

No. 660,075.

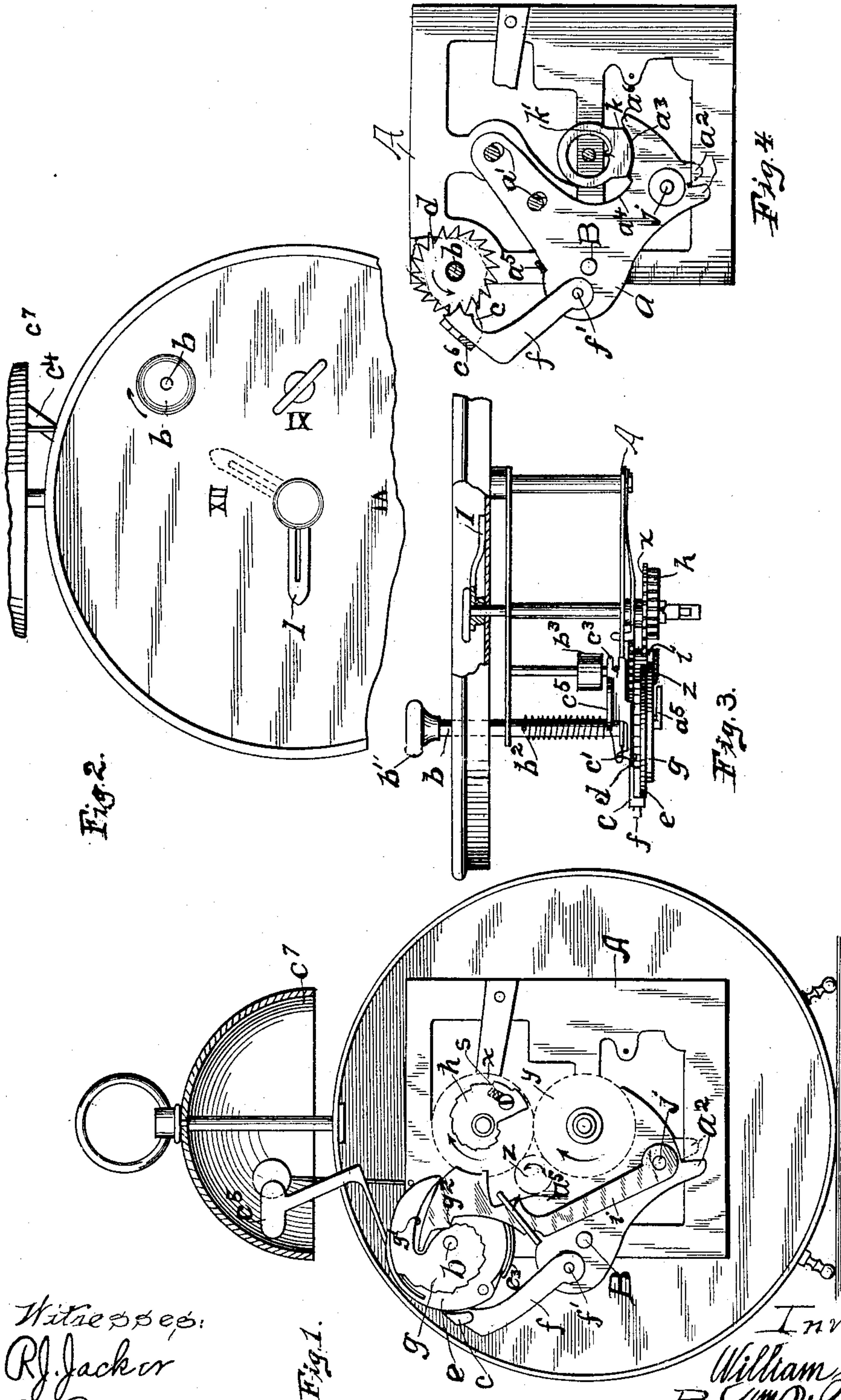
Patented Oct. 16, 1900.

W. JENSEN.
REPEATING CLOCK.

(Application filed Aug. 2, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:
R. J. Jacker
C. Plumtree

Inventor:
William Jensen
By *Wm. Zimmerman*
Att'y.

No. 660,075.

Patented Oct. 16, 1900.

W. JENSEN.
REPEATING CLOCK.

(Application filed Aug. 2, 1899.)

(No Model.)

3 Sheets—Sheet 2.

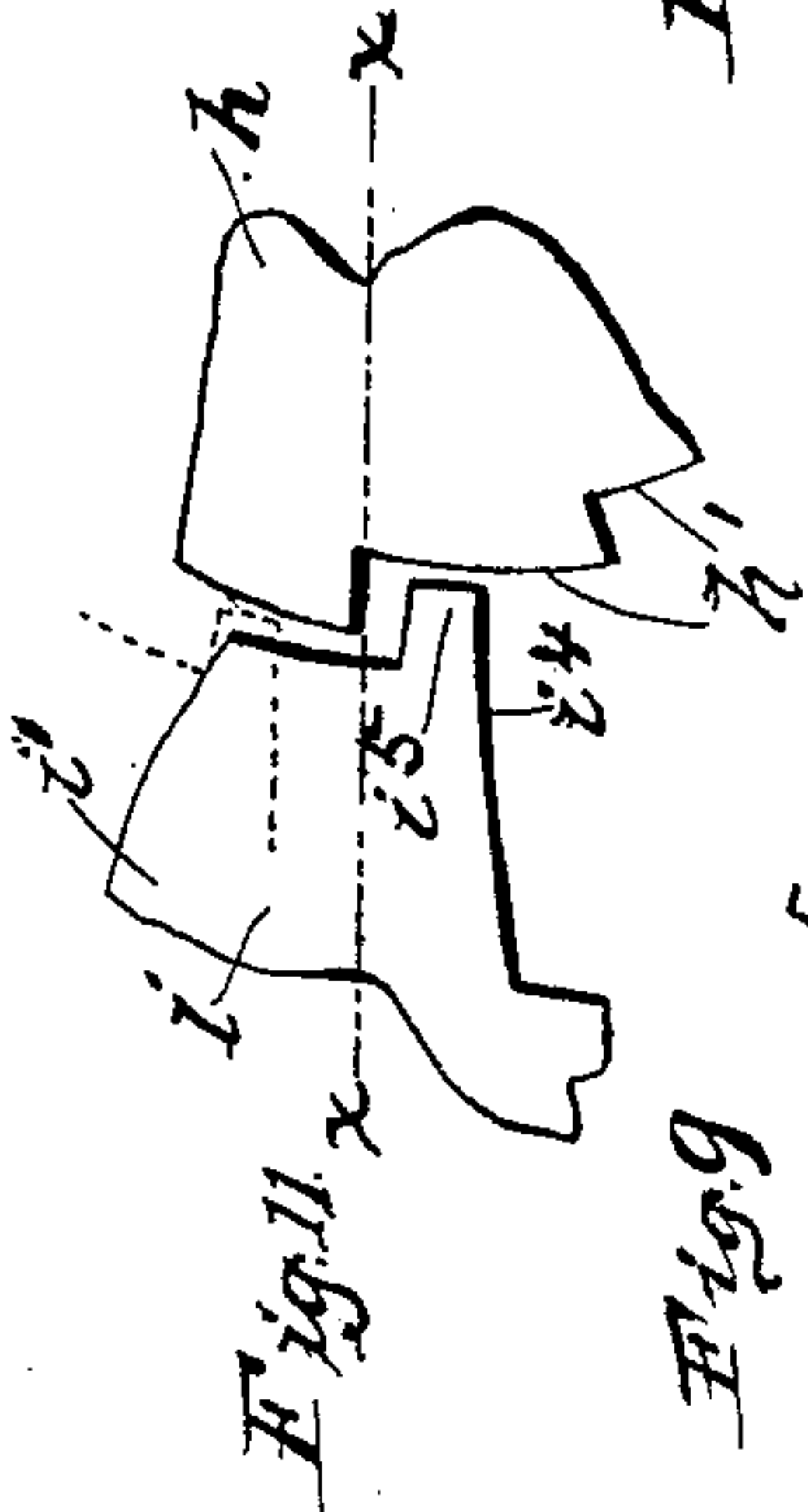
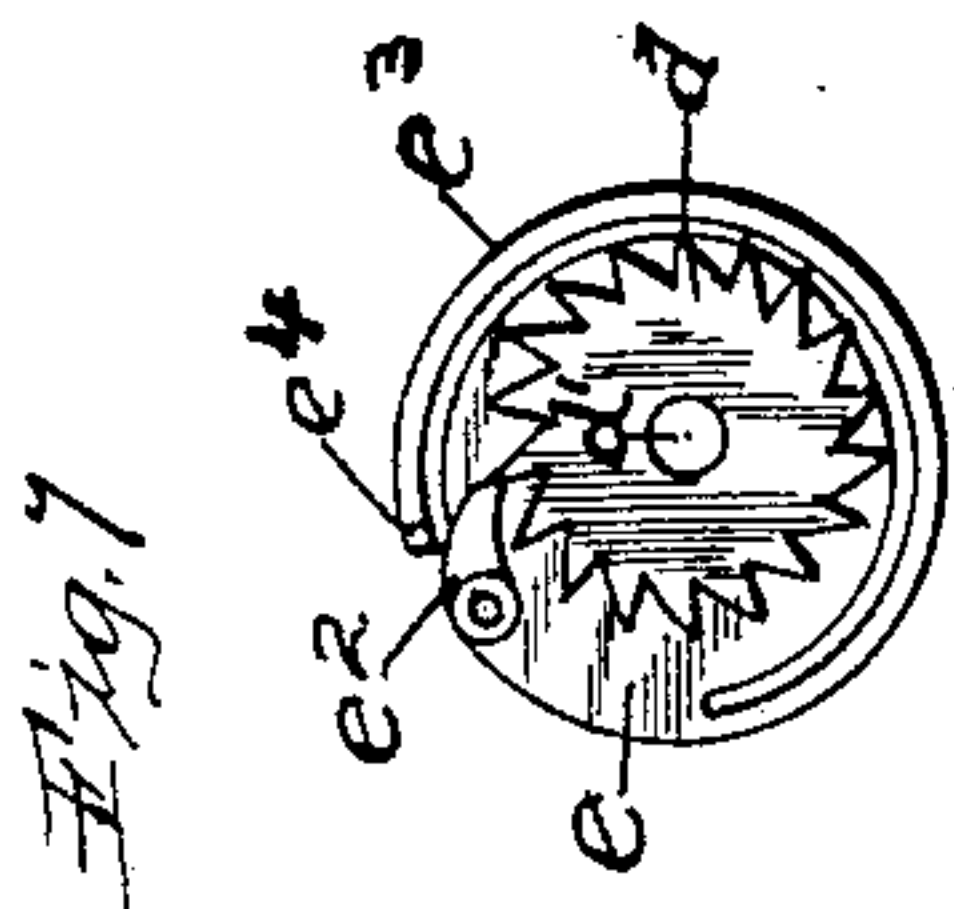
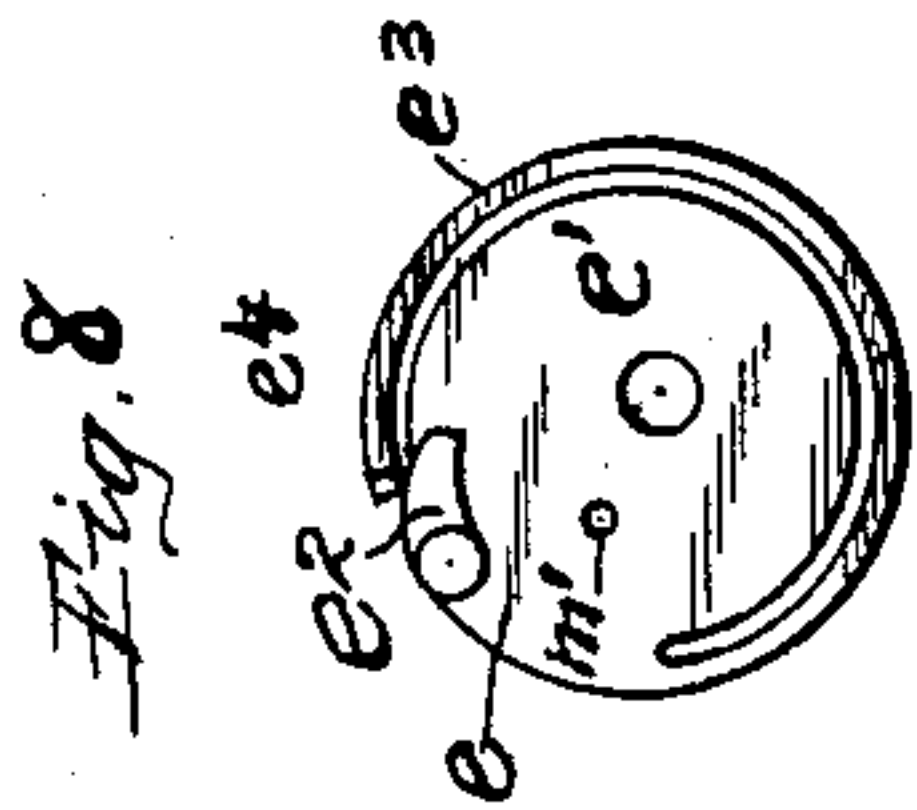


Fig. 10

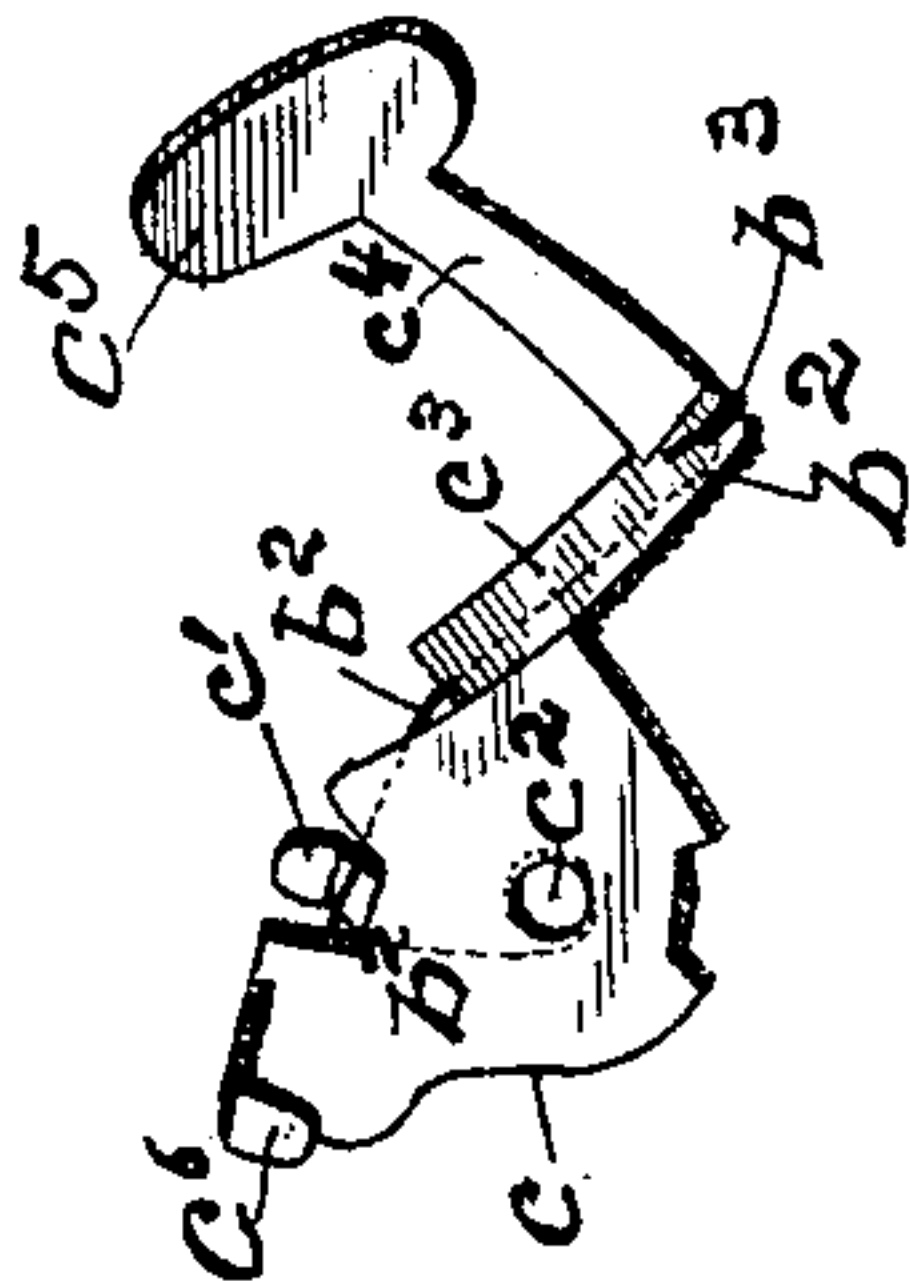


Fig. 9

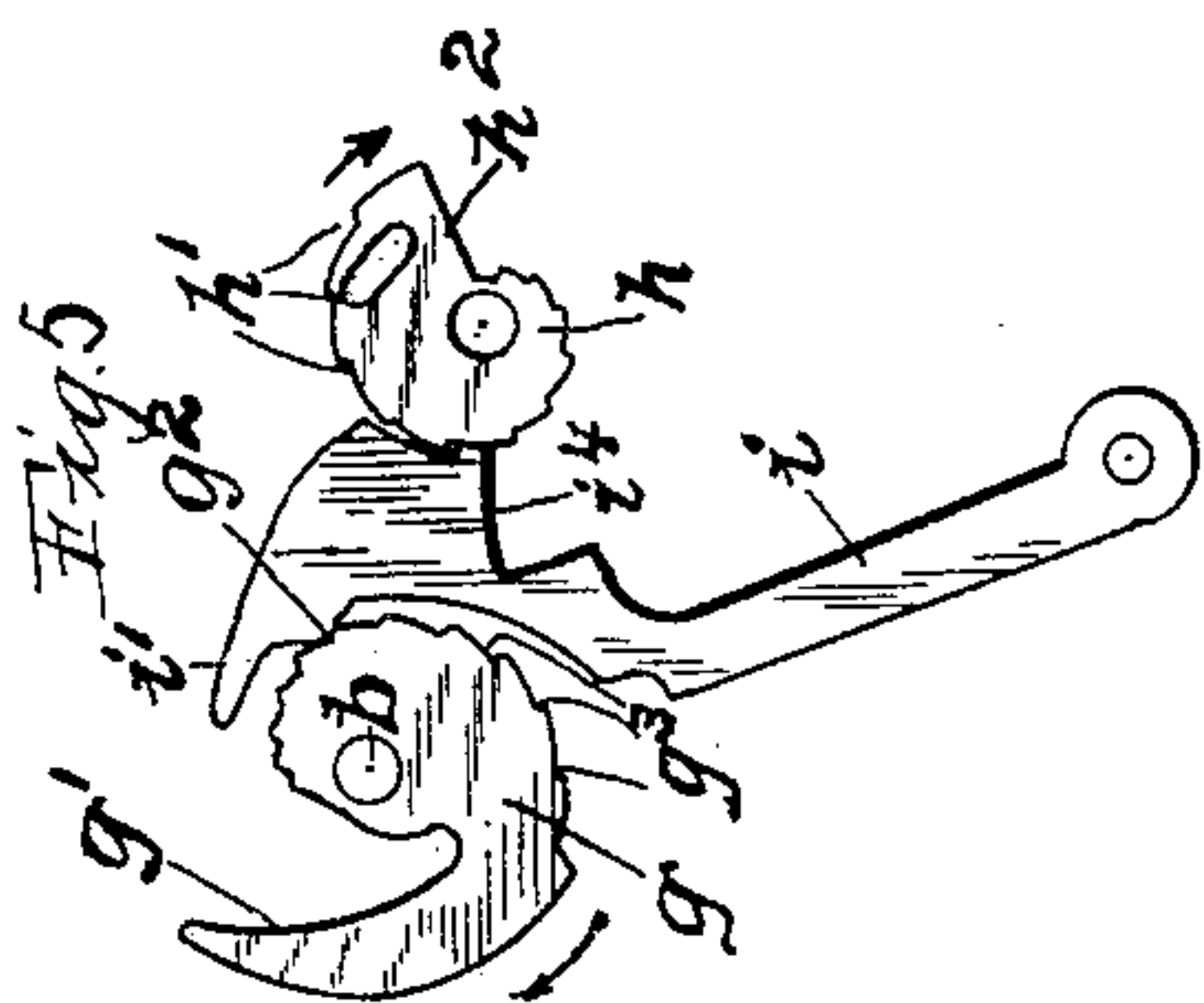
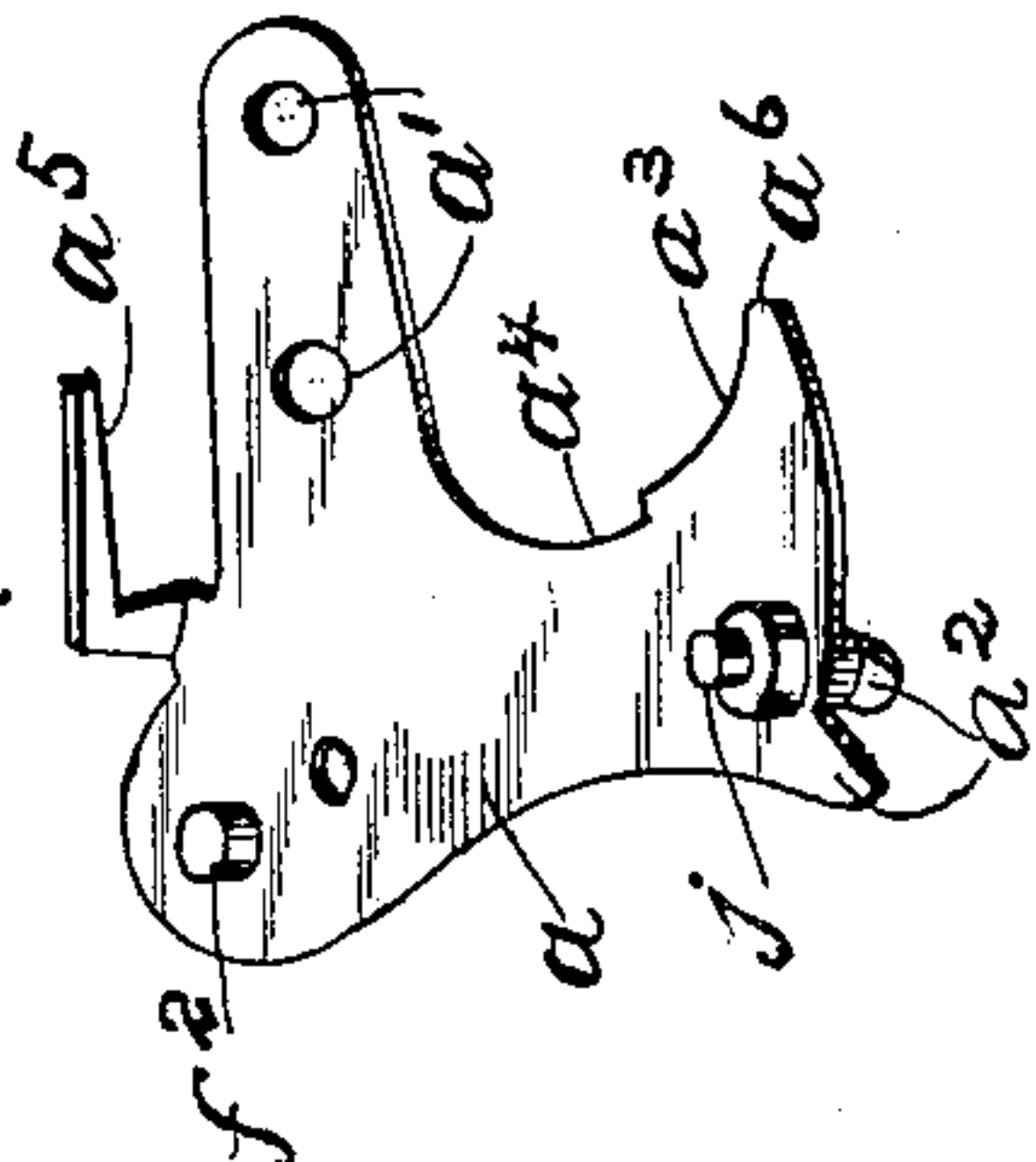


Fig. 6



Witnesses:
R. J. Jacher
O. Humtree

Inventor:—
William Jensen
By Wm Zimmerman.
Attys—

No. 660,075.

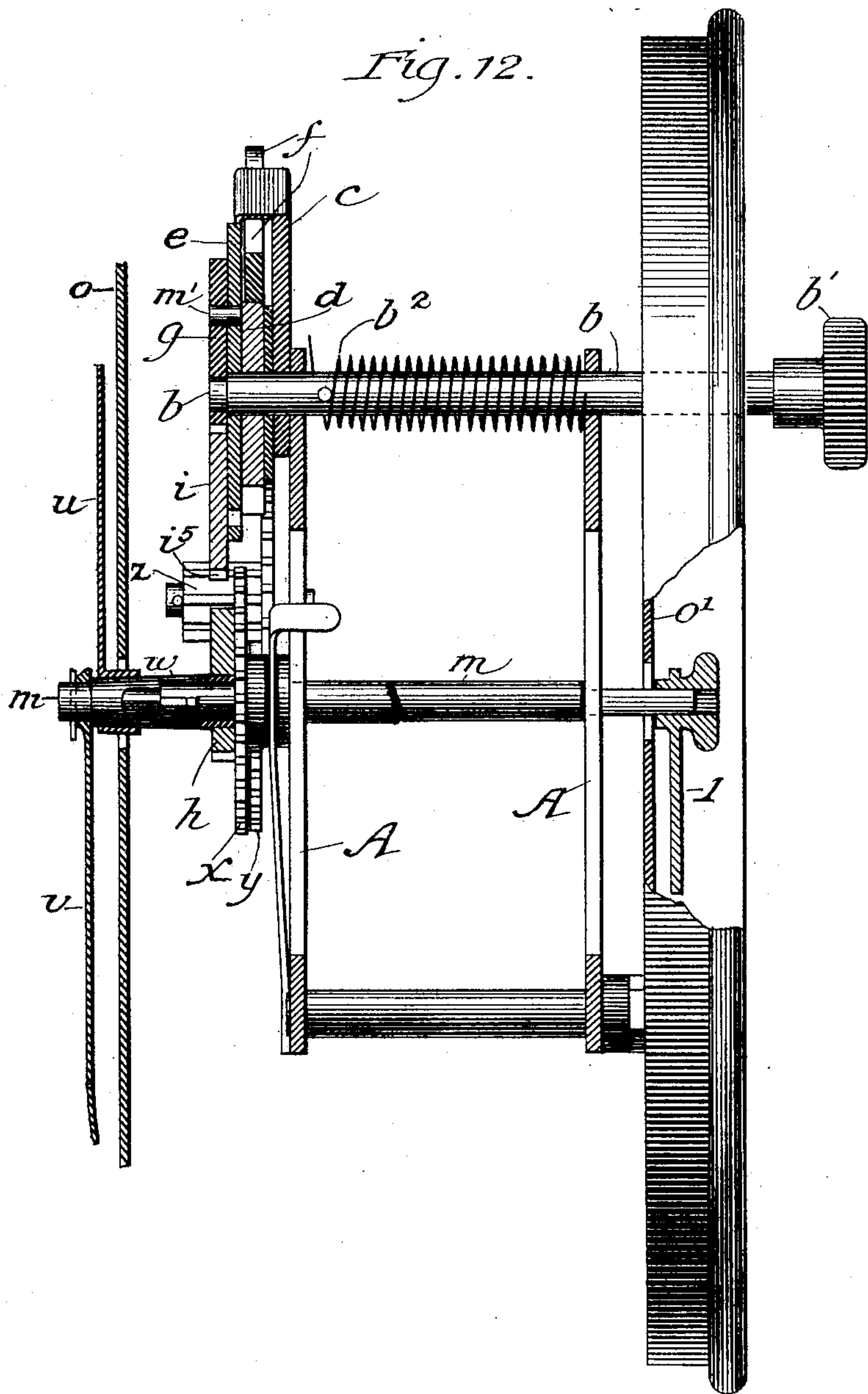
Patented Oct. 16, 1900.

W. JENSEN.
REPEATING CLOCK.

(Application filed Aug. 2, 1899.)

(No Model.)

3 Sheets—Sheet 3.



Witnesses:

Frank S. Blanchard
Frank S. Burham

Inventor:

William Jensen.
By *Wm Zimmerman.*
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM JENSEN, OF CHICAGO, ILLINOIS.

REPEATING CLOCK.

SPECIFICATION forming part of Letters Patent No. 660,075, dated October 16, 1900.

Application filed August 2, 1899. Serial No. 725,834. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JENSEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Repeater-Clocks, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part hereof, and in

which—
Figure 1 shows a front view of a clock to which my new striking mechanism is attached, the bell thereto being shown in section, the clock-front being removed. Fig. 2 shows the back of the clock, on which is seen a pointer for fractional parts of hours. Fig. 3 shows a top view of the mechanism shown in Figs. 1 and 2, a part of the clock-back being broken away to show other parts in place. Fig. 4 shows the striking-pawl and its wheel, together with the vibrating plate or bell-crank lever on which the striking-pawl is mounted, the other parts being removed. Fig. 5 shows the stepped bell-snail and the stepped hour-snail, the several parts in position at the end of the fifth hour, the intermediate pawl, which measures the number of bell-strokes, being still in contact with the hour-snail, the normal position of said pawl being shown in Fig. 1. Fig. 6 shows the bell-snail in a position reversed to that shown in Fig. 5. Fig. 7 shows the striking-wheel with its pawl and spring holding mechanism seen on the reversed side. Fig. 8 shows the spring and pawl holding plate of Fig. 7 on the reversed side, the striking-wheel being removed. Fig. 9 shows in perspective the lever which regulates the striking mechanism, which is also shown in Figs. 1 and 4. Fig. 10 shows in perspective the striking-hammer and its mechanism coöperating with the striking-pawl and other parts of the mechanism. Fig. 11 shows fragments of the time-cam and intermediate pawl *i* on an enlarged scale to more clearly illustrate the operation of the vibratable lever *a* and pawl-spur *i*⁵ with the hour-snail. Fig. 12 shows a sectional view of my mechanism cut on the axial planes of the shafts *b* and *m* and a section of the front dial and its hands and a rear dial partly in

section and its frictionally-adjustable minute-hand also in sectional view.

Like letters of reference denote like parts.

The object of my invention is to make a striking clock mechanism applicable to any clock now on the market and wherewith can be told the time by the blind or those who are in the dark to within an inconsiderable fraction of the hour. To attain said desirable ends, I construct my said mechanism in substantially the following manner, namely:

To the framework *A* of an ordinary clock I attach a vibratable bell-crank lever *a*, pivoted on the mainspring-shaft *B* of the clock, and about vertically above said shaft I provide a shaft *b*, having a knob *b*¹, by which it is turned against the action of a spiral spring *b*², wound on said shaft, (see arrow at Fig. 5,) one end of said spring being fastened to said shaft, while the other end thereof is extended upward and hitched over the spur *c*¹ of the hammer-yoke *c*, which latter plays loosely on said shaft *b*, passing through a hole *c*². The hook *b*³ of the spring end hitches into a notch at the end of a horizontal arm *c*³ of the yoke *c*, on which is a vertical arm *c*⁴, terminating in a bell-hammer *c*⁵. Said yoke *c* is close against the frame *A* behind the deep-toothed striking-wheel *d*, through whose hole *d*¹ passes the shaft *b*, upon which it turns freely, as does also freely turn on said shaft the toothed wheel *d*, and into the teeth of said wheel *d* plays a clicking-pawl *e*², pivoted to the disk *e*, whose free end is depressed toward the shaft *b* by the spring *e*³, attached to the disk *e*, whose free end reaches over and rests on said pawl, and said toothed wheel *d* also receives and actuates the free end of the right-angled striking-pawl *f*, pivoted in the plate *a* on the lever end opposite to that of the pawl *i* at *f*¹, and upon the top edge of the free end of said striking-pawl *f* and near its free end rests the right-angled spur *c*⁶, forming a part of the yoke *c*. The action of the spring *b*² and spur *c*⁶ and the position of the edge of said pawl to said spur brings and constantly holds the end edge of said striking-pawl *f* in contact with a tooth of the striking-wheel *d*. Outside of said disk *e* and securely fastened to the shaft *b* is bell-snail *g*, whereof its companion—the

hour-snail h —may be fastened to the hour-hand wheel or any wheel turning synochronously therewith, as does in this case the wheel x , actuated through the intermediate z and to which said cam h is fastened.

The snail g has a wiper-arm whose face g' slides on the cam-surface i' of the double-faced and double-acting pawl i , vibrating on a pivot j on said lever a both vertically and horizontally, and through said wiper-face by the action of the spring b^2 said pawl i is constantly brought and held in contact with the snail g , its obtuse-angled notch-face g^2 resting in one of the twelve notches g^3 of the cam edge g . The time-snail h also has twelve notches h' , which on both snails are measured by twelve equal angles of thirty degrees at the cam-axis, and each of said snails g h being of involute form said twelve notches will be of constantly-increasing length between successive longer radii. Said pawl i has on the edge opposite to that on which the spur g^2 is located a spur i^5 , whose under edge i^4 is somewhat longer than the edge h^2 of the cam h , so as to permit that end of the tooth i^5 to touch the bottom of the notch at the end of said long edge h^2 . Said vibratable or bell-crank lever a has opposed spurs a^2 on its lower member, which straddle the frame-plate of the frame A to guide it in its motion, and in its upper member are oblong holes a' to pass studs and allow it to vibrate, and on the center arbor, which drives the minute-hand, is a cam-faced arm k on a ring which surrounds and closely fits said pinion, its spur k' passing between two teeth to hold it at its set position. The end of said arm is an arc of a circle whose edge slides over the cam edge a^3 of the lever a from the point a^6 , which it depresses and holds down, as shown, during a part of the time of its revolution and until it leaves it at the beginning of the radially farther edge a^4 .

The cam-face of the arm k is made of sufficient length to hold the cam-face a^3 in its lowest position, and thereby bring the spur i^5 below the line x , corresponding with the radial edge of the notch h' then on said line and which is the line at which the relative positions of the parts i^5 and h' change. Previous to said change the spur i^5 would rise above said line through the depression of the pawl f at the other end of the lever a and continue to do so until the said cam-faces k and a^3 engage. Said two cam-faces hold the lever a down, and with it the spur i^5 , so as to safely clear the radial edge of the notch h' of the time-snail h . When said cam-faces k a^3 have released the lever a —say after twenty minutes—the time-cam has gone forward so far that the spur i^5 cannot quite reach the radial edge of the notch h' and cause said spur to stick, and before the time-cam has gone far enough to allow the spur i^5 to pass below the radial edge of the next time-notch h' the cam-faces k a^3 engage fully in less than

one minute by passing over the point cam-face a^6 and then hold the lever a locked, causing the spur i^5 to pass into the next notch and allow the bell to strike the next hour, and so on. The object of said alternate locking and releasing mechanism is, first, to overcome both the looseness and inaccuracy of cheap clock mechanism and, second, to prevent the opposed faces of the spurs i^5 and h' from coming in close frictional contact on the line x , and thereby causing the spur i^5 to stick.

On the rear of the shaft which carries the minute-hand is a hand or pointer l , frictionally adjustable to its proper place, to serve to show where the position of the minute-hand is on the clock-face, and which may thereby be located within a few minutes of the correspondent minute-hand by feeling it with the fingers. The snail h moves with the hour-hand. Turning the knob b' , as indicated, winds up the spring, which when released throws the cam-surface g' on the inclined edge or cam-face i' , and thereby draws the pawl i against the cam g into its normal position. Whenever it is desired to ascertain the time, the knob b' is turned slowly, thus passing the spur g^2 from notch to notch on the snail g and at the same time clicking the striking-pawl f from tooth to tooth on wheel d , whereby through yoke c and spring b^2 the hammer c^5 strikes the bell c' a blow for each notch of the wheel d , which actuates said pawl f , and whereby for each bell-stroke the pawl i is advanced a notch on the snail g toward the cam h until finally the face of the spur i^5 touches the snail h and the turning of the snail g and wheel d is arrested, the number of bell-strokes thus produced telling the hour.

Although the true position of the upper edge of the spur i^5 is at the line x , it is practically never there when at its work, but either above or below said line a distance which will insure against the wedging or interlocking of the upper edge of the spur i^5 with any of the radial edges of the notches of the time-snail. The distance between the broken outline of the spur i^5 and its place in full lines (see Fig. 11) indicates the motion up and down imparted to the pawl i through the lever a and striking-pawl f through its connections. Said spur will therefore work above said line x some distance, when, were it not for such lever action, it should be down, so that the upper edge of the spur i^5 would engage with the radial edge of the notch h' of cam h , where the change from one hour-notch to the next occurs. By means of this construction it is brought so far below the line x at the time the change takes place of passing from one to another of said notches as to avoid all possible chance of sticking. The hour-snail h has a radially-arched slot, through which passes a screw to bind it to the wheel, as wheel x , and in said slot is a spring s to aid

in the adjustment of said cam. The snail *g* has a hole *m* and the disk *e* a spur *m'*, which enters said hole *m* and causes said two parts to move together. As the snail *g* cannot complete a revolution, the wheel *d* must have enough teeth to supply twelve consecutive strokes at one time in such partial revolution on shaft *b*. The spring *b*² throws the hammer *c*⁵ against the bell. It also holds the striking-pawl against the striking-wheel *d*, and it also returns the cam *g* and pawl *i* to their normal positions. There is a spur *m* on the bell-snail, which enters a hole *m'* of the disk *e* to hold said parts together. The single shaft *m* passes through the dials *o* and *o'* and carries the hour-hand *u* and minute-hands *v* and *l*.

What I claim is—

1. The combination with an adjustable hour-snail and a striking mechanism, of a bell-snail and a pawl between said hour-snail and bell-snail, actuated by said bell-snail and stopped by said hour-snail, substantially as specified.

2. The combination with a time mechanism an hour-snail and a bell-snail and striking

mechanism, of a pawl between said snails reciprocated by said bell-snail and stopped by said hour-snail, substantially as specified.

3. The combination with a time mechanism and a striking mechanism, of an hour-snail and a bell-snail provided with a wiper-face and a wiper-faced reciprocable pawl between said snails, substantially as specified.

4. The combination with a time mechanism and a striking mechanism, of an hour-snail and a bell-snail and mechanism to actuate said bell-snail in one direction and means to return said snail, automatically, to its starting-point, substantially as specified.

5. The combination with a time mechanism and a striking mechanism and time-dials whereof one is provided with the common time-hands, of a dial-hand synchronous with the minute-hand of said common time-hands to, palpably, indicate the fractional parts of an hour in its complete revolution, substantially as specified.

WILLIAM JENSEN.

Witnesses:

WM. ZIMMERMAN,
GEO. W. JENKS.