

No. 743,883.

PATENTED NOV. 10, 1903.

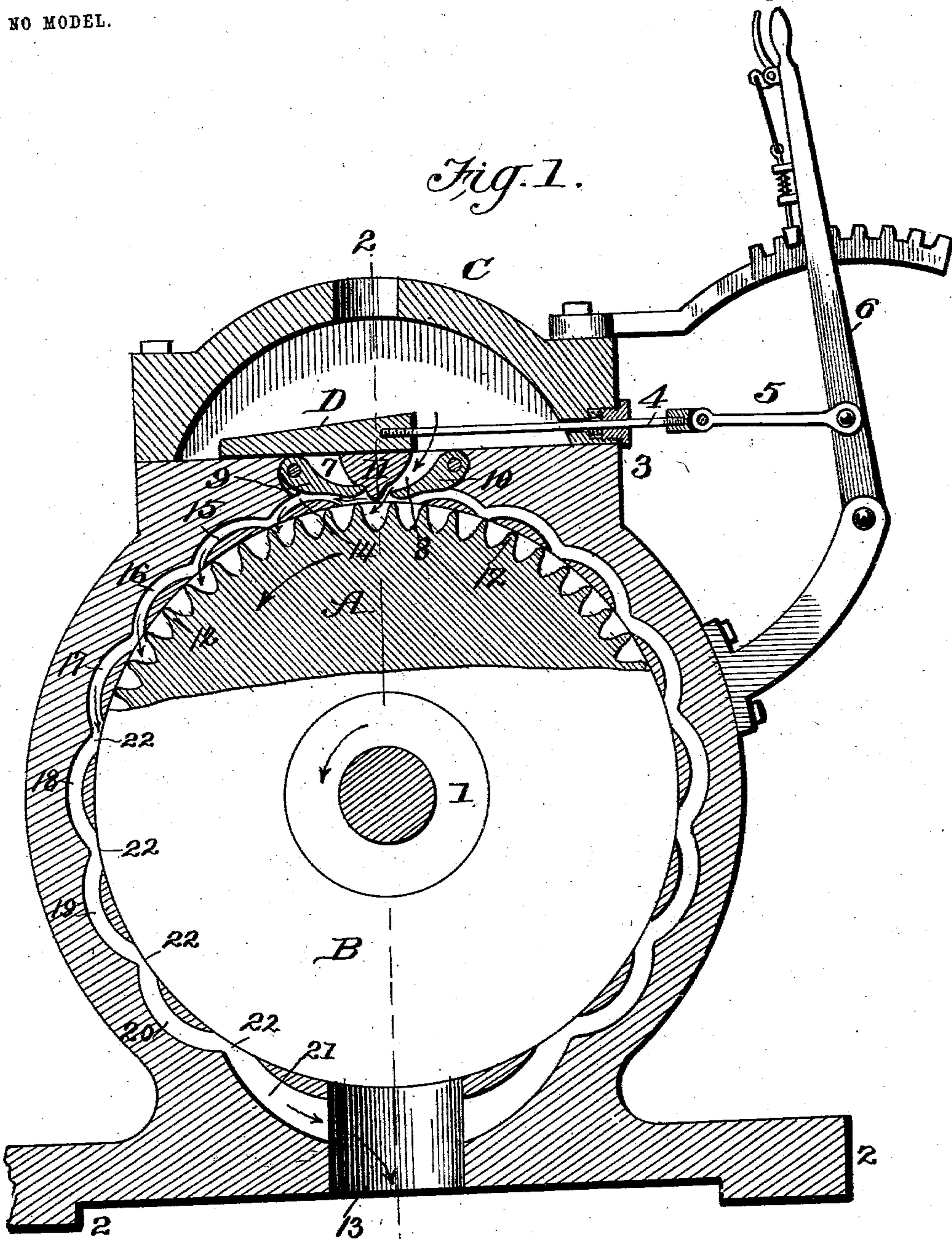
M. D. KALBACH.
ROTARY ENGINE.

APPLICATION FILED JULY 30, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Jos. A. Ryan
Amos W. Hart

INVENTOR

Morgan D. Kalbach

BY *Munn & Co.*

ATTORNEYS.

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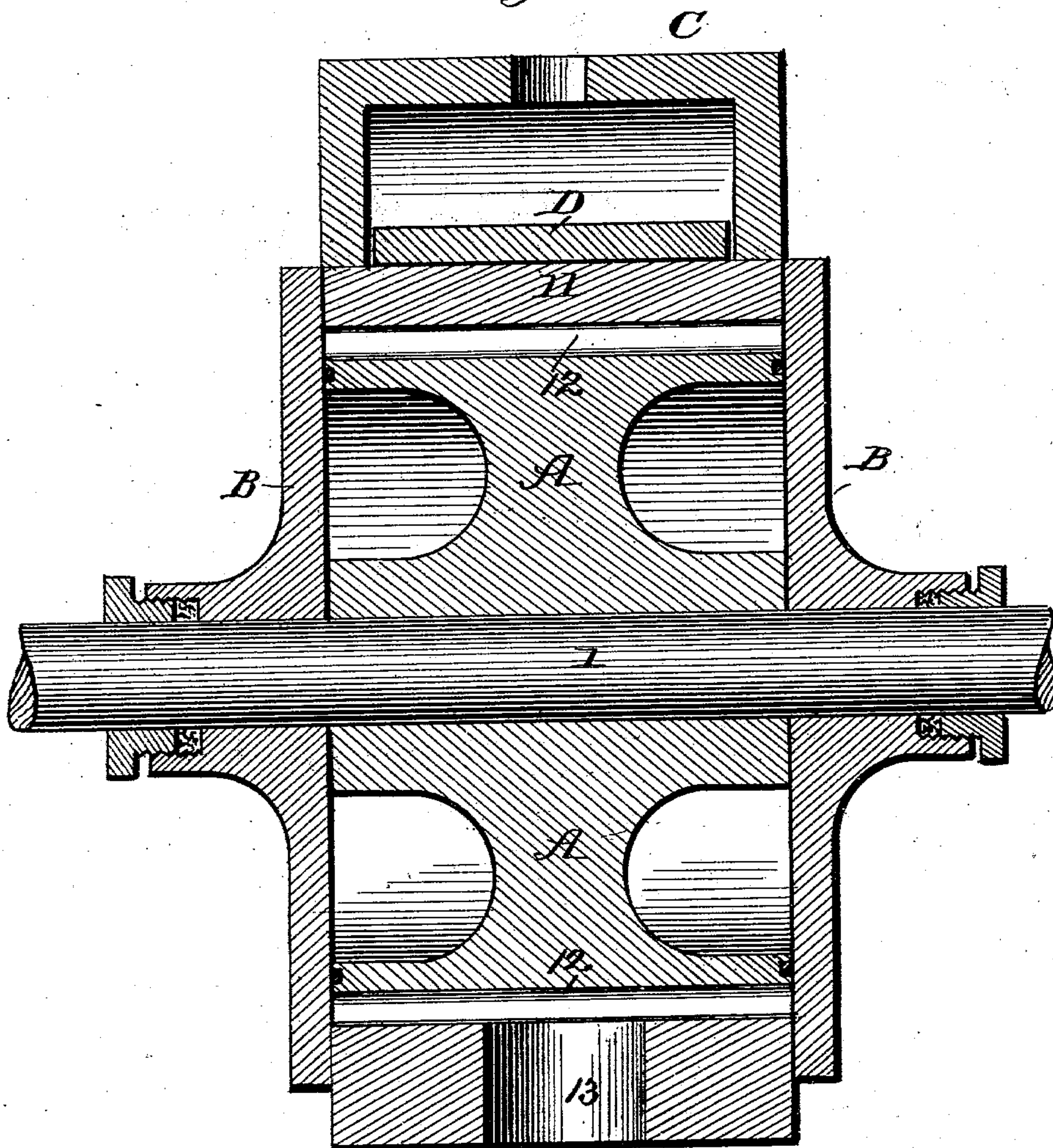
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NO MODEL.

2 SHEETS—SHEET 2.

Fig. 2.



WITNESSES

Jos. A. Ryan
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UNITED STATES PATENT OFFICE.

MORGAN D. KALBACH, OF LEBANON, PENNSYLVANIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 743,883, dated November 10, 1903.

Application filed July 30, 1903. Serial No. 167,537. (No model.)

To all whom it may concern:

Be it known that I, MORGAN D. KALBACH, a citizen of the United States, residing at Lebanon, in the county of Lebanon and State of Pennsylvania, have made certain new and useful Improvements in Rotary Engines, of which the following is a specification.

It is the object of my invention to provide an improvement in that class of rotary engines which are operated by direct impact of a gaseous fluid, such as steam or air, the latter being worked expansively. The motive fluid is directed against radial blades or vanes of a rotary wheel, and the casing or cylinder surrounding the latter is provided with a steam-passage which permits gradual expansion of the fluid in passing from inlet-port to exhaust. Valves are provided to govern the direction of flow of the motive fluid, so that the engine may be reversed at will.

The invention is embodied in the construction, arrangement, and combination of parts hereinafter described, and illustrated in accompanying drawings, in which—

Figure 1 is mainly a vertical sectional view of my improved rotary engine. Fig. 2 is a vertical transverse section on the line 2 2 of Fig. 1.

In the drawings, A indicates a rotary wheel which is keyed upon the horizontal shaft 1, and B indicates a concentric casing having a suitable horizontal base 2 and a flat top portion 3, which serves as a valve-seat. A steam-chest C is secured upon said seat and a slide-valve D is arranged within it, the same being operated by a rod 4, connected by a link 5 with a pivoted hand-lever 6, which may be adjusted and locked, as will be readily understood by reference to the drawings. The valve-seat is provided with two adjacent inlet-ports 7 and 8, (see Fig. 1,) in which are pivoted two similar valves 9 and 10. The two ports 7 and 8 are separated by a narrow abutment or cross-bar 11, whose under sides are sloped and converge, so that the two passages or ports 7 and 8 form an acute angle with each other. The wheel A is provided with numerous radial vanes or blades 12, which are separated or intervened by narrow grooves. It will be seen that when the slide-valve D is adjusted to the left, as in Fig. 1, and the port 8 is thereby opened the motive

fluid—say steam—will be admitted through said port 8, so as to act upon the vanes 12 of the wheel A in a direction corresponding to the inclination of the port, so that the wheel will be driven to the left, as indicated by arrow. The steam in such case passing under the abutment 11 acts upon the valve 9, located in the port 7, and raises the same, so that its nose or free end engages a shoulder formed on the adjacent side of the said abutment. In other words, the valve 9 is raised automatically by the pressure of steam against its under side, there being practically no pressure on the upper side in consequence of the valve D being adjusted over the port 7. I provide in each side of the casing B a continuous steam-passage extending from each of the inlet-ports to the exhaust 13. Each of these passages is formed of a connected series of short passages, as will be seen by reference to Fig. 1. Thus the first passage on the left, which is indicated by 14, communicates with the adjacent inlet-port 7 and with the second passage 15, which in turn communicates with the succeeding passage 16, and so on. The first passage 14 has the least area or capacity, and the next passage 15 has a slightly-increased area or capacity, the remaining passages, to the last passage 21, which communicates with the exhaust, being successively increased in area and capacity. Further, the passages are successively increased in length, and they merge at their adjacent ends and are open on the side adjacent to the wheel A. Such openings 22, which are in the nature of mouths or ports for escape of steam, are gradually increased in width and capacity from the inlet-port to the exhaust, as will be apparent by inspection of Fig. 1. It will be seen that the steam-passages on the right are identical in construction, arrangement, &c., with the steam-passage on the left, and therefore require no special description. By the construction and arrangement of the passages 14 to 21 as described I am enabled to work steam expansively. Thus the steam is gradually expanded as it is reduced in speed from the initial passage 14 to the final or exhaust passage 21. Thus steam admitted through the port 8 and automatically raising the valve 9, so as to close the port 7, impinges upon the wheel,

and a portion of the same passes through the initial passage 14 and expands slightly in passing into and through the passage 15, and so on; but it will be noted that it is directed
5 through the several mouths or ports 22 upon the vanes of the wheel at that point. The motive fluid thus increases in volume, with proportionate diminution of temperature and speed from the inlet to the exhaust.

10 It is apparent that by adjusting the slide-valve D to the right, so as to cover the inlet-port 8 and uncover the adjacent port 7 on the left, the motive fluid will be admitted through port 7, and the valve 10 will be automatic-
15 ally raised, so as to close the port 8. Thus the fluid being directed toward the right instead of to the left as before, it is apparent that the wheel A will be driven to the right, or, in other words, reversed. Thus by simply shift-
20 ing the valve D the wheel may be instantly reversed when conditions require.

By the construction, arrangement, and combination of parts above described I provide

a rotary motor in which the kinetic energy of the motive fluid is fully utilized and which is 25 distinguished by simplicity, durability, and economy of construction.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is— 30

The combination of the rotary wheel having radial vanes, and the casing having two adjacent inlet-ports, valves pivoted in said ports and adapted to oscillate vertically for closing them as described, a slide-valve for 35 opening and closing said ports, and two continuous steam-passages leading in opposite directions from the respective inlet-ports to the exhaust, and consisting of a series of connected short passages which communicate 40 with the wheel-space at their junction, substantially as described.

MORGAN D. KALBACH.

Witnesses:

E. LIGHT BOESHORE,
WM. W. GREINER.