Jan. 18, 1944. H. H. FOX 2,339,327

FOAM DELIVERING APPARATUS

Filed May 21, 1940 2 Sheets-Sheet 1

Fig. 1.

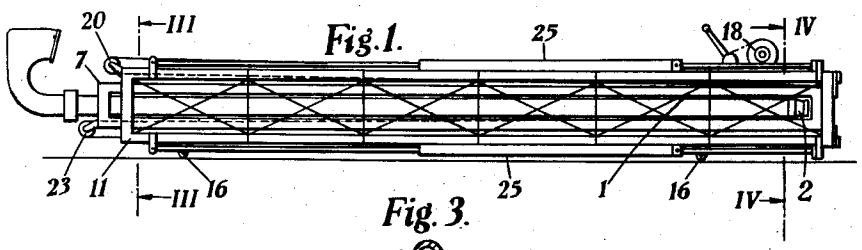


Fig. 3.

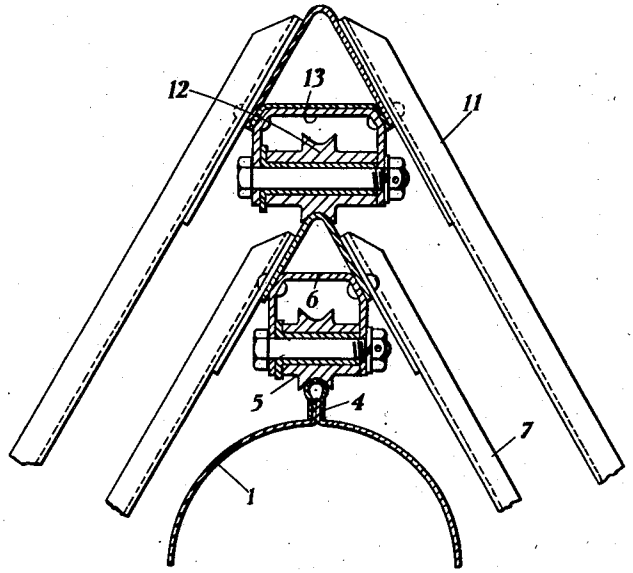
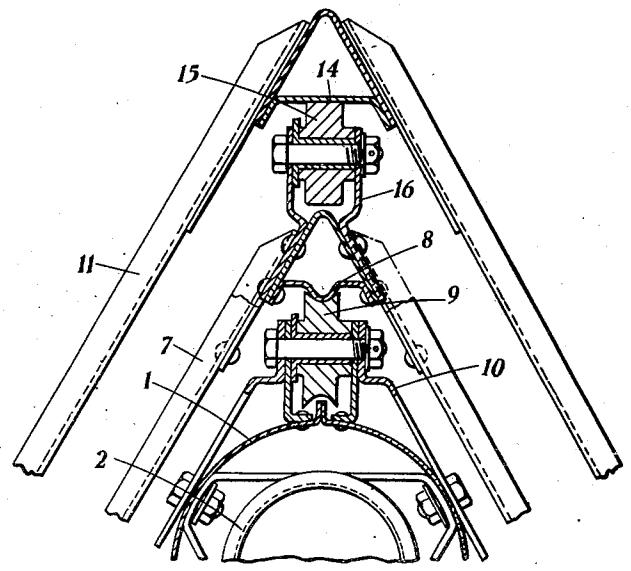


Fig. 4.



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FOAM DELIVERING APPARATUS

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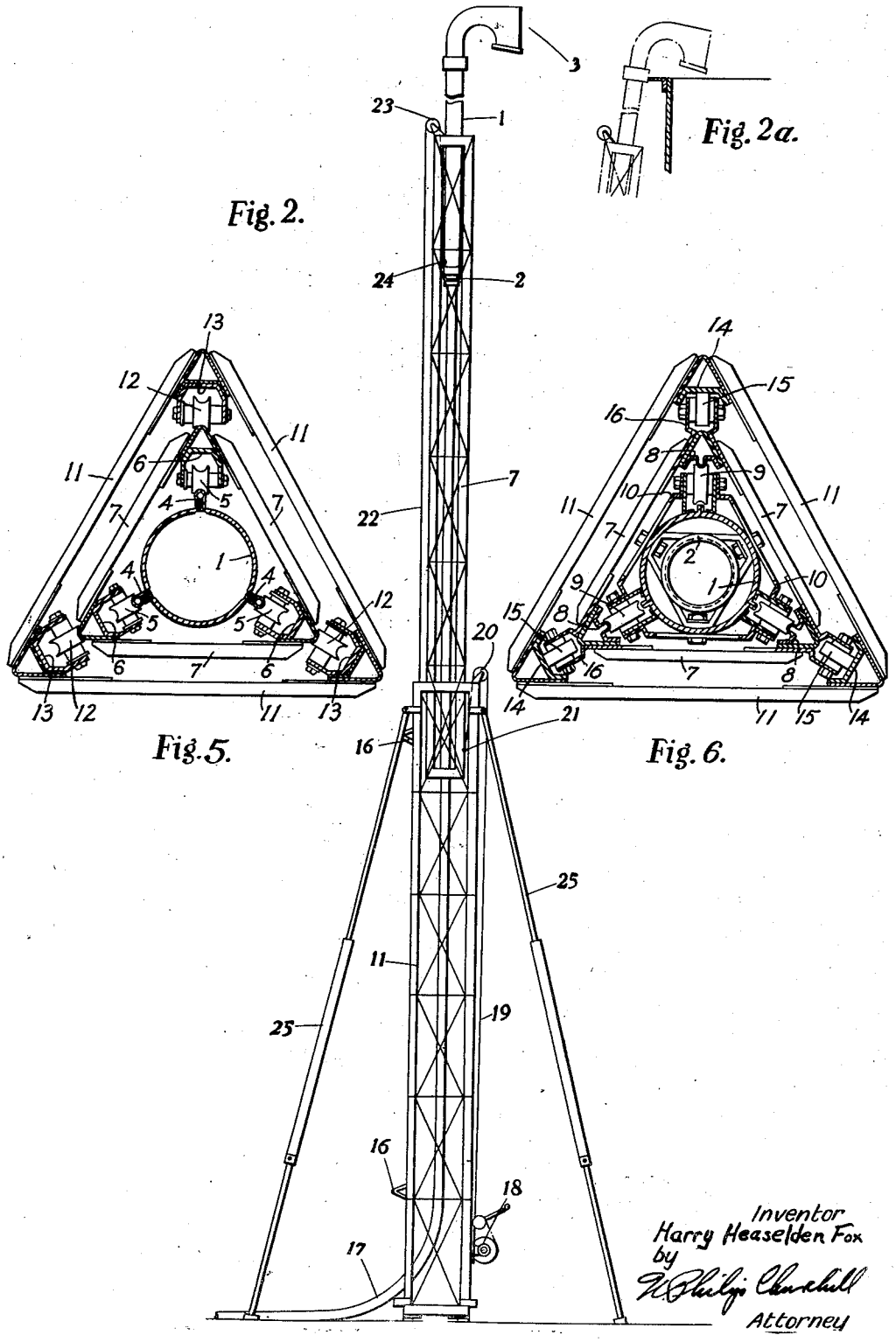


Fig. 2.

Fig. 2a.

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE

2,339,327

FOAM-DELIVERING APPARATUS

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Application May 21, 1940, Serial No. 336,336
In Great Britain June 1, 1939

4 Claims. (Cl. 169—4)

This invention relates to apparatus for delivering fire-extinguishing foam at a height above the ground, and it is concerned with the problem that arises in delivering foam over the top rim of an oil tank. Oil tanks are commonly grouped close together, so that there is very little room in which to manoeuvre an apparatus. The ground in which they stand is much interrupted, so that no large or heavy apparatus can be taken easily to a given tank in the event of fire. It is therefore necessary to provide a light apparatus which can be handled manually during its transport to and erection at a tank, that is to say, can be carried and erected by two men if only two are available. To satisfy all the requirements is not easy, and it is the principal object of the invention to do this.

A further object of the invention is to reduce the height through which foam, as distinguished from water, must be lifted, and thus to reduce the size of the pipe necessary to deliver foam over the top rim of an oil tank.

In my invention, I use a sectional structure which can be extended to form a rigid column, and the foam is delivered through a foam-discharge device so carried by the structure as to be lifted as the structure is extended upwards. The foam-discharge device is in turn connected to a pipe which also moves upwards with the structure. A device, preferably a winch, is fixed to the base of the structure for extending it upwards and means are provided for supporting the structure on the ground in the upright position. In order to make the whole apparatus capable of being man-handled, the structure should be made of metal as light as possible and constructed in lattice fashion. It may have a base large enough to support it in the upright position, but in general any such base adds too much to its weight, so it is most convenient to provide hinged tripod legs.

An important feature of the invention consists in including a mechanical foam-making unit in the pipe, so that the foam-making unit itself is elevated. This produces important advantages, in that it is only necessary to lift the water supply pipe and this may be of much smaller diameter than a pipe that has to carry upwards foam produced on the ground. Further, the foam-discharge pipe may be a curved pouring head to which the unit may be directly connected and which discharges the foam downwards into an oil tank and, therefore, no large-diameter foam pipe need be lifted at all. Moreover, a much larger supply of foam can be obtained when the foam-making unit is taken up by the apparatus than when it is on the ground.

My invention will most clearly be understood from the following description of the preferred form of apparatus embodying the invention, which will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows the apparatus in the collapsed position on the ground;

Figure 2 is an elevation of the apparatus in the upright and extended position;

Figure 2a is an elevation of the upper end of the apparatus canted over the rim of a tank;

Figure 3 is a partial cross-section, on a larger scale, on the line III—III in Figure 1;

Figure 4 is a similar cross-section on the line IV—IV in Figure 1; and

Figures 5 and 6 show on a smaller scale complete cross-section of the structures illustrated in Figs. 3 and 4, respectively.

When the apparatus is not in use, it rests horizontally on the ground in the collapsed position shown in Figure 1. The structure is telescopic and composed of three essential parts, the innermost of which is constituted by a pipe 1, the lower part of which is constructed as a unit 2 for the production of mechanical foam, also known as air foam, by aspirating air into a stream of liquid. The aspirating unit 2 may be of the kind described in United States Letters Patent No. 2,089,646. The pipe carries a curved foam-pouring head 3 at its upper end, and it has three ribs 4 with rounded outer ends which engage grooves in three rollers 5. These are carried by brackets 6 fixed close to the top of the middle part 7 of the structure. This part 7 is triangular in cross-section and of lattice construction, and the pipe 1 telescopes within it. Below the rollers 5 there are three guides 8, which are fixed to the middle part 7 and are engaged by rollers 9 carried by brackets 10 fixed to the lower part of the pipe. Thus, as the pipe moves out of the middle part 7, the rollers 9 run up the guides 8 and the ribs 4 move up in engagement with the rollers 5. The part 7 in turn telescopes within the base part 11 of the structure, which is also triangular in cross-section and of lattice construction. At the top of the base part 11 there are three rollers 12 carried by brackets 13 fixed to the base part 11, and the corners of the middle part 7 are rounded to engage grooves in these rollers 12. Below the brackets 13 there are guides 14 which are engaged by rollers 15 carried by brackets 16 fixed to the middle part 7. Thus, as

the middle part 7 moves out of the base part 11, the rollers 15 run up the guides 14, and the corners of the middle part 7 move up in engagement with the rollers 12.

As stated above, the apparatus normally lies in the position shown in Figure 1, and it is provided with two projections 16 to serve as supporting feet in this position. When the apparatus is required at a burning oil tank, it is taken to the tank and placed in the upright position. A hose-pipe 17 is connected to the foam-making unit 2 and the structure is extended. For this purpose, a winch 18 is fixed close to the bottom of the base part 11 and a wire 19 runs from it over a pulley 20 fixed to the top of the part 11 and is secured to the middle part 7 close to the bottom of that part, as shown at 21. A further wire 22 is fixed at one end to the top of the base part 11 and runs over a pulley 23 fixed to the top of the middle part 7 and is secured at the other end to the pipe 1 at a point 24 close to the bottom of the pipe. When the winch is turned the middle part is moved out of the base part and at the same time the pipe moves, and in fact it moves away from the base part at twice the speed of the middle part.

When the structure has been erected, it may be canted so that the mouth of the pouring head 3 projects over the rim of the tank as shown in chain lines in Figure 2a. Then to support the apparatus firmly in position three tripod legs 25, hinged to the base part 11, are opened out and adjusted to the appropriate length. A mixture of water and foam-producing compound is forced up through this pipe 17 to the foam-making unit when it is desired to produce foam.

It has been found that if the structure is made of a light metal, such as an aluminium alloy, the whole apparatus may weigh only about 200 lbs. and yet be capable of delivering foam at a height of 45 ft., although of course the structure can be extended to any intermediate height desired. This apparatus is both light enough and handy enough to be moved by two men and erected by them at the side of a burning oil tank.

Although the nesting triangular construction described above is preferred for the outermost and intermediate parts of the apparatus, the invention is not restricted to this. Indeed, although in all the apparatus according to the invention a sectional extending structure is provided to carry a pipe upwards, it is not essential that the parts of this structure should telescope into one another, nor yet it is essential that the structure should consist of three telescoping or otherwise extending parts. Again, although a winch on the outermost part is the best method of extending the structure any convenient mechanism may be used for this purpose.

I claim:

1. Apparatus for delivering fire-extinguishing foam into an oil tank and constructed so that it can be handled manually during its transport to and erection at a tank, comprising a sectional structure made up of a plurality of telescoping sections that are extensible to form a rigid column, a foam producing and discharging device including means for aspirating air into a stream of liquid carried within the uppermost member in the extended position of said sectional structure to be lifted as said structure is extended upwards, a single liquid supply pipe connected to and moving upwards with said device, means fixed to the base of said structure for extending it upwards, and means for supporting said structure on the ground in the upright position.

2. Apparatus for delivering fire-extinguishing foam at an elevated point comprising a plurality of rigid frames of triangular cross-section and of substantial length, one frame telescoping inside another and means to guide and raise said inner frame to form an extensible substantially rigid structure, adjustable supporting means connected to said lower frame for supporting said structure in an extended and raised position, and an elongated foam forming and delivering means carrying a flexible liquid supply hose supported by and extensible relative to the uppermost of said frames.

3. Apparatus for delivering fire-extinguishing foam at an elevated point comprising a plurality of frames of triangular cross-section arranged for one frame to telescope within another and extensible to form a substantially rigid column, a pipe supported in sliding engagement within the innermost of said frames, air foam producing means carried in said pipe, foam delivering means at the upper end of said pipe, means for supporting said frames and pipe in an upright position, and means for extending one of said frames relative to another and for extending said pipe relative to said innermost frame to elevate said foam producing and foam delivering means.

4. Apparatus as defined in claim 2 in which the raising means serves to extend simultaneously the inner frame relative to the lower frame, and the elongated means relative to said frames.

HARRY HEASELDEN FOX.