

(Model.)

3 Sheets—Sheet 1.

C. HAHLOWEG.
CLOCK STRIKING MECHANISM.

No. 323,577.

Patented Aug. 4, 1885.

Fig. 1.

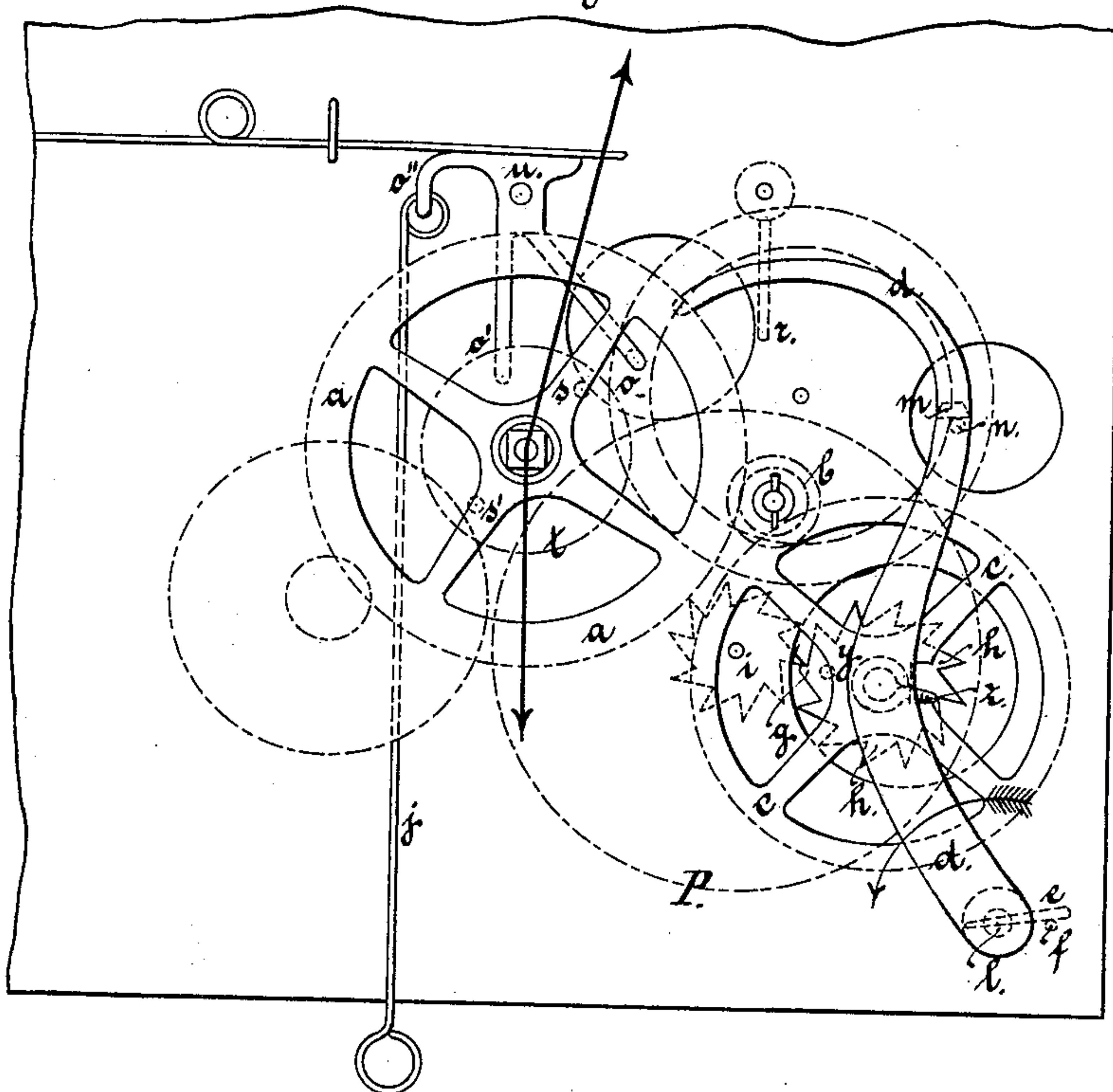
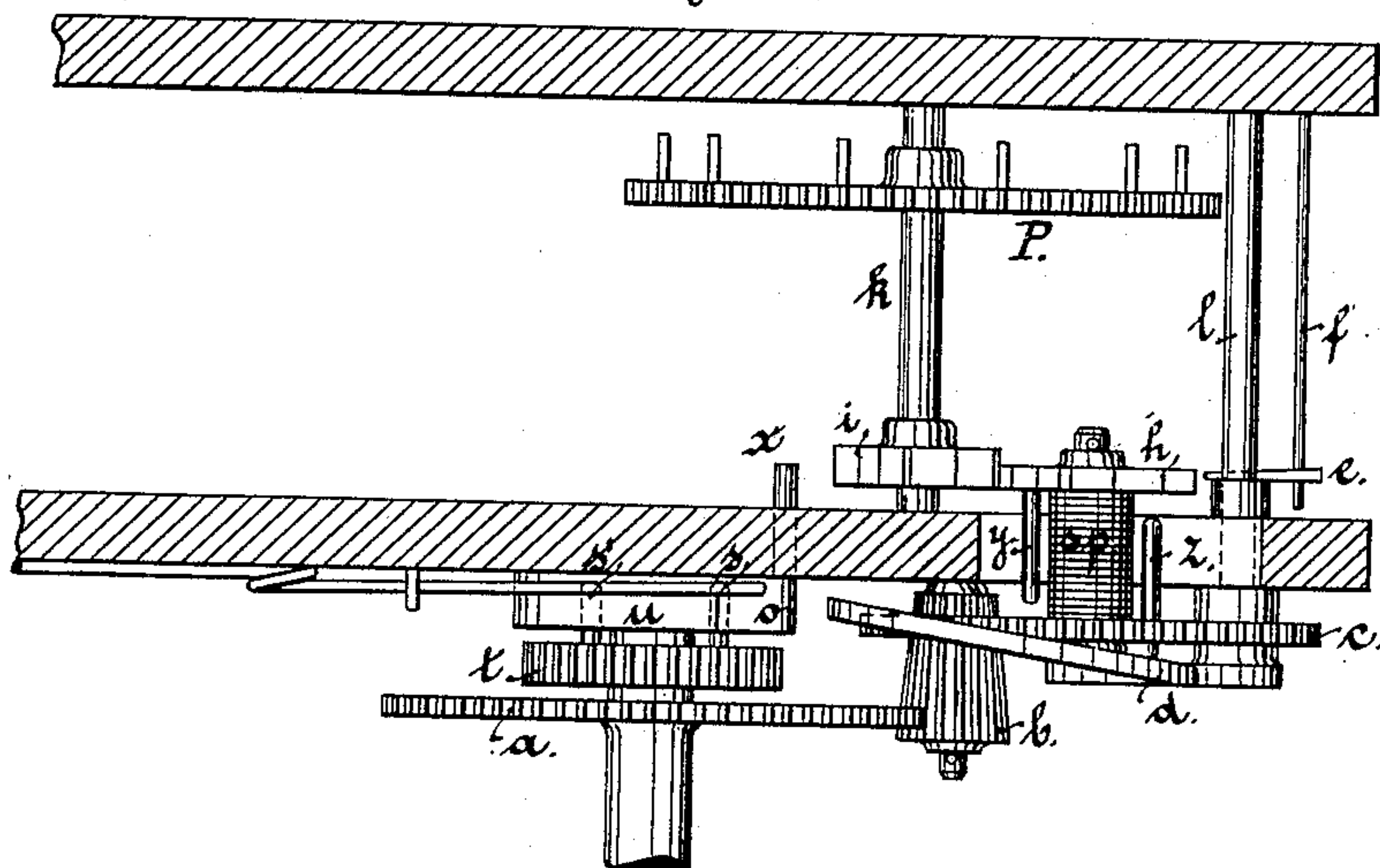


Fig. 4.



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Fig. 2.

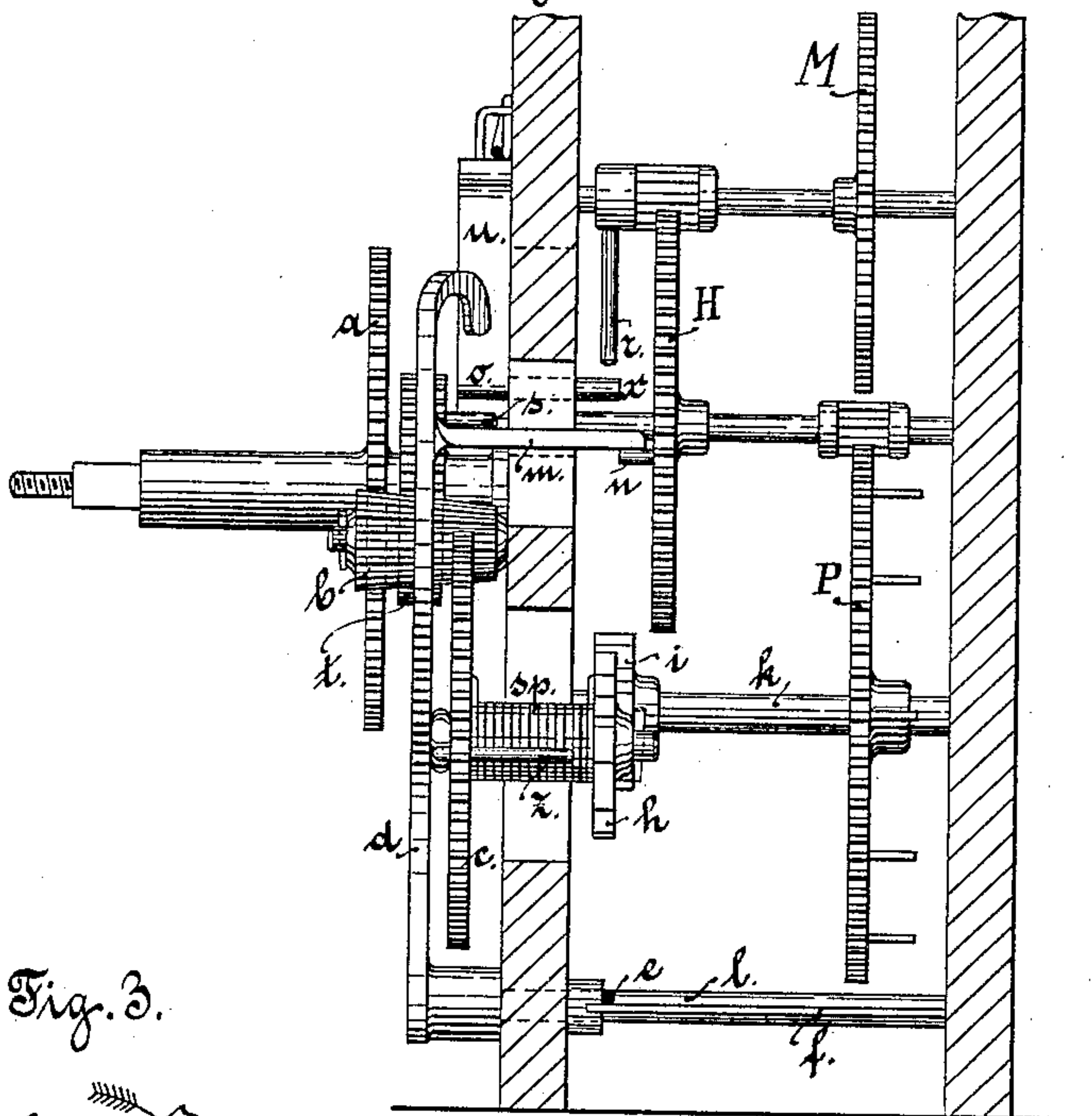


Fig. 3.

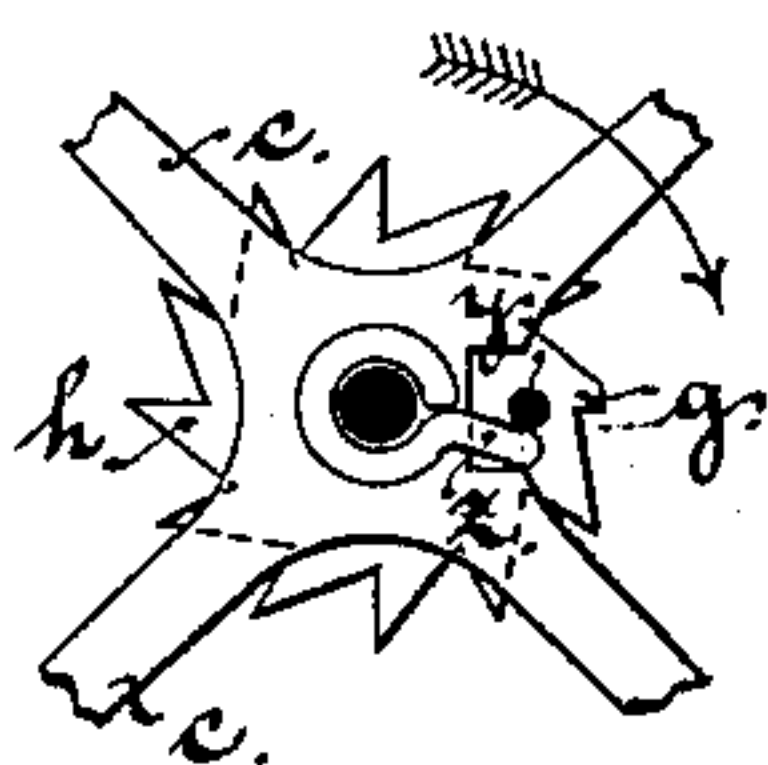
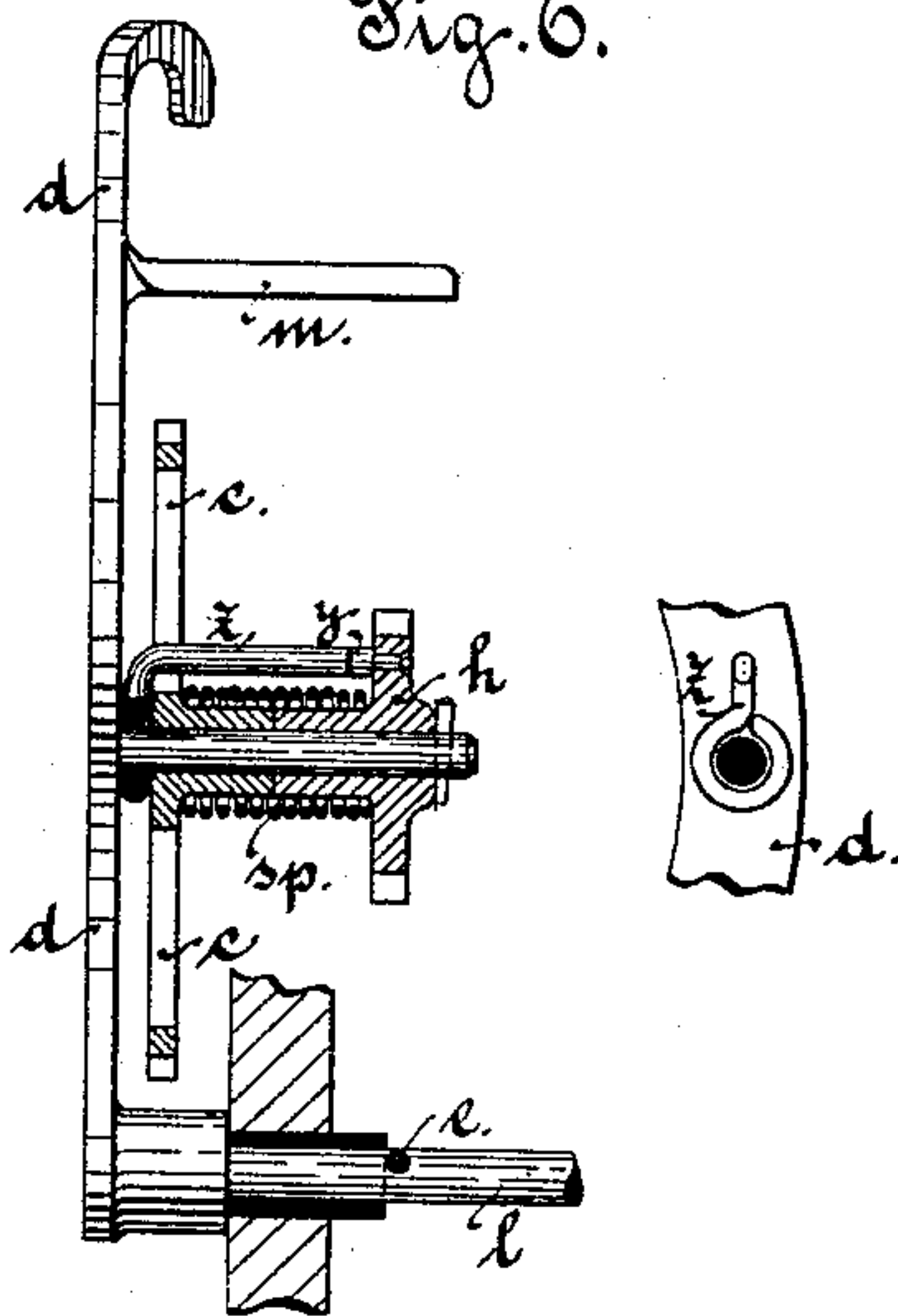


Fig. 6.



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Fig. 5.

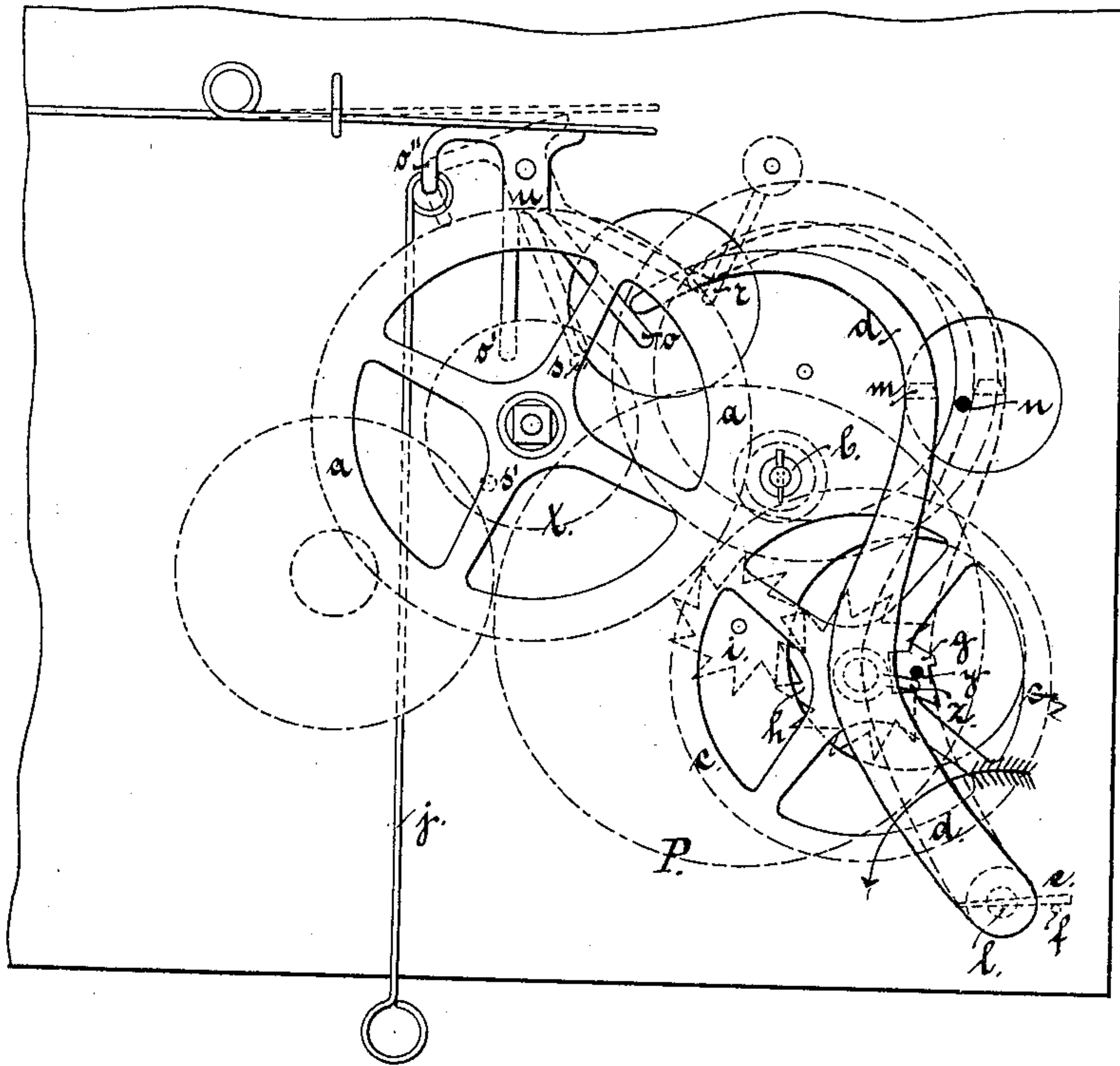
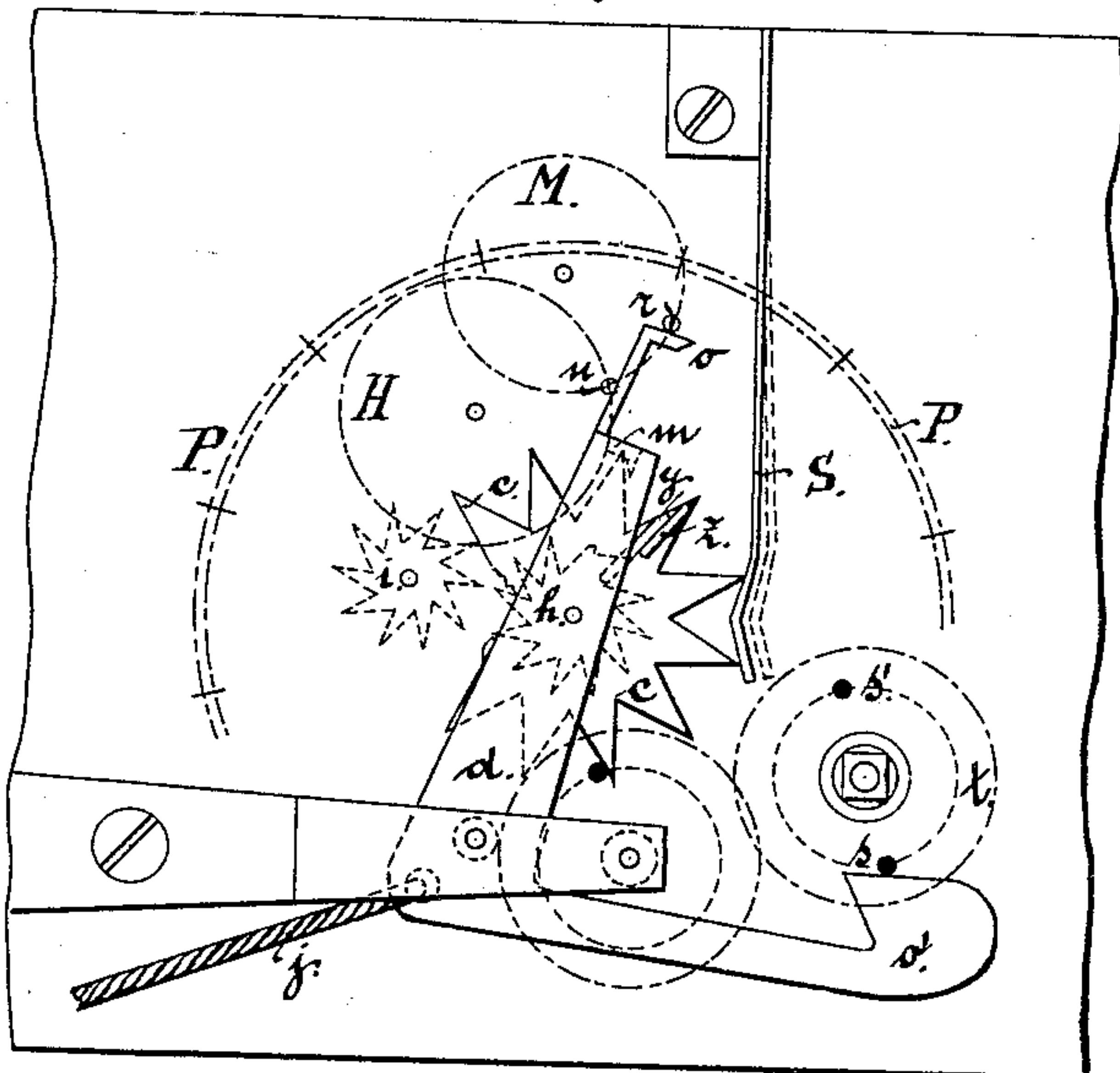


Fig. 7.



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UNITED STATES PATENT OFFICE.

CARL HAHLOWEG, OF STETTIN, PRUSSIA, ASSIGNOR TO GEBRÜDER ZUNGHANS, OF SCHRAMBERG, WÜRTENBERG, GERMANY.

CLOCK-STRIKING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 323,577, dated August 4, 1885.

Application filed March 28, 1885. (Model.)

To all whom it may concern:

Be it known that I, CARL HAHLOWEG, of the city of Stettin, in the Kingdom of Prussia, and Empire of Germany, watch-maker, have invented certain new and useful improvements in Repeating Clocks, of which the following is a specification.

The invention relates to an improved arrangement of devices for striking the hours in clocks and other time-pieces, and repeating the same as often as desired, the construction of the repeating mechanism being simple, cheap, and reliable, so that it can be used not only in expensive clocks, but also in cheaper clocks.

The invention consists of a clock in which the repeating mechanism of peculiar construction is arranged in connection with the striking mechanism, and adapted to start the latter whenever repeating is desired.

The construction of the repeating mechanism will be fully described in connection with the striking mechanism and the novel features finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a front elevation of a clock-movement with the dial-plate removed. Fig. 2 is a sectional side elevation; Fig. 3, a detail front view of the compound gear; Fig. 4, a sectional plan of Fig. 1; Fig. 5, a front view of the clock-movement with dial-plate removed, but showing the parts in different positions. Fig. 6 is a detail vertical transverse section of the compound gear, and Fig. 7 a front view of a modified construction of the repeating mechanism.

Similar letters of reference indicate corresponding parts.

In carrying out my invention the clock-movement has been changed as little as possible. In the striking mechanism only the notch-wheel, the usual latch and unlocking lever have been removed and replaced by other devices, to be described hereinafter.

The new parts are shown in the drawings only in connection with such well-known parts of the movement as far as they are necessary for the explanation of the invention.

a represents the hour-wheel, which meshes

with an idler-pinion, *b*, that turns on an arbor, *b'*, attached to the front plate of the clock-movement. A curved lever or latch, *d*, is keyed to the front end of a shaft, *l*, and provided above the same with a backwardly-extending shaft, *d'*, to which is applied a compound gear, which consists of a transfer-wheel, *c*, having as many teeth as the hour-wheel *a*, and a spur-wheel, *h*, that is connected with the transfer-wheel *c* by a spiral spring, *sp*, in the following manner: the transfer-wheel *c* has a hub extending in backward direction, and the spur-wheel *h* one extending in forward direction, which hubs have the same diameter and abut against each other. The spiral spring *sp* incloses the hubs of both wheels and is fastened at one end to the spur-wheel *h* and at the other end to the transfer-wheel *c*.

For locking the two wheels together, a pin, *y*, of the wheel *h* strikes against a banking-pin, *z*, which is applied by a ring-shaped portion loosely to the shaft *d'*, and which is extended backward through a notch in the spider-frame of the wheel *c*. The spiral spring *sp* is coiled in such a manner that it presses the spur-wheel *h* in the direction of the arrow in Fig. 3. By this arrangement of the spring *sp* the spur-wheel *h* can be turned against the tension of the spring for one entire rotation, and so much more as the banking-pin *z* has play in the notch of the wheel *c*, the object of which will be explained hereinafter. The spur-wheel *h* has twelve teeth, one of which is cut away at the point. The recess *g* between the shorter tooth and the next one in the direction of the arrow in Fig. 3 is made of shallower depth than the recesses between the other teeth. The shorter tooth is next to the pin *y*, as shown in Fig. 3. The latch *d* is pressed in the direction of the arrow shown in Fig. 1 by the tension of a spring, *f*, which presses against a stud, *e*, of the shaft *l*, as shown in Figs. 2 and 4. The latch *d* carries at its upper part a backwardly-projecting nose, *m*, which is located near the unlocking-pin *n* of the heart-wheel *H*. The upper end of the latch *d* is located in the normal position of the parts, near the arm *o* of a repeat-

ing-lever, *u*, as shown in Fig. 1, which latter is moved for the regular striking of the clock by the pins *s s'* of the center wheel, *t*, the arm *o'* lifting the second arm, *o*, of the repeating-lever *u*. For repeating, the lever *u* is actuated by pulling the wire *j*, which latter is attached to the third arm, *o''*, of the repeating-lever *u*. The normal position of the repeating-lever *u* is retained by a suitable spring. The arm *o* of the repeating-lever *u* carries a backwardly-bent hook, *x*, that extends backward through an opening in the front plate of the clock-movement, so as to come at a certain position of the repeating-lever *u* in contact with the moderator-pin *r* on the shaft of the moderator-wheel *M*, so as to stop the movement of the wheel-train, as shown in dotted lines in Fig. 5. The transfer-wheel *c* remains in all positions of the latch *d* in gear with the idler-wheel *b*, and as it has the same number of teeth as the hour-wheel *a* it revolves in conformity therewith.

Upon the shaft *k* of the pin-wheel *P* (the chain-wheel or spring-barrel, which is also mounted on the shaft *k*, being not shown in the drawings) is keyed a spur-wheel, *i*, which meshes with the spur-wheel *h*. The spur-wheel *i* has as many teeth as the pin-wheel *P* has pins—in the drawings ten—when the spur-wheel *h* has twelve teeth. By this arrangement the clock must strike for each full rotation of the spur-wheel *h* twelve times, and for each tooth of it once.

In Figs. 1 and 5 the position of the parts is shown after the clock has struck six. By pulling the wire *j* the arm *o* of the repeating-lever engages the end of the latch *d* and raises it, and is then stopped as the hook *x* comes in contact with the edge of the opening in the front plate. The spur-wheel *h* is thereby lifted out of gear with the wheel *i*, and is moved back by its spring *sp* for six teeth until its pin *y* abuts against the banking-pin *z*, Figs. 3 and 6. At the same time the nose *m* passes the unlocking-pin *n* and releases the heart-wheel *H*, which commences to move until, shortly after the parts have stopped, the moderator-pin *r* comes into the path of the hook *x* and is retained thereby. As soon as the wire *j* is released the repeating-lever *u* is moved backward, so as to liberate the moderator-pin *r* and allow the latch *d* to move forward in the position shown in full lines in Fig. 5. The spur-wheels *h* and *i* are thrown in mesh, while the nose *m* clears the locking-pin *n*, so that the latter can pass it freely. The striking mechanism is now set in motion, and will strike six times, as the spur-wheel *i* has to wind up six teeth of the spur-wheel *h* against the tension of the spring *sp* until the shallow recess *g* sets upon the corresponding tooth of the spur-wheel *i* and lifts the latch *d* into the position shown in Fig. 1, so that the nose *m* arrests the unlocking-pin *n* and stops the striking mechanism.

It is obvious that the striking of the clock may be repeated as often as desired, and as

long as six teeth of the spur-wheel *h* spring back in this operation. This will be the case until the pin *s* of the center wheel, *t*, by moving the lever *u* has stopped the moderator-pin *r* about five minutes before seven o'clock. During these five minutes the clock cannot repeat. As soon as the center wheel, *t*, has moved far enough to bring the minute-hand to the figure 12 the pin *s* passes the arm *o'*, the lever *u* springs back into its forward position, and the latch *d* falls forward and the clock strikes seven, because the transfer-wheel *c*, having turned in conformity with the hour-wheel *a*, the wheel *i* has now to wind up seven teeth until the shallow recess *g* lifts the latch *d* to the position shown in Fig. 1. The repeating operation is continued in this manner until the clock has struck twelve. Between twelve and one o'clock the clock must strike twelve times when repeating; but as the transfer-wheel *c* moves on farther and as much more as the minute-hand approaches five minutes to one the spur-wheel *h* must be allowed to spring back more than twelve teeth—namely, thirteen, for which purpose the banking-pin *z* has sufficient play in the notch of the wheel *c* to permit of this additional turning of the spur-wheel *h*. As the minute-hand moves on, the pin *s* lifts the latch *d* and causes the return of the wheel *h* in such a position that on striking one o'clock only one tooth is moved.

For striking one beat, when the minute-hand arrives at each half-hour, the tooth of the spur-wheel *h* nearest to the pin *y* is cut away, so that when the half-hour pin *s* of the center wheel, *t*, which is nearer to the center than the hour-pin *s*, moves the repeating-lever *u* the latch *d* is lifted only sufficiently to let the shorter tooth pass, so that the gong is struck once.

It is obvious that in place of the spur-wheels *h* and *i* any other shape of gear-wheels may be used which prevents the teeth from riding upon each other. The banking-pin *z* may also be screwed loosely to the spider-frame of the transfer-wheel *c*, or arranged in any other suitable manner. The hook *x*, which is described and shown as forming a part of the arm *o* of the repeating-lever *u*, may just as well be attached to the end of the latch *d*.

A modified construction is shown in Fig. 7, which can be easily understood, as the same parts are represented by the same letters of reference. The latch *d* is here combined with the repeating-lever *u*, and forms an elbow-lever with the arms *o o'*. The transfer-wheel *c* is made in the shape of a star-wheel, which is moved by a pin of the minute-wheel gearing with the center wheel, *t*. This motion is effected by leaps for the second half of each tooth of the star-wheel, a spring, *S*, causing this leap by an angular bend, while at the same time keeping the star-wheel *c* in position.

The construction of the star-wheel *c* and the spur-wheels *h* and *i* is in all other respects the

same as in the other construction, while the operation is substantially the same.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

5 1. The combination, in a repeating clock, with the striking mechanism, of an hour-wheel and transfer-wheel having the same number of teeth, an intermediate idler-pinion, and a repeating mechanism, constructed substan-
10 tially as described, and for the purpose set forth.

2. In a repeating clock, the combination of an hour-wheel, *a*, an idler-pinion, *b*, meshing with the hour-wheel, a spring-actuated latch-
15 lever, *d*, having a nose, *m*, and shaft *d'*, a transfer-wheel, *c*, on the shaft *d'*, meshing with the idler-pinion and having the same number of teeth as the hour-wheel, a spur-wheel, *h*,
20 on the shaft *d'*, a spiral spring, *sp*, connecting the transfer-wheel *c* and spur-wheel *h*, a spur-wheel, *i*, on the shaft of the pin-wheel,

an unlocking-pin, *n*, on the heart-wheel *H*, a moderator-pin, *r*, and a repeating lever, *u*, having arms *o o' o''* and a hook, *X*, substantially as set forth. 25

3. In a repeating clock, the combination, with the latch *d* and spur-wheel *i* on the shaft of the pin-wheel, of a compound gear supported on a shaft, *d'*, of the latch *d*, and consisting of a transfer-wheel, *c*, having a notch 30 in its spider-frame, and a banking-pin, *z*, passing through said notch, a wheel, *h*, having a pin, *y*, a cut-away tooth next to the pin *y*, and shallow recess *g* adjoining the cut-off tooth, and a spiral spring, *sp*, connecting the 35 wheels *c* and *h*, substantially as set forth.

This specification signed by me this 15th day of December, 1884.

CARL HAHLOWEG.

Witnesses:

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