

E. P. ALLEN.
VALVE.

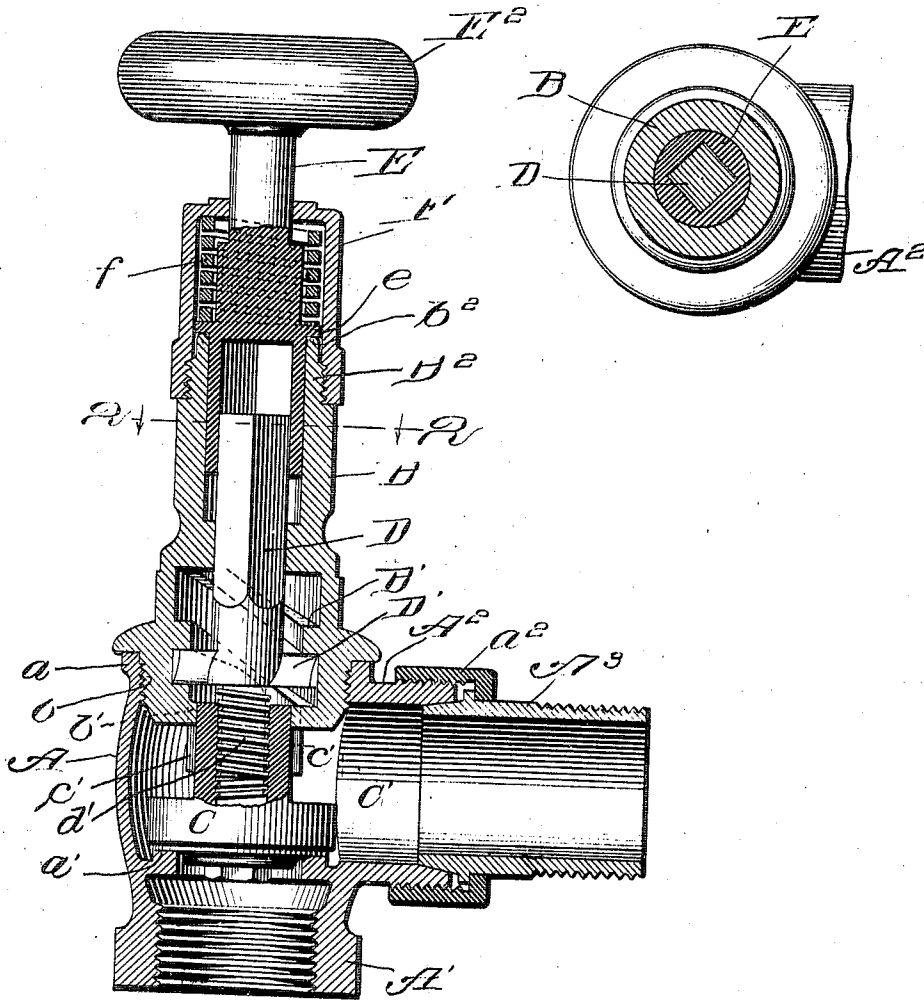
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957,592.

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Fig. 1.

Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

EVERETT P. ALLEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO NORWALL MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS.

VALVE.

957,592.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EVERETT P. ALLEN, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Valves, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates in general to valves for controlling the flow of fluid through a conduit, and more particularly to valves used in heating systems intermediate of the radiators and pipes for supplying the heating medium.

It is customary in steam and hot water heating systems to provide hand-operated valves for controlling the flow of the heating medium to the radiator. Much difficulty is experienced in preventing leakage of the heating medium from the valve casings into which the valve operating stems extend. It is usual to provide packing of some sort around the valve stems which is however objectionable owing to the fact that the materials best adapted for producing a tight joint deteriorate from contact with the steam and packings formed of other materials become loose with usage.

The primary object of my invention is to provide a valve for controlling the flow of fluid through a conduit which will require no packing in order to render the same proof against leakage.

A further object of my invention is to provide a valve for controlling the communication of a radiator with a steam heating system which will be comparatively simple in construction, inexpensive in manufacture, and efficient and durable in use.

The embodiment of my invention herein disclosed may be generally described as consisting in a valve casing, a valve seat within said casing, a valve adapted to engage and disengage the valve seat, a stem for operating the valve extending within a tubular extension of the valve casing but longitudinally immovable relatively thereto, an annular flange rigidly secured to the valve stem, a seat at the upper end of the extension of the valve casing with which said flange engages, a cap surrounding the valve

stem and secured to the upper end of the extension of the valve casing, and a spring interposed between said cap and said flange for retaining the latter in tight contact with its cooperating seat.

My invention will be more fully described hereinafter with reference to the accompanying drawing in which the same is illustrated as embodied in a convenient and practical form, and in which,—

Figure 1 is a central sectional view, and Fig. 2 a cross section on line 2—2 Fig. 1.

The same reference characters are used to designate the same parts in the two figures of the drawings.

Reference letter A designates the valve casing which is adapted to be interposed between a conduit for a heating medium and a radiator.

A' indicates an interiorly screw-threaded coupling formed integrally with the valve casing which is adapted to be united to the conduit through which the heating medium flows.

A² indicates an exteriorly screw-threaded coupling formed integrally with the valve casing and adapted to be connected to a radiator by a short section of pipe A³.

a² indicates a ring engaging the coupling A² and securing thereto the pipe section A³.

B designates a tubular extension of the valve casing provided with an exteriorly screw-threaded lower end which is received within the upper portion of the valve casing. A circular seat b², preferably convex in cross section is formed at the upper end of the tubular extension B of the valve casing. A valve stem E extends within the upper portion of the valve casing and is provided with an annular laterally projecting flange e which over-lies and engages the seat b².

F designates a cap which surrounds the valve stem E and is in screw threaded engagement with the upper end of the tubular extension B of the valve casing. A spring f is interposed between the upper end of the cap F and the flange e the tension of which retains the flange in close contact with the under-lying circular seat b².

E² indicates a disk or other form of handle rigidly fixed to the upper end of the valve stem E for rotating the latter.

C designates the valve within the casing A which is adapted to engage the seat a' to cut off the flow of the heating medium

through the valve casing and is adapted to be moved away from its seat to permit the flow of the heating medium to the radiator. Any suitable intermediate connecting mechanism may be provided for uniting the valve stem E to the valve C whereby the latter may be actuated to engage and disengage its seat.

I have illustrated in the drawing practical and convenient means for operatively connecting the valve stem and valve which may be described as follows: The valve C is provided with a hollow interiorly screw-threaded shank C' into which extends an exteriorly screw-threaded rod d'. The rod d' is provided with laterally projecting lugs D' which engage a thread B' formed within the lower end of the tubular extension B of the valve casing. The portion of the rod d' above the lugs D' is square as shown in D and is received within the squared hollow interior of the lower end of the valve stem E. In order that the valve may be moved toward and away from its seat without being rotated, its shank C' is provided with vertical ribs c' which are received within grooves b' formed within the lower end of the portion B of the casing.

The operation of my improved valve is as follows: When the parts are in the position indicated in Fig. 1, the valve is closed and in order to open the same the hand disk E² is rotated toward the left. Rotary motion is communicated through the valve stem E to the rod D which through engagement of the lugs D' thereon with the thread B' within the upper portion of the casing elevates the rod D and thereby lifts the valve C away from its seat a' through the screw-threaded engagement of the lower end of such rod with the shank of the valve. When the valve is in its open position it is moved downwardly into contact with its seat by rotating the hand disk E² in a reverse direction thereby moving downwardly the rod D and with it the valve C.

The tension of the spring F at all times retains the flange e in tight contact with the convex circular seat b² thereby preventing the leakage of any of the heating medium or whatever fluid is contained in the conduit with which the valve communicates. As the under surface of the flange e is flat while the upper surface of its cooperating seat is convex, the relative rotation between such parts always insures such a close engagement between the same as to render the valve casing fluid pressure tight without the use of packing material.

From the foregoing description it will be observed that I have invented an improved valve which will at all times prevent leakage of the fluid controlled thereby without the use of packing, washer, or gasket such as are commonly used.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination with a valve casing, of a valve seat therein, a valve cooperating with said valve seat, a two-part rotary valve stem, means operatively connecting the lower part of said stem and valve, an annular flange having a flat under surface carried by the upper part of said stem and projecting around the same, a convex seat at the upper end of said casing over which said flange extends, and means for retaining said flange in close contact with said convex seat.
2. The combination with a valve casing, of a valve seat therein, a valve cooperating with said seat, a two-part rotary valve stem extending within the valve casing, means operatively connecting the lower part of said stem with said valve, removing said valve relatively to the lower part of said valve stem, an annular flange carried by the upper part of said stem and projecting around the same, a circular seat at the upper end of said casing over which said flange extends, a cap surrounding the valve stem and secured to the upper end of the valve casing below said seat, and means inclosed within and interposed between said cap and said flange for retaining the latter in close contact with said circular seat.
3. The combination with a valve casing, of a valve seat therein, a valve cooperating with said seat, a two-part rotary valve stem extending within the valve casing, means operatively connecting the lower part of said stem with said valve, removing said valve relatively to the lower part of said valve stem, an annular flange carried by the upper part of said stem and projecting around the same, a circular seat at the upper end of said casing over which said flange extends, a cap surrounding the valve stem and secured to the upper end of the valve casing below said seat, and a spring inclosed within said cap for retaining said cap in close contact with said circular seat.
4. The combination with a valve casing, of a valve seat therein, a valve cooperating with said valve seat, a rotary valve stem, means operatively connecting said stem and valve, an annular flange having a flat under surface carried by said stem and projecting around the same, a convex seat at the upper end of said casing over which said flange extends, a cap surrounding said valve stem and secured to the upper end of said valve casing below said seat, and a spring inclosed within and interposed between said cap and said flange for retaining the latter in close contact with said convex seat.
5. The combination with a valve casing, of a valve seat therein, a valve cooperating with said seat, a rotary valve stem, means

operatively connecting said stem and valve, an annular flange having a flat under surface carried by said stem and projecting around the same, the upper end of said valve casing being reduced to form a convex circular seat over which said flange extends, a cap surrounding said valve stem and engaging screw threads on the exterior of the valve casing below said convex seat, and a spring inclosed within and interposed between said cap and flange for retaining the latter in close contact with said convex seat.

6. The combination with a valve casing, a valve in said casing, a tubular extension on said casing, said tubular extension having its upper edge formed into a seat, a valve stem projecting through said extension, a flange on said stem engaging said seat, a cap screw-threaded upon said extension, and means interposed between said

cap and said flange for forcing the flange against the seat when said cap is secured in place.

7. In combination with a valve casing, a valve in said casing, a tubular extension on said casing, said tubular extension having its upper edge rounded in the form of an annular bead so as to make a seat, a valve stem projecting through said extension, a flange on said stem engaging said seat, a cap adjustably secured upon said extension, and means interposed between said cap and said flange for forcing the flange against said seat.

In testimony whereof, I sign this specification in the presence of two witnesses.

E. P. ALLEN.

Witnesses:

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