

(No Model.)

H. BEISHEIM.
STEAM ACTUATED VALVE.

No. 459,120.

Patented Sept. 8, 1891.

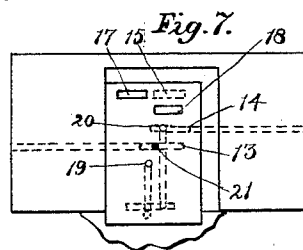
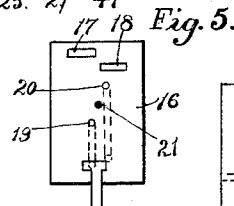
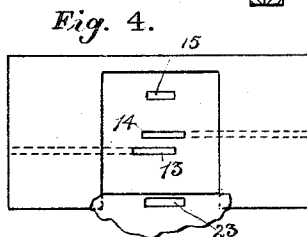
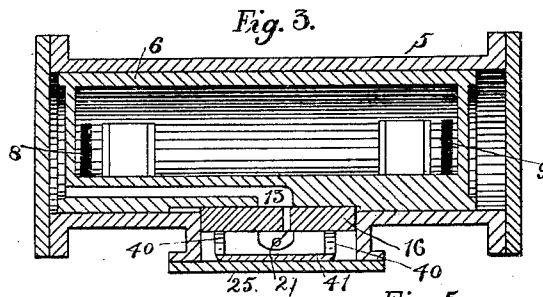
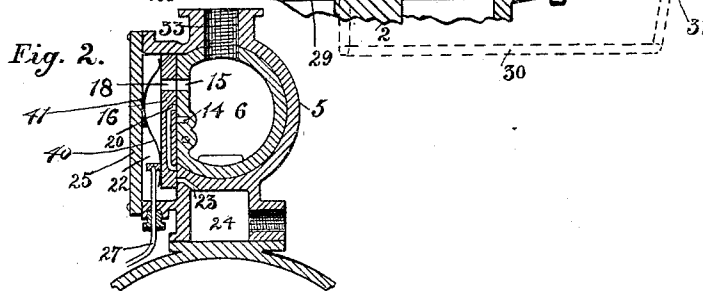
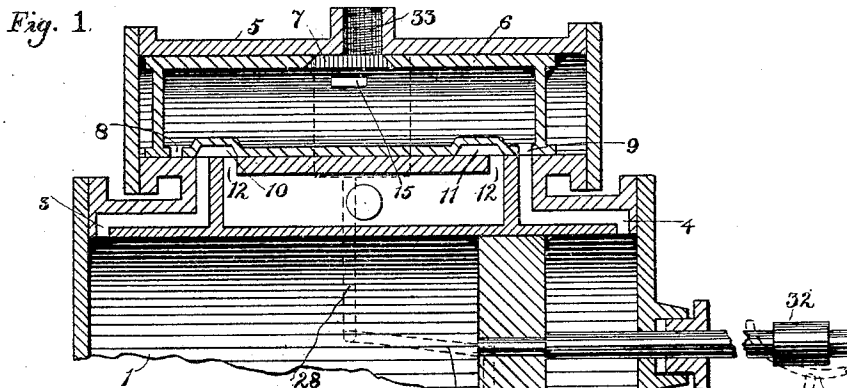
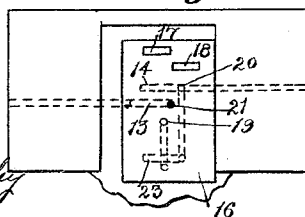


Fig. 6.



WITNESSES.

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UNITED STATES PATENT OFFICE.

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STEAM-ACTUATED VALVE.

SPECIFICATION forming part of Letters Patent No. 459,120, dated September 8, 1891.

Application filed June 8, 1891. Serial No. 395,535. (No model.)

To all whom it may concern:

Be it known that I, HENRY BEISHEIM, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Steam-Actuated Valves; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures of reference marked thereon.

My present invention relates to valves for use on steam-pumps or direct-acting engines, though equally adapted for co-operating with any steam or fluid actuated piston, whether the same serves as a valve for another or main cylinder or not; and it has for its objects to provide a device that will not only be simple and cheap in construction, but as well one that will not possess the disadvantages of the forms in which the movement of the auxiliary valve tends to move the main valve also, and to these ends consists in certain improvements in construction and combinations of parts, all as will be hereinafter described, and the novel features pointed out particularly in the claims at the end of this specification.

In the drawings, Figure 1 is a longitudinal sectional view of a steam-engine valve and cylinder embodying my improvements; Fig. 2, a cross-sectional view of the same; Fig. 3, a horizontal sectional view through the main and auxiliary valves; Fig. 4, a side view of the main valve; Fig. 5, a plan view of the auxiliary valve; Figs. 6 and 7, diagrammatic views of the valves in different positions.

Similar reference-numerals indicate similar parts.

In the form of apparatus to which my invention is shown applied, 1 indicates a steam-cylinder having a piston 2 operating therein, and the ports 3 and 4 at opposite ends communicating with the valve-cylinder 5, in which operates a cylindrical steam-actuated valve 6. This valve 6 is made hollow, having an opening 7 in its upper side and heads at each end, and on its lower side provided with apertures 8 and 9 and the passages 10 and 11, which control the ports 3 and 4 and exhaust-ports 12, as usual.

Near the center of the valve 6 one of its sides is flattened, and in said flattened side

are arranged two steam-ports 13 and 14, communicating with channels extending to the opposite ends of the valve, said ports being arranged in different horizontal planes, but having a portion of their inner ends in the same vertical plane, as shown, and above said ports is a steam-inlet port 15, opening to the interior of the valve.

Co-operating with the flattened part of the piston-valve, sliding at right angles to its line of movement and resting partially upon a seat provided in the valve-casing, is an auxiliary valve 16, consisting, preferably, of a plate provided with two steam-inlet ports 17 and 18, extending through it and adapted to co-operate with port 15 in the main valve, two exhaust-passages terminating in ports 19 and 20, arranged in different planes and adapted to co-operate with ports 13 and 14, and between the two latter a steam-inlet port 21, passing directly through the valve and also adapted to co-operate with the ports 13 and 14. This auxiliary valve operates in a chamber 22, formed by the main valve and the valve-casing, in which latter is provided a port 23, communicating with the exhaust-chamber 24, and with which the lower ends of the exhaust-passages in the valve 16 connect, and it is held to its seat by any suitable device—such, for instance, as springs 40, engaging a plate 41, sliding on the outer cover-plate 25 of the steam-chest.

Any mechanism well known for the purpose may be provided for causing the reciprocation of the auxiliary valve, and as one form I have shown a connecting-rod 27, passing through a suitable stuffing-box and connected by a link 28 with one arm of a bell-crank lever 29, the other arm of which is connected by a link 30 with a pivoted rocking piece 31, arranged on the main pump-frame and adapted to be struck and tilted in opposite directions by a projection or collar 32 on the main piston-rod, the connection being such that the valve will be shifted at the termination of the stroke of the main piston, as will be understood. The main steam-pipe from the boiler is connected with the pipe 33 on the top of the valve-casing, and the steam therefore fills the interior of the valve 6 through an opening 7, and is from thence admitted to the steam-chest in which the auxil-

iary valve is located and then to the ends of the
 piston-valve. The ports in the main and aux-
 iary valves are so located relatively to each
 other that when, for instance, the auxiliary
 5 valve is in its lowermost position, as in Fig. 6,
 the port 17 is in communication with port 15 in
 the main valve 6, and the steam from the in-
 terior of the latter will pass into the chamber 22,
 and at the same time port 21 is over port 13, per-
 10 mitting the passage of steam to the left-hand
 end of the valve, and also port 14 is connected
 with port 20, permitting the steam at the right-
 hand end to exhaust through port 23, with
 which the exhaust-channel communicates.
 15 As the valve 6 shifts, admitting steam to the
 main piston in the usual manner, the port 15
 passes from under port 17, cutting off the
 steam to the chamber 22 and remaining in
 position above port 18 in the auxiliary valve,
 20 as in Fig. 7, until at the termination of the
 stroke of the main piston the auxiliary valve
 is moved upward by the shifting mechanism
 described, when the port 18 will co-operate
 with port 15, port 21 with port 14, and ex-
 25 haust-port 19 connects port 13 with the ex-
 haust, permitting the supply of live steam to
 the right-hand end and the free exhaust from
 the left, moving the valve to first position and
 cutting off the supply to the steam-chest, as
 30 before.

By the employment of valve mechanism of
 this description the speed of the main piston
 can be regulated to a nicety, the movement
 of the main valve operating as a cut-off when
 35 the movement in one direction is completed,
 at which time the immediate reversal can take
 place, thereby preventing the possibility of
 the valves becoming actuated improperly by
 leakage or by the accumulation of live steam.

40 My valve mechanism is not only cheap in
 construction, enabling the parts to be readily
 constructed and put together, but by reason
 of the auxiliary valve moving at right angles
 to the plane of movement of the main valve
 45 there is no possibility of the latter's being
 moved by its operation as to cause a stoppage
 by the improper registering of the ports, as
 is the case when the parts are insufficiently
 lubricated, even if a portion of the auxiliary
 50 moves in the same plane as the main valve.
 As the throttle-valve controlling the main
 supply of steam to the pump or engine is
 above the latter, it will be seen that if even a
 very small opening is left when the ports 15
 55 and 17 or 18 register the steam will gradually
 move the main valve and cut-off, and when
 the auxiliary valve is moved communication
 will be established with the other ports and
 the main valve moved gradually in the other
 60 direction.

While my invention of auxiliary valve and
 the moving piston is designed especially for
 use as a valve-motion, it will be understood

that it could as well be employed as a primary
 valve, the movement of the auxiliary being 65
 caused from the piston, constituting itself a
 valve in the present construction by suitable
 connections.

I claim as my invention—

1. The combination, with the movable pis- 70
 ton having the flat valve-seat on its side and
 provided with the ports communicating with
 opposite ends, of the reciprocating valve mov-
 ing upon said flat portion and at right angles
 to the plane of movement, having the exhaust 75
 and inlet ports, and actuating devices for said
 valve, substantially as described.

2. The combination, with the hollow mov-
 able piston having the flat valve-seat on its
 side and provided with the steam-inlet port 80
 and the two ports communicating with oppo-
 site ends, of the reciprocating valve moving
 upon said flat valve-seat and at right angles
 to its plane of movement, having the two in-
 let-ports co-operating with the one in the pis- 85
 ton, the exhaust and inlet ports, and actuat-
 ing devices for the valve, substantially as de-
 scribed.

3. The combination, with the main cylinder
 and the piston operating therein, the valve- 90
 casing, the piston-valve operating therein
 controlling the main piston, having the flat
 valve-seat on its side and provided with the
 ports communicating with opposite ends of
 the casing, of the reciprocating auxiliary valve 95
 operating on the flat valve-seat and at right
 angles to the plane of its movement, having
 the exhaust and inlet ports, and actuating de-
 vices for said auxiliary valve, substantially
 as described. 100

4. The combination, with the casing, the
 movable piston having the flat valve-seat on
 its side and provided with the ports commu-
 nicating with opposite ends of the casing, of
 the reciprocating valve moving upon said 105
 flattened portion and at right angles to its
 plane of movement, having the two exhaust-
 ports and the inlet-port between them, the
 exhaust-port in the casing, and actuating de-
 vices for the valve, substantially as described. 110

5. The combination, with the casing, the
 movable piston having the flat valve-seat on
 its side and provided with the ports commu-
 nicating with opposite ends of the casing, and
 the central steam inlet-ports, of the recipro- 115
 cating valve moving upon said flattened por-
 tion and at right angles to its plane of move-
 ment, having the two inlet-ports in different
 planes, the two exhaust-ports and the inlet-
 port between them, the exhaust-port in the 120
 casing, and actuating devices for said valve,
 substantially as described.

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Witnesses:

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WILLIAM F. HEPPENHEIMER.