United States Patent

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[31] **150450**

[54] **PROCESS AND DEVICE FOR PRODUCING EXTINGUISHING FOAM**
8 Claims, 3 Drawing Figs.

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[51] **Int. Cl.** **A62c 31/12**
[50] **Field of Search** 169/1, 15; 239/1, 8, 398, 418, 428.5, 548, 549, 550, 554, 565

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ABSTRACT: The present invention is concerned with a method of producing a jet of extinguishing foam containing air, comprising producing a first jet of foam exhibiting more expansion above a more dense and more liquid second jet, the second jet forming a carrier vehicle for the first jet.

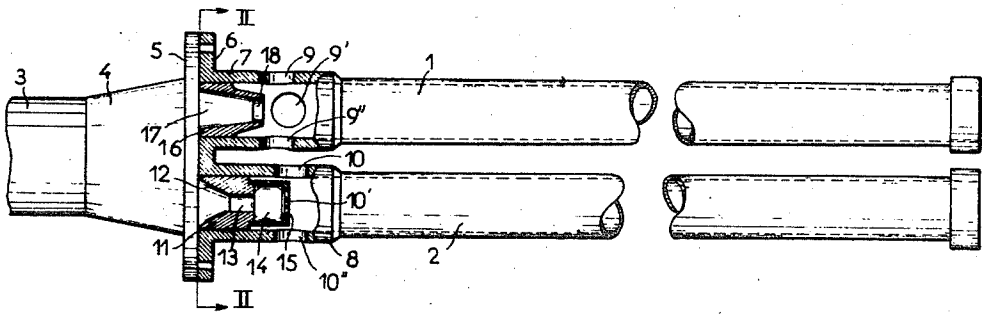


FIG.1

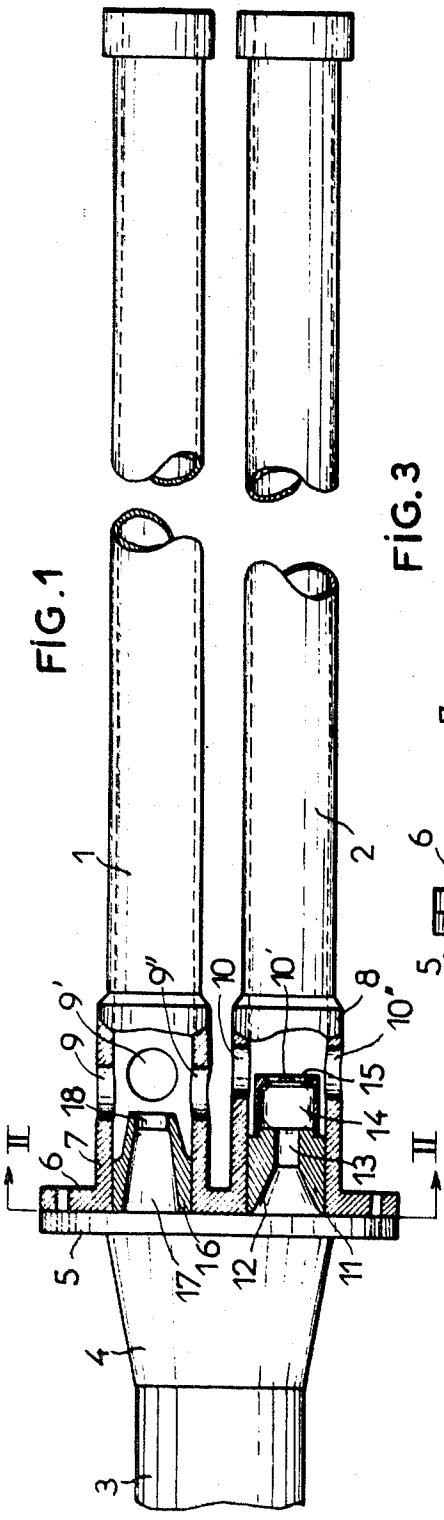


FIG.3

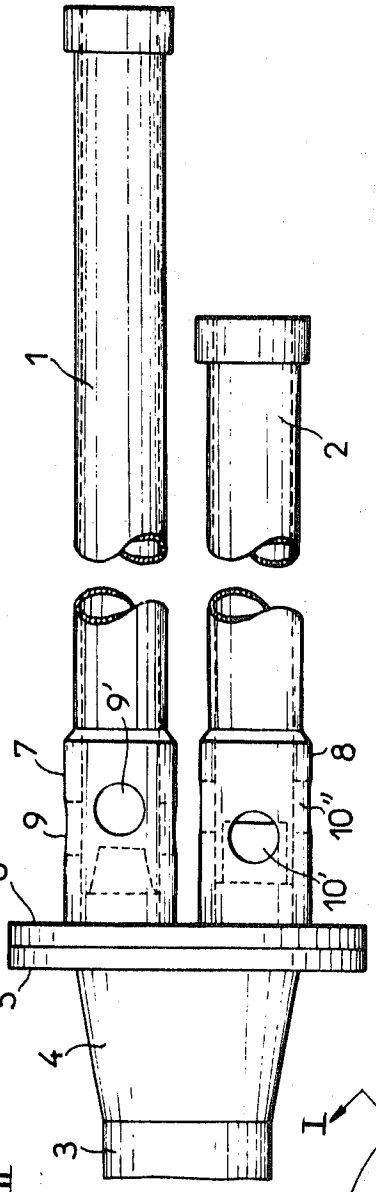
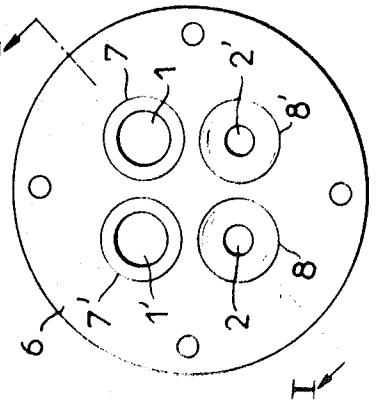


FIG.2



PROCESS AND DEVICE FOR PRODUCING EXTINGUISHING FOAM

The present invention concerns a process and device for producing a long-range jet of extinguishing foam, more particularly for extinguishing hydrocarbon fires. It is indeed known that the construction of large-capacity hydrocarbon tanks more than 20 meters high and of proportionately large diameter makes it necessary to use extinguishing devices producing long-range jets of foam should fire occur. It is likewise known on the one hand that a jet of extinguishing foam produced by emulsion of a foaming liquid with air is more stable the more vigorously it has been stirred, since such a foam decomposes more slowly upon contact with the flaming liquid which it covers; on the other hand, it will easily be understood that the more vigorously the extinguishing foam has been stirred the greater pressure drop in the foam generator, so that it is correspondingly more difficult to obtain a long-range jet with such a foam. On the contrary, a less-well-formed foam containing a relatively small proportion of air for a given proportion of liquid enables longer range jets to be obtained, but it is less stable, the emulsion of which it is formed breaking up more rapidly upon contact with the flaming liquid.

The object of the present invention is to obtain a long-range jet of foam having good extinguishing properties, and according to the invention there is provided a method of producing a jet of extinguishing from containing air, comprising producing a first jet of foam exhibiting more expansion above a more dense and more liquid second jet, the second jet forming a carrier vehicle for the first jet.

The two superimposed jets are not necessarily in direct contact with one another: the lower and more liquid jet may propel the upper and less dense jet indirectly by way of the layer of air which separates them, and which is itself propelled by the lower jet and propels the upper jet.

According to the invention there is also provided apparatus for carrying out the method according to the invention, the apparatus comprising at least a first foam tube operable to produce a first jet of a first degree of expansion and a second tube operable to produce a jet of a lower degree of expansion the jets being operable with the first tube above the second tube.

Two embodiments of apparatus according to the invention are described hereinafter and illustrated in the appended drawing by way of examples.

FIG. 1 is a view in longitudinal section of an appliance according to a first form of embodiment;

FIG. 2 is a transverse section along II—II in FIG. 1, and

FIG. 3 is a view in elevation of a second form of embodiment of the appliance.

As illustrated in FIGS. 1 and 2, an embodiment of apparatus comprises two pairs of foam tubes consisting of two juxtaposed upper tubes 1, 1′ and two juxtaposed lower tubes 2, 2′ disposed plumb with the first two respectively. These four tubes are fed with foaming liquid by a pipe 3 terminating in a divergent portion 4 equipped with a collar 5 to which four air-aspirators 7, 7′, 8, 8′ are bolted with the aid of the collar 6, the tubes 1, 1′, 2, 2′ being linked to the said aspirators. These air-aspirators consist of cylindrical casings in the walls of which there are lateral air-aspirator orifices such as 9, 9′, 9″, 10, 10′, 10″, and in which are fitted nozzles fed with foaming liquid via the pipe 3.

In the example illustrated, the nozzles of the upper tubes and of the lower tubes are of different shapes producing foam exhibiting different expansion. Thus the nozzles 11 of the lower tubes comprise a short convergent inlet 12 followed by a cylindrical passage 13 opening out into a cavitation chamber 14 of larger diameter than the inlet and outlet orifices. The

nozzles 16 of the upper tubes, which give rise to a more aerated foam, comprise a convergent passage 17 over almost their entire length, and terminate in a short cylindrical or slightly divergent passage 18 not extended by a cavitation chamber.

This appliance is capable of supplying four jets each having for example a delivery of 50 m.^{3} of foaming liquid per hour, the expansion being of the order of 6 to 7 for the upper tubes and 4 to 5 for the lower tubes.

The range of the resultant jet thus formed may be 10 percent greater than that of a jet consisting of a foam having a uniform expansion of 6 to 7.

FIG. 3 illustrates another form of embodiment of the appliance according to the invention wherein the upper tubes 1, 1′ are longer than the lower tubes 2, 2′, which enables a finer and lighter foam to be obtained in the tubes 1, 1′ by virtue of a longer turbulent path in them. According to another embodiment of the invention, both upper and lower tubes may be of identical construction, means being provided to feed to the upper and lower tubes respectively different foaming liquids producing different degrees of expansion.

In all cases, there is a composite jet whereof the lower layer consists of a fluid foam spreading rapidly over the surface of the flaming liquid and surmounted by a more creamy layer which forms a thicker extinguishing cushion and collapses less rapidly, this layer effectively preventing the flames from being fed with combustion air.

What I claim is:

1. A method of producing a jet of extinguishing foam containing air, comprising producing a first foam jet exhibiting more expansion above a more dense and more liquid second foam jet, the second jet forming a carrier vehicle for the first jet.

2. The method according to claim 1 in which the first upper jet is in direct contact with the lower second jet.

3. A method of producing a jet of extinguishing foam containing air, comprising producing a first foam jet exhibiting more expansion above a more dense and more liquid second foam jet, the second jet forming a carrier vehicle for the first jet, and wherein the first jet is propelled indirectly by the second jet by a layer of air which separates them.

4. A method of producing a jet of extinguishing foam containing air, comprising producing a first foam jet exhibiting more expansion above a more dense and more liquid second foam jet, the second jet forming a carrier vehicle for the first jet, and wherein the expansion of the first jet is of the order of 6 to 7, while that of the second jet is of the order of 4 to 5.

5. An apparatus for producing an extinguishing air foam comprising at least two tubes arranged one above the other, and means for producing by the upper tube a first jet of air foam having a first degree of expansion and for producing by the lower tube a second jet of air foam having a lower degree of expansion than said first jet of air.

6. Apparatus according to claim 5 wherein said two tubes comprise two identical foam-forming tubes and two different sources of foaming liquids fed to said tubes respectively to produce different degrees of expansion.

7. Apparatus according to claim 5 wherein the upper tube is longer than the lower tube whereby a foam of higher degree of expansion is produced in the upper tube and a foam of lower degree of expansion is produced in the lower tube.

8. Apparatus according to claim 5 wherein said tubes have nozzles for injecting the foaming liquid thereinto accommodating in a cylindrical member provided with air suction orifices, the nozzle of the upper tube has a convergent portion over a major part of its length, followed by a short divergent portion, while the nozzle of the lower tube has a convergent portion over a shorter length than the nozzle of the upper tube, a cylindrical portion extending over its remaining length and followed by a cavitation chamber.