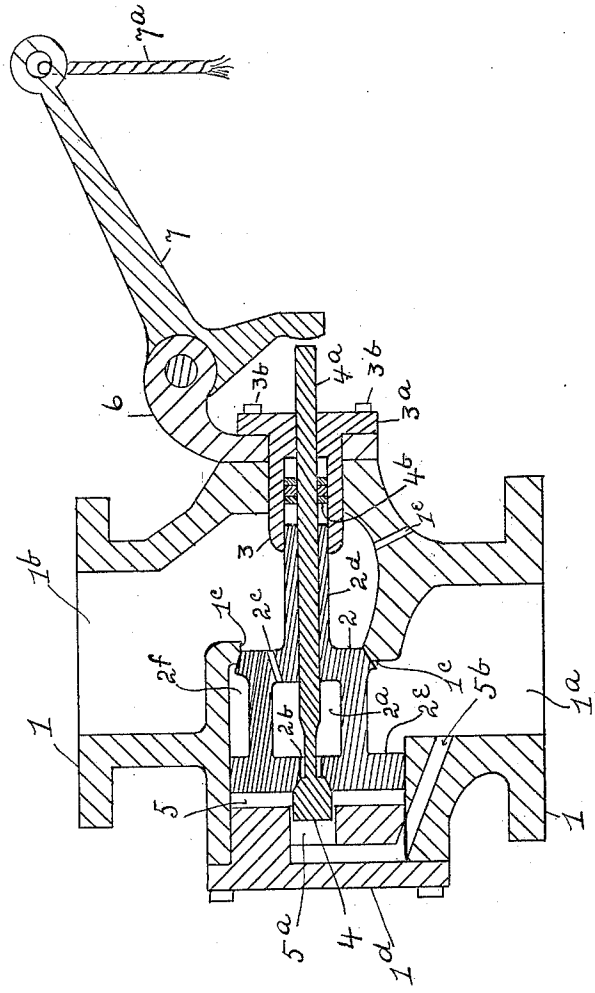
W. N. SILVERNALE.

VALVE.

APPLICATION FILED OCT. 8, 1918.

1,374,244. Patented Apr. 12, 1921.



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VALVE.

1,374,244. Specification of Letters Patent. Patented Apr. 12, 1921.

Application filed October 8, 1918. Serial No. 257,395.

To all whom it may concern:

Be it known that I, WILLIAM N. SILVERNALE, a citizen of the United States, residing at Kawkawlin, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Valves, of which I do hereby declare the following to be a specification.

My invention relates to valves, and especially balanced steam valves, and has for its object the provision of a novel, simple and practical valve of that type. It consists of the structures, combinations and arrangements of parts hereinafter described and claimed.

In the drawing, the figure is a central vertical longitudinal section of my said invention.

In said drawing, 1 is the body portion of a valve housing provided with an intake port 1^a and an exhaust port 1^b. Said exhaust port may, if desired, communicate with a steam whistle, not shown, or with the steam supply pipe of any steam operated device. Said housing has formed therein a main valve seat 1^c, against which a main valve head 2 is adapted to bear. Said main valve in coöperation with said main valve seat is adapted to normally close direct communication between said intake port 1^a and said exhaust port 1^b. Formed in said valve head 2 is a chamber 2^a, through the rear wall of which extends an intake port 2^b, and through the front wall of which extends an exhaust port 2^c adapted to communicate at all times with said exhaust port 1^b. Upon said valve 2 there is preferably formed or secured a forwardly directed tubular nose or valve stem 2^d adapted to extend into a sleeve 3 mounted in the opposite wall of said housing. Said main valve head has formed thereon, an annular flange 2^e adapted to contact with the side walls of said housing whereby an annular chamber or space 2^f is formed between said walls and said main valve head forward of said flange, said annular space being open to said main intake port. Extending through said sleeve and through said valve stem and valve head is the stem 4^a of an auxiliary valve 4, which auxiliary valve is adapted to bear against a seat therefor formed in the outer face of the rear wall of said main valve and to close the intake port 2^b in said main valve head.

The rearward end of the body portion of said housing is open, and is adapted to be closed by a cover portion 1^d, of any suitable structure, which preferably extends into said body portion, the inner face of said cover being spaced from the rearward end of said main valve when said main valve is closed against its seat. A steam chamber 5 is thus formed between the inner face of said cover portion and the rearward end of said main valve. Said cover has a port 5^a formed in its inner face concentric with the auxiliary valve head 4, into which the rearward end of said auxiliary valve head is adapted to loosely extend, which port is adapted to communicate in one direction with said chamber 5 and in the other direction through a port 5^b formed in said body with said intake port 1^a.

Said sleeve 3 preferably extends through the forward end of said housing and is provided at its outward end with a flange 3^a through which bolts 3^b may be projected to secure it to said housing. Mounted on a support of any suitable construction, as preferably upon a bracket 6 erected upon said sleeve intermediate of said flange and said housing, is a bell crank lever 7, one arm of which is adapted in operation to bear against the outward end of said auxiliary valve stem and to retract said auxiliary valve. A lever operating cord or wire 7^a is secured to the other arm of said lever for operating the same. The travel of said auxiliary valve in retractive direction may, if desired, be limited by any suitable means, as by a collar or collars 4^b mounted upon said valve stem 4^a within said sleeve 3.

In operation the direct flow of steam from the main intake port 1^a to the main exhaust port 1^b is normally cut off by said main valve 2 and said main valve seat 1^c, at which time steam flows from said port 1^a through the ports 5^b and 5^a and around the rearward end of the auxiliary valve into the chamber 5, forcing said auxiliary valve against its seat on said main valve and forcing said main valve against its seat on said housing. It will be obvious that the area of the rearward end of said main valve exposed to steam pressure in said chamber 5 is greater than the area of the forward face of the flange of said valve exposed to pressure from the front, and that the area of the rearward end of said auxiliary valve exposed to pressure is comparatively very small. When said aux-

iliary valve is retracted, the steam from chamber 5 flows rapidly through the port 2^b into the chamber 2^a in said main valve head, and out of said chamber 2^a through the part 2^c to the main exhaust port 1^b, thus relieving the pressure behind said main valve, whereupon the pressure forward of the flange of said main valve will open said valve and steam will pass directly from said port 1^a through the main valve seat to said port 1^b. A drain port 1^c is preferably formed in said housing to drain condensed steam or moisture from said housing forward of said main valve seat.

It is obvious that said structure may be modified in certain particulars within the spirit and scope of my claim.

My invention may also be used for controlling the flow of other fluid than steam.

What I claim is:—

In a valve, the combination of a housing comprising a body portion and a cover, said housing having a main valve seat formed therein, said housing having a main intake port formed therein at one side of said seat and a main exhaust port formed therein at the opposite side of said seat, a main valve head within said housing adapted to bear against said seat on the intake side thereof, said valve head being provided with a tubular valve stem extending through said seat and spaced therefrom, a stationary sleeve extending into one of the walls of said housing and engaging the free end of said stem, said main valve head having a steam chamber formed therein, said main valve head having an exhaust port formed therein leading from the steam chamber therein to said main exhaust port, the rearward end of said main valve head being spaced from the opposing inner face of said cover portion to form a steam chamber in rear of said main valve head when said valve head is closed against its seat, said main valve head having an intake port formed therein extending from the steam chamber in rear thereof to the chamber within said valve head, said housing having an intake port formed therein extending from said main intake port to said chamber in rear of said valve head, said main valve head having a valve seat formed in its rearward face concentric with the intake port through its rearward wall and concentric with the inward end of the port leading from said main intake port to said rearward steam chamber, a supplementary valve head, extending into said rearward steam chamber and adapted to be seated against the seat formed on the rearward face of said main valve head and to close the intake port leading into the chamber in said valve head, said supplementary valve head being provided with a valve stem extending through the intake port in said main valve head and spaced therefrom and extending through the forward wall of said main valve head and main valve stem and sleeve longitudinally thereof and thence outwardly of said housing, travel limiting means mounted upon said auxiliary valve stem within said sleeve forward of said main valve stem, said main valve head having an annular external flange formed thereon adapted to contact with the side walls of said housing whereby a chamber or space is formed between said side walls and said main valve head forward of said flange, the latter chamber or space being open to said main intake port, and means for retracting said auxiliary valve head.

In testimony whereof, I hereunto affix my signature, in presence of two witnesses.

WILLIAM N. SILVERNALE.

Witnesses:
JAMES T. WATSON,
OSCAR S. JOHNSON.