

No. 697,026.

Patented Apr. 8, 1902.

J. P. SHEPARD.
ROTARY ENGINE.

(Application filed May 16, 1901.)

(No Model.)

Fig. 1.

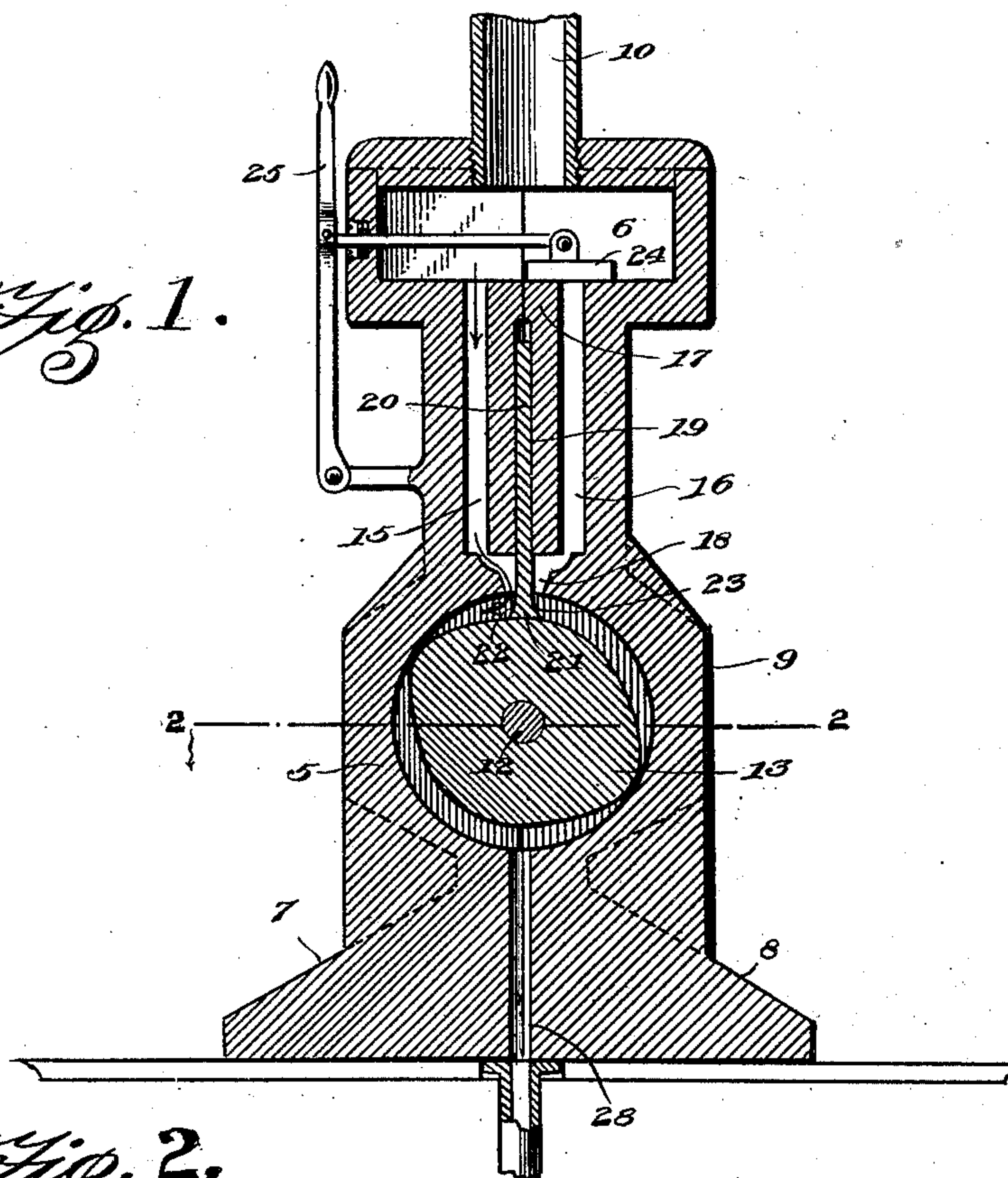


Fig. 2.

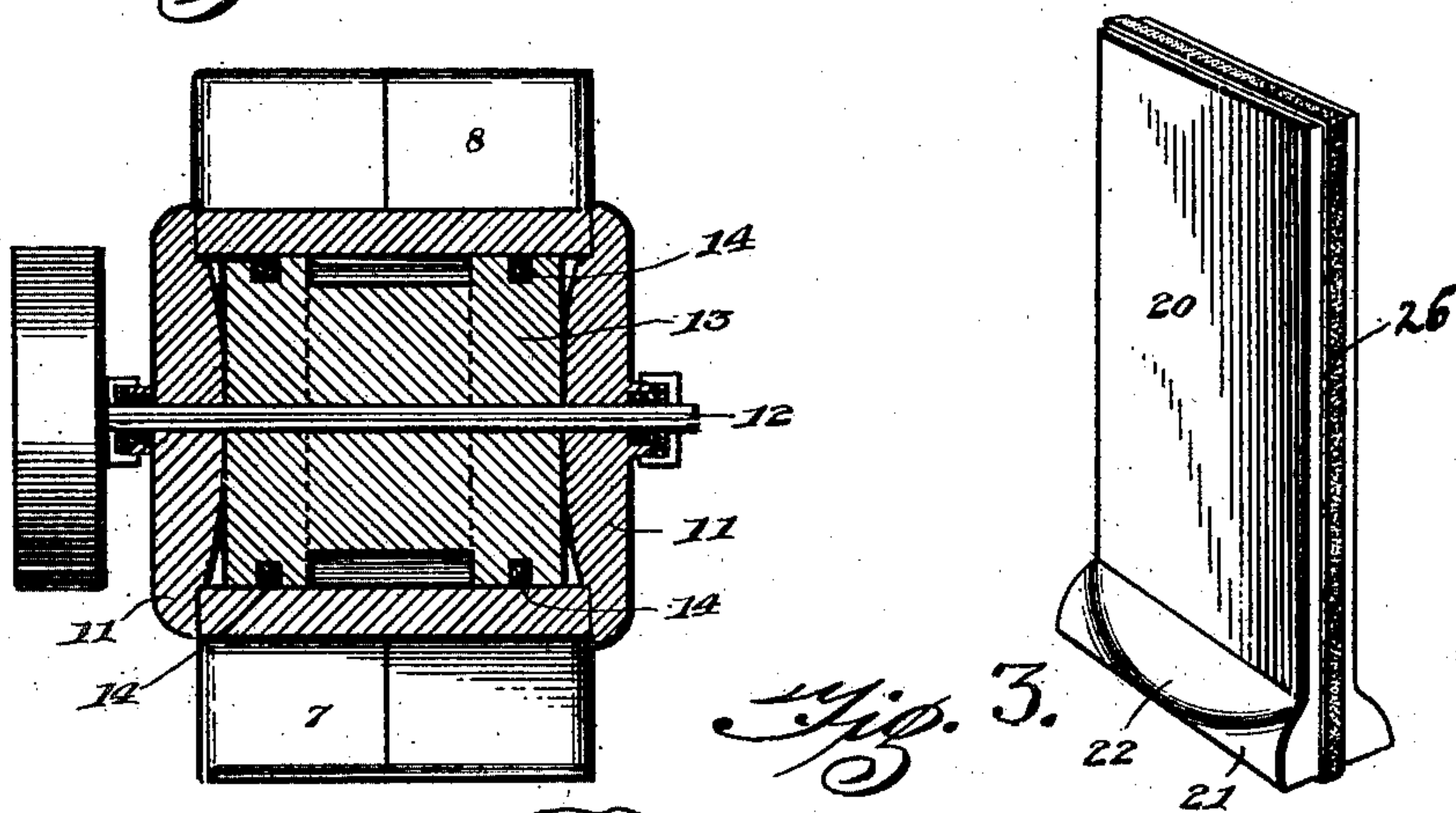
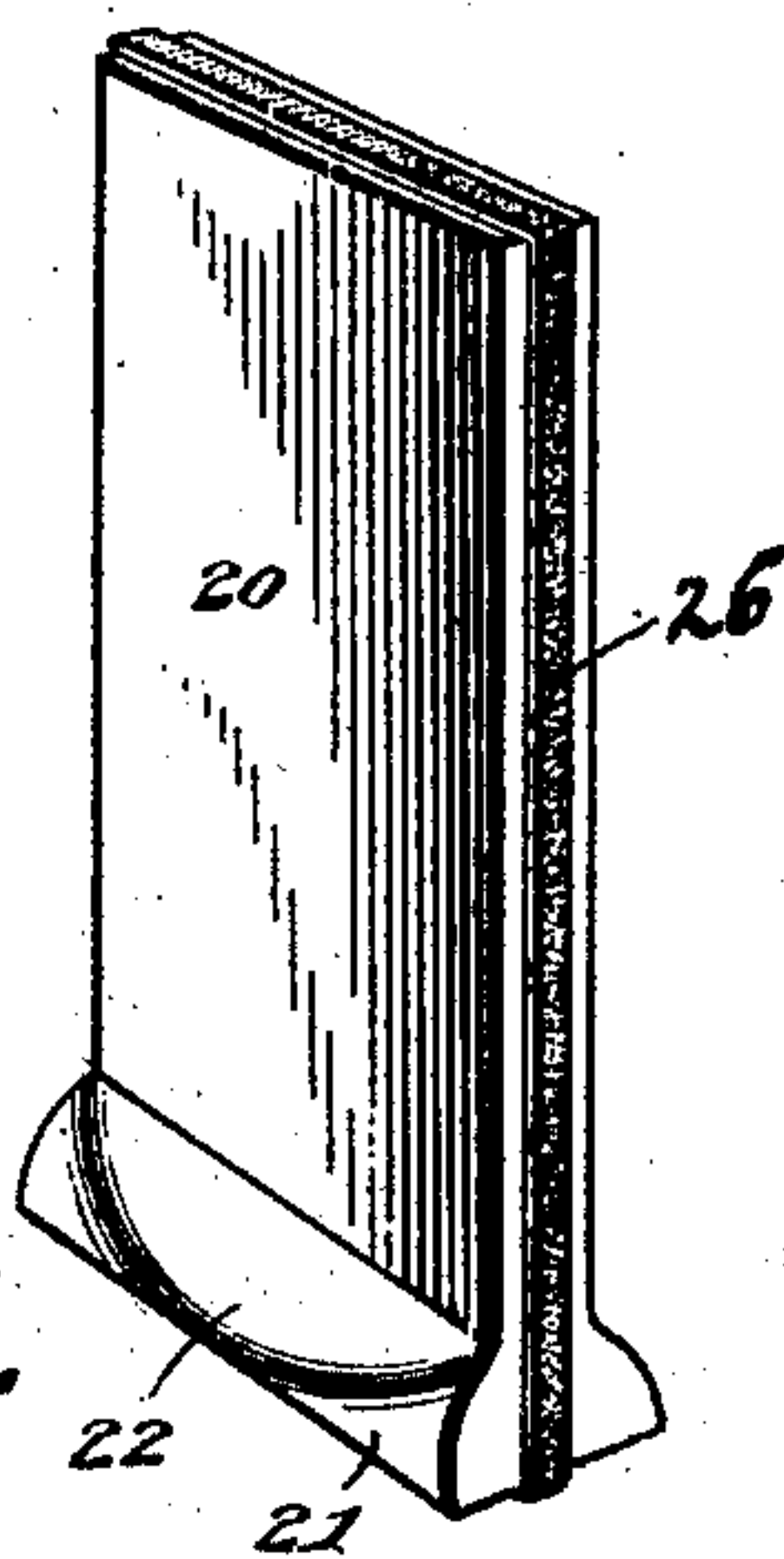


Fig. 3.



Witnesses

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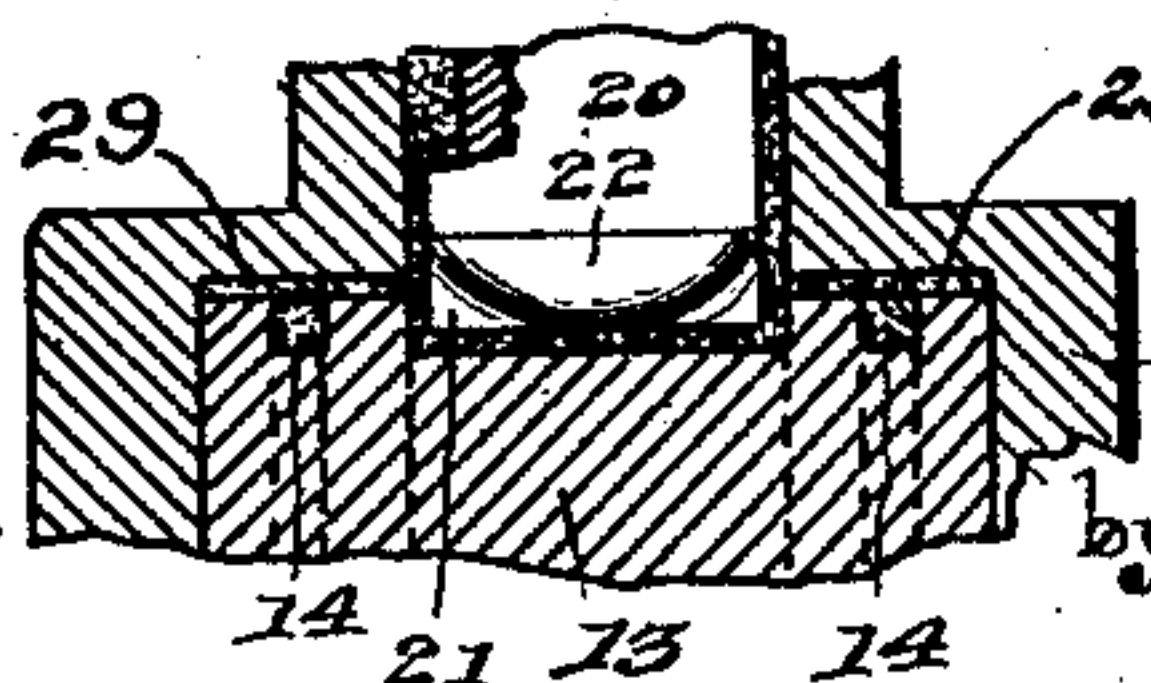


Fig. 4.

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UNITED STATES PATENT OFFICE.

JAMES P. SHEPARD, OF PENNSBORO, WEST VIRGINIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 697,026, dated April 8, 1902.

Application filed May 16, 1901. Serial No. 60,519. (No model.)

To all whom it may concern:

Be it known that I, JAMES P. SHEPARD, a citizen of the United States, residing at Pennsboro, in the county of Ritchie and State of West Virginia, have invented a new and useful Rotary Engine, of which the following is a specification.

This invention relates to rotary engines; and it has for its object to provide an engine of the expansion type wherein the abutment will be automatically moved into and out of operative position and in which the abutment will be held snugly against the periphery of the piston to prevent leakage of steam.

Other objects and advantages of the invention will be apparent from the following description.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a central vertical section of the engine, taken in a plane at right angles to the shaft of the piston. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a detail perspective view showing the movable abutment. Fig. 4 is a detail sectional view showing the upper portion of the cylinder and the arrangement of the packing-strips.

Referring now to the drawings, there is shown an engine comprising a cylinder 5, a steam-chest 6, and connecting steam-passages, the shell including these parts being formed of the two castings 7 and 8 and in each of which is formed one-half of the cylinder, the steam-chest, one of the steam ports or passages, and half of the abutment-chamber and half of the steam-outlet. The shell comprises an enlarged base portion, supported upon which is the body 9, in which is formed the cylinder, and at the upper end of the shell is formed the steam-chest, having the steam-feed pipe 10 connected thereto. The ends of the cylinder are provided with the heads 11, the inner faces of which are convex, and through these heads is passed the shaft 12, which carries the piston 13 of the engine. The end portions of the piston are annular and are grooved to receive packing-rings 14, which bear against the inner face of the cylinder, and between these annular portions the piston is cross-sectionally elliptical, the major axis of which is equal to

the diameter of the cylinder, so that said elliptical portion may work against the inner face of the cylinder. In the upper side of the cylinder is a port 18, which extends throughout the length of the cross-sectionally elliptical portion of the piston, and leading from the steam-chest to this opening are the passages 15 and 16, which are separated by the web 17. In the web 17, which terminates above the opening 18, above referred to, and extending upwardly through the lower end thereof, is a chamber 19, in which is disposed an abutment-plate 20, having a broadened foot 21, in which are formed the cut-away portions 22 and 23 in the upper side edges thereof, and this foot when the abutment is in raised position, with the bottom of the foot flush with the wall of the cylinder, acts to close the opening 18 and cut off flow of steam to the cylinder. The foot of the abutment rests against the cross-sectionally elliptical portion of the piston, and as the piston rotates the abutment is moved from the cylinder and is then released and permitted to return. The abutment is returned by the action of the inlet-steam, which in its passage to the cylinder engages or impinges against the cut-away portion of the foot and acts to force the abutment downwardly, the cut-away portion forming a shoulder for this purpose.

Steam is admitted through either of the passages 15 and 16 by correspondingly shifting the slide-valve 24, disposed in the steam-chest, said valve being shifted by means of the lever 25, which is pivoted to the shell of the engine and is connected to the valve by means of a shift-rod, as shown in Fig. 2 of the drawings. Thus steam being admitted to either side of the abutment it presses against the piston and by expanding rotates the piston. The abutment is provided with packing-strip 26 at its edges to prevent passage of steam from one side to the other thereof. At the upper side of the cylinder and leading longitudinally thereof from the abutment are the packing-strips 29, against which rub the packing-strips 14.

The exhaust-port is shown at 28 and is formed through the base of the shell of the engine.

In practice modifications of the specific construction shown may be made and any suit-

able materials and proportions may be used for the various parts without departing from the spirit of the invention.

What is claimed is—

- 5 1. The combination in a rotary engine, of a cylinder, a steam-chest, an inlet-port opening into the cylinder, steam-passages extending from the steam-chest to said port at opposite sides thereof, a vertically-movable abutment and valve disposed for movement through said port and adapted to entirely close the same when in alinement with the bore of the cylinder, said abutment having a narrow vertically-guided body portion separating the two steam-passages from each other and guiding the steam from one passage to one side of the cylinder and from the opposite passage to the opposite side of the cylinder, there being at the bottom of said abutment a foot portion widened at each side of the body portion for the action of steam leading from either passage, said abutment being operating in a downward direction by the pressure of steam against its foot and being operated in an upward direction by contact with the rotating piston, and a valve located in the steam-chest for controlling the flow of steam through one or other of passages, substantially as specified.
2. The combination in a rotary steam-engine, of a cylinder having convex heads, a steam-chest, a piston in said cylinder said piston having annular end portions provided with annular packings of a diameter equal to the bore of the cylinder and adapted for constant contact therewith and a central cross-sectionally elliptical portion, a steam-port opening into the central portion of the cylinder said port being of a length equal to the distance between the adjacent faces of the annular portions of the piston, an abutment disposed for vertical movement through the
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- 20
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- 35
- 40

port into and out of the cylinder and in contact with the elliptical portion only of the piston, said abutment having a contracted body portion and a foot portion widened at each side of the body portion and adapted to be operated in a downward direction by the steam-pressure, steam-passages connecting the steam-chest with the port at opposite sides of the abutment, and a valve in said chest for opening and closing the passages interchangeably, substantially as specified.

3. The combination in a rotary engine, of a steam-cylinder, steam-chest and connecting-passages, a shell or casing containing and forming the same, said shell or casing comprising two similarly-shaped vertically-connected sections 5, 6, a central web 17 having abutment-chamber formed partly in each of said sections, a rotary piston having annular end portions fitting closely in the cylinder and provided with annular packing for preventing the escape of steam laterally, and a central portion of elliptical shape in cross-section, an entrance-port 18 of a width equal to that of the elliptical portion of the piston, said port forming the common outlet of steam-passages 15 and 16 leading from the steam-chest, and an abutment having a narrowed plate or web 20, adapted to the abutment-chamber, and having its foot portion laterally extended on each side of the web for operation by steam entering from either side of said abutment, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAMES P. SHEPARD.

Witnesses:

JOHN STOOPS,
CREED H. COLLINS.