(No Model.) 2 Sheets—Sheet 1.

J. S. NEGUS.

SHIP'S BELL CLOCK.

No. 500,717. Patented July 4, 1893.

Fig: 1.

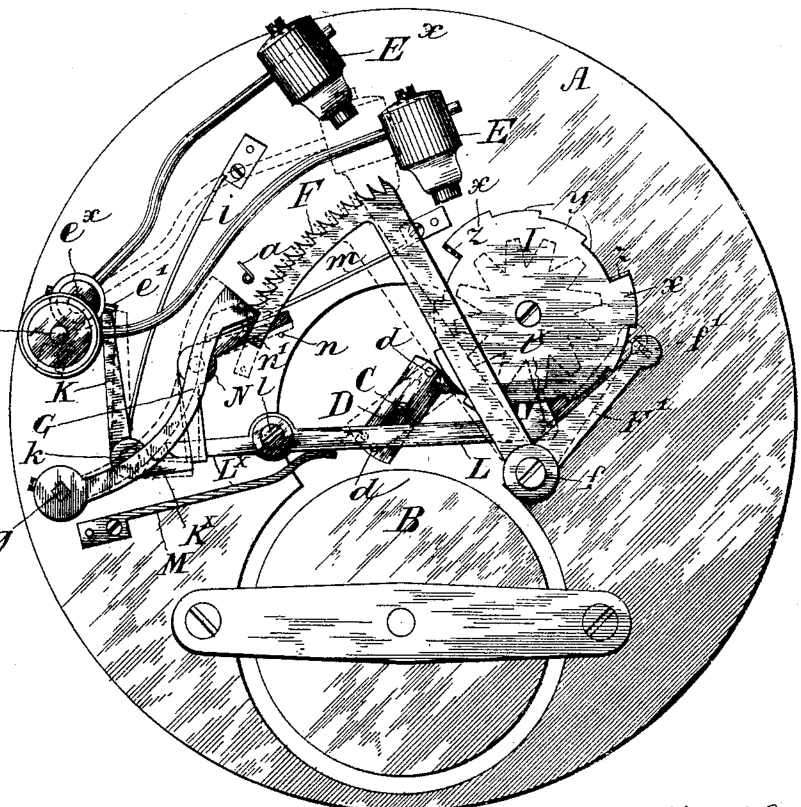


Fig: 3.

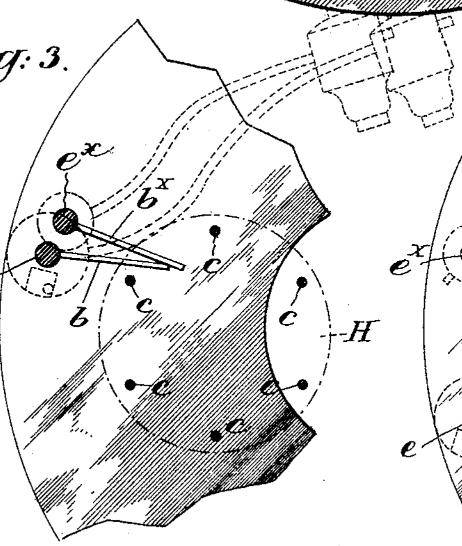
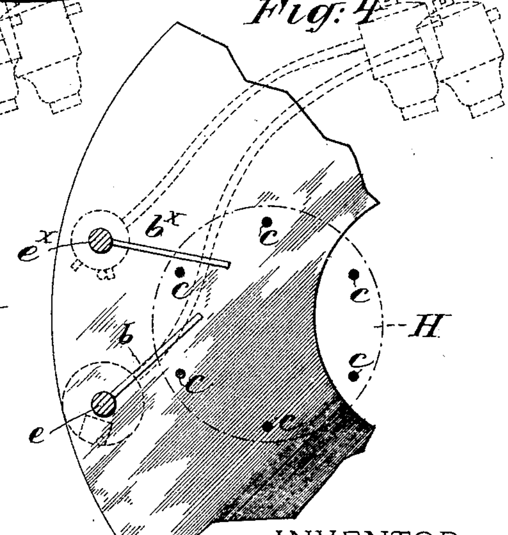


Fig: 4.



WITNESSES:

F. W. Himan

Peter A. Ross.

INVENTOR:

John S. Negus

By Herbert W. Blossom

Attorney.

(No Model.) 2 Sheets—Sheet 2.

J. S. NEGUS.

SHIP'S BELL CLOCK.

No. 500,717. Patented July 4, 1893.

Fig: 2.

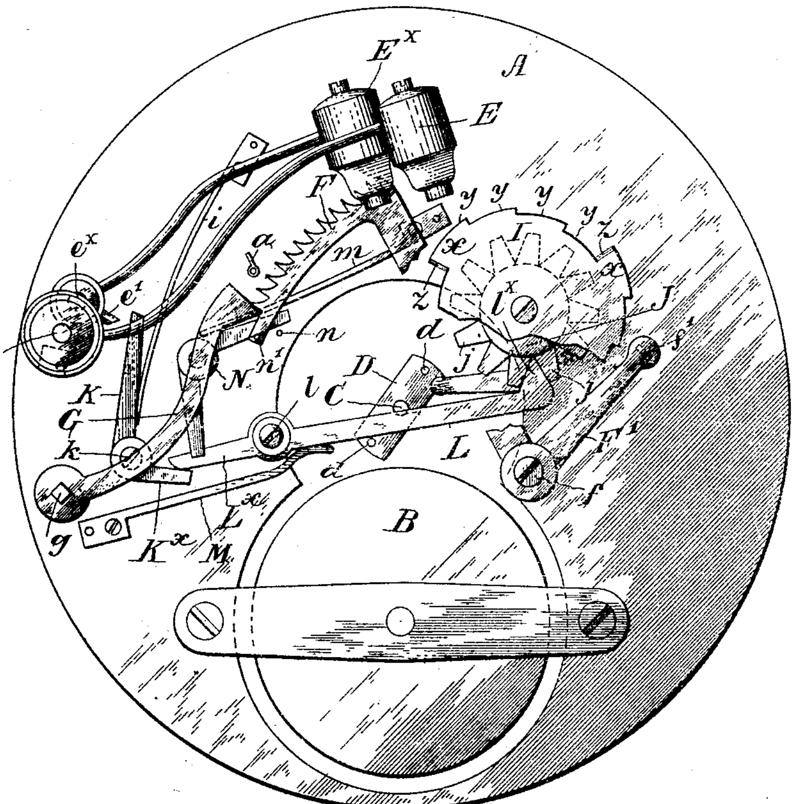


Fig: 5.

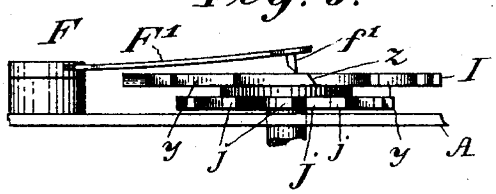
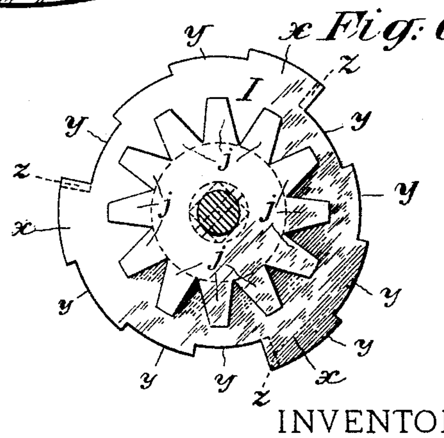


Fig: 6.



INVENTOR:

John S. Negus

By Herbert Blossom

Attorney.

WITNESSES:

F. N. Winan

Peter A. Ross

UNITED STATES PATENT OFFICE.

JOHN S. NEGUS, OF BROOKLYN, NEW YORK.

SHIP'S BELL-CLOCK.

SPECIFICATION forming part of Letters Patent No. 500,717, dated July 4, 1893.

Application filed September 17, 1892. Serial No. 446,150. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. NEGUS, a citizen of the United States, and a resident of the city of Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Ships' Bell-Clocks, of which the following is a specification.

My invention relates to striking mechanisms for ships' bell clocks, and the principal purpose of the invention is to adapt such striking mechanism to an ordinary clock and particularly to one constructed to be set forward or backward, so that the mechanism for striking the "bells" will be automatically set or adjusted in unison with the hands which indicate the time on the dial.

It will be understood by those familiar with the art that on shipboard each twelve hours is divided into three "watches" of "eight bells" each, and that a ship's bell clock strikes the hours and half-hours up to eight, instead of the hours up to twelve, and then begins at one "bell" again. Thus each half-hour is struck as a "bell." It is a long established custom to strike the bells in pairs or couples; for example, in striking "three bells," the first and second are struck, one immediately following the other, as a pair or couple, the third being struck after an interval; at "four bells" the first two or couple are struck as before and after an interval the third and fourth are struck as a second couple and so on. Heretofore such striking mechanisms have employed two hammers, one of which is not operated on the last stroke of the last couple in striking the odd number of bells which occur on the half-hours, representing, respectively one, three, five and seven bells.

My invention will be fully described hereinafter and its novel features carefully defined in the claims.

The mechanism for raising and releasing the hammers is, or may be, the same as that used in ordinary clocks.

As herein shown, my improved striking mechanism is adapted to be applied directly to the mechanism of any ordinary clock capable of being set backward or forward.

Figure 1, is an elevation of the device as it would appear when seen from the back or rear of the clock. Fig. 2, is a similar view showing the moving parts in a different position, and having some of the mechanism broken away to better disclose that behind. Fig. 3, is a fragmentary detail view showing the mechanism for raising and releasing the hammers; and Fig. 4, is a similar view illustrating a modified form of the device seen in Fig. 3. Figs. 5 and 6 are detached detail views, on a larger scale, of the stroke-regulating device or mechanism.

A represents the plate carrying the striking mechanism, and B, the spring case or barrel of the clock.

C, is the central arbor of the clock, and D is a plate on said arbor, provided, as usual with tripping pins, *d*, *d*, to set the striking mechanism in motion. This device is one of the forms commonly found in clocks.

E, is the main hammer, secured to a rock-shaft *e*; F, is the segment rack, pivoted at *f*.

G, is the stop-pawl engaging said rack and secured to a rock-shaft *g*. The rack F is moved step-by-step, by a rotating lifter, *a*, in the usual way. The ordinary snail which determines the extent to which the rack shall fall back when released by pawl G, is replaced by a stroke regulating device which will be hereinafter described.

All of the above mechanism is similar to that in one form of clock in common use and will be well understood by those skilled in the art.

$E^\times$, is the auxiliary hammer, which is secured to a rock-shaft $e^\times$, here shown as arranged just above the shaft *e* of the main hammer. Fig. 3, shows the mechanism for raising and releasing the hammers. Projecting from the respective shafts *e* and $e^\times$, are arms, *b* and $b^\times$, which are in the path of studs, *c*, projecting laterally from a toothed wheel, H, which forms a part of the clock mechanism and is set in motion at the proper time. The studs *c*, lift both hammers, E and $E^\times$, at the same time by wiping under the arm *b* upon which the arm $b^\times$ rests; but as the arm $b^\times$, is a little longer than the arm *b*, the latter is released first, and the former a moment later, thus producing two successive strokes on the bell or gong, in case both hammers are free to fall. However, in order to produce an odd number of strokes with the two hammers, as one, three, five and seven, means are provided, as will be explained, for stopping or arresting the auxiliary hammer $E^{\times}$, at the half-hours.

What I have called the stroke-regulating device, that is, the device which determines the extent to which the rack F will fall back when released, comprises a disk, I, driven by the clock-train and divided into three equal sections, peripherally, in the manner of a three-toothed ratchet wheel, and having each of these sections subdivided into four equal steps, as clearly shown in the drawings, and especially in the detached views, of which Fig. 5 is a side or edge view and Fig. 6, a face view of the front or opposite side to that seen in Figs. 1 and 2.

Fixed to the rack F, at or near the pivot point f, is an arm, F', which carries a pallet f', adapted to bear peripherally on the disk I, and thus limit the extent of movement of the rack after the latter has been released, at the moment before striking. So far as described, the principle of operation of this device is substantially the same as that of the corresponding device in a "French" clock, where a snail, or disk in the form of a snail cam, is employed in the same manner as the disk I shown herein. But the snail is similar in form to a one-toothed ratchet, while the disk I, has three like teeth or divisions, as x, x, x, in Fig. 6, and each such division or third of the periphery is divided into four steps, y, y, y, y, concentric with the axis of the disk I, but at different distances from said axis. As the disk completes one rotation in twelve hours, each step y corresponds to one hour, and as this clock strikes both the hours and half-hours, there will be two striking operations while each step y is opposite the pallet f'.

The main hammer, E, strikes at both the hours and half-hours, but the auxiliary hammer $E^{\times}$, is stopped or prevented from striking once at each half-hour. For example, at "two bells" hammer E makes one stroke and hammer $E^{\times}$ makes one stroke, but at "three bells" hammer E makes two strokes and hammer $E^{\times}$ but one stroke, the other or last stroke of hammer $E^{\times}$ being stopped or suppressed by mechanism which I will now describe.

Fixed to the disk I, and as here shown arranged between it and the plate A, is a wheel, J, having twelve teeth, j, the ends or tips of which correspond with the respective steps y, on the disk I. Pivoted on the plate A, at k, is an elbow detent lever, one arm, K, of which is adapted to take under a beveled stud, e', on the boss of the auxiliary hammer $E^{\times}$, and hold it against falling on the bell or gong during one stroke in sounding the odd bells, one, three, five, and seven. This arm is held in place up to and under the stud e', by a light spring, i. Pivoted or fulcrumed at l, on the plate A, is a controlling lever, one arm, L, of which has a tooth $l^{\times}$, which is adapted to bear on the periphery of the wheel J, and is held up to said wheel by a rather strong spring M. The other arm, $L^{\times}$, of the controlling lever, takes over or bears on the arm $K^{\times}$, of the elbow detent lever before described. Fig. 2 shows the position of these levers, K, $K^{\times}$ and L $L^{\times}$, with respect of the hammer $E^{\times}$ and its stud e', when the tooth $l^{\times}$ occupies a space between the teeth of wheel J. It will be seen that the upright arm K of the detent lever is thrown back clear of the stud e'. This position of the parts is that assumed when the clock strikes the even bells, two, four, six and eight, and the auxiliary hammer $E^{\times}$, is as free to strike at this time as the hammer E. Fig. 1, represents in full lines the positions of the parts at the moment of striking the third bell of "three bells," and in dotted lines the positions of the parts at the moment the striking mechanism has been set in motion for striking "three bells," the rack segment having been released and allowed to fall back to the proper extent. The tooth, $l^{\times}$, on the controlling lever having been forced down or out by the bevel on the tooth j until its point bears on the end of said tooth, thus elevating the arm, $L^{\times}$, to an extent sufficient to free the detent lever K $K^{\times}$ and allow the spring, i, to press the arm K up to the stud e'; and the upper end of said arm would be pushed by said spring in under said stud as soon as the hammer $E^{\times}$, was raised for making the first stroke, but for a mechanism which I will now describe, premising that this device allows the hammer $E^{\times}$ to strike once at "three bells," and permits the detent lever to stop it against striking on the next, or last stroke.

Pivoted on the plate A, is a rock-lever, N, the pendent arm of which is arranged to take over the lower arm $K^{\times}$ of the detent lever, under certain conditions, and thus act as a stop to prevent the arm K of the latter lever from being pressed in under the stud e' when the hammer $E^{\times}$, is raised. A spring, m, presses on the upper arm of lever N, and tends to hold it pressed down against a limiting stud, n, in the plate A. This upper arm of the lever N, lies by the side of, or adjacent to the rack F, and a laterally projecting stud, n', in said rack is arranged to take under said arm and lift it during the passage of the last or end tooth of the rack under the stop pawl G.

The operation is as follows: After striking two bells, the two hammers are in their normal or lower positions, and the movement of the wheel J has, through the tooth $l^{\times}$, raised the arm $L^{\times}$ of the controlling lever high enough to leave the detent lever free. The spring i, acts on the upright arm K of said lever to press it up to and against the point of the beveled stud e', while its lower arm, $K^{\times}$, is elevated correspondingly. Normally the rack F, is held up by the pawl G, and the stud n' in said rack takes under the upper arm of the rock-lever N, and thus holds the lower arm of said lever back clear of the arm $K^{\times}$ of the detent lever. At half-past one, or "three bells," the striking mechanism is set in motion; the pawl G rises and allows the rack F to fall back until the pallet f' strikes the disk I. This movement of the rack allows the spring m to press down the upper arm of the rock-lever N to its stop, and to move the pendent arm of said lever over the arm $K^{\times}$ of the detent lever which is kept down by the impinging of the arm K against the beveled pin e as above described. The hammers E and $E^{\times}$, are now raised and allowed to fall, striking the gong or bell two blows, the rack F being at the same time moved up one tooth by the lifter a; the hammers are again raised and released, and the hammer E falls on and sounds the gong or bell, but as the lifter a, moves the rack up to the extent of the final tooth, the stud n', in the rack takes under and lifts the upper arm of the rock-lever N, thus withdrawing its pendent arm from over the arm $K^{\times}$ of the detent lever and permitting the spring i to push the upright arm K into the path of the stud e', so that when the hammer $E^{\times}$ descends it will be stopped and held in the position seen in full lines in Fig. 1.

When the parts are in the position seen in dotted lines in Fig. 1, the upright arm K of the detent lever does not clear the stud e', when the hammer $E^{\times}$ descends, but the beveled end of the said stud strikes the end of the lever arm and presses it back so that the hammer is free to strike the gong. This is the position of the lever K $K^{\times}$ when the pendent arm of the rock-lever N stands over its arm $K^{\times}$.

Fig. 4 illustrates a modified form of the device for raising the hammers E and $E^{\times}$, wherein two studs, c, in the wheel H, act on the respective arms b and $b^{\times}$ on the hammer shafts or arbors. The operation is the same as that described, but the construction of Fig. 4 permits the shafts of the hammers to be set farther apart.

As clearly seen in Fig. 5 the disk I has three shoulders, z, z, z, each provided with a lateral bevel. The pallet, f', is correspondingly beveled, so that in setting the clock forward, past "eight bells" the beveled faces cause the pallet to wipe or spring out laterally, the arm $F^{\times}$ being thin or spring-like to permit of this and allow the setting of the clock without disarrangement of the parts but I do not claim this construction as it is not new.

I do not limit myself to the precise construction shown as it may be varied without departing from my invention.

Having thus described my invention, I claim—

1. In a ship's bell clock, the combination with two hammers adapted to be struck in pairs or couples and means for operating both of said hammers at each hour and half-hour, of the detent lever operated by the disk I whereby the action of one of said hammers is rendered silent on its last stroke, and said disk, substantially as and for the purposes set forth.

2. In a ship's bell clock, the combination with two hammers adapted to be struck in pairs or couples, mechanism for operating both of said hammers at each hour and half-hour, mechanism for arresting one of said hammers at the last stroke of the last pair, the rack, provided with an arm bearing a pallet to engage the snail disk, the stop-pawl of said rack and the lifter of the rack, of the snail or snail disk I, having its periphery divided into three equal sections, and each of said sections divided into four equal steps or sub-divisions, y, y, y, y, substantially as set forth.

3. In a ship's bell clock, the combination with two hammers adapted to be struck in pairs or couples, and means for operating both of said hammers, the rack, its lifter and pawl, the disk I and the detent lever operated by said disk for arresting one of said hammers, of the elbow lever and means for operating said elbow lever at the last stroke of the last couple, substantially as set forth.

4. In a ship's bell clock, the combination with the two hammers, the means for operating same, the snail disk, the rack, its lifter and its stop-pawl, of the detent elbow lever K $K^{\times}$, the upright arm of which is adapted to engage a projection on one of said hammers, the controlling lever L $L^{\times}$, one arm of which actuates the lever K $K^{\times}$, the spring M, the wheel J, rotating with the snail disk and operating the controlling lever, means intermediate between the rack and the lever, K $K^{\times}$, and controlled by the rack, for holding said detent lever K $K^{\times}$ out of engagement with the hammer, and the spring i, substantially as set forth.

5. In a ship's bell clock, the combination with the main hammer, the auxiliary hammer provided with a stud e', means for operating said hammers, the snail disk, the rack, its lifter and stop-pawl, the detent elbow lever and its spring, the controlling lever L $L^{\times}$ and its spring, and the wheel J, rotating with the snail disk and operating the controlling lever, of the rocking lever N and its spring, the said rocking lever having one of its arms engaged by a pin n' in the rack and its other arm arranged to hold the detent lever normally out from under the stud on the auxiliary hammer, whereby the rack rocks the lever N and thus stops the auxiliary hammer when the rack moves up the last notch, as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN S. NEGUS.

Witnesses:
ROBERT W. S. NEGUS,
ROBERT MITCHELL.