

No. 778,091.

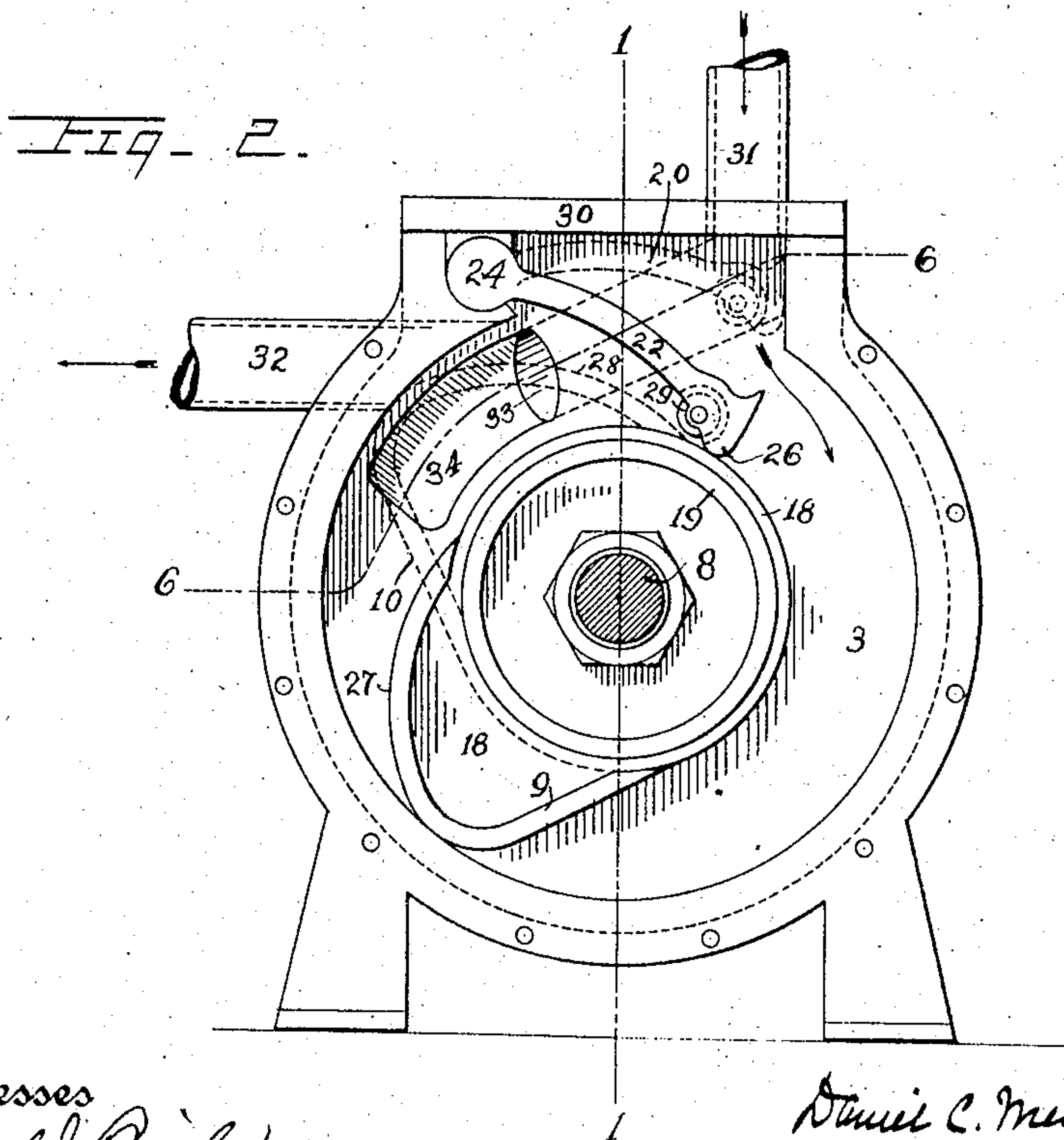
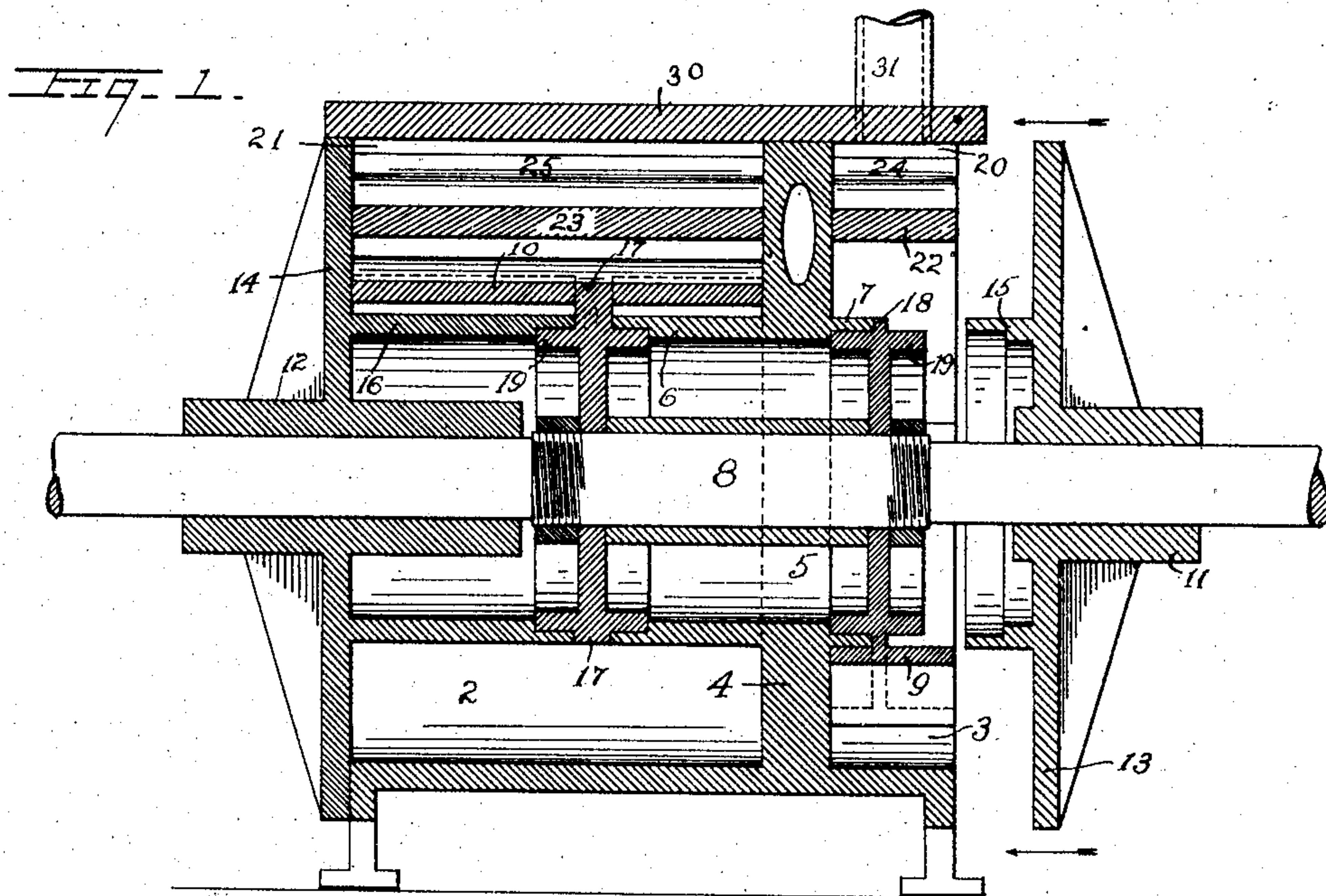
PATENTED DEC. 20, 1904.

D. C. WIEST.  
COMPOUND ROTARY ENGINE.

APPLICATION FILED MAY 12, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses  
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D. M. Stewart

Daniel C. Wiest Inventor  
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Attorney

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2 SHEETS—SHEET 2.

Fig. 5.

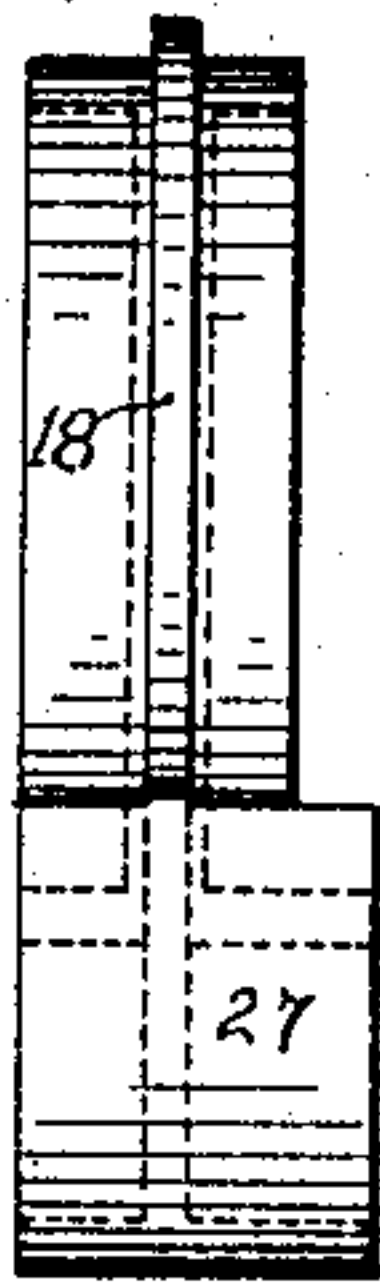


Fig. 4.

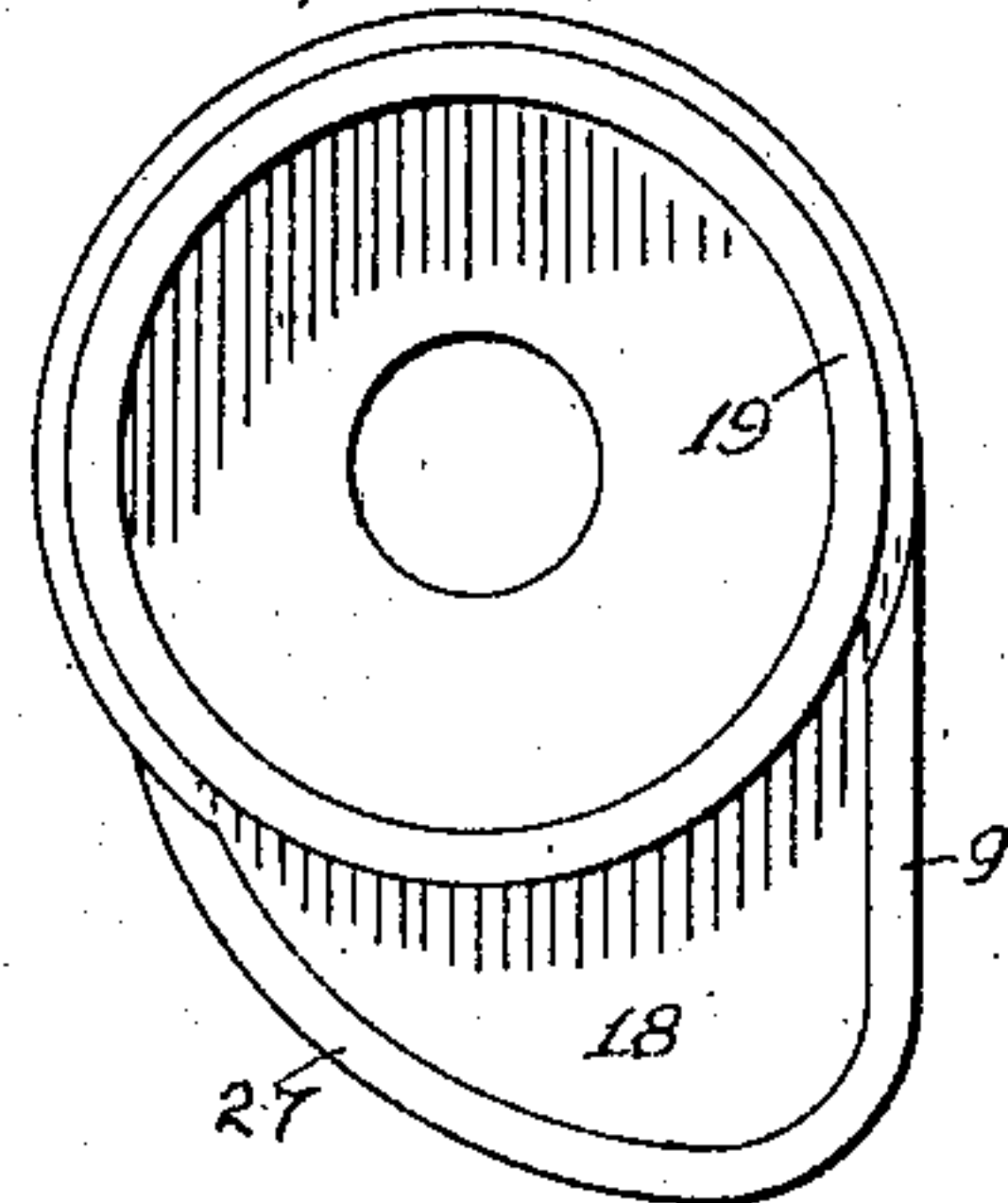


Fig. 6.

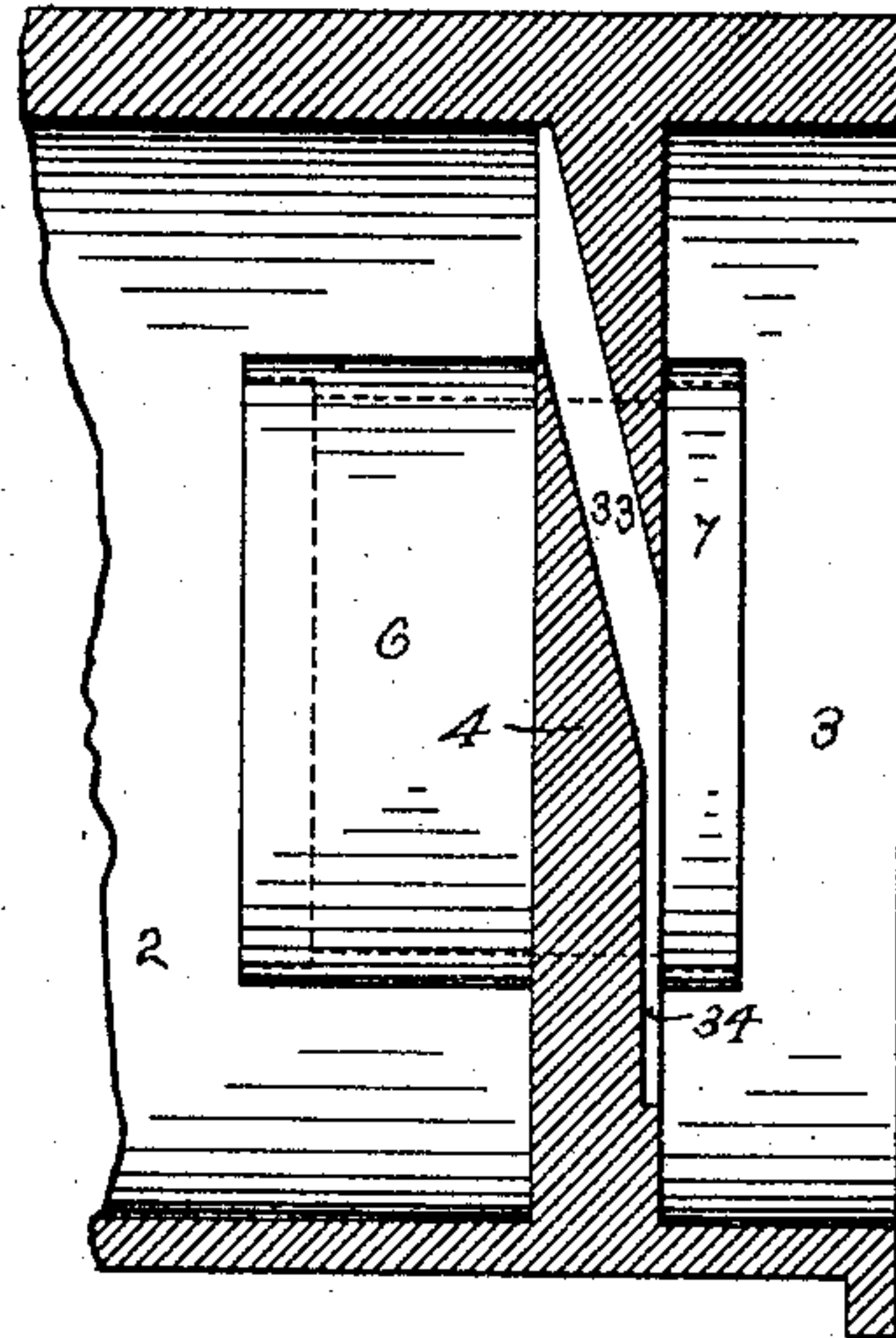


Fig. 3.

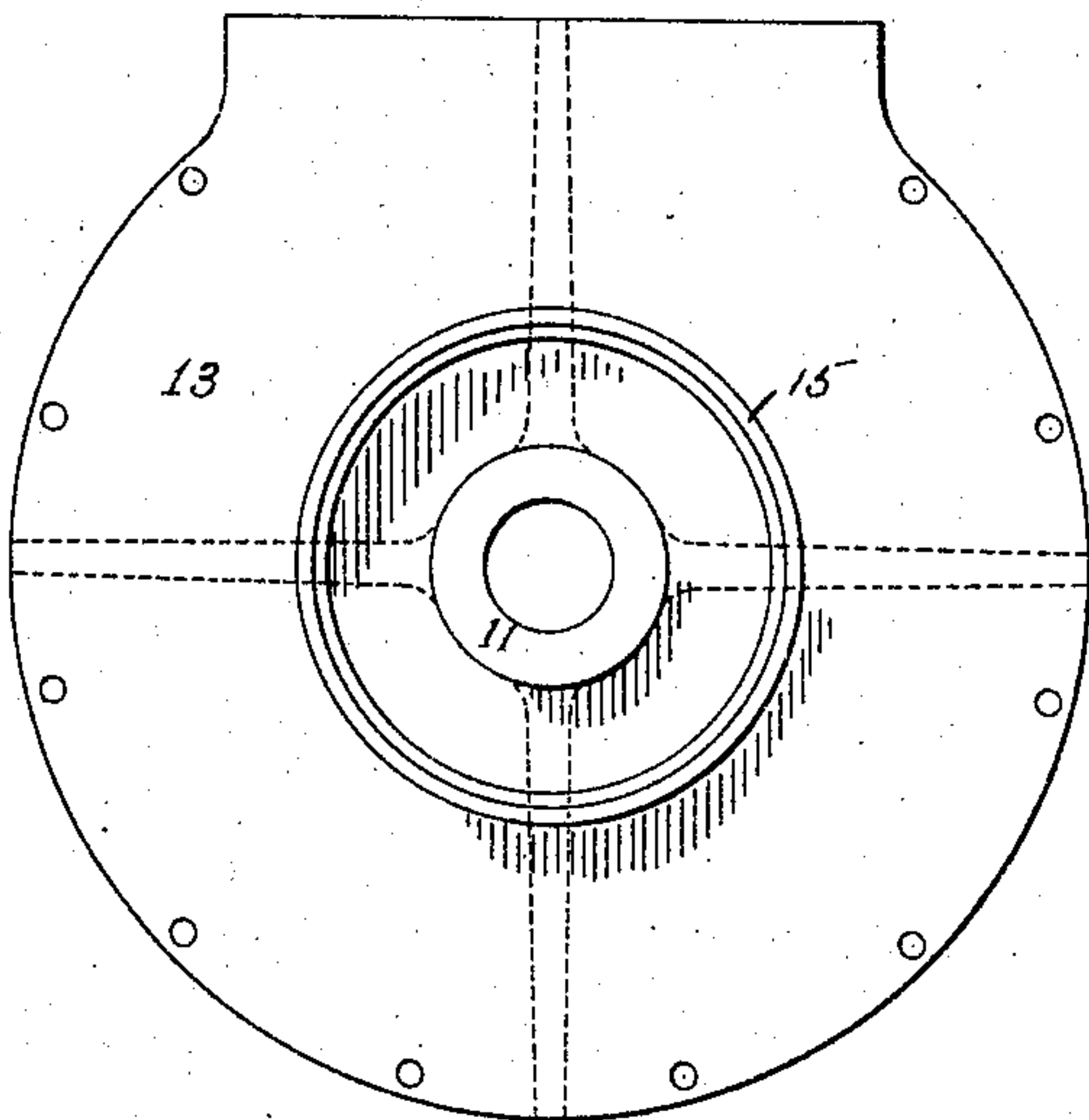
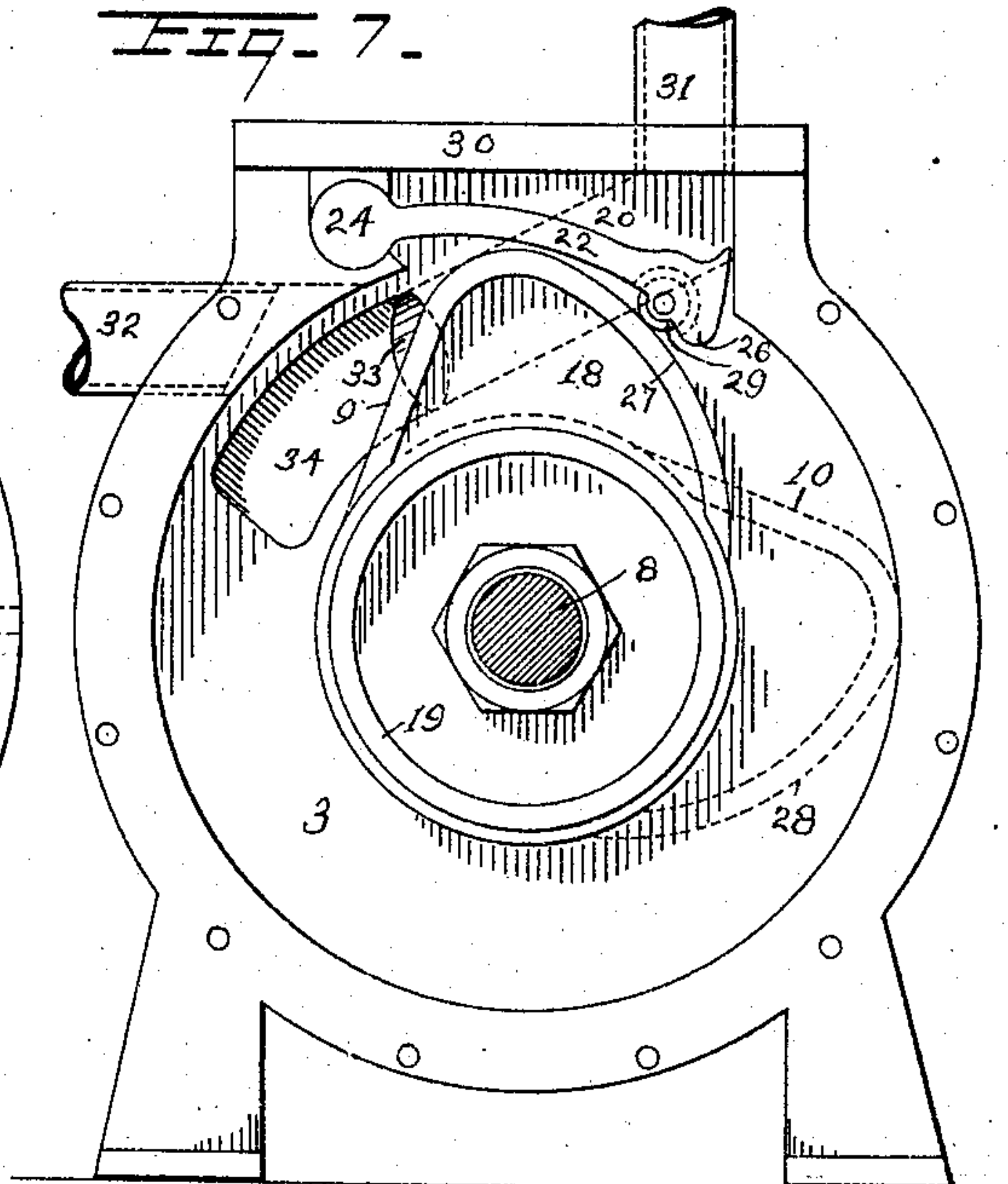


Fig. 7.



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# UNITED STATES PATENT OFFICE.

DANIEL C. WIEST, OF MOHRSVILLE, PENNSYLVANIA.

## COMPOUND ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 778,091, dated December 20, 1904.

Application filed May 12, 1903. Serial No. 156,788.

*To all whom it may concern:*

Be it known that I, DANIEL C. WIEST, a citizen of the United States, residing in Mohrsville, county of Berks, State of Pennsylvania, have invented certain new and useful Improvements in Compound Rotary Engines, of which the following is a specification.

My invention relates to a compound rotary engine; and my object is to provide an improved engine of this type which will be both simple and satisfactory in construction and economical in the use of steam.

The invention is fully described in connection with the accompanying drawings, and the novel features are specifically pointed out in the claims.

Figure 1 is a longitudinal sectional view on the line 1 1 of Fig. 2 of a simple form of engine embodying my invention, one of the cylinder-heads being shown withdrawn from its normal position. Fig. 2 is an end elevation looking in the direction of the arrow, Fig. 1, the cylinder-head being entirely removed. Fig. 3 is a separate inner face view of the cylinder-head. Figs. 4 and 5 show one of the rotary pistons detached. Fig. 6 is a sectional view of the partition-wall between the cylinders, taken on the line 6 6 of Fig. 2 to show the steam-port therethrough. Fig. 7 is a similar view to Fig. 2, showing the rotary pistons in different position.

In the preferred construction indicated in the drawings the two cylinders or rotary-piston chambers 2 and 3 are formed in a single casting, arranged in line longitudinally, with a partition-wall 4 between them having a central opening 5 and similar opposite bosses 6 and 7. This partition 4 is so located lengthwise of the cylinder-casting as to make the chamber 2, which forms the secondary or low-pressure cylinder, considerably larger than the chamber 3, which forms the primary or high-pressure cylinder. The central shaft 8, to which the two rotary pistons 9 and 10 are secured, passes through this partition-opening 5 and through suitable bearings 11 and 12 in the opposite cylinder-heads 13 and 14. Interior bosses 15 and 16 on the latter, corresponding in diameter with those (6 and 7) upon the partition 4, form, in connection with the

latter, similar cylindrical walls in each of the cylinder-chambers 2 and 3, between the two sections of which (6 and 16 in chamber 2 and 7 and 15 in chamber 3) is located the web (17 or 18) of the rotary piston (10 or 9) in said chamber. The hubs of these pistons are secured in any suitable manner to the shaft 8, with their outer cam-shaped portions arranged at about a right angle to each other, as indicated in Figs. 1 and 2, and rotatably fitted in their respective annular chambers. To cover the circular grooves through which the piston-webs 17 and 18 pass, I preferably form the latter with lapping rings or collars 19.

Each cylinder or rotary-piston chamber 2 or 3 is provided with an extension 20 or 21, forming a separate steam-chamber, which communicates with the corresponding cylinder through a "drop-valve" or "abutment-valve," as they are termed, (marked 22 and 23, respectively.) These valves are pivotally mounted at 24 and 25 and are arranged, as usual, to normally bear at their free ends 26 upon the outer surface of the cylindrical bosses 7 15 or 6 16, which form the inner boundary of the annular rotary-piston chambers 2 and 3, and upon the flush web portion 18 or 17 of the piston, which closely fits in the circular groove formed between the separated edges of said bosses. Said valves are raised, however, at each revolution of the pistons into their respective steam-chambers 20 or 21 by the passage of the cam-shaped pistons, the curved forward faces 27 and 28 of which in the preferred construction shown in the drawings come in contact with the antifriction-rollers 29, carried by said valves, slightly to the rear of their bearing edges 26. The cover 30, which seats upon the partition 4 and closes both of the separated steam-chambers 20 and 21, also completes the pivotal mountings 24 25 for the valves 22 23 and is provided with an inlet-pipe 31 for admitting steam to the steam-chamber 20. An exhaust-pipe 32 leads from the secondary cylinder or piston-chamber 2. The partition 4 between the latter and the primary cylinder 3 is formed with a port 33 34, leading from the said primary cylinder 3 into the steam-chamber 21 of the secondary cylinder, as shown in Figs. 1, 2, and 6.



In operation the steam from chamber 20 freely passes through the open valve 22, Fig. 2, into the cylinder 3, thus moving the rotary piston 9. When the latter reaches the position indicated in Fig. 7, its cam-face 27 comes in contact with the rollers 29 of the valve 22 and raises the latter into the steam-chamber 20, thus cutting off the supply of steam to cylinder 3 during the passage of the piston 9. Meanwhile the movement of the latter has uncovered the partition-port 34 33 and permitted the expanding steam from cylinder 3 to pass through said port to the steam-chamber 21 and thence through the valve 23 after the passage of the large piston 10 into the large secondary cylinder 2. The reduced pressure of the expended steam is thus utilized upon the enlarged area of piston 10 in cylinder 2, the equal pressure per square inch of the expanded steam in the primary cylinder 3 operating as a back pressure during a portion of the stroke on the smaller piston 9, such back pressure, however, being largely overbalanced by the forward pressure on the larger area of piston 10. The most satisfactory relative areas of pistons 9 and 10 will vary with the pressure of the steam employed and the point of cut-off in the primary cylinder; but in all cases the excess area of the secondary piston over the primary one provides an effective forward pressure upon the cooperating pistons and economically utilizes the expansive force of the steam.

Any suitable means for oiling and packing may be provided and the construction may be otherwise considerably modified without departing from the spirit of my invention.

What I claim is—

1. A compound rotary engine comprising

aligned annular cylinders each having a steam-chamber extension, a partition between said cylinders having a steam-port therethrough affording communication between the first cylinder and the second steam-chamber, an abutment-valve between each cylinder and its steam-chamber, an exhaust-port from the second cylinder, and rotary pistons for said cylinders fixed at different angles to a common shaft and controlling said valves and ports substantially as set forth.

2. In a compound rotary engine a cylinder having aligned annular rotary-piston chambers or cylinders formed therein by means of a hollow-hubbed transverse partition and hollow-hubbed cylinder-heads secured to the ends thereof, in combination with a central shaft, rotary pistons fixed to said shaft, and abutment-valves arranged to ride upon said hollow hubs.

3. A compound rotary engine comprising a double cylinder with a transverse partition having a central opening and oppositely-projecting hubs or bosses, cylinder-heads having corresponding inwardly-extending hubs or bosses spaced apart from the abutting ends of the partition-hubs, a central shaft in said cylinder, rotary pistons on opposite sides of said partition having web portions extending between said spaced hubs and fixed to said shaft, and abutment-valves adapted to ride upon said hubs.

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

DANIEL C. WIEST.

Witnesses:

D. M. STEWART,

W. G. STEWART.