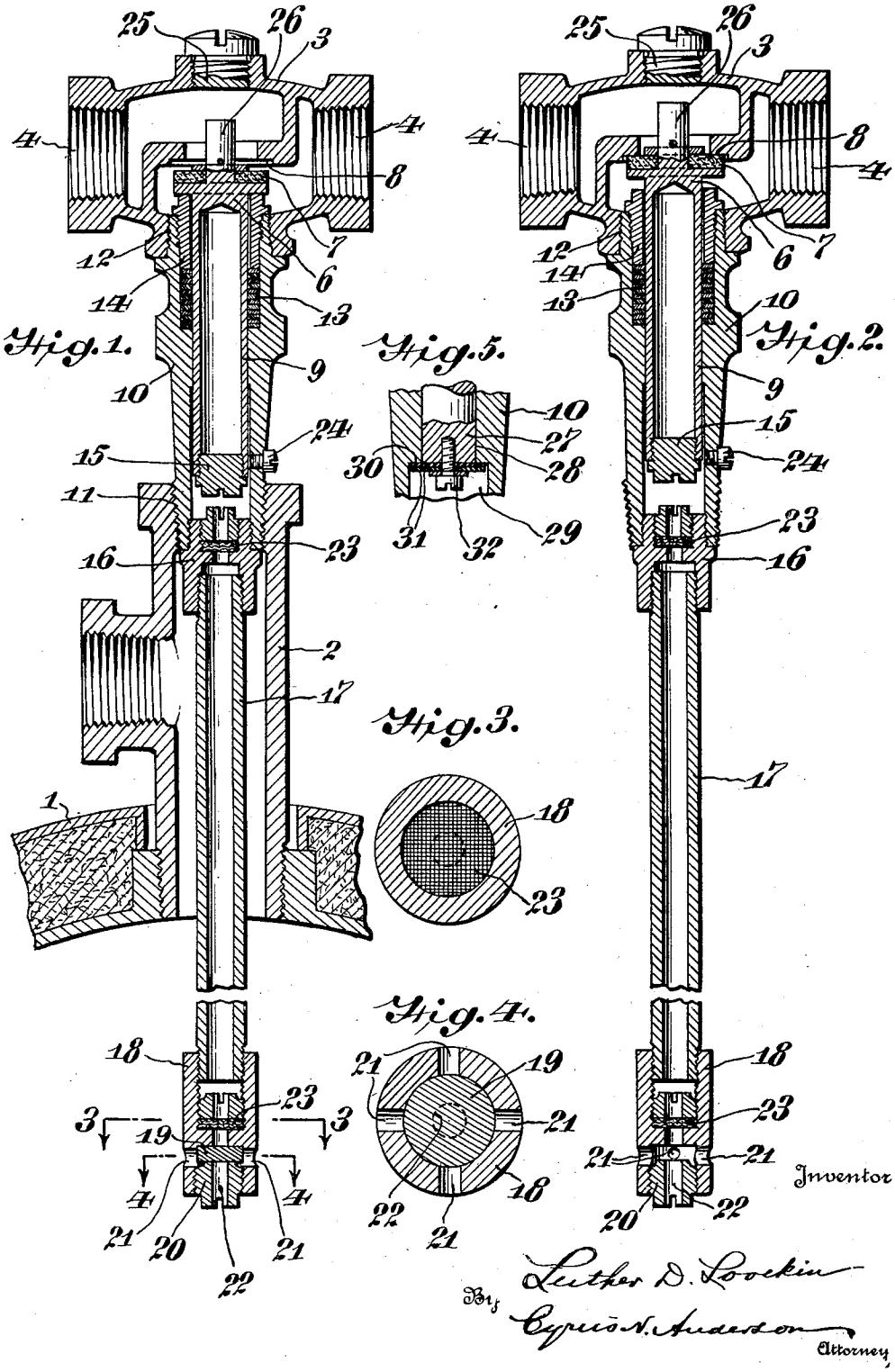
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AUTOMATIC GAS SHUT-OFF VALVE

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UNITED STATES PATENT OFFICE

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AUTOMATIC GAS-SHUT-OFF VALVE

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Various means of construction have been proposed which are adapted to automatically shut off the gas to a gas burner employed to heat the water in a hot water tank or boiler when the temperature of the water therein has reached a point too high for safety. Heretofore it has been customary to provide a special opening in the tank to enable the devices of the character specified to be attached to the hot water tank or boiler in the proper manner, but I prefer to insert the same through a fitting upon the tank or boiler and secure the same thereto.

It is an object of my invention to provide a device including means of novel construction which, when the water in the tank or boiler to which the device is attached reaches a temperature of predetermined value or height, will operate to permit the pressure of the water to move a valve into position to close the passageway through which gas is conducted to a burner and thereby extinguish the flame of said burner. For this purpose a tubular member is employed the inner end of which projects to a greater or less extent into the tank or boiler and the outer end of which is connected with the casing of the said valve and is in communication with the interior thereof. The said tubular member extends, in the construction shown, through a fitting and is connected therewith or may be inserted through and secured in any opening in the wall of the tank or boiler. The inner end of the tubular member is closed by a disc of suitable material, preferably metal, fusible at a predetermined selected temperature. The fusing of said disc admits hot water into the said member and the pressure thereof operates, in a manner to be hereinafter described, to close the valve to which I have referred.

A further object of the invention is to provide a device of the kind to which I have referred, which will be efficient in operation, durable in use, and which will require a minimum of servicing.

Other objects and advantages of the invention will be apparent from the following description, in which reference will be made to the accompanying drawing, wherein I have illustrated one embodiment thereof. But it is to be understood that the invention is susceptible of embodiment in other constructions and that various changes in the details of the construction illustrated may be made without departing from the invention as defined in the claims.

In the drawing:

Fig. 1 is a longitudinal sectional view of the device installed for use, the valve being shown in its open position;

Fig. 2 is likewise a longitudinal sectional view but shows the valve in its closed position after the device has operated;

Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 1; and

Fig. 5 is a view showing a modification of the structure of Fig. 1 in longitudinal section, certain parts being broken away.

In the drawing a tank or boiler 1, which may be of usual construction, is provided with a T-fitting 2 constituting the hot water outlet of the boiler. Such a fitting is customarily employed on hot water heaters and boilers and if not provided in any particular case may be readily substituted for any other fitting which may have been employed in its stead. The valve body or casing 3 is provided with inlet and outlet passages 4 in known manner, which are connected respectively to the gas supply and delivery pipes, not shown. The valve body or casing 3 is provided with a passageway therethrough, the said passageway being controlled by a valve designated generally at 6 having a leather or fiber head 7, which is adapted to cooperate with a suitably formed seat 8 provided in the passageway of the valve body or casing. The valve 6 is extended to form a piston 9, which is slidable in the nipple 10 which forms a part of the tubular member to which reference previously has been made. The nipple 10 is provided with exterior screw threads at its inner end which engage complementary interior screw threads formed in the outer end of the T-fitting 2, as shown at 11. Similar exterior screw threads are provided at the other end of the said nipple for

engaging the interior screw threads of an opening in the side of the valve body or casing 3, as is clearly shown at 12. A packing 13, which may consist of a plurality of layers of rubber held in position by the gland 14, serves to prevent leakage between the interior of the inner end portion of the nipple 10 and the passageway through the valve, as will be obvious. This piston-like extension 9 of the valve 6 preferably is hollow, as is shown, to make it light, the open end of the said piston being closed by a plug 15; but if desired the said extension may be solid. The inner end of the nipple 10 is provided with a nipple 16 having an opening or passageway therethrough. The outer end of said plug is spaced from the inner end of the piston-like extension 9, as shown. The inner end of the passageway through the said plug 16 is enlarged and has screw threaded engagement with the outer end of a tubular member or section 17, as shown. The latter extends longitudinally through the T-fitting 2 into the boiler and is provided at its inner end with a cap 18 which supports a fusible disc 19 inserted and retained therein by a bushing 20. The cap 18 is perforated by the holes 21, which permit access of the water in the boiler to the disc 19; and the bushing 20 which retains the fusible disc in the said cap is also provided with an opening 22 for the same purpose. The nipple 16 and the cap 18 contain strainers 23, consisting of fine wire mesh of the kind known as "gasoline gauze" secured and held therein as shown. That portion of the nipple 10, already referred to, which is adjacent to the inner end of the piston 9 is tapped to receive a screw 24 by means of which the interior of the nipple may be opened to the atmosphere. The valve casing 3 is provided with a removable plug 25, and upon its removal a suitably formed tool may be engaged with a projection 26 on the valve 6 to depress and open the same.

In Fig. 5 a modification of the invention is shown with certain parts broken away illustrating a novel form of piston packing which may be employed in lieu of that disclosed in Fig. 1. In the said figure a solid piston 27 instead of the tubular piston 9 is mounted in a cylindrical opening 28 in the nipple 10. The said opening is enlarged at its lower end to form a chamber 29 having a shoulder 30 with which the adjacent and lower end of the piston is flush when the valve 6 is in closed position. In order to prevent leakage between the piston and the cylinder wall a plurality of thin rubber discs 31 are attached to the piston 27 by means of a machine screw 32 having a shoulder which clamps the discs against the end of the piston as shown in the drawing. The pressure of any fluid which may be present in the chamber 29 will tend to force the discs 31 against the shoulder 30 and thereby form an effective seal between the said shoulder and the piston, and yet the flexibility of the said discs is such as not to substantially resist movement of the piston. When the valve to which piston 27 is connected (but which valve is not shown) is in open position, the discs 31 will be out of engagement with the shoulder 30.

Having in mind the construction of the device as above described, the operation thereof will be easily understood. The device may be attached to the fitting 2, as described, with the inner end of the tubular member 17 extending into the boiler. The disc 19 carried by the cap 18 secured to the inner end of the tubular member 17 will be subjected to the temperature of the water in the boiler, and when a certain temperature is reached therein which corresponds to the melting point of the said disc, the pressure of the water will puncture the disc and the pressure will then be transmitted upwardly through the tubular member into the hollow nipple 10 and will be exerted against the lower end of the piston 9. When sufficient pressure has accumulated in the said chamber the valve 6 will be forced upwardly, seating the head 7 against the valve seat 8, thereby interrupting the flow of gas to the gas burner (not shown). The strainers 23, through which the water passes under pressure, prevent the melted particles of the fusible disc 19 from being carried through the tube 17 into the valve casing. In practice it has been found that if these strainers are not provided the fused material of the disc will be blown into the valve body when the disc is ruptured and will tend to solder the parts together. After the device has operated the gas supply should be cut off by a valve which is ordinarily provided but which is not shown herein, and the valve casing removed from the fitting 2 in order that the device may be put in condition for further use. A new disc may be installed in the cap 18 and the valve 6 will assume its open position upon removal of the plug 24 in order to vent the entrapped air which may be present underneath the inner end of the piston 9 after the valve has been operated. The valve can be forced away from its seat by inserting a tool through the opening which is closed by the plug 25 and engaging the said tool with the valve or with the projection 26. The valve casing is then attached to the fitting, as previously described, and will be ready for use when the gas supply and delivery pipes are attached to the openings 4.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. An automatic gas shut-off valve, comprising a valve casing, a valve controlling the flow of gas through said casing, a piston connected to said valve and adapted to actuate the same, the said piston being mounted

in the said casing, a shoulder formed in the said casing, and a packing for said piston comprising one or more flexible discs attached to the said piston and adapted to engage the shoulder of the casing in which the piston reciprocates when the valve is in closed position.

2. An automatic gas shut-off device, comprising a valve casing having a passageway therethrough, a valve adapted to control the flow of gas through said passageway, a piston connected to said valve and slidably mounted in said valve casing, a shoulder surrounding the opening in said casing through which the piston reciprocates, and a packing for said piston comprising one or more flexible discs attached to one of its ends and adapted to engage the said shoulder when the valve is in closed position.

3. An automatic gas shut-off device comprising a valve casing having a passageway therethrough, a tubular means leading from a side of the said casing and projecting at its inner end into a tank or boiler, the said tubular means being mounted within a fitting connected to said tank or boiler, a valve for closing the passageway through said casing, said valve having a stem projecting from the casing into the outer end portion of the said tubular means and fitting the same closely but being movable therein, a strainer located within said tubular means and extending across the passageway therethrough, and a disc of fusible material mounted within the portion of said tubular means which is located within the tank or boiler for closing the passageway therethrough, the said fusible means being adapted to fuse at a predetermined temperature to permit entry of water into said tubular means which acts upon the inner end of said stem to effect closing of the said valve.

4. An automatic gas shut-off device, comprising a valve casing having a passageway therethrough, a valve mounted in said casing, fluid pressure-responsive means for actuating the said valve, a tubular member connected to said casing and communicating with said means, a disc of fusible material mounted in one end of the said tubular member, and a strainer mounted in said tubular member and interposed between said fusible disc and the said fluid pressure-responsive means.

5. An automatic gas shut-off device, comprising a valve casing having a passageway therethrough, a valve mounted in the said casing, fluid pressure-responsive means connected to the said valve for actuating the latter, a tubular member connected at one end to the said casing and communicating with the said fluid pressure-responsive means, a disc of fusible material mounted in the opposite end of the said tubular member, and strainers mounted in the said tubular member near the ends thereof the said strainers being interposed between the said disc and the said fluid pressure-responsive means.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 7th day of March, A. D. 1928.

LUTHER D. LOVEKIN.