D. BURNFIELD.

TURBINE.

APPLICATION FILED NOV. 16, 1907.

928,178.

Patented July 13, 1909.

2 SHEETS—SHEET 1.

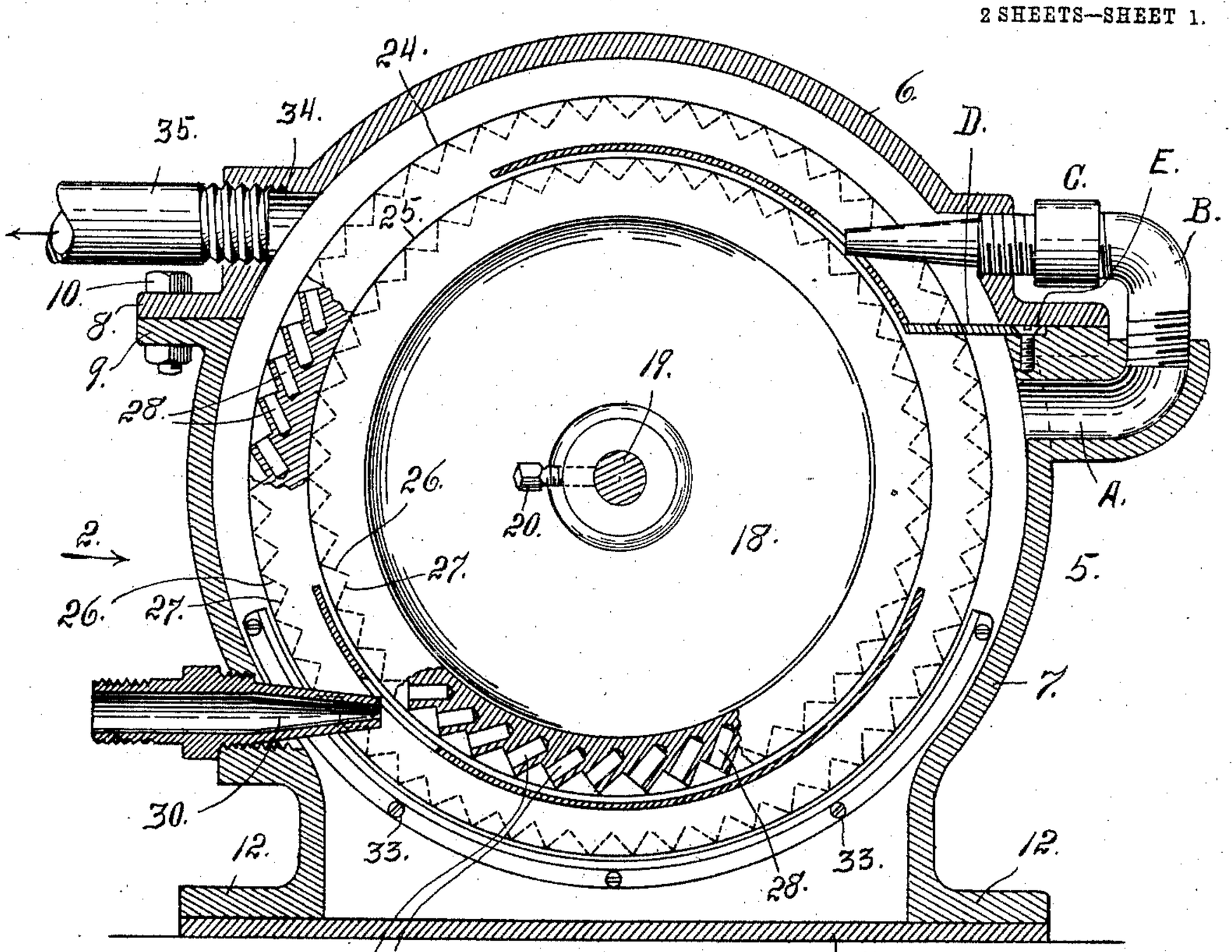

Fig. 1.

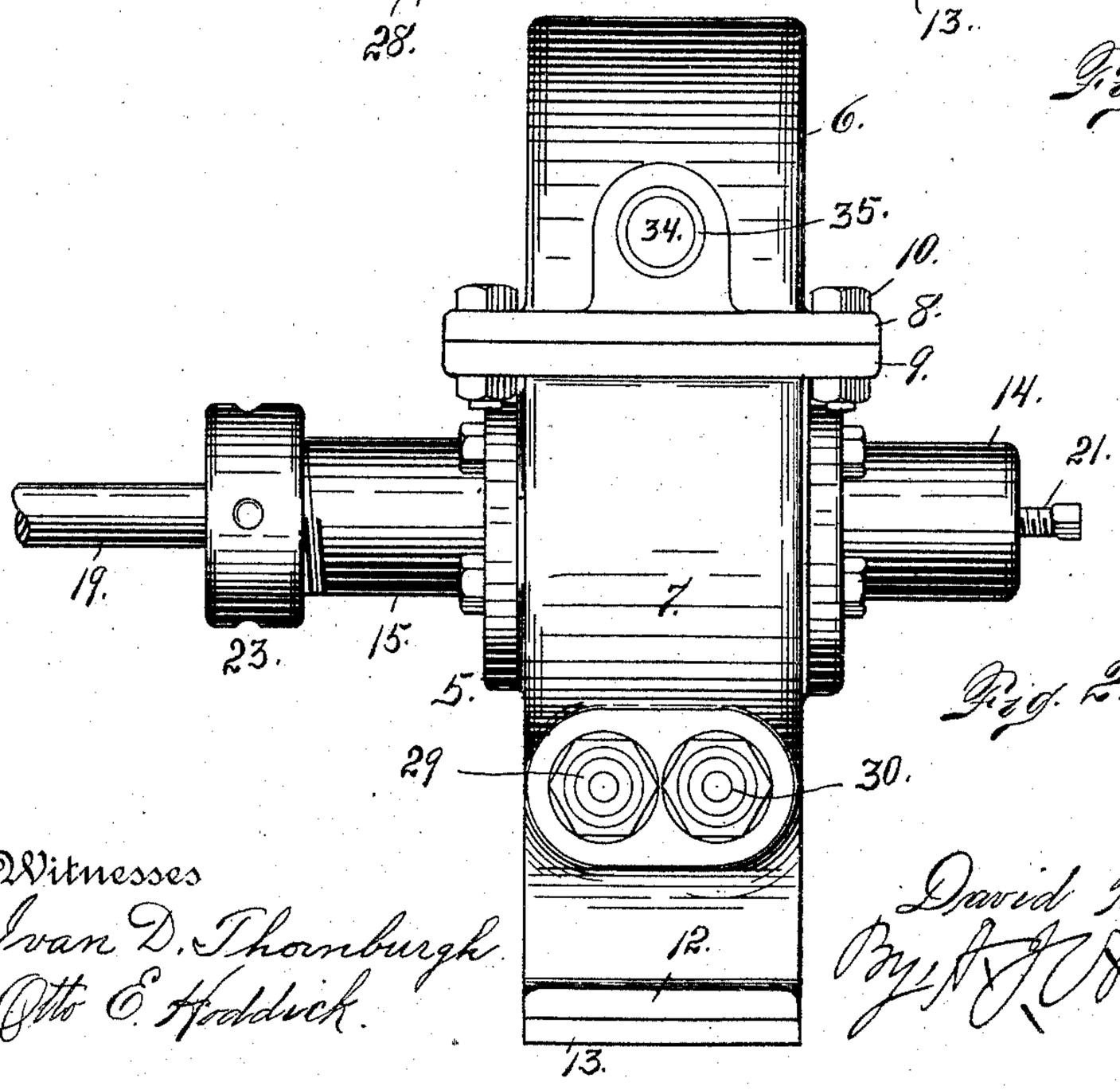

Fig. 2.

Witnesses

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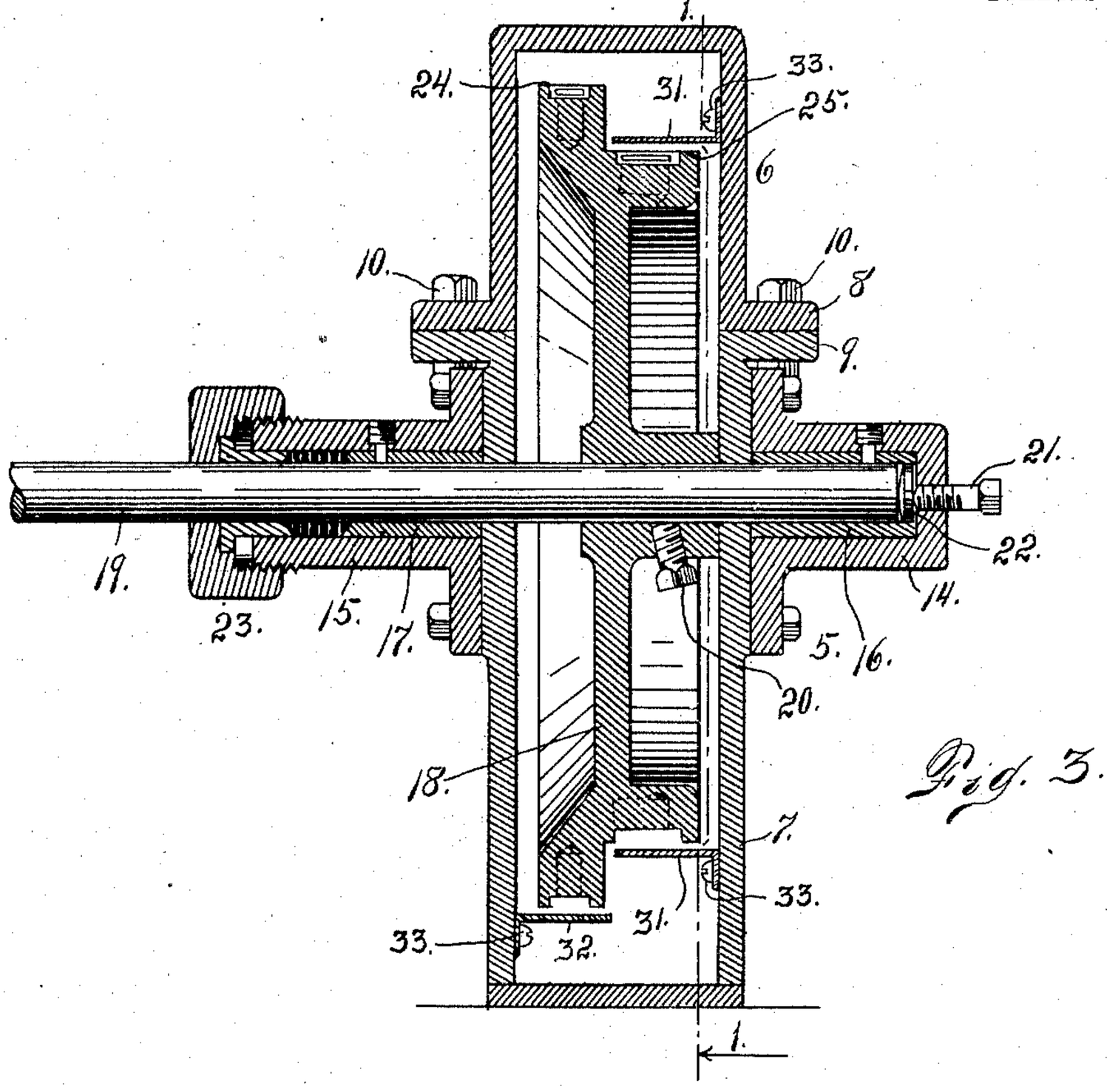

Fig. 3.

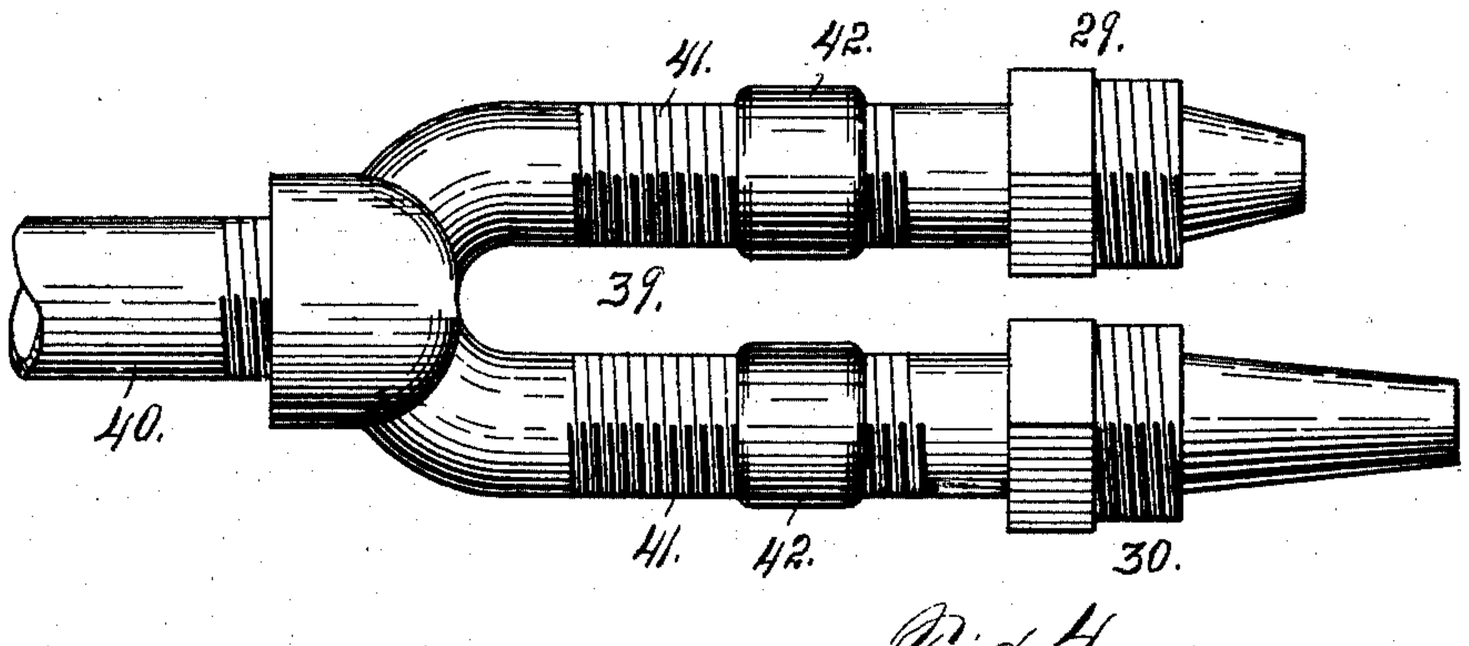

Fig. 4

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UNITED STATES PATENT OFFICE.

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TURBINE.

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To all whom it may concern:

Be it known that I, DAVID BURNFIELD, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Turbine-Motors; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in motors of the turbine class.

My improved motor is adapted to be actuated by any suitable motive fluid as air or steam.

One of the distinguishing features of my improved motor, consists in the fact that the rotary piston is provided with two peripheries of different diameters against which the motive fluid acts. These peripheries or zones of the piston are provided with pockets adapted to catch the motive fluid and facilitate its utilization for driving purposes. By virtue of the fact that the periphery of less diameter moves more slowly than the periphery of greater diameter, the motive fluid acts to better advantage upon the former, especially after the piston has acquired a considerable rate of speed. For convenience these two peripheries or zones of the piston will be referred to as inner and outer peripheries, the one of less diameter being termed the inner periphery and the one of greater diameter the outer periphery. Housings are located adjacent the portions of the two peripheries upon which the motive fluid is delivered, thus confining the said fluid whereby it acts more effectively upon the piston.

Having briefly outlined my improved construction I will proceed to describe the same in detail reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a section taken on the line 1—1 Fig. 3 cutting the casing of my improved motor, portions of the rotary piston being also shown in section. Fig. 2 is an elevation of the motor viewed at right angles to Fig. 1. This may be said to be a view looking in the direction of arrow 2 Fig. 1. Fig. 3 is a central vertical section taken through the motor on a plane cutting its axis longitudinally. Fig. 4 is a detail view showing one of the double nozzles employed in delivering motive fluid to the piston, shown on a larger scale.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a relatively stationary casing which as shown in the drawing consists of two members 6 and 7, provided with abutting flanges 8 and 9 connected by bolts 10. The upper member 6 is the smaller, the flanges 8 and 9 being located considerably above the axial center of the casing. The lower member is flanged as shown at 12 and secured to a suitable stationary bed plate 13. The casing member 7 is provided with journal boxes 14 and 15 within which are located bushings 16 and 17.

Located within the casing is a rotary piston 18 made fast to a shaft 19 by means of a set bolt 20 or in any other suitable manner. When the upper casing member 6 is removed, the piston may be placed within the casing, after which the shaft 19 is inserted passing through registering openings formed in the piston and the opposite sides of the casing, the said shaft being journaled in the boxes 14 and 15. The journal box 14 is closed at its outer extremity except for a threaded opening into which is screwed a cap screw 21 which engages a bearing disk 22 whose inner face is convex and engages the adjacent extremity of the shaft 19. There is very little friction on the end of the shaft since the convex face of the disk really presents only a point to the end of the shaft. The bearing 15 is provided with a stuffing box 23 through which the shaft 19 passes.

The piston 18 is provided with two peripheral faces 24 and 25 of different diameters, the face 24 being the larger. Each of these faces is grooved in zigzag fashion, whereby the bottom of the groove is composed of a series of surfaces 26 and 27 occupying positions at right angles to each other. Leading inwardly from each alternate surface of each peripheral face is a pocket 28. As shown in the drawing these pockets are formed in the surfaces 27 of each peripheral face. These pockets form receptacles for the operating fluid and make its action more effective than would be the case in their absence. The casing is provided near its bottom with threaded openings in which are inserted a pair of nozzles 29 and 30, the said openings being so ar-

ranged that these nozzles are positioned to deliver motive fluid upon the lower portions of the two peripheral faces of the piston. The operating fluid after acting on the lower portions of the two peripheral faces of the piston, passes upwardly and out through a port A and thence into an elbow pipe B with which is connected a nozzle C which is threaded into the casing and arranged to deliver fluid upon the inner periphery of the piston, thus utilizing the motive fluid a second time and producing in effect a compound motor.

Arranged adjacent the peripheral faces of the piston are housing plates 31 and 32 which are curved to conform thereto and occupy positions in such proximity thereto as to confine the motive fluid at its point of delivery and for a considerable distance therefrom. These plates are attached to the inner wall of the casing by means of screws 33. As shown in the drawing there are two of these plates 31 an upper and a lower plate arranged adjacent the smaller peripheral face or that of less diameter while only one is shown adjacent the larger peripheral face 24.

It will be observed that there is only one nozzle C for performing the compounding function and this nozzle is arranged to deliver the motive fluid the second time upon the inner periphery of the piston, being directed against the upper portion thereof and pointing in a direction opposite that of the nozzles 29 and 30 below, whereby the motive fluid issuing from the nozzle C coöperates with that issuing from the nozzles 29 and 30 to produce the rotary action of the piston.

It will be observed that a partition D is secured to the casing as shown at E and projected into the chamber thereof just above the part A. This partition D joins the upper housing plate 31 and thus practically cuts off the escape of the motive fluid to the upper portion of the casing without first passing out through the port A and thence through the nozzle C for the purpose stated. The upper portion of the casing 5 is provided with an exhaust port 34 with which a pipe 35 is connected for carrying away the exhaust steam or other motive fluid which may be employed in operating the piston. This exhaust port is located approximately opposite the nozzle C. The nozzles 29 and 30 for introducing the motive fluid to the casing, are connected with the bifurcated portion 39 of a motive fluid supply pipe 40. The bifurcated members are threaded as shown at 41 and are connected with the nozzles by screw sleeves 42, (see Fig. 4).

From the foregoing description the use and operation of my improved turbine motor will be readily understood. The motive fluid being introduced through the nozzles 29 and 30, passes through openings formed in the housing plates 31 and 32 and engages the peripheral faces of the piston in the manner heretofore explained thus imparting rotary action to the piston. The motive fluid after leaving the lower housing plates 31 and 32, passes upwardly and out of the port A into the nozzle C and is again delivered upon the inner peripheral face of the piston thus cooperating with the nozzles 29 and 30 to produce the rotary action of the piston. The motive fluid after having been utilized both directly and expansively, escapes through the exhaust port 34.

Having thus described my invention, what I claim is:

1. A motor comprising a casing, a piston mounted to rotate in the casing and provided with a peripheral face fashioned to utilize the force of a motive fluid, means for delivering the motive fluid directly to the peripheral face of the casing, a partition separating the piston chamber into two compartments, and means for taking the motive fluid from one compartment after its initial force has been spent upon the piston, and conducting it to the other compartment and causing it to act a second time upon the piston, the casing being provided with an exhaust port, substantially as described.

2. A motor comprising a casing, a piston mounted to rotate therein and provided with two peripheral faces of different diameters, each face being fashioned to utilize the force of a motive fluid, nozzles arranged to deliver the motive fluid to the respective peripheral faces of the piston, the portions of the peripheral faces where the motive fluid is delivered being provided with housing plates whereby the fluid is confined within predetermined limits and caused to act more effectively upon the piston.

3. A motor comprising a casing, a piston mounted to rotate therein, a driving shaft connected with the piston, the piston being provided with a peripheral face having a circumferential groove with a zigzag bottom formed of surfaces extending at right angles to each other, the piston being provided with pockets extending inwardly from each alternate surface, means for delivering motive fluid to the said peripheral face of the piston, and means for exhausting the fluid from the casing after it has spent its force, substantially as described.

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

DAVID BURNFIELD.

Witnesses:
A. J. O'Brien,
Dena Nelson.