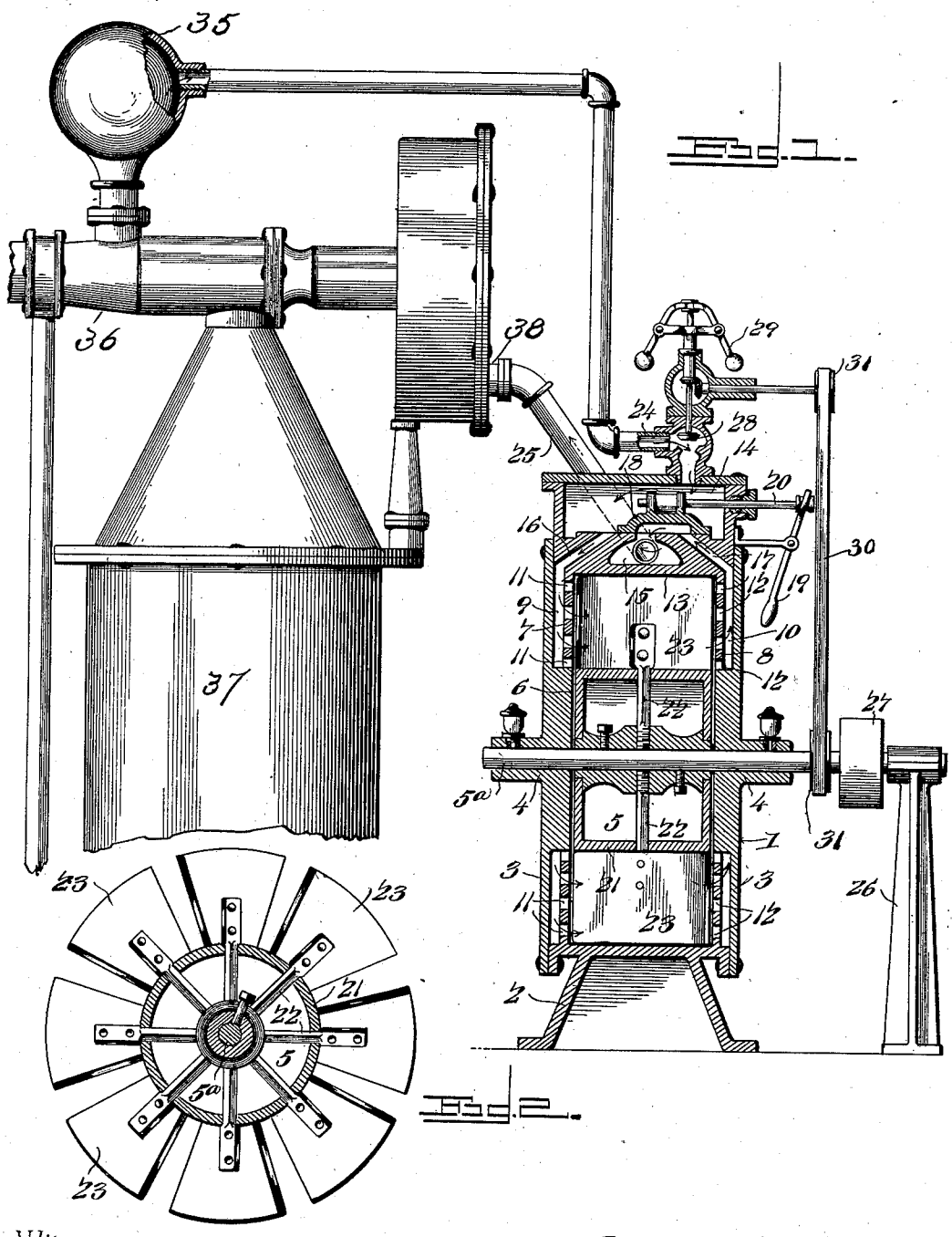
No. 662,975. Patented Dec. 4, 1900.

A. SAUER.

ROTARY MOTOR.

(Application filed Feb. 6, 1899.)

(No Model.)



Witnesses

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UNITED STATES PATENT OFFICE.

ADELBERT SAUER, OF PITTSBURG, PENNSYLVANIA.

ROTARY MOTOR.

SPECIFICATION forming part of Letters Patent No. 662,975, dated December 4, 1900.

Application filed February 6, 1899. Serial No. 704,680. (No model.)

To all whom it may concern:

Be it known that I, ADELBERT SAUER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Rotary Motor, of which the following is a specification.

My invention relates to a rotary motor, and is especially adapted for service in connection with a circulating system which is supplied with a high-pressure motive fluid by an air-compressing apparatus which forms the subject-matter of another application filed by me November 17, 1898, Serial No. 696,713.

The object of the present invention is to provide a simple and efficient motor adapted for propulsion by a motive fluid which is admitted to one side of the piston-chamber and expends its energy on the blades of a rotary piston, and such motive fluid is exhausted from the opposite side of the piston-chamber, the whole forming a compact motor, having its piston-shaft equipped with means by which power may be transmitted to machinery for operating the same.

In my present invention the motor is reversible by the simple adjustment of a valve between the inlet and exhaust ports, and this motor is driven by the energy of the motive fluid, and the exhaust from the motor is connected with suction devices of a generator included in such circulating system, thus providing for the return of the motive fluid to the generator for utilization in the system.

With these ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand the invention, I have illustrated the same in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a vertical sectional elevation taken in the plane of the motor-shaft and showing it operatively connected with a generator that maintains a high-pressure motive fluid in the circulating system. Fig. 2 is a detail view in sectional elevation of the rotary piston.

Like numerals of reference denote like and corresponding parts in both of the figures of the drawings.

1 designates the casing of the motor, which is erected or supported on the base or pedestal 2. This casing is annular in form and the heads or plates 3 thereof are provided with shaft-bearings 4. The rotary piston 5 is mounted on the piston-shaft 5^a, which is journaled in the bearings 4, and this piston operates in the annular chamber 6. The heads or plates 3, which form the side walls of the casing, are provided with recesses on their opposing faces, and on the flanges of the heads or plates are rigidly secured the partitions 7 8, the latter being fixed within the motor-casing contiguous to the piston-chamber 6. The partition 7 forms, in connection with one head or plate, an inlet-chamber 9, to which the motive fluid is admitted, while the other partition 8 is arranged in such relation to the other head or plate of the motor-casing as to form the exhaust-chamber 10. These inlet and exhaust chambers in the heads or plates of the motor-casing do not extend inwardly to the piston-shaft 5, but they terminate a considerable distance away from the shaft. In the partition 7, forming one of the walls of the inlet-chamber 9, is a plurality of inlet-ports 11, by which the motive fluid may freely pass from the chamber 9 to the piston-chamber 6, while a like number of exhaust-ports 12 are formed in the partition 8 to establish communication from the piston-chamber to the exhaust-chamber 10.

A bridge plate or partition 13 is fixed in the upper part of the motor-casing, so as to engage with the partitions 7 8, and this bridge-plate lies between the piston-chamber 6 and the valve-chest 14 at the upper side of the motor-casing. An exhaust-chamber 15 is formed in the bridge-plate 13, and the ports 16 17 are also formed in the bridge-plate on opposite sides of the exhaust-chamber 15 therein. The port 16 leads from the valve-chest to the chamber 9, while the port 17 establishes communication between the chamber 10 and the valve-chest. This bridge-plate forms the seat for a slide-valve 18, having a chamber in its under side, and this valve is op-

eratively connected with a lever 19 by means of the link 20, whereby the adjustment of the valve in one direction reverses the motor.

The piston which I employ consists of a hub 21, the arms 22, and the blades 23. The diameter of the piston-hub 21 is preferably equal to the flanged central portions of the heads 3, forming the side walls of the motor-casing, so that the hub lies flush with the inner edge of the chambers 9 10 and the arms 22 are fastened securely to the hub 21, substantially as shown by Fig. 1. The blades 23 are arranged obliquely to the piston-shaft, and they are firmly secured to the ends of the arms 22, which protrude from the piston-hub. It will be observed that the blades of the piston lie some distance from the axis of the piston-shaft and that the motive fluid is admitted to the piston-chamber to act against said blades at a considerable distance from the shaft, thereby utilizing the leverage of the arms on the piston-shaft and effecting economy in the consumption of the motive fluid, as well as securing maximum efficiency of the parts.

The inlet-pipe 24 is connected to the valve-chest 14 to discharge the compressed motive fluid to the chamber of the chest, and this inlet-pipe is connected with a storage or reservoir chamber 35 of a circulating system 36, which is charged with compressed motive fluid by a generator 37, as graphically indicated by Fig. 1 and as more fully disclosed by another application filed by me November 17, 1898, Serial No. 696,713, and to which reference has been made. The exhaust motive fluid from the motor is not discharged into the outer atmosphere; but such exhaust is conveyed by the pipe 25 from the chamber 15 to the suction devices or low-pressure inlet 38 of the generator in the circulating system, also as represented by Fig. 1 and disclosed by my aforesaid application.

The piston-shaft 5^a is extended beyond one of the shaft-bearings 4 to find a bearing in a fixed standard 26, and on this prolonged end of the piston-shaft is secured a pulley 27 or other mechanical appliance by which the power of the motor-shaft may be transmitted to machinery for operation thereof. In the supply-pipe 24 is fitted a governor-valve 28, which is combined with an ordinary governor 29, having a belt connection 30 with the motor-shaft, and this belt connection, as is usual in the art, is fitted to the pulleys 31, secured to the motor-shaft and the governor-shaft, respectively.

In the operation of the motor the high-pressure fluid from a main or the reservoir 35 of the circulating system is conveyed by the pipe 24 to the valve-chest, and with the valve adjusted in the position shown in Fig. 1 the port 16 establishes communication between the chest and the chamber 9, while said valve covers the port 17 from the chamber 10 to place the latter in communication with the exhaust-chamber 15. The motive fluid from the chamber 9 passes through the ports 11 into the piston-chamber and expends its energy against the oblique radial blades of the rotary piston. The admission of the motive fluid to the piston-chamber expands the fluid, and it is of much lower pressure when it emerges from the piston-chamber into the chamber 10 by the ports 12 in the partition 8. The reduced pressure fluid or exhaust traverses the port 17 to the chamber 15, and thence through the pipe 25 to the suction devices or low-pressure inlet 38 of the generator, and this exhaust fluid is regenerated by combining the same with a high-pressure motive fluid conducted through a combining injector forming an element of the generator 37. As the exhaust is drawn by suction into the generator, it is not necessary to provide valve devices to control the exhaust from the motor back to the generator, and the valve 18 cuts off communication from the inlet and exhaust ports of the motor. A reversal of the position of the valve by shifting the lever 19 will cover the port 16 and open the port 17, and the motive fluid from the valve-chest will be caused to traverse the ports 16 17 in a reverse direction to drive the rotary piston in an opposite direction. The engine or motor may thus be driven economically and at high speed solely by the energy of the motive fluid obtained from the circulating system, and the motor may be arrested by the simple operation of closing a stop-cock (not shown) in the supply-pipe, while a reversal of the piston may be effected by shifting the position of the valve.

Changes may be made in the form of some of the parts, while their essential features are retained and the spirit of the invention embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described the invention, what I claim is—

1. In a rotary motor, a casing having its heads or plates provided with inlet and exhaust chambers on opposite sides of the piston-chamber and with the perforated partitions between the piston-chamber and said inlet and exhaust chambers, respectively, in combination with a rotary piston arranged within said piston-chamber and having the wings or blades lying obliquely to the axis of the piston-shaft, the row of perforations in each partition being each equal in length to one blade, substantially as described.

2. In a rotary motor, a casing having a piston-chamber and having its head on each side recessed or cut away and provided with perforated partitions or walls extending from the shoulders formed by said recessing so as to form between the heads and said partitions or walls inlet and exhaust chambers on opposite sides of the piston-chamber, in combination with a rotary piston arranged within

the piston-chamber and provided with blades or wings lying obliquely to the axis of the piston-shaft, said piston having a hub arranged flush with said shoulders in the heads.

3. In a rotary motor, a casing having the inlet and exhaust chambers in the heads or plates thereof, the chambered bridge-plate provided with ports which establish communication between a valve-chest and the chambers of said heads and the perforated partitions fixed in the casing and separating the piston-chamber from the exhaust and inlet chambers, combined with a rotary piston mounted in the piston-chamber between the perforated partitions and having the oblique wings or blades arranged to sweep close to said partitions, and a reversible valve seated on the bridge-plate, substantially as described.

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

ADELBERT SAUER.

Witnesses:
JOHN H. SIGGERS,
HAROLD H. SIMMS.