(No Model.)

3 Sheets—Sheet 1.

J. LINDAUER.

CHIME CLOCK.

No. 267,092. Patented Nov. 7, 1882.

Fig 2.

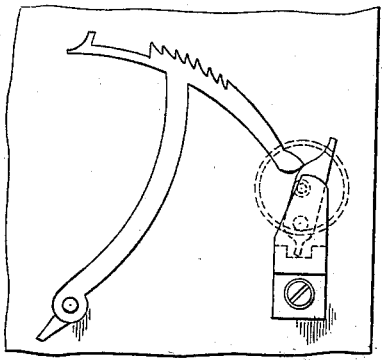
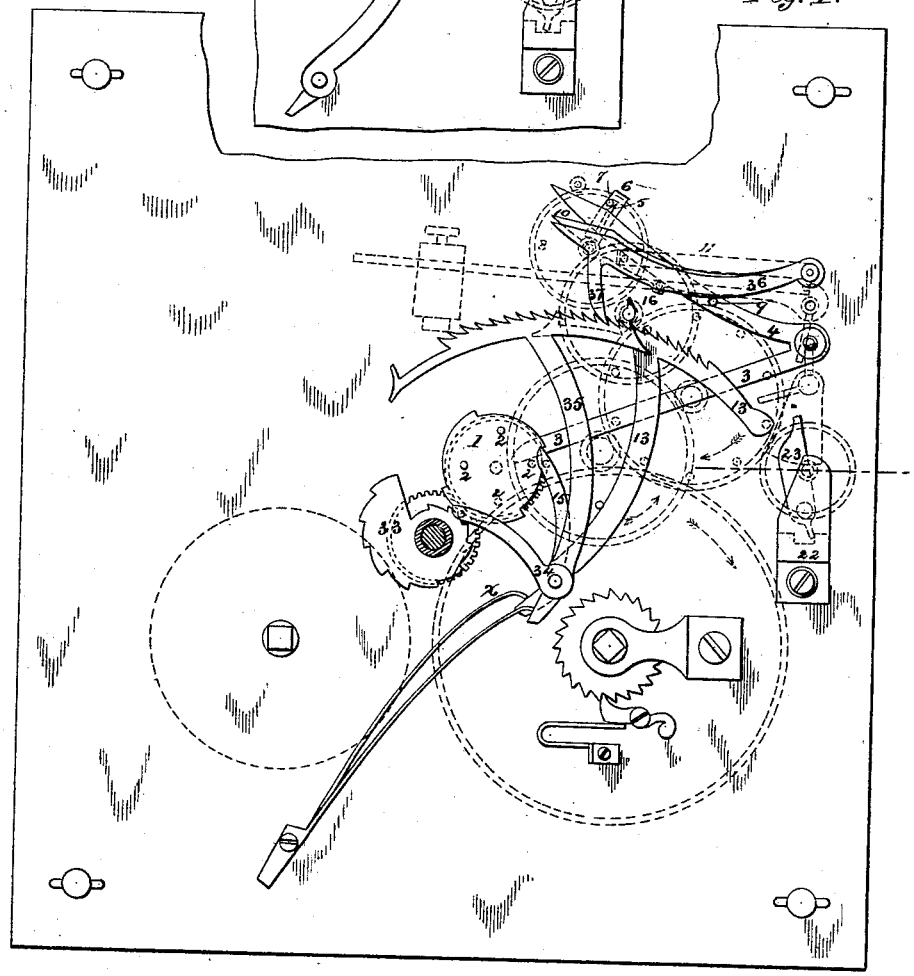


Fig. 1.



Witnesses:
Henry F. Parker.
James H. Hunter.

Inventor:
Joseph Lindauer

(No Model.) 3 Sheets—Sheet 2.

J. LINDAUER.

CHIME CLOCK.

No. 267,092. Patented Nov. 7, 1882.

Fig. 3.

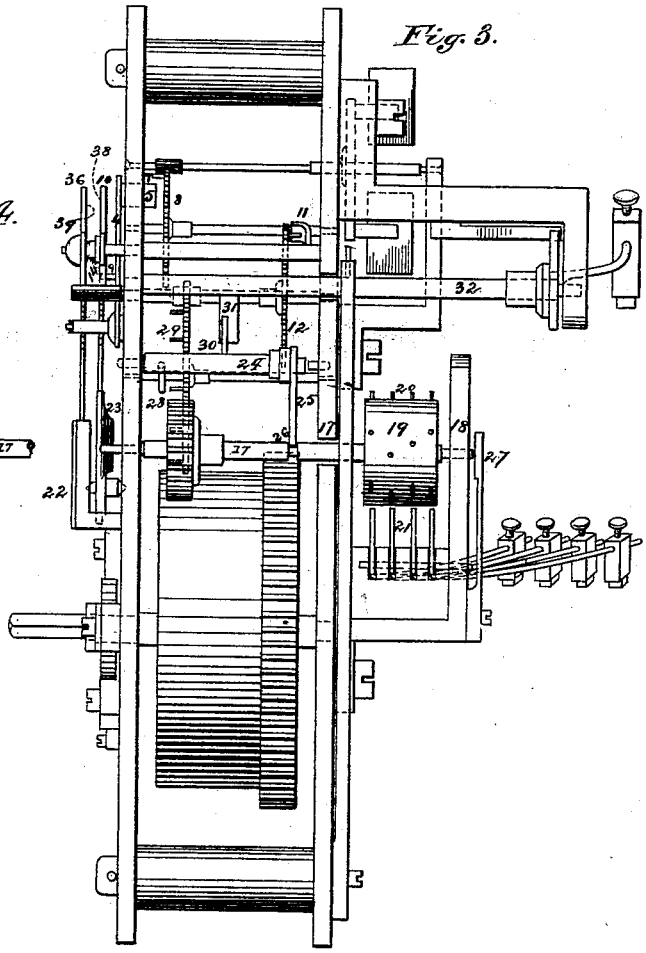


Fig. 4.

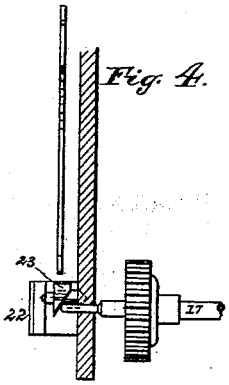
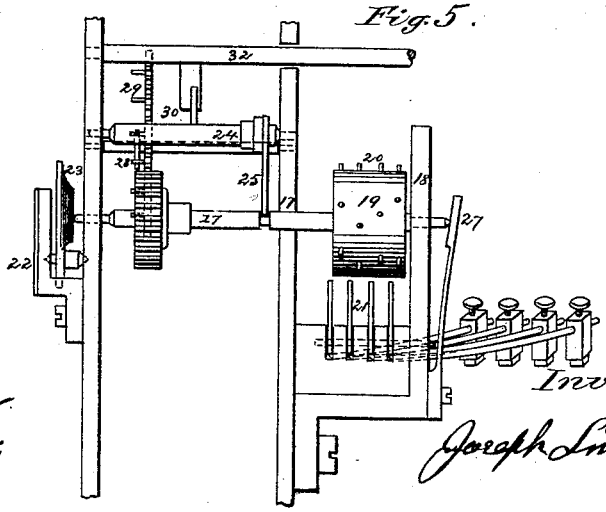


Fig. 5.



Witnesses:
Henry F. Parker
James A. Hunter.

Inventor:
Joseph Lindauer

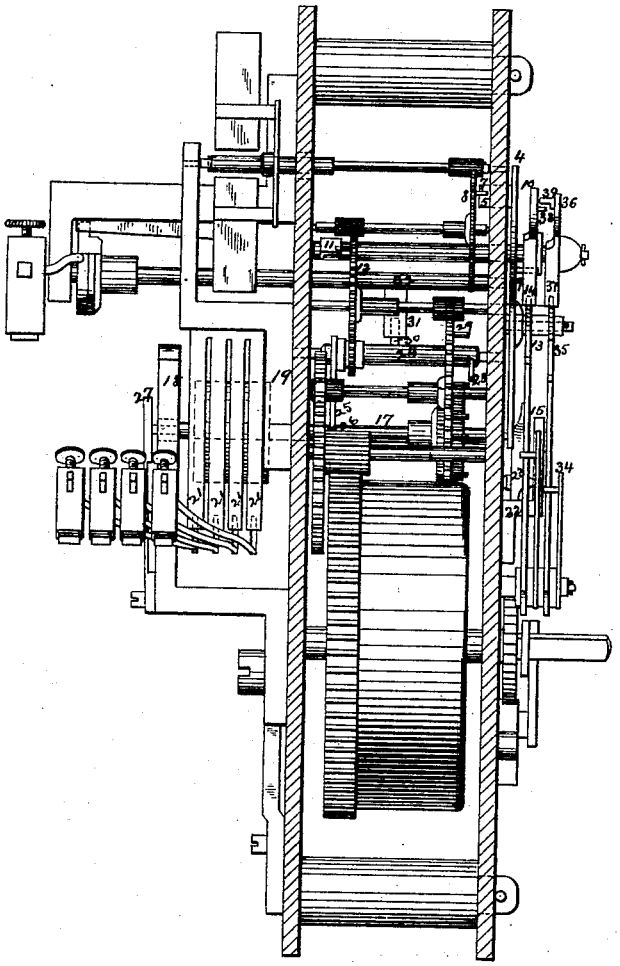
(No Model.) 3 Sheets—Sheet 3.

J. LINDAUER.

CHIME CLOCK.

No. 267,092. Patented Nov. 7, 1882.

Fig. 6.



Witnesses:
Henry F. Dike.
James H. Hunter.

Inventor:
Joseph Lindauer

UNITED STATES PATENT OFFICE.

JOSEPH LINDAUER, OF NEW YORK, N. Y., ASSIGNOR TO TIFFANY & CO., OF SAME PLACE.

CHIME-CLOCK.

SPECIFICATION forming part of Letters Patent No. 267,092, dated November 7, 1882.

Application filed March 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH LINDAUER, of the city, county, and State of New York, have invented certain new and useful Improvements in Clocks, of which the following is a specification.

Heretofore clock-movements containing a set of chimes for the quarter-hours have had the chimes mechanism connected with a separate mainspring and train of wheels.

My invention consists in combining the chimes and hour-striking mechanism with one and the same mainspring and train of wheels, thereby constructing the clock-movement with two instead of three mainsprings and attendant mechanism, and thereby relieving the general construction of the movement of a number of wheels and pinions and parts immediately connected therewith. So combining the chimes and hour-striking mechanism brings the former under the same relations as the latter, so that should the clock-hands be turned in a backward direction past any one or more of the quarter-hours, or very rapidly forward past the quarter-hours, or during the operation of the chimes, the normal condition of the two mechanisms will be alike preserved, that of the chimes being protected from injury as efficiently as is the hour-striking mechanism in the present most approved of construction of French or English clock-movements. When the hands are turned in a backward direction or forward, as above stated, in existing constructions of clock-movements containing chimes mechanism, the hour-striking mechanism is not affected thereby, but the chimes mechanism is disarranged to such an extent that it must be readjusted at considerable trouble and expense before the quarter-hour chimes will be again indicated correctly.

In the drawings which illustrate my improvements, Figure 1 is a view of the mechanism for controlling the action of the chimes and hour-striking hammers contained on the outside of the front pillar-plate of the movement. Fig. 2 is a detached view of a part of the said chimes-controlling mechanism, giving the position of such mechanism at the time of the shifting of the shaft on which is the chimes-barrel, in order to bring into position the hour-striking mechanism. Fig. 3 is a vertical side view of the movement, showing the manner in which the chimes and hour-striking mechanisms are combined together on the one train of wheels and mainspring, the chimes mechanism being operated by the train at one of the quarter-hours. Fig. 4 is a detached view of the principal mechanism connected with the chimes-barrel shaft in its position as seen in Fig. 3—namely, to chime one of the quarter-hours. Fig. 5 is a detached view, looking in the same direction as in Fig. 3 and giving the position of the parts after the chimes-barrel shaft has shifted at the fourth quarter-hour, thereby throwing the chimes-mechanism hammer-levers out of contact with the pins on the periphery of the chimes-barrel and bringing into contact with the pins on the strike-wheel a lever of the strike-hammer shaft for the purpose of operating the said hammer in indicating the hour. Fig. 6 is a vertical cross-section of the movement, taken in the line *x x* of Fig. 1.

It is not necessary to refer in detail to the train of wheels connected with the mainspring for the running of the clock, nor to the train of wheels connected with the mainspring for operating the hour-striking mechanism, except so far as any part of such train may be modified in its arrangements or mode of operation by reason of the combination and operation therewith of the chimes-operating mechanism, such two sets of mechanisms being well known to persons skilled in the art.

I will first describe how the chimes mechanism is connected to the train of wheels of the hour-striking mechanism, and how such chimes are let off every quarter-hour.

1 is a four-quarter-chime snail on an axle secured between the front pillar-plate and a bridge. This snail receives motion by reason of the gearing of a cog-wheel rigidly attached to its back on the same axle, with a cog-wheel on the axle of the center or minute-hand shaft, these two cog-wheels containing an equal number of cogs, so that one revolution of the center shaft will give one revolution of this snail cog-wheel on its axis. At the rear surface of this snail and its cog-wheel are four pins, 2 2 2 2, projecting at four equal distances on such surface, except that the fourth, corresponding

to the deepest depression on the snail, is on a slightly greater radius from the center of the snail than the other three for the purpose of enabling the hour-striking mechanism to be let off immediately after the fourth and last quarter-hour has been chimed, in manner as hereinafter explained.

3 is the lower arm of a V-shaped detent, resting upon these pins, and in such manner that the rotation of the snail will at each one of four intervals raise such arm, and thus elevate also the upper arm, 4, of the detent. To this upper arm, 4, is connected a small plate, 5, projecting through the slot 6 in the front pillar-plate, and which serves to arrest for a brief interval, by contact with the pin 7 on the delay-wheel 8 of the train, the movement of the train until the segmental rack determining the number of quarter-chimes which are to be rung has assumed its proper relative position, in manner as hereinafter indicated. The complete let-off of the train so temporarily arrested is accomplished by a pin, 9, on the upper arm, 4, of the detent projecting under the lever 10 and raising the lever up so that its shaft will operate the bent end of a wire, 11, thereby removing such bent end away from one of the pins on the locking-wheel 12 of the train. By the time the lower arm, 3, of the detent becomes slightly depressed by the moving away of the pin 2 in contact with it the plate 5 passes out of the path of the pin 7 on the delay-wheel, and the train of wheels commences to move off again. This interval of delay has given time for the segmental rack 13 to operate, which has been released by the raising up of the lever 10, carrying out of forward end of the ratchet-teeth on such rack the spur 14 of said lever. One arm of the divided spring *x* then causes this rack 13 to fly forward until the lever 15, rigidly affixed to bottom and pivotal end of rack 13, comes into contact with the periphery of the snail 1, bringing the spur 14 immediately above the space between the two ratchet-teeth, which determines the extent of traverse back of the rack 13 during the operation of the train for the quarter-chimes then about to be rung, and which traverse is always governed by the portion of the snail with which the lever 15 comes into contact. As the minute-hand moves a little forward the arm 3 of the detent becomes depressed and the spur 14 drops down between two ratchet-teeth, the train then moving off, the revolving dog 16 on the end of the stop-wheel shaft projecting through the pillar-plate, and with a knife-edge taking into one of the teeth of the rack 13 moves one tooth at each revolution of the wheel, the spur 14 of the lever slipping up over and detaining such tooth so moved at each of such revolutions until all of the ratchet-teeth have been so operated upon, and such spur drops down below the front end of the last tooth of the rack 13 so rotated back, which also causes the bent end of the wire 11 to drop against one of the pins of the locking-wheel 12, the lever 10 and wire 11 being attached to same shaft, and the movement of the train is arrested. Just before the moving off of the train at every quarter the chimes mechanism is brought into operation therewith, and so kept until the chimes have finished striking, when such mechanism passes out of contact, and at every fourth quarter after such passing out of contact the hour-striking mechanism is immediately brought into contact with the train for the striking of the hour. The chimes mechanism is so brought into contact as follows:

17 is a sliding shaft extending through the rear pillar-plate, and containing between the back surfaces of such plate and a bridge, 18, a cylindrical barrel, 19, with pins 20 arranged suitably on its periphery for the chimes required, and having vertical levers 21 beneath, attached at their lower ends to the chimes bell-hammers, the upper ends being left free to be operated upon by the pins on the barrel 19 in its revolution. The other end of the sliding shaft 17 extends through the front pillar-plate, and between the front surface of such plate and a bridge, 22, is a beveled-faced swinging block, 23, the front end of shaft 17 impinging against such bevel-edge, the block being pivoted between the inner cheek of the bridge and the front pillar-plate. The rear end of the rack 13, after the quarter-hour has been chimed, presses against the rear of this beveled-faced block and partially rotates it on its pivots, and thereby gives a sliding movement to the shaft 17 sufficient to clear the lines of pins 20 on the barrel from contact with the series of levers 21 attached to the chimes bell-hammers, so that the striking mechanism may proceed to operate if it is that the fourth quarter-hour has been chimed. This striking mechanism is thus brought into contact with the train. Immediately above the shaft 17, carrying the chimes-barrel, is a shaft, 24, which partakes of the same lateral sliding motion by reason of the curved edge of segmental disk 25, attached to shaft 24, taking into the annular recess 26 in the shaft 17. Now, while the block 23 is not acted on by the rack 13, the spring 27, at the rear end of the shaft 17, will press such shaft endwise forward, and by reason of the segmental disk 25 also carry forward endwise at same time the shaft 24 and the projecting pin 28 out of the way of the circle of pins on the strike-wheel 29. As soon, however, as the bevel-face of the block 23 acts on the front end of the shaft 17, the shaft 24 will also be moved along and its strike-pin 28 brought into contact with the pins on the strike-wheel 29, and such shaft 24 will be thereby reciprocated, and a second pin, 30, projecting therefrom, caused to trip the flat plate 31 on the hammer-shaft 32, and thereby reciprocate the said hammer-shaft, and cause the hammer to strike the required number of blows on the bell to indicate the hour. The required number of blows to be given by this hammer is determined as follows:

33 is a snail placed concentric with and fast

to the sleeve of the hour-hand cog-wheel. This snail determines the throw of the rack-lever 34 of the second segmental rack, 35, having a common center with the chimes-rack 13. This rack 35 has also its corresponding lever, 36, and spur 37 at a common center with the chimes-lever 10 and spur 14 of the latter. This rack 35 has sixteen teeth, and it will be seen from what has been before stated that while the chimes are ringing the striking mechanism is virtually disconnected from the train, the racks being so timed by their respective snails that after the spur 14 drops down below the front end of the rack 13 at the end of the chimes for the fourth quarter the hour-striking mechanism will begin to operate, and continue until the spur 37 of the lever 36 also drops down in front of the teeth of the rack 35, when the bent end of wire 11 will arrest the train by striking against one of the pins of the locking-wheel 12. A projection, 38, on the outer end of the lever 10 rides up against a projection, 39, on the outer end of the lever 36, and serves to cause the lever 10 to operate the shaft, carrying the bent wire into contact with the pins of the locking-wheel through such lever 36 by reason of lever 10 being loose on such shaft, so that after the lever 10 has ceased to operate at the fourth quarter-hour for the chimes mechanism it will drop down, and the lever 36 will then proceed to operate and register with its spur 37 on the segmental rack 35 the strokes of the bell-hammer, such lever 35 being rigidly connected to the end of shaft 17.

I do not claim a mechanism by which the quarter-hours are struck, in combination with a mechanism by which the full hour is struck after the last quarter-hour has been struck.

What I do claim, and desire to secure by Letters Patent, is—

1. The combination of an hour-striking mechanism and its bell with a chimes mechanism and its set of chimes, adapted to strike at the full hour and each quarter, both being operated by a single train and mainspring, substantially as described.

2. The combination of the segmental rack 13 with the bevel-faced block 23, chimes-barrel shaft 17, and spring 27, all arranged so as to shift such shaft after the ringing of the chimes, substantially as described.

3. The combination of the segmental rack 13 with bevel-faced block 23, chimes-barrel shaft 17, the spring 27, and the shaft 24, carrying the pin 28, all arranged so as to bring into operation with the train successively the chimes and the hour-striking mechanism, substantially as described.

4. The combination of the snails 1 and 33, the segmental racks 13 and 35 and their attached snail-levers 15 and 34, the levers 10 and 36 and their attached spurs 14 and 37, and the revolving dog 16, with the bevel-faced block, chimes-barrel shaft 17, the spring 27, and the shaft 24, carrying the pin 28, all so arranged as to bring into operation with the train the chimes mechanism at every quarter-hour and the chimes and hour-striking mechanism successively at every full hour, substantially as described.

JOSEPH LINDAUER.

Witnesses:
JAMES H. HUNTER,
E. S. MAILLER.