

No. 659,530.

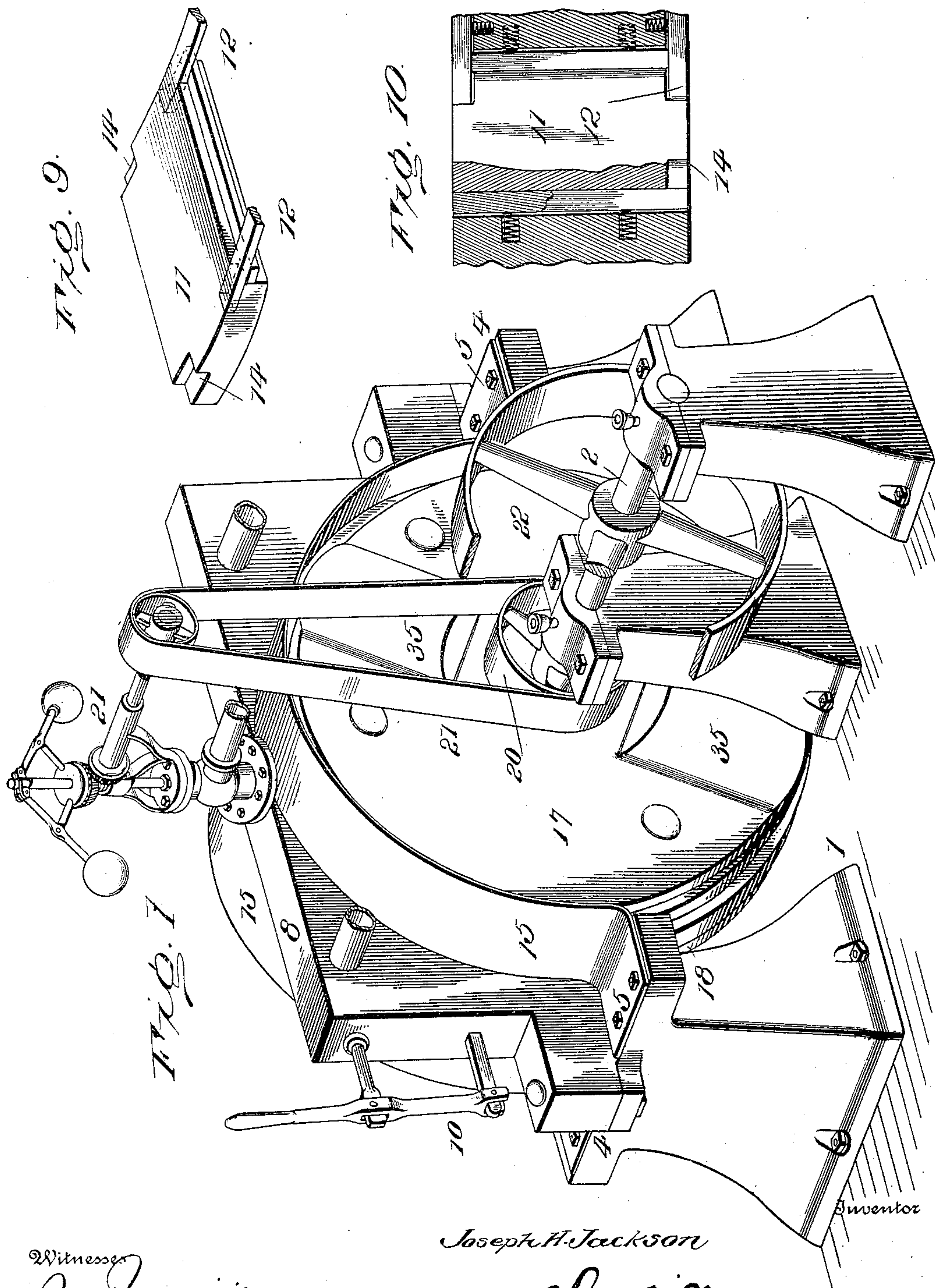
Patented Oct. 9, 1900.

J. H. JACKSON.
ROTARY ENGINE.

(Application filed Feb. 2, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

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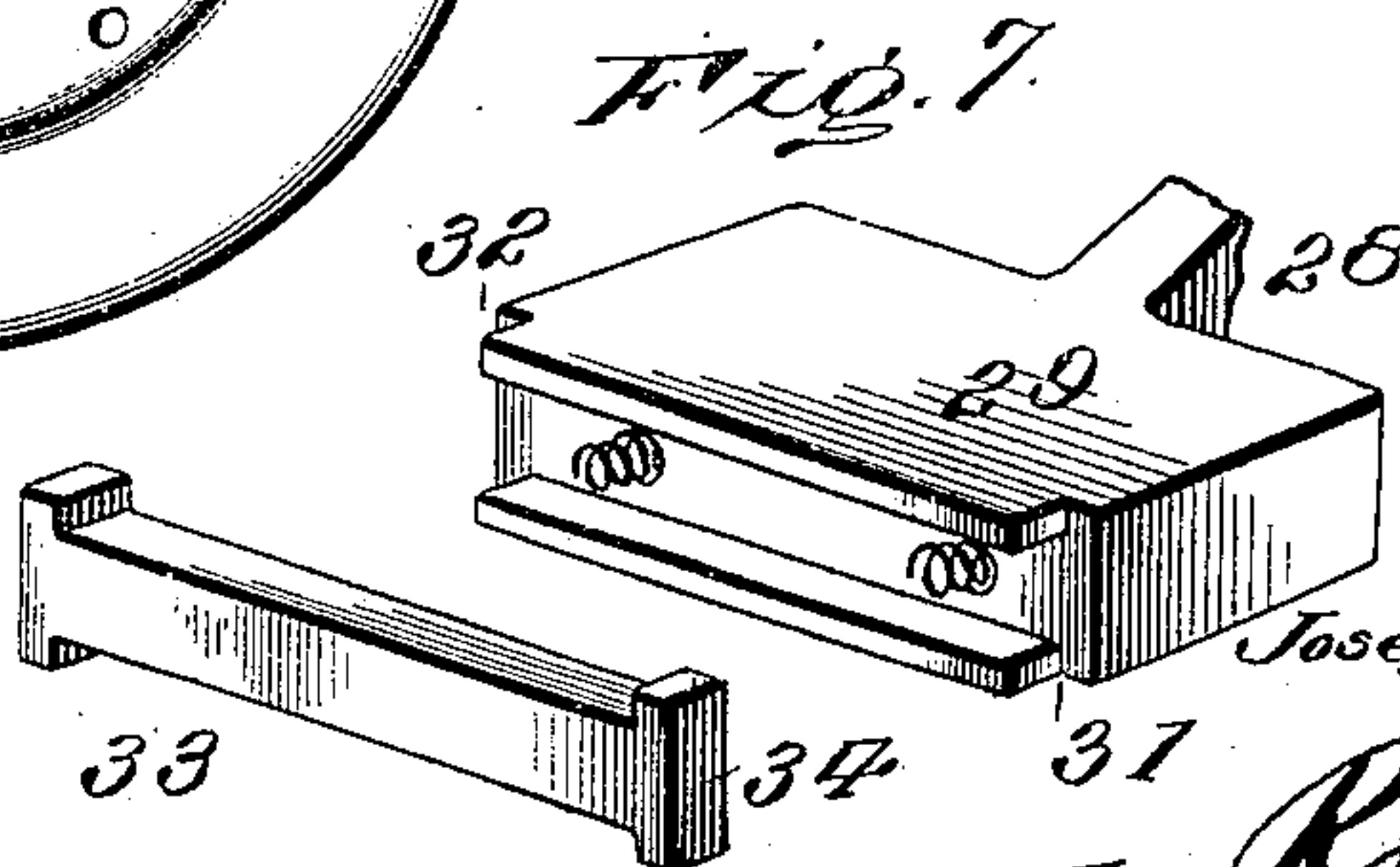
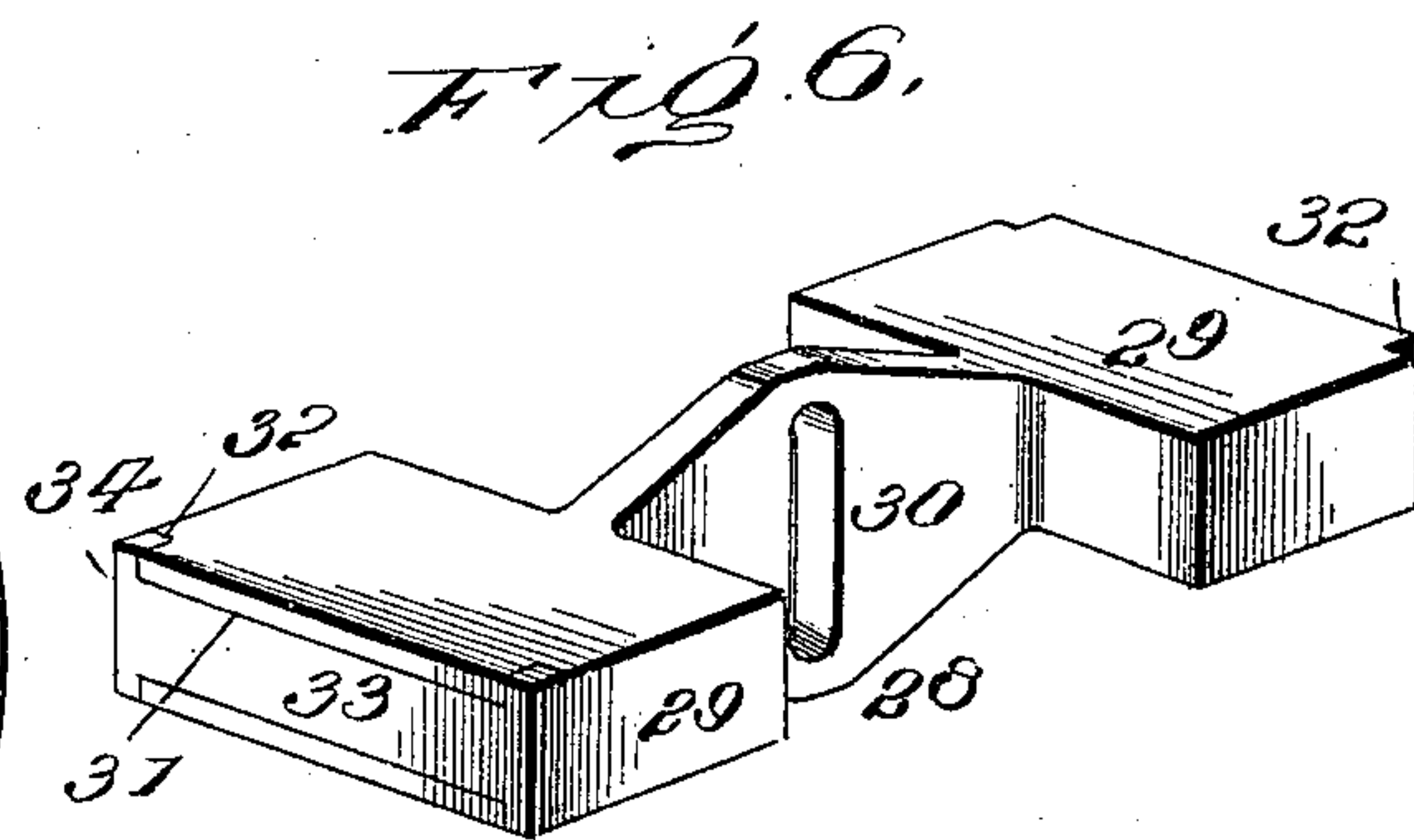
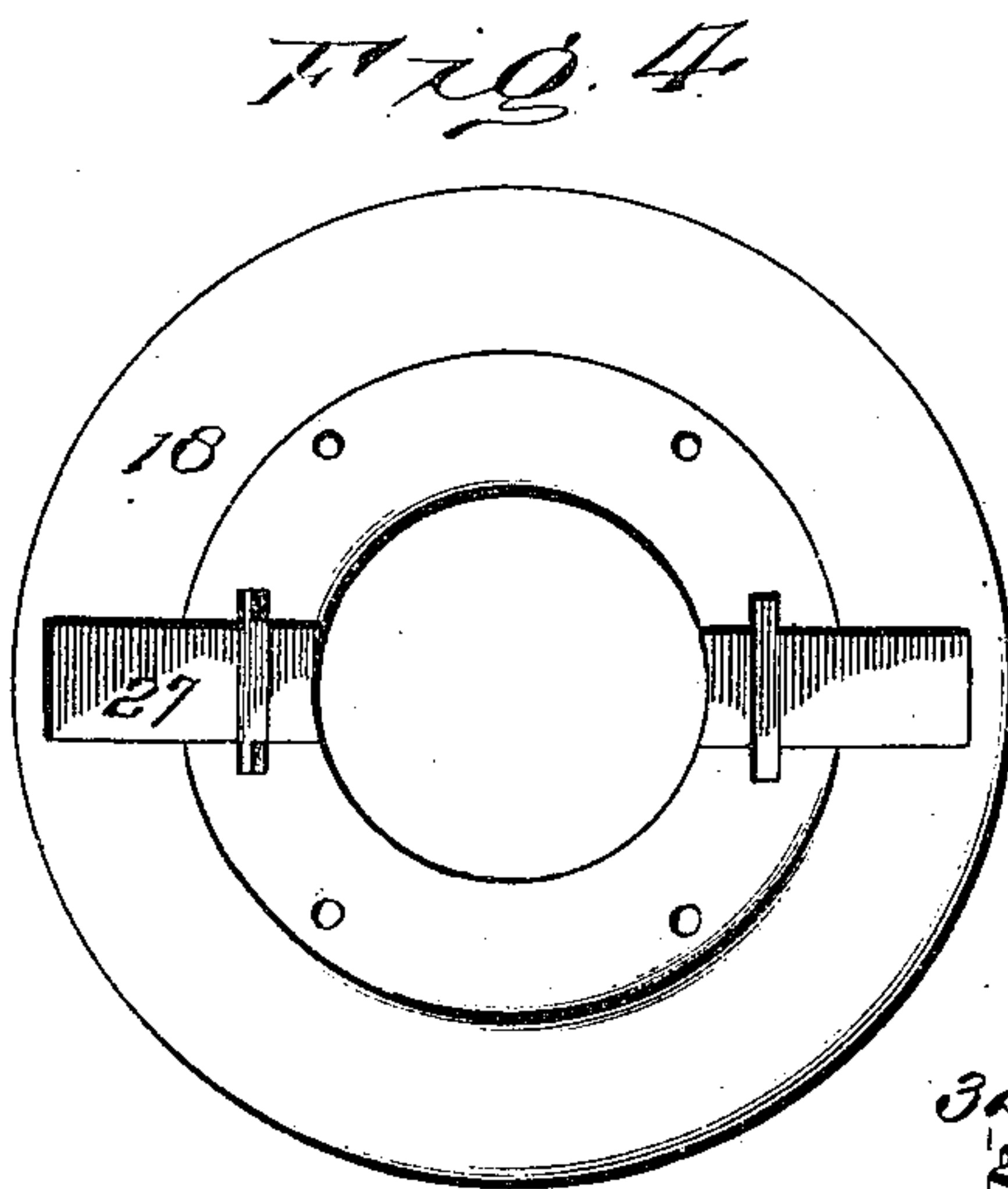
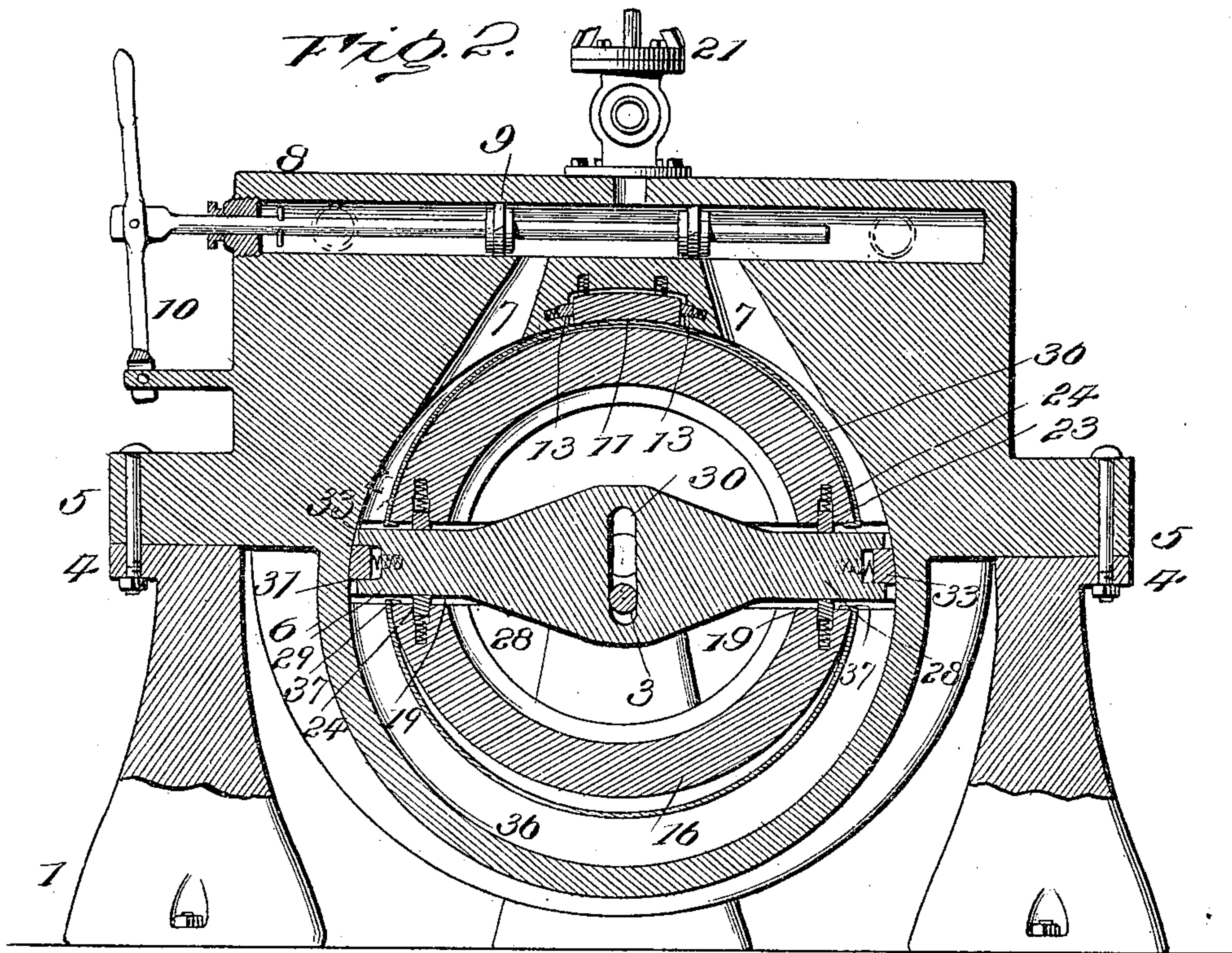
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3 Sheets—Sheet 2..



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UNITED STATES PATENT OFFICE.

JOSEPH H. JACKSON, OF BUFFALO, ALABAMA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 659,530, dated October 9, 1900.

Application filed February 2, 1900. Serial No. 3,726. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH H. JACKSON, a citizen of the United States, residing at Buffalo, in the county of Chambers and State of Alabama, have invented certain new and useful Improvements in Rotary Engines; 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 belongs to that type of rotary engines in which the piston is eccentrically disposed and slidably mounted in the hub or drum and which is adapted to be driven in reverse direction, either to the right or to the left, as required.

This invention aims to devise an engine of the character aforesaid which will utilize a maximum percentage of the motive power, obviate backlash, and be free from jar and pounding.

With these and other objects in view, which will suggest themselves to the skilled observer as the details of the engine are unfolded and comprehended, the invention consists, essentially, of the novel features, peculiar construction, and the combination of the parts, which will be hereinafter more fully set forth, illustrated, and finally embodied in the claims.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are necessarily susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a rotary engine embodying the vital features of the invention. Fig. 2 is a longitudinal section. Fig. 3 is a transverse section. Fig. 4 is a plan view of one of the heads of the drum or hub. Fig. 5 is a perspective view of the other head having the drum or hub applied thereto, the packing at one opening being in position and that at the opposite opening being removed. Fig. 6 is a perspective view of the

piston. Fig. 7 is a detail perspective view of an end portion of the piston, the packing being shown separated therefrom. Fig. 8 is a perspective view of the cylinder. Fig. 9 is a detail view in perspective of the abutment. Fig. 10 is a detail plan view of the abutment, the adjacent parts being broken away to show more clearly the relative arrangement of the transverse and annular packing-strips.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The base or stand 1 is hollow and is provided at opposite sides with bearings to receive shafts 2 and 3, disposed relatively out of line, the shaft 2 constituting the axis of the engine and the shaft 3 a guide for the shiftable piston. This base is designed to be secured to a bed of masonry or other substantial foundation and is provided at its ends with offstanding lugs 4, to which corresponding lugs 5 of the cylinder are bolted.

The cylinder 6 is approximately of annular form and is open at its ends and is gradually thickened at its upper portion in order to make provision for the ports 7, by means of which the steam or other motive medium is admitted to the engine and exhausted therefrom. The chest 8 is applied to the upper portion of the cylinder and contains a valve 9, by means of which the direction of admission of the steam or other motive medium into the cylinder is controlled to drive the engine either to the right or to the left, as required. A lever 10 has connection with the valve-stem and is adapted to be manipulated to throw the valve to the required position. The ports 7 are spaced apart at their inner or delivery ends and are separated by means of a spring-actuated abutment 11, fitted to the inner wall of the cylinder at the highest point. Packing-rings 12 are fitted into rabbets at the ends of the cylinder and are pressed outward by springs and are designed to preserve a steam-tight joint between the ends of the cylinder and the heads of the rotary hub or drum. These packing-rings 12 may be of any material and of desired construction so long as they will attain the desired end. Packing-strips 13 are fitted into the grooves or seats formed in the walls

of the recess in which the abutment 11 is seated and prevent any escape of steam at these points. The outer corners of the abutment are cut away, as shown at 14, to receive the projecting terminals of the packing-rings 12, which fit therein and overlap the end portions of the abutment and hold the latter in place. The terminal portions of the packing-strips 13 overlie the end portions of the packing-rings, as most clearly indicated in Fig. 8. Curved plates 15 are disposed upon opposite sides of the chest 8 and overlie the upper portions of the cylinder 6 and heads of the rotary drum and are secured at their ends to the base or stand 1 and at their inner edges to the cylinder. These plates extend over the joint formed between the heads of the drum and the adjacent portions of the cylinder and prevent any foreign matter finding its way into said joint, and they also serve as deflectors to prevent the upward flight of any steam escaping when the engine is in operation.

The rotary element of the engine comprises a drum or hub 16 and heads 17 and 18. The drum or hub 16 may be formed with or rigidly attached to one of the heads, as 17, and is provided at diametrically-opposite points with openings 19, through which the end portions of the piston slide. The drum or hub is hollow or of annular formation, and the head 18 is bolted or otherwise secured to the end opposite that provided with the head 17. The hub or drum is eccentrically mounted with reference to the cylinder, and the shaft 2 is secured at its end to the head 17 and is mounted in bearings applied to the base 1 and is provided with a pulley 20, connected by belt with the governor 21, of ordinary construction, by means of which the speed of the engine is controlled in the usual manner. A band-pulley 22 is likewise secured to the shaft 2 in order to enable power to be taken from the engine for driving the machinery in the ordinary way. The heads 17 and 18 overlap the ends of the cylinder 6, a steam-tight joint being maintained between them and said cylinder by means of the packing-rings 12 in the manner aforesaid.

As previously stated, the piston is slidably mounted in the openings 19, and in order to prevent escape of steam or other motive agent packing is provided in the sides of the openings 19 to bear against the corresponding sides of the piston. Grooves 23 are formed in the side walls of the openings 19 and receive packing-strips 24, and corresponding grooves 25 are provided in the end walls of the openings 19 to receive packing-strips 26, said grooves 25 being formed in the inner faces of the heads 17 and 18 in line with the grooves 23. The meeting end portions of the packing-strips 24 and 26 are halved, so as to overlap, and these packing-strips are pressed against the adjacent faces

of the piston by means of springs located in the bottoms of the respective grooves or seats 23 and 25. Grooves or radial depressions 27 are formed in the inner faces of the heads 17 and 18 in line with the openings 19 and receive the end portions of the heads or buckets of the piston. The grooves 27 in the same head are in longitudinal alinement and are disposed at diametrically-opposite points, and their side walls constitute bearings for the heads of the piston when projected beyond the outer wall of the drum or hub 16.

The piston comprises a centrally-disposed bar 28 and heads or buckets 29, secured to the end portions of the bar 28 and of a length to have their end portions enter the grooves or radial depressions 27, in which they slide when the engine is in operation. The bar 28 is provided at a medial point with a transverse slot 30 to receive the inner end of the shaft 3, which latter is secured at its outer end to a side of the base or stand 1. This shaft 3, in conjunction with the slot 30, serves in a measure to effect a shifting of the piston with reference to the drum or hub 16 when the engine is in operation, thereby reducing the friction and wear between the inner wall of the cylinder and the terminals of the piston. The outer ends of the heads or buckets 29 are grooved or channeled, as shown at 31, and the terminal portions of the walls bordering upon the grooves 31 are cut away, as shown at 32, the grooves or channels 31 and the cut-away parts 32 being designed to receive a packing by means of which a steam-tight joint is preserved between the cylinder and piston. The packing applied to the outer ends of each of the heads 29 consists of a strip 33, having lateral extensions 34 to enter the cut-away parts 32, the strip 33 being adapted to snugly fit the groove or channel 31. This packing is pressed outward by means of a spring interposed between it and the bottom of the groove or channel 31.

The central portion of the head 18 is open for the sake of lightness and also to enable a lubricant to be supplied to the slot 30 and to the heads of the piston. The portions of the heads 17 and 18 adjacent to the ends of the drum or hub 16 are raised, as shown at 35, and segment-plates 36 are fitted to the outer walls of the portions of the drum or head separated by the openings 19, the end portions of the plates 36 being bent, as shown at 37, and secured to the side walls of the openings 19. The edge portions of the plates 36 project beyond the ends of the drum or hub 16 and overlap the outer shoulders of the annular raised parts 35 of the heads. These plates 36 are of spring metal and normally stand a short distance away from the outer wall of the part comprising the drum 16, to which they are attached, and exert a pressure against the abutment 11 and cooperate therewith to preserve a steam-tight joint between

the cylinder and drum or hub, so as to prevent any possible escape of steam when the engine is working under high pressure.

Having thus described the invention, what is claimed as new is—

1. A rotary engine comprising an open-ended cylinder, a drum eccentrically disposed with reference to the cylinder, heads secured directly to the ends of the drum and rotatable therewith and overlapping the ends of the cylinder and closing the latter, the engine-shaft being made fast to one of said heads, a piston slidably mounted in the drum, and a second shaft out of line with the first-mentioned shaft and passing through the other head and having slidable connection with the piston and serving to direct the same in its reciprocating movements, substantially as set forth.

2. In a rotary engine, an open-ended cylinder, a drum having eccentric relation with reference to the cylinder, heads secured directly to the ends of the drum and rotatable therewith and overlapping and closing the ends of the cylinder, one of said heads being a disk and having the engine-shaft applied thereto and the other head being an annulus, a piston slidably mounted in the said drum and comprising a central portion having a transverse slot, and heads, and a second shaft out of line with the first-mentioned shaft and secured at its outer end and having its inner end passing through the central opening of the annular head and slidably connected with the central portion of the piston by entering the transverse slot thereof, substantially as set forth.

3. In an engine of the type described, the combination with the slidably-mounted piston having a groove in its outer end and the terminal portions of the wall bordering upon the groove cut away, of a packing-strip seated in said groove and having oppositely-disposed terminal extensions to fit into the aforesaid cut-away portions of the walls thereof, substantially as set forth.

4. In an engine of the type described, the combination with the cylinder and an eccentrically-disposed drum provided with a movable piston, of an abutment applied to the inner wall of the cylinder and adapted to press upon the outer wall of the drum and having its corner portions cut away, and packing-rings applied to the ends of the cylinder and having terminal portions entering the cut-away corner portions of the said abutment, substantially as set forth.

5. In an engine of the type described, the combination with the cylinder, and an eccentrically-disposed drum having a movable piston, of an abutment seated in the inner wall

of the cylinder and normally bearing against the outer wall of the drum and having its corner portions cut away, packing-strips let into grooves in the walls of the recess in which the abutment is seated, and packing-rings applied to the ends of the cylinder and having their end portions underlapping the terminals of the aforesaid packing-strips and entering the cut-away corner portions of the abutment, substantially as specified.

6. In an engine of the character described, the combination with the cylinder, and an eccentrically-disposed drum provided with a movable piston, of a spring-plate applied to the outer wall of the drum and adapted to cooperate with the abutment of the cylinder to maintain a steam-tight joint, substantially as set forth.

7. The combination with a cylinder, an eccentrically-disposed drum having openings in opposite points and a piston slidably mounted in the drum, of segment-plates applied to the outer wall of the drum and secured to the side walls of the openings in which the piston is slidably mounted, substantially as set forth.

8. The combination with an open-ended cylinder and the eccentrically-disposed drum provided with a movable piston and heads, the latter overlapping the ends of the cylinder and closing the latter, of curved plates overlapping the joints formed between the said heads and ends of the cylinder and secured to the latter, substantially as set forth.

9. A rotary engine comprising a hollow base or stand, an open-ended cylinder secured to the said base and having its upper portion gradually thickened and provided with inlet and exhaust ports, a drum eccentrically disposed with reference to the cylinder and having diametrically-disposed openings, a head at one end of the drum and adapted to close one end of the cylinder and provided with the engine-shaft, a second head adapted to be secured to the opposite end of the drum and closing the other end of the cylinder and having its central portion removed, a piston comprising a central portion formed with a transverse slot, and heads, slidably mounted in the drum and in radial grooves or depressions formed in the said heads, and a second shaft secured to the aforesaid base out of line with the first-mentioned shaft and having slidable connection with the piston, substantially as set forth.

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

JOSEPH H. JACKSON. [L. S.]

Witnesses:

P. H. LAUSON,
J. A. WILLIAMS.