No. 650,979. Patented June 5, 1900.

W. K. MENNS.

SHIP'S BELL CLOCK.

(Application filed Mar. 8, 1900.)

(No Model.) 4 Sheets—Sheet 1.

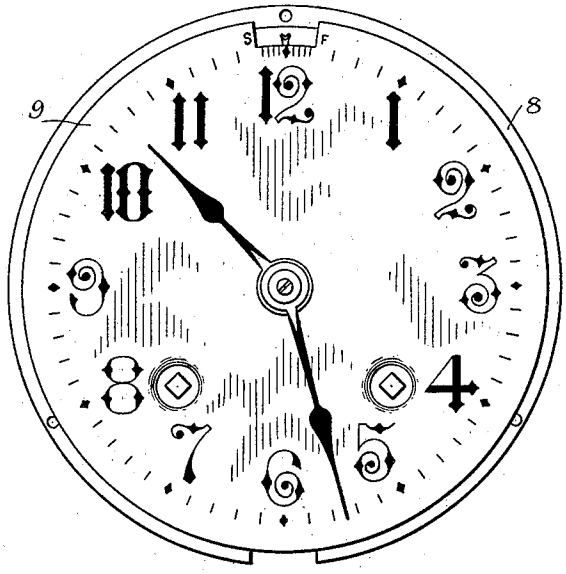

Fig. 1.

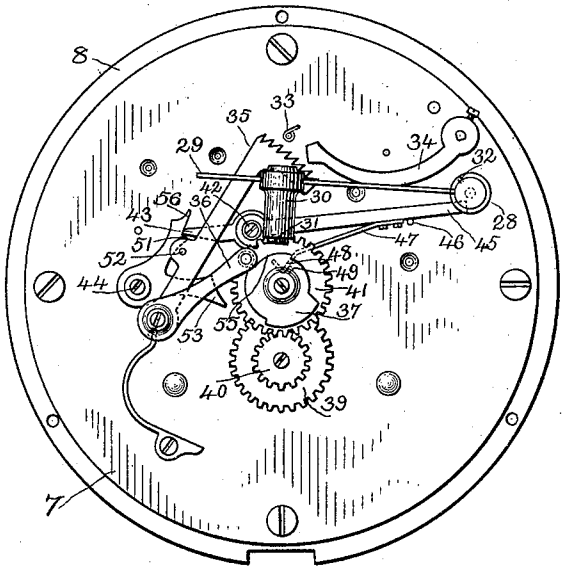

Fig. 2.

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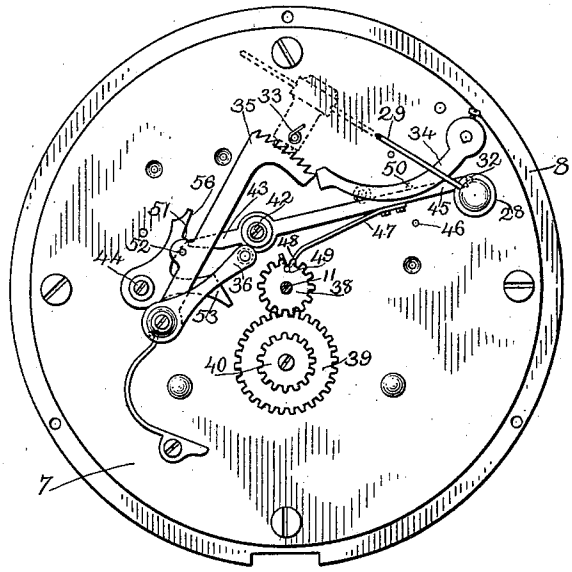

Fig. 3.

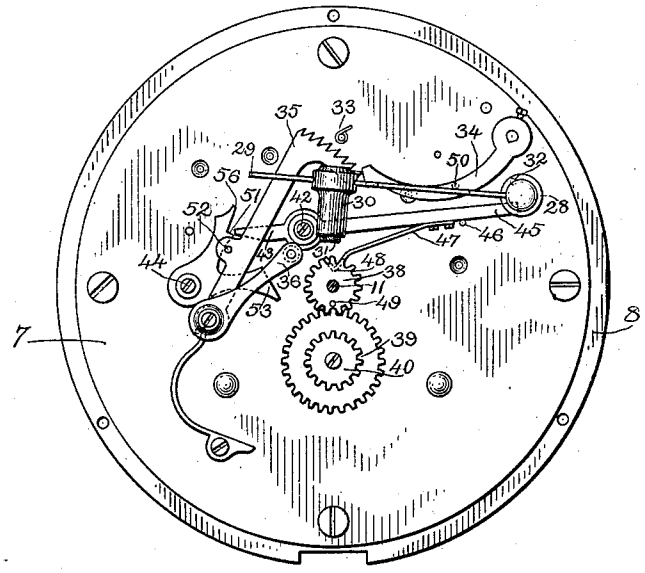

Fig. 4.

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(No Model.) 4 Sheets—Sheet 3.

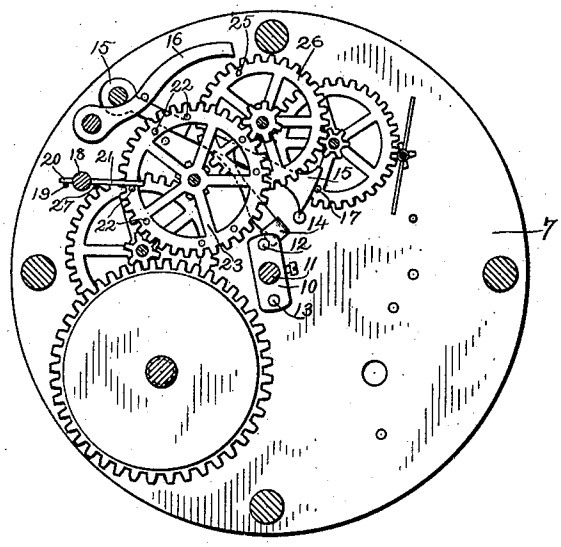

Fig. 5.

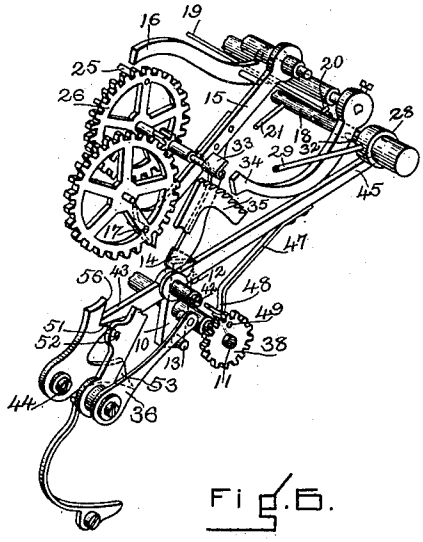

Fig. 6.

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(Application filed Mar. 8, 1900.)

(No Model.) 4 Sheets—Sheet 4.

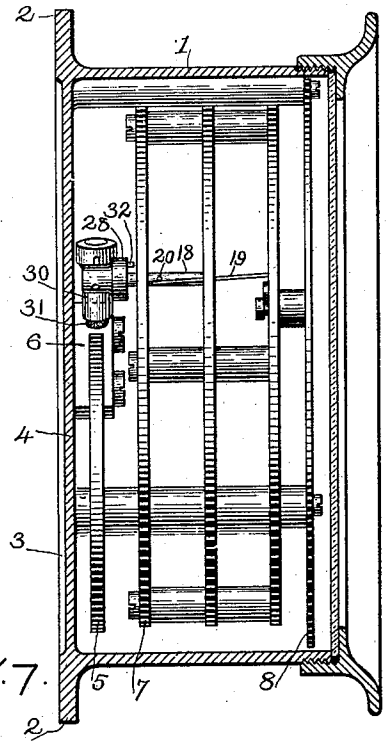

Fig. 7.

WITNESSES:
E. L. Swett
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INVENTOR:
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UNITED STATES PATENT OFFICE.

WALTER K. MENNS, OF CHELSEA, MASSACHUSETTS, ASSIGNOR TO CHARLES H. PEARSON, OF BROOKLINE, MASSACHUSETTS.

SHIP'S-BELL CLOCK.

SPECIFICATION forming part of Letters Patent No. 650,979, dated June 5, 1900.

Application filed March 8, 1900. Serial No. 7,877. (No model.)

To all whom it may concern:

Be it known that I, WALTER K. MENNS, a subject of the Queen of Great Britain, residing at No. 88 Shurtleff street, Chelsea, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Clocks, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention in clocks relates to the mechanism for audibly indicating the time, and is adapted to imitate the strokes of a ship's bell instead of following the common manner of indicating time ashore.

It is customary in keeping time at sea to divide the day into periods of four hours, called "watches," each having a particular designation, as "middle-watch," beginning at midnight, or the "dog-watches," beginning at four o'clock in the afternoon, and the watches are divided into half-hour spaces. At the end of each half-hour the ship's bell is sounded the number of half-hours completed of that watch, and it is usual to group the strokes in pairs. The preferred constructions for this purpose now in use have two hammers, which are actuated, first one and then the other, in quick succession to sound a pair of strokes on the gong. One of these hammers sounds the gong once at every pair or portion of a pair of strokes—that is, this hammer sounds its full number of strokes at every striking interval. The other hammer is actuated to strike the gong at every striking interval to complete the pairs of strokes begun by the other hammer and will do so, except at the last stroke of the last pair of strokes occurring at a half-hour, which on shipboard should be indicated by an odd number of strokes. The second hammer in this case after being released to strike is prevented from so doing by some interrupting mechanism. Of course this duplication of the mechanism makes a needlessly complicated and cumbersome structure. The redundant parts add to the cost of manufacture and render the mechanism more difficult to keep in order. I have remedied these objections; and to this end my invention consists in a striking mechanism having only one hammer, arranged to be actuated in groups of double strokes to sound the bell at each full hour; but at each half-hour, although the hammer is actuated in double strokes, one blow will be interrupted before it sounds the bell, a consequent decrease in number of parts enabling cheaper and more expeditious production and less liability to derangement of the parts when in use; also, the devices and their combinations for particular purposes that will be described.

In a preferred construction I insert four pairs of pins in the striking-wheel of a well-known type of striking-train, against which pins the actuating-pin of the hammer rests under tension. On the outside of the plate carrying the striking mechanism I arrange, as usual, a rack, gathering-pallet, and rack-dog, the rack being controlled by a four-step snail timed to revolve once in four hours. At each full hour or even number of strokes the striking mechanism will act to operate the hammer as controlled by the snail and the specially-arranged groups of double pins on the striking-wheel, as will be readily understood by those familiar with clocks who are accustomed to applying suggested improvements thereto. At the half-hours or odd numbers of strokes a pin moving in unison with the minute-hand tends to lift the normally-depressed extremity of a rocker, but is prevented from so doing by a detent until a pin on the rack removes the detent to permit the end of the rocker to pass just before the last blow of the hammer is to occur. This moves the opposite extremity of the rocker into the path of a pin connected with the hammer-shaft, and as the hammer starts on this stroke the said pin strikes the extremity of the rocker and holds the hammer against the tension of its spring, so it will not sound the bell.

The drawings show, in Figure 1, the face of a clock; Fig. 2, part of the striking mechanism in position of Fig. 1 with the train ready to start; Fig. 3, a like view with the hammer intercepted; Fig. 4, a view of the mechanism in normal position; Fig. 5, a view of the striking-train in position of Fig. 1. Fig. 6 is a sketch of the principal pieces as in Fig. 1. Fig. 7 is a section of the case, showing relation of movement, hammer, and gong.

The frame of the movement consists of three plates separated by studs and secured to each other by screws, the rear plate 7 carrying the striking-train and associated parts. The frame of the movement is attached in any usual manner to a disk 8, which serves

to support the movement in the case and to which the dial 9 is secured.

The striking-train connected with the plate 7 is actuated by the lifting-block 10, mounted on the center arbor 11, as the pins 12 or 13 come in contact with the spring-blade 14, connected with the warn-lever 15, thus lifting the locking-lever 16 to permit the train to move till checked by the pin 17 on the warn-wheel coming against the warn-lever 15 to stop the train in position to begin a round on the gong. Extending parallel with the shaft 18 of the hammer is a spring 19, one end of which is fastened to the front plate of the movement and the other presses against a pin 20 in the shaft 18 and tends to throw the hammer toward the gong 5. Another pin 21, extending from the hammer-shaft, rests in the path of the pairs of pins 22, inserted in the striking-wheel 23 of the train, the arrangement being such that two blows may be struck, then an interval of rest, followed by two blows and another interval of rest, till the striking-wheel stops, when the locking-lever 16 drops into the path of and comes in contact with the pin 25 on the third wheel 26 of the striking-train. From the middle plate of the movement a pin 27 projects into the path of the pin 21 to limit the motion of the hammer, the elasticity of the connection of the hammer with its hub allowing it to strike the gong and then rebound, so as not to interrupt the vibrations thereof.

Outside of the plate 7 the hammer-hub 28 is secured to the shaft 18, and the wire 29, extending parallel with the plate, adjustably supports the hammer-head 30. From the hub 28 a pin 32 extends for a purpose that will be explained. Dog 34, attached to the same shaft as the locking-lever 16, and gathering-pallet 33 act on the rack 35, which is under spring tension, in the usual manner, and the projection 36 from the rack, adapted to come in contact with the snail 37, determines the travel of the rack, as is common. The snail, each step of which controls the strokes of the hammer for one hour, or two striking intervals, is moved at one-fourth the speed of the minute-hand by means of the snail-pinion 38 on the center arbor 11, meshing with the intermediate gear 39, and the connected pinion 40 meshing with the gear 41, to which the snail is attached.

The mechanism so far described would enable the hammer to strike double blows with an interval of rest between the double blows each half-hour. To strike the gong odd blows, I intercept the last-attempted blow of the hammer by means of a rocker pivoted to the plate at 42, one portion 43 of which is normally restrained in its motion in one direction by a detent pivoted at 44 to the plate 7. As the portion 45 overbalances the portion 43 the rocker will normally rest on the pin 46 in the plate 7; but to lift the portion 45 into the path of the pin 32 of the hammer-hub I attach to the rocker a light spring 47, the hooked extremity 48 of which is positioned over the center of the snail-pinion 38, having the pin 49 projecting from its inner face, that is designed at the half-hours to come in contact with the hook 48 to strain the spring and tend to lift the extremity of the rocker to intercept the pin extending from the hub 28, and to properly position the rocker for this purpose the limiting-pin 50 is driven into the plate 7.

Ordinarily the shoulder 51 of the detent, which is so pivoted on the plate 7 that it rests in contact with the end of the rocker, prevents the spring 47 from lifting the extremity of the rocker; but a pin 52 is inserted in the rack 35, so that as the rack comes to its position of rest the pin will lift the detent enough to allow the rocker to snap by the shoulder 51, the projection 53 of the detent preventing excessive motion and tending by its weight to restore the parts. It may be here noted that any parts herein described and illustrated as positioned by gravity may be positioned by suitable springs.

Figs. 1, 2, 5, and 6 show the parts as just before five bells of either the "first watch" at night or of the "forenoon watch." The pin of the lifting-block 10 having come in contact with the spring-blade 14 has removed the locking-lever 16 from the stop-pin 25 of the third wheel and allowed the train to move to starting position, with the pin 17 in contact with the end of the warn-lever 15 and the first pin of the pairs 22 in the striking-wheel resting under the pin 21, connected to the hammer-shaft 18. Referring to the mechanism on the other side of the plate 7, the dog 34, which normally rests under the end of the rack 35 to hold the projection 36 clear of the snail 37, has been lifted, so the projection 36 may be forced into contact with the snail by the spring connected with the rack to determine the number of strokes of the hammer. As the lifting-block passes from under the blade 14 the warn-lever falls to release the train, and the dog 34 falls on the teeth of the rack to prevent retrogression as it is advanced by the rotation of the gathering-pallet 33 from the position determined by the step 55 of the snail. As the first pair of pins on the striking-wheel pass, the hammer is lifted, and the spring 19 causes it to deliver two blows in quick succession, to be followed by a rest till the next pair of pins repeat the blows in like manner, then another rest, and the first pin of the third pair causes its blow to be delivered by the hammer. At the time under consideration—that is, an odd number of strokes—the pin 49 in the snail-pinion 38 will be positioned so as to press against the hook 48 of the spring 47 and puts pressure on the rocker, tending to lift the portion 45. This pressure has, however, been resisted until just after the odd stroke described above by the shoulder 51 of the detent. The last pin of the third pair on the striking-wheel 23 will lift the hammer, compress the spring 19, and free the hammer to

deliver another blow; but meanwhile the rack 35 has been returned by the gathering-pallet to its normal position, in which the pin 52 pushes back the shoulder 51 of the detent from the end of the portion 43 of the rocker, and immediately the spring 47 throws up the extremity of the portion 45 of the rocker against the pin 50 into the path of the pin 32 of the hammer-hub and stops the hammer before the blow is delivered, the position of the parts at this time being illustrated in Fig. 3, the mechanism having delivered five effective blows. The snail-pinion continuing its motion carries the pin 49 past the hook 48 of the spring 47, so it no longer exerts pressure on the rocker; but the other parts remain as in Fig. 3 for about half an hour, or until the warn-lever again releases the train, and as the hammer is lifted by the first of the pins 22 the unsupported rocker falls to its usual position, resting on the pin 46, and as the end of the portion 43 of the rocker passes the shoulder 51 the detent falls until its projection 56 comes in contact with the end of the rocker. When the pins 22 pass the pin 21, the double strokes of the hammer begin, and as the rocker remains inactive the entire group governed by the step 55 of the snail is delivered to indicate that it is now six bells in the watch being considered, the parts being at the termination, as indicated in Fig. 4, which is the normal position of the parts.

I have described a mechanism capable of automatically sounding the time at sea by interrupting one blow of predetermined couples of strokes of a single hammer, but do not wish to be limited to this precise construction, as mechanics may readily modify the details without departing from the principle of the invention, and

I claim and desire to secure by Letters Patent of the United States—

1. In a clock, mechanism to actuate a single hammer at regular intervals double strokes with intervening rests, combined with means at alternate intervals to render one stroke of the same hammer ineffectual, substantially as described.

2. In a clock, the combination of a striking mechanism having a single hammer, a striking-wheel provided with pairs of pins arranged to contact with a pin extending from the hammer-shaft to cause the hammer to make double strokes with intervening rests at alternate striking intervals, and means for rendering the hammer ineffectual at predetermined times.

3. In a clock, a single hammer and appliances to actuate the hammer each half-hour double strokes with intervening rests, combined with means at alternate half-hours to prevent the last blow of the last double stroke of the hammer from sounding the gong, substantially as described.

4. In a clock, mechanism to actuate a single hammer double strokes at regular intervals and a projection from the hammer in the path of a normally-inactive rocker, combined with means at alternate intervals to yieldingly tend to render the rocker active to stop the hammer and means to remove a restraining-detent from the rocker just before the last blow of the last double stroke of the hammer, substantially as described.

5. In a clock, a single hammer actuated in double strokes at regular intervals, a dog, gathering-pallet, rack and controlling-snail, combined with a rocker normally held inactive by a detent and means for removing the detent to allow the rocker when positioned by devices at alternate intervals to interrupt the last blow of the hammer, substantially as described.

6. In a clock, mechanism to actuate a hammer double strokes at regular intervals and devices to control and feed the rack, combined with a rocker and detent, means connected with the rack-controlling devices adapted to operate the rocker and means connected with the rack to release the detent to allow the rocker to intercept the hammer, substantially as described.

7. In a clock, devices for starting a train, at regular intervals, a striking-wheel having pins set in pairs, spring-actuated hammer having a projection, a rack, gathering-pallet, dog and snail, provided with suitable actuating connections, combined with a rocker normally locked by a detent, a pin on the snail-pinion adapted to contact with a spring on the rocker at alternate intervals and a pin on the rack adapted as it nears its normal position to contact with the detent to release the rocker so it may stop the hammer, substantially as described.

8. In a clock, the combination with a hammer of a rocker normally held out of engagement therewith, a detent, a pin on the snail-pinion and coacting spring on the rocker to move the rocker into the path of the hammer and a pin on the rack acting on the detent to release the rocker to stop a stroke of the hammer, substantially as described.

9. In a clock, mechanism to actuate a single hammer to deliver double strokes with intervening rests, combined with a rocker, detent and suitable actuating mechanism therefor, so the rocker may intercept a blow of the hammer at certain intervals, substantially as described.

10. In a clock, a single hammer actuated in double strokes at regular intervals, combined with a rocker yieldingly positioned by the time-train and a suitably-controlled detent to permit the rocker at alternate intervals to stop a blow of the hammer, substantially as described.

In testimony whereof I have hereunto subscribed my name this 3d day of March, A. D. 1900.

WALTER K. MENNS.

Witnesses:
BEATRICE M. WETMORE,
A. O. ORNE.