

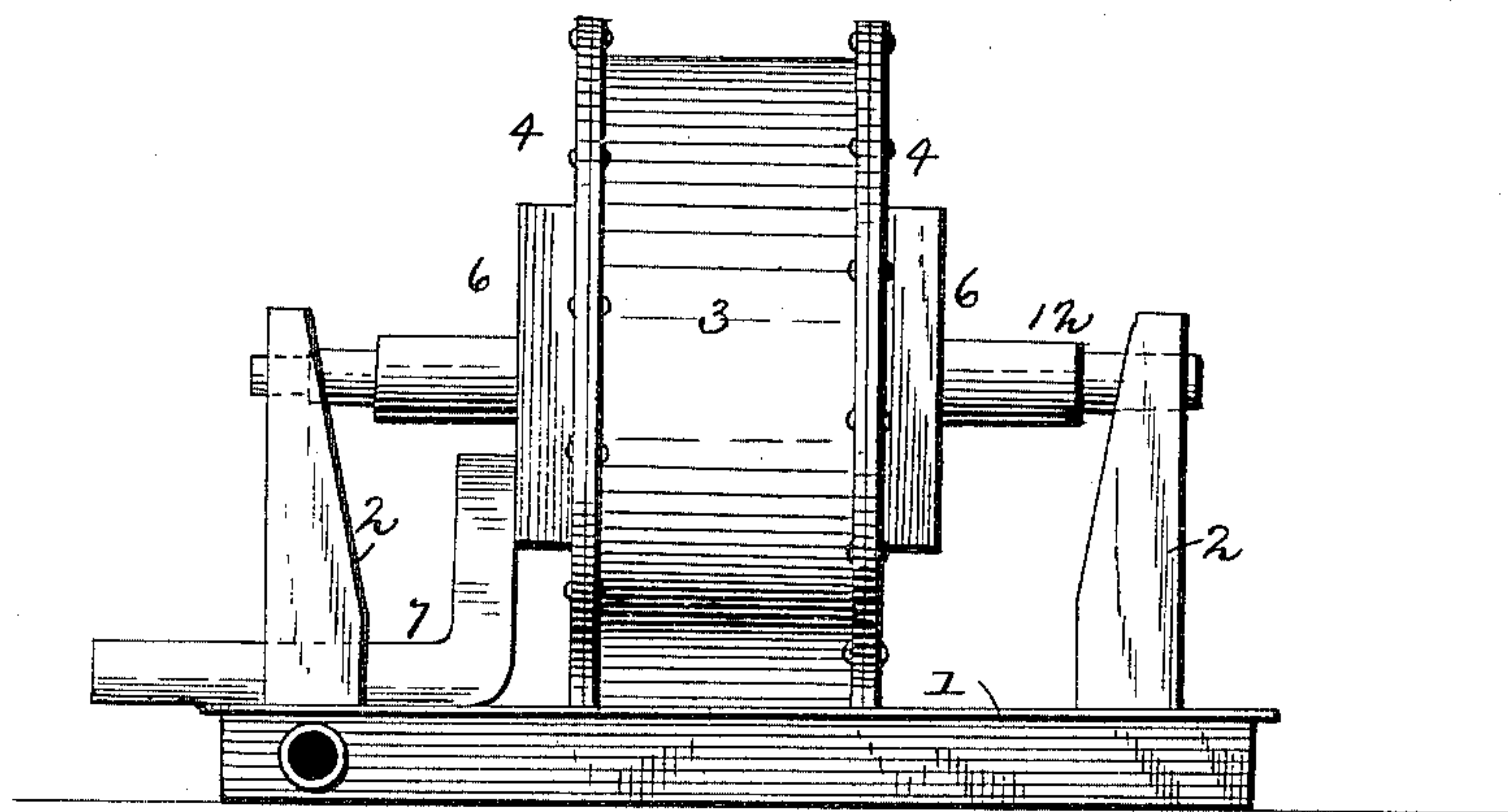
(No Model.)

J. SCHWARZMANN.  
ROTARY ENGINE.

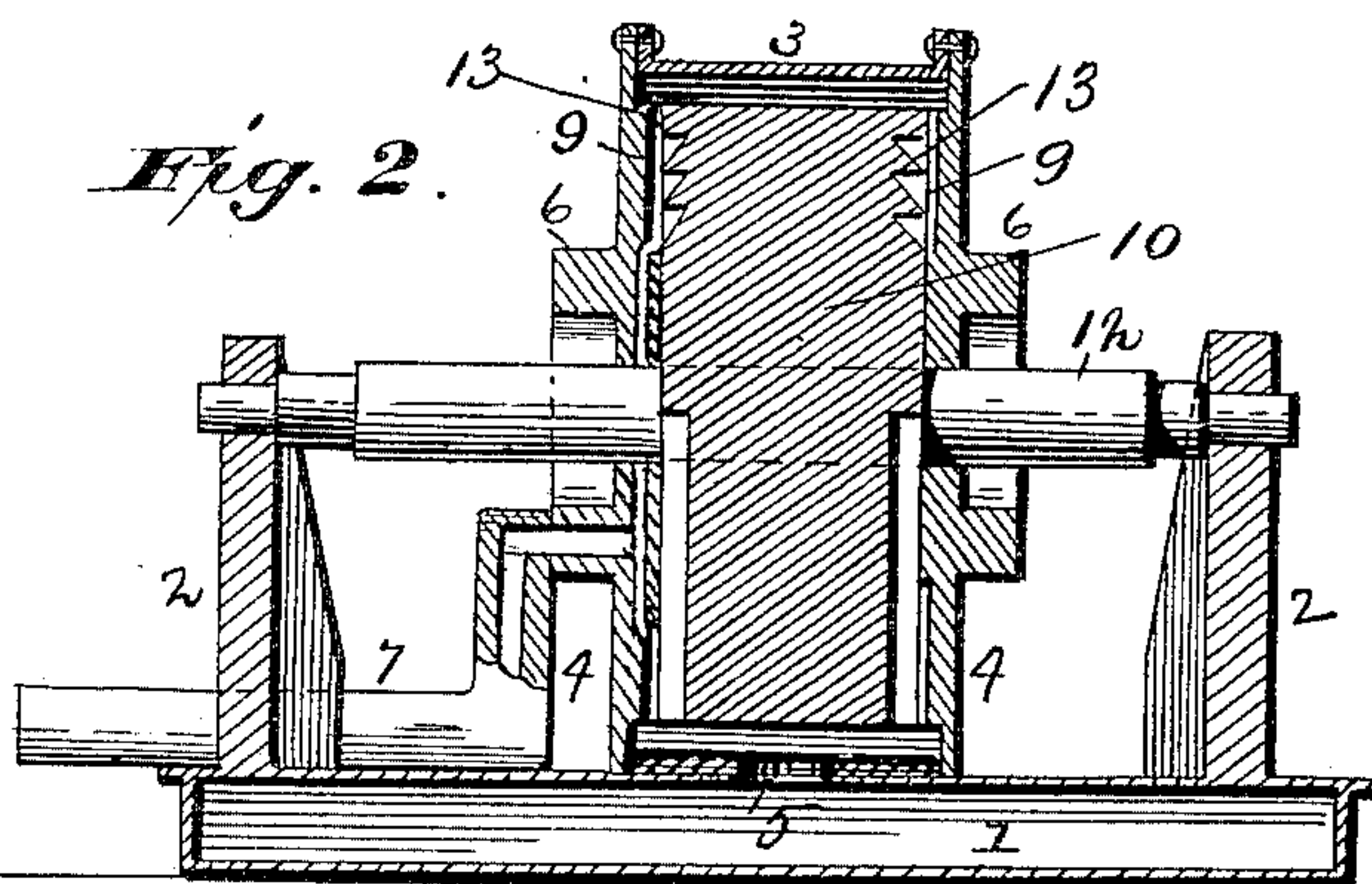
No. 450,874.

Patented Apr. 21, 1891.

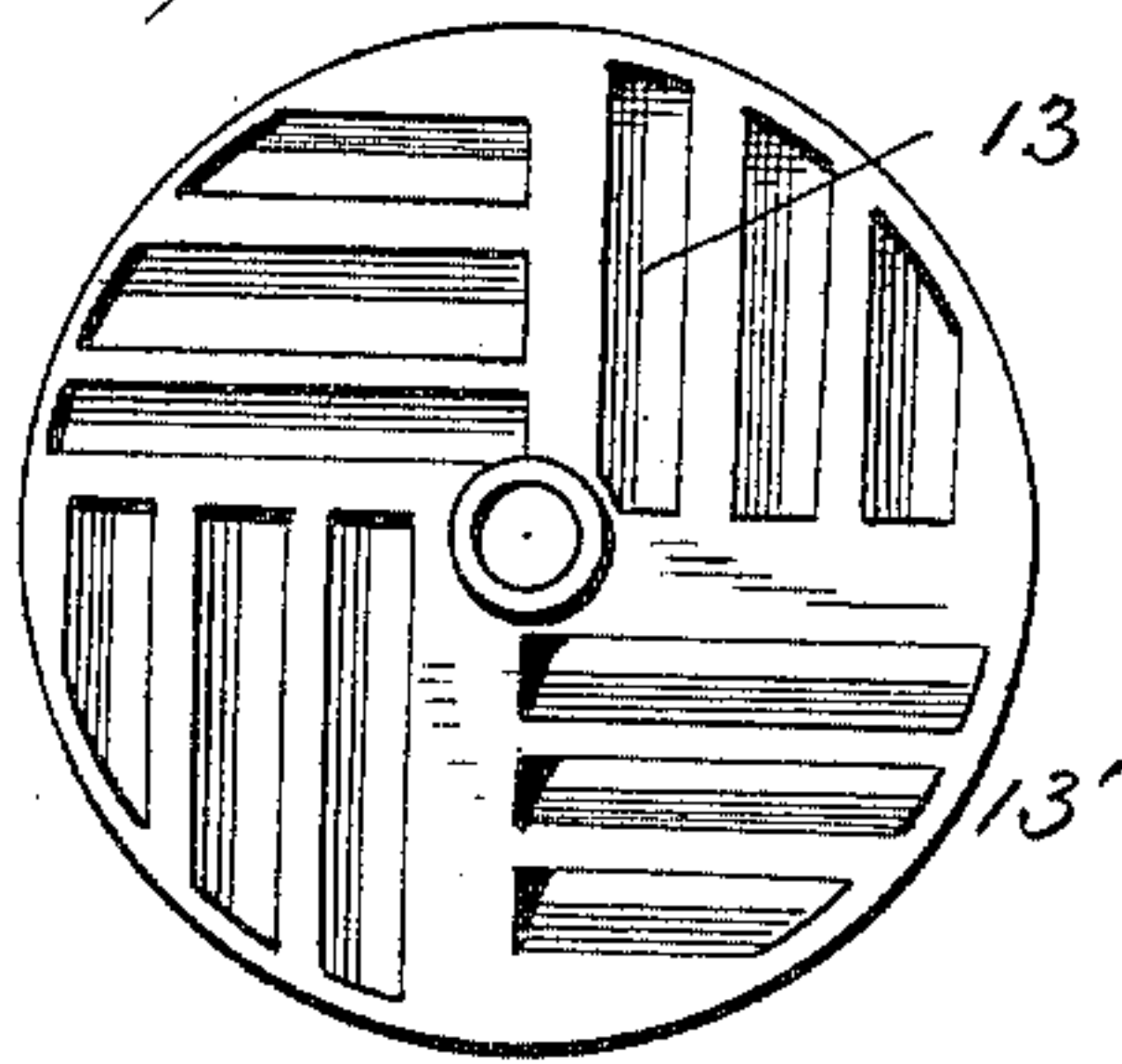
*Fig. 1.*



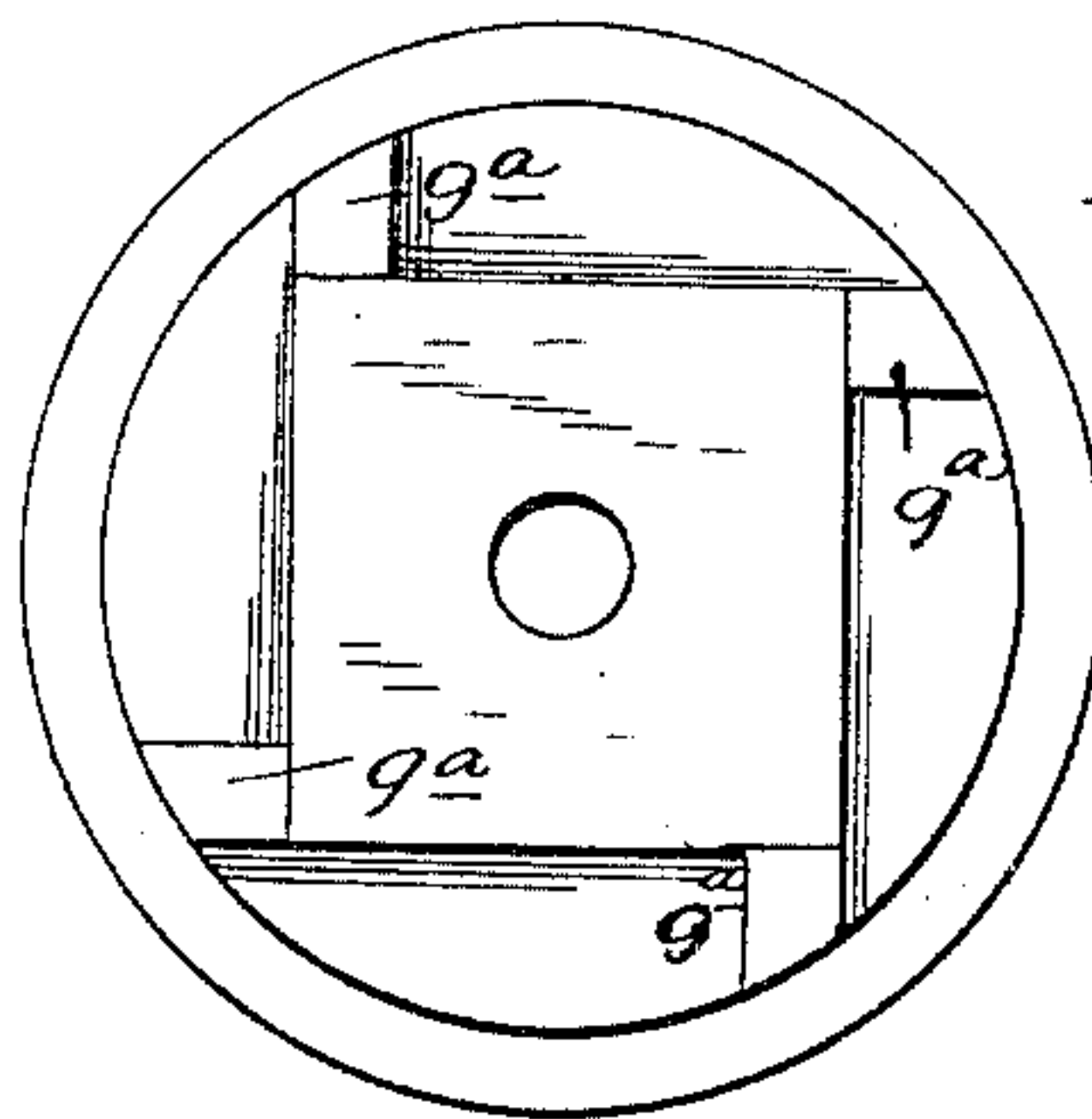
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

JOHN SCHWARZMANN, OF WASHINGTON, DISTRICT OF COLUMBIA.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 450,874, dated April 21, 1891.

Application filed August 7, 1890. Serial No. 361,258. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN SCHWARZMANN, a subject of the Emperor of Germany, and a resident of Washington, in the District of Columbia, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to improvements in rotary steam-engines; and its object is to provide such an engine which shall be simple and economical in construction and efficient and reliable in use and which is not liable to get out of order.

The invention consists in the novel construction and combination of parts hereinafter fully described, and definitely pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a rotary engine constructed in accordance with my invention. Fig. 2 is a central longitudinal section of the same. Fig. 3 is a face view of the piston. Fig. 4 is a similar view of the steam-chest.

In the said drawings the reference-numeral 1 designates the base of the engine, which also forms the exhaust-chamber. Mounted upon this base are two uprights 2, in which is journaled the driving-shaft which carries the piston.

The engine proper consists of a cylinder or casing composed of the rim 3 and the heads 4. The lower portion of this cylinder rests upon the base 1, and the rim is provided with an exhaust-opening 5. In the cylinder-heads are the steam-chests 6. These may be formed by making each head of two annular disks united at their peripheries, whereby an annular space is provided. This construction, however, may be varied, so long as the object thereof is attained, which is the provision of a steam-chest in the cylinder-head.

The numeral 7 designates the steam-supply pipe communicating with the steam-chest. At each side of the cylinder-head and forming a part of the steam-chest are outwardly-extending square or other suitably-shaped

projections 8. On the inner face of the cylinder-head is a series of steam-ports 9. These ports consist of openings extending from the corners of the projection 8 to near the periphery of the steam-chest, with an overlapping part or piece 9<sup>a</sup> so arranged that the steam will issue from said openings or ports in lines tangential to the axis of the driving-shaft, which passes through the cylinder-heads.

The numeral 10 designates the piston mounted upon the driving-shaft 12, which passes through the cylinder-heads and is journaled in the uprights 2, as before stated. On one or both faces of the piston are formed a number of grooves 13, arranged in series, and the grooves of each series being tangential to the axis of the shaft and coinciding and registering with the ports in the steam-chests. These grooves extend from near the center to the periphery of the piston, their outer ends being closed by the rim 13' encircling the piston. As seen in Figs. 2 and 3, these grooves are of peculiar form, one of the sides thereof being beveled, while the opposite side is plain or concaved, so as to form buckets which catch the steam issuing from the steam-ports. The number of the series of grooves should correspond with the number of steam-ports in the drawings, four of such ports being shown and four groups of grooves, each of which is composed of three grooves. The number, however, may be varied, as may be found best suited for the work.

I have illustrated the engine as having steam-ports in each cylinder-head and corresponding grooves upon both faces of the piston; but it is obvious that they may be used upon one side only. It is also obvious that the ports and grooves upon one side may be arranged in reverse order to throw on the other side, so that the engine may be reversed.

The operation is as follows: Steam being admitted to the steam-chest from any suitable source, it escapes through the steam-ports in the inner face thereof in a line tangential to the axis of the piston-shaft, and, striking the beveled sides of the grooves, is directed against the opposite side thereof, causing the piston and its shaft to be rotated.

It will be seen that there is a space left between the piston and the steam-chest between the steam-ports which will allow the steam to



escape into the space between the rim of the cylinder and the piston and finally discharge into the exhaust-chamber through the exhaust-ports.

5 Having thus described my invention, what I claim is—

1. In a rotary engine, the combination, with a casing or cylinder having a steam-chest located in the head thereof, said chest being  
10 provided with a steam-inlet and the ports discharging into the cylinder in a line tangential to the axis thereof, of a driving-shaft passing through said cylinder and having a piston mounted thereon, the face of which is  
15 provided with a number of grooves arranged in series and coinciding and registering with the steam-ports and exhaust-ports in said cylinder, substantially as described.

2. In a rotary engine, the combination, with

a casing or cylinder having a steam-chest located in the head thereof, said chest being provided with a steam-inlet and the ports discharging into the cylinder in a line tangential to the axis thereof, of a driving-shaft carrying a piston having a series of grooves  
25 coinciding and registering with said steam-ports, said grooves being beveled upon one side, an exhaust-chamber in the base of the engine, and exhaust-ports communicating therewith, substantially as described. 30

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

JOHN SCHWARZMANN.

Witnesses:

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