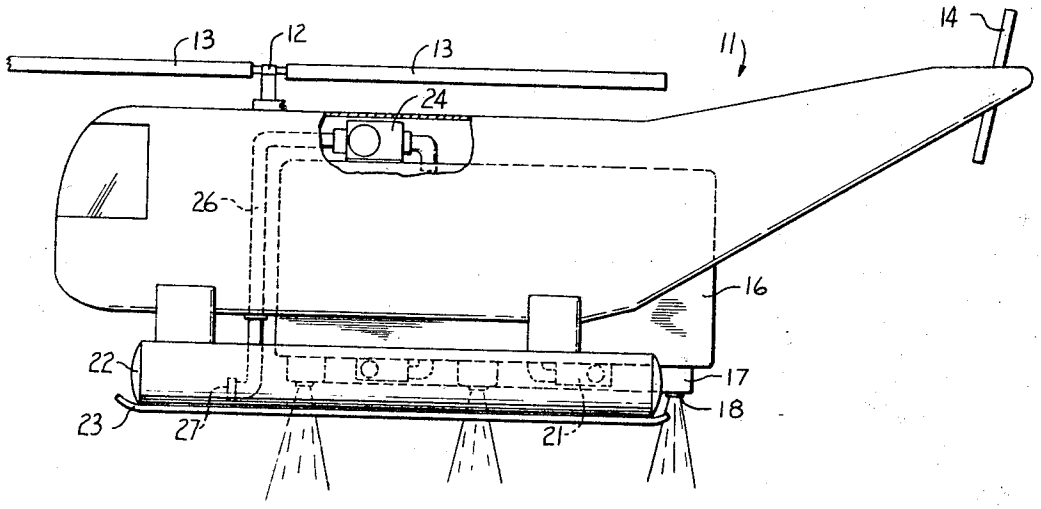
May 6, 1969 S. GOUSETIS 3,442,334

FIRE FIGHTING APPARATUS

Filed Jan. 27, 1966

Fig. 1



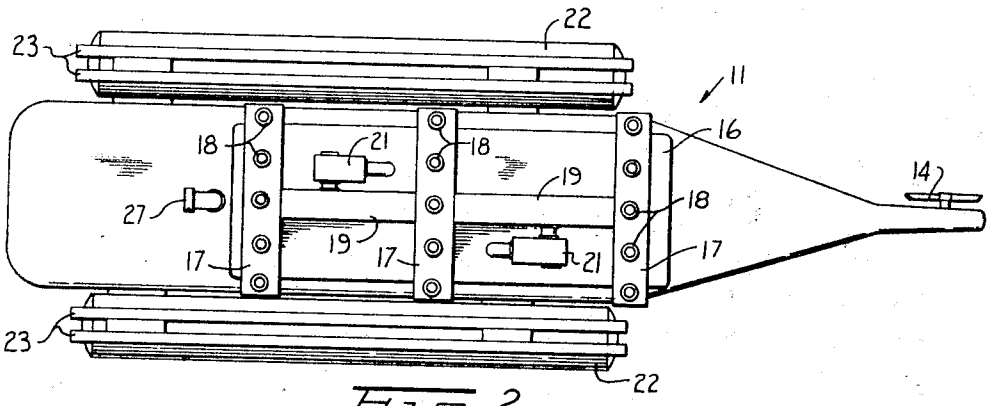


Fig. 2

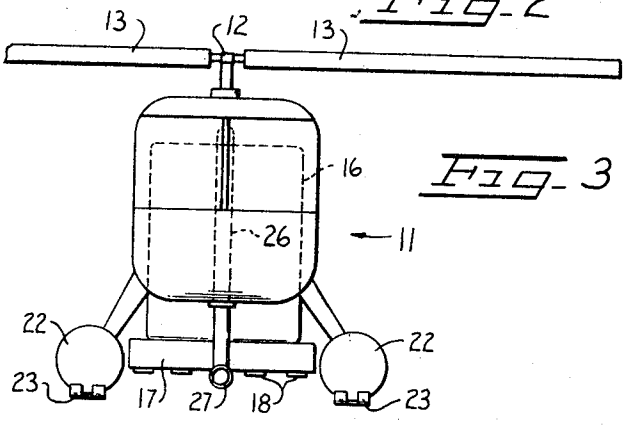


Fig. 3

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FIRE FIGHTING APPARATUS

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U.S. Cl. 169—2 1 Claim

ABSTRACT OF THE DISCLOSURE

A fire fighting apparatus is described which permits a large amount of anti-pyro liquid to be applied to a fire in a relatively short time and which can quickly reach areas not easily accessible on the ground. The apparatus comprises a helicopter in which is mounted a high capacity anti-pyro liquid tank. A plurality of manifolds, each of which is provided with discharge nozzles are communicably connected to the tank by variable speed pumps and are mounted beneath the helicopter to discharge the liquid into the downwash of the helicopter rotor blades. The helicopter is provided with pontoons so that it can land upon a body of water, and the inlet opening of a filling conduit for the tank is positioned so as to extend into the water when the helicopter is on a body of water to facilitate filling of the tank from the body of water.

The present invention relates to fire fighting apparatus and, more particularly, to an improved apparatus capable of quickly transporting and accurately directing an anti-pyro liquid onto a fire which is in an inaccessible location.

Brush and forest fires usually begin as relatively small fires capable of easily being extinguished. However, quite often these fires start in areas to which access is difficult. Even an hour's delay in reaching a starting fire can be catastrophic. While parachutists are now used to reach a fire quickly, they have been limited to using the same type of relatively inefficient extinguishing methods on a small fire as they would use on a larger one. This is so because these parachutists are unable to transport any appreciable quantity of an anti-pyro liquid to the fire.

Accordingly it is an object of the present invention to provide fire fighting apparatus capable of providing a relatively large amount of anti-pyro liquid onto a fire in the shortest possible time.

Another object of the instant invention is to provide such apparatus which can quickly reach areas which are not easily accessible on the ground.

A further object of the present invention is to provide such an apparatus which is particularly effective in directing an anti-pyro liquid onto a fire.

A further object is to provide such an apparatus capable of utilizing the nearest available water supply to fight a fire.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims. Referring to such drawing:

FIGURE 1 is an elevation view of a preferred embodiment of the fire fighting apparatus of the present invention;

FIGURE 2 is a bottom plan view of the apparatus of FIGURE 1 depicting the means for discharging an anti-pyro liquid onto a fire; and

FIGURE 3 is a front elevation of the apparatus of FIGURE 1.

In general, the fire fighting apparatus of the invention includes a helicopter which preferably is one capable of lifting large weights. A high capacity liquid tank adapted to contain an anti-pyro liquid is mounted on the helicopter, and means are provided for filling the tank. There is also provided on the helicopter means for discharging the anti-pyro liquid from the tank and into the downwash of the rotor blades of the helicopter.

It is to be appreciated that with this apparatus, a relatively large amount of anti-pyro liquid can be applied to a fire a short time after its discovery. More particularly, the helicopter can be immediately dispatched from the nearest fire fighting station. In many instances, it will be able to reach the fire before it has become of such a size that an anti-pyro liquid is no longer effective. The anti-pyro liquid can then be discharged onto the fire to douse it.

Quite often the fire will be so situated and of a size that fairly good accuracy with the anti-pyro liquid will be necessary. It has been found that when the liquid is discharged into the helicopter's downwash, the downwash acts to direct the liquid downward away from the plane of rotation of the blades. Thus, the operator of the helicopter can control the direction of the liquid to assure that it lands on the fire. Furthermore, the downwash itself helps to extinguish the fire in many instances.

The invention is particularly useful when water is used as the anti-pyro liquid. If a body of water such as a lake or river is in the vicinity of the fire, the helicopter can be flown empty to this area in order that its flying speed will not be curtailed by the weight of the liquid. The helicopter can land at the body of water and be filled therefrom. To facilitate such a use, the helicopter is desirably provided with pontoons for amphibious landings so that it is capable of landing directly upon the body of water for filling. However, conventional skids for ground landings such as at the fire fighting station are also preferably provided. These skids additionally allow the helicopter to land adjacent the closest body of water for filling if the body of water is not conducive to amphibious landings.

Considering the invention in greater detail, reference is now made to the drawing wherein a helicopter is generally indicated by the reference numeral **11**. Rotatably mounted on the helicopter **11** is the usual rotor **12** having blades **13**. A stabilizing tail rotor **14** is also provided on the helicopter adjacent its rear end. While the helicopter **11** is provided with only one rotor, it is to be appreciated that a helicopter having two rotors is also applicable to the invention.

A high capacity liquid tank **16** for containing an anti-pyro liquid is mounted on the helicopter. Since it is desirable to carry as much anti-pyro liquid to a fire as possible, the tank **16** should be as large as is consistent with the weight limitations of the helicopter. The greater portion of the tank **16** is contained within the body of the helicopter and occupies substantially all of the cargo space therein. With this arrangement, a high capacity tank is accommodated without adding materially to the bulk of the helicopter and reducing its maneuverability.

The means for discharging the anti-pyro liquid from the tank **16** includes three manifolds **17** extending transversely of the helicopter below the tank. Each of the manifolds is provided with a plurality of downwardly directed discharge nozzles **18** spaced along its length. The manifolds **17** are, in turn, spaced longitudinally of the helicopter in order that a fairly large area below the helicopter can be doused with the anti-pyro liquid. A liquid distribution pipe **19** provides communication between the various manifolds **17**. This pipe **19** extends longitudinally of the helicopter below the tank **16**. Two pumps

21 are mounted below the tank in communication with the tank and with the distribution pipe. As depicted, each one of the pumps 21 is between a different pair of the manifolds 17. This arrangement assures that a substantially uniform amount of the anti-pyro liquid is provided to each of the manifolds. Furthermore, the provision of two pumps assures that the anti-pyro liquid can be discharged from the manifold at a fast rate. Desirably, the pumps 21 are variable speed pumps so that the amount of liquid discharged from the manifold 17 can be controlled depending upon the particular fire.

To enable amphibious landings, the helicopter is provided with pontoons 22 which extend longitudinally below the helicopter body. As mentioned before, the capability of landing on a body of water permits the apparatus to be flown empty to the lake or river which is closest to the fire and then be filled therefrom. Skids 23 are also provided on the helicopter beneath the pontoons for ground landings.

A high capacity pump 24 is provided within the helicopter on the top of the tank for pumping liquid into the tank. As depicted, a conduit 26 extends downward at the front end of the tank to a position in between the pontoons. A coupling 27 is provided on the free end of this conduit 26 in order that a hose for filling can be secured thereto. Since the conduit 26 and the coupling 27 are at the front end of the tank, they are readily accessible to the helicopter crew for the filling operation. The conduit 26 extends sufficiently below the helicopter that its free end is immersed when the helicopter is resting upon a body of water. Thus, it is only necessary to activate the pump 24 when the helicopter is on a body of water to fill the tank 16. The pump 24 desirably has a high capacity in order that the tank 16 can be filled in a minimum of time.

A hose can be connected to the conduit 26 by means of the coupling 27 for filling of the tank when the helicopter is not resting upon a body of water. As depicted, the free end of the conduit 26 is curved to provide a forwardly extending horizontal portion to facilitate the attachment of a hose thereto. Desirably, a hose for securance to the conduit 26 is carried with the helicopter. Then it is possible to fill the tank 16 while the helicopter is hovering above a body of water because of the terrain, if necessary, by securing the hose to the coupling 27 and dangling it into the water.

While the fire fighting apparatus of the invention has been described with respect to a particular embodiment thereof, it is not to be considered as limiting. For example, while it has been described as being for fighting small forest and brush fires, it can also be used for combating home and building fires. Furthermore, the apparatus can be adapted for anti-pyro liquids other than water such as chemical foams.

What is claimed is:

1. Fire fighting apparatus comprising a helicopter having a rotor with blades, pontoons for amphibious landings and skids for conventional ground landings; a high capacity tank mounted on said helicopter for containing an antipyro liquid, the greater portion of said tank being contained within the body of said helicopter; a high capacity first pump means mounted adjacent said tank for pumping liquids therein; a filling inlet conduit extending from said first pump to a location below said tank to be in a body of water upon which said helicopter pontoons are resting, said inlet conduit being relatively rigid with a free terminal lowermost end above said skids and below the water line of said pontoons with said tank empty, said inlet conduit extending from the top of said tank downwardly to a right angle elbow portion mounting said free terminal end to extend substantially horizontally, said inlet conduit further having a coupling member on its free terminal end for securing a hose thereto; and means for discharging liquid from said tank into the downwash of said helicopter blade including at least three substantially parallel, transversely elongated, horizontally extending manifolds mounted below and spaced longitudinally of said helicopter and tank in the path of said downwash, each of said manifolds being provided with a plurality of transversely spaced discharge nozzles; said means for discharging further including a central water distribution pipe horizontally extending longitudinally of said helicopter, perpendicular to said manifolds and serially fluid connecting all of said manifolds; said means for discharging further including at least two additional pump means for forcing antipyro liquid from said tank into said distribution pipe, each of said additional pump means being mounted below said tank between different pairs of said manifolds and serially fluid connected between said tank and said distribution pipe.

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U.S. Cl. X.R.

239—171; 244—136