D. P. UPSON.

STEAM ENGINE.

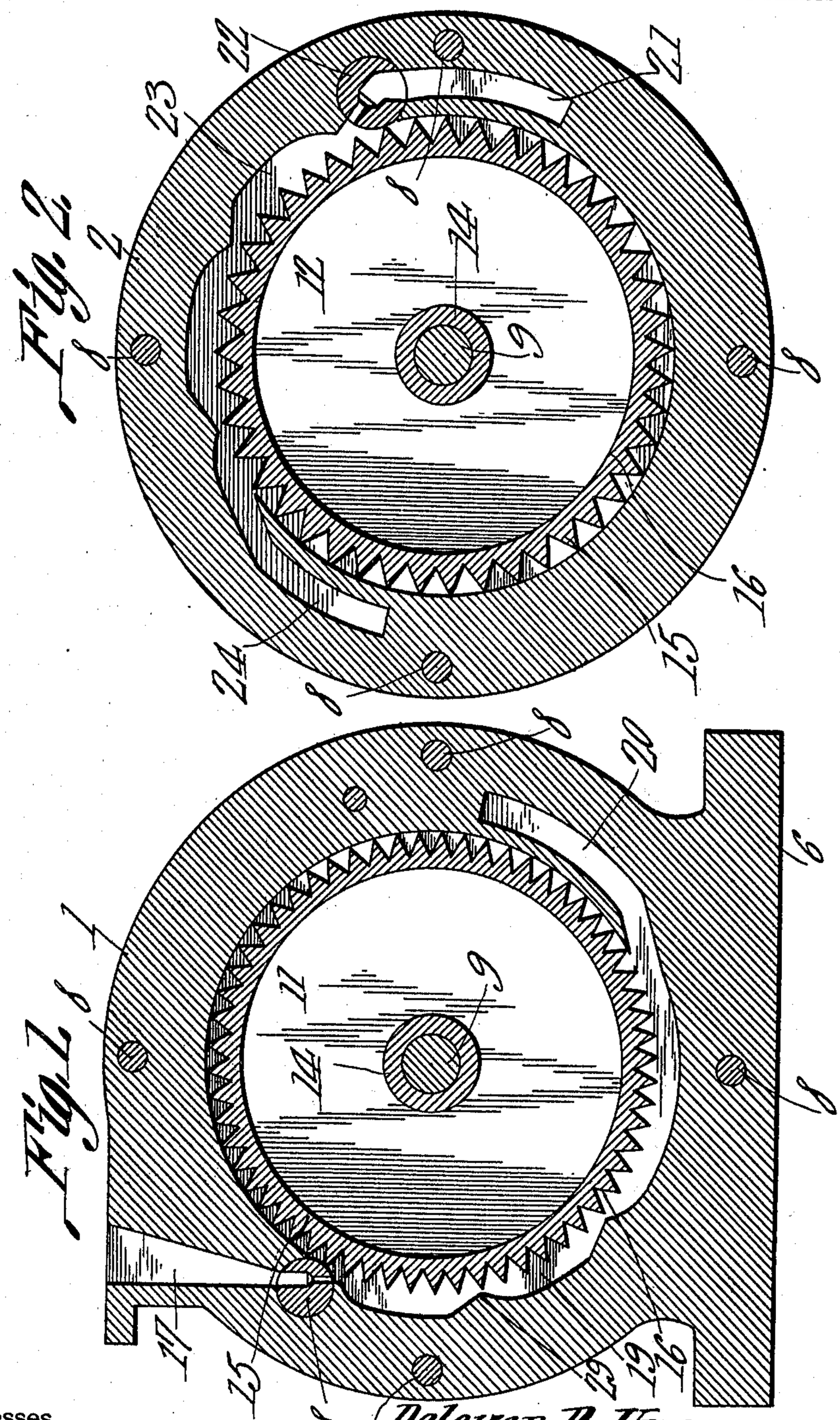
APPLICATION FILED JULY 15, 1910.

992,927.

Patented May 23, 1911.

2 SHEETS—SHEET 1.

Fig. 2.



Witnesses

J. Conklin

M. A. Schmidt

Deleran P. Upson

Inventor

by C. A. Snow & Co.

Attorneys

THE NORRIS PETERS CO., WASHINGTON, D. C.

D. P. UPSON.

STEAM ENGINE.

APPLICATION FILED JULY 15, 1910.

992,927.

Patented May 23, 1911.

2 SHEETS—SHEET 2.

Fig. 4.

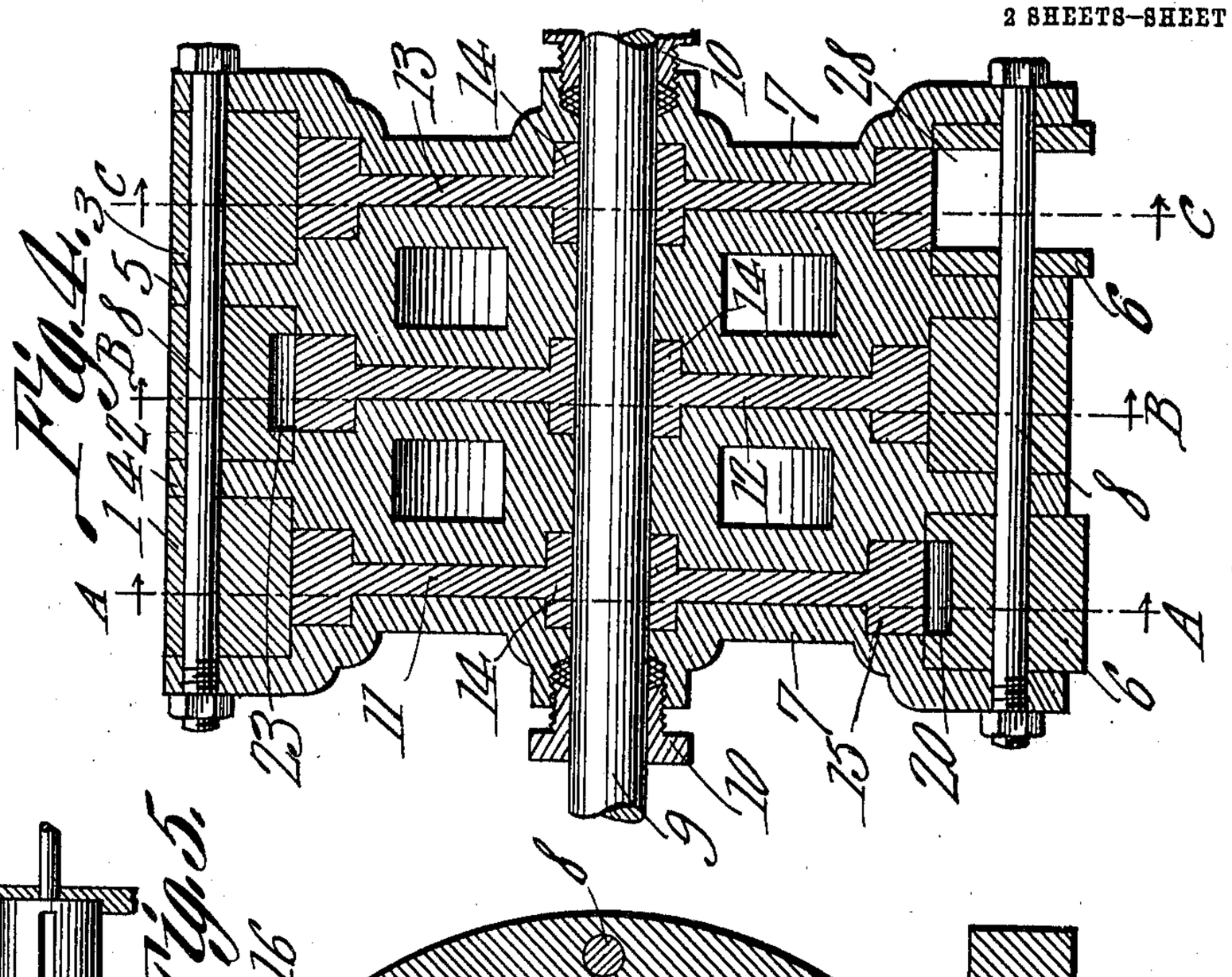


Fig. 5.

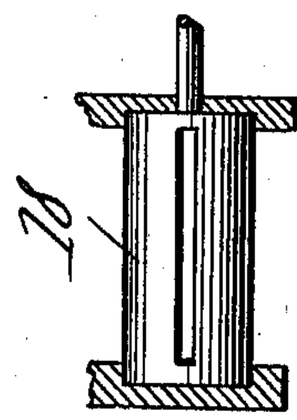
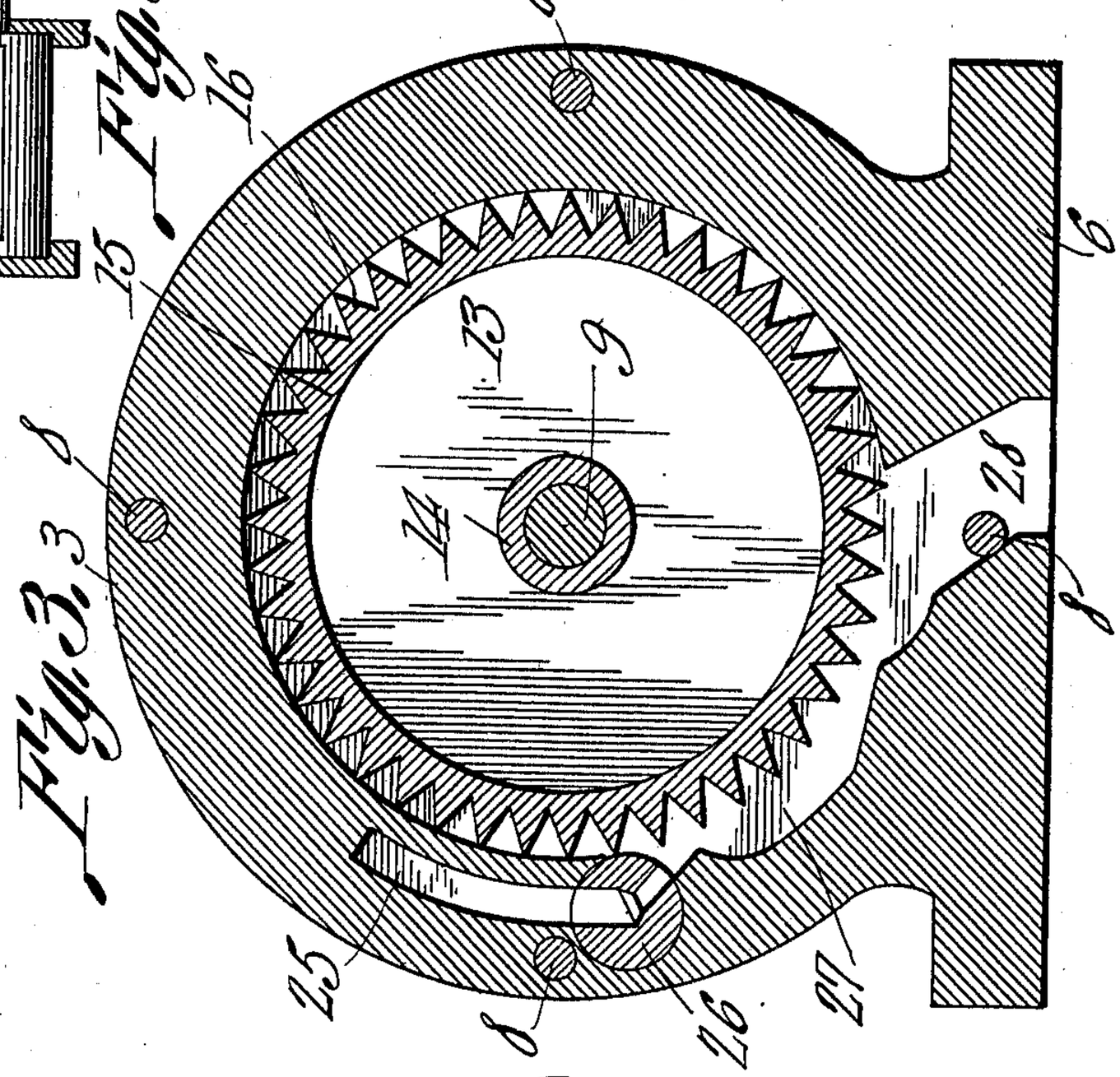


Fig. 3.



Witnesses

J. C. Dowling

H. E. Schmidt

Delevan P. Upson, Inventor

by Cushman & Co.

Attorneys

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

DELEVAN P. UPSON, OF JACKSONVILLE, FLORIDA.

STEAM-ENGINE.

992,927. Specification of Letters Patent. **Patented May 23, 1911.**

Application filed July 15, 1910. Serial No. 572,179.

To all whom it may concern:

Be it known that I, DELEVAN P. UPSON, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented a new and useful Steam-Engine, of which the following is a specification.

This invention relates to rotary motors of the impact type in which the steam or other fluid pressure is directed against the blades or vanes projecting from the periphery of a rotary piston.

It is the object of the present invention to provide a simple and efficient compound motor of the kind stated, a plurality of rotary pistons being provided against which the energy of the motive fluid is successively expended.

Another object of the invention is to provide improved means for controlling the motive fluid, and also to provide a series of deflectors for guiding said fluid against the blades of the pistons.

A further object of the invention is to provide a structure which is simple and compact, and in which friction, as well as the radiating surface are reduced to a minimum, thus adding greatly to the efficiency of the motor.

With these and other objects in view as will be apparent when the nature of the invention is better understood, it consists in a novel construction and arrangement of parts to be hereinafter described and claimed, reference being had to the accompanying drawings forming a part of this specification, in which drawings,

Figures 1, 2 and 3 are longitudinal sections on the lines A—A, B—B and C—C of Fig. 4, Fig. 4 being a central longitudinal section of the motor. Fig. 5 is an elevation of one of the nozzles for controlling the flow of the motive fluid.

Referring to the drawings, the casing of the motor is in three sections indicated at 1, 2 and 3, respectively, said sections being divided by partitions 4 and 5 respectively. Each casing section is formed with a circular space in which a rotary piston, to be presently described, works, and the end sections are also formed each with a base 6. The middle casing section is spaced from the two end sections by the partitions, and the latter also serve to shut off the interior of the middle section from the interior of the end sections, there being no communication between the interior of the casings except by the way of the passages to be hereinafter described. The outer portions of the end sections are closed by heads 7. The several parts herein described forming the casing of the motor are fastened together by bolts 8.

Extending centrally through the casing, is a shaft 9, the partitions 4 and 5, and the heads 7 having alined openings in which the shaft is supported. The heads 7 are also provided with stuffing boxes closed by glands 10 to form a fluid-tight joint around the shaft.

Mounted in spaced relation on the shaft 9, and fastened thereto in any suitable manner, are three rotary pistons, indicated at 11, 12 and 13, respectively, the piston 11 working in the casing section 1, the piston 12 in the casing section 2, and the piston 13 working in the casing section 3. Each piston is a narrow disk having a hub 14 through which the shaft 9 passes, and a widened periphery 15 formed with a large number of substantially V-shaped blades or vanes 16, the interior of the several casing sections being enlarged to accommodate the blades, said enlarged portion of the casing forming an annular channel across which the blades extend.

In the wall of the casing section 1 is a fluid pressure inlet port 17 connected to a suitable source of supply, and containing a rotary nozzle 18 discharging in a line tangential to the periphery of the piston 11, and at a right angle to the plane of the blades 15 of said piston when said blades are opposite the mouth of the nozzle. However, as the nozzle is rotatable, the angle at which the motive fluid is discharged against the blades may be varied.

The channel in which the blades of the piston 11 work has an enlarged portion 19 which starts from a point adjacent to the mouth nozzle 18, and is continued any desired distance, the enlargement leading into a passage 20 made in the wall of the casing section 1. This passage is continued through the partition 4, and communicates with a port 21 in the wall of the casing section 2, said port 21 having a nozzle 22 which is located so as to discharge into the annular channel of the casing section 2, against the blades of the piston 12 working therein, in the same manner as the nozzle 18. This annular channel also has an enlarged portion 23 starting from the mouth of the nozzle 22,

and continued for a suitable distance therefrom, and leading into a passage 24 in the wall of the casing section 2. The last mentioned passage is continued through the partition 5, and communicates with a port 25 in the wall of the casing section 3. The last mentioned port leads to a nozzle 26 located so as to discharge against the blades of the piston 13 working in the annular channel in the casing section 3, in the same manner as the nozzles 18 and 22. The annular channel of the casing section 3 also has an enlargement 27 leading to an exhaust port 28.

The motive fluid operates in stages, its energy being successively expended against the several pistons. The motive fluid enters the first stage by the way of the port 17 and the nozzle 18, and passing along the channel 19 to the passage 20, it enters the port 21 and is discharged by the nozzle 22 to the second stage, in which it travels through the channel 23, and enters the passage 24, and thence, by way of the port 25 and the nozzle 26, it passes into the third stage, and finally exhausts through the port 28. The areas of the piston blades, and that of the passages and the ports, and the size of the nozzles are progressively increased in order that the steam or other motive fluid at lower pressure may exert substantially the same force on blades of larger area.

In each of the enlarged portions of the annular channels of the several casing sections are deflectors 29 formed by contracting said enlarged portions so as to extend within a short distance from the tip of the blades. These deflectors are located in the enlargements of each stage, and their function is to guide the stream of steam or other motive fluid against the piston wings. The operation is repeated in each stage as many times as is found best.

The engine disclosed operates in three stages, but this may be varied as is necessary to utilize the full energy of the motive fluid, the number of stages depending on the initial pressure of the motive fluid. The pressure of the motive fluid in any of these stages may be governed by adjustment of the nozzles, and by providing the deflectors, a larger portion of the energy of the motive fluid is utilized.

The method of constructing and assembling the several parts constituting the casing of the engine allows a passage for the steam to be cored out of the partitions 4 and 5, thus doing away with the use of pipes, and making the passage of the motive fluid more direct, and thereby also lessening friction. This also makes a much more compact machine, and greatly reduces the radiating surface, which is of great importance in engines of this type. The structure also makes it possible to use a much shorter shaft, and one requiring only two journal bearings, thus doing away with all but two stuffing boxes.

What is claimed is:

A rotary motor comprising a plurality of casings having inlet and exhaust ports for the motive fluid, a rotary nozzle at each inlet port, partitions between the casings, for closing the inner casing and one side of the end casings the partitions having passages connecting the exhaust port of one casing with the inlet port of the adjacent casing, heads closing the outer sides of the end casings, fastening means passing through said heads, the casings and the partitions for holding said parts together, rotary pistons working in the casings and provided with peripheral blades, the casings having annular channels across which the blades extend, the channels being contracted at intervals from the nozzles to the exhaust ports.

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

DELEVAN P. UPSON.

Witnesses:
J. V. FREEMAN,
H. W. UTTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."