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Method and installation for fighting fire

5 The present invention relates to a method and an installation for fighting fire, in which a number of hydraulic accumulators are utilized for delivering extinguishing liquid to a number of spray heads or sprinklers.

10 The extinguishing liquid is usually driven out of the hydraulic accumulators by means of propellant gas, which is preferably nitrogen gas, though air can be used as well. The propellant gas shall generally be capable of having an initial charging pressure of about 100 bar.

15 Necessary pressure gas containers or bottles are mainly charged in advance somewhere else than where they are used. Accordingly, there is always a certain risk that the propellant gas is wasted e.g. due to a leakage, before the fire-fighting installation is actually needed. On land, this does not generally imply any
20 larger problem, while on ships and objects comparable with them, which lack necessary charging equipment, this risk is not considered acceptable.

The object of the invention is to eliminate this problem.

25 The procedure according to the invention is mainly such that, at a first stage, the hydraulic accumulators are filled with gas up to available pressure, and subsequently at a second stage, the accumulators are filled with liquid under a desired initial charging
30 pressure, so that the liquid compresses the gas to the desired initial charging pressure.

35 There are preferably a number of liquid containers connected in parallel and a number of propellant gas containers likewise connected in parallel to the liquid containers, whereby the propellant gas of the gas

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containers is arranged to drive the liquid out of the liquid containers. At such an installation, the preferred procedure is that, at the first stage, all liquid containers as well as all propellant gas containers are filled with gas with available pressure, and subsequently, liquid is pumped into the liquid containers so that the liquid drives the gas out of the liquid containers and into the propellant gas containers, whereby the pressure in the propellant gas containers rises in proportion to the amount of gas from the liquid containers to the gas containers.

Accordingly, if the total volume of the liquid containers is for instance double as big as the volume of the gas containers, it is possible to achieve in this way a propellant gas pressure which is usable for fire-fighting and three times as high as the gas pressure available otherwise.

On ships, for instance, there is usually no available gas having a pressure higher than about 35 bar, i.e. so-called start air for diesel engines, etc. Thanks to the invention, this start air can charge the drive unit of a fire-fighting installation to a pressure of about 100 bar without difficulty.

When air is used as propellant gas in a hydraulic accumulator unit for fire-fighting, it is usually not desirable that the propellant air flows with the extinguishing liquid to the seat of fire. This can be avoided by providing the liquid containers with floating bodies closing an outlet aperture for the liquid after the containers have been emptied of liquid. For this purpose, the floating bodies may be provided e.g. with conical elements, which penetrate into the liquid outlet aperture when the container is empty and plug it up. The floating bodies are preferably provided with corresponding elements also on the gas side for securing that li-



quid does not penetrate into the propellant gas containers while the liquid containers are filled.

5 The invention will be described in the following in greater detail with reference to a preferred embodiment shown in the attached drawing.

10 In the drawing, a drive unit of an installation for fighting fire is indicated by reference numeral 1. The drive unit comprises four liquid containers 2 and two propellant gas containers 3; the number of the containers 2 and 3 may vary as desired. In the drawing, the drive unit is ready for use with the containers 2 entirely filled with liquid and with the propellant gas containers 3 charged to a pressure of about 100 bar. At an activation, the gas containers 3 are connected, one
15 at a time or simultaneously, to a common feeder line 4, whereby the gas presses the liquid out of the containers 2 via a common outlet line 5 and a feeder line 6 to a current fire zone 7.

20 Floating bodies arranged in the containers 2 are indicated by 8, a gas feeder line from a separate gas source, e.g. so-called start air for diesel engines etc. on a ship, is indicated by 9 and a liquid pump of about 100 bar is indicated by 10.

25 When necessary, if the propellant gas in the containers 3 were wasted for some reason, the drive unit may be charged to a state ready for use in the following way by means of start air from the line 9, which start air can be supposed to have a pressure of about 35 bar. At a first stage, all containers 2 and 3 are filled with
30 start air to a pressure of 35 bar, and subsequently, the line 9 is closed. At a second stage, the containers 2 are filled with liquid by means of the pump 10, the liquid driving the initially fed gas out of the containers 2 into the containers 3. If each container 2 and 3, re-



spectively, has the same size, the containers 3 will be charged to a pressure of about 100 bar.

5 At an activation of the installation, the
floating bodies 8 sink downwards in the containers 2 as
soon as the liquid is driven out and reaches the bottom
of the respective container when it has been entirely
emptied. Since it is not usually desirable that the
propellent air flows with the extinguishing liquid to
the seat of fire, the floating bodies 8 are preferably
10 arranged to close the outlet aperture in the bottom of
the respective liquid container 2. For this purpose, the
floating bodies may be provided e.g. with conical ele-
ments penetrating into the liquid outlet aperture and
closing it when the container is empty. The floating
15 bodies are preferably provided with corresponding
elements also on the gas side, for securing that liquid
is not penetrating into the propellent gas containers
while the liquid containers are filled. To construct
closing elements like that does not cause any difficulty
20 for one skilled in the art, and therefore, they are not
shown in detail in the drawing.

 The number of liquid containers 2 and gas con-
tainers 3, as well as their mutual volumes, may vary
according to wishes. No separate gas containers are
25 needed, but the liquid containers may be closed at the
top, whereby it is naturally sufficient with a valve
effect downwards by the floating bodies 8. Between the
floating bodies 8 and the enclosing container wall,
there is a distinct space, preferably somewhat bigger
30 than the drawing gives impression of, due to which the
containers 2 can have a simple "rough" construction
without surface finish. Instead of so-called start air,
any other available gas source can be used.





Claims:

1. A method for fighting fire, in which a drive unit comprising a number of hydraulic accumulators is utilized for delivering extinguishing liquid to a number of spray heads or sprinklers, characterized in that, at a first stage, the hydraulic accumulators (2, 3) are filled with gas up to available pressure, and subsequently at a second stage, the accumulators are filled with liquid under a desired initial charging pressure, so that the liquid compresses the gas to the desired initial charging pressure.

2. A method according to claim 1, in which the drive unit comprises a number of liquid containers connected in parallel and a number of propellant gas containers likewise connected in parallel to the liquid containers, whereby the propellant gas of the gas containers is arranged to drive the liquid out of the liquid containers, characterized in that, at the first stage, all liquid containers (2) as well as all propellant gas containers (3) are filled with gas with available pressure, and subsequently, liquid is pumped into the liquid containers so that the liquid drives the gas out of the liquid containers and into the propellant gas containers, whereby the pressure in the propellant gas containers rises in proportion to the amount of gas from the liquid containers to the gas containers.

3. A method according to claim 2, especially for ships and the like, characterized in that, at the first stage, all liquid containers (2) as well as all propellant gas containers (3) are filled with so-called start air for diesel engines, etc.

4. A method according to any of the foregoing claims, characterized in that floating





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bodies (8) arranged in the liquid containers (2) are utilized for closing a liquid outlet aperture of the container when the container is empty and preferably also a possible inlet aperture for gas when the container is filled with liquid.

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Abstract

A method for fighting fire, in which a drive unit comprising a number of hydraulic accumulators is utilized for delivering extinguishing liquid to a number of spray heads or sprinklers. The procedure for avoiding a premature waste of propellant gas is that, at a first stage, the hydraulic accumulators (2, 3) are filled with gas, and subsequently at a second stage, the accumulators are filled with liquid, so that the liquid compresses the gas.

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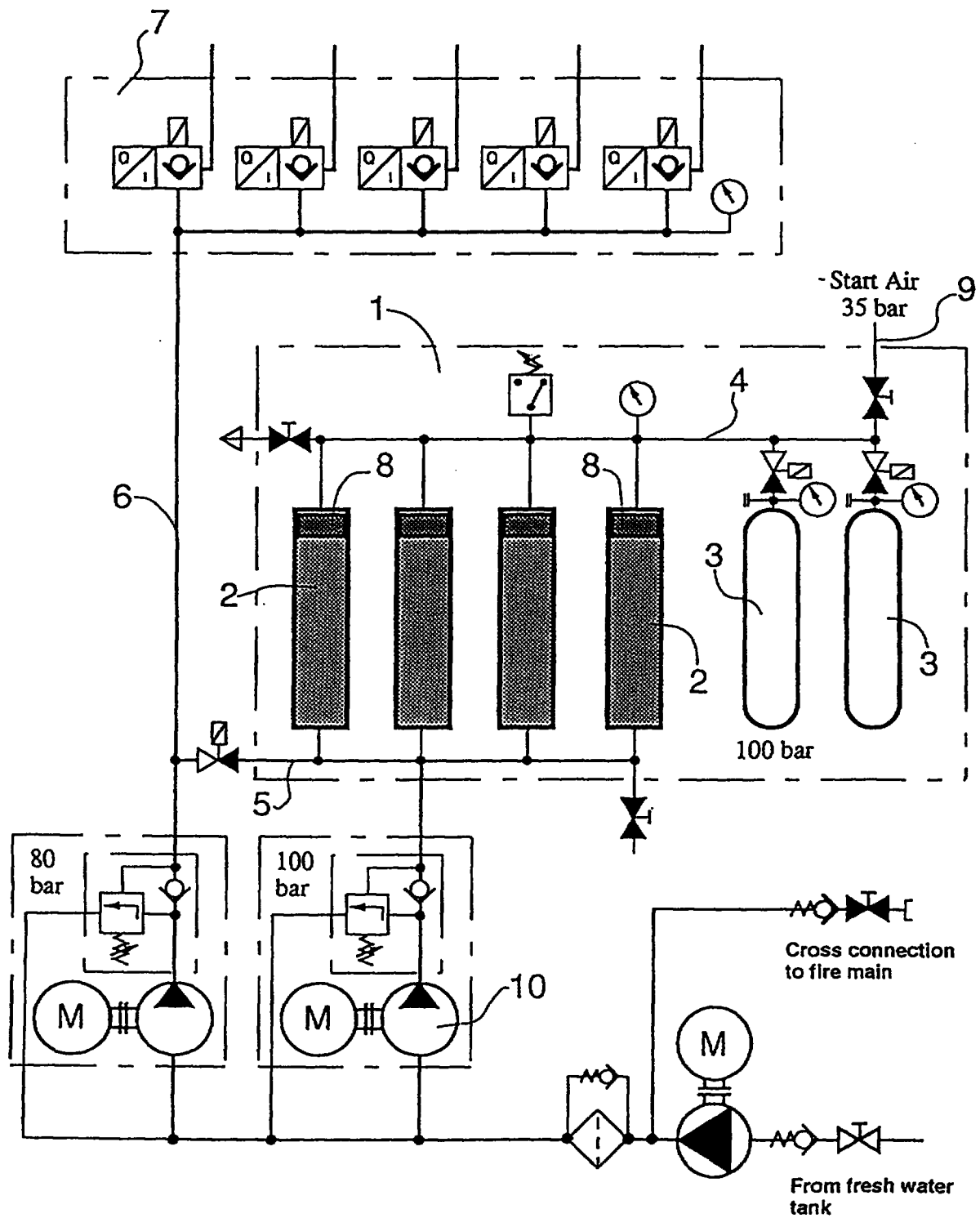
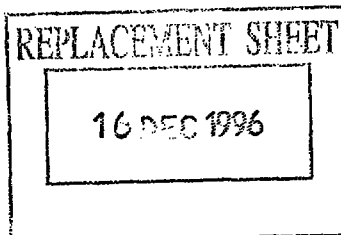


Fig. 1

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Abstract

Method and installation for fighting fire

A method for fighting fire, in which a drive unit comprising a number of hydraulic accumulators is utilized for delivering extinguishing liquid to a number of spray heads or sprinklers. The procedure for avoiding a premature waste of propellant gas is that, at a first stage, the hydraulic accumulators (2, 3) are filled with gas, and subsequently at a second stage, the accumulators are filled with liquid, so that the liquid compresses the gas.

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Charging of Accumulators for Fire Fighting

The present invention relates to a method and an installation for fighting fire, in which a number of hydraulic accumulators are utilized for delivering extinguishing liquid to a number of spray heads or sprinklers.

The extinguishing liquid is usually driven out of the hydraulic accumulators by means of propellant gas, which is preferably nitrogen gas, though air can be used as well. The propellant gas shall generally be capable of having an initial charging pressure of about 100 bar.

Necessary pressure gas containers or bottles are mainly charged in advance somewhere else than where they are used. Accordingly, there is always a certain risk that the propellant gas is wasted, e.g. due to a leakage, before the fire-fighting installation is actually needed. On land, this does not generally imply any larger problem, while on ships and objects comparable with them, which lack necessary charging equipment, this risk is not considered acceptable.

It is preferably an advantage of the present invention to eliminate this problem.

In accordance with a first aspect of the present invention, there is provided a method for fighting fire, whereby a drive unit comprising a number of hydraulic accumulators is utilized for delivering extinguishing liquid to a number of spray heads or sprinklers, characterized in that, at a first stage, the hydraulic accumulators are filled with gas from a gas source having a first pressure, and subsequently at a second stage, the accumulators are filled with liquid under a desired initial charging pressure, so that the liquid compresses the gas in the accumulators to the desired initial charging pressure.

There are preferably a number of liquid containers connected in parallel and a number of gas containers likewise connected in parallel to the liquid containers, whereby gas of the gas containers is arranged to drive

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liquid out of the liquid containers. At such an installation, the preferred procedure is that, at the first stage, all liquid containers as well as all gas containers are filled with the gas from the gas source having a first pressure, and subsequently, liquid is pumped into the liquid containers so that the liquid drives the gas out of the liquid containers and into the gas containers, whereby the pressure in the gas containers rises in proportion to the amount of gas driven from the liquid containers to the gas containers.

Accordingly, if the total volume of the liquid containers is for instance double as big as the volume of the gas containers, it is possible to achieve in this way a gas pressure which is usable for fire-fighting and three times as high as the gas pressure available otherwise.

On ships, for instance, there is usually no available gas having a pressure higher than about 35 bar, i.e. so-called start air for diesel engines, etc. Thanks to the invention, this start air can charge the drive unit of a fire-fighting installation to a pressure of about 100 bar without difficulty.

When air is used as propellant gas in a hydraulic accumulator unit for fire-fighting, it is usually not desirable that the propellant air flows with the extinguishing liquid to the seat of fire. This can be avoided by providing the liquid containers with floating bodies closing an outlet aperture for the liquid after the containers have been emptied of liquid. For this purpose, the floating bodies may be provided e.g. with conical elements, which penetrate into the liquid outlet aperture when the container is empty and plug it up. The floating bodies are preferably provided with corresponding elements also on the gas side for securing that liquid does not penetrate into the gas containers while the liquid containers are filled.

In accordance with a second aspect of the present

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invention, there is provided a method for fighting fire using a source of fire-extinguishing liquid, a source of gas at an available pressure, and interconnected hydraulic accumulators including at least one gas container and at least one liquid container, said method comprising:

charging said hydraulic accumulators, said charging comprising,

interconnecting said hydraulic accumulators into fluid communication with each other,

initially filling said hydraulic accumulators with said gas at said available pressure from said source of said gas, and

subsequently filling said liquid container with said fire-extinguishing liquid from said source of said fire-extinguishing liquid so that said fire-extinguishing liquid drives said gas from said liquid container into said gas container and compresses said gas in said gas container to a desired initial charging pressure; and

directing said fire-extinguishing liquid toward the fire upon occurrence of the fire, said directing comprising,

pressing said fire-extinguishing liquid out of said liquid container with said gas in said gas container at said charging pressure toward the fire.

One preferred embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawing which

Fig. 1 shows a schematic diagram of one preferred embodiment of the present invention.

In the drawing, a drive unit of an installation for fighting fire is indicated by reference numeral 1. The drive unit comprises four liquid containers 2 and two propellant gas containers 3; the number of the containers 2 and 3 may vary as desired. In the drawing, the drive unit is ready for use with the containers 2 entirely filled with liquid and with the propellant gas containers 3 charged to a pressure of about 100 bar. At an activation, the gas

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containers 3 are connected, one at a time or simultaneously, to a common feeder line 4, whereby the gas presses the liquid out of the containers 2 via a common outlet line 5 and a feeder line 6 to a current fire zone 7.

Floating bodies arranged in the containers 2 are indicated by 8, a gas feeder line from a separate gas source, e.g. so-called start air for diesel engines etc. on a ship, is indicated by 9 and a liquid pump of about 100 bar is indicated by 10.

When necessary, if the propellant gas in the containers 3 were wasted for some reason, the drive unit may be charged to a state ready for use in the following way by means of start air from the line 9, which start air can be supposed to have a pressure of about 35 bar. At a first stage, all containers 2 and 3 are filled with start air to a pressure of 35 bar, and subsequently, the line 9 is closed. At a second stage, the containers 2 are filled with liquid by means of the pump 10, the liquid driving the initially fed gas out of the containers 2 into the containers 3. If each container 2 and 3, respectively, has the same size, the containers 3 will be charged to a pressure of about 100 bar.

At an activation of the installation, the floating bodies 8 sink downwards in the containers 2 as soon as the liquid is driven out and reaches the bottom of the respective container when it has been entirely emptied. Since it is not usually desirable that the propellant air flows with the extinguishing liquid to the seat of fire, the floating bodies 8 are preferably arranged to close the outlet aperture in the bottom of the respective liquid container 2. For this purpose, the floating bodies may be provided e.g. with conical ele-

ments penetrating into the liquid outlet aperture and closing it when the container is empty. The floating bodies are preferably provided with corresponding elements also on the gas side, for securing that liquid is not penetrating into the propellant gas containers while the liquid containers are filled. To construct closing elements like that does not cause any difficulty for one skilled in the art, and therefore, they are not shown in detail in the drawing.

The number of liquid containers 2 and gas containers 3, as well as their mutual volumes, may vary according to wishes. No separate gas containers are needed, but the liquid containers may be closed at the top, whereby it is naturally sufficient with a valve effect downwards by the floating bodies 8. Between the floating bodies 8 and the enclosing container wall, there is a distinct space, preferably somewhat bigger than the drawing gives impression of, due to which the containers 2 can have a simple "rough" construction without surface finish. Instead of so-called start air, any other available gas source can be used.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method for fighting fire, whereby a drive unit comprising a number of hydraulic accumulators is utilized for delivering extinguishing liquid to a number of spray heads or sprinklers, c h a r a c t e r i z e d in that, at a first stage, the hydraulic accumulators are filled with gas from a gas source having a first pressure, and subsequently at a second stage, the accumulators are filled with liquid under a desired initial charging pressure, so that the liquid compresses the gas in the accumulators to the desired initial charging pressure.

2. A method according to claim 1, whereby the drive unit comprises a number of liquid containers connected in parallel and a number of propellant gas containers likewise connected in parallel to the liquid containers, whereby propellant gas of the propellant gas containers is arranged to drive the liquid out of the liquid containers, c h a r a c t e r i z e d in that, at the first stage, all liquid containers as well as all propellant gas containers are filled with the gas from the gas source having the first pressure, and subsequently, liquid is pumped into the liquid containers so that the liquid drives the gas out of the liquid containers and into the propellant gas containers, whereby the pressure in the propellant gas containers rises in proportion to the amount of gas from the liquid containers to the propellant gas containers.

3. A method according to claim 2, especially for ships, c h a r a c t e r i z e d in that, at the first stage, all liquid containers as well as all propellant gas containers are filled with so-called start air for diesel engines.

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4. A method according to any one of the foregoing claims, c h a r a c t e r i z e d in that floating bodies arranged in the liquid containers for closing a liquid outlet aperture of the container when the container is empty.

5. A method according to claim 4, c h a r a c t e r - i z e d in that gas inlet apertures of the containers are closed by said floating bodies when the liquid containers are filled with liquid.

6. A method for fighting fire using a source of fire-extinguishing liquid, a source of gas at an available pressure, and interconnected hydraulic accumulators including at least one gas container and at least one liquid container, said method comprising:

charging said hydraulic accumulators, said charging comprising,

interconnecting said hydraulic accumulators into fluid communication with each other,

initially filling said hydraulic accumulators with said gas at said available pressure from said source of said gas, and

subsequently filling said liquid container with said fire-extinguishing liquid from said source of said fire-extinguishing liquid so that said fire-extinguishing liquid drives said gas from said liquid container into said gas container and compresses said gas in said gas container to a desired initial charging pressure; and

directing said fire-extinguishing liquid toward the fire upon occurrence of the fire, said directing comprising,

pressing said fire-extinguishing liquid out of said liquid container with said gas in said gas container at said charging pressure toward the fire.

7. A method for fighting fire substantially as hereinbefore described with reference to the accompanying drawing.

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ABSTRACT

CHARGING OF ACCUMULATORS FOR FIRE FIGHTING

A method for fighting fire, in which a drive unit comprising a number of hydraulic accumulators is utilized for delivering extinguishing liquid to a number of spray heads or sprinklers. The procedure for avoiding a premature waste of propellant gas is that, at a first stage, the hydraulic accumulators (2, 3) are filled with gas, and subsequently at a second stage, the accumulators are filled with liquid, so that the liquid compresses the gas.

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