

No. 855,906.

PATENTED JUNE 4, 1907.

M. SCHMIDT.  
ROTARY ENGINE.

APPLICATION FILED JAN. 25, 1907.

2 SHEETS—SHEET 1.

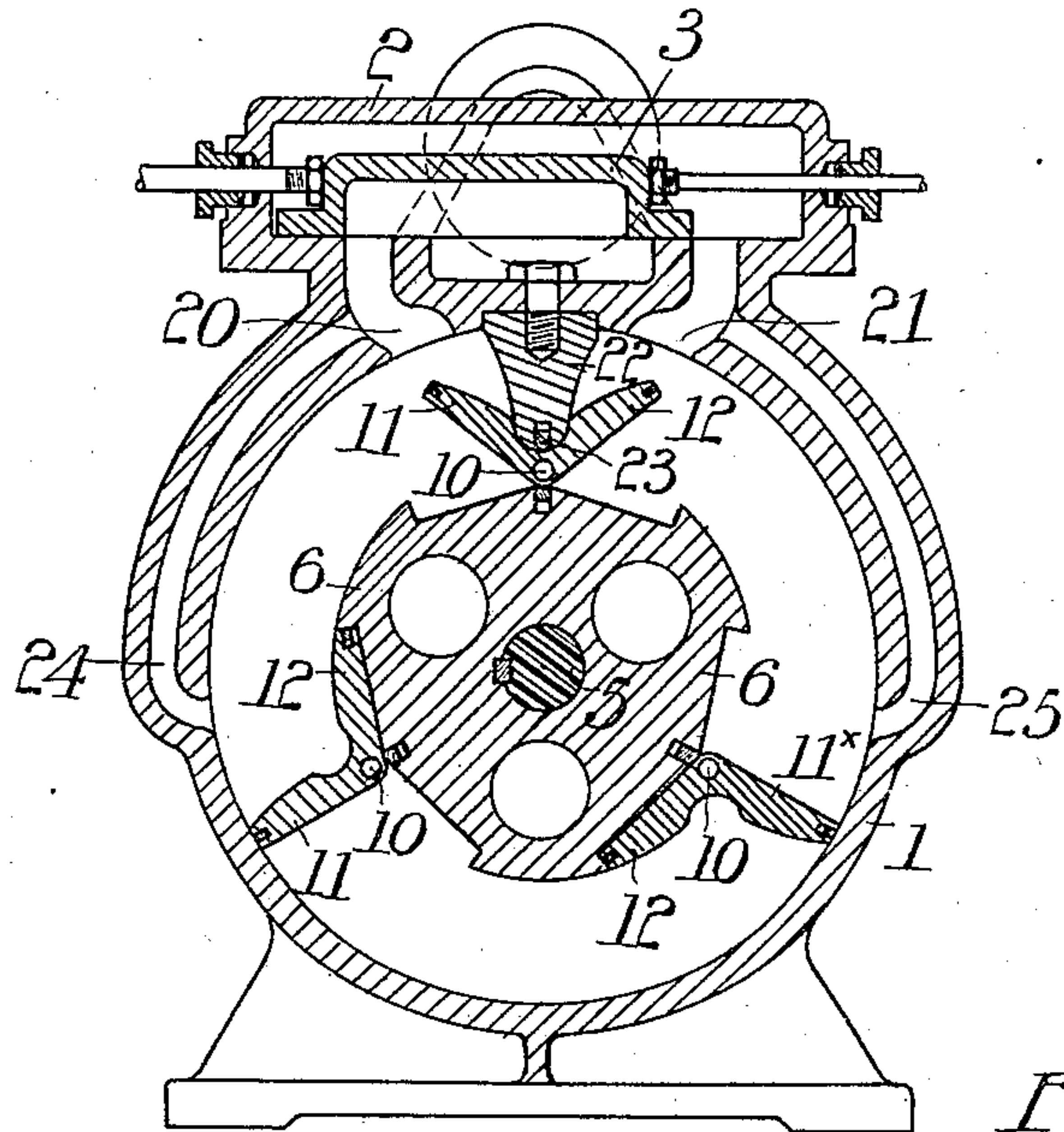


Fig. 2.

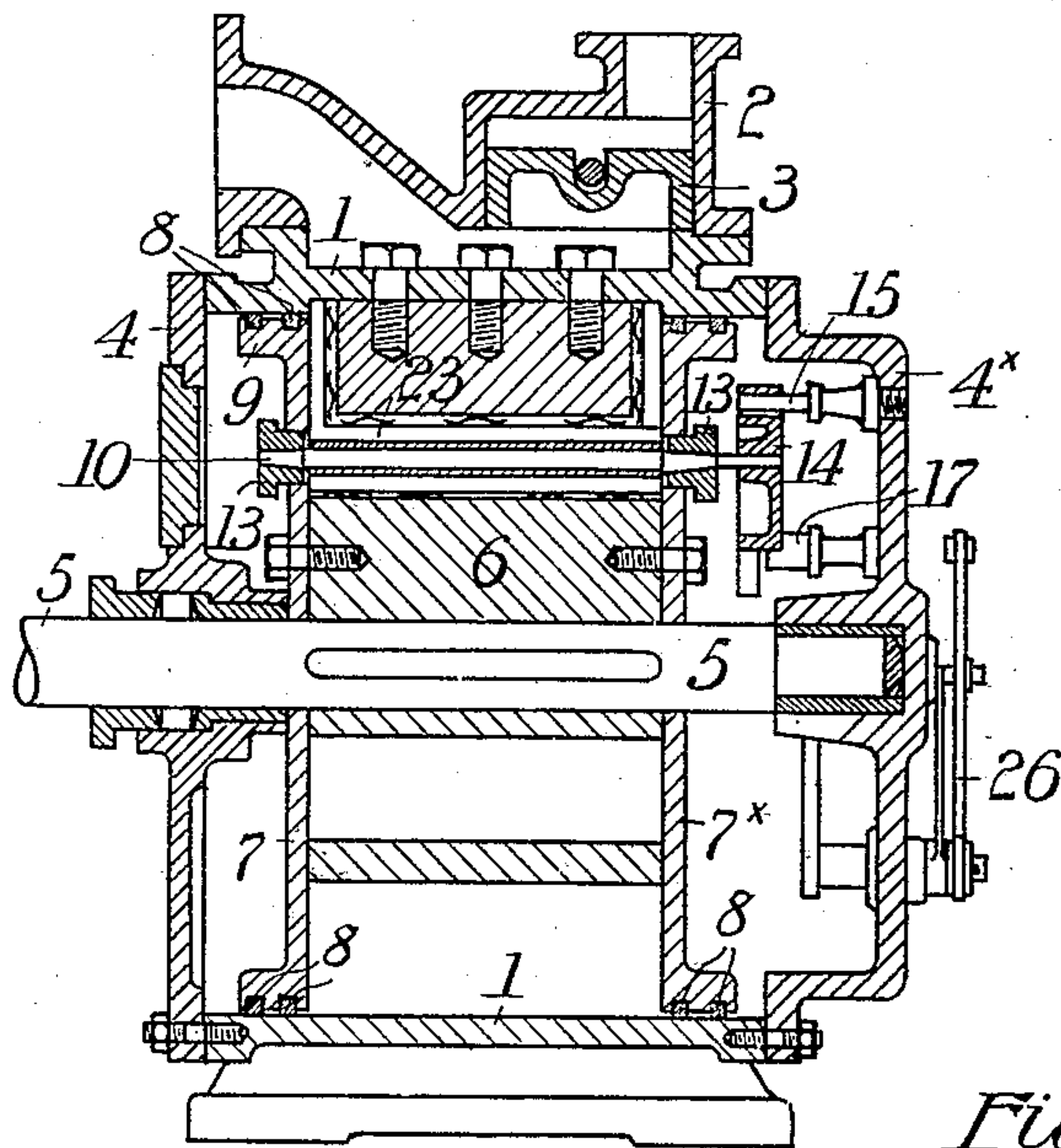


Fig. 1.

Witnesses  
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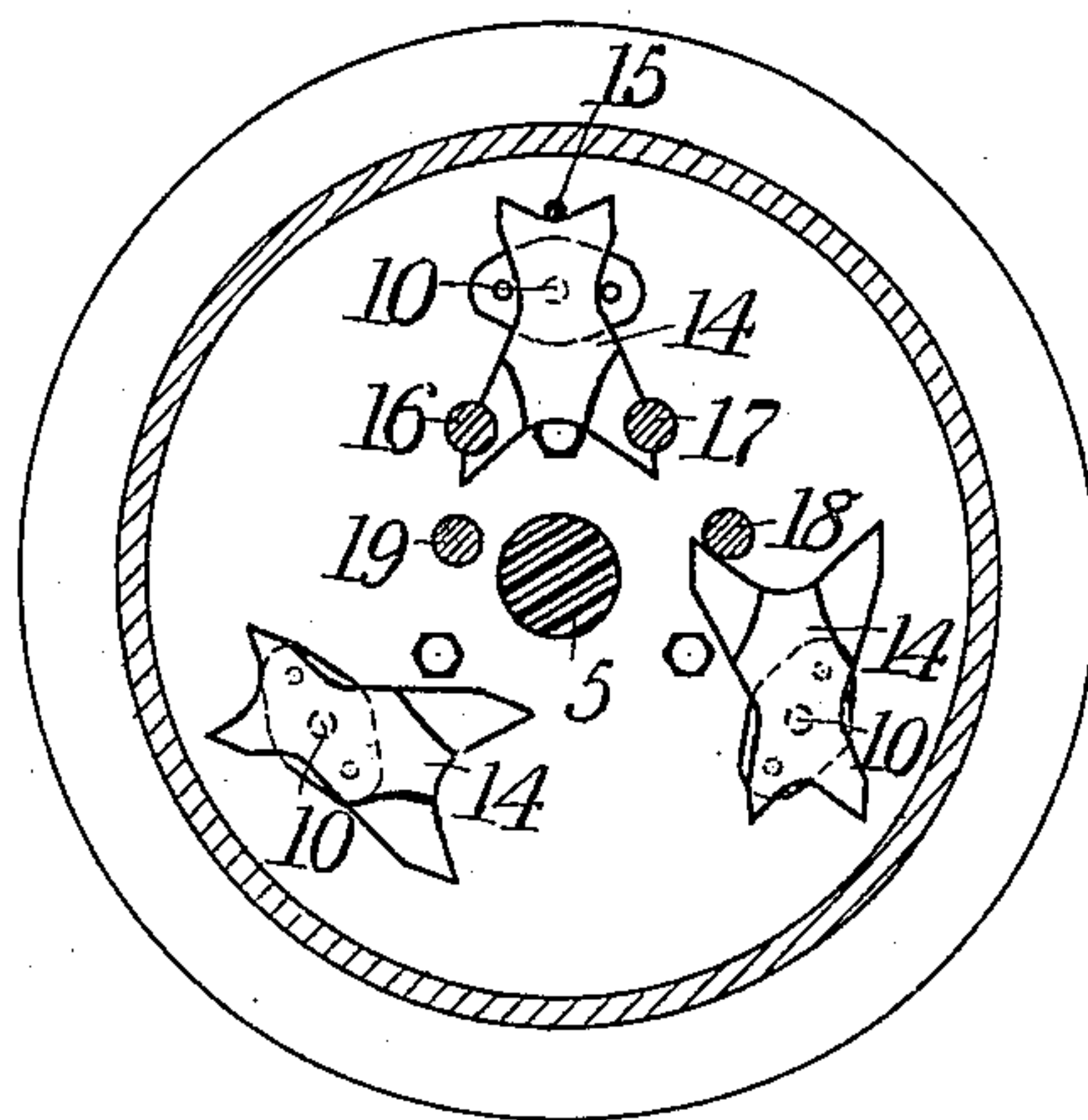


Fig. 3.

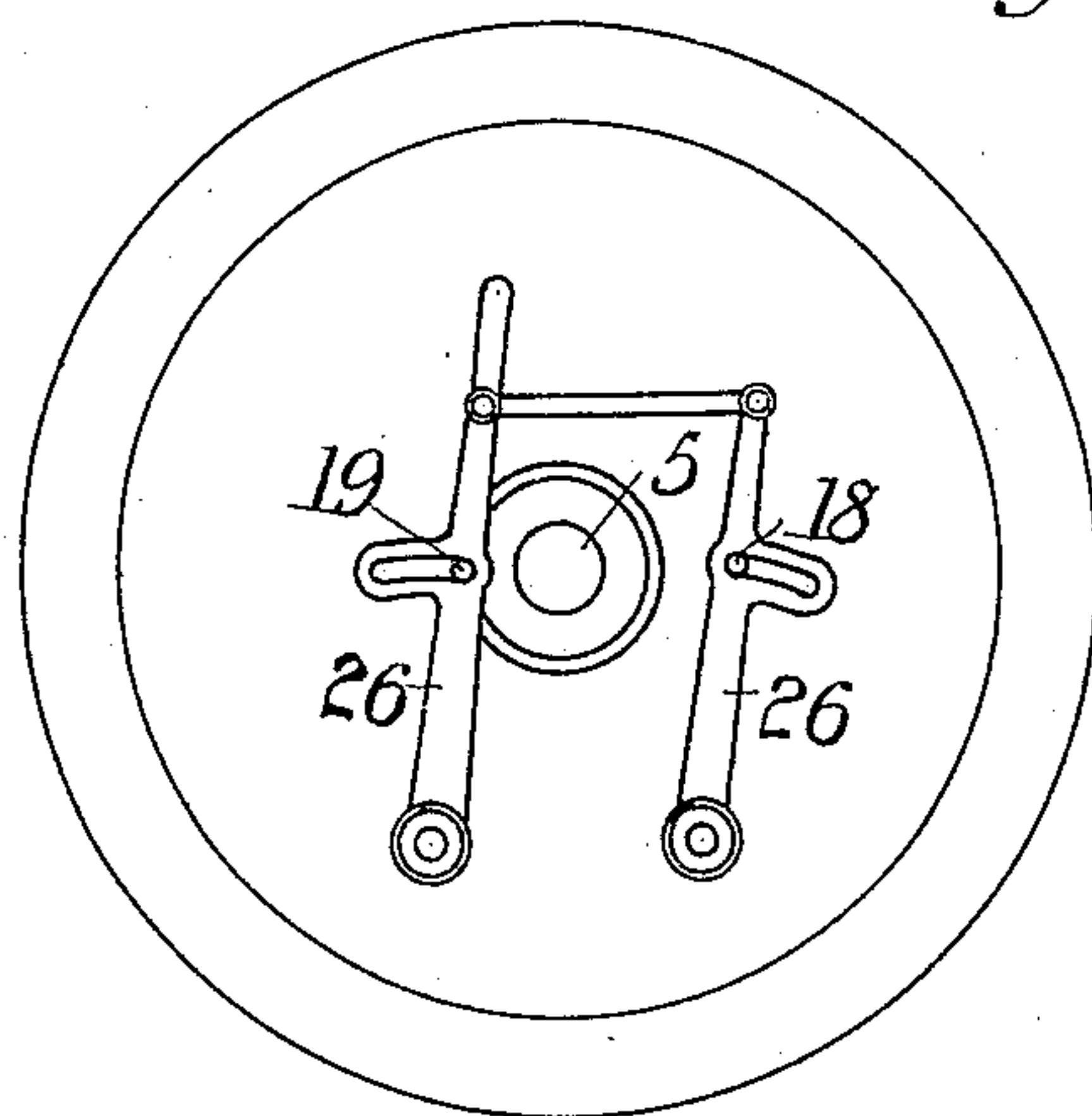


Fig. 4.

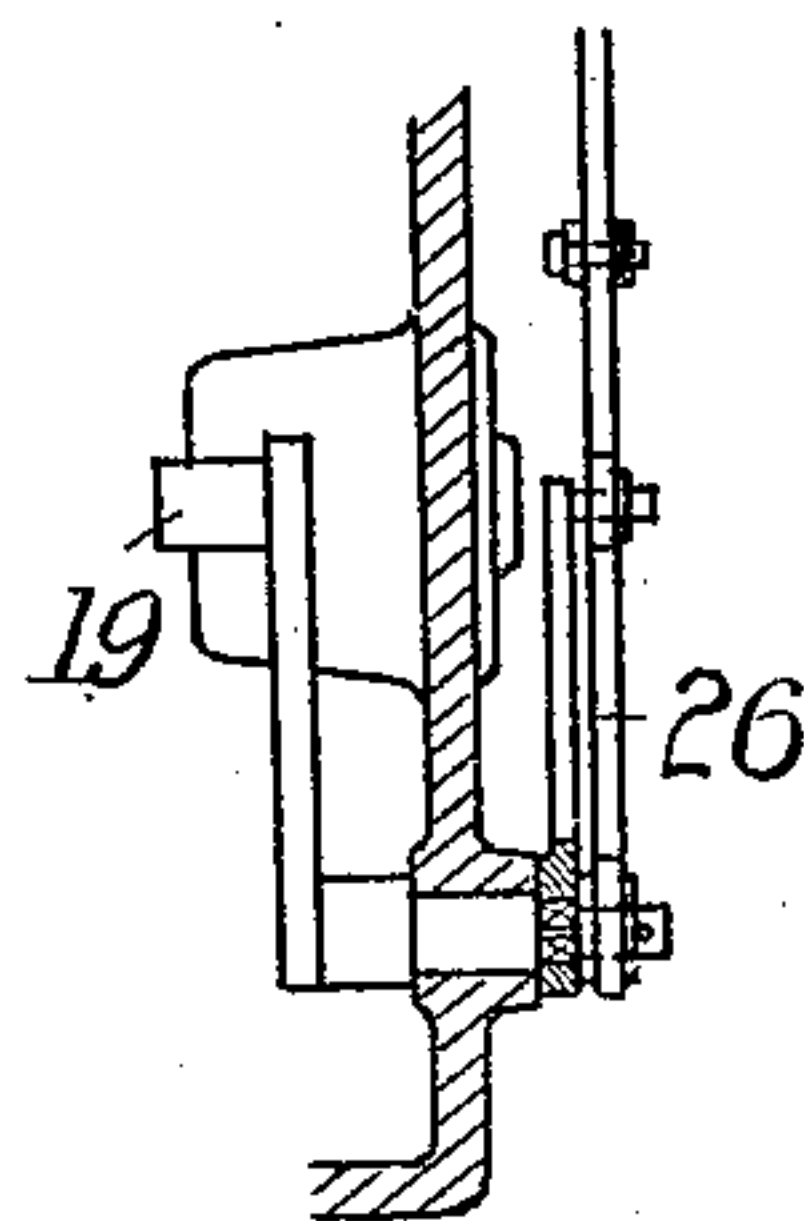


Fig. 5.

Witnesses

Julius Röpke  
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Inventor

Max Schmidt.



# UNITED STATES PATENT OFFICE.

MAX SCHMIDT, ON BOARD OF THE HULK "KRONPRINZ," IN KIEL-WIK,  
GERMANY.

## ROTARY ENGINE.

No. 855,906.

Specification of Letters Patent.

Patented June 4, 1907.

Application filed January 25, 1907. Serial No. 354,127.

*To all whom it may concern:*

Be it known that I, MAX SCHMIDT, engineer in the Imperial German Navy, a subject of the King of Prussia, and a resident on board of the hulk "Kronprinz," in Kiel-Wik, in the Empire of Germany, (whose post-office address is care of Kipp & Buttner, of No. 21 Glockengiesserwall, Hamburg, Germany,) do hereby declare the nature of my invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement.

The present invention relates to an improved rotary engine, which offers the advantages of the reciprocating engines combined with those of turbine engines, which runs with equal efficiency in both directions, which may be adapted to suit various grades of speed and which requires only a very small space in its erection.

Further objects of the invention are to simplify and cheapen the construction and to render more efficient serviceable and durable in operation devices of the kind referred to.

With these ends in view the invention consists in the novel combination, arrangement and adaptation of parts, all as more fully hereinafter explained, shown in the accompanying drawings and then specifically set out in the appended claims.

In the drawings Figure 1 represents a central vertical section through the engine. Fig. 2 represents a transverse section. Fig. 3 shows, in an end view, the governing organs for the piston wings, and Figs. 4 and 5 show the reversing gear in plan view and section.

The cylindrical casing 1 is connected, at its top end, with the valve chest 2, in which is housed a slide 3 for governing the supply of the driving agent in accordance with the direction of rotation of the engine. This slide valve 3 is of any well known and approved construction and it may be operated in any well known manner, which requires no further description to render the invention intelligent to those skilled in the art.

Concentric within the cylindrical casing 1 is supported, and steam-tightly journaled in the cover plates 4 the drive shaft 5, which carries, keyed thereto, a piston drum 6. The two end faces of this drum 6 have fas-

tened thereto cover disks 7, the peripheral edges of which move steam tight along the internal surface of the casing 1, after suitable packing material 8 has been interposed between the bearing surfaces.

Piston wings, which assume the shape of a V in cross section, are pivotally mounted on axles 10 parallel with the shaft 5 at the peripheral surface of the piston drum 6. Said piston wings offer one or the other end face as an abutment for the driving agent in accordance with the direction of rotation of the engine. In the drawings are shown, by way of example, three of the said piston wings, the two wings of each being marked 11 and 12.

The axles 10 of the piston wings are journaled steam-tight in appropriate bearings in the cover disks 7 and one extremity of the said axles is extended through one of the cover disks, projecting into the space inclosed between the cover disk marked 7<sup>1</sup> and the cylinder head plate, marked 4<sup>1</sup> in the drawings. The projecting extremities of the axles 10 carry, firmly keyed thereto, governing cams 14, which serve for the purpose of regulating the motion and action of the piston wings during the rotation of the engine. Bolts 15, 16, 17, 18, 19 are employed for operating the governing cams 14. The bolts 15, 16, 17 are fixed to the head plate 4<sup>1</sup> of the casing 1, the bolts 18, 19 are movably supported and adapted to be actuated from outside, as will be more fully described later on.

20, 21 denote the ports for the supply of the driving medium from the valve chest 2. According to the position of the slide 3 either the port 20 or the port 21 is in operation as will be readily understood without further description. Inside the casing 1 is fixed a transverse wall 22 intermediate between the two ports 20 and 21. Said transverse wall 22 is provided with packing material 23 in such a manner, that a steam-tight joint is obtained on the circumference of the piston drum 6 or on the piston wings respectively, when the latter pass the wall.

In the position of the slide 3, shown in Fig. 2, the driving medium flows from the valve chest 2 through the port 21 into the casing 1 and is impelled by the fixed transverse wall 22 to act upon the piston wing marked 11<sup>1</sup>, thereby causing the rotation of the piston drum 6, and with same the rotation of the end disks 7 and of the drive shaft 5. During



the rotation the piston wings, shown in Fig. 2 in a position opposite to the fixed wall 22, enter the working chamber of the engine and knocks with the cam 14 on the external projecting end of its axle 10 against the bolt 18. In view of this contact and obstruction said piston wings are rocked on their axle and turned into such a position, that the rear working face is presented to the action of the driving medium.

In order to insure a smooth passage of the piston wings beneath the fixed transverse wall 22, the bolt 16, acting against a suitable surface of the cams 14, presses the forward wing 12 into a fitting aperture at the periphery of the piston drum 6 and thus holds same against backward rotation which might otherwise occur by virtue of gravitation. After being liberated from the bolt 16 the piston wings, in passing the wall 22, are turned into the position shown in Fig. 2. The exhaust takes place through the port 20.

The circumferential wall of the cylinder casing is provided with channels 24, 25 starting from the port openings 20, 21 respectively and terminating at about the elevation of the drive shaft 5 diametrically opposite into the interior space of the casing 1. These narrow channels 24, 25 serve, on the one hand, for insuring an early escape of the spent driving medium, on the other hand for attaining the admission of the driving medium up to the last moment favorable for the action of the engine. The latter purpose is very important, since the piston wings in passing the fixed transverse wall 22 partially cover the admission port and present no abutment face for the driving impulse.

For reversing the engine the slide 3 has to be actuated to change the admission port as is well known. By means of the lever mechanism 26 the bolt 19 has to be moved forward. The bolt 18 remains in its original position, owing to the pin and slot connection illustrated in Fig. 4, which does not affect said bolt, while the bolt 19 is being moved. This serves for the purpose of turning the first passing piston wings. The steering cam of the next piston wings, in passing the bolt 18, presses same in the direction of the drive shaft 5 into its position of rest.

The top bolt 15 effects the turning of the piston wings, when passing the fixed transverse wall 22, independent of the direction of rotation of the engine. The bolt 17 serves for pressing down the front wing in the same manner and for a like purpose as previously described with regard to the bolt 16.

Any suitable packing means may be employed to insure a steam-tight joint between the movable and the stationary organs of the rotary engine described.

Should it be required or desired to utilize the expansive force of the driving medium, it is necessary to mount on the same shaft, a

plurality of the engines described interconnected for the suitable supply and conduct of the driving medium.

I do not desire to be understood as limiting myself to the detail construction and arrangement of parts as herein shown and described, as it is manifest that variations and modifications therein may be resorted to, in the adaptation of my invention to varying conditions of use, without departing from the spirit and scope of my invention and improvements. I therefore reserve the right to all such variation and modification as properly falls within the scope of my invention and the terms of the following claims.

What I do claim as my invention, and desire to secure by Letters Patent, is:

1. A rotary engine comprising in combination a cylindrical casing, a drive shaft concentric in the aforesaid casing, head plates for closing the casing at its two ends affording bearings for the aforesaid drive shaft, a piston drum keyed on the drive shaft inside the cylinder casing leaving an annular space, disks fixed at the two ends of the piston drum laterally inclosing the aforesaid annular space, packing means at the peripheral edges of the drum disks adapted to insure a steam-tight joint at the inner surface of the cylinder casing, a plurality of piston wings pivotally connected at the periphery of the piston drum, reversible means for the supply and escape of the driving medium, a stationary transverse wall fixed at the inside of the cylinder casing insuring the action of the driving medium in the required direction of rotation, and means for governing the rotary movement of the aforesaid pivoted piston wings, substantially as set forth.

2. A rotary engine comprising in combination a cylindrical casing, a drive shaft concentric in the aforesaid casing, head plates for closing the casing at its two ends affording bearings for the aforesaid drive shaft, a piston drum keyed on the drive shaft inside the cylinder casing leaving an annular space, disks fixed at the two ends of the piston drum laterally inclosing the aforesaid annular space, packing means at the peripheral edges of the drum disks adapted to insure a steam-tight joint at the inner surface of the cylinder casing, a plurality of piston wings pivotally connected at the periphery of the piston drum, each pair of piston wings assuming in cross section a V-shape, or approximately so, reversible means for the supply and escape of the driving medium, a stationary transverse wall fixed at the inside of the cylinder casing insuring the action of the driving medium in the required direction of rotation, and means for governing the rotary movement of the aforesaid pivoted piston wings, substantially as set forth.

3. A rotary engine comprising in combination a cylindrical casing, a drive shaft con-



centric in the aforesaid casing, head plates  
for closing the casing at its two ends afford-  
ing bearings for the aforesaid drive shaft, a  
piston drum keyed on the drive shaft inside  
5 the cylinder casing leaving an annular space,  
disks fixed at the two ends of the piston drum  
laterally inclosing the aforesaid annular  
space, packing means at the peripheral edges  
of the drum disks adapted to insure a steam-  
10 tight joint at the inner surface of the cylinder  
casing, a plurality of piston wings rotatable  
at the periphery of the piston drum, each  
pair of piston wings keyed on an axle suitably  
supported in bearings in the end plates of the  
15 piston drum, each axle of the piston wings  
penetrating through one of the said end  
plates, a cam on each projecting extremity of

the axles, means, consisting of stationary  
and movable bolts, for governing the rotary  
movement of the aforesaid pivoted piston 20  
wings, reversible means for the supply and  
escape of the driving medium and a station-  
ary transverse wall fixed at the inside of the  
cylinder casing insuring the action of the  
driving medium in the required direction of 25  
rotation, substantially as set forth.

In witness whereof I have hereunto signed  
my name this 4th day of January 1907, in the  
presence of two subscribing witnesses.

MAX SCHMIDT.

Witnesses:

JULIUS RÖPKE,  
OTTO LAU.