No. 633,192. Patented Sept. 19, 1899.

W. S. HALSEY.

FLUID PRESSURE MOTOR.

(Application filed Feb. 18, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

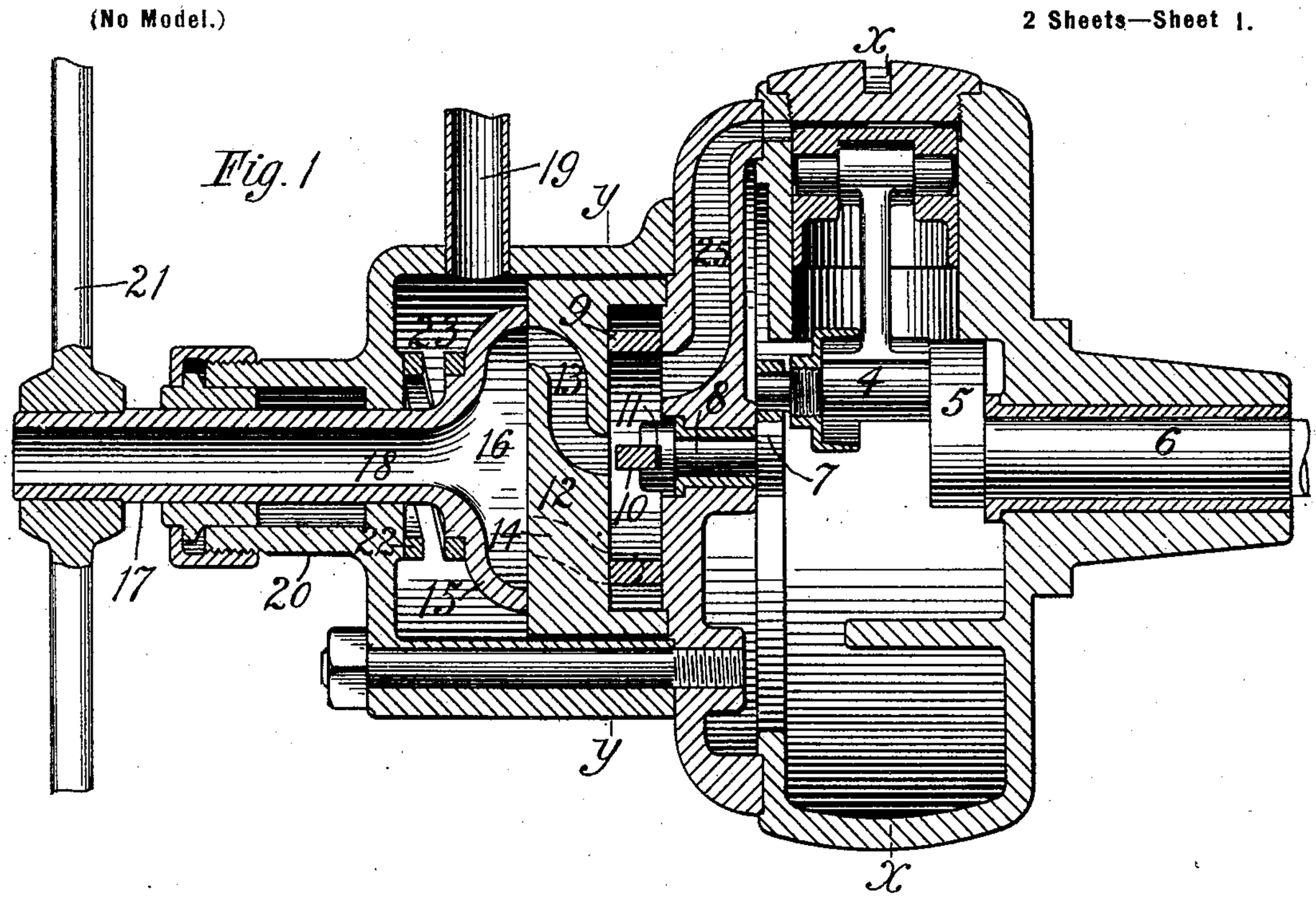
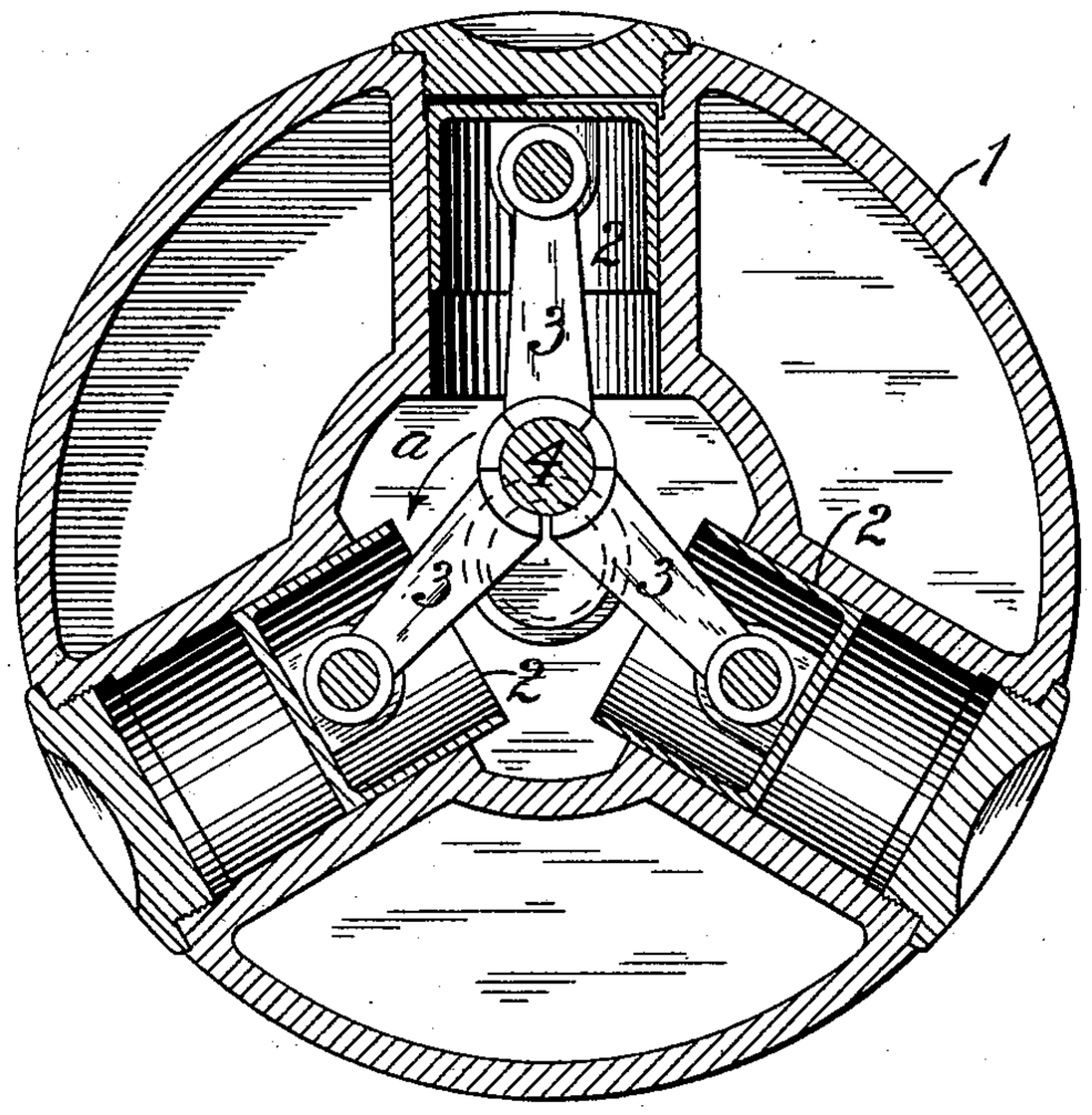


Fig. 2



WITNESSES:

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Ethel Gallagher

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Fig. 3

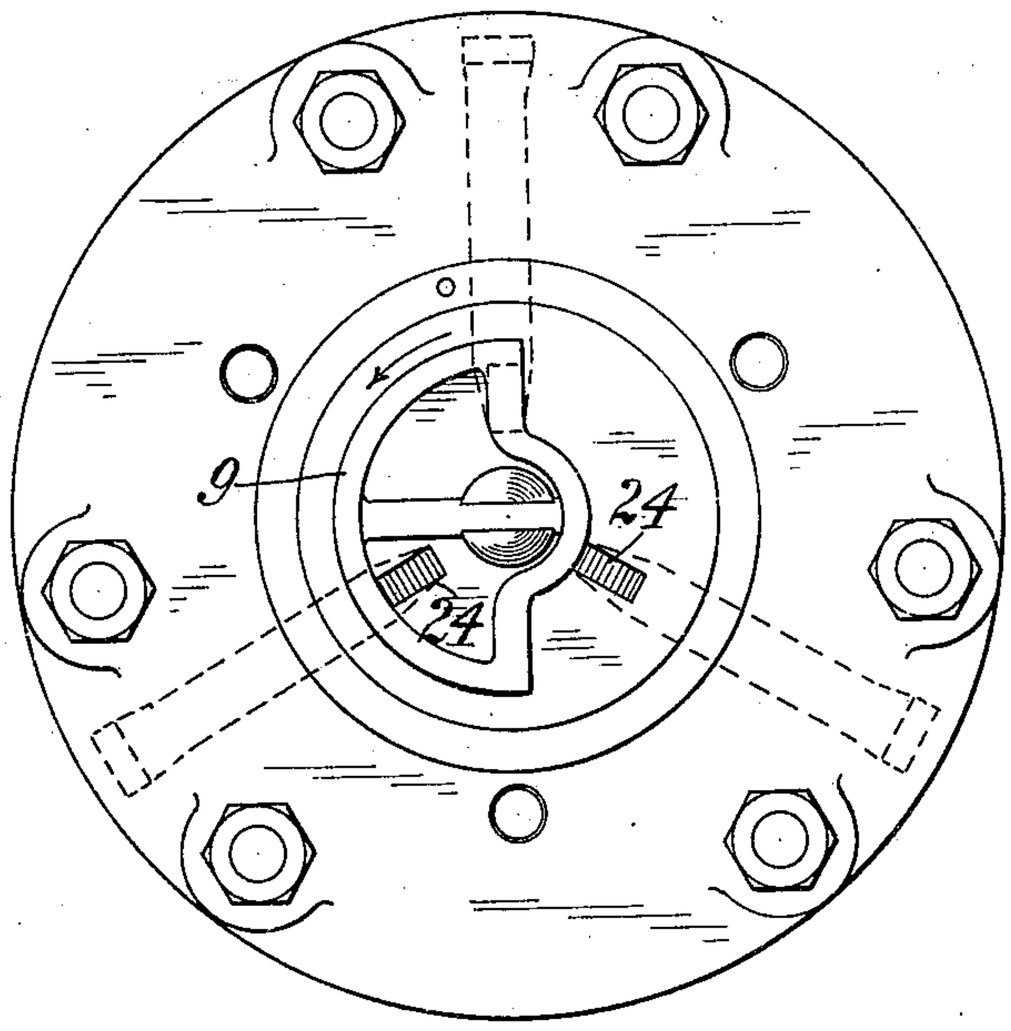


Fig. 4

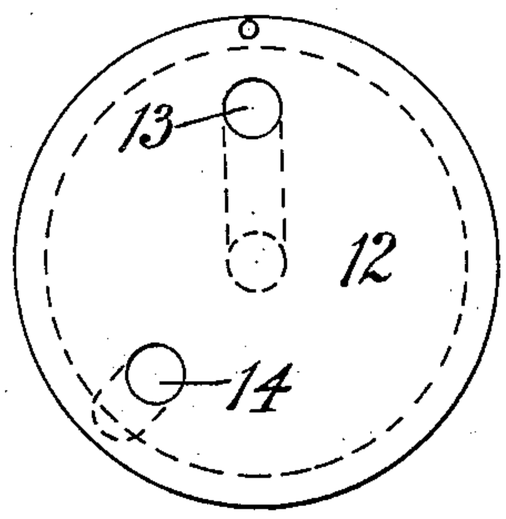
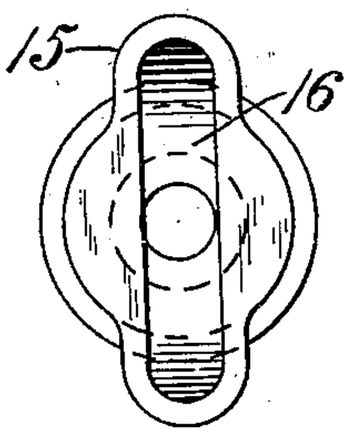


Fig. 5



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UNITED STATES PATENT OFFICE.

WILLIAM S. HALSEY, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO THE UNION BOILER TUBE CLEANER COMPANY, OF SAME PLACE.

FLUID-PRESSURE MOTOR.

SPECIFICATION forming part of Letters Patent No. 633,192, dated September 19, 1899.

Application filed February 18, 1898. Serial No. 670,787. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. HALSEY, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Fluid-Pressure Motors, of which improvement the following is a specification.

The object of my invention is to provide an improvement in fluid-pressure motors; and to this end my invention consists in new and improved means for controlling and reversing a fluid-pressure motor and in certain combinations and features of construction, all as hereinafter set forth.

In the accompanying drawings, which illustrate an application of my invention, Figure 1 is a central section through a multiple-cylinder engine provided with my improvement; Fig. 2, a section on the line *x x* of Fig. 1; Fig. 3, an elevation on the plane of the line *y y* of Fig. 1, looking toward the right, the parts to the left of the line *y y* being removed; Fig. 4, a view in elevation of the back of the plate covering the distribution-valve, and Fig. 5 an end view of the reversing-valve.

In the drawings I have shown my improvement applied to a three-cylinder single-acting engine, the cylinders being formed in a circular casing 1 and fitted with pistons 2, which are connected by means of the connecting-rods 3 with a single crank-pin 4 on the crank 5 of the shaft 6. A crank 7 is driven by the pin 4 and rotates the shaft 8, to which the distribution-valve 9 is connected by means of a bar 10, which fits in a slot 11 in one end of the shaft 8. A recessed plate 12 fits over the valve 9 and is provided with two ports 13 and 14 for the admission and exhaust of motive fluid. The port 13 opens into the space within the valve 9, and the port 14 opens into that portion of the valve-chamber which surrounds the valve 9. So far as these features are concerned my improvement is not limited to the particular construction shown and described, as it is equally appplicable to other constructions and forms of engines and relates more particularly to the means for effecting a reversal of the engine.

In accordance with my invention a reversing-valve device 15 is fitted on the back of the plate 12 and has its face formed, as in Fig. 5, with an elongated opening or slot 16, which is adapted to register with either of the ports 13 or 14, as may be desired. The reversing-valve device 15 is provided with a hollow stem 17, the passage 18, through which it communicates with the slot 16 at one end and at its other end opens into the atmosphere. The passage 18 may, if preferred, be connected with any chamber or space, or the stem may be farther extended to remove the outlet farther from the engine, as it is not essential that the passage 18 should open, as shown, directly to the atmosphere in such close proximity to the engine. In certain applications of my invention, however, I prefer this arrangement—as, for instance, where air is employed as the motive fluid—and it may not be merely unobjectionable but very desirable to have the fluid exhausted into the atmosphere in the immediate vicinity of the engine.

As shown in the drawings, the reversing-valve is located in a chamber 23, to which live steam or other motive fluid is supplied through a pipe 19, and the fluid surrounding and acting on the valve will tend to hold it to its seat on the plate 12. The stem 17 passes through a stuffing-box 20, which prevents the leakage of fluid around the stem, and on the outer end of the stem is secured an operating-lever 21, by which the reversing-valve may be shifted in position. A spring 22 is shown bearing at one end against the back of the reversing-valve and at the other end against the casing; but this spring is not an essential feature of my improvement and may be dispensed with. The inner end of the reversing-valve 15 makes a fluid-tight joint with the back of the plate 12, and the slot or opening 16 is adapted to register with the port 13 or with the port 14, so as to connect the space within the distribution-valve 9 or the space surrounding it with the atmosphere.

As shown in Fig. 1 of the drawings, the reversing-valve 15 is in position to connect the passage 13, through the passages 16 and 18, with the atmosphere. The passage 14 is uncovered by the valve 15 and is in open com-

munication with the chamber 23, so that live steam or other motive fluid may pass into the space surrounding the valve 9, and as the ports 24 are uncovered in succession as the valve 9 rotates motive fluid will pass in succession through the passages 25 into the cylinders, and as these ports 24 are in succession connected through the valve 9 with the passages 13, 16, and 18 the motive fluid will be exhausted from each of the cylinders in turn to the atmosphere.

With the parts arranged as shown and described the engine-shaft will be rotated in the direction shown by the arrow marked *a* in Fig. 2, the valve 9 being rotated in the same direction, as shown by the arrow in Fig. 3. In order to reverse the direction of rotation of the engine-shaft, it is only necessary to shift the reversing-valve 15 so as to uncover the passage 13 and to cause the slot or passage 16 to register with the passage 14. The live steam or other motive fluid will then be admitted through the passage 13 to the interior of the valve 9, the space surrounding the valve 9 will be connected with the atmosphere through the passages 14, 16, and 18, and the engine-shaft will be rotated in a direction the reverse of that shown by the arrows in the drawings. The reversing-valve may be shifted by a slight movement of the lever 21 or by other means connected with the stem 17 of the reversing-valve.

By means of my improvement a simple, inexpensive, and efficient means is provided by which the engine may be easily, quickly, and certainly reversed.

Instead of employing a complicated and expensive mechanism which is liable to get out of repair my improvement provides a reversing device of such simplicity that it may consist of but a single part—that is, the integral structure forming the reversing-valve and its stem—and no movement of this device is required for the purpose of reversing the engine but a slight or partial rotary movement against no resistance but the friction of the valve and its stem on their bearing parts.

I claim as my invention and desire to secure by Letters Patent—

1. In a fluid-pressure motor, means for contolling the direction of the motor-shaft, comprising a distribution-valve and ports for admission to and release of fluid from the valve-chamber, a rotatable reversing-valve controlling the ports and having a rigid operating-stem in line with the axis of the main shaft and having a central passage leading to the inside of said valve and to the outside of the reversing-valve chamber.

2. In a fluid-pressure motor, the combination, with a distribution-valve, of passages communicating with the interior of the valve and with the space or chamber on the exterior of the valve, a reversing-valve controlling the passages and adapted to permit the admission or exhaust of fluid therethrough, and a passage through the reversing-valve and its stem to the atmosphere.

3. In a fluid-pressure motor, passages through which fluid may pass through or around the distribution-valve, a reversing-valve adapted to reverse the flow of fluid through the passages, and a passage through the reversing-valve and its stem to the outside of the engine.

4. In a fluid-pressure motor, a distribution-valve and a reversing-valve for controlling passages through which fluid may be admitted to or released from the engine, and a hollow stem on the reversing-valve extending outside of the valve-chamber.

5. In a fluid-pressure motor, a distribution-valve, a chamber to which fluid under pressure is supplied, a reversing-valve in the chamber, and a hollow stem on the valve through which fluid may be exhausted, and which extends through the wall of the chamber in position to be operated for shifting the valve.

6. In a fluid-pressure motor, a rotary distribution-valve, a plate having passages therethrough leading to the distribution-valve chamber from the fluid-supply chamber, a reversing-valve in the supply-chamber for controlling the passages in the plate, a passage through the reversing-valve and its stem to the atmosphere, and means for rotating the stem of the reversing-valve.

In testimony whereof I have hereunto set my hand.

WILLIAM S. HALSEY.

Witnesses:
JOHN M. PRESCOTT, Jr.,
W. G. DOOLITTLE.