

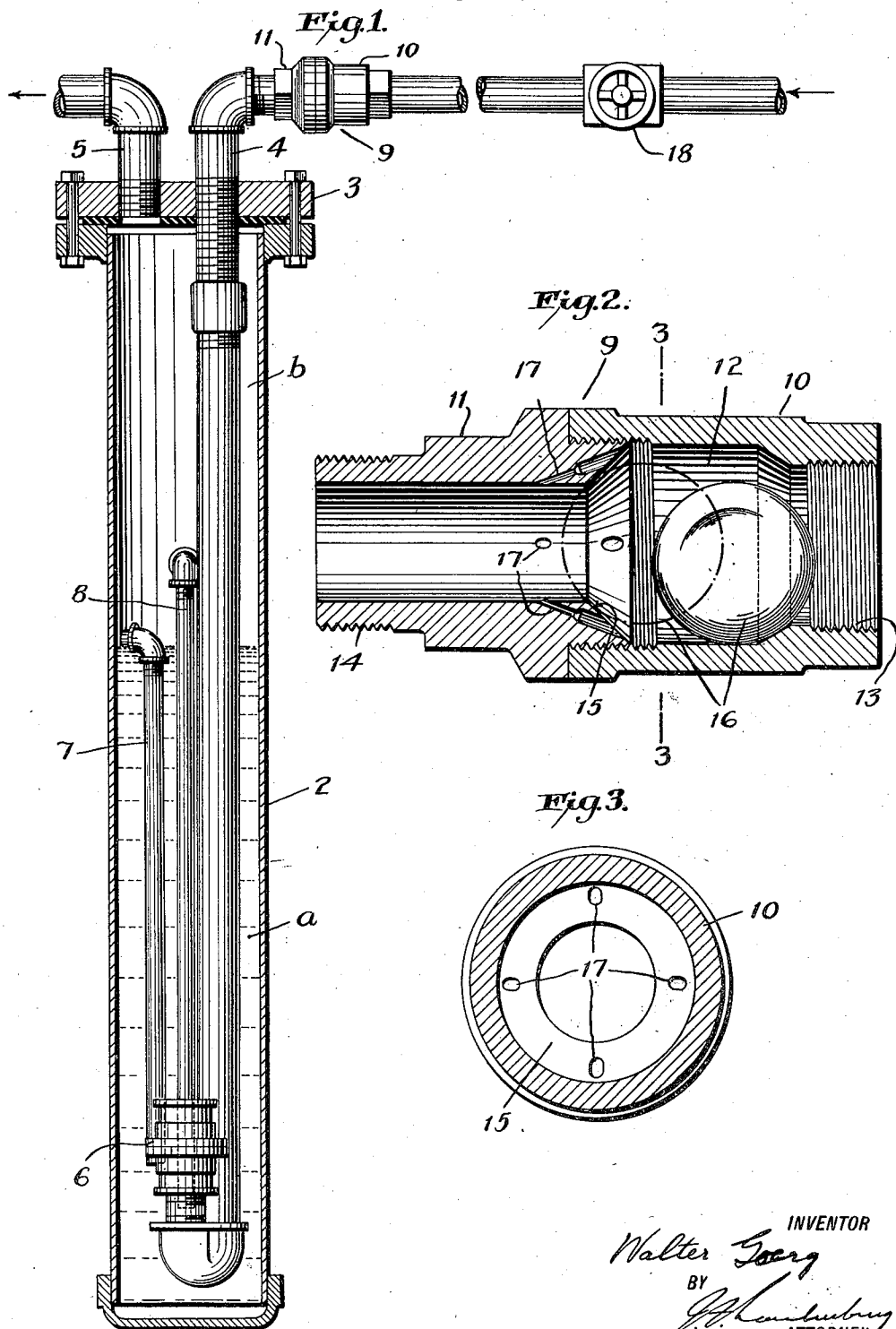
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ACETYLENE DISTRIBUTION SAFETY APPARATUS

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UNITED STATES PATENT OFFICE.

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ACETYLENE-DISTRIBUTION SAFETY APPARATUS.

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In acetylene gas lines such as those which conduct acetylene from generators to points of consumption by welding and cutting apparatus in shops and factories, it is customary to provide a water-seal at an appropriate point to extinguish the flame of any back-fire or flash-back that may be propagated rearward through the line, to keep it from reaching the generator or source. When the valve at the inlet or source side of the seal is opened, the initial impact of the gas is apt to produce a powerful hydraulic hammer effect, which may partly or even entirely discharge the water from the seal into the outlet or consumption side of the line. Baffle plates and other devices have been tried to break up the gas chamber in the seal, but without satisfactory effect.

The subject of the invention is an automatic device at the inlet side of the water-seal, which closes at a pressure differential between the inlet and outlet pressures sufficiently low to guard against purging yet sufficiently high not to close under normal flow at normal differentials, there being means for building up the pressure, that is to say the pressure beyond the closure, gradually to a point which will release the closure and permit normal flow through the main port to the water-seal. The simple and effective form of the closure particularly claimed is one in the nature of a dead rubber ball, which is driven up an incline to a seat encircling the main port by a pressure differential acting in the direction of normal flow but in excess of normal differential, the wall adjacent the seat having one or more by-pass ports leading from the ball chamber to the outlet side of the seat so calculated that the outlet pressure through the seal to the consumption part of the line will build up until the ball drops away.

In the accompanying drawings illustrating the invention:

Fig. 1 is a vertical section through the water seal, with inlet and outlet portions of the gas line in elevation, and the device in the inlet part of the line also in elevation;

Fig. 2 is a vertical longitudinal section through the device, the closure being shown down away from the seat in full lines, and against the seat in broken lines; and

Fig. 3 is a cross-section on the line 3—3 of Fig. 2.

The water seal illustrated in Fig. 1 comprises an upright water tank 2 having a bolted cover 3. Secured in openings in this cover are gas inlet and outlet conduits 4, 5, of the line. While the application of the invention is not necessarily limited, the principle involved may be understood by considering the conduit section 4 to lead from an acetylene generator and the section 5 to lead to one or more torch stations. The inlet section 4 of the line passes through the cover downward within the tank, plunging far below the surface of the water body *a* and terminating in an upturned check-valve exit 6. The outlet section 5 has its inlet at the top of the gas outlet chamber *b* constituting the upper part of the tight casing. The water-level is determined and maintained by an overflow pipe 7 and a charging pipe 8, the open lower ends of which extend down to near the bottom of the tank, so that it may be refilled from time to time without admission of air. The upper ends of these pipes open through the side of the tank, and are normally closed by suitable plugs, not necessary to illustrate.

The anti-purge device is contained in a casing 9 interposed in the inlet part of the line, between the water-seal and the source; as shown, it is close to the seal. The chamber is substantially horizontal, or upwardly inclined, and is advantageously made of two special pipe fittings 10 and 11 screwed together to form an enlarged ball chamber 12, the remote portions of the two parts being screw-threaded at 13 and 14 for connection to the adjoining portions of the line. The bore of the outlet section 11 constitutes a main port for conducting the normal flow of gas to the water-seal, and at the entrance end of this port, in the said section, a conical seat 15 is formed, providing an incline up which a closure 16 must be driven to seat against the seat. The closure is preferably a dead rubber ball, of which the rubber is dead rather than springy.

Fine or restricted by-pass ports 17, one, two or more in number depending upon the capacity of the seal, are drilled diagonally through the wall of the section 11, the inlets of the by-pass ports being outside the ring of actual seating of the ball, and their outlets opening into the main port beyond the seat. When the inlet valve 18 is first opened, the solid rubber ball is immediately forced up the incline and closes the main port. This

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saves the water in the seal from being expelled but would cut off the gas entirely from the seal and the outlet part of the line but for the ports 17, which are properly calculated, and permit gas to pass gradually and harmlessly into and through the seal and its outlet gas chamber into the outlet part of the line, until the pressure in this part is built up to a comparatively low differential, whereupon the ball drops away and stays down throughout normal flow.

The device also has other functions and advantages. If for any reason, during operation, the rate of flow or the pressure differential should become too high, as in case of a break in the outlet part of the line, the closure will be again seated, cutting off all but a slight flow. If it should occur that initially the torch operators were standing by their stations with their apparatus valves

open, waiting for pressure to build up in the acetylene mains, there would be a constant drain on the outlet side of the water-seal. Under these conditions, if the drain is not excessive, the device will permit free flow, but should the drain be above a certain rate the differential will be such as to seat the ball, which will then continue to close the main port until the rate of drain is decreased by shutting part or all of the apparatus valves.

What I claim as new is:

An acetylene gas distribution main having in combination, an interposed safety water seal, a safety gas regulating device, said safety device having a chamber and ball valve, and said chamber having a restricted gas passage around said ball valve.

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