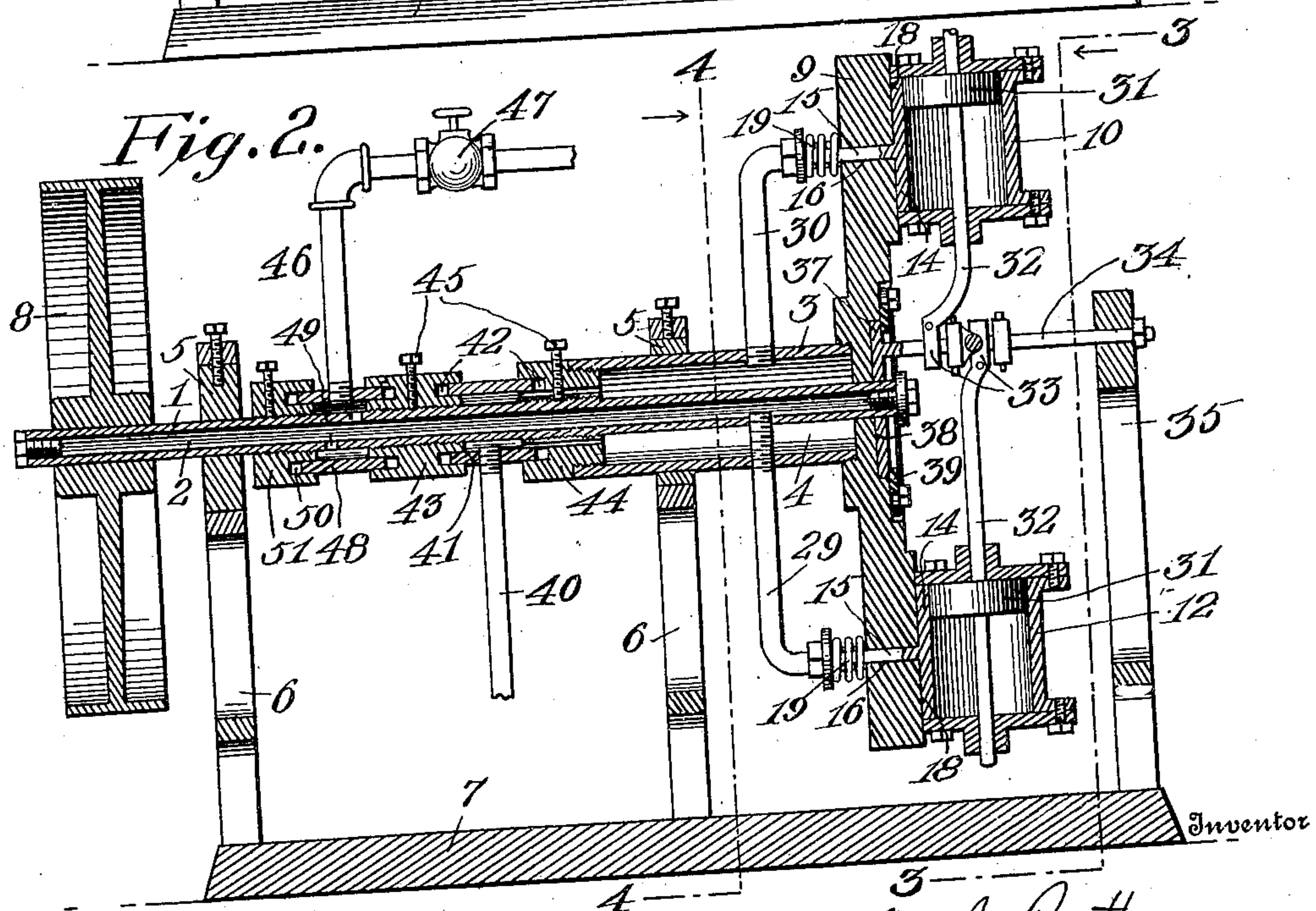
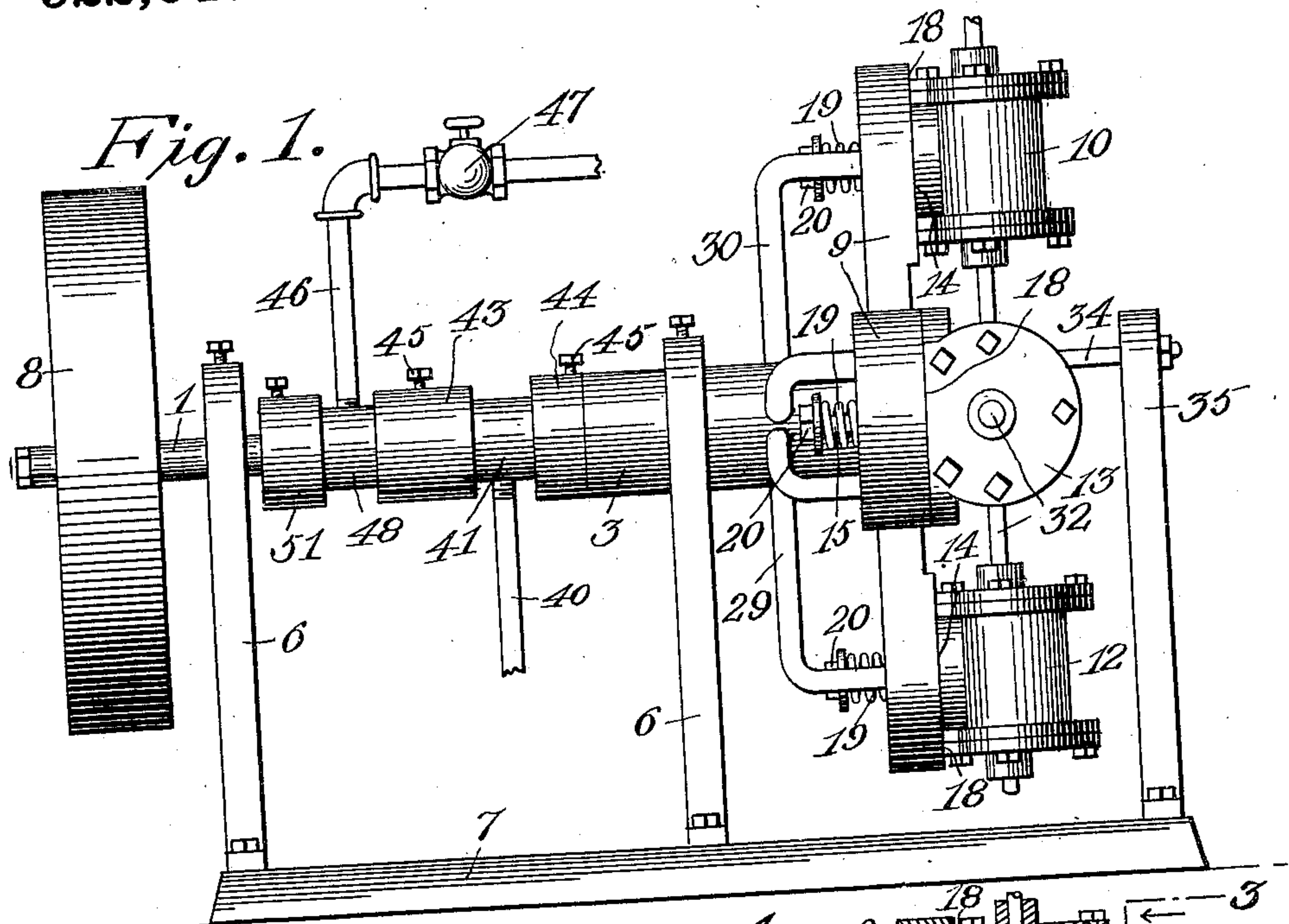


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 ROTARY ENGINE.  
 APPLICATION FILED SEPT. 16, 1908.

Patented May 18, 1909.  
 3 SHEETS—SHEET 1.



Witnesses

James F. Crowe  
 Anna L. Martin

A. J. Ruth  
 By Watson E. Coleman  
 Attorney

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Fig. 3.

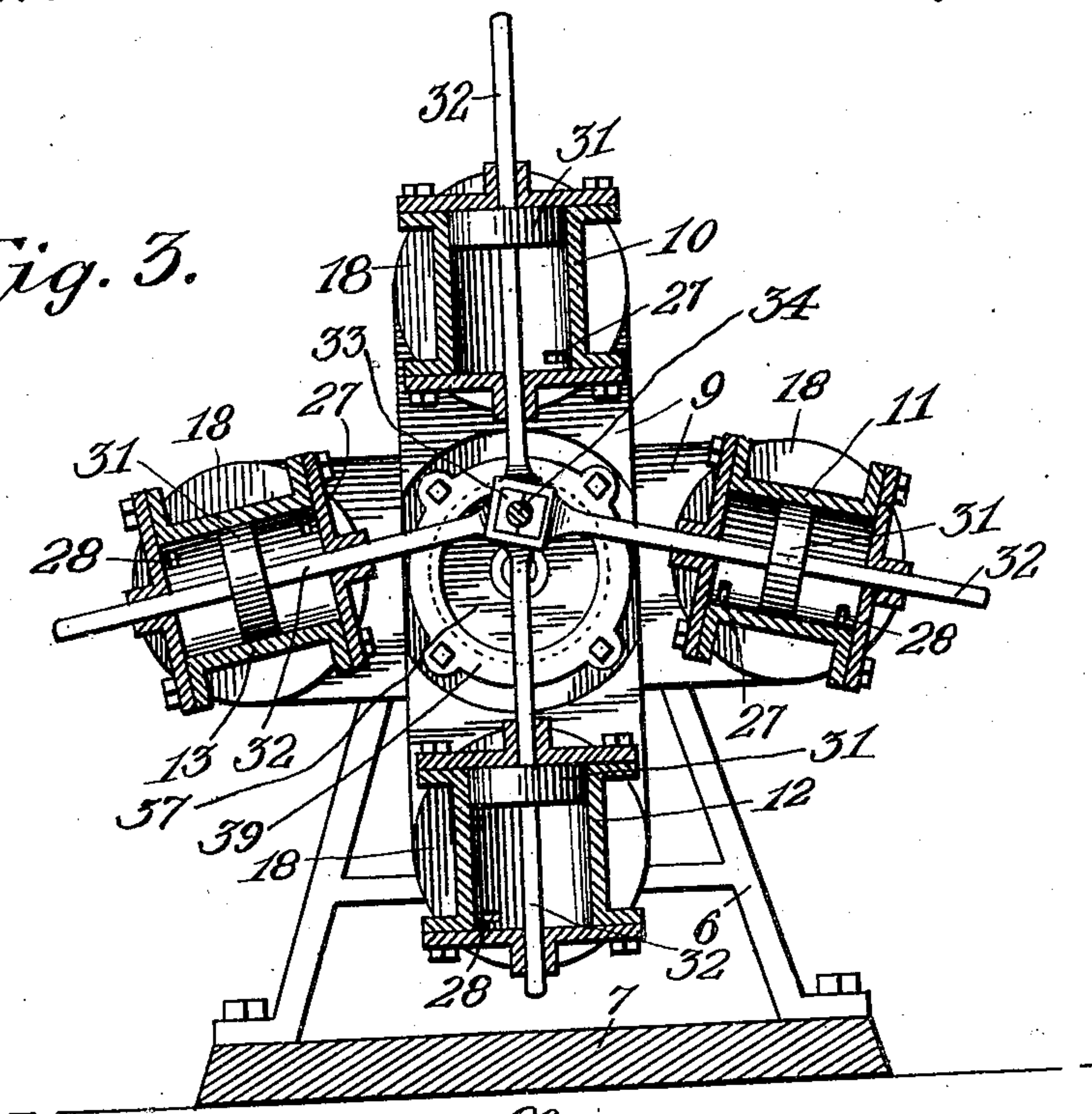
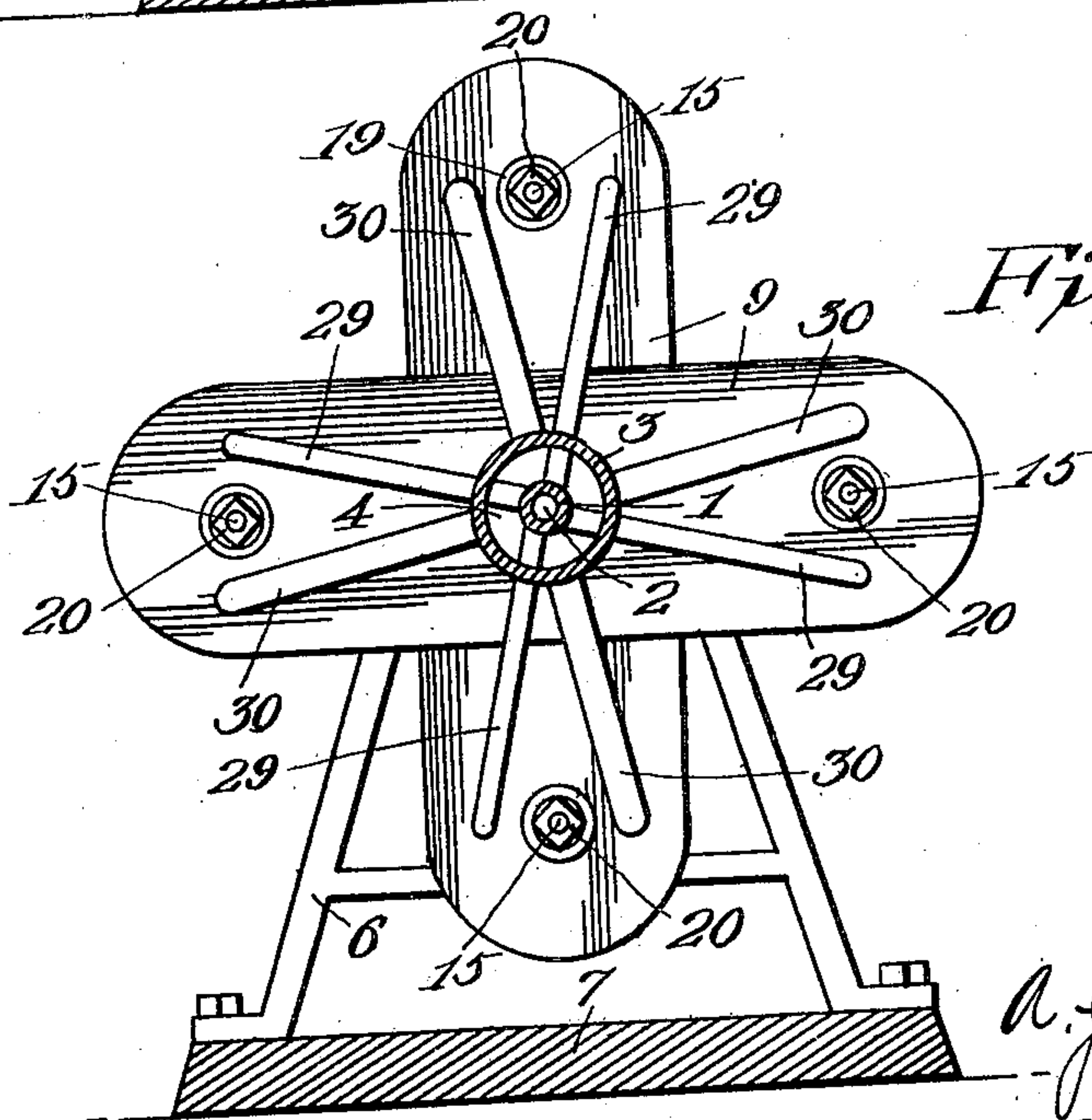


Fig. 4.



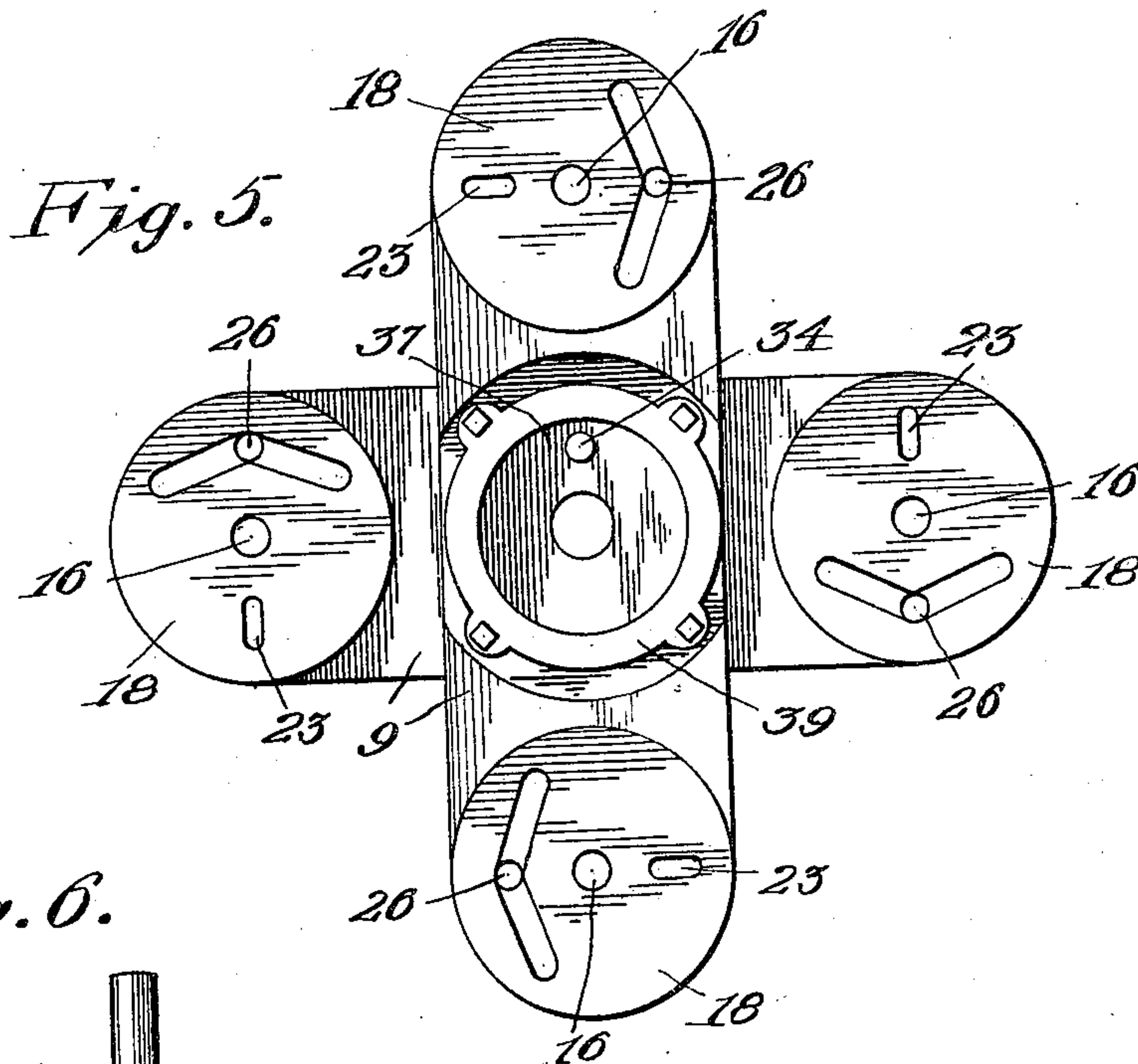
Witnesses

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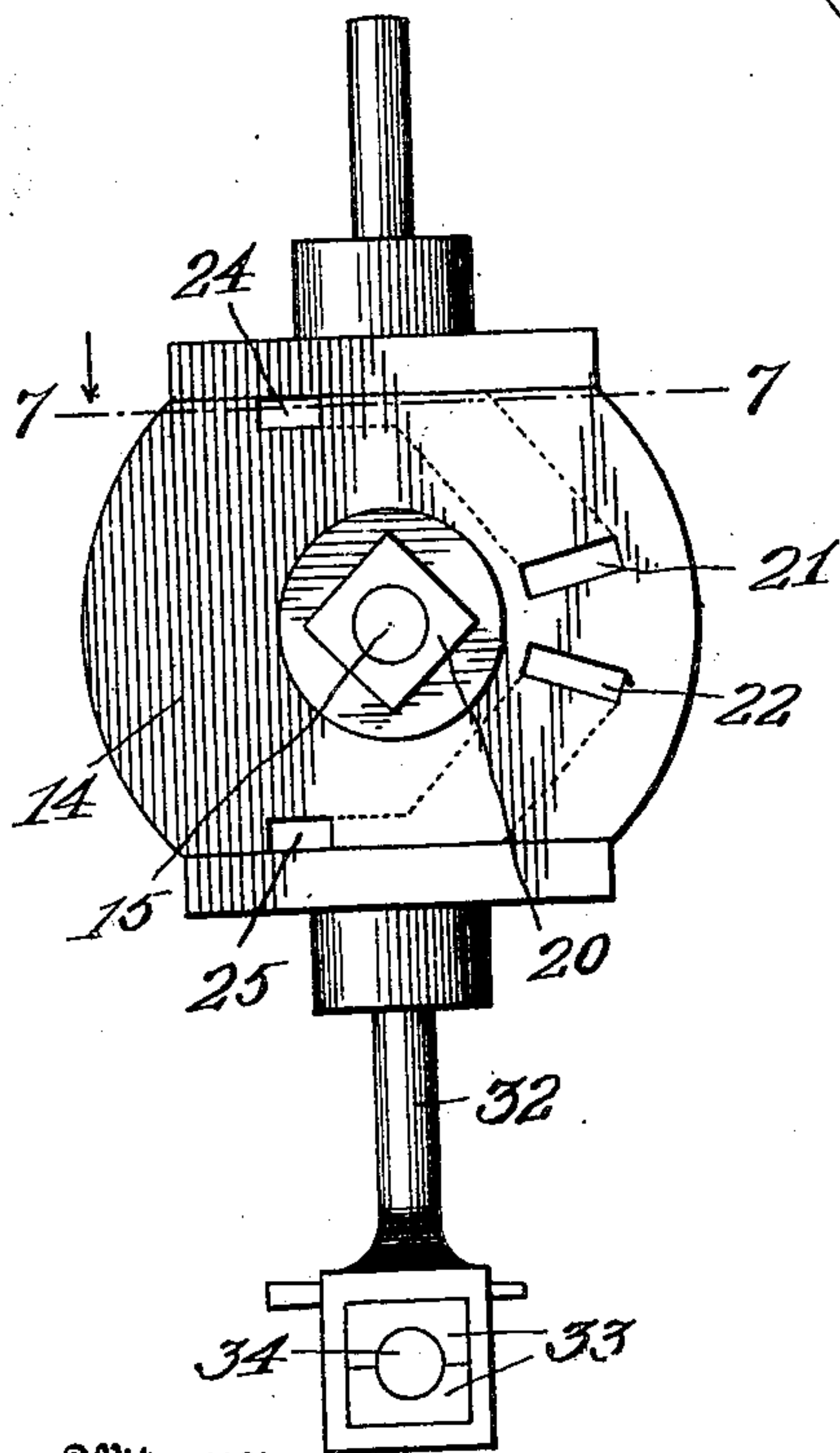
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 A. J. Ruth  
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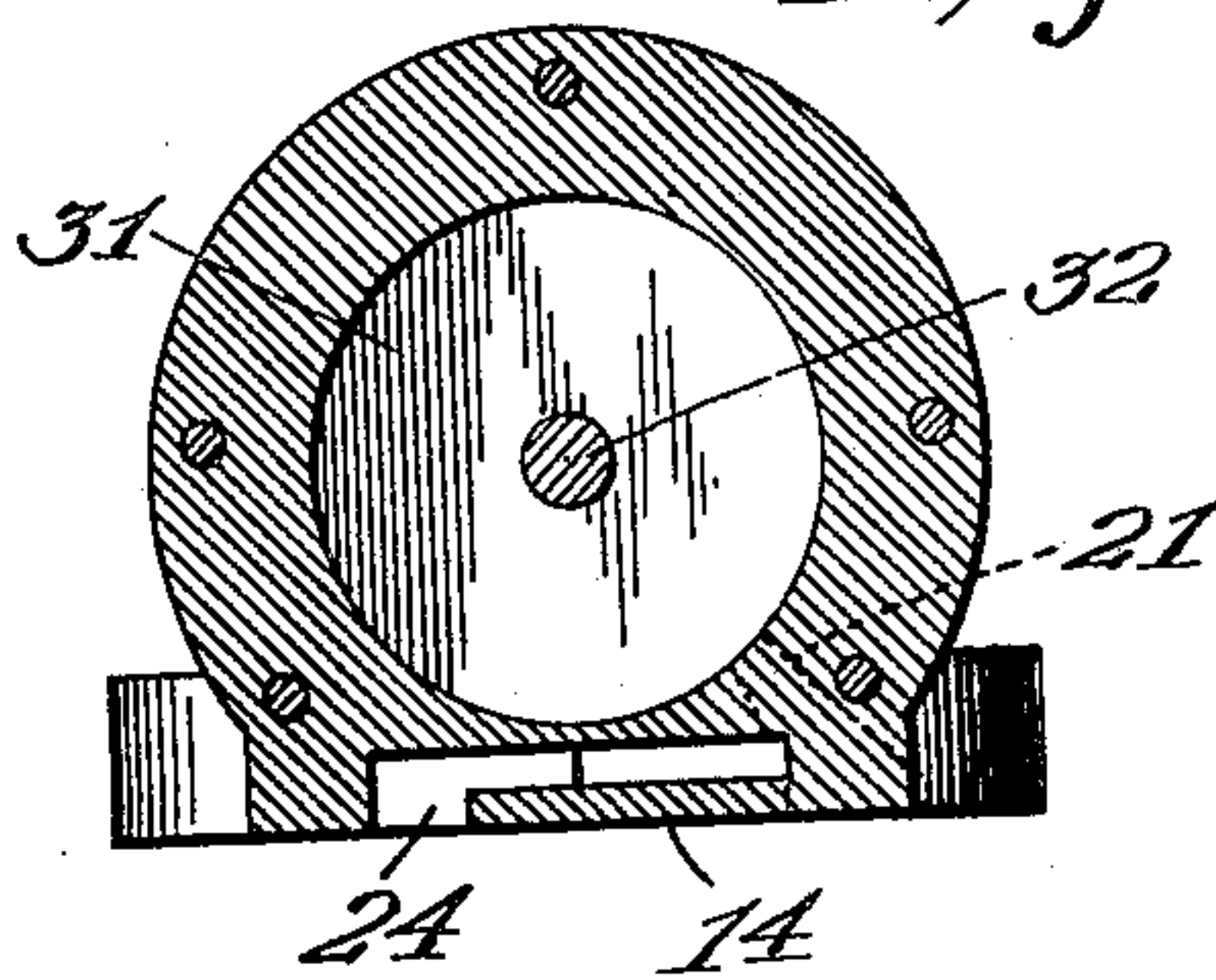
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*Fig. 6.*



*Fig. 7.*



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# UNITED STATES PATENT OFFICE.

ANDREW J. RUTH, OF VALIER, PENNSYLVANIA.

## ROTARY ENGINE.

No. 922,047.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed September 16, 1908. Serial No. 453,313.

*To all whom it may concern:*

Be it known that I, ANDREW J. RUTH, a citizen of the United States, residing at Valier, in the county of Jefferson and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to improvements in rotary engines and its object is to provide one which will be simple in construction and powerful in operation.

15 With the above and other objects in view, as will hereinafter more fully appear, the invention consists of the novel features of construction and the combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the 20 accompanying drawings, in which—

Figure 1 is a side elevation of the engine; Fig. 2 is a vertical longitudinal section; Figs. 3 and 4 are vertical cross sections taken on the lines 3—3 and 4—4 in Fig. 2; Fig. 5 is an 25 elevation of the rotary member or head with the cylinders removed; Fig. 6 is a view of one of the cylinders looking toward the bottom or inner face of the same; and Fig. 7 is a sectional view of one of the cylinders taken 30 on the line 7—7 in Fig. 6.

In the drawings 1 denotes the main shaft which is hollow to provide a live steam passage 2, and 3 denotes a sleeve or jacket surrounding the shaft and adapted to provide 35 a space or passage 4 for the exhaust steam. The shaft and its jacket are rotatable in suitable bearings 5 in two uprights 6 which rise from a base 7 and upon one end of the shaft 1 is a fly wheel 8 and upon its other end is a 40 rotary member or head 9 adapted to carry a plurality of steam cylinders. As illustrated, four of the latter are provided and they are arranged on the four arms of the head 9, which latter is X-shaped. Each of said cylinders which are numbered 10, 11, 12, 13, 45 has a flat inner or bottom face 14 from the center of which projects a pivot stud 15 arranged in an opening 16 formed in one of the arms of the head 9 concentric with a flat circular surface 18 which is formed on said 50 arm and against which said flat face 14 of the

cylinder is adapted to be pressed by means of a coil spring 19 surrounding the projecting end of the pivot 15 and retained thereon by an adjusting nut 20. The flat inner face or 55 base portion 14 of the cylinder contains two steam inlet ports 21, 22 adapted to be brought into and out of register with a steam inlet port 23 in one of the arms of the head 9 and said face 14 contains two exhaust ports 60 24, 25 adapted to be brought into and out of register with a V-shaped exhaust port or channel 26 on one of the arms of the head 9. Said ports are caused to be brought into and out of register with each other by reason of 65 the oscillation of the cylinder on its pivot 16, as presently explained. The portions 21, 22 are connected by passages to ports 27, 28 formed in the cylinder adjacent its ends and the ports 24, 25 also communicate with said 70 ports 27, 28 through suitable passages. Each of the steam inlet ports 23 is connected to the steam passage 2 in the shaft 1 through a steam pipe 29 and the ports or passages 26 are in communication with the exhaust 75 steam space 4 and the jacket 3 through exhaust pipes 30.

31 denotes the pistons arranged for reciprocation in the cylinders and connected to piston rods 32 intermediate the ends of the 80 latter. The inner ends of said piston rods are offset and contain bearing boxes 33 which receive a stationary crank-pin 34 disposed eccentrically with respect to the shaft 1. One end of the crank or eccentric pin 34 is 85 fixed in an upright bearing 35 rising from the base 7 and its other end is preferably supported by attaching it to a circular disk 37 which is concentrically arranged upon the shaft 1 so that the latter rotates within it 90 and which is also arranged within a concentric recess or seat 38 formed in the outer face of the head 9. Said disk 37 is retained in the recess 38 by a ring 39 bolted to the outer face of the head 9 so as to overlap the disk 95 and to permit said head to rotate around it.

40 denotes a steam exhaust pipe connected to a stationary ring or sleeve 41 surrounding the shaft 2 and confined between two stuffing boxes 42 arranged in the ends of two rings 100 43, 44 which latter are screwed upon the shaft 2 and held stationary by set screws 45. The



collar 44 is screwed into one end of the jacket 3 and is formed with passages which afford communication between said jacket and the ring or sleeve 41 as clearly shown in Fig. 2.

46 denotes a steam supply pipe containing a controlling valve 47 and opening into a steam ring or sleeve 48 which surrounds a perforated portion 49 of the shaft 1 and has its ends arranged in stuffing boxes 50 one of which is in the collar 43 and the other is arranged in a similar collar 51.

In operation, when the valve 47 is opened steam will pass through the pipe 46, the ring 48, the shaft 2, the pipes 29 and into the cylinders when the inlet valves of the latter are opened. Owing to the arrangement of the steam ports and the arrangement of the cylinders steam will be admitted alternately into the opposite ends of the cylinders so the latter will be caused to move back and forth upon the piston and by reason of the stationary crank pin, the head 9 will be caused to rotate. Two of the opposing cylinders will be constantly in operation as will be seen upon reference to Fig. 3, in which the cylinders 11, 13 are performing the work while the cylinders 10, 12 are at the beginning of a new stroke.

While the preferred embodiment of the invention has been shown and described it will be understood that I do not wish to be limited to the precise construction set forth and various changes in the form, proportion and minor details may be made without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described the invention what is claimed is:

1. In an engine, the combination of a hollow steam shaft, an exhaust steam jacket arranged concentrically upon one portion of the shaft and spaced therefrom, a support having two bearings, one in which the steam jacket is rotatably mounted and one in which the opposite end of the steam shaft is rotatably mounted, a rotary member upon one end of the shaft and closing one end of the steam jacket, a collar fixed to the shaft and secured in the other end of the jacket to close the same, said collar being formed with longitudinal passages, a second collar fixed to the shaft, a steam exhaust pipe, a stationary sleeve connected to said pipe and having its ends suitably packed and arranged in the collars on the shaft, said sleeve being in communication with the jacket through the longitudinal passages in the first mentioned collar, means for introducing steam into the shaft, cylinders carried by the rotary member, valve controlled supply and exhaust connections between the cylinders and the shaft and jacket, a crank pin eccentrically disposed with respect to the rotary member and pistons in the cylinders and connected to said pin.

2. In an engine, the combination of a hollow steam shaft, an exhaust steam jacket arranged concentrically upon one portion of the shaft and spaced therefrom, a support having two bearings, one in which the steam jacket is rotatably mounted and one in which the opposite end of the steam shaft is rotatably mounted, a rotary member upon one end of the shaft and closing one end of the steam jacket, a collar fixed to the shaft and secured in the other end of the jacket to close the same, said collar being formed with longitudinal passages, a second collar fixed to the shaft, a steam exhaust pipe, a stationary sleeve connected to said pipe and having its ends suitably packed and arranged in the collars on the shaft, said sleeve being in communication with the jacket through the longitudinal passages in the first mentioned collar, a third collar upon the shaft, the portion of the shaft between the second and third collars being apertured, a steam supply pipe, a sleeve connected to said pipe and arranged over the apertured portion of the shaft, the ends of the last mentioned sleeve being suitably packed in the second and third collars, cylinders carried by the rotary member, valve controlled supply and exhaust connections between the cylinders and the shaft and jacket, a crank pin eccentrically disposed with respect to the rotary member and pistons in the cylinders and connected to said pin.

3. In an engine, the combination of a support, a horizontal shaft journaled thereon, a rotary member fixed to one end of said shaft for rotation therewith and formed in its outer face with a circular recess concentric with the shaft, a standard on the support opposite said recess, a stationary crank pin fixed at one end to said standard, a circular plate carried by the other end of said pin and loosely arranged in the recess in said member and on the end of the shaft, a retaining ring secured to said member and overlapping the edge of said plate to retain the same in the recess, cylinders upon said member and pistons in said cylinders and connected to said crank pin.

4. In an engine, the combination of a support, a shaft journaled thereon, a rotary member fixed to one end of said shaft and provided upon one side with a plurality of flat bearing surfaces, each having centrally arranged pivot openings and steam inlet and exhaust ports, a plurality of cylinders each formed upon one side with a flat bearing surface adapted to engage one of the flat bearing surfaces on said rotary member and also formed with steam inlet and exhaust ports adapted to be brought into and out of register with the ports in the bearing surfaces of said member, pivot studs projecting from the bearing surfaces on the cylinders and through the pivot openings in said member, the pro-



jecting ends of said pivot studs being screw threaded, nuts upon the threaded ends of said studs, coil springs upon said studs between the nuts and said member, whereby  
5 the flat bearing surfaces on the member and cylinders are held in contact, a stationary crank pin, pistons in the cylinders connected to said pins and means for supplying steam

to and exhausting it from said ports in said member.

In testimony whereof I hereunto affix my  
signature in the presence of two witnesses. 10

ANDREW J. RUTH.

Witnesses:

D. M. CROASMUN,  
S. C. RUTH.