Nov. 16, 1937. W. STRELOW ET AL 2,099,284

GAS VALVE CONSTRUCTION

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Fig. 1

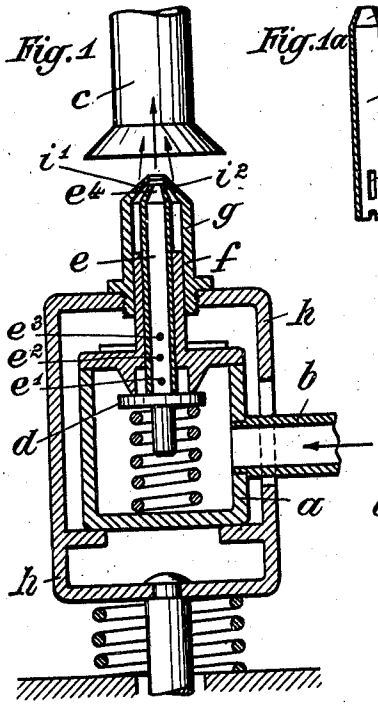


Fig. 1a

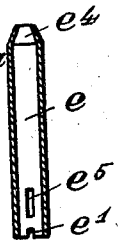


Fig. 2

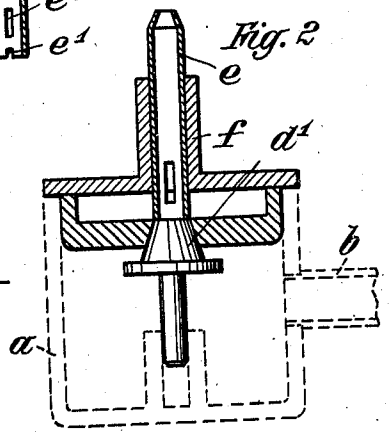
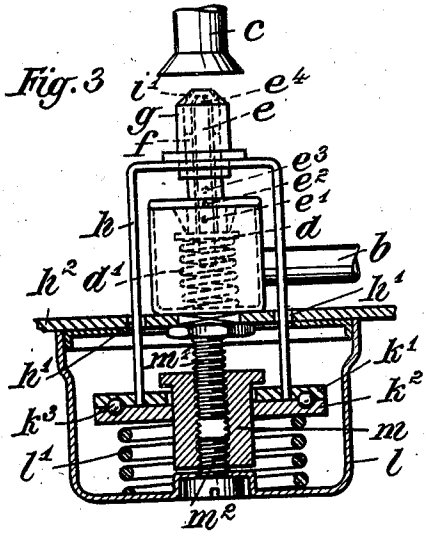


Fig. 3



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GAS VALVE CONSTRUCTION

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4 Claims. (Cl. 251—115)

The invention relates to a valve which is arranged in the supply pipe of a gas conduit in front of the mixing tube of a gas burner. In order to employ this valve for very small quantities of gas at high working pressure, e. g. for liquefied hydrocarbons, propane, butane or mixtures thereof, it is necessary to provide an absolutely reliable closure and to be able to draw off the gas even through extremely small openings, e. g. of 0.3 mm. diameter.

In the valve construction according to the present invention a simple valve which may be a conical valve or a disc valve is employed for opening or closing the outlet from an otherwise closed gas chamber connected to the supply pipe and the actual flow of gas through the outlet when the valve is opened is regulated by further control means moving with the valve. Thus the reliable closure is afforded by the valve and, independently of the dimensions of this valve, the flow of gas through the opened valve is regulated by the further control means which conveniently take the form of an apertured tubular member sliding in the outlet, the gas passing into the tubular member through the apertured portion thereof and through it to the mixing tube of the gas burner.

Constructional forms of the invention are shown by way of example in the accompanying drawing, in which:—

Fig. 1 is a diagrammatic representation of one constructional form in longitudinal section.

Fig. 1*a* shows a longitudinal section through an alternative construction of the regulating member.

Fig. 2 shows a modified form of gas chamber valve and regulating member in fragmentary section.

Fig. 3 is a diagrammatic representation of a modified constructional form in part longitudinal section.

In Figure 1 gas can pass through the supply pipe *b* into the gas chamber *a* the outlet of which is closed by means of the spring loaded disc valve *d*. The regulating member *e* is a hollow tube or needle arranged in the gas outlet from the chamber and guided in a bore in the outlet socket *f*. Above the socket *f* and the needle *e* is the cap *g* sliding externally on the socket *f* and adapted to be moved towards and away from the gas chamber by means of the strap *h* bent in U-shape, which as indicated is attached to an actuating member and is spring urged into the closed position of the valve.

The needle *e* is provided with transverse bores e', e^2, e^3. On actuating the strap *h* manually, the cap *g* bears against the needle *e* which in turn bears against the valve *d* to open the same. Thereby the gas flows from the chamber *a* through e' into the bore of the needle *e* and through the outlet aperture e^4 into the mixing tube *c*. On further motion of the strap *h* the valve opens more and the bore e^2 is exposed for the passage of a larger quantity of gas. On further movement of *h*, the bore e^3 finally enters the gas chamber so that the gas can then flow in larger quantity from the chamber *a* through all three bores or apertures e^1, e^2 and e^3 into the hollow needle *e* and from thence out through e^4. In the return motion of *h* the hollow needle and the valve *d* close in a similar way. Any quantity of gas escaping around the hollow needle *e* through the bore in the guide *f* when the valve is opened is collected in the cap *g* and is directed through the openings i^1, i^2 into the gas stream from the aperture e^4. The two bores e^2 and e^3 in the hollow needle could be united to form a single bore or slot e^5 as in Fig. 1*a* and if desired all three bores e^1, e^2, e^3 could be united as shown in Fig. 2.

In Figure 2 which shows only a gas chamber and associated valve, a conical valve *d'* is arranged in the gas chamber *a* instead of the disc valve *d* and a further valve guide is provided within the chamber *a*. The construction of Fig. 2 would in practice be amplified by the addition of an actuating yoke and associated parts as in Fig. 1.

In the constructional form of the invention shown in Fig. 3, the valve mechanism is assumed to be the same as that according to Fig. 1. It is, however, to be understood that a valve according to Fig. 1*a* or 2 could be utilized if desired. Corresponding parts are indicated by the same reference letters in Figs. 1 and 3. Thus, in Fig. 3 also, *b* is the gas inlet into the chamber *a*. The plate *d* is urged against its seating by the spring *d'*. The needle *e* which is secured to the plate *d* is drawn downwardly by means of the strap *h* at the upper end of which a cap *g* is provided. Due to the downward motion of the needle *e* the plate *d* is moved away from its seating and the gas can pass through the aperture e^1 into the mixing chamber *c*. On further downward motion, the gas can pass through the apertures e^2 and e^3 also into the mixing chamber *c*. The strap *h* is attached at its lower end to a plate k^1. The strap *h* passes through openings h^1 in a plate h^2 and thus is held against rotation. Also securely fixed to the plate h^2 is a threaded bolt

m^1. The upper part of a threaded sleeve m is in threaded engagement with the threaded bolt m'. At its lower end the sleeve m is rigidly secured to a rotatable housing l by means of a screw m^2. The lower end of a spring l^1 bears against the lower part of the housing. The upper end of the spring bears against a plate k^2 which is movable with respect to the plate k^1. In order to facilitate this movement, it is desirable to provide a ball bearing k^3. If the housing l is rotated, then the sleeve m participates in the rotary motion whereby it is subjected to a longitudinal displacement relatively to the threaded bolt m^1. Due to this longitudinal motion the strap h is depressed. The cap g bears against the needle e and depresses the same. In this way the valve plate d is moved away from its seating as previously described with reference to Fig. 1 and gas can emerge from the chamber a through the needle e.

We claim:—

1. A gas valve construction comprising a gas chamber, a pipe through which gas is introduced into said chamber, an outlet from said chamber, a valve adapted to close said outlet, an external tubular guide mounted on said chamber wall and contiguous with said outlet, a hollow tubular member slidable within said guide towards the interior of said chamber by a distance determined by the travel of said valve in its opening motion, a cap on the upper end of said hollow tubular member, adapted to be depressed to press said cap against said hollow tubular member to displace said valve from said outlet, the wall of said hollow tubular member being apertured at the end adjacent said valve to form a communicating channel of cross sectional area varying with the sliding displacement of the tubular member.

2. A gas valve construction as specified in claim 1, in which the cap is slidable on the tubular guide and terminates in a constricted aperture adjacent the outer end of the hollow tubular member.

3. A gas valve construction comprising a gas chamber, a pipe through which gas is introduced into said chamber, an outlet from said chamber, a valve adapted to close said outlet, an external tubular guide mounted on said chamber wall and contiguous with said outlet, a hollow tubular member carried by said valve and slidable within said guide, a cap on the upper end of said hollow tubular member, adapted to be depressed to press said cap against said hollow tubular member to displace said valve from said outlet, the wall of said tubular member having at least one aperture at the end adjacent said valve.

4. A gas valve construction, comprising a chamber, an outlet from said chamber, a valve adapted to close said outlet, a hollow tubular member slidable in the outlet and having at least one aperture in its wall at the end adjacent said valve, a cap slidable externally of the outlet and a yoke carrying said cap and adapted to be depressed to press said cap on to the upper end of said tubular member and shift said valve away from said outlet, said cap having at its outer end a constricted aperture of less diameter than said tubular member, and controlling means operating to displace said sleeve.

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