

No. 791,757.

PATENTED JUNE 6, 1905.

C. A. DREISBACH.
ROTARY EXPLOSIVE ENGINE.
APPLICATION FILED OCT. 26, 1904.

6 SHEETS—SHEET 1.

Fig. 1

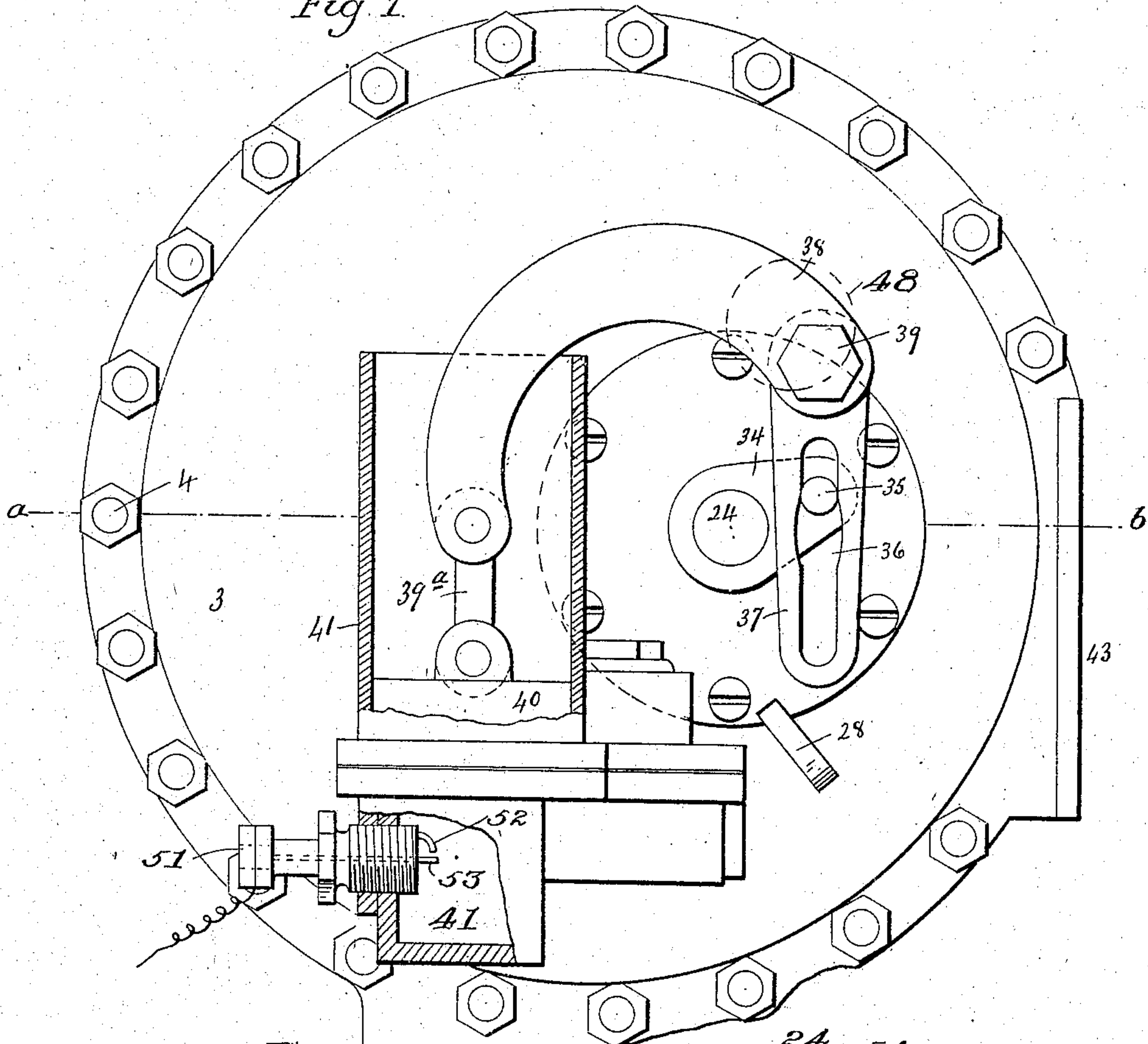
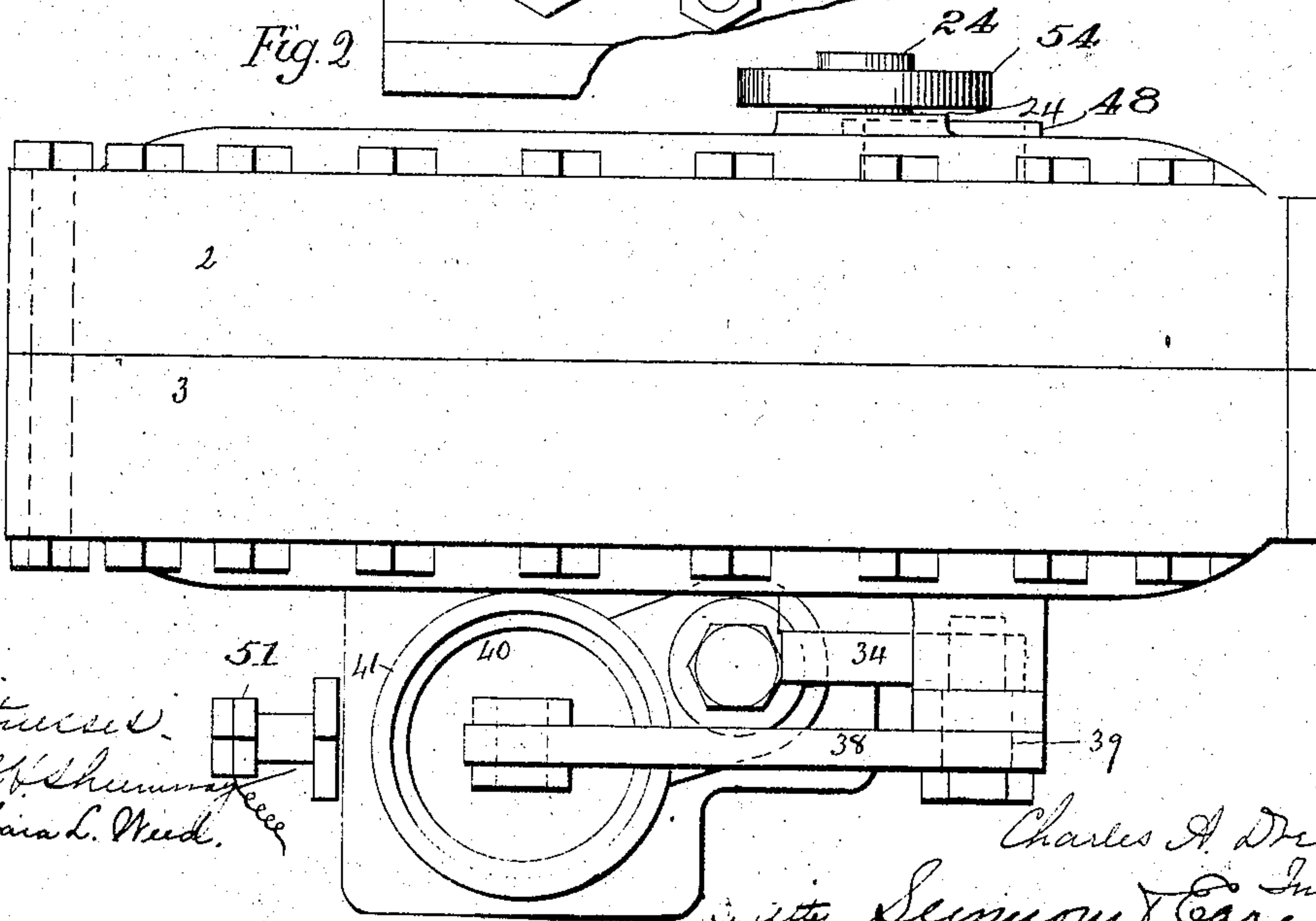


Fig. 2



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6 SHEETS—SHEET 2.

Fig. 3

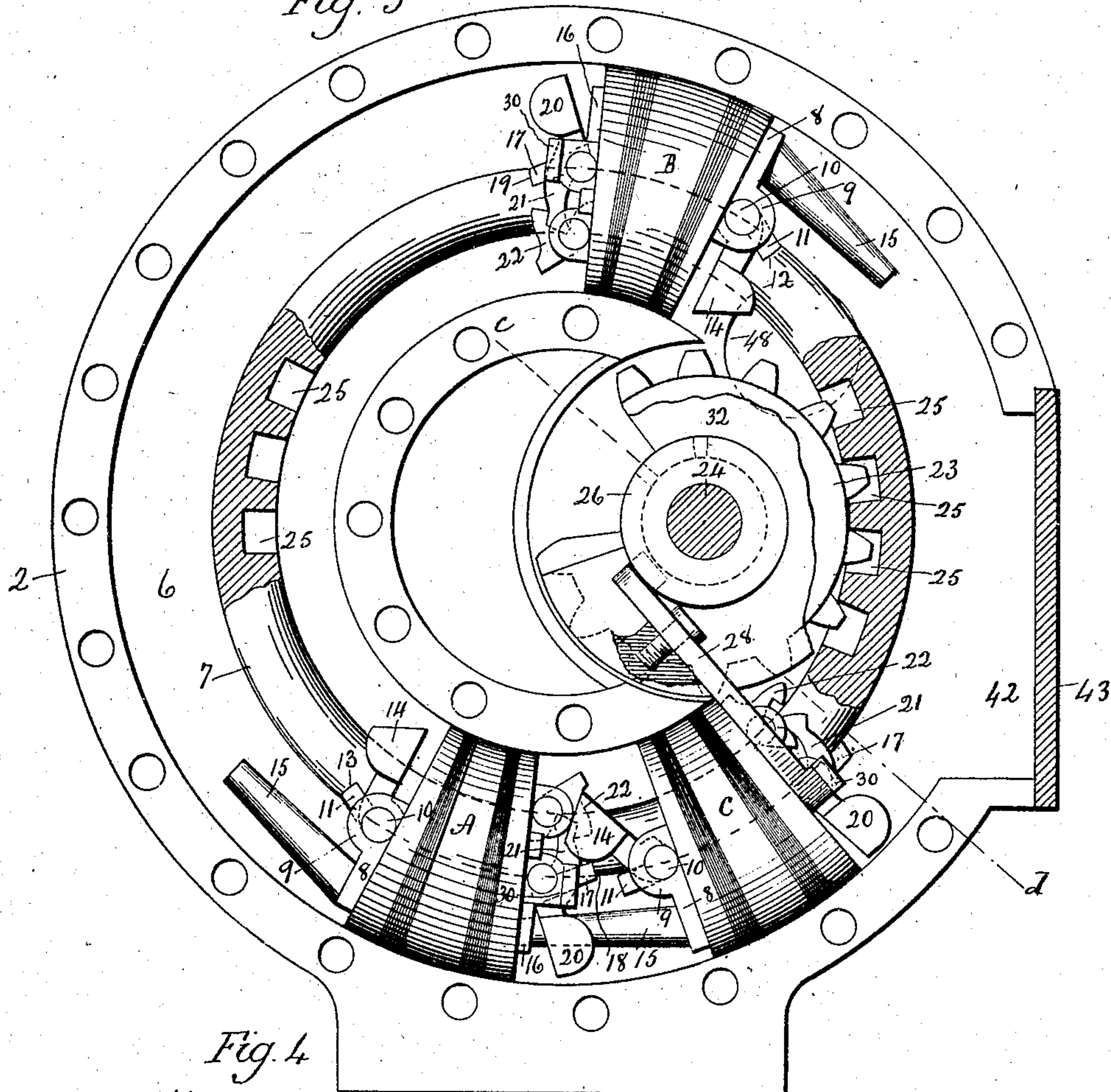
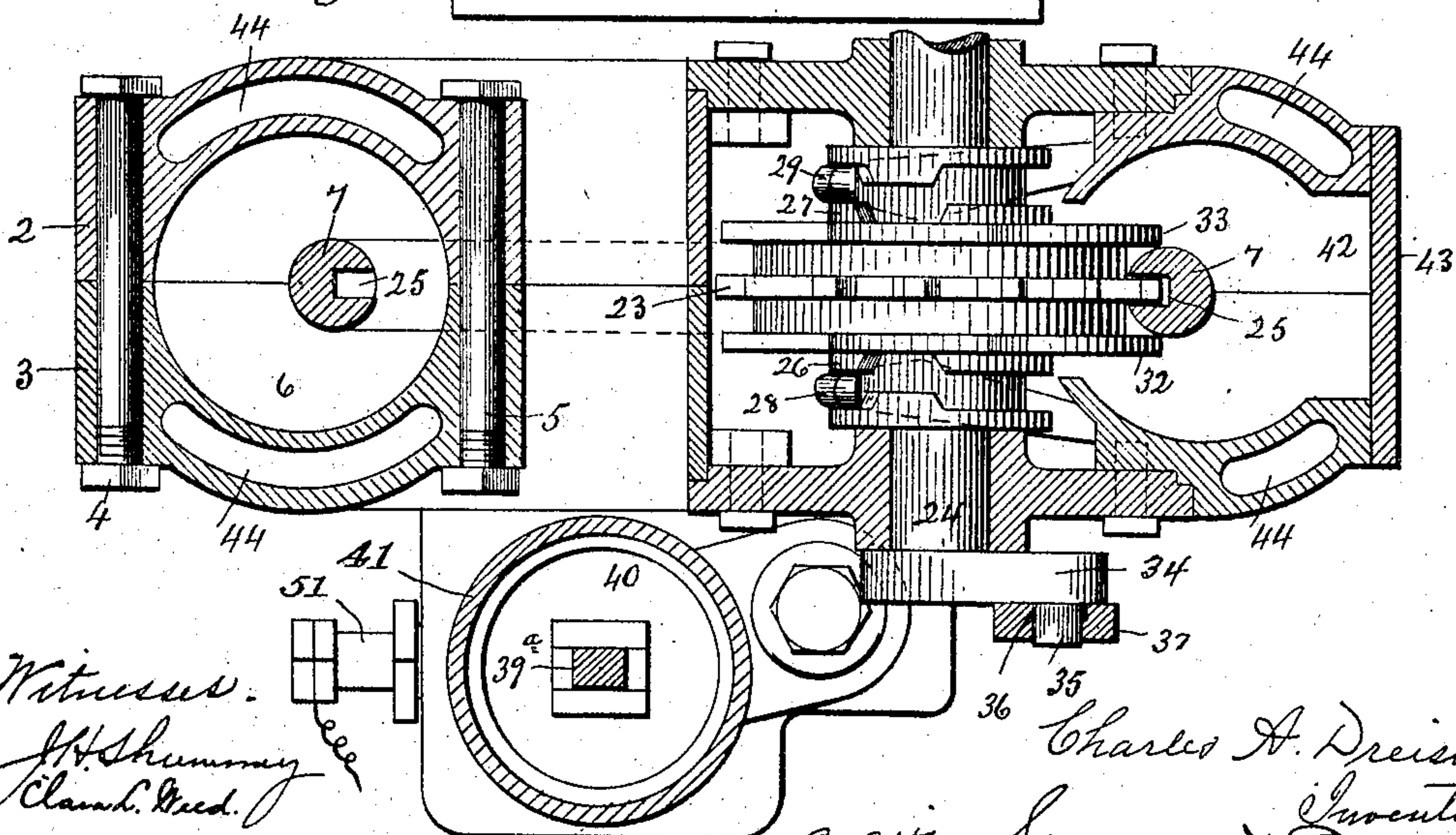


Fig. 4



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5 SHEETS—SHEET 3.

Fig. 5

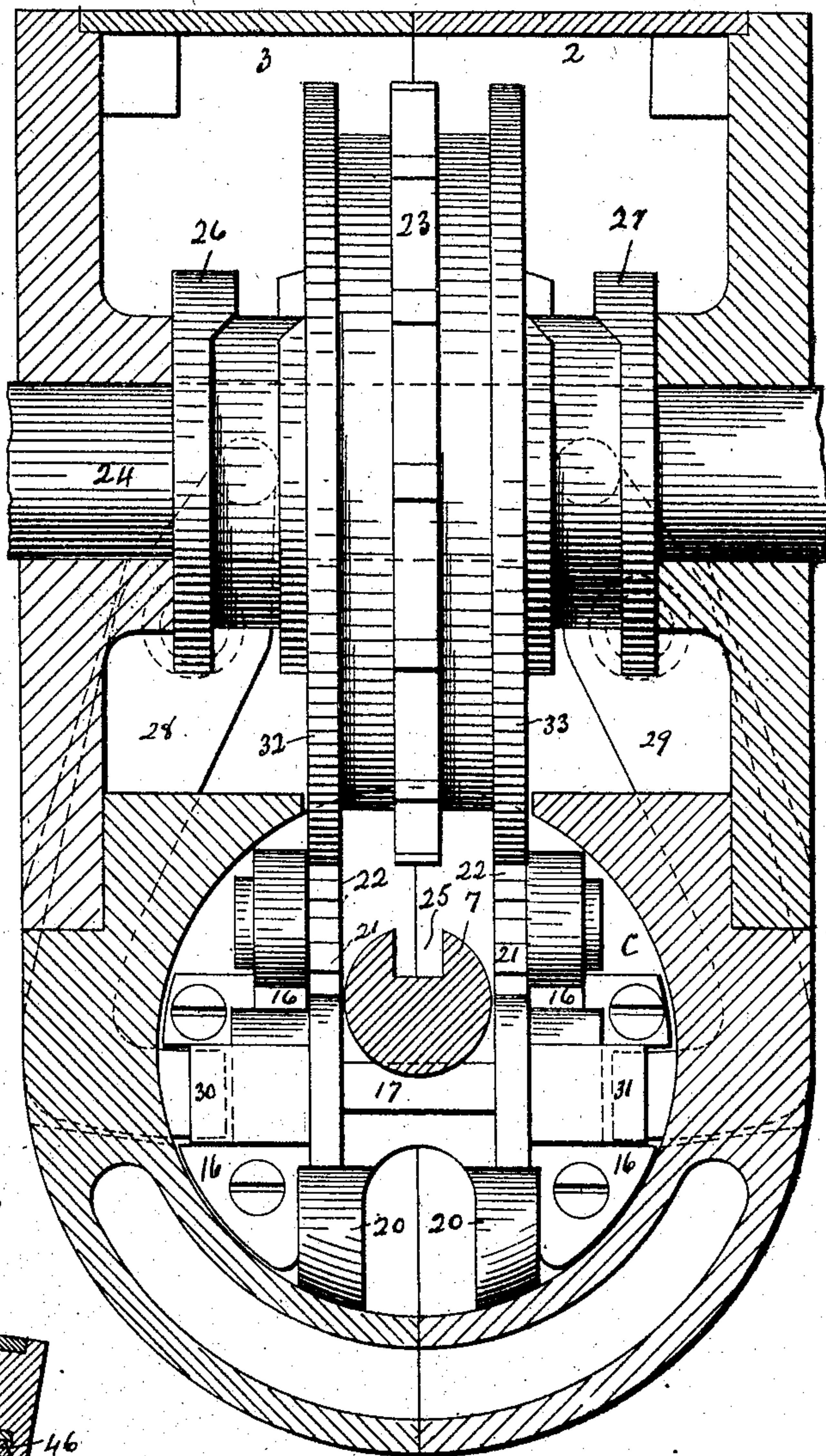


Fig. 9

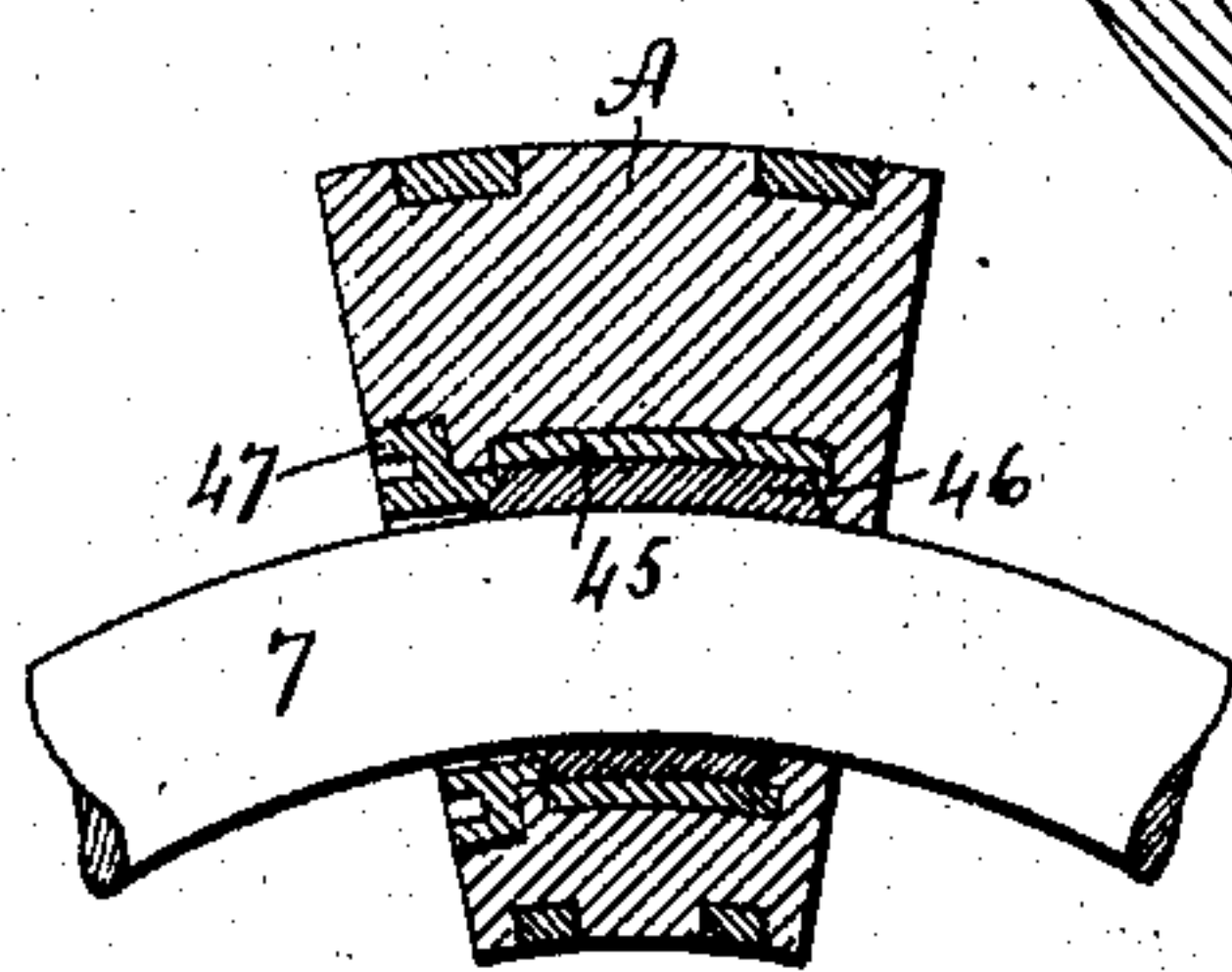
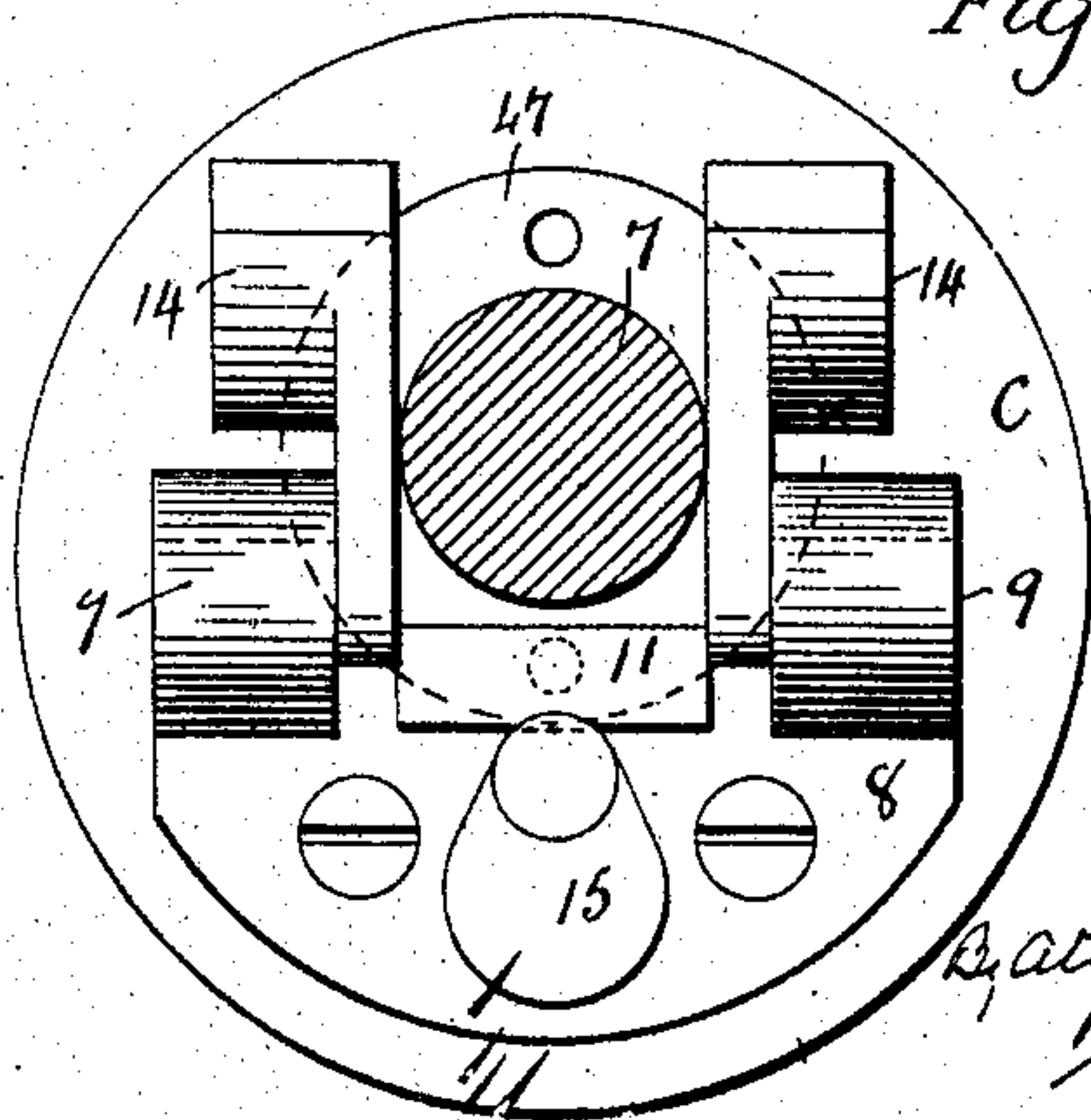


Fig. 6



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5 SHEETS—SHEET 4.

Fig. 7

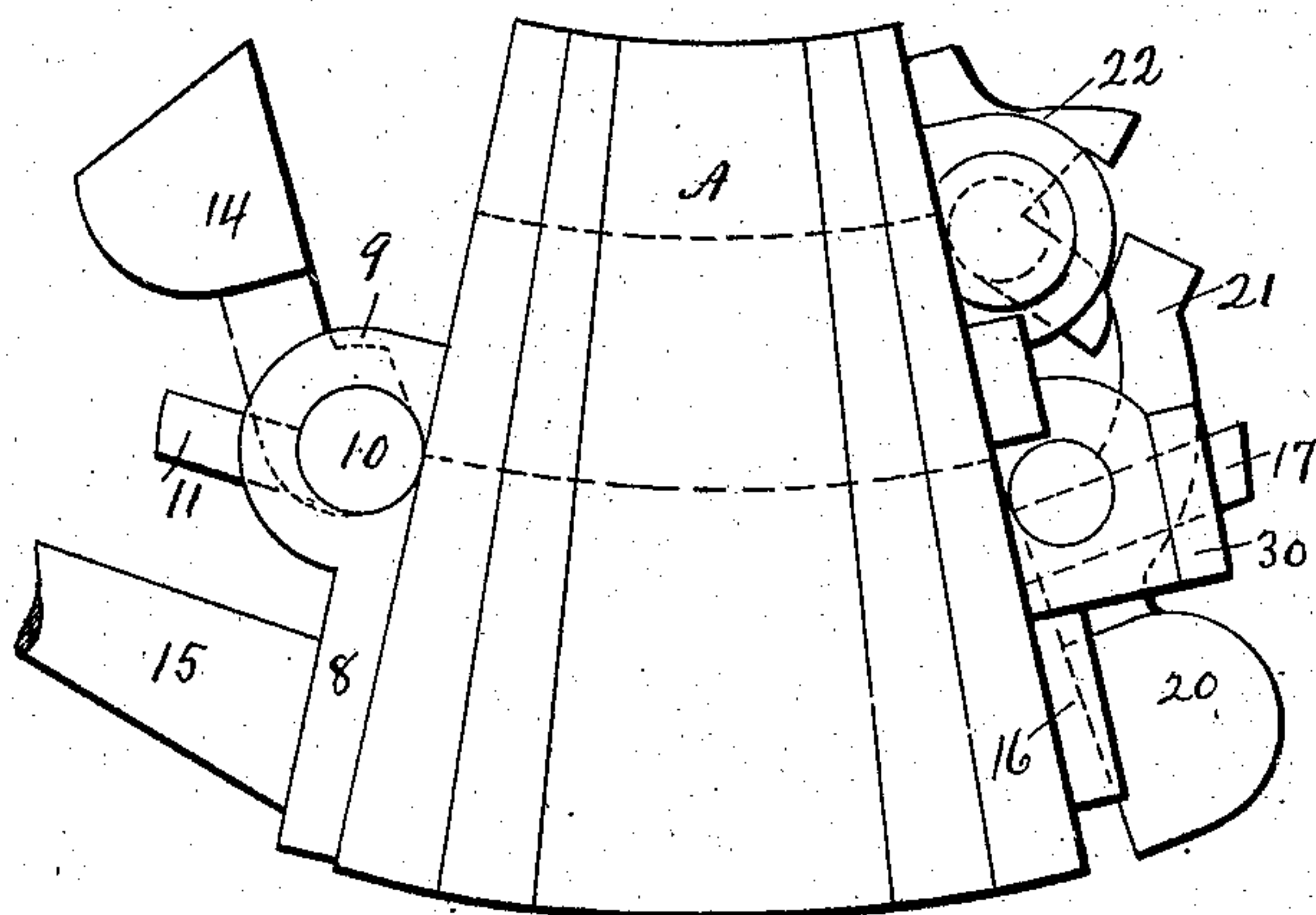
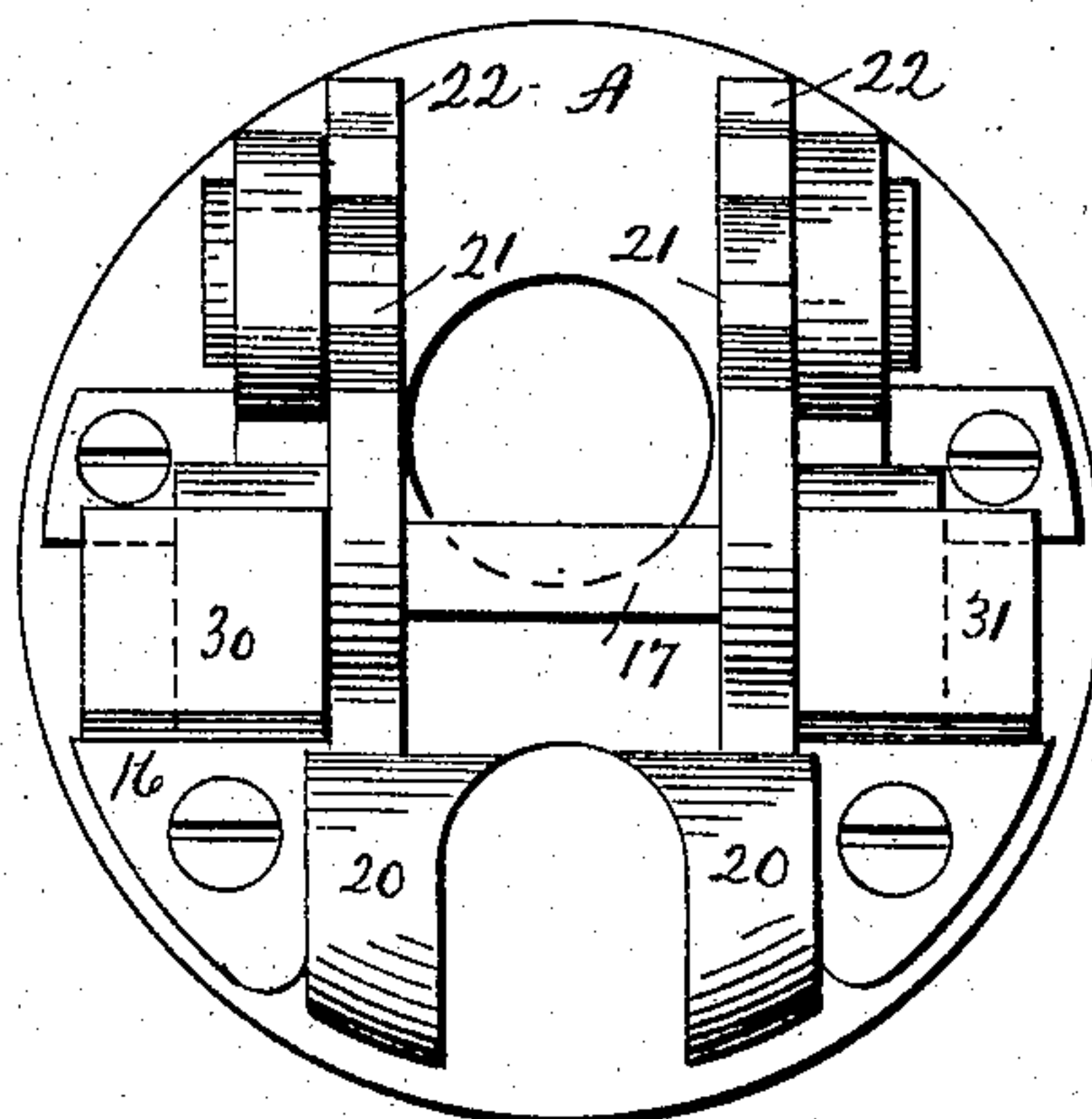


Fig. 8



Witnesses.

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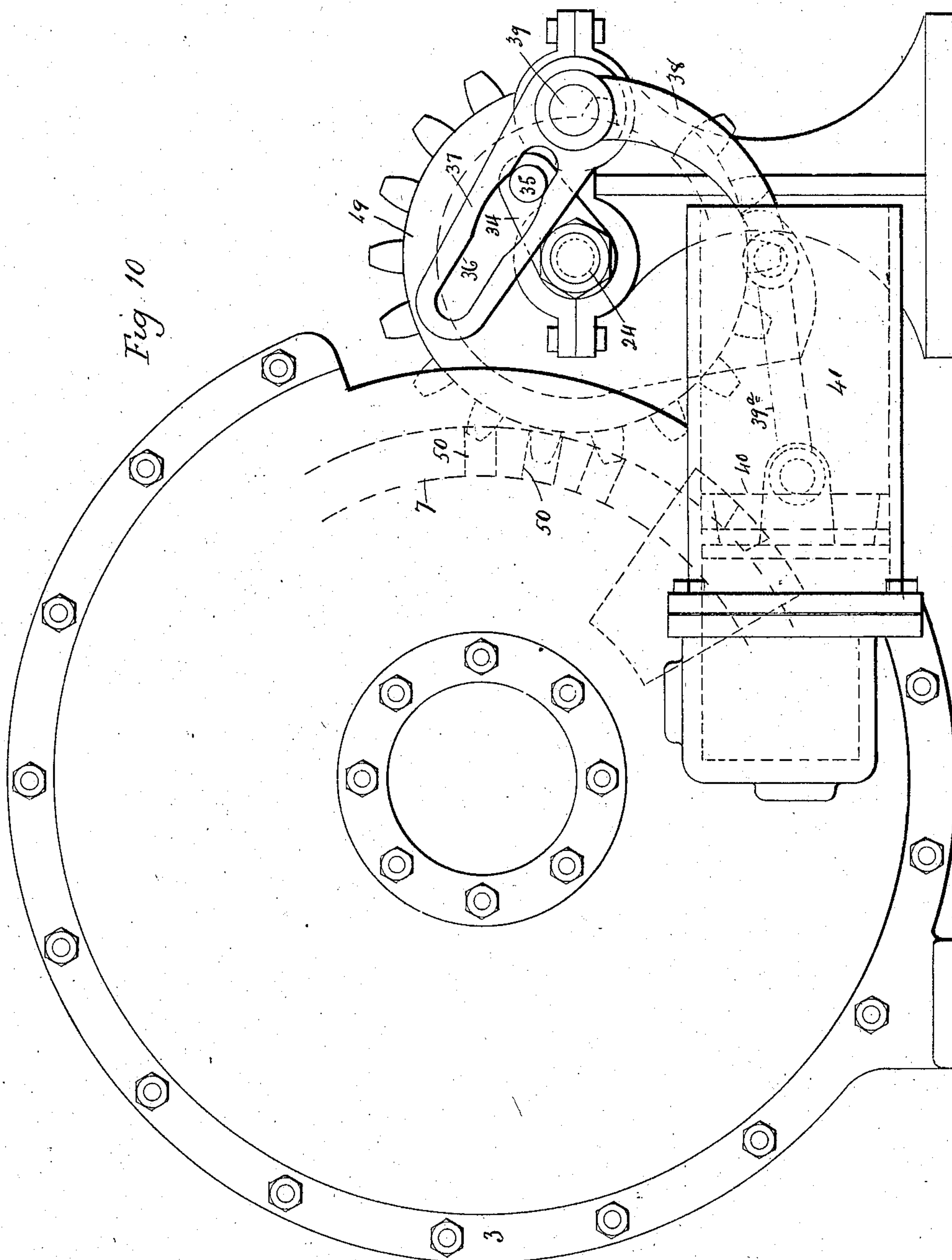
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

CHARLES A. DREISBACH, OF EAST HAVEN, CONNECTICUT.

ROTARY EXPLOSIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 791,757, dated June 6, 1905.

Application filed October 26, 1904. Serial No. 230,034.

To all whom it may concern:

Be it known that I, CHARLES A. DREISBACH, a citizen of the United States, residing at East Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Rotary Explosive-Engines; and I do hereby declare the following, when taken in connection with the accompanying drawings and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view of an engine constructed in accordance with my invention, the charging-cylinder being shown partially in section; Fig. 2, a top or plan view; Fig. 3, a side view, partially in section, with the side of the casing removed; Fig. 4, a sectional view on the line *a b* of Fig. 1; Fig. 5, a sectional view on the line *c d* of Fig. 3; Fig. 6, a front view of the face of one of the pistons; Fig. 7, a side view of one of the pistons; Fig. 8, a rear view of the same, Figs. 5, 6, 7, and 8 being enlarged; Fig. 9, a vertical sectional view of the piston; Fig. 10, a side view of a modification of my invention, showing the driving-shaft arranged outside the cylinder.

This invention relates to an improvement in rotary explosive-engines, and while particularly adapted for gas-engines features of my invention may be utilized in the construction of steam-engines.

In the more general construction of rotary engines more or less difficulty is found in packing the joint in the casing or cylinder.

The object of this invention is to simplify the construction of rotary engines and improve their working capacity.

Another object of the invention is to employ a ring-like piston-rod directly coacting with a pinion to transfer the movement of the piston-rod to the driving-shaft; and the invention consists in details of construction and arrangements of parts, as will be hereinafter described, and particularly recited in the claims.

In carrying out my invention I employ a substantially circular casing formed in two parts 2 and 3, suitably connected by a series

of bolts 4 5, the two sections forming a circular cylinder 6, which may be readily made tight. In this cylinder is a ring-like round piston-rod 7, passing through three pistons A, B, and C, which closely fit the cylinder 6. To the front face of each of the pistons a plate 8 is attached, these plates forming bearings 9 at opposite sides for the trunnions 10 of latches 11, which are adapted to engage at proper times with notches 12 and 13, formed at opposite points in the outer circumference of the piston-rod 7. The trunnions 10, on which these latches are hung, also carry a counterbalancing-weight 14 at each side of the piston, the tendency of which is to throw and hold the latches in their respective notches. These plates are also provided with forwardly-projecting fingers 15 for the purpose as will hereinafter appear. These latches interlock the pistons with the rod, so that as they move forward they will carry the rod with them, while to prevent the rod being turned without moving the pistons I secure to the rear faces of the several pistons plates 16, to which latches 17 are pivoted, said latches being adapted to engage with notches 18 and 19, arranged at opposite points in the outer circumference of the piston-rod. These latches are also provided with counterbalancing-weights 20, which are constructed with arms 21 to engage with rockers 22, whereby the latches 17 are respectively held in the notches 18 or 19. At one side the inner edge of the casing is cut away to give clearance to a pinion 23, mounted upon the driving-shaft 24, the teeth of the pinion entering sockets or recesses 25, formed in the inner circumference of the piston-rod 7, the movement of the piston-rod imparting movement to the pinion 23. On this shaft 24, at opposite sides of the pinion 23, are groove-cams 26 27, which operate levers 28 29, which extend through slots in the side of the cylinder-casing into engagement with lugs or projections 30 and 31 on the plates 16 at the rear of the pistons to hold the pistons stationary at predetermined times. Also mounted on the driving-shaft between the cams 26 27 and the pinion 23 are edge cams 32 33, adapted to trip the rockers 22, and hence unlock the pistons from the piston-

rod. Upon one end of the driving-shaft 24 is a crank 34, carrying at its outer end a pin 35, working in a slot 36 in the arm 37 of a lever 38, which is mounted upon a stud 39, this lever 38 being connected with a pitman 39^a of a piston 40 in a cylinder 41, which opens into the main cylinder 6, near the bottom thereof and between the points shown by the pistons A C in Fig. 3, this piston 40 being utilized to compress the charge and force it into the cylinder at predetermined times, it being understood that the usual valves between the compression-cylinder and explosive-cylinder are provided. At one side of the cylinder 6 is a hand-hole 42, closed by a suitable cap 43. The cylinder is also provided with suitable water-jackets 44. The pistons A, B, and C will be provided with packing-rings 45 of any suitable material and will also be internally chambered to receive a packing-box 46, which will be held in place by a screw-collar 47 entering the rear face of the several pistons, as shown in Fig. 9, the screw-collars also acting as glands to take up for wear. The casing will also be provided with a suitable exhaust-port 48.

In describing the operation I will speak of the position of the pistons A B C as "first" position, "second" position, and "third" position. In operation at time of explosion two of the pistons will always be connected with the piston-rod. Thus, as shown in Fig. 3 of the drawings, the pistons A B are connected with the piston-rod both by the engagement of the latches 11 with the notches 12 and 13 and also at the rear by the engagement of the latches 17 with the notches 18 and 19, these latches being held in the notches by their counterbalancing-weights, and the latch 17 also by the engagement of the rocker 22 with the arm 21 of the weight, the velocity or forward movement of the pistons causing the counterbalancing-weights (by gravity) to hold the latches in place. At this time the piston C will be held by the levers 28 and 29. At this point the mechanism is so timed that a charge will have been compressed and forced into the chamber 6 between the pistons A C and ignited by suitable mechanism. For the purposes of illustration I show a jumpspark-plug 51, which screws into the combustion-chamber 41, it being provided with the usual points 52 53 and creates a spark by a make-and-break disk 54 on the pinion-shaft 24. One wire will ground on the engine and the other will go to the plug, which is insulated in the usual manner and timed to make a spark inside the chamber at the proper instant. The explosion of this charge forces the piston A forward, the piston C being rigidly held, and this forward movement also moves the piston B, which after the engine is in operation will still be under the influence of the explosion of the charge between the pistons A B, while the charge between the pistons B C will exhaust through the port 48.

It should here be stated that the pinion 23 has a portion of its teeth cut away to give clearance for the pistons as they successively pass the pinion. Just before the piston A reaches the second position the piston B will have been forced around so that the forwardly-projecting arm 15 will strike the piston C and move it forward to the first position, the piston C being released from engagement with the levers 28 and 29 at the proper time to permit it to be moved forward. At the same time the piston C is moved forward to the first position the movement of the piston-rod brings the piston B to the third position, at which point the cams 32 33 act to turn the rockers 22, and hence trip the latch 17 out of engagement with the piston-rod, while at the same time the levers 28 29 will be brought into engagement with the plate on the rear of the piston B, so as to hold it in the third position. When thus held, the piston-rod continues to advance under the force of the piston A and brings the notches 18 19 into position for engagement by the latches at the front and rear, so that the piston C will be locked to the piston-rod, as were the pistons A B, while the piston B is free from the rod and held by the locking-levers 28 and 29 preparatory to another explosion and so continue, the operations being so successive that a practically continuous power is exerted upon the piston-rod and movement thereof transmitted to the driving-shaft.

Instead of arranging the pinion to coact with the inner circumference of the piston-rod it may be arranged to coact with the outer circumference of the piston-rod, as shown in Fig. 10, in which the pinion 49 meshes with sockets or recesses 50 in the piston-rod 7, the sockets preferably extending entirely through the rod. A section of the teeth of the pinion will be cut away to give clearance for the outer portion of the pistons instead of the inner portion, as in the construction before described. With the pinion outside the cylinder 41 will be arranged horizontally instead of vertically; but the piston will be operated in substantially the same way.

I therefore do not wish to be understood as limiting the invention to the exact construction shown, but hold myself at liberty to make such departures therefrom as fairly fall within the spirit and scope of my invention.

Thus it will be understood without further illustration or description that the charge for moving the pistons may be either gas introduced and exploded as above described or steam admitted between the pistons in the first and third positions, which under expansion will force the movable piston forward.

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

1. In an engine having a circular cylinder, the combination of a ring-like piston-rod,

three pistons thereon, means for automatically connecting and disconnecting said pistons to said rod, and a pinion operated by said piston-rod for transferring movement therefrom to the driving-shaft and means for admitting a motive charge between two of the pistons for forcing one of them forward, substantially as described.

2. In an engine, the combination with a circular cylinder, of a ring-like piston-rod arranged therein, three pistons on said rod and closely fitting said cylinder, notches in the outer circumference of said rod, and latches on the forward faces of said pistons adapted to engage said notches and means for admitting a motive charge between two of the pistons for forcing one of them forward, substantially as described.

3. An explosive-engine comprising a circular cylinder, a ring-like piston-rod arranged therein, pistons on said rod and closely fitting said cylinder, latches on the front and rear of said pistons, the latches adapted to engage with the piston-rod whereby they are interlocked therewith, means for automatically disengaging said latches from the piston-rod, a pinion meshing with said rod whereby the movement thereof is transmitted to a driving-shaft, means for admitting a motive charge of gas between two of said pistons, and means for exploding said charge.

4. In an engine, the combination with a circular cylinder, of a ring-like piston-rod therein, three pistons on said rod and adapted to be interlocked therewith, and disengaged therefrom, a driving-shaft, a pinion on said shaft and meshing with the said piston whereby movement of the piston is imparted to said rod,

cams on said driving-shaft, levers operated by said cams for holding one of the pistons against the movement of the rod, and arms at the forward faces of said pistons and adapted to move the adjacent piston forward at predetermined times and means for entering a charge between two of the pistons, substantially as described.

5. In an engine, the combination with a circular cylinder, of a ring-like piston-rod therein, three pistons on said rod, latches adapted to be interlocked therewith or disengaged therefrom, rockers for holding said latches in engagement with said rod, a driving-shaft, a pinion on said shaft and meshing with the said piston-rod, cams on said shaft and adapted to turn said rockers, whereby the pistons are disengaged from said rod, means for admitting a charge between two of the pistons whereby one of them is forced forward, substantially as described.

6. In an engine having a circular cylinder, the combination of a ring-like piston-rod, three pistons thereon, means for clamping said pistons to said rod, a pinion operated by said piston ready for transferring movement therefrom to the driving-shaft, said pistons each internally chambered, packing-boxes in said chamber, and a screw-collar entering the rear face of the pistons and holding the packing-boxes in position, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHARLES A. DREISBACH.

Witnesses:

LOUIS BRADLEY,
FREDERIC C. EARLE.