

No. 641,477.

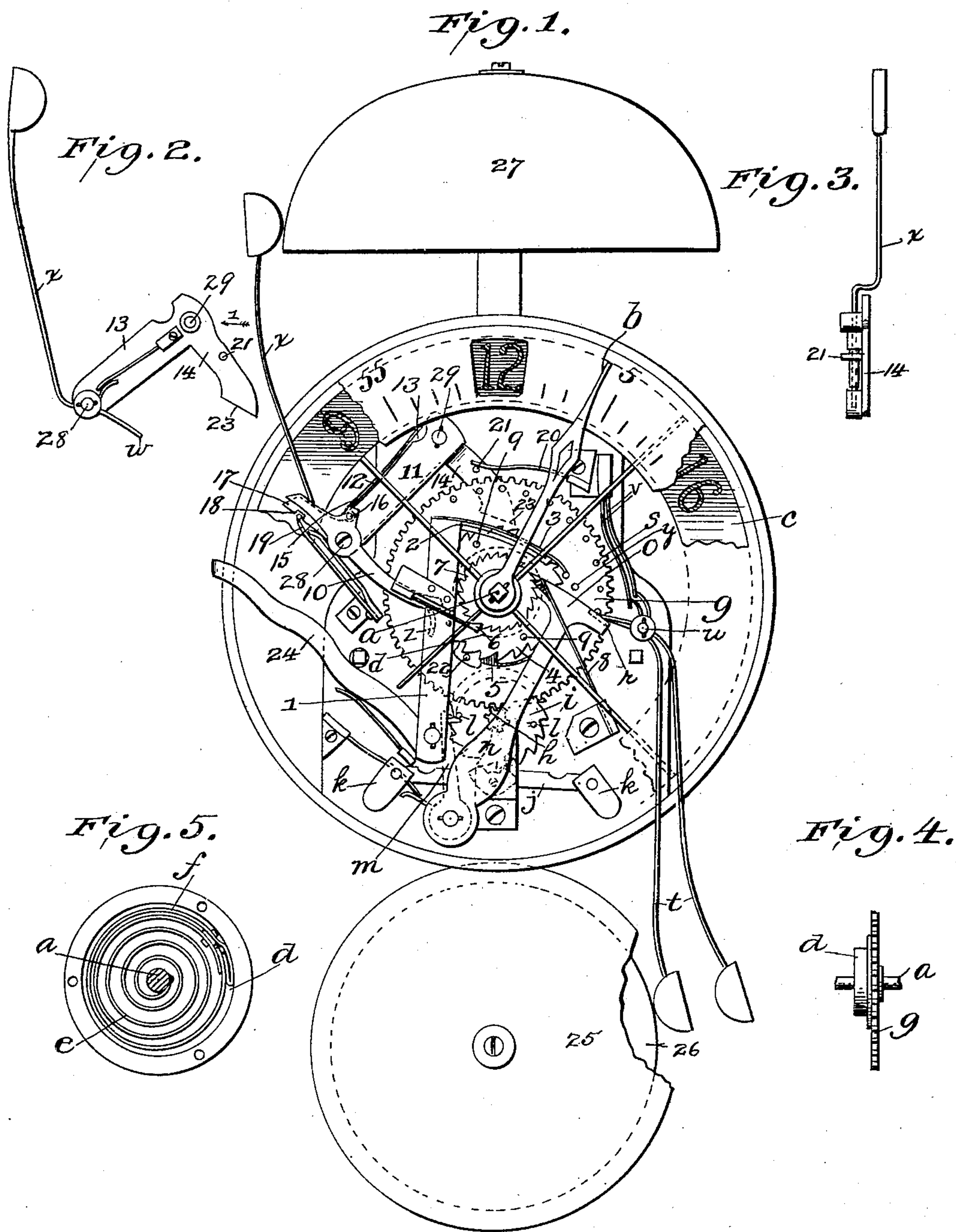
Patented Jan. 16, 1900.

E. TORRES.
REPEATING CLOCK.

(Application filed July 29, 1899.)

(No Model.)

3 Sheets—Sheet 1.



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Fig. 6.

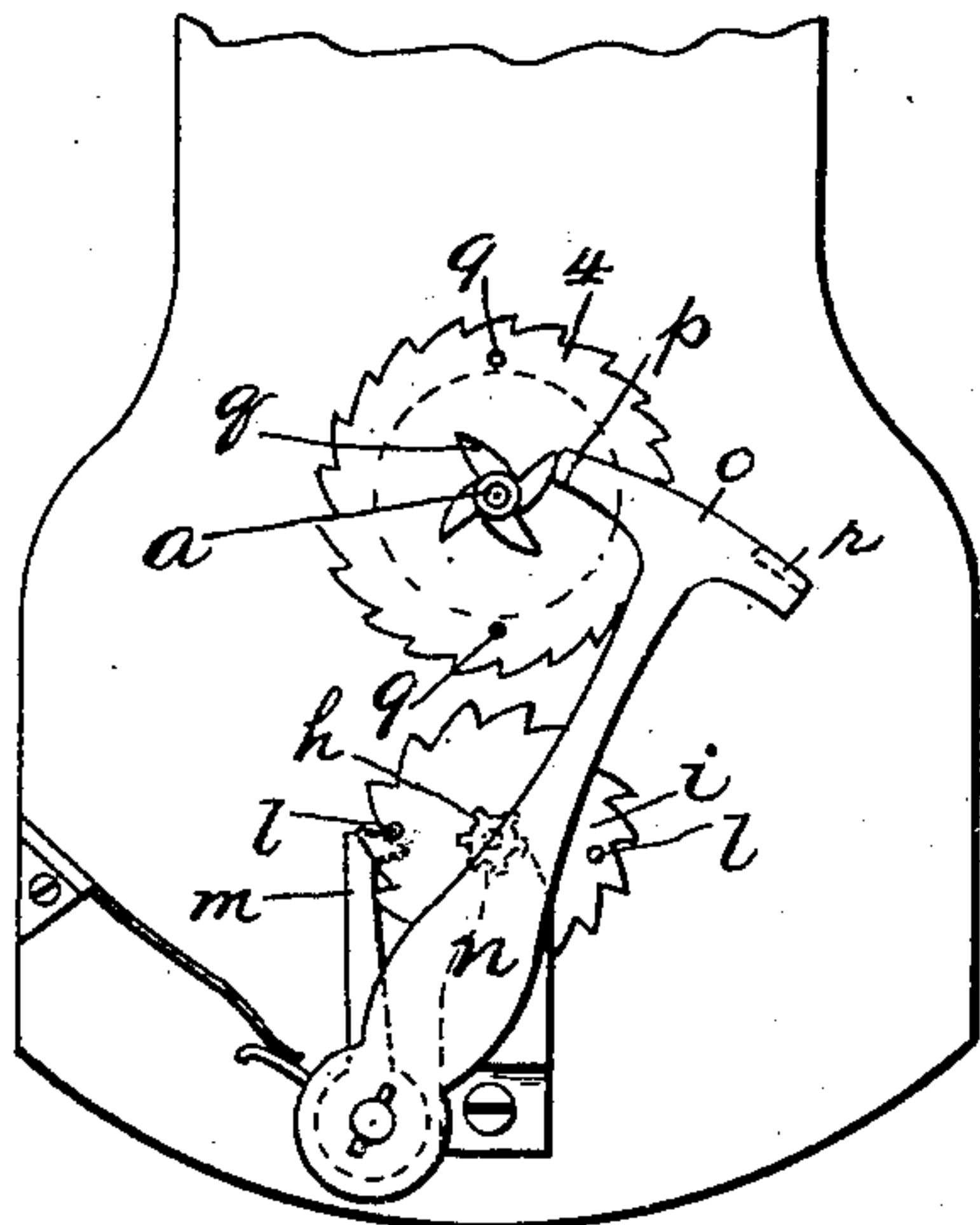


Fig. 7.



Fig. 8.

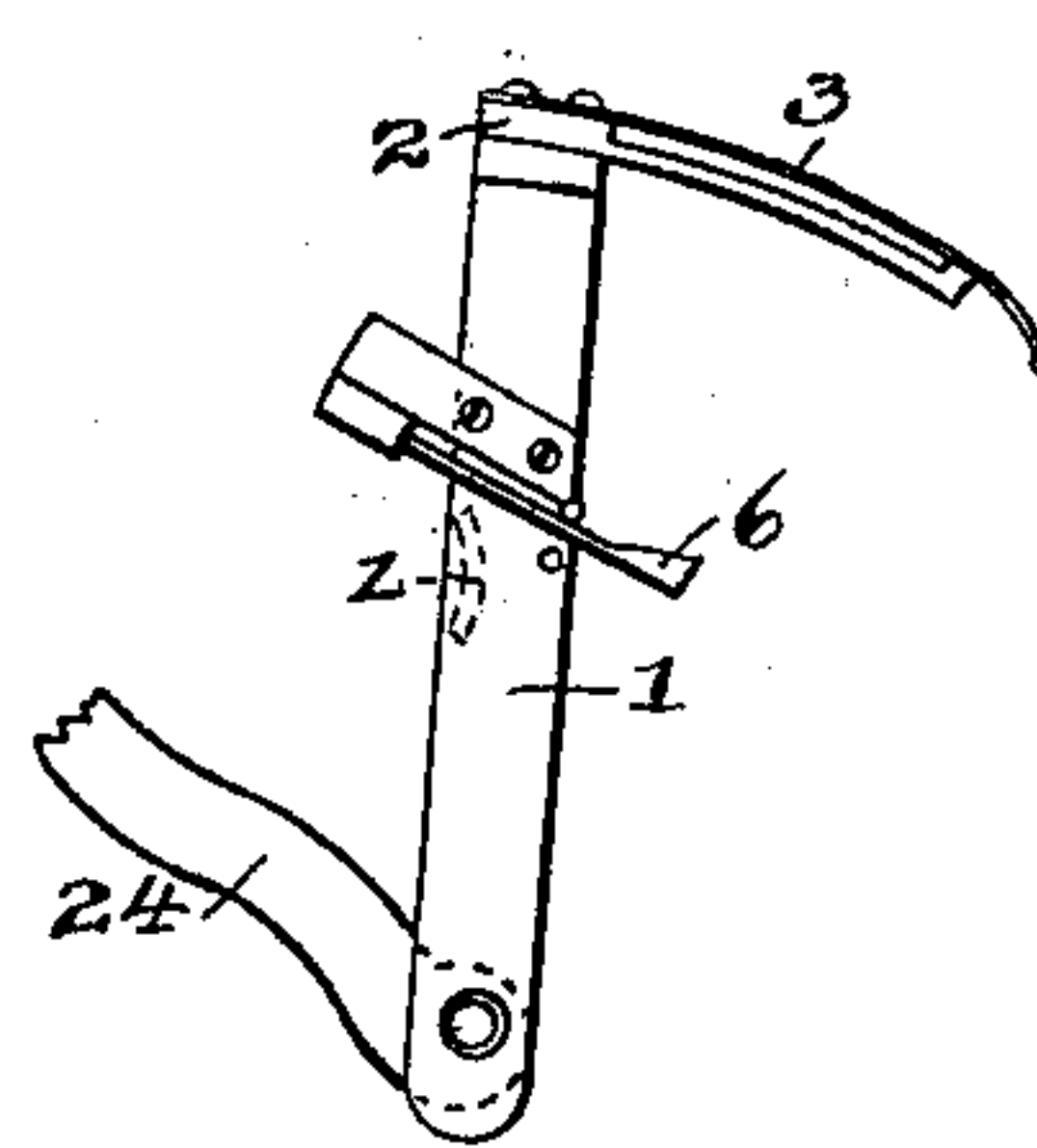


Fig. 9.

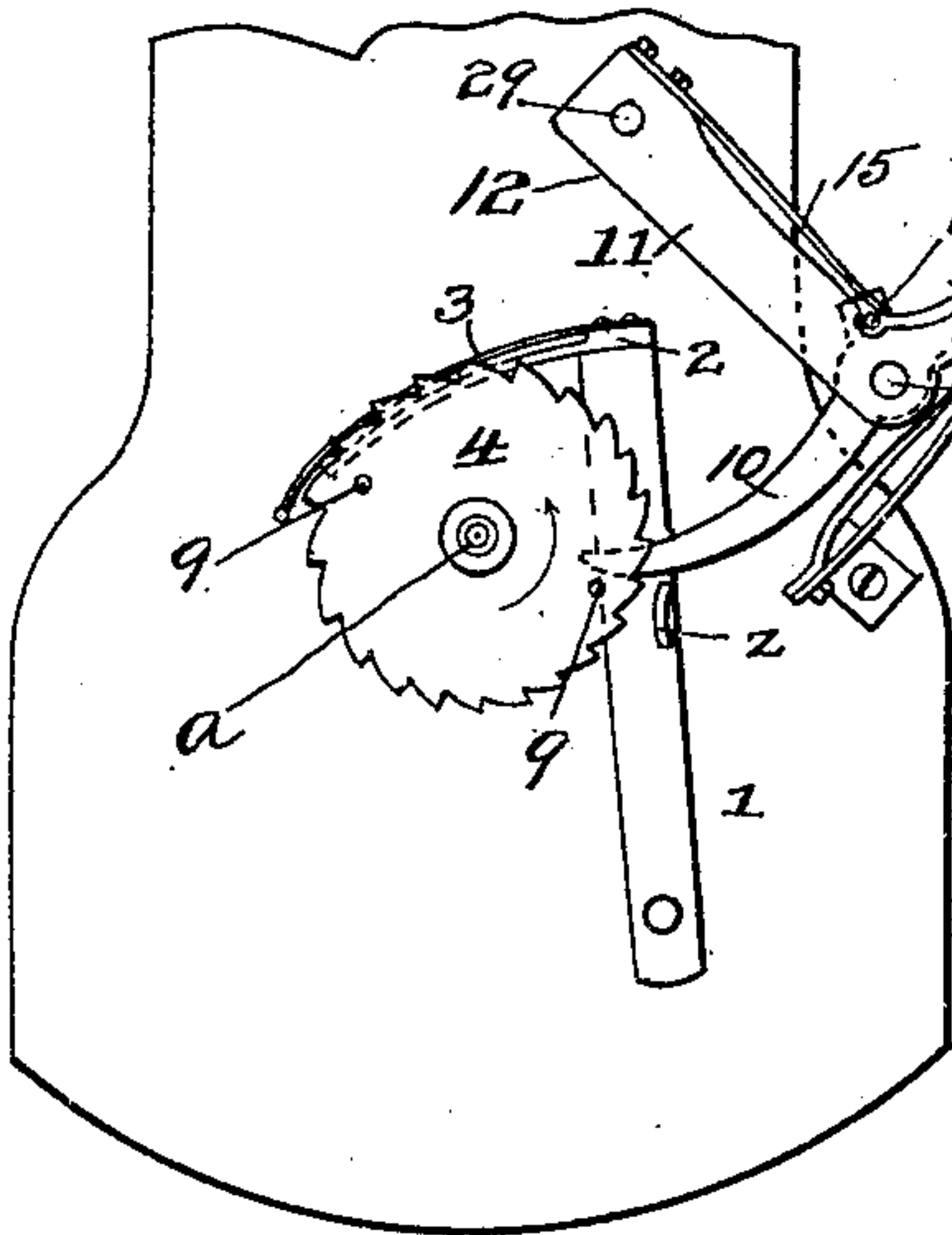


Fig. 10.

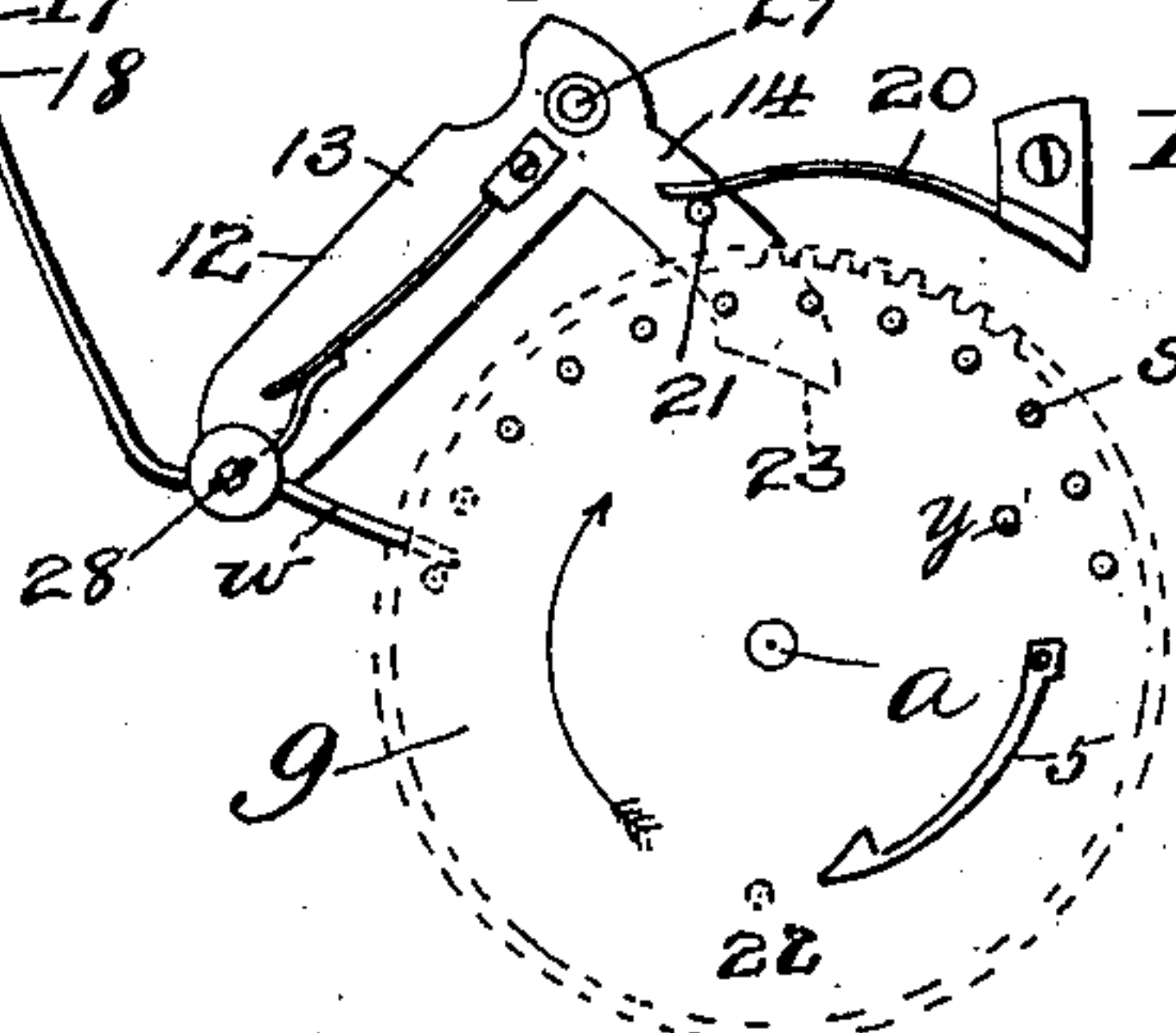


Fig. 11.

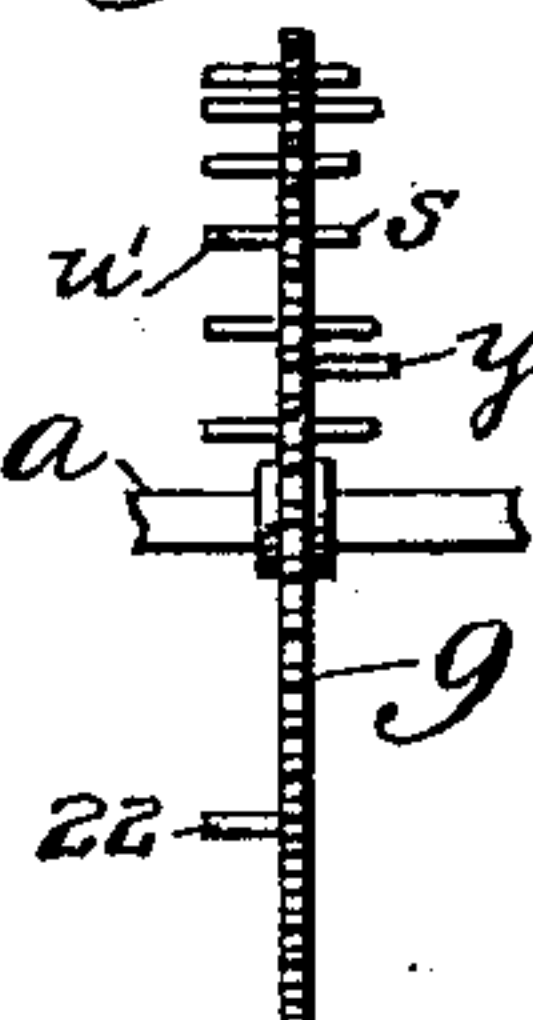


Fig. 13.

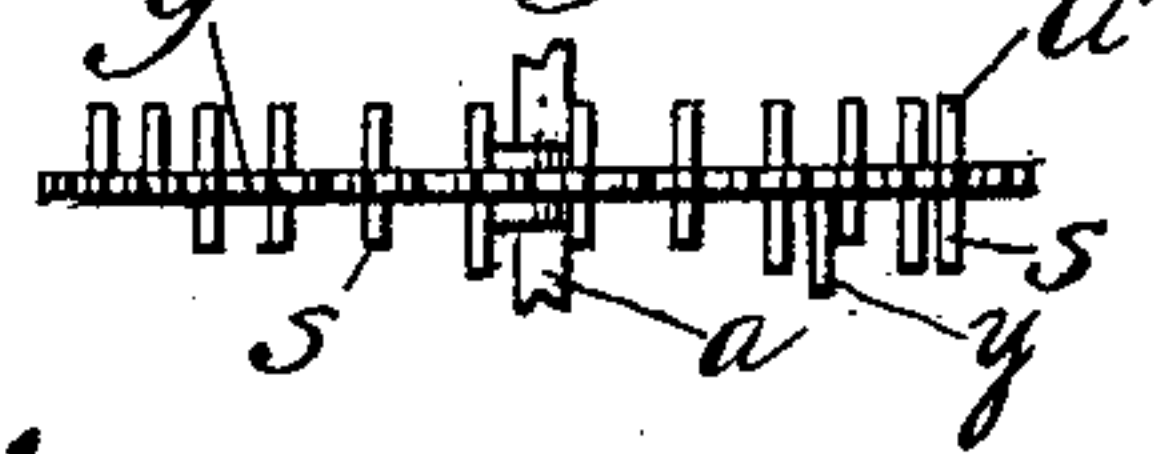
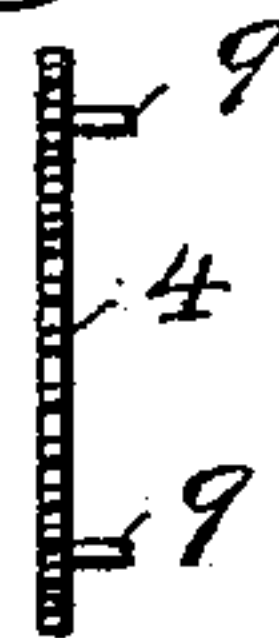


Fig. 12.



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3 Sheets—Sheet 3

Fig. 14.

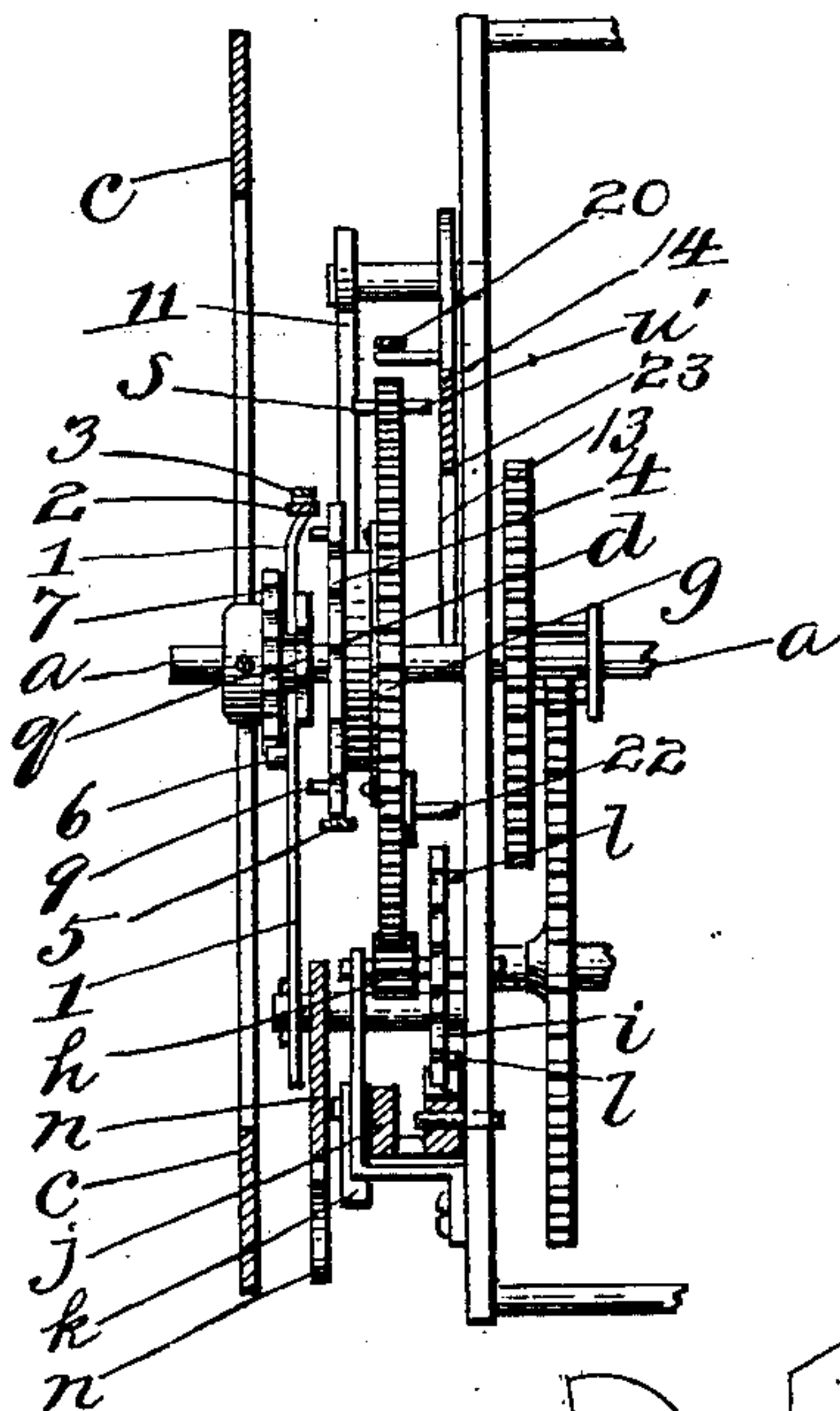


Fig. 15.

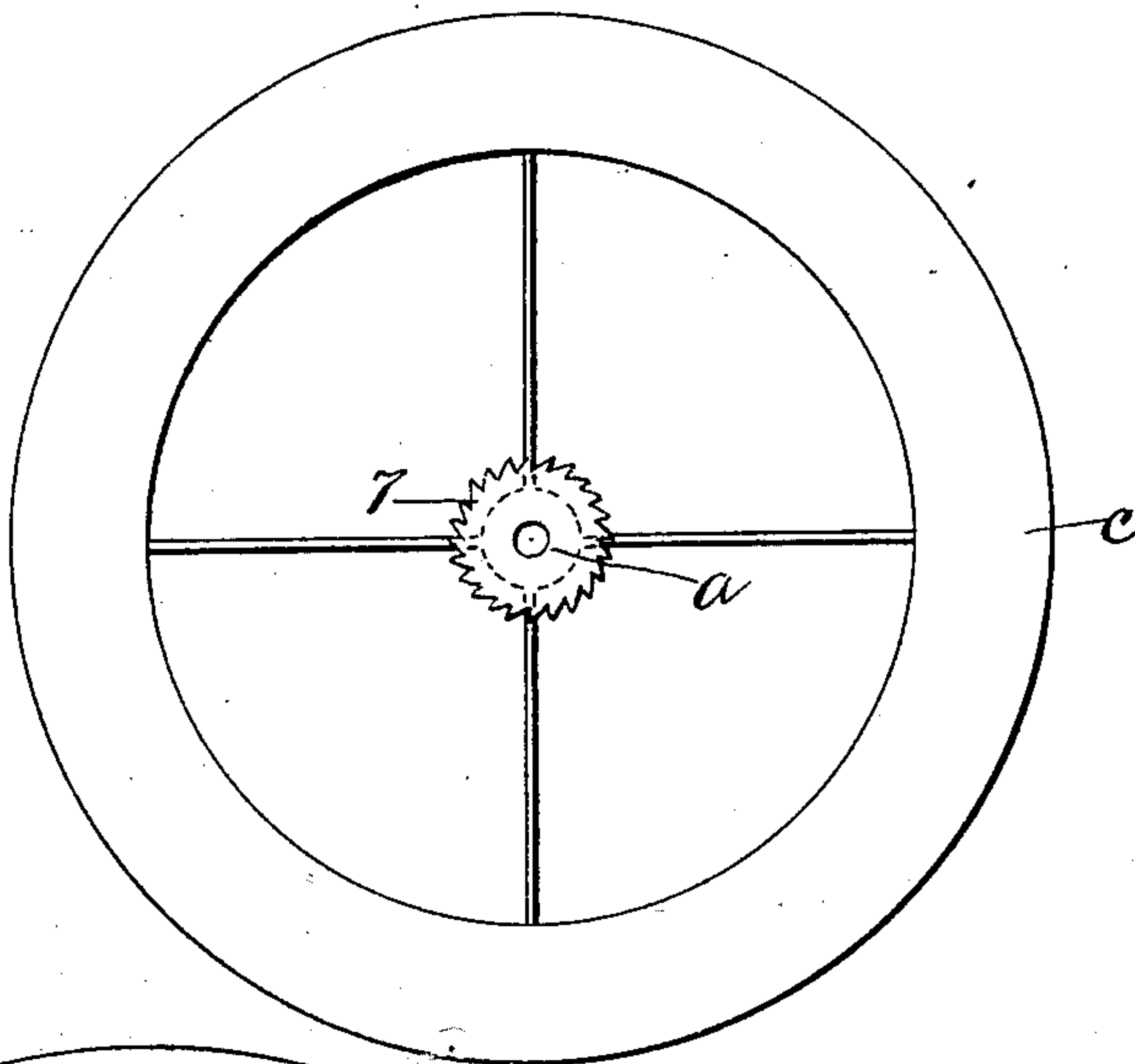
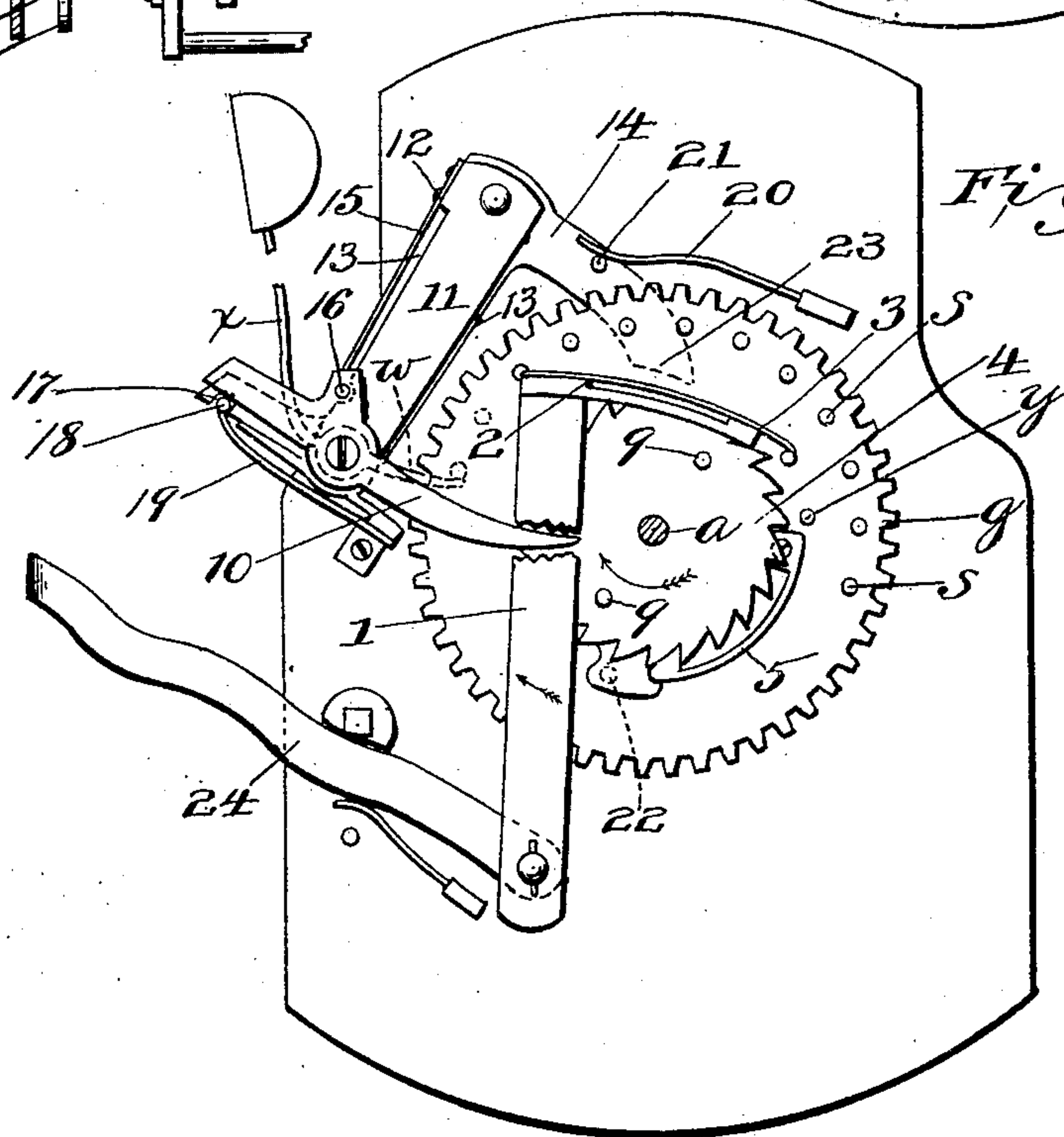


Fig. 16.



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UNITED STATES PATENT OFFICE.

ENRIQUE TORRES, OF GUADALAJARA, MEXICO.

REPEATING CLOCK.

SPECIFICATION forming part of Letters Patent No. 641,477, dated January 16, 1900.

Application filed July 29, 1899. Serial No. 725,499. (No model.)

To all whom it may concern:

Be it known that I, ENRIQUE TORRES, a citizen of the Republic of Mexico, residing at Guadalajara, State of Jalisco, Mexico, have
5 invented a new and useful Clock, (Case C,) of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

10 My invention relates to clocks in which the hours and the quarters are struck, and has for its objects to provide a clock of very simple and effective construction.

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

15 Figure 1 is a front view in elevation of the clock; Fig. 2, a detail view of the bell-hammer for striking the hours; Fig. 3, an edge view of same part; Fig. 4, an edge view of drum containing spring for driving striking mechanism; Fig. 5, a detail elevation of same parts; Fig. 6, a detail plan of mechanism for releasing the striking mechanism; Fig. 7, an
20 edge view of lever for controlling the hour-ratchet and dial; Fig. 8, a detail plan of said lever; Fig. 9, a detail plan of rocking arm controlling the hour-striking hammer; Fig. 10, a plan of hour-striking hammer and the hammer-actuating pin-wheel; Fig. 11, an
30 edge view of said wheel, and Fig. 12 a detail edge view of wheel shown in Fig. 9; Fig. 13, a plan of wheel shown in Fig. 11; Fig. 14, a central vertical section; Fig. 15, a front detail view of movable dial; Fig. 16, a front elevation of mechanism operating the hours-hammer.

Referring now to the drawings, *a* is the main arbor of the clock, on which is mounted the single hand *b*, which is used for indicating the minutes on the fixed dial. The movable dial *c* is shown in the drawings as divided into spaces denoting twenty-four hours; but such division of the dial is not necessary to the use of my clock, and the ordinary division of the dial into twelve spaces and a corresponding number of teeth upon the ratchet-wheel by which the dial is moved may be employed, if desired.

Rotatably mounted on main arbor *a* is a
50 drum *d*, containing a coiled spring *e*, having one end fixed to the arbor *a*, so as to be wound up thereby, and the other end secured to a

band *f*, freely held within the drum. To this drum is secured the bell-tripping pin-wheel *g*, which is toothed to drive a pinion *h*, mounted
55 on the shaft of an escapement-wheel *i*, which is controlled by an anchor *j*, having control-pallets and a weight *k* at each end for the purpose of governing the speed of the escapement. The wheel *i* is provided on its
60 under surface with two pins *l*, with which is adapted to contact an arm *m* of a rocking controlling latch-lever *n*, said arm *m* and pins forming a latch to control the release and detention of the escapement-wheel *i*. Lever *n*
65 has at the opposite end an arm *o*, one end *p* of which is adapted to engage the four cam-teeth of a tripping star-wheel *q*, mounted on and turning with the arbor *a*. The other end of arm *o* is provided with a latch-lug *r*, projecting inwardly. On the outer edge of wheel
70 *g* are mounted ten pins *s* of graduated length, arranged in an arc of such length and location that the first pin of the series will bear against and be held by the latch-lug *r* when
75 the latter is held in its normal position by the end *p*, fitting into the star-wheel at the bottom of one of the teeth. The first two pins
80 *s* are long and of equal length, the third short, the fourth long, the next two short, the seventh long, and the remaining three short. These pins are adapted to trip the ends of the bell-hammers *t*, pivoted at *u* to the frame.
85 *v* are springs bearing against the hammers to return them to place. The pins extend through the wheel *g*, forming a row of ten
90 pins *u'* of equal length, to which are added two other pins to form a series to correspond to the twelve hours and which are adapted to contact with and vibrate the arm *w* of an
95 hour-striking hammer *x*. A single pin *y* is mounted on the outer surface of wheel *g*, near the center thereof, which contacts against a cam-ledge *z* on a rocking ratchet-lever 1. From the free end of this lever projects an
100 arm 2, on which is carried a toothed spring-catch 3. This catch is adapted to engage by the rocking of the ratchet-lever a ratchet-wheel 4, rotatably mounted on arbor *a*. A detent 5, having a strong spring, is secured to the pin-wheel *g* and engages the ratchet-wheel 4, bearing strongly against it, so as to carry it around with the wheel *g* and the drum. A spring-pawl 6 is mounted on the

controlling ratchet-lever 1 and engages a ratchet-wheel 7, which carries the dial *c* and is loosely mounted on arbor *a*. A spring-detent 8 engages ratchet-wheel 7.

5 On the outer face of ratchet-wheel 4 are two diametrically opposite pins 9. These pins in the revolution of their wheel strike against the end of lever 10, which is pivoted on arm 11 of the rocking hammer-carrier 12, 10 formed of said arm and arms 13 and 14. The hammer *x* is journaled on a rod 28, held between arms 11 and 13. A spring 15 on arm 11 bears on the pin 16 of lever 10 and holds its inner end forward. The outer end of the 15 lever extends over and substantially parallel to an extension 17 of arm 11. This extension is provided with a notch 18, with which is adapted to engage a spring-detent 19 when the hammer-carrier is rocked forward. The 20 carrier is normally held in its outward or backward position by means of a spring 20, secured to the frame and bearing against a pin 21 on arm 14. The carrier is rocked to its inner or forward position by means of the con- 25 tact of a pin 22 on wheel *g* against the inclined end 23 of the arm 14 once in every hourly revolution of the wheel.

A handle 24 is secured to controlling ratchet-lever 1 and serves to turn either dial *c* along 30 or both the dial and ratchet-wheel 4 to any hour that may be desired.

25, 26, and 27 are the bells for sounding the quarters and hours, respectively.

The operation of the clock is as follows:

35 The star-wheel *q* in rotating with the arbor will, as each quarter of an hour is approached, lift and rock outward by one of its cam-teeth the latch-lever *n* until the highest point of the cam-tooth bears on the lever, whereupon 40 the latch-lug *r* will be released from the first of the pins *s* and the wheel *g* allowed to turn. The release of this pin will not, however, permit the wheel to move far enough to vibrate the hammers, since the arm *m*, which has 45 been rocked inward by the movement of lever *n*, will catch and hold one of the pins *l* of the escapement-wheel and thereby prevent further rotation of the escapement and of wheel *g*. When the quarter is reached, the 50 star-wheel *q* will trip the controlling latch-lever *n* and the latter will be rocked back to its normal position. This movement will carry arm *m* away from pin *l* and release the escapement-wheel, which, together with pin- 55 wheel *g*, will thereupon be rotated by the spring *e*. The first pin *s* will strike against and trip the hammers *t*. The trip-arm of one of the hammers being shorter than that of the other, one hammer will be released sooner 60 by the pin, and the hammers will thus strike successively, so as to give a double sound to indicate the quarter. The lever *n* in rocking back to its original position carries the latch *r* into the path of pins *s*, and the sec- 65 ond pin will consequently be caught and held by the latch, thus preventing more than one vibration of the hammers. When the

half-hour is reached, two pins—a long one and a short one—will pass the latch, produc- ing two double sounds, and the next long 70 pin will catch on the latch. On the three-quarters three short pins will be released, sounding three double sounds. When the hour is reached, the last long pin and the re- 75 maining three short pins will be released, striking four double sounds on the quarter-bell. Since there are no more pins to engage the latch *r*, the wheel *g* will continue its rota- tion. On its continued rotation the pin *y* 80 will strike against the cam-ledge *z* and rock the ratchet-lever 1, whereupon the spring- catch 3 will be retracted into engagement with ratchet-wheel 4 and will retain said wheel until the detent 5, carried by wheel 85 *g*, has slipped by one tooth of the ratchet-wheel and engaged the succeeding tooth. On the release of the lever by the pin the former will spring back and will carry spring- 90 pawl 6 against ratchet-wheel 7, turning the same one tooth and the dial *c* one figure. By this movement of lever 1 at each rotation of the wheel *g*, which is completed every hour, a new figure will be presented on the dial *c* at the opening. The pins 9 serve to 95 throw the hammer out of line with the pins *u'*. The wheel 4 has twenty-four teeth and the pins 9 are at diametrically opposite points on the wheel, one each for twelve teeth of the wheel. There are twelve pins *u'*. When the 100 lever 1 is rocked and engages and holds ratchet-wheel 4 until detent 5 has engaged a succeeding tooth, wheel *g* will continue ro- tating, while wheel 4 is held still one tooth, and will therefore carry around one more 105 tooth *u'* past one of the pins 9 than it did before. Hence at each hour one more pin will strike the bell-hammer than on the preced- ing hour, and thereby produce the necessary additional note. When the hour of twelve 110 is reached, the striking will begin again at one. At each rotation of wheel *g* the pin 22 will strike the end 23 of arm 14, rock- ing the latter and carrying inward arm 11, 115 so as to bring arm *w* into the path of the twelve pins *u'*. The lever 10 and arm 11 will be held inward by notch 18 engaging detent 19. The pins *u'* will trip the hammer until one of the pins 9 comes in contact with lever 10, whereupon said lever will be turned for- 120 ward until its other end forces detent 19 out of notch 18 and permits the hammer-carrier 12 to swing back under the action of spring 20. The arm *w* is thus carried out of the path of pins *u'*, and the hammer will cease 125 striking. On the succeeding hour the pin 9, having been carried back one tooth of its wheel, will not trip the hammer until an- other pin of the series *u'* has vibrated it.

By means of the handle 24 the dial *c*, if out of correct place, can be alone moved to the 130 proper indication, or by a longer swing of the handle both the dial and ratchet-wheel 7 may be moved to both indicate and strike a new hour.

Having thus described my invention, what I claim is—

1. In a clock, in combination with a movable dial, a ratchet-wheel carried thereby, a rocking ratchet-lever, a time-train, a wheel released by said train, means to drive the wheel, and a trip on said wheel to rock said lever, substantially as described.

2. In a clock, in combination with a movable dial, a ratchet-wheel carried thereby, a hammer, a hammer-vibrating mechanism, a second ratchet-wheel carried by said mechanism, a rocking ratchet-lever, oppositely-working ratchet-pawls carried by said lever to engage said wheels, means to rock said lever, a time-train, connections between said train and rocking means and means on said second ratchet-wheel to control the operation of the hammer-vibrating mechanism, substantially as described.

3. In a clock, in combination with a time-train, a rocking latch-lever, an escapement-wheel, a hammer, hammer-actuating mechanism, a latch at each end of said lever adapted to engage said escapement-wheel and hammer-actuating mechanism respectively, a trip on said time-train to release said latch-lever, and means to operate said trip at certain intervals of an hour, substantially as described.

4. In a clock, a mechanism for striking quarters or other fractions of an hour, comprising a hammer, a rotating wheel, a spring to drive said wheel, a latch to hold said wheel and a trip to release said latch, said wheel provided with several series of pins, each series corresponding to one of said fractional periods, said hammer having a trip-arm extending into the path of said pins, and a stop-pin in each series to engage said latch, substantially as described.

5. In a clock, in combination with a hammer or hammers for striking the quarters, means to actuate said hammer or hammers, a rotating wheel, a hammer for striking the hour, a rocking carrier for said hammer, a carrier-rocking pin on said wheel, and means on said wheel to vibrate said hammer, substantially as described.

6. In a clock, in combination with a bell-hammer, a rocking carrier therefor, a rotating wheel, projections on said wheel, an arm on said hammer, means to rock said arm into line with said projections, a spring-latch for said arm, a release or trip device for said latch carried by said wheel, and means to successively retard the action of said release or trip device, substantially as described.

7. In a clock, in combination with a hammer and carrier therefor, a time-train, a rotating wheel, a latch and trip mechanism for said wheel operated by the time-train, said wheel provided with means to rock said carrier, pins on said wheel to vibrate said hammer, a ratchet-wheel carried by said pin-wheel, releasing or trip pins carried by said ratchet-wheel, a rocking ratchet adapted to engage said ratchet-wheel, a projection on said pin-wheel adapted to rock said ratchet, whereby on each revolution of the pin-wheel, the ratchet-wheel trip-pin will be turned back the distance of one tooth of said ratchet-wheel to thereby permit a succeeding pin of the pin-wheel to vibrate said hammer, substantially as described.

In testimony whereof I have signed my name in the presence of two witnesses.

ENRIQUE TORRES.

Witnesses:

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JOS. H. BLACKWOOD.