No. 664,886. Patented Jan. 1, 1901.

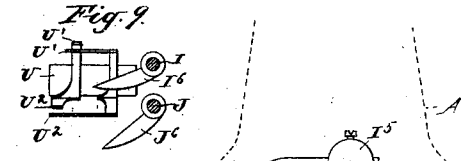
G. D. McMILLAN.

SHIP-BELL CLOCK.

(Application filed Feb. 8, 1900.)

(No Model.)

Fig. 9.



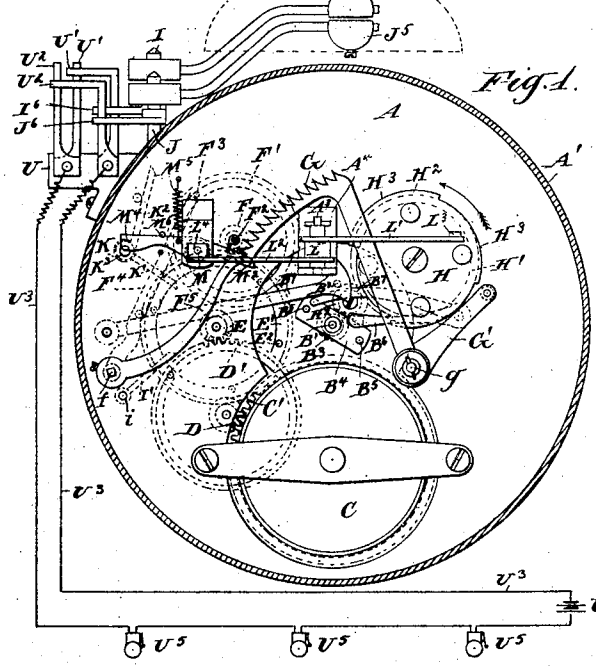


Fig. 1.

Fig. 2.

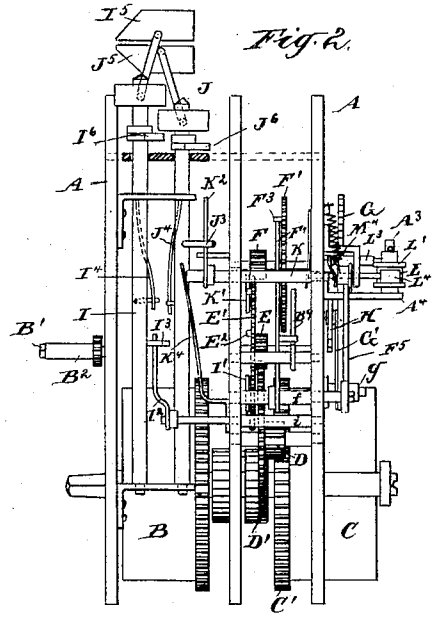


Fig. 10.

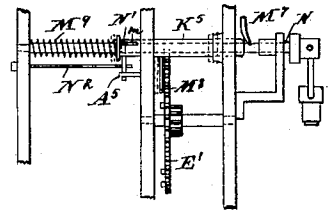


Fig. 3.

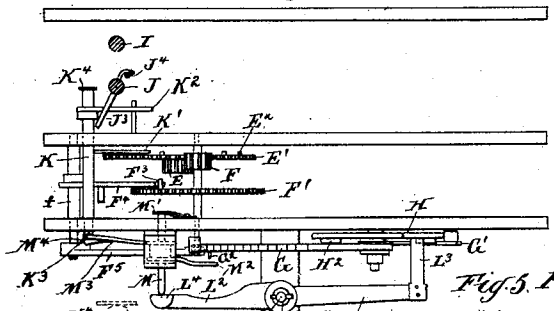


Fig. 12.

Fig. 11.

Fig. 5. Fig. 6. Fig. 7.

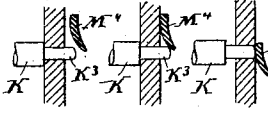
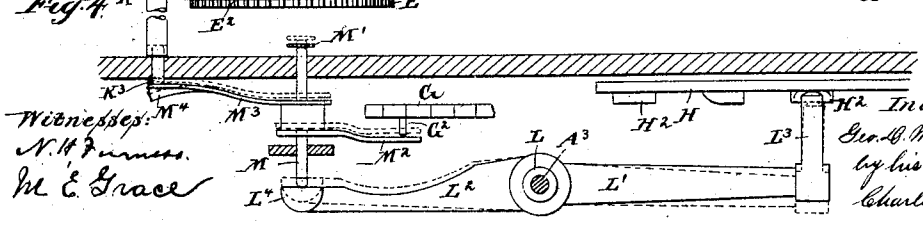


Fig. 8.

Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE D. McMILLAN, OF NEW YORK, N. Y.

SHIP-BELL CLOCK.

SPECIFICATION forming part of Letters Patent No. 664,886, dated January 1, 1901.

Application filed February 8, 1900. Serial No. 4,449. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. McMILLAN, a citizen of the United States, residing in the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Ship-Bell Clocks, of which the following is a specification.

The invention relates to the striking mechanism, and particularly to the means for producing the "silent blow" or omission of a stroke in ringing the odd-numbered bells.

In the forms of striking mechanism for ship-bell clocks now commonly known it is the general practice to move the hammer-shaft and its connections out of the path of the pins on the pin-wheel or other engaging means in effecting the silent blow. The parts are necessarily of considerable weight and require a corresponding expenditure of power to move them.

The object of my invention is to avoid this movement of the hammer and shaft, and thus reduce the work to be performed and lessen the liability of failure by derangement.

The invention consists in introducing into the mechanism a shifting tripper movable into and out of engaging relation to the pin-wheel and practically independent of the hammer-shaft, but so connected to the latter as to transfer to it the motions received from the wheel, and in means for moving such tripper into and out of operative relation to the wheel when required, so that on the silent blow the comparatively light tripper is alone moved out of engagement with the pin-wheel and the heavy hammer-shaft and its connections remain stationary and unaffected.

The invention also consists in certain details of construction and arrangement of parts, to be hereinafter described.

The accompanying drawings form a part of this specification and show the invention as I have carried it out.

Figure 1 is an elevation or view of the rear face of a clock mechanism constructed in accordance with the invention, certain portions being omitted for clearness. Fig. 2 is a corresponding side elevation, and Fig. 3 is a view from above. Fig. 4 is a plan view, partly in horizontal section on a larger scale, showing the shifting mechanism alone. Figs. 5, 6, and 7 are vertical sections, partly in elevation, showing certain portions of the shifting mechanism in three positions. Fig. 8 is a face view showing another portion of the tripper mechanism. Fig. 9 is a top or plan view showing certain electrical connections for actuating bells at a distance. Figs. 10, 11, and 12 show a modified form of the invention. Fig. 10 is a side elevation. Fig. 11 is a face view of a portion, partly in vertical section; and Fig. 12 is a vertical section taken on the line 12 12 in Fig. 11.

Similar letters of reference indicate like parts in all the figures.

A indicates the framing of the clock-movement, certain portions being omitted.

A′ is the casing, and A^2 a bell mounted thereon and shown in dotted lines in Fig. 1.

B is the barrel for the time-train, B′ the center-post, and B^2 the hour-hand sleeve, all of which, with the omitted portions of this train, may be understood to be of the usual or any approved construction.

C is the barrel of the striking-train, carrying a gear C′, meshing into the pinion D of an intermediate gear D′, in mesh with a pinion E and through the latter communicating motion to the pin-wheel E′, equipped with the series of pins E^2, through which the hammers are operated, and meshing into a pinion F, carrying on its shaft the gathering-pallet F^2 and locking-wheel F′, with its locking-pin F^3. From the locking-wheel the train continues, as usual, through the warning-wheel and fly. (Not shown.)

The mechanism is of the rack-strike type, in which a segmental rack G is engaged and lifted one notch at each revolution of the gathering-pallet F^2 and produces a corresponding number of double strokes on the bell. The rack is centered at *g* and carries an arm G′, arranged to contact with the periphery of the snail H, and thus determine the distance to which the rack may descend when released to effect the striking. The snail-arbor is revolved three times in each twelve hours by an intermediate pinion H^2, meshing into a gear-wheel H′ thereon and also with a pinion B^3 on the center-post B′, which also carries a cross-arm B^4, equipped with the studs B^5 B^5, arranged to lift an arm

B^6 at each half-hour, and through the connected arm B^7 engages a pin B^8 on the lever B^9, which lifts the locking-arm F^4 on the shaft *f* from engagement with the locking-pin F^3 and releases the striking-train and also moves the arm F^5 on the same shaft out of engagement with the lower end of the rack G and allows the latter to fall to a distance governed by the arm G′ and snail H, as before indicated. The periphery of the snail is divided into four portions H^3 of differing radius, each adapted to permit the rack to drop sufficiently when released to allow the required even number of pins E^2 to act on the hammer-shafts to produce the desired number of double strokes or "couplets" before the gathering-pallet F^2 shall have again lifted the rack to the position shown, in which it is supported by the arm F^5 and the locking-wheel again engaged by the arm F^4.

Motion is communicated to the hammer-shaft I by the passage of the pins E^2 on the pin-wheel E′, lifting the arm I′ on the arbor *i*, and by the action of the arm I^2 on the same arbor against the projecting pin I^3 on the hammer-shaft the latter is partially rotated in opposition to the force of the spring I^4 and its hammer I^5 drawn from the bell A^2, the blow being delivered at the fall of the arm I′ from the pin E^2. The hammer-shaft J, with its arm J^3, spring J^4, and hammer J^5, is similarly operated, but through the medium of an endwise-movable tripper K, consisting in this form of an arbor mounted in the framing and adapted to partially rotate and having arms K′ K^2, corresponding to the arms I′ and I^2 and actuated by the passage of the same pins E^2. The arms I′ and K′ are so arranged relatively to the pins that the stroke of the hammer I^5 is closely followed by the hammer J^5, thus producing the couplet and allowing a longer interval before the next stroke of the hammer I^5, as will be understood.

So far as yet described the mechanism would produce even strokes on the bell in couplets, as two, four, six, and eight bells. In order to produce the odd numbers, the last stroke of the last couplet, if there be more than one, is omitted. This is effected in my improved mechanism by shifting the tripper K so that its arm K′ at the time of the last stroke shall lie out of the path of the pin E^2, and thus escape its action. I will now describe the means by which the tripper K is shifted and the above result attained.

H^2 H^2 are four equidistant cam-surfaces or elevations on the face of the snail H, each serving, as the snail rotates, to pass under and lift a finger L^3, arranged in their path and held normally in contact with the plain face of the snail. The finger projects inwardly from the end of the arm L′ of a horizontally-swinging lever L′ L^2, mounted on the sleeve L, supported on a stud A^3 in a bracket A^4, fixed to the framework of the clock. The other arm L^2 carries a block L^4, impinging against the outward end of an arbor M, free to be moved endwise by the tilting of the lever L′ L^2 against the force of a spring M′, tending to hold the arbor M normally in the outward position. The arbor M is also free to partially rotate in opposition to the spiral spring M^5 and fixed stop M^6 and carries two oppositely-extending arms M^2 and M^3, the former lying alongside but separated from the lower end of the rack G and the other carrying at its outward extremity a cam-surface M^4, partially covering the end K^3 of the tripper or arbor K, above described. The tripper is subject to the force of a spring K^4, tending to protrude the end K^3 through the frame-plate and hold the arm K′ normally in the path of the pins E^2. The lower end of the rack G carries an outwardly-projecting pin G^2, which when the parts are in the position shown in strong lines in Fig. 4 passes the arm M^2 without lifting it; but when the finger L^3 is lifted by one of the elevations H^2 on the snail and the two-armed lever L′ L^2 is correspondingly tilted the arbor M, with its arms M^2 M^3, is forced inward, as shown by the dotted lines in the same figure, and then lies in the path of the pin G^2. Thus conditioned the arm M^3 lies at the same time with its cam-surface M^4 nearly in contact with the protruding end of the tripper K, and as the rack is lifted by the last turn of the gathering-pallet to the point at which the last bell-stroke will be delivered the pin G^2 lifts the arm M^2, correspondingly depressing the arm M^3, and the cam-surface M^4 is swept over the protruding end of the tripper, and the latter is forced inward sufficiently to carry the arm K′ out of the path of the pins E^2 on the pin-wheel, and the pin which otherwise would produce the last stroke passes idly and the stroke is omitted. The arms F^4 and F^5 then fall into their places and hold the striking mechanism until again released by the time-train, at which time the elevation H^2 will have passed and the finger L^3 be in contact with the plain face of the snail. In this condition the even couplets will be struck.

I^6 J^6 are arms of hard rubber or other insulating material secured to the vertical shafts L and J and serving to bring together the contact-points U′ U′ and U^2 U^2, supported on an insulating-block U, attached to the framing at any convenient point, and thus completing the circuit through the wires U^3 U^3, battery U^4, and series of electric bells U^5, whereby the latter will be sounded to correspond to the strokes on the bell A^2 and located at any desired points more or less remote from the clock.

Figs. 10, 11, and 12 show a modified form of the invention, which may be preferred in some constructions. In this form the hammer-shafts lie horizontally and the hammers instead of swinging in a horizontal plane move in a vertical arc. The shifting is performed in the same general manner as before, but instead of a tripper in the form of an arbor, as

above described, it is in these figures in the form of a sleeve K^5, inclosing the hammer-shaft N and protruding through the plate and acted upon by a forked cam-surface M^7, partially inclosing the hammer-shaft. The sleeve is movable endwise on the shaft by means of a pin N′ engaging a longitudinal slot *m*, which also compels the shaft to partake in any partial revolution. The sleeve carries an arm M^8, corresponding to the arm K′ in the form first described and acted upon in the same manner by the pin-wheel E′. The cam-surface M^7 is operated as before and forces back the sleeve against the resistance of the helical spring M^9, carrying the arm M^8 out of the path of the pins E^2 and omitting that stroke, as before. The pin N′ also engages in a slot on the opposite side of the sleeve and extends radially sufficiently to receive a spring N^2, by which the blows of the hammer are delivered, and also to lie against the stud A^5, serving as a stop. The mechanism for moving the cam-surface M^7 is in all respects similar to that first described and need not be particularly illustrated and is therefore omitted from the figures, as is also the companion hammer-shaft corresponding to the shaft I.

In addition to the features before set forth the improved mechanism allows a further important advantage to be attained, which is the avoidance of the large openings in the clock-case usually required to permit the hammer-blows to be delivered. It will be observed that in both the forms shown only sufficient openings are needed to allow the hammer-shafts to protrude. Thus the entrance of dust is largely prevented. The openings may, if preferred, be further protected by slight rings or collars of felt encircling the shaft and lying upon the casing.

Further modifications may be made in the forms and proportions within wide limits without departing from the principle of the invention or sacrificing its advantages.

The electric connections shown may be omitted or varied to suit the conditions under which they may be called upon to serve.

It will be understood that the portions of the clock mechanism not shown or described may be of the ordinary or any approved type. I have here shown the barrels for the time and striking trains as of the "right and left wind" form operated by the same winding-post; but the barrels may be on independent posts.

I claim—

1. In a ship-bell clock, a time-train, a striking-train, and a hammer-shaft and hammer thereon independent of said striking-train, in combination with a tripper located between said hammer-shaft and striking-train and free to be moved endwise into and out of operative relation with the latter, adapted when in such operative relation with said striking-train to communicate motion therefrom and actuate said hammer-shaft, and means controlled by said time-train for imparting such endwise movement at the required intervals, all substantially as and for the purposes herein set forth.

2. In a ship-bell clock, a time-train and a snail moved thereby, a striking-train and its pin-wheel, and a pair of hammer-shafts and their hammers, in combination with a tripper located between said pin-wheel and one of said hammer-shafts and free to move endwise into and out of operative relation with said pin-wheel, adapted when in such operative relation with said pin-wheel to communicate motion therefrom and actuate one of said hammer-shafts, and means controlled by said snail for imparting such endwise movement at the required intervals, all substantially as and for the purposes herein set forth.

3. In a ship-bell clock, a time-train, a snail moved thereby and having elevations upon its face, a striking-train having a pin-wheel and gathering-pallet, and a rack operated by the latter, in combination with a pair of hammer-shafts and hammers, a tripper connected to one of said shafts but free to move endwise and having an arm acted upon by said pin-wheel, a cam-lever adapted to produce such endwise movement, a lever actuated by the elevations on said snail and adapted to force said cam-lever into operative relation to said tripper, and a pin on said rack adapted to operate said cam-lever and move said tripper to free its arm from said pin-wheel, all substantially as herein specified.

4. In a clock mechanism of the character set forth, a hammer-shaft and its hammer, a tripper connected to said shaft but free to move endwise, a time-train, the snail H moved thereby and having the elevations H^2 upon its face, the rack G and means operated by said time-train for allowing it to fall, the arm G′ on said rack controlling the extent of such descent, the lever L′ L^2 and finger L^3 thereon arranged in the path of said elevations, the arbor M, arm M^2 and cam-lever M^3 thereon, adapted to be moved by said lever into operative relation to said tripper, and the pin G^2 on said rack arranged to engage said arm and through said cam-lever produce the endwise movement of said tripper, all combined and arranged to serve substantially as herein specified.

5. A striking-train and its rack G and gathering-pallet F^2 therefor, a time-train, a hammer-shaft and hammer actuated by said striking-train, the snail H moved by the time-train, the elevations H^2 on the face of said snail and the surfaces H^3 on its periphery, in combination with the arm G′ serving with said surfaces to determine the fall of said rack, and the lever L′, L^2 and finger L^3 thereon arranged in the path of said elevations, and means operated by said lever whereby the blows of said hammer are interrupted, all adapted to serve in a ship-bell clock substantially as herein set forth.

6. In a clock mechanism of the character set forth, a striking-train and its hammer, a

time-train, the snail H moved thereby and having the elevations H^2 upon its face, the rack G and means operated by said time-train for allowing it to fall, the arm G′ on said rack controlling such descent, the lever L′ L^2 and finger L^3 thereon arranged in the path of said elevations, the arbor M, arm M^2 and cam-lever M^3 thereon adapted to be moved by said lever, the pin G^2 on said rack arranged to engage said arm and tilt said cam-lever, and means actuated by the latter for interrupting the blows of said hammer, all combined and arranged to serve substantially as herein specified.

7. In a clock mechanism of the character set forth, a striking-train having a pin-wheel, a time-train controlling the striking-train, the movable tripper K having an arm K′ arranged to be struck by the pins on said pin-wheel, and an arm K^2, in combination with a hammer-shaft J arranged at a right angle to said tripper, the hammer J^5 and arm J^3 on said hammer-shaft, the said arm J^3 adapted to be struck by said arm K^2 and thereby swing said hammer, and means controlled by said time-train for moving said tripper out of engagement with said pin-wheel when required, all substantially as herein shown and described.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

GEO. D. McMILLAN.

Witnesses:
C. A. HAUCK,
CHARLES R. SEARLE.