R. H. NELSON.

PRESSURE OPERATED CONTROLLING VALVE FOR HOUSE WATER SUPPLY SYSTEMS.

APPLICATION FILED APR. 17, 1909.

1,022,327. Patented Apr. 2, 1912.

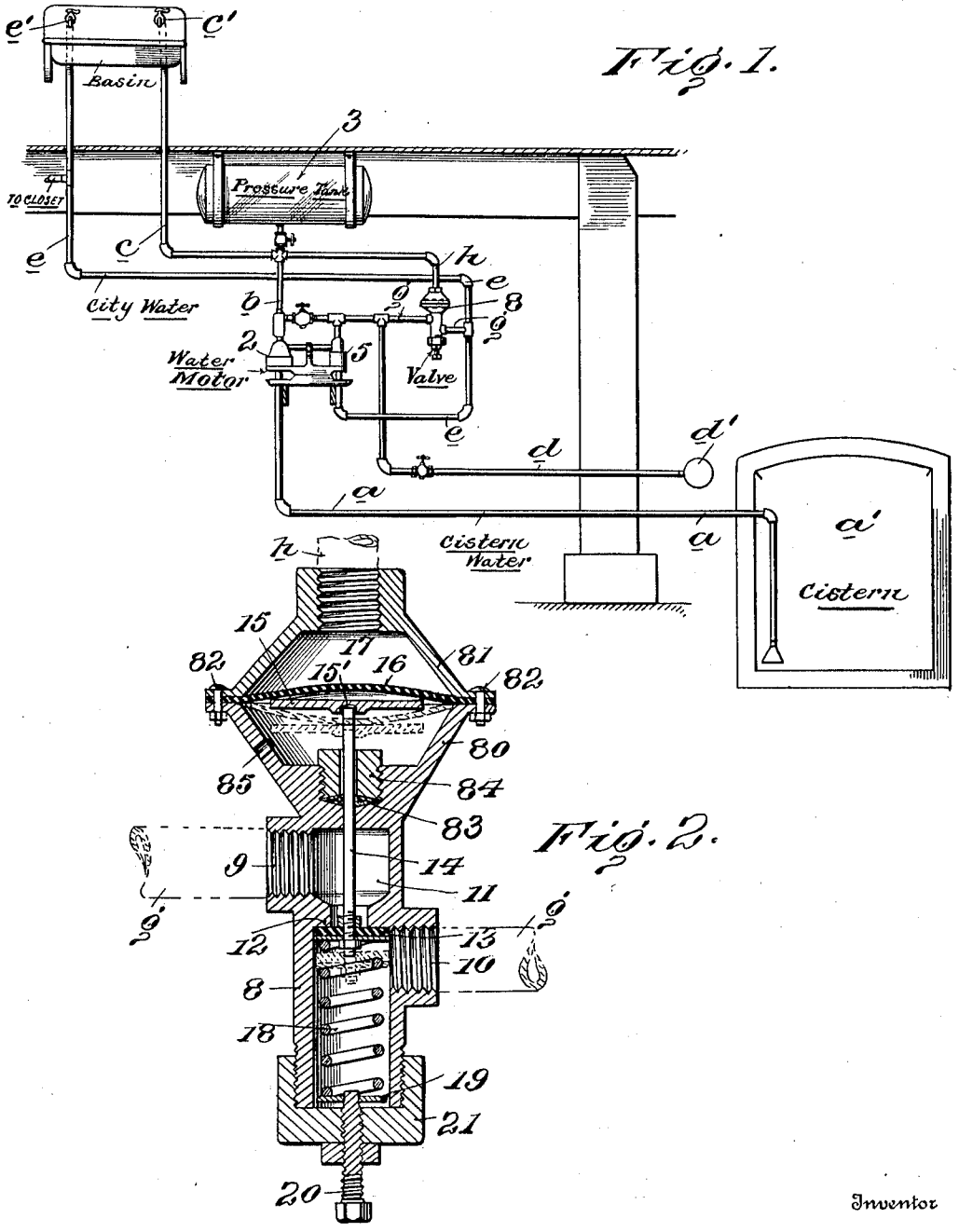

Fig. 1.

Fig. 2.

Witnesses

W. A. Williams

E. R. Ueck

Inventor

Robert H. Nelson.

By Hubert Dick

Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT H. NELSON, OF DIXON, ILLINOIS, ASSIGNOR OF ONE-HALF TO CHARLES A. ROBBINS, OF DIXON, ILLINOIS.

PRESSURE-OPERATED CONTROLLING-VALVE FOR HOUSE WATER-SUPPLY SYSTEMS.

1,022,327. Specification of Letters Patent. Patented Apr. 2, 1912.

Application filed April 17, 1909. Serial No. 490,622.

To all whom it may concern:

Be it known that I, ROBERT H. NELSON, a citizen of the United States, residing at Dixon, Lee county, Illinois, have invented certain new and useful Improvements in Pressure-Operated Controlling-Valves for House Water-Supply Systems; 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 relates to certain improvements in pressure-operated controlling valves for house water supply systems; and relates more particularly to means for automatically controlling water elevating mechanism in water supply systems for houses or wherever adapted to supply water at distant points; and the objects and nature of my invention will be readily understood by those skilled in the art in the light of the following explanation of the accompanying drawings illustrating what I consider my preferred embodiment from among other arrangements and constructions within the spirit and scope of my invention.

The invention consists in certain novel features in construction and in combinations or arrangements of parts as more fully and particularly described and set forth hereinafter.

In the accompanying drawings:—Figure 1, is a somewhat diagrammatical view illustrating my improved valve in a water supply system. Fig. 2, is a longitudinal section, on an enlarged scale, of the pressure regulating or controlling valve.

In the drawings, *a*, is the water supply pipe from a cistern *a'*, to lift pump 2, by which the water is forced through pipe *b*, to pressure tank 3, from which the water is supplied through service pipe *c*, to faucets *c'* *d*, is a water supply pipe from the pressure or city water main *d'*, to water motor 5, by which the pump 2 is driven. A pressure service pipe *e*, for the city water supplies faucet *e'*, and extends from the waste or exhaust port of the motor 5. A water pipe or shunt connection *g*, is established between pipes *d*, and *e*. In this direct or shunt water connection *g*, is included the casing of my improved automatic differential or pressure operated controlling valve. The pressure chamber of this valve is in direct open communication with the cistern water house supply pipe or system *c*, through the medium of a pipe *h*, from pipe *c*, and opening into said chamber. The valve casing has city water inlet opening 9, and outlet opening 10, in which the sections of the pipe *g*, are secured. The casing is formed with a longitudinal or vertical water passage 11, extending down from inlet port 9, to outlet port 10, and intermediate said ports, the casing is formed with an internal annular valve seat 12.

A vertically movable reciprocating valve 13, is arranged within said casing below said seat 12, and adapted to move up against said seat and tightly close the passage 11, against flow of water through the casing, consequently closing or cutting off the direct or shunt pipe connection *g*. This valve is provided with valve stem 14, rigid therewith and extending upwardly therefrom longitudinally of the casing and at its inner end fits in socket 15' in the center of the under side of enlarged horizontal plate 15, bearing loosely against the under face of flexible diaphragm 16 forming the floor or bottom wall of the pressure chamber 17, into which pipe *h*, opens and which chamber receives the cistern water from tank 3, and wherein the cistern water is under the same pressure as in the cistern water house-service pipe *c*.

Suitable means is provided to normally and yieldingly hold the valve 13, to its seat under a certain predetermined pressure. For this purpose, I employ a coiled expansive spring, 18, arranged in the lower end of the passage 11, of the valve casing and compressed between the under side of valve 13, and a head or abutment 19, on the upper end of adjusting screw 20, adjustable through and carried by cap 21, screwed on and closing the lower end of the casing.

Through the medium of screw 20, the tension of the spring on the valve can be adjusted to the desired pressure to determine the pressure of the cistern water in the tank 3, necessary to open the valve 13. The object is to maintain the water in tank 3, at the pressure necessary to properly supply water through pipe *c*, and when through the medium of pump 2, the desired quantity or pressure of water has been supplied in tank 3, to open valve 13, so that city water flowing through pipes *d* and *e*, will not cause operation of the water motor but will be

shunted around the motor by flowing through direct or cut-off pipe connection *g*.

The controlling pressure valve, shown in the specific example illustrated, comprises a depending cylindrical or tube-like casing 8, having the inlet and outlet openings 9 and 10, and forming the longitudinal internal fluid passage 11, closed at the upper end. This vertical or reduced casing 8, can be formed integral with an outwardly flared or bell-shaped flanged upper end 80, forming the lower half of the diaphragm shell of casing, the upper half of which is formed by the bell or flared flanged section 81, having a top inlet into which pipe *h*, is screwed or otherwise secured. The edge portion of the diaphragm is interposed between the edge flanges of the sections 80, 81, so that the diaphragm spans the interior of the chamber formed by said shells and forms a partition completely shutting off the pressure chamber 17, from the space below the diaphragm. The two shells are fixed together and against the diaphragm to form a water tight joint by screws 82, or other suitable means. The fluid passage 11, is separated from the space in shell section 80, by a transverse wall perforated for the passage of valve stem 14. To prevent leakage of fluid from passage 11, into the shell below the diaphragm, I have provided packing 83, around said stem in a socket formed in and opening through the top of said transverse wall. I internally screw thread this socket to receive a gland or nut 84, by which the packing 83 can be tightened around the valve stem. I also usually provide means whereby the space in the shell and below the diaphragm is open to the atmosphere, for instance by vent or perforation 85, through shell section 80. If water should leak around the stem, it will be drained from the shell through said vent, and hence the pressure below the diaphragm will remain at that of the atmosphere and will not interfere with the free and proper operation of the diaphragm.

It will thus be noted that the pressure of the cistern water in the house service pipe *c*, or in pressure supply tank 3, is exercised against diaphragm 16 in a direction to tend to force valve 13, from its seat and permit flow of city service water through cut-off or direct connection *g*.

I find that the controlling or pressure valve prevents pounding, jar or hammering of the water in the house pipes and of the pump and motor while in action, because, I presume, of the cushioning effect of the diaphragm and the spring 18, acting thereon. The controlling pressure valve can be utilized for automatically controlling the waste or overflow pipes of elevated tanks and can be employed in other connections than in the specific system described.

The operation of my valve in the system shown is fully described in my Patent No. 920,774, dated May 4, 1909, for water supply systems.

What I claim is:—

1. A water-supply-system controlling valve comprising a casing having an open enlarged end and closed at its opposite end, a cap on said enlarged end having an inlet opening, a diaphragm between said enlarged end and cap, said casing having a water passage with an inlet and an outlet and an intermediate valve seat, and a partition between said passage and said enlarged end, a valve to close said seat against the flow of water through said passage and having a stem rigid therewith and extending into said enlarged end and slidable through said partition, an enlarged plate loosely and flatly resting against said diaphragm and having a center socket receiving the end of said stem, packing means for said stem accessible above said partition, and a spring between the closed end of the casing and said valve and holding the valve to its seat and provided with exterior adjusting means.

2. A water-supply-system controlling valve comprising a casing enlarged at one end, a cap on said end, a diaphragm between said end and cap, said cap having an inlet opening above said diaphragm, said casing having a longitudinal water passage with an inlet and an outlet and a valve seat between the same, and a partition closing said passage from the space in said end below said diaphragm, a cap closing the opposite end of said casing, a reciprocatory valve to engage said seat and close said passage, a coiled spring below and holding said valve to its seat, spring adjusting means carried by and extending to the exterior of said last-mentioned cap, a valve-opening stem from said valve to said diaphragm and slidable through said partition, and a packing box in said partition having a gland accessible above said partition on the removal of said first mentioned cap and diaphragm.

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

ROBERT H. NELSON.

Witnesses:
H. A. BROOKS,
C. A. ROBBINS.