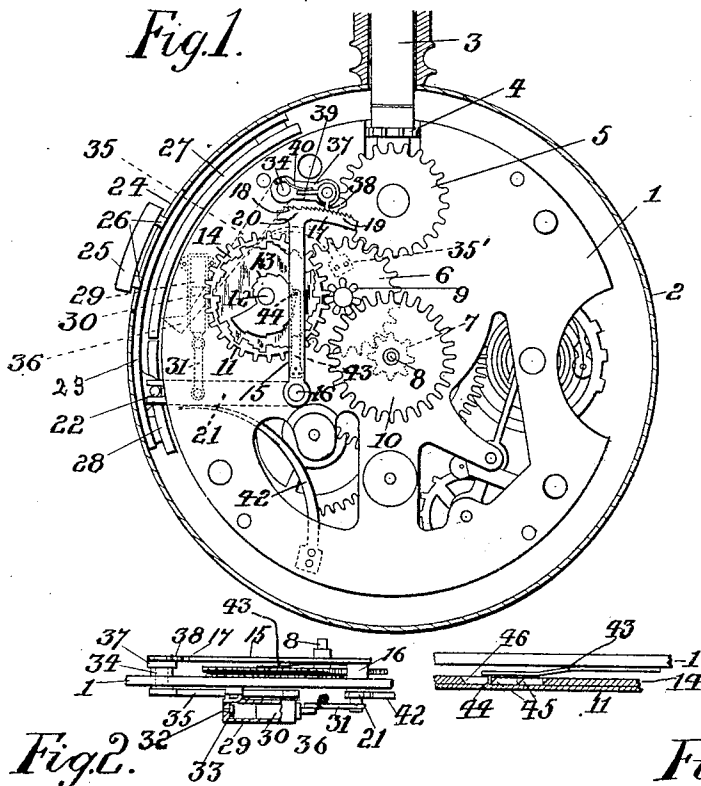


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REPEATING WATCH.
APPLICATION FILED JUNE 11, 1909.

933,696.

Patented Sept. 7, 1909.
2 SHEETS—SHEET 1.



Inventors

15 Thomas A. Connolly
Joseph B. Connolly

Witnesses
S. P. Himes.

Chas. Williamson.

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Fig. 5

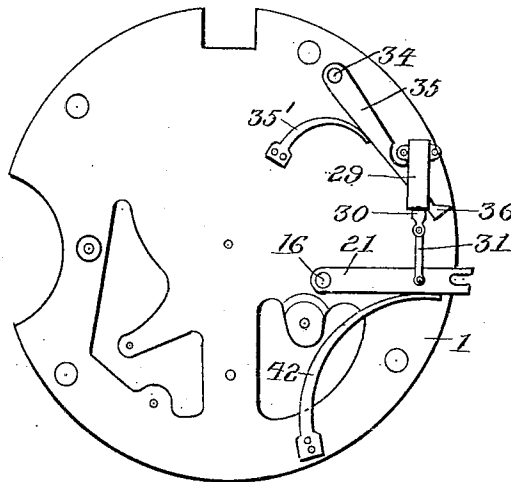
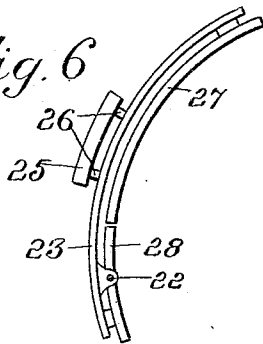


Fig. 6



WITNESSES

J. P. Hinks

Charles Williamson

INVENTORS

Thomas A. Connolly

Joseph B. Connolly

UNITED STATES PATENT OFFICE.

THOMAS A. CONNOLLY AND JOSEPH B. CONNOLLY, OF WASHINGTON, DISTRICT OF COLUMBIA.

REPEATING WATCH.

933,696.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed June 11, 1909. Serial No. 501,673.

To all whom it may concern:

Be it known that we, THOMAS A. CONNOLLY and JOSEPH B. CONNOLLY, citizens of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Repeating Watches, of which the following is a specification.

This invention has relation to repeating watches and has for its object the provision of novel and comparatively simple, cheap and effective mechanism for striking the hours and divisions thereof at will and as often as may be desired by manipulating a slide or push button.

Referring to the accompanying drawing wherein we have illustrated our improvements: Figure 1 is a transverse sectional view on an enlarged scale taken through the case and looking at the front plate of the movement, the latter being in plan view with the dial and hands removed. Fig. 2 is a fragmentary detail view showing a portion of the front plate with parts of the repeating mechanism carried thereby. Fig. 3 is a sectional detail view on a further enlarged scale of a part of the repeating mechanism. Fig. 4 is a detail plan view of another part of the repeating mechanism. Fig. 5 is a plan view of the under side of the front plate. Fig. 6 is a detail plan view of the push piece, the slide and the attached bells or gongs of the repeating mechanism.

The watch movement proper, apart from the repeater mechanism, is of the usual character and need not therefore be described in detail and we will, accordingly, only specifically refer to such parts of the movement as coact with the repeating mechanism in the performance of the required functions of the latter.

The front plate of the movement is designated 1 and is, together with the other parts of the movement, arranged and secured in position in the case 2, in the usual manner. A longitudinally movable winding and setting stem 3 carries a pinion 4 which at one position of the stem meshes with a setting gear 5 rotatably mounted on the front plate and at another position of the stem 3 is out of mesh with gear 5. The setting gear 5 is maintained constantly in mesh with the minute wheel 6, while the latter is in mesh with the cannon pinion 7 carried by the center shaft 8. The minute wheel 6 carries a

pinion 9 which meshes with the hour wheel 10 loosely mounted on the center shaft 8.

The above described parts are all of the ordinary and well known construction and their operation is so well understood that further description thereof is deemed unnecessary and we will now describe the repeating mechanism which constitutes our present improvement. A gear wheel 11 is loosely mounted on a stub shaft 12 carried by the front plate 1, this gear wheel partly overlapping the minute wheel 6 and being in mesh with the pinion 9 and being of the same size and having the same number of teeth as the wheel 10. The gear wheel 11 has two snails 13, 14 on its outer face, the snail 13 being the hour snail and having twelve contact surfaces on its edge, each a different distance from the center of the snail. The other snail 14 is the quarter snail and is of peculiar and novel construction being composed of twelve sets of steps or contact surfaces, each set having three steps or contact surfaces one each for the second, third and fourth quarter of the hour.

The two snails 13, and 14 may be formed integral with the wheel 11, as shown in Fig. 1, or they may be formed separately as illustrated in Fig. 3 and attached to the wheel by soldering or riveting them thereto.

The twelve sets of steps or contact surfaces on the quarter snail are so disposed that each set is opposite one step or contact surface of the hour snail and the two snails being in fixed position relatively to one another, the position of each set of steps of the quarter snail relatively to the corresponding step on the hour snail will remain always the same.

A lever 15 is rigidly mounted on a rock-shaft 16 that is pivotally mounted in the front plate 1 and this lever carries on its free end a segmental rack bar 17 having on its edge two sets of teeth 18 and 19 the set 18 having three teeth and the set 19 having twelve teeth and the two sets of teeth being separated by a blank space 20 corresponding in width to one of the teeth of the rack 18. The rock-shaft 16 has an arm 21 rigidly attached to its end within the front plate and this arm projects slightly beyond the edge of the front plate 1 and is slotted at its end to receive a pin 22, carried by a segmental slide 23 that is mounted within the case 2. The case 2 is slotted at 24 and outside this slot is

arranged a push-piece 25 that is rigidly connected to the slide 23 by pins 26. Two segmental bells designated respectively 27 and 28 are carried by the slide 23 the free ends of the bells being very close to one another and the bells being of different tone so that their sounds may be readily distinguished by the ear, the bell 27 being the bell on which the hours are struck and the bell 28 that on which the quarters are struck as will be hereinafter described.

A cylinder 29 is attached to the inner side of the front plate 1, and a plunger or piston 30 works in this cylinder and is connected to the arm 21 by a rod 31, pivoted at one end to the piston or plunger and at the other end to the arm 21. The cylinder 29 is provided with a small hole at 32 and a valve 33 is arranged in the cylinder, this valve being adapted to close the hole 32 as the piston or plunger is pushed into the cylinder and open the hole 32 as the piston or plunger is drawn out and resulting in a free movement of the piston or plunger in one direction and a retardation of the movement in the other direction, the piston or plunger fitting the cylinder loosely enough to permit a gradual escape of the air as the piston or plunger is forced into the cylinder. The cylinder and piston or plunger constitute the retarding device of the repeater movement and permit the lever 15 and the rack bar to move with just sufficient rapidity on their backward stroke or movement to properly and distinctly sound the hours and quarters.

The retardation of the return movement of the lever 15 and the rack bar will effect a retardation of the return movement of the arm 21, the slide 23, the bells 27, 28 and the push piece 25, these parts being connected to said lever 15. The return movement of the rack bar is retarded for the purpose of preventing the hammer from striking the bells so rapidly that the sound of the separate strokes could not be easily distinguished.

Arranged adjacent to the rack bar 17 and extending through the front plate is a second rock-shaft 34 which carries on its lower end a lever 35, rigidly secured on the rock shaft and having a hammer 36 on its end, this hammer being adapted to successively strike the bells 27, 28, under the impelling action of a curved spring 35' secured to the front plate 1, according to the position of the bells during the movement of the arm 21. Upon the upper end of the rock-shaft 34 is secured an arm 37 which carries a pivoted click 38, one end of which engages the teeth on the edge of the rack bar 17, while the other end is arranged between a stop 39 and a spring 40, the end of the click which engages the rack bar, being beveled as shown at 41 in Fig. 4, so that the click will ride easily over the teeth of the rack bar during the movement of the latter in one direction.

The movement of lever 15 and rack bar 17 during the striking operation is produced by a strong curved spring 42 which is arranged within the front plate and is attached at one end to the front plate and at the other end bears against the edge of the arm 21.

A flat spring 43 is attached at one end to the lower side of the lever 15 and the free end of this spring carries a small pin 44 that extends between the adjacent edges of the hour snail 13 and quarter snail 14 and is adapted to contact with the appropriate steps on these snails during the repeating operation and limit the movement of the lever 15 in both directions so as to cause the proper hour and quarter hour to be struck as will be hereinafter described.

As the pin 44, will, when the repeating mechanism is inactive, rest against one of the steps of the quarter snail, the shoulders at the end of each step and the shoulder opposite the steps are beveled, as shown at 45, 46 in Fig. 3, to permit the pin to ride up onto and over the upper surface of the quarter snail when the quarter snail is turned in either direction in setting the hands of the watch.

Operation: When it is desired to strike the hours and quarters, the push-piece 25 is pushed downwardly or away from stem 3 until its movement is stopped by the contact of the pin 44 with whichever of the steps or contact surfaces of the hour snail happens to be presented toward the pin. As the lever 15 is swung over toward the case by the movement of push-piece 25 the click 38 rides first over the three teeth 18 on rack bar 17 and then over so many of the teeth 19 as may be permitted by the particular step or contact surface on the hour snail as is then presented toward pin 44. At the same time and by the same movement of the push-piece 25 the piston or plunger 30 is drawn outwardly in cylinder 29 and the spring 42 is compressed. The push-piece 25 is then released and the spring 42 moves the push-piece, the slide 23, the bells 27, 28, the arm 21, and lever 15 slowly back to their original position, the piston or plunger moving slowly into the cylinder by reason of the compression and gradual escape of the air therein. During this backward movement of the slide the rack bar passes slowly past the click 38 and, as the click bears against the stop 39, the arm 37 is moved away from the rack and the lever 35 moved inwardly toward the center of the watch, compressing spring 35', the spring serving, as the click passes over a tooth of the rack bar, to cause the lever 35 to swing outwardly and causing the hammer 36 to strike the bell 27. When the proper number of strokes has been given on bell 27 to indicate the hour, the progressive movement of the slide brings the teeth 18 on rack bar 17 into position to operate on

the click and as the bell 28 is brought into position to be struck by the hammer during the time the click is passing the blank space 20 on the rack bar, the operation of the click by the teeth 18 will cause the hammer 36 to strike the quarters on bell 28. The number of quarters struck on bell 28 will, of course, depend on whichever of the steps of a set of steps on the quarter snail is in position to meet pin 44 and stop the movement of the lever 15 and rack bar 17. The steps on the quarter snail are so located that if the pin 44 meets the innermost step the click will be at the blank space 20 on the rack bar and no quarter will be struck. If the pin meets the next step to the innermost step, one tooth of the set of three teeth 18 will pass the click and give one stroke of the hammer 36 on bell 28, the next step will give two strokes and the outermost step will give three strokes, thus indicating that the quarter hour, the half hour or the third quarter of the hour respectively has passed at the time the device is operated.

25 We claim:

1. In a repeating watch the combination with the striking mechanism of a retarding device comprising means for subjecting a confined body of fluid to pressure.

30 2. In a repeating watch the combination with the striking mechanism of a pneumatic retarding device, comprising a cylinder and piston or plunger functionally connected to the striking mechanism.

35 3. In a repeating watch, the combination with the striking mechanism of a pneumatic retarding device functionally connected to said striking mechanism and comprising a piston or plunger and a cylinder provided with an air inlet and a valve governing said air inlet.

40 4. In a repeating watch, the combination with a rack bar having two sets of teeth and a hammer operated by said rack bar, of two bells movable successively into position to be struck by the hammer.

45 5. In a repeating watch, the combination with striking mechanism including a hammer, of a push-piece and a plurality of bells of different tone, one of said bells and said hammer being automatically brought into relatively operative position by the return movement of the push-piece.

6. In a repeating watch, the combination with a single hammer and means for actuating the hammer including a plurality of snails and a rack bar having a plurality of sets of teeth, of a plurality of bells and means for automatically and successively moving the bells within the striking range of the hammer accordingly as the hammer is actuated by one or the other of said sets of teeth.

7. In a repeating watch the combination with striking means, of two snails, one arranged within the other and adapted to successively limit the number of strokes of the striking mechanism, one snail having internal steps and the other having external steps.

8. In a repeating watch, the combination of a movable rack bar, means for moving said rack bar, a hammer operable by said rack bar, and two snails, said snails being adapted to limit the movement of the rack bar in opposite directions respectively.

9. In a repeating watch, the combination with the striking mechanism of a retarding device operably connected to the striking mechanism and comprising a cylinder, a piston or plunger and means for retarding the movement of the piston or plunger in the cylinder.

10. In a repeating watch, the combination with striking mechanism, including a hammer and spring actuated means for operating the hammer, of a movable bell, means for manually moving said bell into striking range of the hammer and simultaneously tensioning the actuating spring of the hammer operating means.

11. In a repeating watch, the combination with striking mechanism, including a hammer, of a movable bell, means for manually moving the bell in one direction and means for automatically moving the bell into striking range of the hammer on the return movement of the bell.

In testimony whereof we have affixed our signatures, in presence of two witnesses.

THOMAS A. CONNOLLY.
JOSEPH B. CONNOLLY.

Witnesses:

CLYDE B. WEIKERT,
IRA P. HIMES.