

No. 675,890.

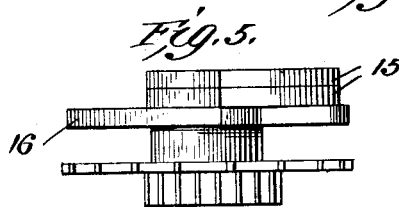
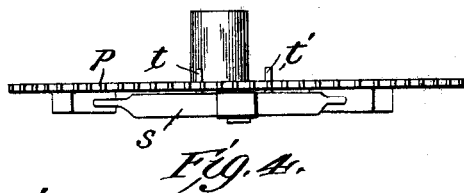
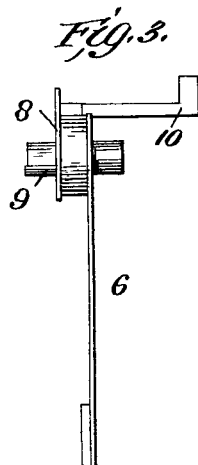
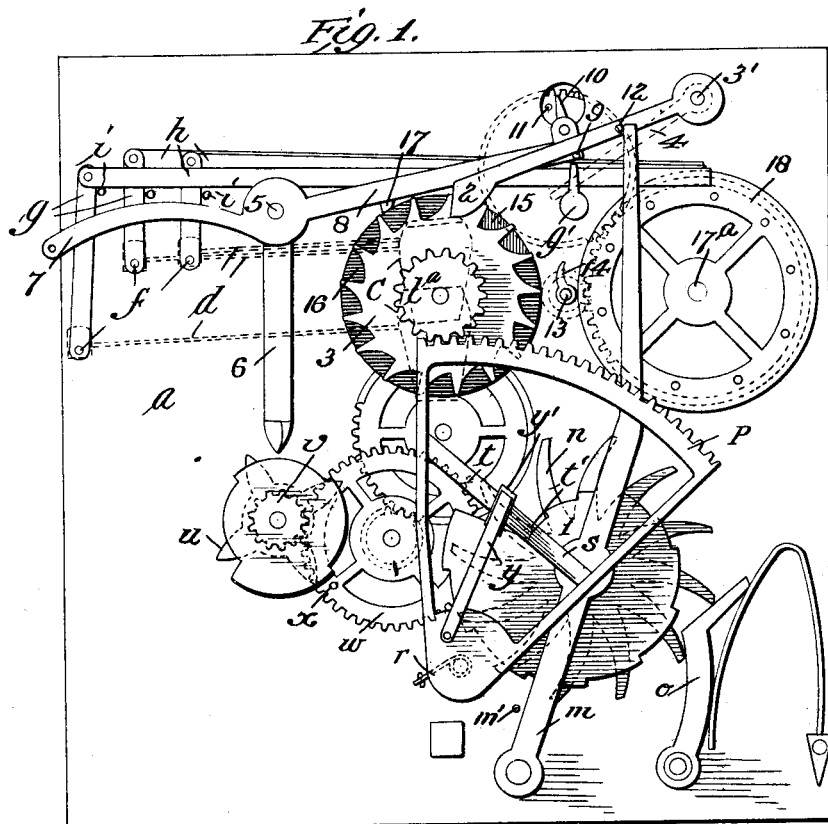
Patented June 11, 1901.

J. GUTEKUNST.
CLOCK STRIKING MECHANISM.

(Application filed Nov. 19, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 7.

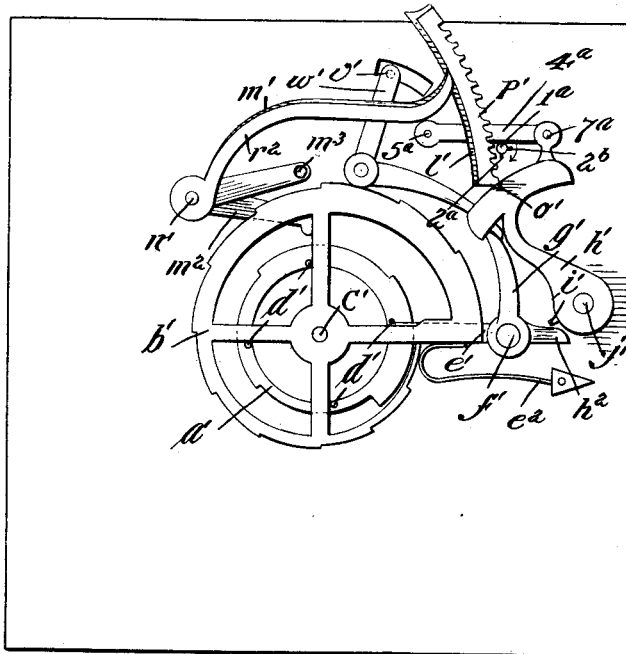


Fig. 6.

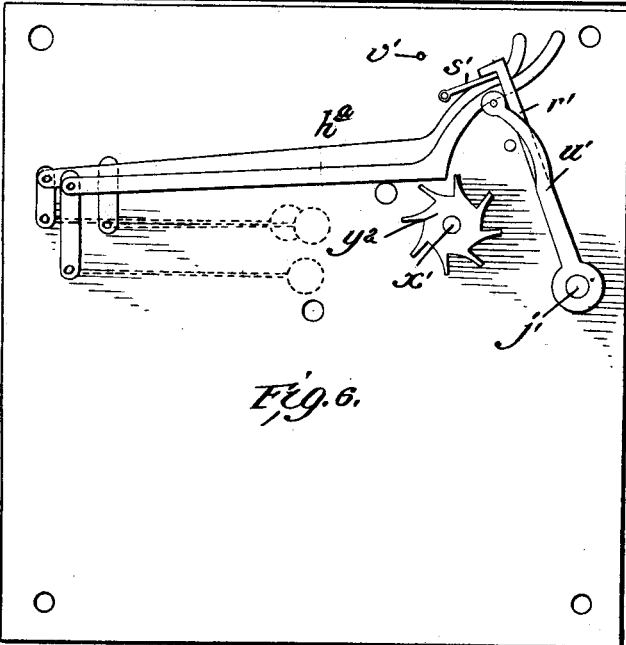


Fig. 2.

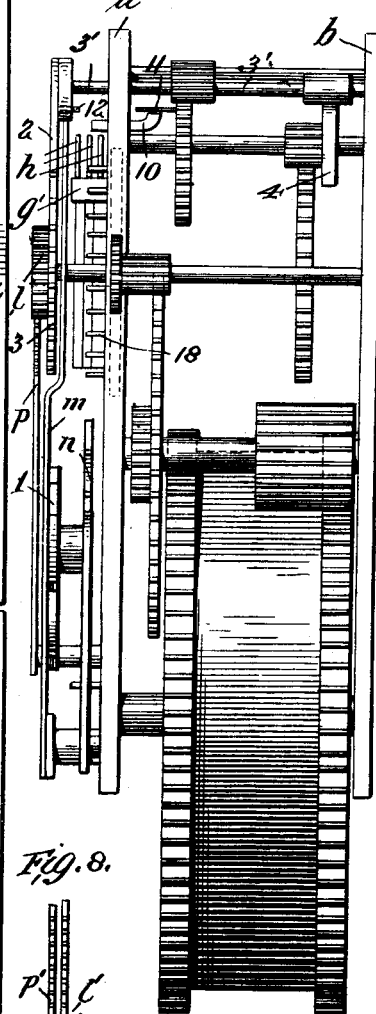
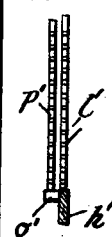


Fig. 8.



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UNITED STATES PATENT OFFICE.

JACOB GUTEKUNST, OF AUGSBURG, GERMANY.

CLOCK STRIKING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 675,890, dated June 11, 1901.

Application filed November 19, 1897. Serial No. 659,144. (No model.)

To all whom it may concern:

Be it known that I, JACOB GUTEKUNST, a subject of the Emperor of Germany, and a resident of Augsburg, Germany, have invented certain new and useful Hammer-Raising Mechanism for Clocks, of which the following is a full, clear, and exact description.

My invention relates to striking mechanism for clocks in which an hour and a quarter-hour strike is obtained.

To this end the invention includes an hour-hammer and one or more quarter-hour hammers, independent sliding bars, with means for reciprocating the same to operate the hammers, and mechanism for lifting the bars out of the path of the means for reciprocating the same.

The invention further includes the details of construction to be hereinafter described, and particularly pointed out in the claims.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 shows the front plate with the mechanism in front elevation. Fig. 2 is a detail edge view. Figs. 3, 4, and 5 are detail views. Figs. 6 and 7 are elevations of a modified form of the invention. Fig. 8 is a detail view.

To make the illustration as clear as possible, most of the ordinary clock mechanism well known to those skilled in the art has been omitted.

The frame of the clock herein shown includes the two plates *a b*, and to the rear of the latter the hammers *c* are shown, they being carried by arms *d*, secured to the ends of spindles *f*, extending between and journaled in said plates *a b*. The ends of the spindles *f* projecting through the plate *b* carry arms *g*, to the ends of which the slide-bars *h* are connected, these bars being supported near their forward ends on the shaft *g'* and being limited in their forward movement under the influence of the weight of the hammers by the pins *i*, projecting from the plate *b* in the path of the arms *g*. These bars are pushed rearwardly to raise the hammers, which when released fall and produce the striking action, as will be described hereinafter. As the striking mechanism herein shown is intended to strike the quarter-hours, as well as the hours,

quarter-hour and hour controlling-snails are provided.

The hour-snail *l* is journaled on a spindle carried by an arm *m*, pivoted at its lower end to the front plate *a*. Fixed to the hour-snail is a toothed wheel *n*, with which a spring-pressed detent *o* engages. Pivoted to the plate *a* in front of the snail *l* and arm *m* is a toothed segment *p*, constantly pressed to left by a spring *r*. The segment has an open center, in which is loosely pivoted a transverse bar *s*, from which two pins *t t'* project inwardly, the pin *t'* into the plane of the hour-snail and the pin *t* into the path of the quarter-hour snail, which is journaled on an arbor fixed in the plate *a* a distance to the left of the normal position of the hour-snail. Fixed to or in one piece with the quarter-hour snail is a toothed wheel *u*, having four equidistant teeth and a pinion *v*. The latter is in mesh with a gear-wheel *w*, forming one of the ordinary train of gearing used in clock mechanism. The latter gear carries a laterally-extending pin *x*, which engages with the teeth of the wheel *n* to feed the same step by step and therethrough rotates the hour-snail. During the rotation of the snail when in certain position it moves in the path of the pin *t'*, which must yield, and for this purpose the bar carrying the same is loosely pivoted. It is held normally with the pin *t'* projecting in the plane of the hour-snail by the spring *y* engaging a block *y'* on said bar, which also serves to return said pin to this position when it is freed from the face of said snail. As before described, the toothed segment is constantly pressed toward the left; but it is held against movement normally by a pinion *1^a*, meshing therewith, which is locked against rotation by a detent 2, which engages with the teeth of a wheel 3, fixed to or integral with the pinion. The detent 2 is secured to the outer end of a spindle 3', extending between the plates *a* and *b*, which carry a radial stop-arm 4, adapted to normally engage with and lock the fly-wheel spindle of the striking mechanism.

Pivoted on an arbor 5, fixed to the plate *a*, is a lever having a depending arm 6, projecting into the path of toothed wheel *u*, a rearwardly-extending arm 7, adapted to be man-

ually depressed to effect the release about to be described, and a forwardly-extending arm 8, carrying at its end a laterally-extending pin 9, projecting underneath the detent 2, and a second pin 10, extending from the opposite side of said arm through an opening in the plate *a* into proximity to a pin 11, extending from one of the chain of gearing constituting the striking mechanism. In the rotation of the wheel *u* the teeth thereof come into contact with and tilt the arm 6, raising the arm 8 and through the pin 9 disengaging the detent 2 from the wheel 3, which being thus released frees the pinion 1^a and permits the toothed segment to move toward the left until arrested by the pin *t* coming against the quarter-hour snail. On the movement of the segment to the left, which carries the pin *t'* out of engagement with the hour-snail, the latter and the arm carrying the same are also moved to the left under the influence of the spring-pressed detent *o* until arrested by said arm coming against pin *m'*, projecting from plate *a*. As the detent 2 is lifted, as described, it turns the spindle carrying the same and lifts the stop-arm out of engagement with the fly-wheel, thus freeing the striking mechanism. The mechanism is temporarily arrested, however, by the pin 10, which has been moved into the path of pin 11 by the lifting of arm 8. The detent 2 carries a laterally-extending pin 12, beneath which the end of arm *m* moves when pressed to the left, as described, so that after the tooth of wheel *u* has released arm 6 and permitted arm 8 to drop back into its normal position the detent 2 is prevented from also falling. When arm 8 falls, pin 10 moves out of the path of pin 11, and as stop 4 is held out of engagement with the fly-wheel the striking mechanism is entirely freed. Upon an arbor 13, fixed on plate *a* in proximity to toothed wheel 3, a pinion is journaled, which is in mesh with one of the gears of the striking mechanism, and this pinion carries a radial lifting-finger 14, adapted to engage with the teeth of wheel 3 and rotate the same step by step. On the spindle-carrying pinion and toothed wheel 3 and fixed to or integral with said pinion and wheel are three segmental controller-cams 15, 15', and 16, which are placed directly below the striking hammer-bars.

As previously stated, for the quarter-stroke a double action is desired—that is, two hammers striking in unison—while a single hammer strikes the hour. Therefore two quarter-hour sliding bars are operated to produce the quarter-hour strike, and with these bars the cams 15 engage. Each bar is provided with a depending lug 17. The cams 15 have a periphery of a length equal to four teeth of wheel 3, while the periphery of cam 16 is cut out at this point; but the continuity for the remainder of its periphery is uninterrupted. The cams are so disposed that on the movement of segment *P* to the left they will be rotated through pinion 1^a to bring the

periphery of the cam 16 beneath the lip of the hour hammer-bar and raise the same, while the cams 15 are moved away from the lips of the quarter hammer-bars. On a spindle 17^a, journaled between plates *a* and *b*, a pinion is arranged which meshes with one of the train of striking-gear mechanisms, and this spindle, outside of plate *a*, carries the pin-wheel 18. On the release of the striking-train this wheel is rotated and the pins thereof strike against the ends of those hammer-bars which are in their lowered position and reciprocate the same, producing, as before described, the striking action. At the beginning of the strike, as the hour-bar is held raised, only the quarter-hour strikes will be given. The parts are so relatively arranged that for each step of wheel 3 one stroke is given. For each step of wheel 3 through pinion 1^a segment *P* is moved one step to the right. At the end of the quarter-stroke the cut-out part of cam 16 is moved beneath the lug of the hour-bar, while the peripheries of cams 15 move into contact with and lift the quarter-hour bars, so that in the continued rotation of the pin-wheel only the hour-stroke is given. The snails, as is usual in striking mechanism, determine the number of strokes. As the segment nears the limit of its movement toward the right the pin *t'* strikes against the hour-snail and on the last stroke moves the same, together with arm *m*, toward the right one step against the tension of the spring-pressed detent *o*. This moves the end of arm *m* from beneath the pin 1^b, extending from the detent, permitting the latter to drop and arrest the backward movement of wheel 3 and pinion 1^a, while stop-arm 4 drops into engagement with and arrests the fly-wheel spindle.

The cams 15 15 16, as before described, are moved automatically to shift the sliding bars out of the path of their operating devices. The cams may be moved manually to throw out the quarter or the hour strike if either or both of said strikes are not desired.

In the second form of the invention the sliding bars operating the hammers are lifted out of the path of the devices which reciprocate the same, as in the first form; but this lifting mechanism, as well as the other parts of the striking mechanism, is changed, as will appear hereinafter. In this form of the invention the quarter-hour snail *a'* and the hour-snail *b'* are journaled on a common arbor *c'*. Projecting laterally from the snail *a'* are four equidistant pins *d'*, which are designed in the rotation of said snail to depress the arm *e'* of a lever journaled on arbor *f'* against the tension of spring *c''*, said lever having a vertical arm *g'* and a third arm *h''*, the latter being designed to engage a pin *i'*, projecting from arm *h'*, carried by spindle *j'*. The arm *h'* carries at its end a segmental head, the periphery of which normally supports a segmental rack *l'*, carried at the end of one member of a bell-crank lever *m'*, pivoted on arbor *n'*, the other member *m''* of said lever coacting with the

quarter-hour snail. From said head a pin o' extends laterally to provide a support for the toothed segment p' , corresponding to segment l' , carried by a like bell-crank lever r^2 , pivoted on arbor n' , the other member m^2 of said bell-crank coacting with the hour-snail. When the arm h' is tilted, the segmental head moves from beneath the segmental racks, and they are permitted to fall until arrested by the members m^2 m^3 , resting against the snails. On the spindle j' a lock-arm r' is secured, which normally engages a radial arm s' , extending from the fly-wheel spindle of the striking mechanism. This spindle j' also carries a controlling-arm u' , having a laterally-extending pin against which the extensions of the reciprocating hammer-bars rest. These extensions are bent in such a manner that when the two bars which operate the quarter-hammers are in their lowermost position the hour reciprocating bar is held elevated, and vice versa. On the arm h' being tilted, as described, the spindle j' is rocked, which carries the lock-arm r' out of engagement with the arm s' and raises the controller-arm u' to lift the hour reciprocating bar. The arm s' being released by the lock-arm r' it is temporarily arrested by a pin v' , projecting from the vertical member of a bell-crank lever w' , which is moved into the path of the same by said lever being tilted by arm g' on the depression of arm e' . When the pin on the quarter-hour snail which has caused the depression of the latter arm e' passes out of engagement with the same, said arms e' g' return and the lever w' is pushed back, moving pin v' out of the path of the arm s' , extending from the fly-wheel spindle. The arm h' is prevented from dropping back by the end of the head thereof coming against the segmental racks, and therethrough the lock-arm r' and controlling-arm u' are held back. The striking mechanism being unrestrained, it begins its operation. Suitably driven from this mechanism is a spindle x' , carrying three toothed wheels y^2 , only one being shown, the others being behind the same, which turn in the path of the lowered position of the ends of the reciprocating hammer-bars. On each step of these wheels the rods h^2 which are then in lowered positions are given a rearward reciprocation. At each step of the wheel a second spindle 1^2 , carrying two projections 2^2 2^3 , placed ninety degrees apart, is given a complete rotation. These projections engage the teeth of the segmental racks and lift the same one step for each complete revolution of said spindle. The head of the arm h' acts as a detent for the rack l' and prevents it falling back when released from said projections; but the rack p' , having no supports, drops back each time when released. When the rack l' has been raised to its normal position, which occurs at the last quarter-hour stroke, the head of the arm h' drops forward under the same and from the pin o' engages with

the rack P' . The arm h' dropping forward brings the controller-arm into engagement with different parts of the reciprocating-bar extensions, the parts being so arranged relatively to each other that the quarter-hour bars are now raised and the hour-bar lowered. The striking continues, but only the hour is now struck, the rack P' being lifted step by step. When the rack P' has been raised by the projection 2^2 engaging the last tooth, the arm h' would fall forward far enough to permit the locking-arm to arrest the fly-wheel spindle, and the hour-hammer would not be raised the last stroke if means to prevent this action were not provided. In the present case this means comprises an arm 4^2 , pivoted at 5^2 , the end of which falls in front of a pin 7^2 , extending from the head of arm h' when said arm is moved rearwardly. The pin 7^2 coming against the end of said arm prevents the head falling forward the full limit of its movement. After the hour-hammer has had time to give the last stroke, however, the projection 2^2 comes beneath said arm and raises the same out of the path of pin 7^2 . The arm h' then drops forward, bringing pin o' beneath rack P' and locking arm r' again into engagement with the radial arm s' on the fly-wheel spindle, which again locks the whole striking mechanism.

I claim—

1. The combination in a clock having an hour and a fractional-hour strike, the hammers, the sliding bars, the operating means, the connections between each of said bars and one of the hammers, the hour and fractional-hour counts and means for independently moving the sliding bars into and out of the path of the operating means, substantially as described.

2. In combination in a clock having a fractional-hour and an hour strike, a single hammer for striking the hour, a hammer arranged on each side thereof for striking the fractions of an hour, a central sliding bar, connections from the same to said hour-hammer, a sliding bar arranged on each side of said central bar, connections between said side bars and the fractional-hour hammers, the snails, a spindle common to all of said bars, operating means carried thereby moving in the path of said bars and adapted to shift the same to tilt the hammers, and means adapted to move the fractional hammer-bars and the hour-bars successively out of the path of the operating means, substantially as described.

3. In combination in a clock having an hour and fractional-hour strikes, the independent hammers, the sliding bars, connections between the same and said hammers, the fractional-hour and hour snails, rotary means operating in the path of said bars adapted to shift the same to tilt said hammers, and means for moving the bar connected to the hour-hammer out of the path of said rotary means on the commencement of the strike, and for

returning said bar on the completion of the fraction-hour strike, substantially as described.

4. In combination in a clock having a fractional-hour and an hour strike, a single hammer for striking the hour, a plurality of hammers for striking the fractional hour, a sliding bar with connections to the hour-hammer, a plurality of sliding bars each having connections with one of the fractional-hour hammers, the hour and fractional-hour snails, rotary means operating in the path of said bars to shift the same, and means for moving the bar connected to the hour-hammer out of the path of the rotary means on the commencement of the strike and for moving the bars for operating the fractional-hour strike on the completion of said fractional-hour strike, substantially as described.

5. The combination with the hour and quarter-hour snails, the hammer, the sliding bars having connections thereto for operating the

same, means for shifting the bars, extensions on said bars and an arm adapted to engage the same at different points to control the position of the same relative to said shifting means, substantially as described.

6. In combination with the hour and quarter-hour snails, the hammer, the sliding bars having connections thereto for operating the same, means for shifting the bars, extensions on said bars, the extension from the quarter-hour-operating hammer-bars having a different configuration from the hour-operating hammer-bar, and an arm designed to engage said extension to control their positions relatively to the shifting means for the same, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JAC. GUTEKUNST.

Witnesses:

F. OBERNDORF,
K. DREXLER.