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W. H. FREYGANG

FIRE EXTINGUISHING APPARATUS

Filed July 10, 1925

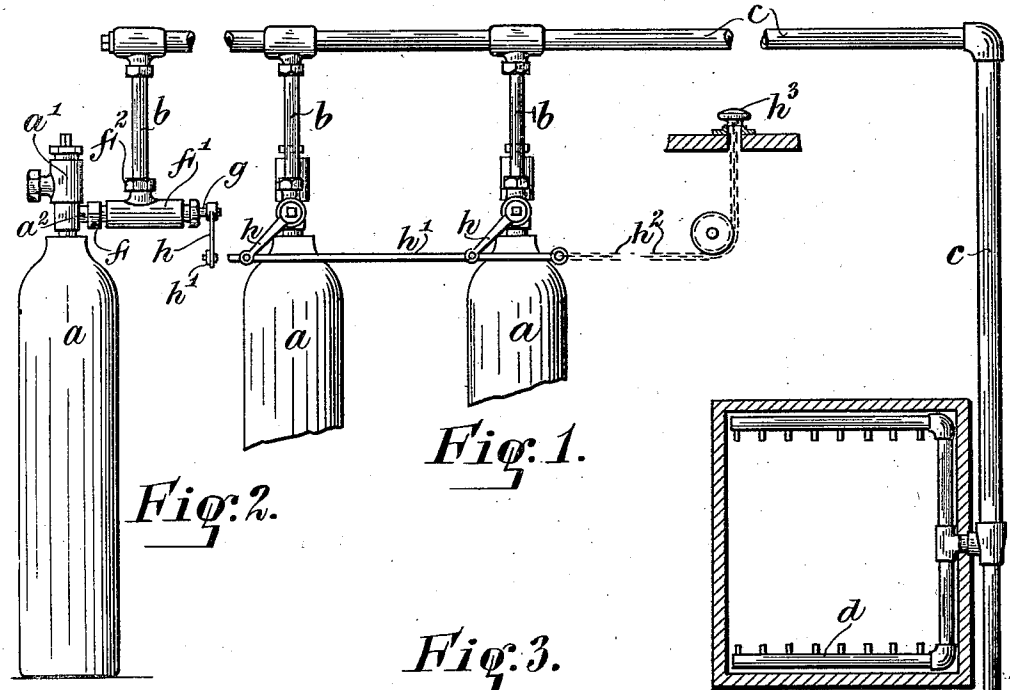


Fig. 1.

Fig. 2.

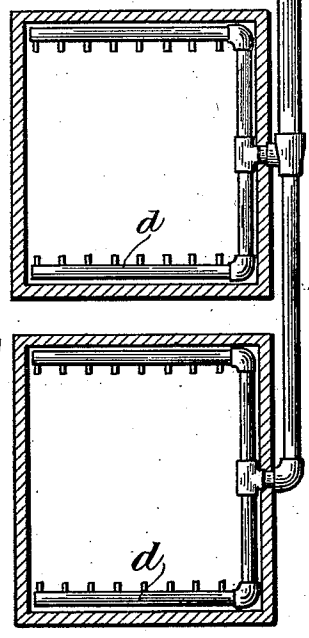
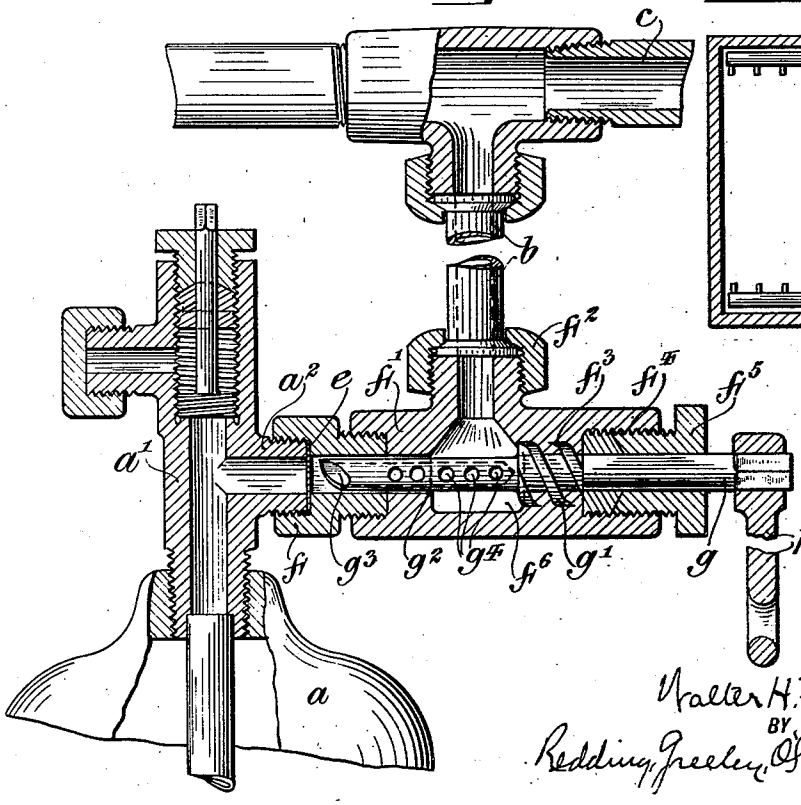


Fig. 3.



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FIRE-EXTINGUISHING APPARATUS.

Application filed July 10, 1925. Serial No. 42,710.

This invention relates to fire extinguishing apparatus of the general character of that shown in Letters Patent of the United States No. 1,335,394, dated March 30, 1920, in which a fire extinguishing gas, or liquid or solid particles thereof, or a mixture of gas, liquid and solid, is discharged upon the fire to be extinguished. The fire extinguishing agent commonly and preferably used for the purpose is for example carbonic acid which is supplied from containers in which it is stored in liquid form under great pressure and from which it is conducted through suitable pipes to the place of use. Government regulations require every such container to be provided at its outlet with a check or stop, usually a relatively thin disc of metal, which will be ruptured under excessive pressure, the purpose being to release the contents when, from any cause, the pressure in the container exceeds a given pressure, measured by the resistance of the disc. It is desirable, of course, that the fire extinguishing agent be discharged upon the fire immediately and in ample volume upon the discovery of the fire and delay incident to the opening of a valve is undesirable. It is therefore the object of the present invention to provide means whereby such disc can be ruptured in such manner as to permit the instant and free flow of the fire extinguishing medium and preferably from the control station, such means being also preferably capable of effective operation at one time for a plurality of containers, such as are commonly connected to the pipe system. The invention will be more fully explained hereinafter with reference to the accompanying drawing in which it is illustrated and in which—

Figure 1 is a view, partly broken away and partly in section, showing a plurality of containers connected to a delivery system.

Figure 2 is a view in elevation, from a point of view at right angles to that of Figure 1, showing a single container with the disc rupturing device applied.

Figure 3 is a detail view in section and on a larger scale showing more particularly the construction of the disc rupturing device which is indicated in Figures 1 and 2.

In fire extinguishing apparatus of the general character referred to, several containers a, charged with a fire extinguishing agent, which may or may not be partially liquefied and which is under pressure, are connected through branch pipes b with a pipe system c by which the agent is conducted to the delivery nozzles, indicated at d, from which it is discharged upon the fire. Such an arrangement of apparatus is well known and requires no further description herein.

The frangible disc or stop, referred to above, is generally applied to an outlet of the coupling member a' and is protected by a cap which is perforated to permit the escape of the agent when the stop is ruptured. In the present case it is applied, for example, as indicated at e, to a threaded nipple a^2 of the coupling member a' and is held to its seat by a coupling f to which is secured a T-coupling f' which carries the disc breaking device and is conencted, as by a coupling f^2, with the branch delivery pipe b. The T-coupling f' is suitably chambered, as at f^6 for a purpose to be described and is threaded as at f^3, with a quick thread and is also threaded, as at f^4 to receive a stuffing box gland f^5. A spindle g, threaded as at g' for co-action with the quick thread f^3, carries at its inner end a thin tubular cutter g^2, which is suitably shaped, as at g^3, to cut out the central portion of the stop e when pressed against it and is also formed with ports g^4, some of which are at all times in communication with the chamber f^6 formed about the cutter. The cut out portion of the stop is driven by the fire extinguishing agent into the tubular cutter beyond the port, thereby permitting the instantaneous and free flow of the agent through the unrestricted bore of the tubular cutter from the container a to the branch pipe b when the stop e has been ruptured. It will be observed that the wall of the tubular cutter is relatively thin and that the cutter is of a size to cause the stop e to be cut out practically to the full diameter of the chambered coupling and the free flow of gas is therefore unimpeded. At the other end of the spindle g connection is made through which the spindle can be rotated from the control station. As shown, the spindle has secured thereto an arm h which is connected, as by a link h' and chain h^2, with an actuator h^3 located in convenient position in the control station. As shown, the stop rupturing devices of the several containers a connected to the pipe system are operated simultaneously through a con-

nection of all of the arms h to the operating member h^3. Thereby, upon discovery of fire, all of the safety stops or discs e can be ruptured simultaneously and the fire extinguishing agent from all of the containers be admitted to the pipe system and discharged immediately upon the fire.

It will be observed that some of the ports g^4 in the cutter g^2 are at all times in communication with the chamber f^6 which is formed in the coupling f' about the cutter and with which the pipe b is in free communication. The cutter therefore does not act as a valve to prevent or permit the flow of the gas. On the contrary, as soon as the disc e is cut out by the cutter, the cut-out portion is exposed on the one side to the full pressure of the gas and on the other side is exposed to no pressure above atmospheric. Consequently the cut-out portion of the disc is immediately blown back through the cutter beyond the ports g^4 within the chamber f^6 and thereby immediate and full flow of the gas to the pipe b is permitted. It is essential in the extinguishment of fires that the extinguishing gas be delivered practically instantaneously, that is, within a very few seconds, and this can be accomplished only when the delivery passage is continuously and permanently in communication with the interior of the hollow tubular cutter and when the severed portion of the disc e is completely severed and blown through the cutter beyond the point at which it might impede the flow of gas.

It will appear to one skilled in the art that if the pipe system is closed at the discharge end pressure may be established in the pipe system to counter-balance the pressure in the container whereby the disc may be made of thinner material than a disc designed to withstand the full pressure of the container, and upon the relief of the pressure in the pipe system the disc may be ruptured by the now excessive pressure in the container. Such counter-balancing pressure may be mechanical as well as fluid. It is desirable, of course, that the fire extinguishing medium be discharged upon the fire immediately upon the discovery of the fire and delay incident to the rupturing of the stop disc by pressure as just described, or by the opening of a seated valve, as has been the practice, is believed to render such devices less desirable than the other embodiment illustrated and described herein.

It will be understood that various changes in details of construction can be made to suit different conditions of use and that, except as pointed out in the claim, the invention is not limited to the particular construction shown and described herein.

I claim as my invention:

In an apparatus for extinguishing fire by a fire extinguishing agent under pressure and comprising a container and a delivery passage, the combination of a chambered coupling member interposed between the container and the delivery passage and in communication with said passage and container, a frangible disc interposed between the container and said coupling member, a spindle carried by the coupling member and having a tubular cutter within the coupling with a port continuously and permanently in communication with the chamber thereof and the delivery passage and movable through actuation of the spindle to cut out the central portion of the frangible disc and permit it to be driven, by the pressure of the agent in the container, within the cutter beyond the port to establish free and unrestricted communication from the container to the delivery passage through the bore of said tubular end and port, and means to actuate the spindle.

This specification signed this 3rd day of July, A. D. 1925.

WALTER H. FREYGANG.