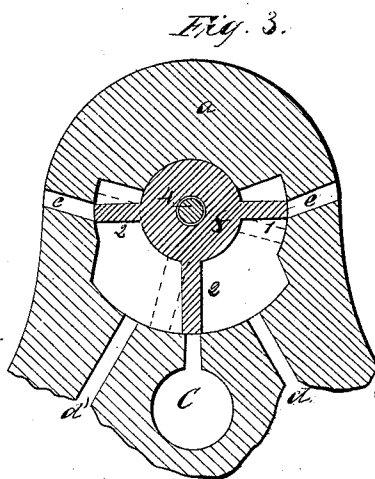
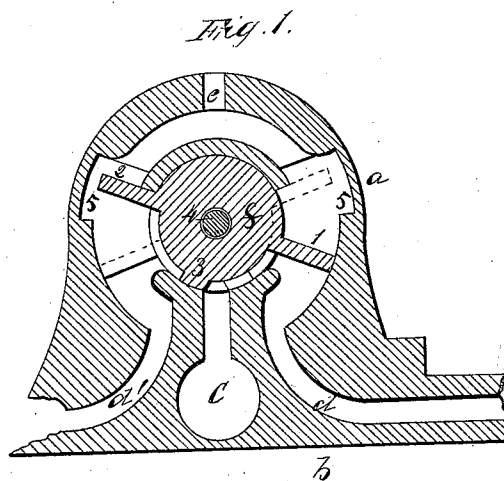
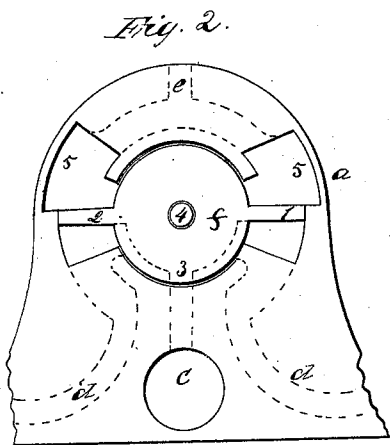


J. & C. B. Hardick,
Rotary Steam Valve.
No 30,815. Patented Dec. 4, 1860.



Witnesses:
Lemuel W. Sewell
Wm. H. Smith

Inventors:
John Hardick
Charles B. Hardick

UNITED STATES PATENT OFFICE.

JOHN HARDICK AND CHARLES B. HARDICK, OF BROOKLYN, NEW YORK.

VALVE.

Specification of Letters Patent No. 30,815, dated December 4, 1860.

To all whom it may concern:

Be it known that we, JOHN HARDICK and CHARLES B. HARDICK, of Brooklyn, in the county of Kings and State of New York, have invented, made, and applied to use a certain new and useful Improvement in Valves for Pumps and Engines; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making part of this specification, wherein—

Figure 1, is a vertical section of our said valve, Fig. 2, is an elevation with the cap or cover plate removed and Fig. 3, is a section representing a slight variation in said valve by which it is especially adapted for steam engines.

Similar marks of reference denote the same parts.

In steam fire engines and hydraulic machinery generally, experience has shown the want of a reliable self acting valve that would open and shut the water ways: The engines that reciprocate and are connected directly to such pumps or to other machinery without the use of a crank to regulate the length of stroke have been found defective because if the momentum is not sufficient to cause a perfect and complete movement the valve is only partially opened and the next movement being slower the engine quickly stops.

The nature of our said invention consists in a three armed valve so arranged in connection with the induction and eduction ports that the pressure itself will insure the completion of the movement as hereafter set forth; in using this valve in a pump, the water in passing into and out of the pump, will give motion to the said valve, but when used with a steam engine, a movement has to be communicated from a tappet or similar device on the piston rod or cross head, which movement to the valve shuts off the steam on one side and partially opens the steam way on the other side, the pressure completing the movement of the valve.

In the drawing *a*, is a circular valve chest or a cylinder, a portion of which is represented at *b*; *c*, is the induction port and *d*, *d'*, are the ports to the respective ends of the cylinder, and *e*, is the eduction port. *f* is our improved valve with the wings

1, 2, and 3. This valve is attached to or moves on the spindle 4.

By reference to Figs. 1 and 2, it will be seen that the water being supplied to the pipe *c*, the valve standing in the position of Fig. 2, the piston in the cylinder is started and produces suction on one of the wings and compression on the other which immediately throws the valve *f* into the position shown in Fig. 1, (or the reverse thereof as represented by the dotted lines) opening the inlet from the pipe *c*, so that the water flows freely through the valve into the port *d*, and at the same time the wing 2 having passed to the position shown opposite to the passage way 5, that is formed in the chest *a*, the water passes out of *d'*, and past the end of 2, through the passage way 5 to the exit pipe *e*. When the piston in the cylinder (*b*) commences to move in the opposite direction the water in passing out of *d*, strikes against the wing 2, and the suction on the other side acts conjointly to reverse the position of the valve, and the water passes into the other side of the cylinder, the wing 3, being on the opposite side of *c*, to that represented in full lines in Fig. 1, (see the dotted lines in this figure.)

The form in which our three winged valve is made when used for a steam engine is represented in Fig. 3. The same marks of reference are applied to the corresponding parts and the operation will be apparent from the foregoing, we however remark that the pressure coming from the inlet or induction port *c*, requires that the wing 3, be made longer than the wings 1 and 2, and we attach the valves to the stem 4, and provide a crank arm or other device to be acted on by the piston rod or cross head near the termination of each stroke so that the valve is moved until it passes either way of the normal position shown in Fig. 3, the inlet *c*, on one side is opened as also the exhaust *e*, on the other side and the pressure being in excess on the wing 3, to what it is on the other wing (1 or 2) insures the movement of the valve to its entire extent as denoted by the dotted lines (Fig. 3.)

It will be seen that in Fig. 3, we have represented the exhaust ports *e*, *e*, one on each side of the circular valve chest but the same may be constructed as represented in

Fig. 1, the action of the parts relatively to said exhaust being precisely similar.

What we claim and desire to secure by Letters Patent is—

- 5 The valve *f*, provided with the wings (1, 2 and 3,) and arranged relatively to the ports *c*, *d*, *d'*, and *e*, and operating substantially as and for the purposes specified.

In witness whereof we have hereunto set our signatures this twenty seventh day of 10 August 1860.

JOHN HARDICK.

CHARLES B. HARDICK.

Witnesses:

LEMUEL W. SERRELL,

CHAS. H. SMITH.