No. 790,969. PATENTED MAY 30, 1905.

W. J. McCARROLL.

REVERSING VALVE FOR ENGINES.

APPLICATION FILED SEPT. 23, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

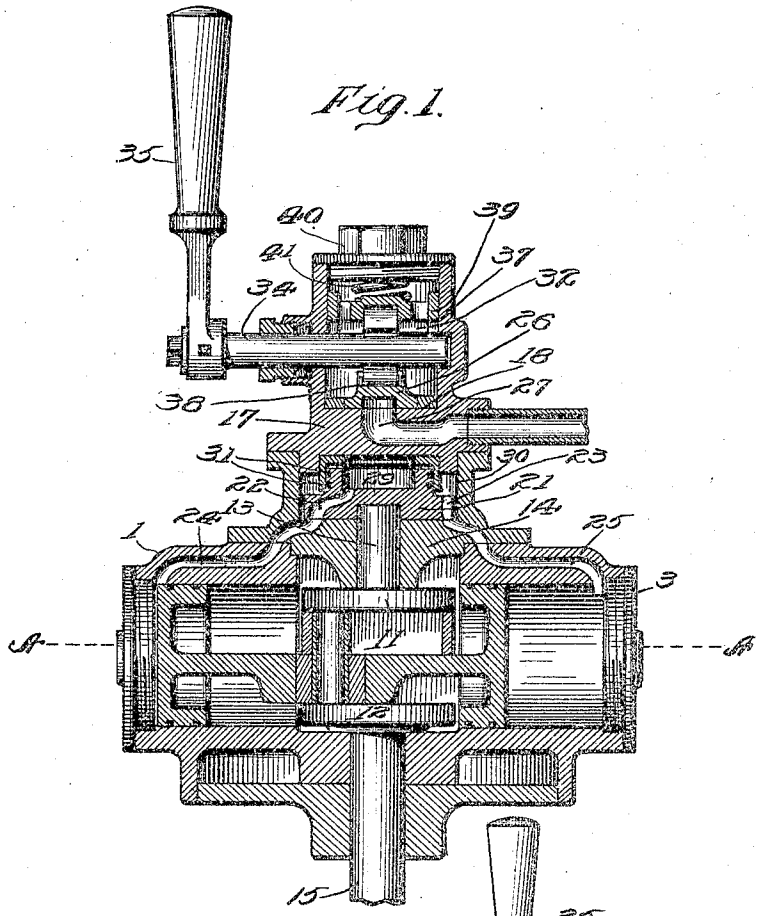
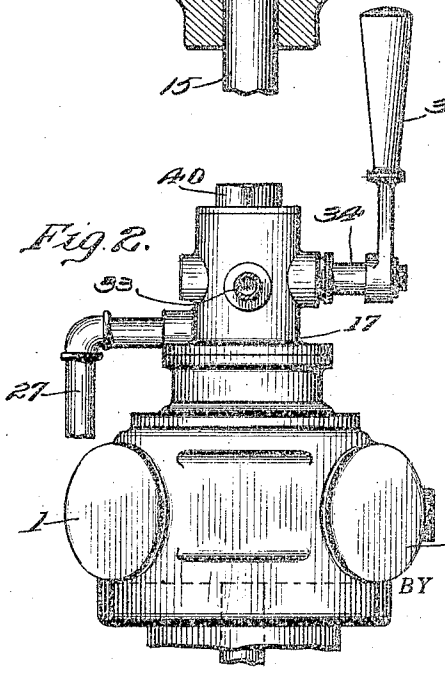


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

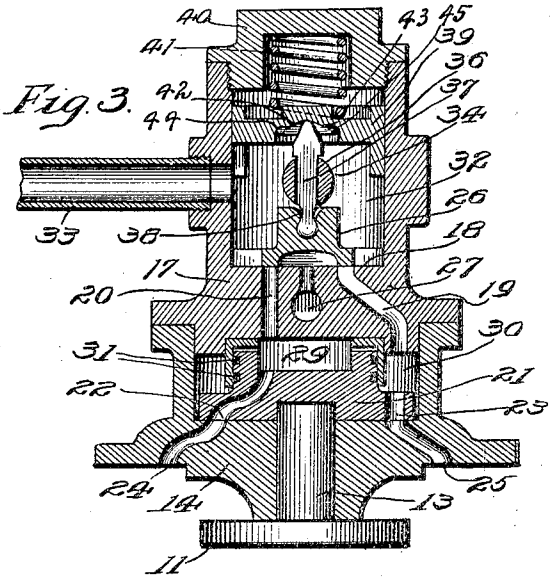
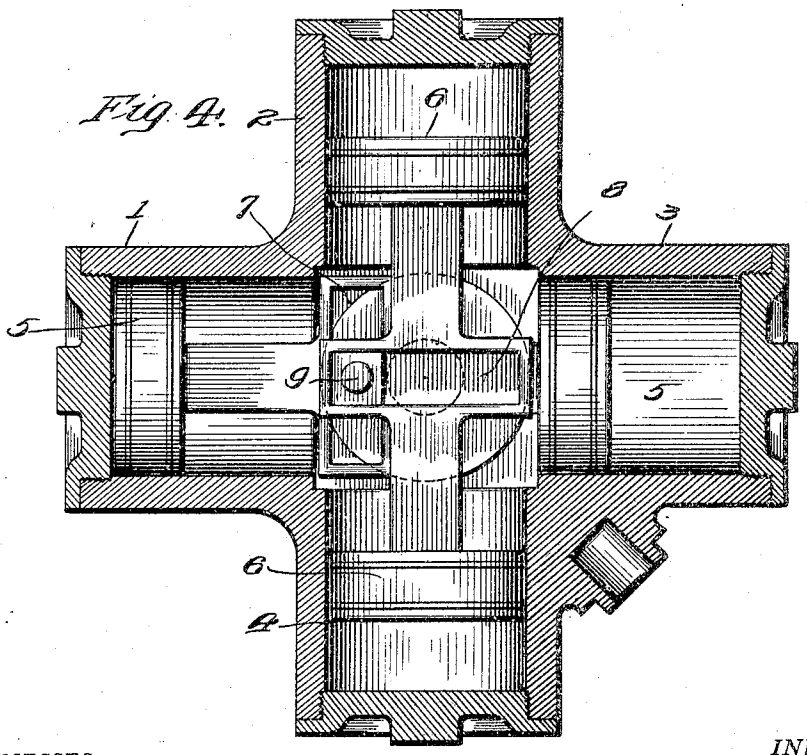


Fig. 4.



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PHOTO-LITHOGRAPHED BY SACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 790,969. Patented May 30, 1905.

UNITED STATES PATENT OFFICE.

WILLIAM J. McCARROLL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO BURNHAM, WILLIAMS & CO., OF PHILADELPHIA, PENNSYLVANIA, A FIRM.

REVERSING-VALVE FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 790,969, dated May 30, 1905.

Original application filed July 25, 1904, Serial No. 217,940. Divided and this application filed September 23, 1904. Serial No. 225,605.

To all whom it may concern:

Be it known that I, WILLIAM J. McCARROLL, a citizen of the United States, and a resident of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Reversing-Valves for Engines, of which the following is a specification.

My invention relates to improvements in multiple-cylinder engines in which the cylinders are arranged in pairs about a common crank-shaft, the cylinders of each pair of cylinders being diametrically opposite one another and each pair of pistons being connected to a common crank on the shaft; and my invention consists in an arrangement of valve and passages whereby the actuating fluid may be conducted to the cylinders, so as to cause the pistons to drive the crank and shaft either forward or backward—in other words, to furnish an improved form of reversing-valve for multiple-cylinder engine.

My present invention was originally described in my application for patent on a reversing-gear, Serial No. 217,940, filed July 25, 1904, this application being a division thereof.

In the accompanying drawings, forming part of this specification, and in which similar figures of reference indicate similar parts throughout the several views, Figure 1 is a vertical central sectional view through my reversing-engine; Fig. 2, a side elevation of the engine on a reduced scale; Fig. 3, a vertical central sectional view of the upper part of the engine, taken at right angles to the view shown in Fig. 1; Fig. 4, a section of Fig. 1 on line A A.

1 2 3 4 are the engine-cylinders, all preferably formed in a single casting and arranged as shown—viz., 1 and 3 in axial alinement and at right angles to 2 and 4, which are also in axial alinement. Within the cylinders 1 and 3 are pistons 5, and within the cylinders 2 and 4 are pistons 6. The two heads of the pistons 5 are secured together by a web in which is a slot 7, arranged at right angles to the travel of these pistons. The two heads of the pistons 6 are similarly joined and furnished with a slot 8, which is at right angles to the slot 7.

9 is a pin passing through slots 7 and 8, the ends of which enter and form pins for cranks 11 and 12, the shafts 13 and 15 of which are carried in bearings, the former in a piece 14, carried by the cylinder-casting, and the latter in the cylinder-casting.

24 25, Figs. 1 and 3, are the ports for alternately admitting and exhausting the actuating fluid to and from cylinders 1 and 3, the cylinders 4 and 2 being furnished with identically similar ports.

So far the construction and operation of the engine is well known and will not need detailed description.

Secured to the shaft 13 of crank 11 is a rotary valve 21, which is seated against the piece 14, which latter is bolted to the top of the cylinder-casting. This valve is furnished with ports 22 23, which upon the rotation of the valve register successively with the several ports 24 25, which lead to the cylinders 1 2 3 4. The port 22 leads to a chamber 29 in the interior of valve 21, while the port 23 leads into a space 30 surrounding the valve 21. The top of the valve 21 is seated in a casting 17, a tight joint between the valve and casting being made by a cup-like bearing 28, furnished with packing-rings 31, as shown in Figs. 1 and 3.

Within the casting 17 is a space 32, the bottom of which forms a seat 18 for a slide-valve 26, one port, 20, of which leads to the chamber 29 within valve 21 and the other port, 19, of which leads to the space 30 outside the valve 21.

27 is an exhaust-port leading out from valve 26; 33, a port for admitting actuating fluid to chamber 32; 34, a stem furnished with an operating-handle 35.

37 is a pin passing loosely through a slot 36 in stem 34, the under end of which engages a notch 38 on top of slide 26 and the upper end of which engages the under part of a stop 39, which latter is within and guided by the walls of the chamber 32.

40 is a screw-plug closing the top of cham-

ber 32; 41, a spring bearing against plug 40 and stop 39, so as to force the latter downward.

The bottom of stop 39, where engaged by pin 37, is inclined from the center outward and downward, as shown in Fig. 3 at 42 43, and at the other ends of these inclines are formed notches 44 45, as shown. By throwing the lever 35 to one side or the other the stem 34 is correspondingly rocked and will cause the pin 37 to move the slide-valve, so as to open ports 19 20 to either admission or exhaust of actuating fluid to cause the engine to run either forward or backward, as may be desired. If the lever be thrown completely over, the pin 37 will engage one or the other of the notches 44 45, and the valve 26 will be held open until the stem 34 be rocked in order to release the pin from its engaging notch. If the slide 26 be moved so as to connect port 20 with the interior of chamber 32 and port 19 with the exhaust, the actuating fluid will pass down port 20 to chamber 29, thence through port 22 successively to the ports leading to the outer ends of the cylinders 1 4 3 2, driving the pistons carried by these cylinders successively inward, and thus rotating the shaft 15 in one direction. The ports 22 23 in the rotary valve 21 are diametrically opposite, and hence while the port 22 is delivering steam to one cylinder the steam from the opposite cylinder of this pair of cylinders is being exhausted through the port 23, or vice versa, if the valve 26 be moved to connect the port 19 with the actuating fluid in chamber 32 and the port 20 with the exhaust in order to cause a reverse movement of the shaft 15.

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

1. In a reversing-valve, in combination, a valve-chamber, a D-valve within said chamber furnished with a notch upon its top, a perforated revoluble stem, a pin passing through said perforation, one end of said pin engaging the notch on the top of said D-valve, a stop having inclines and notches on its under side adapted to be engaged by the other end of said pin, and a spring for forcing said stop downward.

2. In a reversing-valve, in combination, a valve-chamber, a D-valve within said chamber, a revoluble stem, a pin movable by said stem, the lower end of which is adapted to engage said valve, and a spring-actuated stop engaging the upper end of said pin.

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