(No Model.)

H. A. STEARNS.

GAS SERVICE VALVE.

No. 325,989. Patented Sept. 8, 1885.

Fig. 2.

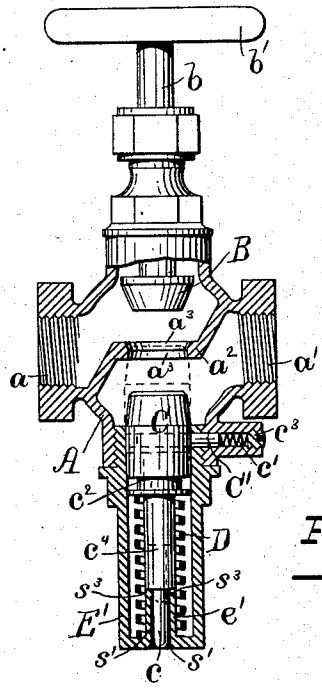


Fig. 1.

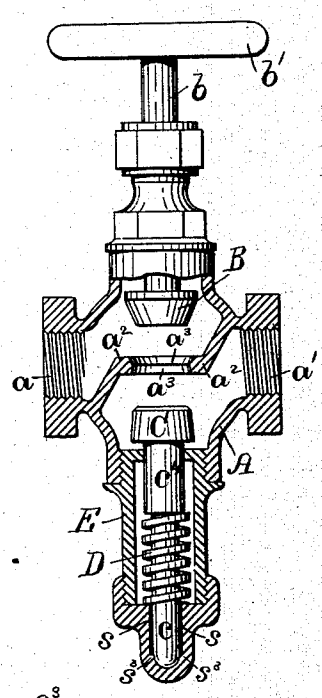
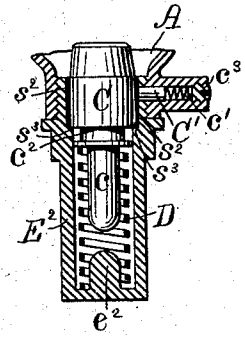


Fig. 3.



WITNESSES:

C. H. Leuther Jr.

Jno. L. Condron.

INVENTOR:

Henry A. Stearns

by Joseph A. Miller & Co

Attys

N. PETERS. Photo-Lithographer. Washington, D. C.

UNITED STATES PATENT OFFICE.

HENRY A. STEARNS, OF LINCOLN, RHODE ISLAND.

GAS-SERVICE VALVE.

SPECIFICATION forming part of Letters Patent No. 325,989, dated September 8, 1885.

Application filed September 10, 1884. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. STEARNS, of Lincoln, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Gas-Service Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings forming a part of this specification.

My invention relates to that class of valves which are designed to admit and exclude illuminating-gas from buildings, such gas being supplied from either natural or artificial sources.

In case of fire in buildings provided with gas-service pipes, from either natural or artificial sources of supply, the pipes almost inevitably become ruptured, and from this cause the gas escapes from the pipes, and, becoming ignited, causes a rapid spread of the flames, and renders the fire extremely difficult to extinguish. This condition of things can only be averted by shutting off the supply of gas from the building; but frequently it is impossible to accomplish this purpose owing to intense heat, or to the presence of débris, or to ignorance of the precise location of the main inlet-valve.

The object of my invention is to produce a valve which shall automatically shut off the supply of gas upon the breaking out of a fire, such action being due to the elevation of temperature consequent to combustion.

A further object of my invention is to render the valve capable of repeated operation and to adapt it to operate in conjunction with a hand-valve of any suitable character.

A still further object of my invention is to render the action of the valve certain, complete, and, for the time being, permanent.

To the above purposes my invention consists in certain peculiar and novel features of construction and arrangement of an automatic valve, which is held in open condition by solder, and which is closed by a spring or by gravity or by other similar means upon the fusion or yielding of the holding-solder.

My invention further consists in the combination, with a suitable hand-valve, of an automatic auxiliary valve, which is held in open condition by a soldered joint, and which is automatically closed upon the fusion of the solder.

My invention still further consists in certain peculiar and novel features of construction and arrangement by which the auxiliary valve is automatically held in closed position; furthermore, in the detachable character of the auxiliary valve, and, finally, in certain combinations of general details of construction and arrangement, all as hereinafter described and claimed.

In order that my invention may be fully understood I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a view, partly in side elevation and partly in vertical longitudinal section, of my improved valve. Fig. 2 is a similar view illustrating a modified form of the automatic-valve devices. Fig. 3 is a detached view of a still further modification of the automatic-valve devices.

In the said drawings, A designates the valve-casing, which is provided with two threaded sockets, a a', and the interior of which is divided into two portions by a partition, a^2, in the middle of which is formed an orifice, a^3.

B designates a hand-valve, which may be of any suitable or preferred form, as the automatic auxiliary valve, which will presently be described in detail, is capable of operating in conjunction with almost any form of hand-valve. As shown in the drawings, the hand-valve consists of the plug B, the stem b of which carries a hand-wheel, b', by turning which the plug is lowered into closed position or raised into open position, as desired. The plug is tapered toward its lower end, so as to fit closely into the upper side of the orifice or valve-opening a^3, which is flared out at this point to accurately correspond with the form of the plug, so that when the hand-valve is closed no gas can pass beyond it.

Any suitable or preferred material may be employed in the construction of the plug, and packing may or may not be used, as desired.

I have illustrated three forms of the automatic auxiliary valve, which I am about to describe, but before entering into a detailed description I would observe that this portion of

my invention contemplates generally any form of construction in which the plug is held in open position by solder, which is so placed as to be readily fused by heat from without, and which is thrown automatically into closed position upon the fusion or yielding of the solder. I apprehend that various arrangements differing specifically from those shown may be arranged to be operated upon the same principle as those illustrated, and such illustrations are selected as embodying most clearly the general characteristics of my invention.

C designates a plug, which is tapered toward its upper end, so as to fit closely into the lower side of the orifice or valve-opening *a*, which is flared out at this point to accurately correspond with the form of the plug, so that when the automatic auxiliary valve is closed no gas can pass beyond it. As in the case of the plug of the hand-valve, any suitable or preferred material may be employed in the construction of the plug C, and packing may or may not be used, as desired. The stem *c* of this valve is inserted into a casing, which is detachably secured to the valve-casing A, (which will be presently described in detail,) and said stem is surrounded by a coiled spring, D, which acts expansively to throw the plug C upward into the orifice of the partition a^2. Owing to the peculiar form of the plug C and the corresponding shape of the orifice a^3, when the plug C is thus thrown into the orifice it will stick therein, and consequently any tendency of the plug to fall back again out of the orifice will be counteracted.

In order to further insure the maintenence of the plug C in closed position, a latch, C′, (see Figs. 2 and 3,) may be employed. This latch is mounted in a lateral recess in the valve-casing A, and is supplied with a backing spring, *c′*, which acts expansively to throw the latch out of the recess and toward the plug. As the plug rises its depression c^2 will come opposite the inner end of the recess, whereupon the latch C′ is thrown out and enters the recess. Thus the plug is held in closed position, and this operation of the latch serves to prevent any tendency of the plug to drop out of the orifice a^3 upon the cooling and consequent contraction of the parts, or counteracts such tendency which would result from the weakening of the spring D under the action of great heat. It is obvious that the latch would not withdraw from the recess c^2, even if its spring *c′* were weakened or destroyed by the action of heat. In order to permit access to the latch and its spring the outer end of the recess in which the latch moves is closed by a removable screw-plug, c^3.

E, Fig. 1, designates the removable casing of the valve C. At its upper end this casing is threaded into a screw-socket in the under side of the valve-casing A, a tight joint being formed by an external flange upon the casing E, which flange abuts against the mouth of the socket. Upon the lower end of the casing E is screwed a cap, *e*, within which is received the lower end of the stem *c* when the valve C is in open condition. The lower end of the spring D rests upon the cap *e*, and the upper end of said spring is confined beneath the extension c^4 of the plug C. The upper end of the casing E is internally flanged, so as to properly guide the movements of the valve. In this arrangement no latch is used, the binding of the plug in the orifice a^3 being alone depended upon to retain the valve in closed condition.

In Fig. 2, E′ designates a modified form of the casing for the automatic valve. In this instance the upper end of the casing is threaded into the socket of the casing A, and is externally flanged as before, but at its lower end the casing E is formed with an upwardly-extending internal sleeve, *e′*, which is open both at top and bottom and into which the stem *c* is inserted. The spring D surrounds the extension c^4 and the sleeve *e*, and is confined between the bottom of the casing and the under side of the plug C.

In Fig. 3, E^2 designates a still further modification of the casing for the automatic valve. The upper end of this casing is, as before, externally flanged and threaded into the socket in the casing A. In this instance, however, the lower end of the automatic-valve casing is closed integrally, and on the inner surface of the bottom is formed an upwardly-extending projection, e^2. The spring D surrounds the projection e^2, and is confined between the base of the plug C and the bottom of the casing E^2.

As previously stated, the auxiliary valve is held in open condition by solder, and I will now describe the several arrangements of the solder-connection, premising this description by stating that the objects of the several forms of automatic-valve casing will become evident from the ensuing descriptive matter.

In the arrangement illustrated in Fig. 1 the lower end of the stem *c* enters the depression in the cap *e*, and is held therein by solder *s*, which surrounds the stem within the cavity or depression. In order to run the solder into this cavity it is only necessary to remove the cap *e* from the casing E, and upon replacing the cap upon the casing and holding the valve C depressed the solder will become set around the stem, as is shown in the figure. The casing E, which had been previously detached from the casing A, is now replaced upon the said casing A, and the automatic valve will be held open in readiness for action upon the occurrence of fire.

In the arrangement illustrated in Fig. 2 the stem *c* is held within the sleeve *e′* by solder at *s′*, and in order to introduce the solder into the sleeve it is only necessary to detach the casing E′ from the casing A and to hold the casing E in inverted position, with the valve C depressed. The solder *s′* is then run into the orifice at the lower end of the casing E′, and will set around the stem, as is shown in the figure. The casing E′ is then attached to the casing A.

In the arrangement illustrated in Fig. 3 the

valve C is held in depressed or open condition by solder s^2, which surrounds the lower sides of the plug within the upper part of the casing E^2. In order to introduce the solder, the casing E^2 is detached from the casing A, and while the valve is held depressed the solder is run into the upper part of the casing, where it will set around the plug, as shown in the figure. The casing E^2 is then attached to the casing A.

It will be observed that in each of the above arrangements the entrance of the solder is limited by shoulders s^3, which also prevent any improper clogging of the parts by the solder.

The general operation of the devices is as follows: Let it be supposed that the automatic and hand valves are in open condition, the former being so held by its solder. Now, upon the occurrence of fire, the heat of combustion will melt the solder, whereupon the valve C will be thrown upward by the spring D, and will forcibly enter the orifice a^3 of the partition a^2, and will thus automatically shut off the gas. If the latch be used, it will be thrown by its spring into the recess c^2 of the plug, and will prevent any possibility of the plug C dropping down upon the cooling of the parts after the fire has been extinguished. After the fire has been extinguished, it will be desirable to inspect the automatic valve for the purpose of resetting it and replacing any injured parts. This may be accomplished without entailing any emission of gas by first turning the hand-wheel b' so as to force the plug B down tightly into the orifice a^3, and thus completely shutting off the gas. The automatic-valve casing is then detached from the casing, and if the springs are found to be uninjured, the valve is simply reset in the manner above described, after which the casing is attached to the casing A. Should either of the springs be found weakened or otherwise injured, they may be readily removed and others substituted in their places.

Thus it will be seen that the automatic valve is capable of repeated operation; that it will operate certainly and effectively, and that it will remain in closed condition till removed and reset. Owing to the peculiar character of the casings the internal devices will be capable of withstanding great heat without injury. By virtue of the detachable character of the auxiliary-valve casing the fittings may be readily freed from all accumulations of tar, paraffine, or other substances deposited by the gas.

I do not wish to be understood as confining myself exclusively to the precise details of construction herein shown and described, because not only may any form of hand-valve be used, as before stated, but various modifications of the automatic-valve devices may be used without departing from the essential spirit of my invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a valve-casing containing a single valve-seat, of a hand-valve and an auxiliary automatic valve arranged to close said seat, substantially as described.

2. The combination, with a valve-casing containing a single valve-seat, of a hand-valve and an automatic auxiliary valve arranged to close said seat, the automatic valve being held in open condition by solder, and provided with a spring to throw said valve into closed condition, substantially as set forth.

3. The combination, with a casing having a single valve-seat, of a hand-valve and an automatic auxiliary valve disposed in alignment upon opposite sides of the casing and operating to close the seat, substantially as specified.

4. The combination, with a valve-casing having a single seat, of a hand-valve and an auxiliary automatic valve provided with a catch to hold said valve in closed condition, substantially as set forth.

5. The combination, with a valve-casing having a single seat, and a hand-valve, and an automatic valve for closing said seat, of a detachable casing containing the automatic valve, substantially as specified.

6. The combination, with the casing A, having the partition a^2, with its orifice or valve-opening a^3, of the hand-valve, and the automatic valve C, the stem c, the spring D, and the casing for said automatic valve, secured detachably to said casing A, as set forth.

7. The combination, with the casing A, having the partition formed with the orifice a^3, of the hand-valve, the detachable automatic-valve casing, and the plug C, having the recess c^2, the latch C′, and its spring c', and the spring D, for throwing said valve into closed condition, as set forth.

8. The combination, with the casing A, having the partition a^2, with its orifice a^3, and the detachable valve-casing, of the hand-valve, the automatic valve and its spring, and the latch with its spring and removable plug, as specified.

HENRY A. STEARNS.

Witnesses:
J. A. MILLER, Jr.,
M. F. BLIGH.