May 9, 1939. A. V. SAMMIS 2,158,015

METHOD OF AND APPARATUS FOR PRODUCING FOAM FOR FIRE EXTINCTION

Filed April 22, 1937

Fig. 1.

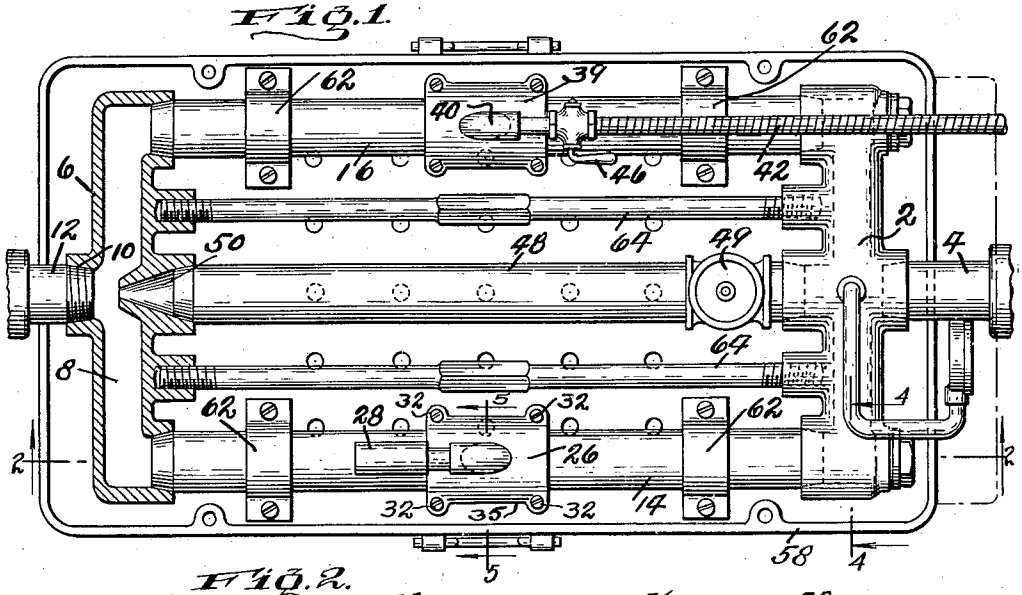


Fig. 2.

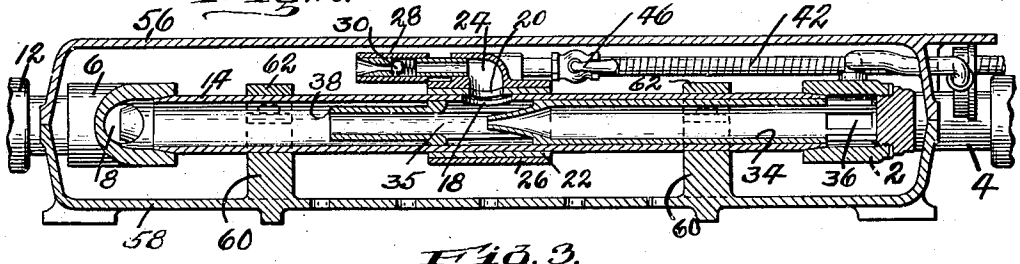


Fig. 3.

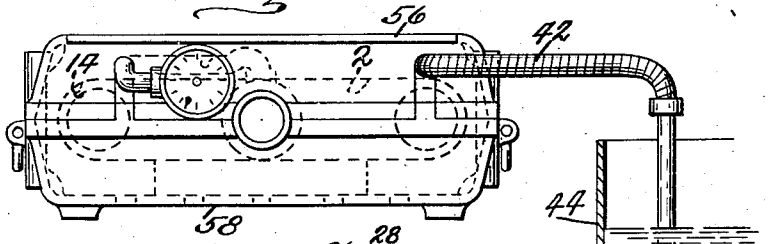


Fig. 4.

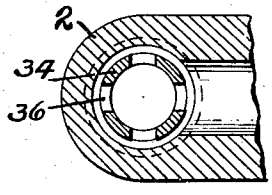
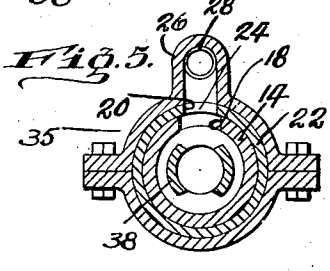


Fig. 5.



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METHOD OF AND APPARATUS FOR PRODUCING FOAM FOR FIRE EXTINCTION

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Application April 22, 1937, Serial No. 138,285

2 Claims. (Cl. 261—76)

This invention is directed to an improved method and apparatus for producing foam for fire extinction and fundamentally involves the automatic mixing of air, water and a foam-forming agent in proper proportions without the use, however, of any moving parts, and without any attention on the part of an operator other than the mere opening of a water supply valve at the intake side of the machine, an outlet valve at the discharge side of the machine and the opening of a valve in the line leading to the supply of foam-forming agent.

A further object of my invention is the provision of a method and apparatus of the character above indicated whereby water and air are passed through one line, and water and a foaming agent through another line, the water, air and foaming agent merging in a mixing chamber in which the foam is formed and from which it is discharged upon the fire.

The equipment is small and compact in design, automatic in operation and adapted for stationary as well as portable installation. It has a further advantage over prior constructions, in that in use the equipment may be shut off at the hose nozzle or outlet valve, whereas in prior devices it is necessary to shut off between the device and the water supply source.

Fig. 1 is a plan view in part section of an embodiment of my invention;

Fig. 2 is a section taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is an end view; and

Figs. 4 and 5 are sectional views taken substantially on the lines 4—4 and 5—5, respectively, of Fig. 1.

Referring to the drawing in detail: 2 designates a header which extends transversely of the unit, this header being coupled midway of its length to a pipe or hose 4 leading to a suitable valve-controlled source of water supply.

At the other end of the unit is a header 6 providing a mixing chamber 8. The header 6 is coupled, as shown at 10, to a discharge hose or pipe 12, which, as will be understood, may be equipped with a discharge or outlet valve.

Extending lengthwise of the unit and coupled to and communicating with one end of each of the headers 2 and 6 is a pipe 14. A similar pipe 16 connects the other end of each header to each other.

The pipe 14 for purposes of description will hereinafter be referred to as an air line, while the pipe 16 for purposes of clarity of description will be referred to as a foaming agent line.

The wall of the air line 14, as will be seen from Figs. 2 and 5, is provided with an opening or port 18 communicating with a port 20 in a sleeve 22 which surrounds the pipe. The two ports 18 and 20 communicate with air intake opening 24 in a sleeve 26 which surrounds the pipe 14 and sleeve 22. The intake opening 24 is provided with an air intake nozzle 28 equipped with check valve 30. This valve unseats toward the intake 24. The sleeves 22 and 26 are preferably split longitudinally and the two halves bolted together about the pipe 14 by the bolts 32. The sleeves may be of one-piece construction if desired.

Fitting within the pipe 14 is a tube 34, provided at its rear end with openings 36 for the flow of water thereinto out of the header 2, its forward end being contracted to form a nozzle or jet terminating approximately at the air intake ports 18 and 20.

Within the air line 14, beyond the nozzle of the tube 34, is a preferably straight tube 38 of materially reduced diameter with respect to the internal diameter of the pipe 14. This construction provides a jet pump which I designate 35.

It will be evident that with water from the header 2 flowing through the jet pump 35 a vacuum created suction action will result at the jet pump to effect unseating of the check valve 30 to draw air into the pump to mix with the water passing therethrough, the air and water flowing into the mixing chamber 8. The mixture of air and water as it enters the mixing chamber is deflected by the walls of the chamber so as to agitate the mixture.

The foaming agent pipe 16 internally is constructed substantially the same as the air line 14 to provide a jet pump 39. The intake connection 40 which corresponds to the air intake nozzle 28 of the jet pump 35 is coupled to a line 42 leading to a supply of foaming material in a tank 44. This line 42 is equipped with a pet cock 46 which may be closed when a plain water stream is desired or when the equipment is not in use.

It will be evident that as water flows from the header 2 through the pipe 16 a vacuum created suction action will result due to the jet pump 39 to draw the foaming agent from the tank 44, the foaming agent being carried along with the water to the mixing chamber 8. As this mixture enters the mixing chamber it will be deflected or baffled by the walls of the chamber to give the mixture a swirling motion, this swirling body merging with the stream of water and air enter-

ing the chamber 8 through the line 16, air being drawn into the equipment at the jet pump 35 by the action of the jet pump, to cause a thorough commingling and mixing of the air, water and foaming agent to produce the desired fire extinguishing foam.

Extending centrally of the unit is a water line 48 controlled by a valve 49. One end of this line is in communication with the header 2, while the other end communicates with the header 6 and the mixing chamber 8 through a nozzle orifice 50 which is directly abrest of the end of the outlet pipe or hose 12. This arrangement provides a jet pump construction also, as will be appreciated, resulting in a vacuum created suction action at the intake end of the outlet pipe or hose 12. This not only eliminates any back pressure in the lines 14 and 16 but promotes thorough mixing of the air, water and foaming agent at the area abreast of the nozzle 50 where the streams from the lines 14 and 16 meet each other.

The unit is enclosed in a housing comprising an upper section 56 and a lower section 58. The lower housing section 58 is provided with cradles 60 for supporting the pipes 14 and 16. Straps 62 hold the unit in place on the cradles.

For convenience in assembling, the ends of the pipes 14, 16 and 48 are tapered to fit tapered openings in the headers 2 and 6 and the two headers are drawn together so as to hold the pipes 14, 16 and 48 liquid-tight in the headers preferably by tie rods 64. The pipes 14, 16 and 48 may be threaded into the headers, if desired, or otherwise attached thereto.

It will be seen from all of the foregoing that with the pet-cock 46, the valve in the outlet pipe or hose 12, and the water supply valve and valve 49 open, water flowing through the lines 14 and 16 will, through the jet pump action of the jet pumps 35 and 39, draw air into the unit at the air nozzle 28 and foaming agent into the unit at the nozzle 40. The streams of water and air and water and foaming agent will flow to the mixing chamber 8 where they are merged and mixed. It will be appreciated also that the rush of water through nozzle 50 and chamber 8 and into the pipe 12 will produce the jet pump action and result in a negative pressure in the mixing chamber to insure a thorough commingling and mixing of the foaming agent with the air and water to produce the necessary foaming action at the inner end of the pipe or hose 12. The foaming agent may be any of the well known saporifying agents.

It will be appreciated also that the unit may be shut off at the line 12, that is, at the nozzle of the hose, if desired, and that no back surge will be created, the escape of the foam or water from the unit being effectively prevented by the check valves in the air and foaming agent intakes.

It will be appreciated also that the equipment may be operated without the line 48 if desired, by simply closing the valve 49; and that if a stream of water is desired the supply of foaming agent can be shut off merely by closing the pet-cock 46.

It is to be understood that changes may be made in the details of construction and arrangement of parts hereinabove described without departing from the spirit and scope of my invention.

What I claim is:

1. The method of producing a fire extinguishing foam which method comprises introducing a foaming agent into a flowing stream of water by the vacuum-created suction action of said stream, simultaneously introducing air into a separate stream of water by the vacuum-created suction action of said second stream, and then causing said streams to impinge against each other to effect mixing of the air, water and foaming agent and simultaneously forcibly injecting a third stream of water into and through the mixture to augment the mixing action and produce a driving force on the resultant foam.

2. Apparatus for producing foam for fire extinction comprising in combination, a header, a mixing chamber, a pair of tubes connecting said header and chamber, a jet pump in each of said tubes to produce a vacuum therein to draw air into one tube and a foaming agent into the other, and a third tube connecting said header and chamber and comprising a jet pump for producing a negative pressure in the mixing chamber.

ALBERT V. SAMMIS.