

1,069,604.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses:

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AUTOMATIC VALVE-ACTUATING MEANS.

1,069,604.

Specification of Letters Patent.

Patented Aug. 5, 1913.

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To all whom it may concern:

Be it known that I, IRVING COWLES, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Valve-Actuating Means; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its object to provide automatic valve-actuating means adapted for the governing of pressure pumps, vacuum pumps and the like, and consists in the features of construction and combinations of parts hereinafter fully described and claimed.

A suitable embodiment of the invention is illustrated in the accompanying drawings in which—

Figure —1— is a view partly in side elevation and partly in central vertical longitudinal section of a valve and actuating means therefor constructed in accordance with my invention. Fig. —2— is a top plan view of the same. Fig. —3— is a fragmentary detail section of the cylinder employed, showing means therein for regulating the pressure of the spring. Fig. —4— is a fragmentary detail section of the cylinder employed showing the spring disposed to adapt the device for a vacuum governor.

My invention relates particularly to that class of valves for governing the supply of fluid under pressure or vacuum or the means for supplying said fluid which are actuated by gravity and in which the gravity-actuating means for the valve is controlled by the fluid pressure delivered by a pump or the like. A valve of this character is exemplified in my companion application of even date herewith; the present construction differing from the construction described and claimed in said companion application in certain specific details.

The main object sought to be attained is to provide a fluid pressure controlled valve

in which the pounding of the valve on its seat due to sudden closure is eliminated and which, furthermore, will be more sensitive to slight variations in pressure to the end that it may more advantageously perform its function.

A further object of the invention is to provide automatic valve-actuating means for a wide range of adjustment and adaptation to various uses suited to a great variation of purposes.

My invention is most advantageously employed in connection with balanced or partially balanced valves and in the accompanying drawings I have illustrated the same in connection with a valve of this type. The invention may, however, be employed in connection with valves of other types than that shown.

The balanced or substantially balanced valve 1 is provided with a stem 2 projecting through a stuffing box 3 and which is operatively engaged by means of a slotted head 4 with a lever 5 pivotally supported between its ends upon one of two standards 6 and 7 carried by the valve casing. The said standards 6 and 7 carry a small cylinder 8 at their upper ends which is adapted to be connected by means of a pipe 9 with a source of supply of fluid under pressure or vacuum. A piston 10 is reciprocally movable in said cylinder 8 and is normally maintained at one limit of its movement by means of the spring 11. The piston rod 12 projects through a removable cylinder head 13 in which a dash pot 14 is formed which receives the small plunger or piston 15 on said piston rod 12.

Preferably, means are provided for adjusting the pressure exerted by said spring 11. Any suitable means for accomplishing this may be provided as, for example, the means shown in Fig. —3— in which the recess 25 in the cylinder head 13 is threaded to receive the sleeve 26 in which the plunger or piston 15 moves, said sleeve being equipped with an annular flange 27 upon which the spring 11 bears at one end. On said lever 5 on opposite sides of the pivotal

support for the same are disposed two carriages 16 and 17 respectively, each of which is adapted to carry weights 18. Said carriages 16 are connected together by means of a rod 19 which is adjustable relatively to each of said carriages so as to maintain the latter a given distance apart. On the standard 7 is a bracket 20 upon which a bell crank lever 21 is pivotally supported at its elbow, the short arm 22 of said lever 21 being provided with a longitudinal slot in its free end portion in which the end of the piston rod 12 engages. The other and longer arm of said bell crank lever 21 is also longitudinally slotted in its free end portion and in said slot a pin 23 on the rod 19 engages; said pin being preferably adjustable on said rod 19.

The operation of the device is as follows: The spring 11 normally maintains the piston 10 at the upper limit of its movement; the weights 18 on the respective carriages 16 and 17 being adjusted to maintain the valve normally open. Upon a movement of the piston 10 against the action of the spring 11 the bell crank lever 21 will be turned on its pivot thus imparting longitudinal movement to the rod 19 and to the carriages 16 and 17 engaged therewith. Thus the carriage 16 will be caused to move nearer the pivotal support for said lever 5 and the carriage 17 farther therefrom, such movement of said carriages causing the counter-weights on the carriage 17 to over-balance those on the carriage 16 with the result that the lever will turn on its pivot in a direction to close the valve 1. Upon relieving the pressure in the upper end of the cylinder 8 the piston 10 will move back to its normal position thus imparting reverse movement to the bell crank lever and returning the carriages 16 and 17 to their normal positions whereupon the lever 5 will be turned in a direction to again open said valve 1. By means of the dash pot 14 and plunger or piston 15 the movement of the piston 10 is cushioned or decelerated so that a shifting of the carriages 16 and 17 takes place relatively gradually. As soon as the carriages move a given distance relatively to the pivot of the lever 5 in one direction an over-balancing action takes place which will primarily slowly impart movement to said lever 5; this movement being gradually accelerated until the valve 1 is closed. The movement of the valve, however, is so gradual as to eliminate the pounding which a direct connection with a spring-and-fluid-pressure-actuated piston usually causes.

In the standard 7 is an opening 24 for a pivot pin for the lever 5 which is employed in place of the pivotal connection of said lever with the standard 6 when the device is intended to be utilized for controlling a vacuum pump or other vacuum producing

or maintaining means. When so disposed it will be noted that a movement of the piston upwardly will move the weights carried by the carriages 16 and 17 in the opposite direction from that caused by a pressure or downward stroke of said piston and will shift the weights relatively to the pivot of the lever 5 in a direction to impart movement to said lever to close the valve. When the device is adapted for use for controlling a vacuum pump, or the like, it will be obvious that the spring 11 must be disposed above said piston 10; this disposition of the said spring being shown in Fig. —4—.

I claim as my invention:

1. In a device of the kind specified, a valve casing, a cylinder supported thereon and connected at one end with a source of supply of fluid under pressure, a valve in said casing, a lever controlling the same, a weight movable on said lever, a piston in said cylinder connected with said weight for moving the same on said lever.

2. In a device of the kind specified, a valve-casing, a valve therein, a lever pivotally supported on the casing and engaged with the stem of said valve, a weight longitudinally movable on said lever, a cylinder connected with a source of fluid under pressure, and a piston therein connected with said weight for moving the same on said lever.

3. In a device of the kind specified, a valve-casing, a valve therein, a lever pivotally supported on the casing and engaged with the stem of said valve, a weight longitudinally movable on said lever, a cylinder connected with a source of fluid under pressure, a piston therein connected with said weight for moving the same on said lever, and a spring acting to oppose the movement of said piston by said fluid pressure.

4. In a device of the kind specified, a valve, a pivotally supported lever connected therewith, counter-weights disposed on opposite sides of the pivotal support for said lever, at least one of said weights movable on said lever, a cylinder connected at one end with a source of fluid under other than atmospheric pressure, a piston in said cylinder, and a member connected with said piston and with said movable weight on said lever to shift the position thereof in accordance with variations in pressure of the fluid actuating said piston, and a spring normally maintaining said piston at one limit of its movement.

5. A device of the kind specified, comprising a valve, pivotally supported lever for actuating said valve, carriages disposed on opposite sides of the pivot of said lever, weights on said carriages, a rod connecting said carriages with each other, a pivoted lever connected at one end with said rod, a cyl-

inder connected at one end with a source of
supply of fluid under pressure, a piston
therein connected with the other end of said
last-named lever, and a spring normally
5 maintaining said piston at one limit of its
movement.

In testimony whereof I have signed my

name in presence of two subscribing wit-
nesses.

IRVING COWLES.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."