

WATER-MIST FIRE-FIGHTING APPARATUS**5 Field of the invention**

The invention relates to a fire-fighting apparatus, in particular, to a fire-fighting apparatus that generates a water-mist spray.

10 Background and prior art

The conventional approach to fire-fighting requires a crew of fire-fighters using large amounts of water and fire engines to extinguish the fire. Very often, due to the copious amount of water used, the result is unnecessary destruction at the
15 site of the fire. There is invariably damage to unburned property and vital evidence for fire investigation is washed away. In fact, the majority of fires in residential properties involve home contents and rubbish. Thus, it is not necessary to fight these medium and small size fires with a large quantity of water and large manpower resources, which in turn also causes significant
20 property damage.

It would be advantageous to apply principles of water-mist fire-fighting through a mobile system for front-line fire-fighting. The key to water-mist effectiveness is in its high efficiency in absorbing a tremendous amount of heat as the minute
25 droplets are easily converted to steam at 1,700 times its original volume. This steam then displaces oxygen and disrupts the combustion process. There is also rapid temperature reduction as the water droplets also tend to wet and cool combustibles and hot surfaces.

30 Minimal flow rates means minimal property damage. The fine droplets also tend to demonstrate smoke scrubbing/washing capability, removing the air of many

hazardous products of combustion, and at the same time creating better visibility. Since water is used, it is environmentally friendly and safe. The water-mist can be safely used to extinguish primarily Class A and B fires with an option of adding foam additives into the system.

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One example of a portable water-mist fire-fighting system is revealed in UK Patent No. GB 2,320,189 for a "Portable water mist fire-extinguishing apparatus". The apparatus comprises a nozzle, hand-held means for controlling the spray of fluid from the nozzle, storage means for the fluid and a hose for delivery of the fluid from the storage means to the hand-held means. However, the contents of the storage container are pre-pressurized, much like a conventional fire extinguisher. Once the contents of the storage container are exhausted, the fire-fighter would have to use another apparatus to continue fighting the fire. Thus, the apparatus is not able to provide a continuous flow of water-mist for fires that take a longer time to extinguish.

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Summary of the invention

It is an object of the invention to seek to mitigate the disadvantages of the prior art mentioned above.

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According to the invention, there is provided a fire-fighting apparatus comprising a water supply, a nozzle for producing a water spray, and a pump for pumping water from the water supply to the nozzle.

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Using the invention, it is possible to provide an improved water-mist apparatus for fire-fighting that is able to draw upon a low pressure and/or low-flow water source, such as a domestic water tap, to provide a continuous water supply to extinguish a fire safely.

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It will be convenient to hereinafter describe an embodiment of the present invention with reference to the accompanying drawings which illustrates an embodiment of a water-mist fire-fighting apparatus incorporating the invention. It is to be understood that the particularity of the drawings and the related description is not to be understood as superseding the generality of the broad description of the invention as defined in the claims.

Brief description of the drawings

Figure 1 is an elevation view of a main body of a water-mist apparatus according to the invention illustrating a motor and water tank used with the apparatus according to a preferred embodiment of the invention.

Figure 2 is an elevation view from the left side of the apparatus of Figure 1 illustrating the motor, pump and water tank used with the apparatus.

Figure 3 is an elevation view from the right side of the apparatus of Figure 1.

Figure 4 is a schematic view of the connections between a water-mist gun, high-pressure attack hose for connection to the water-mist apparatus, pump, motor, water tank and supply hose when the apparatus is deployed for use.

Figure 5 is an elevation view of a water-mist gun usable with the apparatus.

Figures 6a to 6c are the front, plan and sectional views of the nozzle usable with the apparatus in accordance with the preferred embodiment of the invention.

Detailed description of a preferred embodiment of the invention

Figure 1 is an elevation view of a main body of a water-mist apparatus according to the invention illustrating a motor 12 comprising a petrol engine and

water tank 14 used with the apparatus according to a preferred embodiment of the invention. A recoil starter 18 may be used to start the motor.

5 The petrol engine is compact and is preferably a 5 HP petrol-driven engine to provide sufficient power to run a high-pressure water pump. To increase its portability, the main body of the apparatus 10 may be built within a compact frame measuring 71cm x 47cm x 60cm and with a gross weight of no more than 90 kg, including a 36-litre water tank 14, to supply water for at least the first three minutes to extinguish a fire. The apparatus may be mounted on a push trolley so
10 that it can be more easily transported from one point to another.

Figure 2 is an elevation view from the left side of the apparatus of Figure 1 illustrating the motor 12, pump 20 and water tank 14 used with the apparatus 10. The motor 12 drives a pump 20 which pumps water from the water tank 14 out of
15 the apparatus 10 from a water outlet 22. The pump 20 may be a radial pump capable of producing high pressures of up to 150 bars, and the pump 20 is preferably able to atomise the water droplets into fine water-mists.

Figure 3 is an elevation view from the right side of the apparatus 10 of Figure 1. It also illustrates a water inlet 24 into the water tank 14 to provide water from a
20 water source to the water tank 14.

Figure 4 is a schematic view of the connections between a water-mist gun 26, high-pressure attack hose 32 for connection to the water-mist apparatus 10, pump 20, motor 12, water tank 14, and supply hose 52 when the apparatus 10 is
25 deployed for use. The high-pressure attack hose 32 connects the water-mist gun 26 to the apparatus 10. The supply hose 52 provides uninterrupted water supply from a water source to the water tank 14.

30 The water-mist gun comprises a handguard 28, handle 29 and nozzle 30 respectively. A hose 32 has quick coupling means 34, 36 at each end to connect

to the handle 29 of the water-mist gun 26 and water inlet 22 respectively. Optionally, a hose reel 38 may be included to wind longer lengths of hoses 32.

5 The motor 12 of the apparatus 10 further includes a fuel tank 13 storing petrol to drive the motor 12. Water is fed into the pump 20 from the water tank 14 via an internal pipe 42 running from the water tank 14 to the pump 20 that includes water valves 44, 45 at either end.

10 A significant feature of the apparatus 10 is that the water in the water tank 14 can be re-filled by any low-pressure and/or low-flow water supply, such as a domestic tap. Thus, in the case of an apartment fire, water can be drawn from a tap from an adjacent apartment or a service tap along the corridor. This has the advantage of avoiding the running of heavy hoses and operating the water risers, yet providing an uninterrupted supply of water for firefighting.

15 In order to refill the water tank 14 with water if the contents are insufficient, Figure 4 shows how water may be fed from a domestic tap to the water tank 14 for continued water-flow. To do so, a supply hose 52 is connectable at its ends to the water inlet 24 of the water tank 14 and to the domestic tap 56. Quick coupling means 50, 51 are located at each end of the supply hose 52 to achieve quick coupling. If the length of the supply hose 52 is long, a second hose reel 54 can optionally be included for winding the supply hose 52 for extension as well as storage.

25 Figure 5 is an elevation view of a water-mist gun 26 usable with the water-mist apparatus 10. It includes a handguard 28 for directing the water-mist spray and a handle 29 including a trigger 31 for controlling the spray. It has a nozzle 30 for expelling a spray of water-mist, which will be described in further detail below.

30 Figure 6a is the front view of the nozzle 30 usable with the apparatus 10 in accordance with the preferred embodiment of the invention. The nozzle 30 is

preferably made of brass for strength. The nozzle 30 should be durable and be able to smash through glass to reach a fire.

5 Figure 6b is a plan view of the nozzle 30 of Figure 6a. The tip 60 of the nozzle 30 has a nozzle orifice 62 and a plurality of nozzle orifices 62 are also spread around the nozzle 30 from which water is expelled. Preferably, the nozzle 30 has four nozzle orifices 62. The diameter of the tip 60 is preferably 12mm in diameter and the diameter of each nozzle orifice 62 is preferably 1mm.

10 The nozzle 30 preferably offers a discharge rate of 12 litres per minute. It is preferably capable of a 60-degree coverage from its nozzle with an effective throwing distance of 6-8 metres. The low discharge rate ensures that the water discharge can be continuous although the water tank 14 is replenished by a water source with a relatively low rate of flow, such as a domestic tap.

15 Figure 6c is a sectional view along line A-A of Figure 6a. Water from the high-pressure hose will enter the water-mist gun 26 and into the nozzle 30 through the water inlet 64 and into the reducing chamber 66. The high pressure will cause the water to be atomised via the water reducer 68 and out into the open through
20 the mist orifices 62 as fine water mist.

While a particular embodiment of the invention has been shown and described, it will be appreciated by those skilled in the art that changes and modifications of the present invention may be made without departing from the invention in
25 broadest aspects. As such, the scope of the invention should not be limited by the particular embodiment and specific construction described herein but should be defined by the appended claims and equivalents thereof. Accordingly, the aim in the appended claims is to cover all such changes and modifications as fall within the spirit and scope of the invention.



CLAIMS

1. Fire-fighting apparatus comprising a water supply, a nozzle for producing
5 a water spray, and a pump for pumping water from the water supply to the
nozzle.
2. Fire-fighting apparatus according to claim 1, wherein the water supply is
connectable to a mains water supply.
- 10 3. Fire-fighting apparatus according to claim 2, wherein the water supply is
connectable to a domestic water tap.
4. Fire-fighting apparatus according to any preceding claim, wherein the
15 water supply comprises a reservoir for storing water.
5. Fire-fighting apparatus according to any preceding claim, wherein the
pump is a high pressure water pump.
- 20 6. Fire-fighting apparatus according to claim 5, wherein the pump is capable
of producing a pressure of up to 150 bar.
7. Fire-fighting apparatus according to any preceding claim, wherein the
nozzle is capable of producing a water mist.
- 25 8. Fire-fighting apparatus according to any preceding claim, wherein the
nozzle has a discharge rate of 12 litres per minute or less.
9. Fire-fighting apparatus according to any preceding claim, wherein the
30 nozzle is capable of breaking glass.



10. Fire-fighting apparatus according to any preceding claim, wherein the apparatus is transportable.
11. Fire-fighting apparatus according to claim 10, wherein the apparatus is
5 mounted on wheels.