

UNITED STATES PATENT OFFICE.

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VACUUM-VALVE FOR STEAM-HEATING SYSTEMS.

No. 800,908.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, THOMAS F. DEXTER, a citizen of the United States of America, and a resident of the city and county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Vacuum-Valves for Steam-Heating Systems, of which the following is a specification.

This invention relates to vacuum-valves for steam-heating systems; and it consists, essentially, in the combination with a suitable valve-body, the valve proper adapted to be seated therein, and a screw-threaded valve-stem, of a longitudinally-movable plug, mounted in the bonnet or cap of the valve-body, having said valve-stem adjustably secured therein, and means coacting with said plug and stem for maintaining the latter in its adjusted position, whereby the normal area of the discharge or valve opening may be contracted as desired, the device being so constructed that the valve may be readily opened to its maximum limit when required and returned to its previously adjusted or set position without a readjustment of the parts, all as will be more fully hereinafter set forth and claimed.

In the accompanying sheet of drawings, Figure 1 is a vertical central sectional view of a vacuum-valve or fitting embodying my invention, the valve proper being partly open, as in use. Fig. 2 is a horizontal sectional view taken on line *xx* of Fig. 1. Fig. 3 is a sectional view, similar to Fig. 1, showing a slightly-modified form; and Fig. 4 is a sectional view taken on line *oo* of Fig. 3.

Again referring to the drawings, A designates my improved vacuum-valve complete and as adapted for steam-heating systems. The usual body or casing *a* is provided with inlet and outlet nozzles *a'* *a''*, respectively, and a central nozzle *a¹*, into which latter is screwed the bonnet or cap *d*. The cap has a central longitudinal hole or chamber *d²*, adapted to receive the endwise-movable plug *e*, the latter when in use resting on the lower end *d³* of said chamber. The lower portion of the cap is provided with a smaller central hole through which the valve-stem *b'* freely passes. To the upper end of the cap is secured a cover *g*, Fig. 1, through which passes a rod *f*, its upper or outer end having, as drawn, a transverse handle *f'*. If desired, the cap-opening may be provided with packing *g'* for the rod *f*.

The plug *e*, Figs. 1 and 2, is provided with oppositely-disposed longitudinal feathers *e'*, arranged to work in corresponding grooves

d', formed in the inner wall of the cap. A helical spring *s* may be interposed in the space *d²* formed between the cap-cover *g* and the upper end of the plug to maintain the latter in the normal position shown.

The valve proper, *b*, is adapted when seated to close the opening *c*. The stem *b'*, integral with the valve, is screwed into the plug *e*, its upper end being slotted at *b³* to receive a screw-driver. The said rod *f* is secured or screwed into the top end of the plug and forms a lock or check for the valve-stem.

In order to adjust the valve *b* without removing the bonnet *d*, the rod *f* is first unscrewed from the plug, followed by inserting a screw-driver blade down through the cap *g* until it engages the nick *b³* of the valve-stem. After turning the latter in the normally stationary plug, so as to raise or lower the valve to produce the desired valve-opening, the blade is withdrawn, followed by inserting the rod *f* and screwing it into the plug until it snugly engages the upper end of the stem, thus practically locking the parts together.

The valve may be readily blown out or cleaned by simply grasping the handle *f'* and pulling upwardly, thereby lifting the plug and its attached members until the maximum valve-opening is attained, the spring *s* being of course correspondingly compressed. The force of the spring automatically returns the plug to its seat *d³* when the handle is released, the valve itself at the same time returning to its previously-adjusted position, wherein the net area of the valve passage or opening is materially contracted.

In lieu of the valve-supporting spring-compressed plug just described it may be screwed into the tapped cap *d*, as indicated in Fig. 3, the plug in this case having its upper end slotted at *e³* to receive a suitable screw-driver. In this construction the shortened rod *f* is screwed into the plug and abuts the upper end of the valve-stem. A removable cover *g²* closes the cap end. The operation or manner of adjusting the valve-opening is substantially the same as before described—that is to say, after removing the rod *f* by means of a screw-driver the latter is inserted in the plug until it engages the slotted end of the valve-stem. The latter is then turned in the desired direction, as the case may be, to increase or to reduce the valve-opening *c*, followed by replacing the check-rod or stop *f* and screwing it snugly against the upper end of the valve-stem. In order to blow out the valve, the

plug is unscrewed or elevated, carrying with it the parts *b*, *b'*, and *f*, until the required or maximum valve-opening is attained, after which the plug is screwed downwardly until it reengages the stationary shoulder or seat *d'*, the valve itself at the same time or instant resuming its former contracted position without readjustment.

It will be seen that the construction is such as to readily permit the valve to be opened wide when necessary and positively returned to its contracted normal position without resetting it. This is an important advantage, because any variation in the annular opening *c* around the valve would impair or affect the efficiency of the heating system. It may be explained that as a rule the discharge-outlet of each radiator in the system is provided with a vacuum-valve, each of which in turn is carefully adjusted or set according to the requirements conditioned on the volume and pressure of the return circulation and the location of the several radiators. The matter of first setting or adjusting the valves when connected to the circulating-pipes, &c., is a comparatively delicate one and may be only entrusted to an expert or skilled engineer. Therefore it is desirable that vacuum-valves of this class should be rendered difficult of access except to the person in charge.

I claim as new and desire to secure by United States Letters Patent—

1. In a vacuum-valve for steam-heating systems, a valve body or casing provided with suitable openings for the circulation of fluid and having a stationary cap member, the combination therewith of the valve proper ar-

ranged to be seated in said casing having a screw-threaded stem, an endwise-movable plug member seated in and supported by said cap having the valve-stem adjustably mounted therein, and a removable check-rod or stop mounted in said plug and in normal engagement with the upper end of the valve-stem, substantially as described.

2. In a vacuum-valve provided with suitable inlet and outlet passages and a valve-seat, the combination therewith of the stationary bonnet or cap *d*, a longitudinally-movable plug seated in said cap, a valve-carrying stem adjustably mounted in the plug and a check or stop-pin *f* adjustably mounted in said plug and in normal engagement with the valve-stem, substantially as described.

3. In a vacuum-valve, the combination with the interiorly-screw-threaded bonnet secured to the valve-casing, and a centrally-tapped plug movably fitted to the screw-threaded part of said bonnet, of the valve-carrying threaded stem *b'* passing freely through the base of the bonnet and screwed into the plug, and a check member also screwed into the latter and abutting the valve-stem, the upper end of the plug, stem and check members being slotted or adapted to receive a screw-driver blade or other analogous implement, for the purpose hereinbefore described.

Signed at Providence, Rhode Island, this 30th day of November, 1904.

THOMAS F. DEXTER.

Witnesses:

GEO. H. REMINGTON,
ELIZABETH V. PYNE.