

No. 747,676.

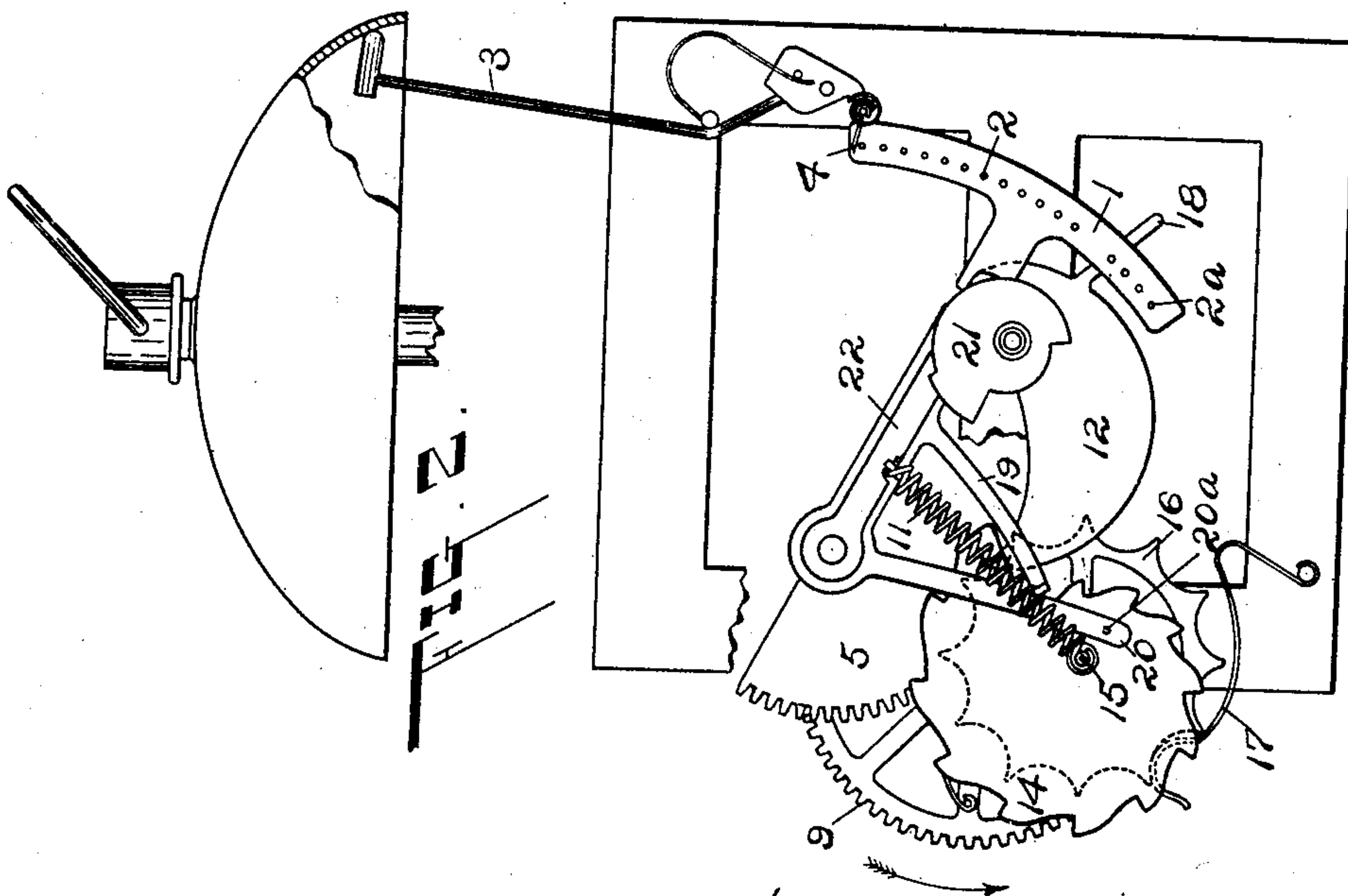
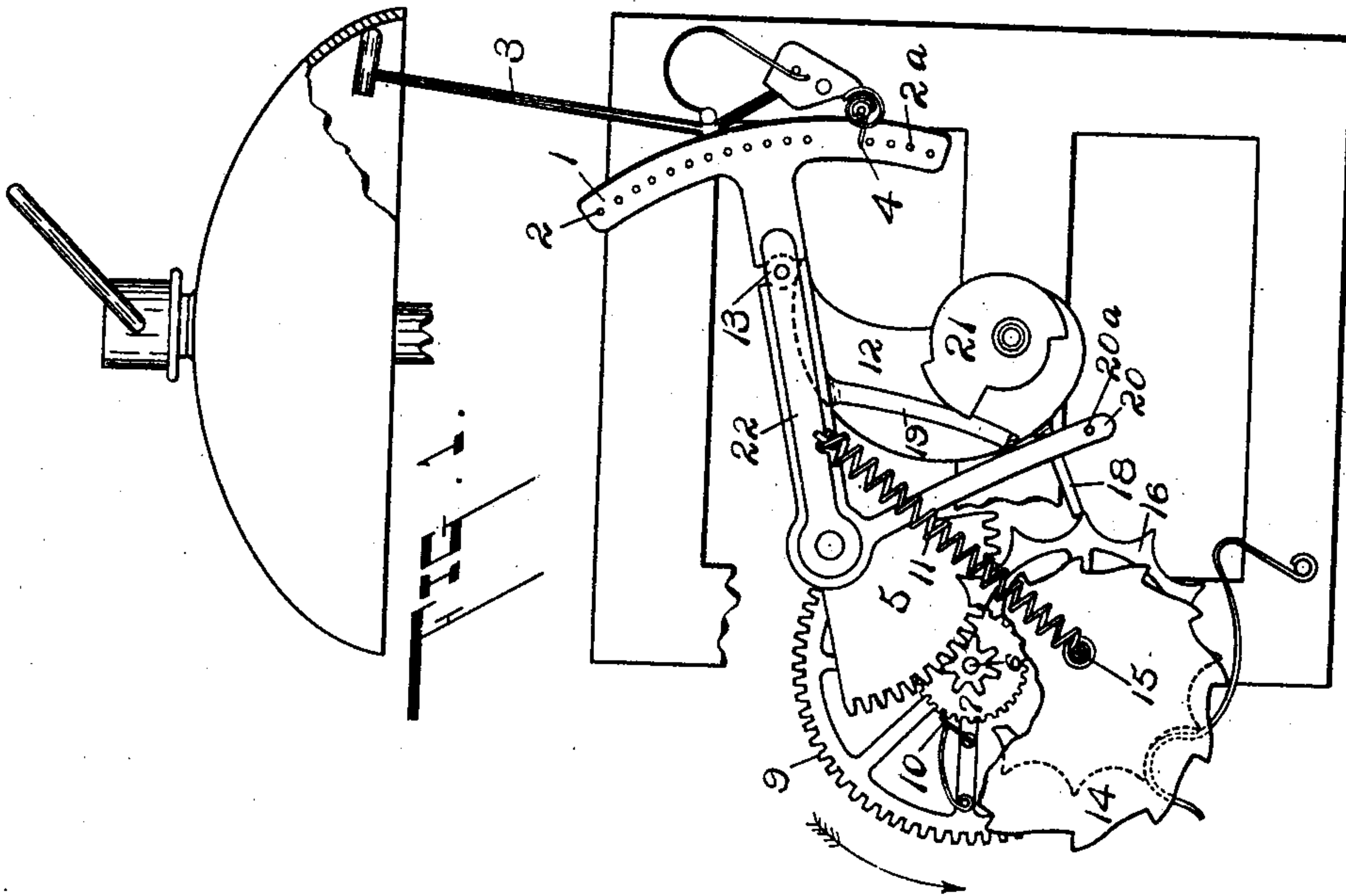
PATENTED DEC. 22, 1903.

F. G. BERLING.
CLOCK STRIKING MECHANISM.

APPLICATION FILED JUNE 1, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES:

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James C. Hanson.
A. A. Easterly.

Franz G. Berling. INVENTOR.

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Geo. B. Willard ATTORNEY

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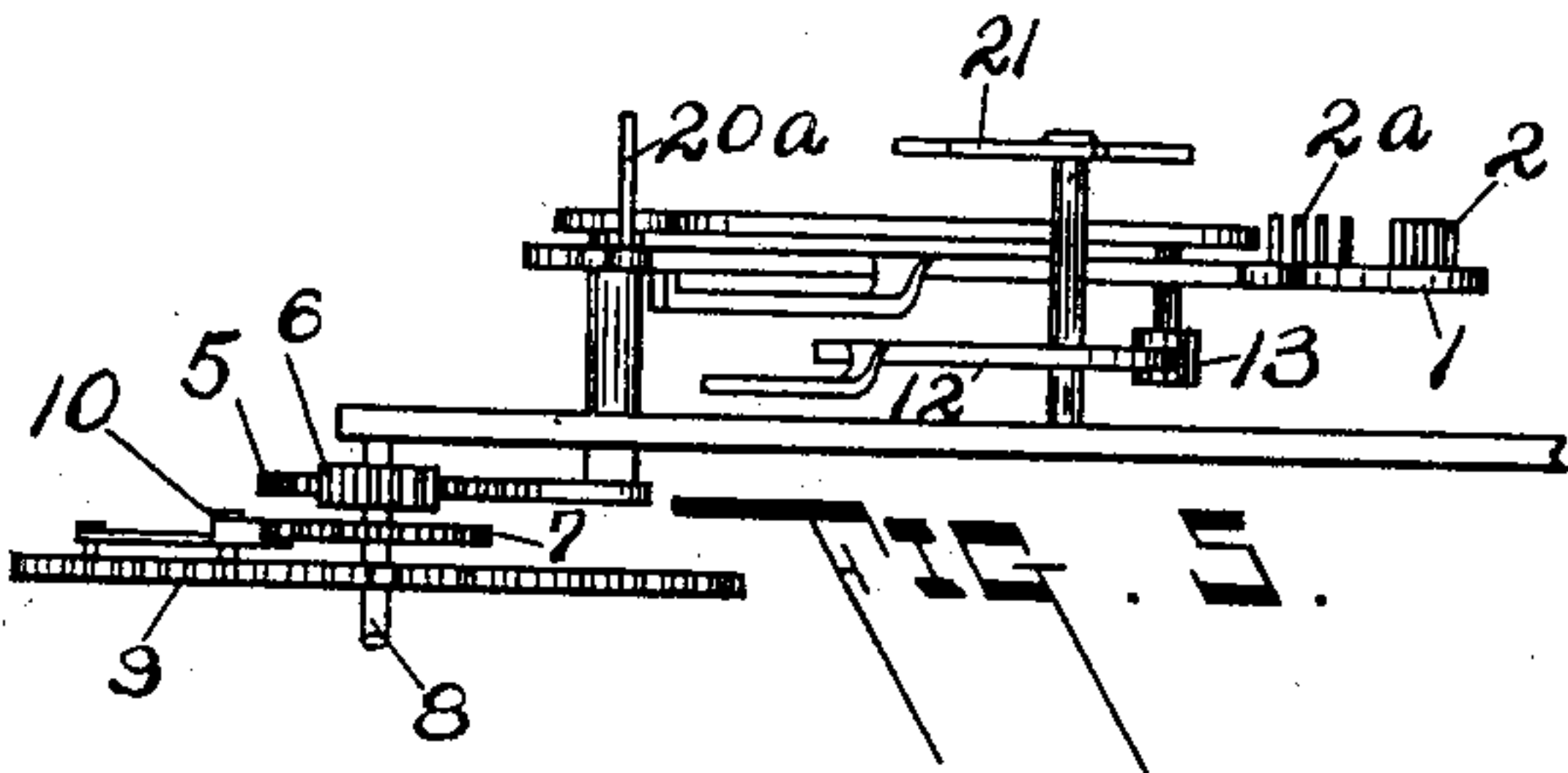
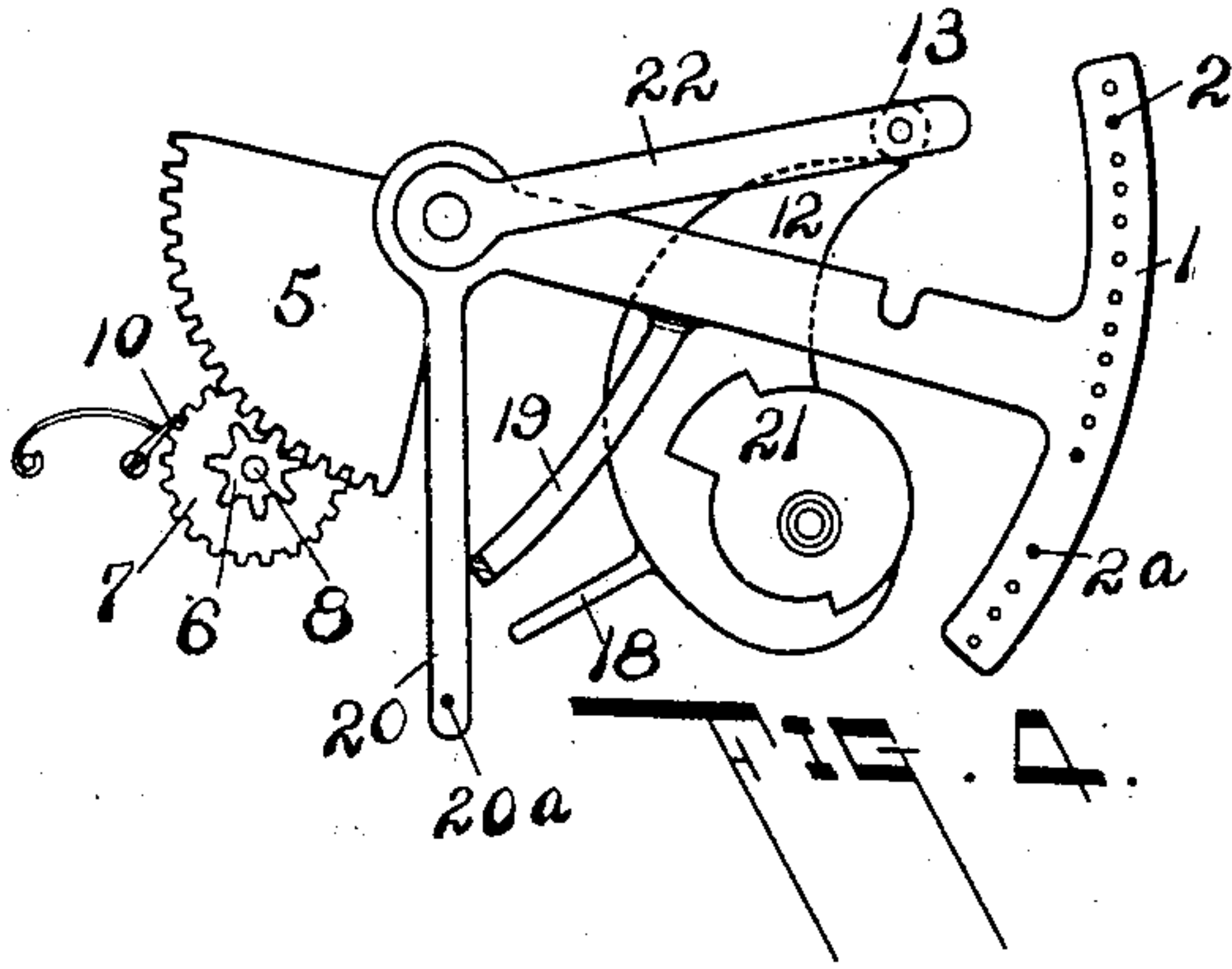
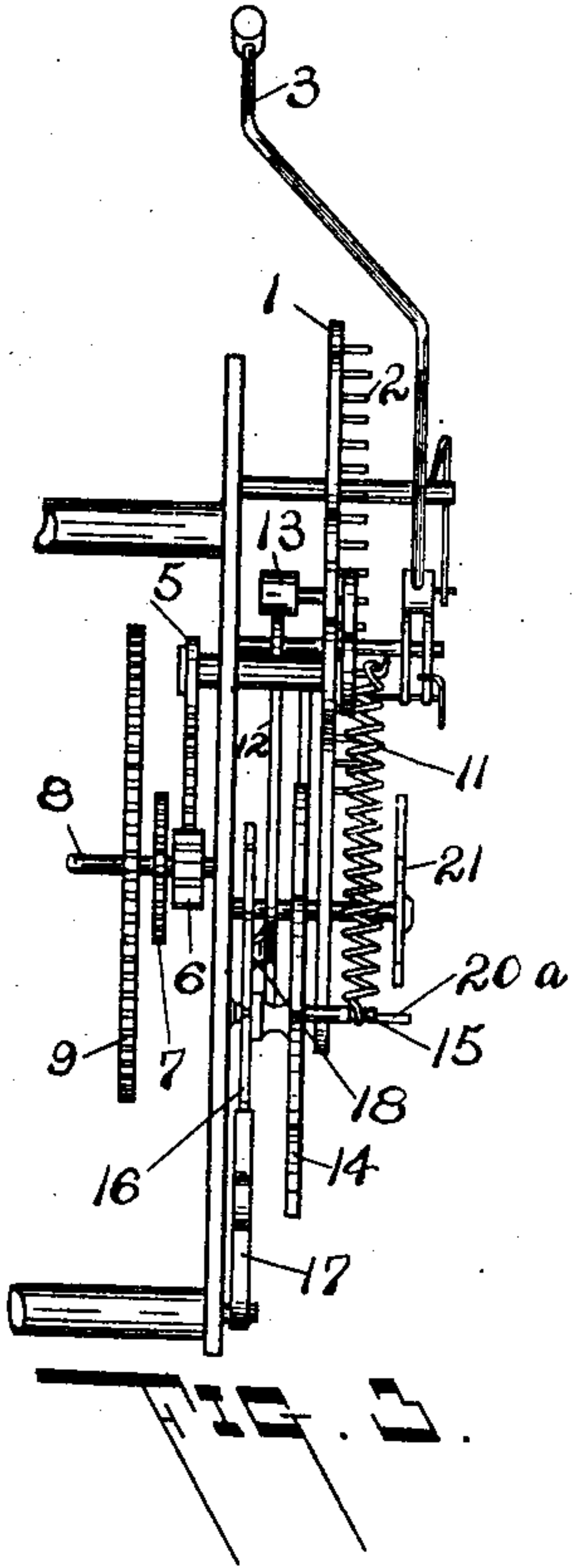
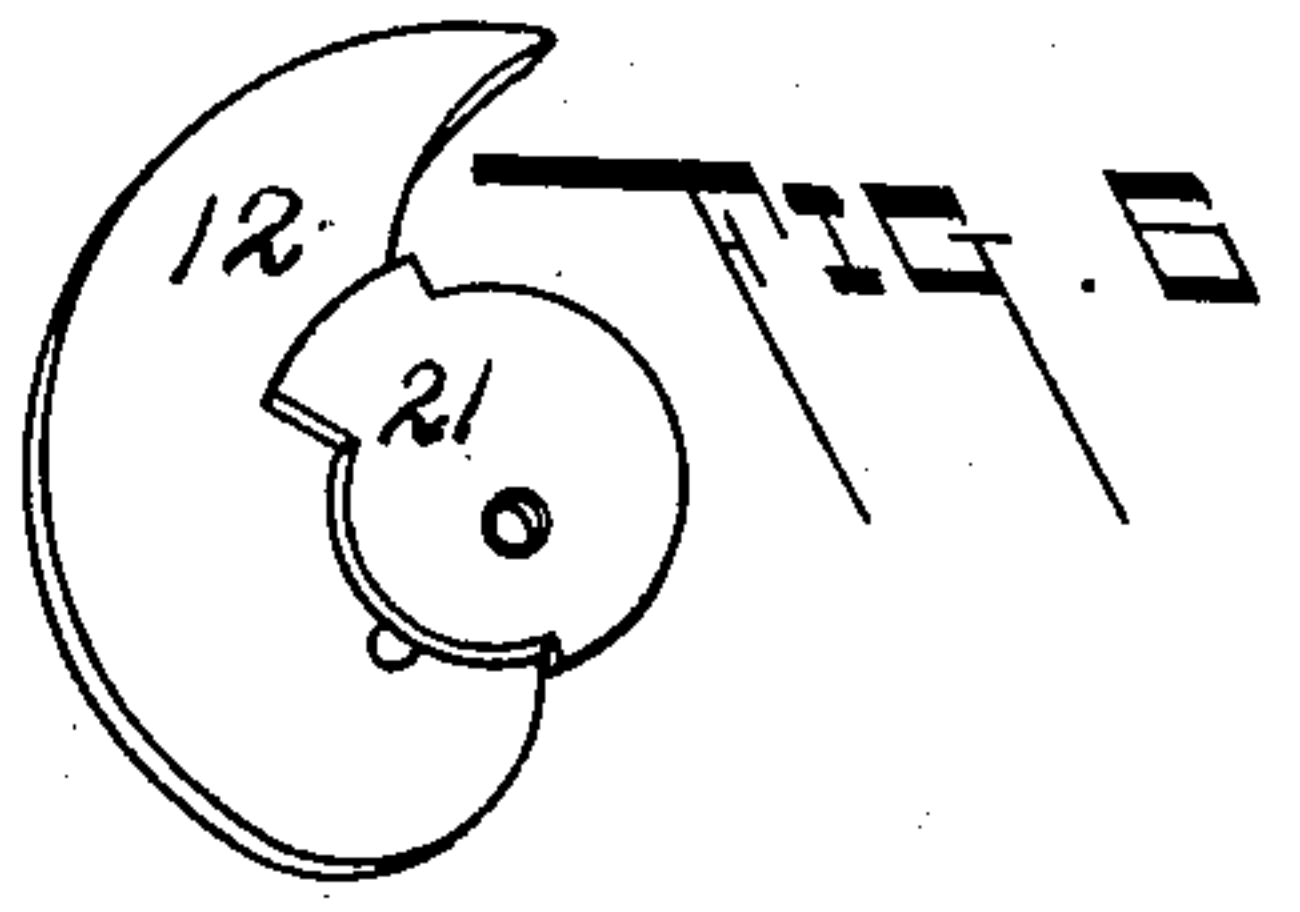
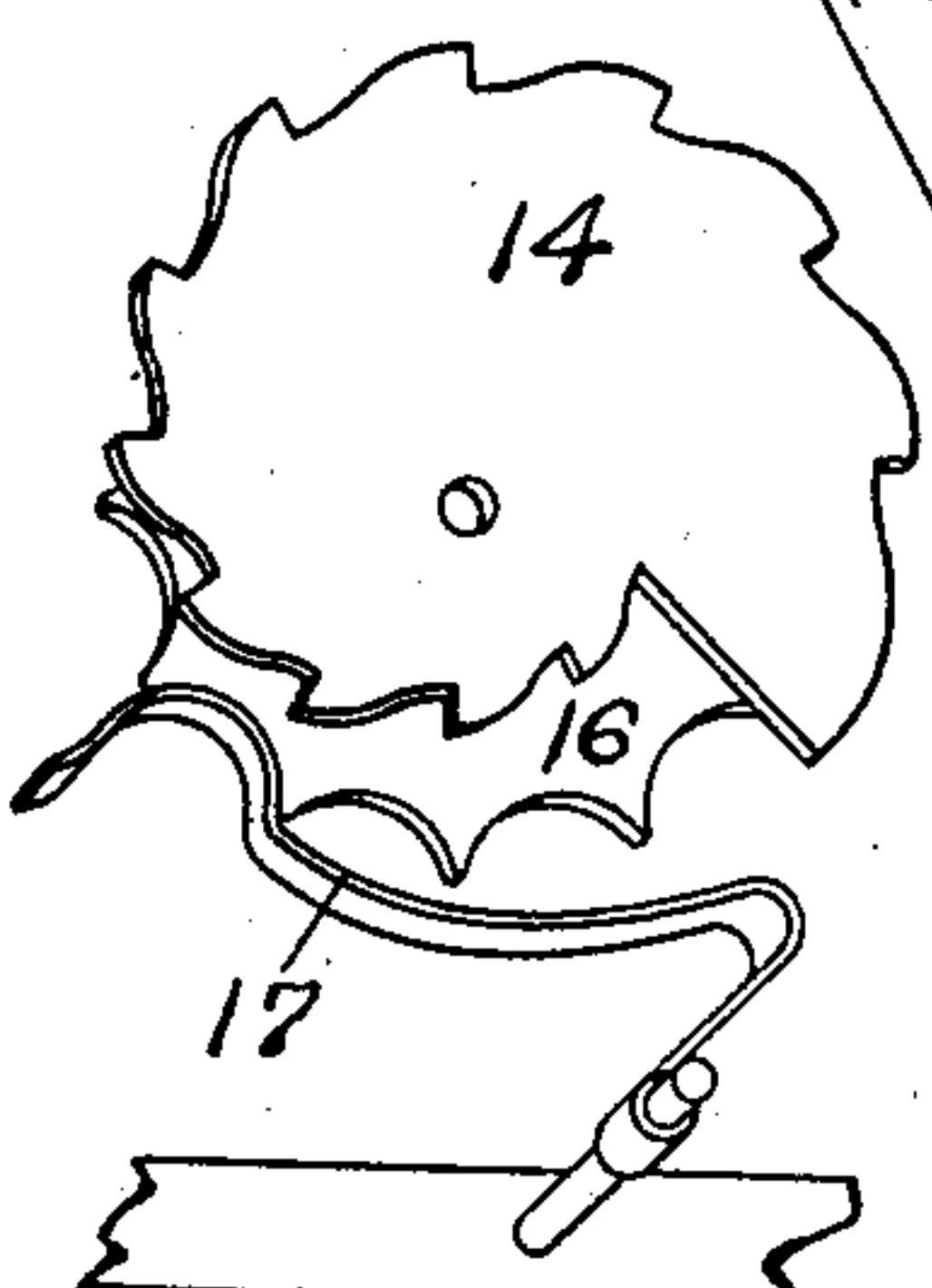


FIG. 7.



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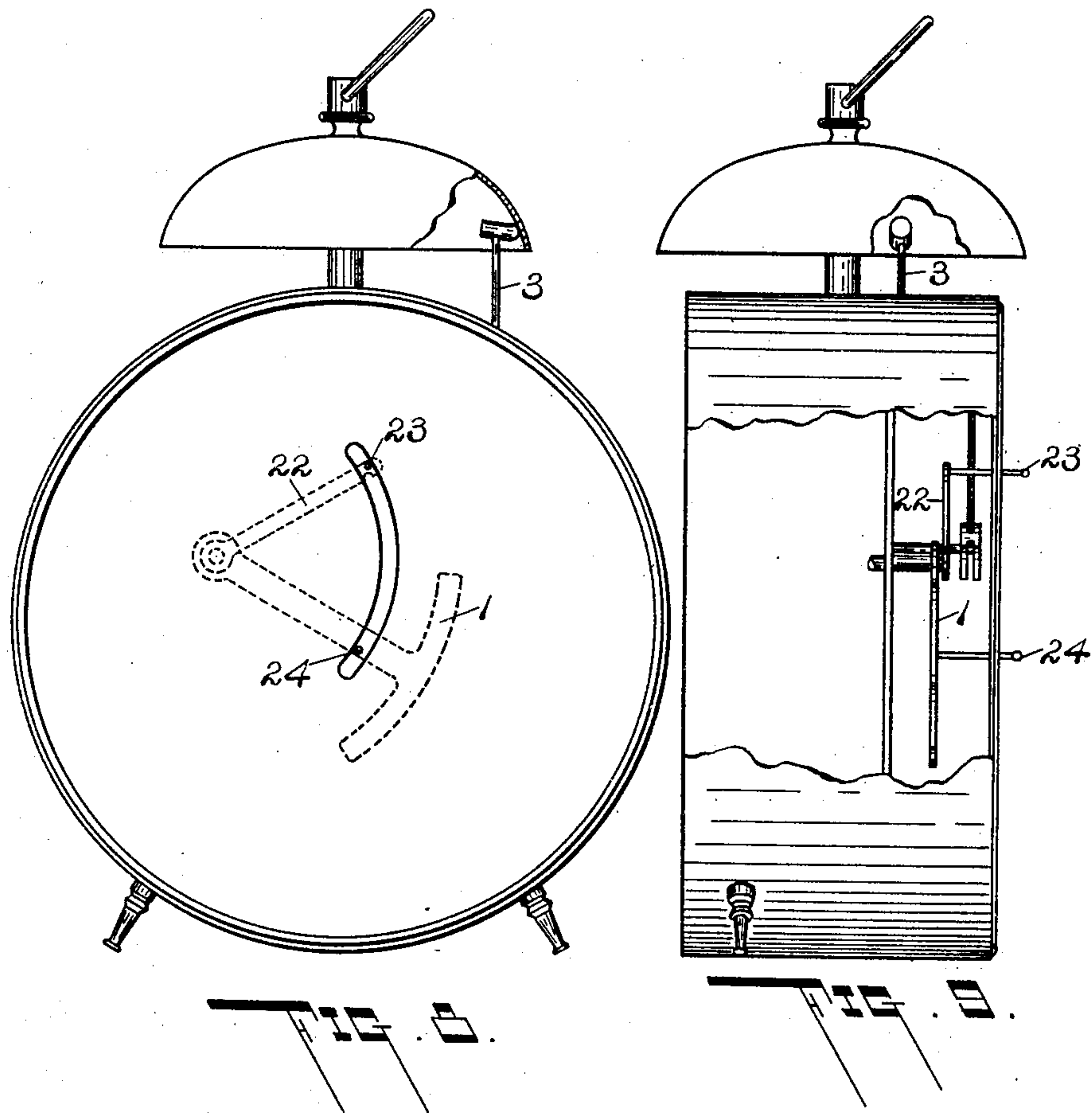
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3 SHEETS—SHEET 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANZ G. BERLING, OF BAY CITY, MICHIGAN.

CLOCK STRIKING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 747,676, dated December 22, 1903.

Application filed June 1, 1903. Serial No. 159,611. (No model.)

To all whom it may concern:

Be it known that I, FRANZ G. BERLING, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Clock Strike Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is a clock strike mechanism; and its object is to produce a striking device that can be cheaply manufactured, having a minimum number of working parts adapted to be applied to the common forms of clocks without interfering with the clock mechanism and without requiring any extensive changes in the clock works or frame.

Further objects are to adapt the strike mechanism to repeat hours and quarter-hours or other subdivisions whenever desired and to insure steady uniform strokes of the bell at regular intervals.

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

Figure 1 is an elevation, partly broken away, showing the striking mechanism ready to strike the hour. Fig. 2 is a similar view showing the position of the mechanism after striking the hour. Fig. 3 is an edge view of the parts shown in Fig. 1. Fig. 4 is a detail showing the repeating device. Fig. 5 is a plan of Fig. 4. Fig. 6 is a perspective view of the hour and quarter-hour cams. Fig. 7 is a perspective of the cam and wheel that regulate the number of strokes. Fig. 8 is a rear view of a clock to which my improvement is attached. Fig. 9 is a side view of the same, partly broken away.

As is clearly shown in the drawings, the device consists in a curved member or quadrant 1, pivotally mounted on the frame of the clock, so as to move up and down in the arc of a circle. On the outer end of the quadrant are projecting pins 2, adapted to successively trip the striking-lever 3, so that the bell is struck once for every pin that passes the trip 4. Fixed to the opposite end of the quadrant-lever is a segmental gear 5, that

intermeshes with a loose pinion 6, revolvably mounted on the shaft 8 of one of the wheels 9 of the clock-train. Fixed to the pinion 6 is a toothed wheel 7, also loosely mounted on the shaft. On the wheel 9 of the clock-train is a spring-pressed pawl 10, arranged to engage the teeth on the wheel 7. While the clock is running the train-wheel 9 revolves in the direction of the arrow. When the quadrant is pushed up, the segmental gear 5 moves down and the pinion 6 and wheel 7 revolve to the right and the pawl 10 slides over the teeth of the wheel 7. As the quadrant 1 moves down under the action of the spring 11, provided for the purpose, the pawl engages the wheel 7, and the quadrant can then move down only so fast as the slowly-revolving wheel 9 of the clock-train permits. Thus the pins 2 are moved down slowly, successively tripping the striking-hammer at regular intervals.

To automatically move the quadrant up to its proper striking position, a cam 12 is provided on the minute-hand spindle of the clock, and so revolves once an hour. The edge of the cam presses against the roller 13 on the quadrant, thus reducing friction while the quadrant is being raised. The roller drops off the point of the cam once each hour, the spring draws the quadrant down, and the clock strikes.

To strike the proper number of times, a strike-regulating cam 14 is loosely mounted on a pin 15, fixed to the clock-frame. On the periphery of the cam is a series of twelve notches at different distances from its center corresponding to the twelve hours. Fixed to this cam is a wheel 16, having twelve depressions. A spring 17 holds the wheel in place. Fixed to the cam 12 is a projecting finger 18, that turns the wheel one space each hour, and consequently moves the strike-regulating cam 14 one notch per hour. To stop the striking mechanism when the proper number of strokes has been given, an arm 19 is fixed to the quadrant 1 and engages the notches of the strike-regulating cam, bringing the quadrant to rest, thereby preventing more than the proper number of pins from passing the trip.

By the above simple means a striking mechanism is produced that will strike the hours regularly.

To further increase the usefulness of the device, I have provided a mechanism whereby the apparatus will not only strike the hours, but may be made to repeat not only the hours, but the nearest quarter-hours, so that one may ascertain the time in the dark. To strike the quarter-hours, four additional pins 2^a are provided on the quadrant, separated a short distance from the hour-pins. The four quarter-hours are struck automatically when the quadrant is pushed up, so that the trip successively engages the four pins. To indicate the nearest quarter-hour, a stop is provided that prevents the quadrant from being pushed up beyond the proper quarter-hour pin. This stop consists in an arm 20, fixed to the quadrant 1 and having a projection 20^a adapted to engage the edge of the quarter-hour cam 21. This cam is fixed to the minute-hand spindle and revolves with it and with the hour-striking cam 12. The distances of its edges from the center fixes the limit of upward movement permitted the quadrant, so that on the first quarter-hour only one pin can be pushed beyond the trip 4 and at the fourth quarter four pins can be pushed above the trip. During the first half-hour this mechanism will repeat without difficulty; but when the hour-cam 12 begins to raise the quadrant by bearing against the wheel 13, as shown in Fig. 1, the desired downward movement of the quadrant in repeating would be encroached upon by the cam. To avoid this difficulty and to permit the mechanism to repeat correctly at any time, I mount the wheel 13 on an auxiliary arm 22, as shown in Fig. 4. This arm is normally held by frictional contact or by any suitable form of clasp close against the arm of the quadrant, but may be easily separated therefrom by means of a projecting pin 23, that protrudes back of the clock, as shown in Figs. 8 and 9. A similar pin 24 is provided on the quadrant-arm. To strike the hours, the two pins 23 and 24 are pressed together, so that the arm 22, carrying the wheel 13, coincides with the quadrant-arm; but to repeat when the hour is nearly completed and the hour-cam is in the position shown in Figs. 1 and 4 the pins are separated, as shown in Fig. 8, thus separating the two arms, and the lower or repeating arm is then pushed up, carrying the quadrant up as far as it will go. On its way down the quadrant repeats the quarter-hour and then the hour. This may be done as many times as desired. While the two pins 23 and 24 are separated the clock will operate simply as a repeater, not striking the hours; but as soon as the two pins are pressed together, thus fixing the wheel 13 on the quadrant-arm, it becomes again an hour-striking mechanism.

A clock fitted with this mechanism will

strike in any position. In striking the strokes are at regular intervals apart. The clock-hands can be set in any position without interfering with the action of the strike mechanism. For instance, if the hands are set ahead three hours the strike mechanism also goes ahead three hours. It is compact, easily applied to existing forms of clocks or watches, and is inexpensive to manufacture.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a striking mechanism, the combination with the clock-train of a striking-hammer having a trip; a pivotally-mounted spring-actuated arm; projections at the outer end of said arm adapted to successively engage said trip; a segmental gear fixed to the rear end of said arm; a pinion loosely mounted on the spindle of one of the revolving wheels of the clock-train and meshing with said gear; a toothed wheel fixed to said pinion and a pawl arranged to lock the toothed wheel to the train-wheel when the quadrant moves down.

2. In a striking mechanism, the combination with the clock-train of a striking-hammer having a trip; a pivotally-mounted spring-actuated arm; projections at the outer end of said arm adapted to successively engage said trip; a segmental gear fixed to the rear end of said arm; a pinion loosely mounted on the spindle of one of the revolving wheels of the clock-train and meshing with said gear; a toothed wheel fixed to said pinion and a pawl arranged to lock the toothed wheel to the train-wheel when the quadrant moves down; a quadrant-raising cam fixed to the minute-hand spindle of the train and adapted to raise the quadrant-arm and release it at each revolution; a revoluble notched cam; a wheel, having depressions, secured thereto; a spring engaging said wheel; a projecting arm fixed to the quadrant-raising cam and adapted to engage the depressions of said wheel; and a projecting arm carried by the quadrant and adapted to engage the notches of the notched cam.

3. In a striking mechanism, the combination with the clock-train of a striking-hammer having a trip; a pivotally-mounted spring-actuated arm; projections at the outer end of said arm adapted to successively engage said trip; a segmental gear fixed to the rear end of said arm; a pinion loosely mounted on the spindle of one of the revolving wheels of the clock-train and meshing with said gear; a toothed wheel fixed to said pinion and a pawl arranged to lock the toothed wheel to the train-wheel when the quadrant moves down; a quadrant-raising cam fixed to the minute-hand spindle of the train and adapted to raise the quadrant-arm and release it at each revolution; a revoluble notched cam; a wheel, having depressions, secured thereto; a spring engaging said wheel; a projecting arm fixed to the quadrant-raising

ing cam and adapted to engage the depres-
sions of said wheel; a projecting arm carried
by the quadrant and adapted to engage the
notches of the notched cam; a quarter-hour
5 cam fixed to the minute-hand spindle of the
train; an arm carried by the quadrant-arm
and adapted to engage the quarter-hour cam
to limit the upward movement of the quad-
rant; an arm pivotally mounted on the quad-

rant-arm and having a roller at its outer end; 10
together with means for temporarily detach-
ing said arm from the quadrant-arm.

In testimony whereof I affix my signature
in presence of two witnesses.

FRANZ G. BERLING.

Witnesses:

JAMES C. HANSON,
A. A. EASTERLY.