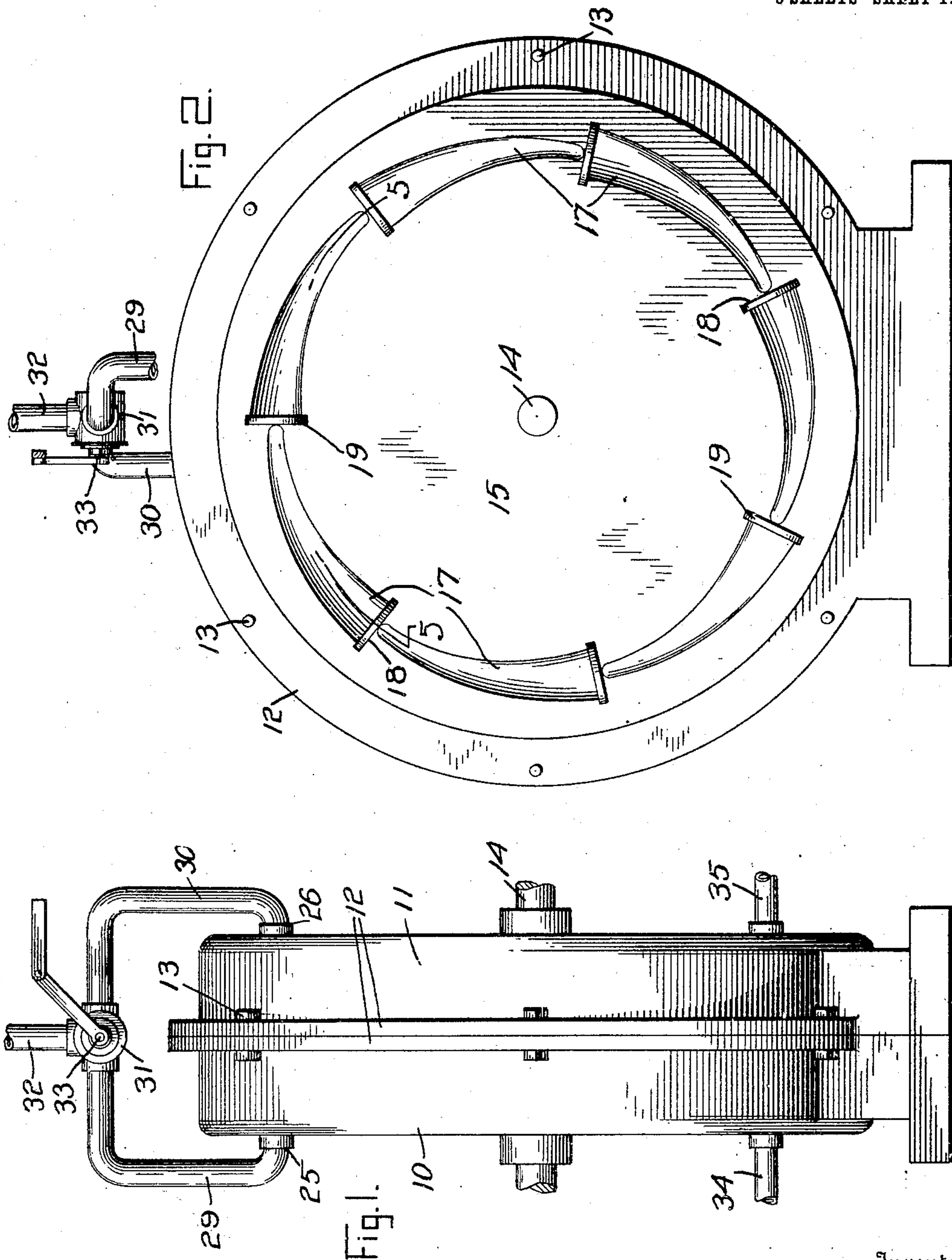


N. BINDRUP.
 ROTARY ENGINE.
 APPLICATION FILED OCT. 8, 1907.

954,162.

Patented Apr. 5, 1910.

3 SHEETS—SHEET 1.



Witnesses

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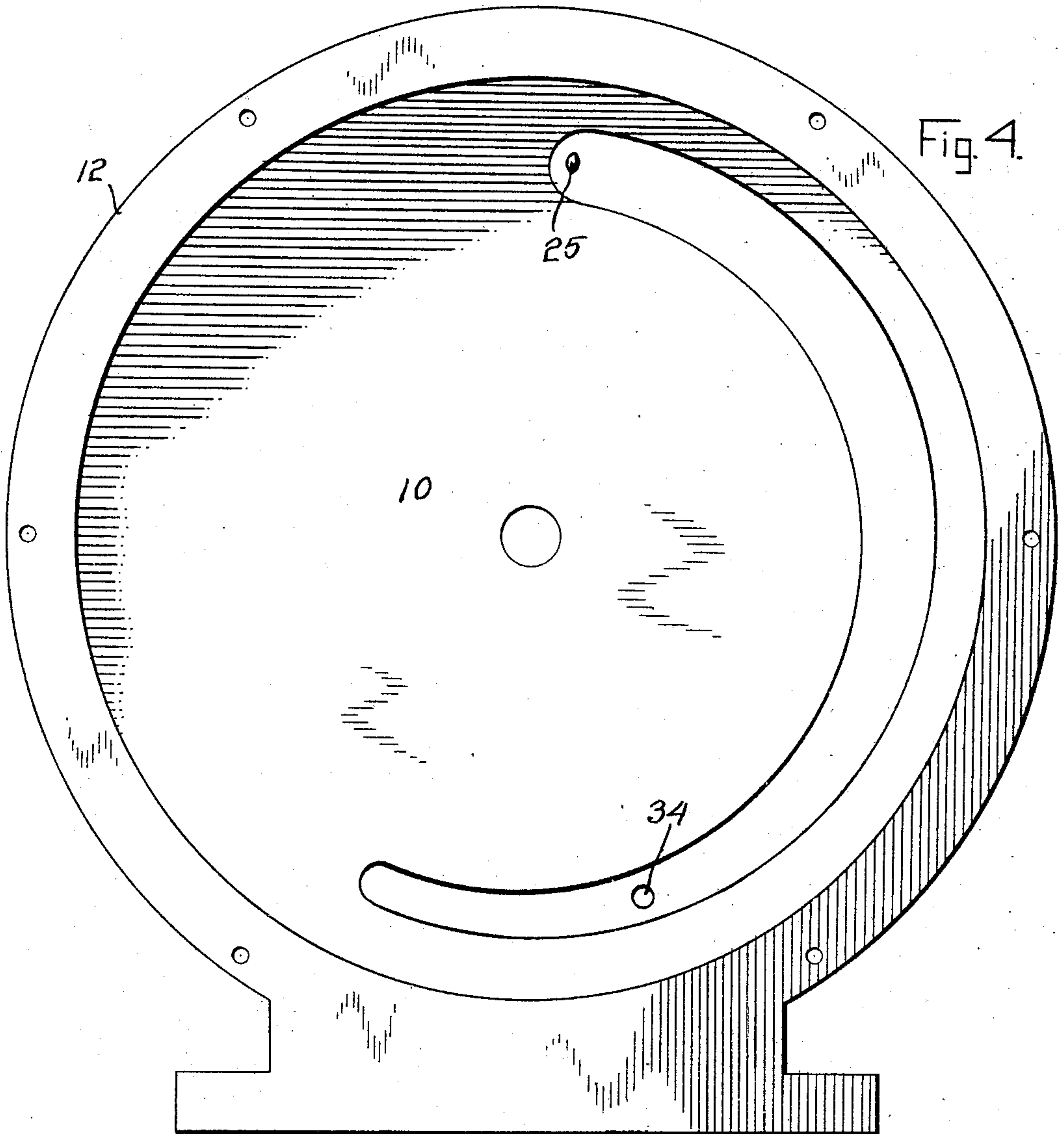
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

NEPHI BINDRUP, OF LOGAN, UTAH.

ROTARY ENGINE.

954,162.

Specification of Letters Patent.

Patented Apr. 5, 1910.

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To all whom it may concern:

Be it known that I, NEPHI BINDRUP, a citizen of the United States, residing at Logan, in the county of Cache, State of Utah, have invented certain new and useful Improvements in Rotary Engines; and I do hereby 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.

This invention relates to rotary engines; and it has for its object to provide a rotary engine of the impact type which shall be simple in construction, comprising few parts and adapted to rotate in either direction by simply turning a valve which admits steam into one side or the other of the cylinder.

With this and other objects in view, the invention consists of the novel construction, combination and arrangement of parts hereinafter described and claimed, and illustrated in the accompanying drawings, in which,

Figure 1 is a front elevation of an engine constructed in accordance with the present invention; Fig. 2 an end elevation of the same with one section or member of the cylinder removed; Fig. 3 a central transverse section of the engine taken in a vertical plane; Fig. 4 a detail view of one-half of the cylinder looking at its inner side, showing the semi-circular groove therein for the passage of steam; Fig. 5 a sectional view on the line 5—5 of Fig. 2.

Similar reference characters are used for the same parts in all of the figures.

In the drawings, the engine cylinder is shown as comprising two members, each closed at the outer end by the respective plates 10 and 11 and provided on the outside of their inner ends with projecting flanges 12, which are connected together steam tight by means of bolts 13 extending therethrough. Through the axis of the cylinder passes a shaft 14 mounted in bearings 14^a on the cylinder heads 10 and 11, each bearing being provided with a stuffing box to prevent the escape of steam. Such construction being common in the art, further description thereof is deemed unnecessary.

The cylinder constructed as described, has an open space within extending partly into each member for the reception of a disk 15, fixed on the shaft 14, and adapted to rotate within said space, the periphery

and side faces of said disk being ground or otherwise treated to prevent the passage of steam between said periphery and side faces, and the walls of the cylinder.

Formed in the inner face of each cylinder head 10 and 11 is a semi-circular groove 20 substantially semi-circular in cross section and of the same depth throughout its length, except at the ends where it merges into the plane of the disk as clearly shown in Fig. 5. The grooves 20 are disposed on diametrically opposite sides of the cylinder, that is to say, the groove in the head 10 will be on one side of the shaft, while the groove in the head 11 will be on the opposite side of said shaft. The grooves 20 are concentric with the axis of the cylinder and are provided at one end with inlet ports 25 and 26 and at their opposite ends with exhaust ports 34 and 35.

The rotatable disk 15 is provided on each of its side faces with an annular series of recesses 16 and 17, the recesses 16 being formed in one side face of the wheel and the recesses 17 in the opposite side face. The recesses of both series consist of a plurality of curved tapered depressions wider and deeper at one end than at the other and so disposed that the larger end of each depression or recess is adjacent the smaller end of the recess in advance thereof.

It is to be understood that the arrangement or disposition of the recesses 16 with respect to their larger and smaller ends on the opposite side of the disk 15 will be reversed and the larger end of said recesses 16 will be opposite the smaller ends of the recesses 17. Between the adjoining ends of each recess and extending through the disk 15 are slots 18 in each of which is fitted a plate or button 19 adapted to slide endwise therethrough, its ends bearing against one of the heads 10 or 11 and in the groove 20 in the opposite head. The plates 19 or slots 18 are provided with a packing to render them steam tight. The ends of said plates also fit steam tight against the inner faces of the heads 10 and 11 and in the grooves 20.

The inlet ports 25 and 26 enter the cylinder heads at an angle as shown in Fig. 5 so that steam entering through either port will strike the plate or button 19 and by its impact thereon assist the steam as it expands to rotate the engine. The steam inlet pipes 29 and 30 are connected with the respective inlet ports 25 and 26, the outer ends of said pipes being joined by a three-way valve 33

for controlling the flow of steam entering said valve by way of the pipe 32.

To operate the engine, steam is admitted through one of the inlet ports, say 25, and if the disk 15 be in the position indicated in Fig. 5, the steam will enter the space formed by the recess 16, and the inlet end of the groove 20, and cause the engine to turn in the direction indicated by the arrow. The pressure of the steam on the projecting end of the plate 19 which projects into the groove 20 and the impact of the steam upon said plate being the power which causes the rotation of the disk. As the disk revolves, the plate 19 in the rear of the similar plate being acted upon by the steam advances, and as it approaches the inlet port 25, its end which has been traveling in the groove 20 of the plate 11 is caused to slide endwise as it is moved out of said groove by the inclined or curved surface of its end into the groove 20 in the plate 10, thus bringing it in position to receive in turn, the pressure of the steam. The end of said disk in each plate 19 which heretofore had been traveling in the groove 20 of the plate 11, now bears against the plain surface of said head and will continue to do so until it has made about one-half a revolution or the termination of the groove 20 in the head 10. At this point is located the exhaust port where the steam escapes from between the said plates 19 as they pass the ports during the operation of the engine. The slides 19 at this point pass out of the groove 20 in the head 10 and into the groove 20 in the head 11 and travel therein, until the inlet port is once more reached. To reverse the engine, the valve 33 is turned to cut off steam from the inlet port 25 and admitted through the inlet port 26 on the opposite side of the disk 15, and acts on the opposite ends of the plates 19, as will be readily understood.

What is claimed is:—

45 1. A rotary engine, comprising a two-part

hollow cylinder centrally divided and connected by bolts, a rotatable disk within said cylinder and filling the space therein, said cylinder having a semi-circular concentric groove in each cylinder head situated on opposite sides of its axis, said grooves having each an inlet port at one end and an outlet port at the opposite end, a circular series of curved recesses larger at one end than at the other formed in each side of said disk, said recesses on one side of the disk being oppositely disposed with relation to those on the other side, and plates adapted to slide through transverse slots made in said disk between the adjacent ends of the recesses on both sides and bear at one end on the inner face of one cylinder head and at the other end in the groove in the other head.

2. A rotary engine, comprising a cylinder divided centrally on a plane transverse to its axis and connected together by bolts passing through a flange on each member, the inner face of one cylinder head provided with a concentric semi-circular groove near one side and a similar groove in the face of the other member on the opposite side, said grooves having each an inlet port and an outlet port, a rotatable disk in said cylinder extending from one head to the other and bearing against the inner periphery thereof and having in each side a series of curved depressions connected one to the other and larger at one end than at the other, and plates adapted to slide laterally through said disk in slots formed between the ends of the recesses and bearing at their ends against said cylinder heads, said slides serving as abutments against which steam strikes on entering the cylinder to rotate the disk.

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

NEPHI BINDRUP.

Witnesses:

ANDREW KING, Jr.,
JOHN P. CARDON.