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MIST FIRE FIGHTING SYSTEM

Field of the Invention

The present invention relates to a fire fighting system using mist.

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Background to the Invention

In conventional fire fighting, a high volume water jet is used to extinguish fire. This existing technique uses a large amount of water that can result in large amounts of water damage, which in many cases results in greater damage than the damage from the actual
10 fire. In addition, high water volume jets are not effective in cooling hot gases within a confined space, which can result in an explosion. Furthermore still, due to the velocity of high water jets, other destruction can take place including destruction of evidence which may be required by forensic personnel to investigate a crime.

15 The present invention provides an improved fire fighting system.

Summary of the Invention

According to the present invention there is provided a fire fighting apparatus comprising:

- 20 a liquid intake;
a pressure generating means for receiving liquid from the intake and pressurising the liquid;
a mist generating gun for atomising pressurised liquid delivered to the gun into mist, the gun including a plurality of atomising nozzles, and a selection means for
25 selecting which of the nozzles are used, one of the nozzles for generating long throw mist, another of the nozzles for generating wide angle mist; and
a hose for delivering pressurised fluid from the pressure generating means to the mist generating gun.

30 Preferably the liquid intake is a water tap connector for intaking water from a tap. Preferably an additive is mixed with water delivered to the gun. Preferably more than one of the nozzles is configured for wide angle mist delivery. Typically, four nozzles

are configured for wide angle mist delivery.

Preferably the pressure generating means is portable.

- 5 According to another aspect of the present invention there is provided a mist generating gun comprising an intake for receiving pressurised fluid and at least one atomising nozzle for atomising pressurised liquid delivered to the gun into mist, the gun including a plurality of atomising nozzles, and a selection means for selecting which of the nozzles are used, one of the nozzles for generating long throw mist, another of the
10 nozzles for generating wide angle mist.

Also in accordance with the present invention there is provided a method of fire fighting including:

- providing a fire fighting apparatus having a pressure generating means for
15 delivering pressurised fluid to a mist generating gun, the gun including a plurality of atomising nozzles, and a selection means for selecting which of the nozzles are used, one of the nozzles for generating long throw mist, at least one of the other of the nozzles for generating wide angle mist;
- delivering pressurised fluid to the mist generating gun;
- 20 selecting the appropriate nozzle(s); and
- directing mist generated from the gun at a fire.

Detailed Description of Preferred Embodiments

- In order to provide a better understanding, preferred embodiments of the present
25 invention will now be described in greater detail, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a schematic representation of the fire fighting system in accordance with the
present invention;

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Figures 2A and 2B are representations of a mist gun of the system of Figure 1;

Figure 3 is a schematic representation of a mist spray selector of the gun of Figures 2A and 2B;

Figure 4 is a hose backpack of the system of Figure 1; and

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Figure 5 is a perspective representation of a high pressure pump including the hose backpack of Figure 4.

Referring to Figure 1, there is shown a mist fire fighting system 10 which includes a
 10 high pressure pump that delivers liquid, such as water, under pressure by high pressure hose 16 to a mist gun 14 for projecting as mist. The high pressure pump receives water by a wire reinforced hose 20 connected to a tap 24. Optionally, a chemical such as a fire retardant, may be added to the water received from the tap 24. The chemical is stored in
 15 a chemical tank 18 and injected into the water travelling into the high pressure pump by a venturi action at T piece 22. It is preferred to have the water pressurised to more than 50 bar, more preferably 100 to 200 bar.

Referring to Figures 2A and 2B, the mist gun 14 includes an inner piping 30 and a convenient housing 50 for holding the inner piping 30. The housing/casing 50 includes
 20 suitable grips and may include a flash light on the top as shown. The inner piping 30 receives water by an inlet connector 32 and projects the water as mist at outlet 34. Fluid received from the inlet connector 32 is stopped from travelling through the rest of the inner piping 30 by trigger mechanism 38. It is only allowed to proceed when the trigger is depressed where it travels through pipe 36 to mist selector 44. The mist selector 44
 25 diverts liquid into either pipe 40 or 42. Water directed to pipe 40 exits outlet 34 from a long throw atomising nozzle 46 which sprays the liquid as a mist such that it has a long range. Water travelling through pipe 42 exits the outlet 34 through four wide angle nozzles 48. Each of the wide angle nozzles atomises the liquid so that a wide area of mist is created from the outlet 34. It is to be understood that the term "atomising" is
 30 intended to mean separation into fine droplets, generally of less than 1 mm in droplet diameter, but preferably less than 0.1 mm and more preferably less than 0.01 mm in droplet diameter.

Referring to Figure 3, the selector 44 is shown in more detail. Water from pipe 36 flows into a chamber 54 of a body 52 of the selector 44. Within the chamber 54 are two narrow passages 56 and 58 which lead to pipes 40 and 42, respectively. The chamber
5 54 is shaped so that a ball shaped stopper 60 is movable between the entry to passages 56 and 58 from the chamber 54. Thus, liquid is stopped from entering either passage 56 or 58 by the stopper 60, depending on the position of the stopper 60. The stopper 60 can be moved between each entrance to these passages. The chamber 54 is shaped so that inclined wall 62 between each of the openings to the passage 56 and 58 cause the
10 stopper 60 to move over one or other of the openings. By overcoming the slope of the wall 62, the position of a stopper 60 can be moved so that it rests within/over either one of these openings.

Referring to Figure 4, a hose carrying backpack 70 is shown which includes frame 74
15 for resting against a person's back and straps (not shown) for securing the frame to the person's back. The backpack 70 also includes a spool or reel 72 around which the hose 16 is wound. Reel 72 is mounted to the frame 74 by connecting brackets 76.

Referring to Figure 5, a high pressure pump 12 is shown. The pump 12 is portable and
20 includes wheels 88 mounted to its body 86. In addition, a handle 84 is provided to push the pump 12 along. The pump 12 is shown with the backpack 70 resting on its upper surface with the frame 74 coupled by shoulder straps to the handle 84. The reel 72 is shown with hose 16 wound thereon with the hose having connector 80 for connecting to an inlet connector 32 of the mist gun 14. The other end of the hose 16 is connected
25 inside the body 86 to a compression unit for compressing liquid provided by hose 20. The high pressure pump 12 is preferably powered by an internal combustion engine. Liquid delivered by hose 20 is stored in a reservoir which is then pumped through hose 16. An opening 90 is shown for filling the chemical tank 18 within a housing 86. A pressure gauge 82 is shown for measuring the pressure of liquid delivered by hose 16.

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The method of use of the present invention will now be described with reference to the accompanying drawings.

The apparatus of the present invention is carried close to the fire to be extinguished. Hose 16 is carried by backpack 70 on a person's back, gun 14 is carried by hand and high pressure pump 12 is wheeled along or carried by its handle 84 (another handle may be affixed to the front of the body 86 to assist in carrying, such as in the case of stairs). Hose 20 is connected to a nearby tap 24, which is turned on. Backpack 70 is coupled to high pressure pump 12 as depicted in Figure 5. One end of the hose is connected to the outlet of the high pressure pump 12. The other end 80 of the hose 16 is connected to the gun by inlet connector 32. The motor of the high pressure pump 12 is started. Hose 16 is unwound from reel 72 so that the gun 14 can be carried to be in close proximity to the fire. The trigger of the gun 14 is depressed thereby allowing liquid to exit the outlet 34 as mist according to the nozzles selected by selector 44. Depending on the nature of the fire, mist may be desired to be projected a long distance by using nozzle 46 or nozzles 48 may be used to allow fighting of fire over a greater area.

Once the fire has been extinguished, the hose 16 may be wound back onto the spool 72 by handle 92.

Mist provides good fire fighting qualities because it has the ability to cool areas due to greater surface area of water particles. It can lead to a greater temperature drop. Furthermore, radiant heat is attenuated which can reduce the activity of a fire. Furthermore, the volume of water increases by about 1600 times when it is transformed into steam. This displaces oxygen in proximity to the fire thereby causing smothering. In addition, minimal consequential damage is provided by using mist when compared to high volumes of water. Furthermore, mist droplets also bind to a high percentage of smoke particles which can reduce smoke damage.

Modifications and variations may be made to the present invention without departing from the basic invention concept. Examples of such variations may include altering the form of the high pressure pump. It may be stored with pressurised gas which delivers pressurised water to the mist gun. Alternatively, an electric motor may be provided rather than an internal combustion engine. The hose 16 need not be wound on a reel of

the backpack, the reel could be mounted to the pump.

Such modifications and variations are intended to fall within the scope of the basic inventive concept, the nature of which is to determined from the foregoing description.

CLAIMS:-

1. A fire fighting apparatus comprising:
a liquid intake;
5 a pressure generating means for receiving liquid from the intake and pressurising the liquid;
a mist generating gun for atomising pressurised liquid delivered to the gun into mist, the gun including a plurality of atomising nozzles, and a selection means for selecting which of the nozzles are used, one of the nozzles for generating long throw
10 mist, another of the nozzles for generating wide angle mist; and
a hose for delivering pressurised fluid from the pressure generating means to the mist generating gun.
2. A fire fighting apparatus according to claim 1, wherein the liquid intake is a
15 water tap connector for intaking water from a tap.
3. A fire fighting apparatus according to claim 1, wherein an additive is mixed with water delivered to the gun.
- 20 4. A fire fighting apparatus according to claim 1, wherein more than one of the nozzles is configured for wide angle mist delivery.
5. A fire fighting apparatus according to claim 1, wherein the pressure generating means is portable.
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6. A mist generating gun comprising an intake for receiving pressurised fluid and at least one atomising nozzle for atomising pressurised liquid delivered to the gun into mist, the gun including a plurality of atomising nozzles, and a selection means for selecting which of the nozzles are used, one of the nozzles for generating long throw
30 mist, another of the nozzles for generating wide angle mist.
7. A method of fire fighting including:

- providing a fire fighting apparatus having a pressure generating means for delivering pressurised fluid to a mist generating gun, the gun including a plurality of atomising nozzles, and a selection means for selecting which of the nozzles are used, one of the nozzles for generating long throw mist, another of the nozzles for generating
- 5 wide angle mist;
- delivering pressurised fluid to the mist generating gun;
 - selecting the appropriate nozzle; and
 - directing mist generated from the gun at a fire.