

(19)



(11)

EP 1 539 301 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
03.10.2007 Bulletin 2007/40

(21) Application number: **03703568.0**

(22) Date of filing: **29.01.2003**

(51) Int Cl.:
A62C 5/02 (2006.01) **A62C 31/12** (2006.01)

(86) International application number:
PCT/SE2003/000141

(87) International publication number:
WO 2003/068321 (21.08.2003 Gazette 2003/34)

(54) **FIRE EXTINGUISHING ARRANGEMENT**

FEUERLÖSCHANORDNUNG

SYSTEME EXTINCTEUR D'INCENDIE

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT SE SI SK TR**

(30) Priority: **12.02.2002 SE 0200390**

(43) Date of publication of application:
15.06.2005 Bulletin 2005/24

(73) Proprietors:
• **Hed, Tommy**
239 30 Skanör (SE)
• **Ängman, Gösta**
291 97 Gärd's Köpings (SE)

(72) Inventors:
• **Hed, Tommy**
239 30 Skanör (SE)
• **Ängman, Gösta**
291 97 Gärd's Köpings (SE)

(56) References cited:
DE-A1- 19 520 265 US-A1- 4 047 571
US-A1- 5 113 945

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 539 301 B1

Description

[0001] The present invention relates to a fire extinguishing arrangement, which is preferably but not exclusively intended for stationary installation in buildings, means of transport, and similar.

[0002] Various systems have been suggested for achieving extinguishing in the event of a fire, as is known, which systems are sufficiently efficient to make it possible to evacuate a building such that injury to persons is prevented.

[0003] The water stations with hoses that are installed in hotels and in other frequently visited buildings are normally unsatisfactory, not only because it takes time to connect nozzles, hoses, etc., and the effect is often unsatisfactory, but also because it is not possible due to aesthetic considerations to arrange the water outlet in the most appropriate manner. Furthermore, it must also be considered that the water damage that arises as a consequence of extinguishing with water is often considerable.

[0004] Sprinkler systems have the advantage of, in a manner of speaking, always being in a state of readiness, but the effect is far too low to be able to guarantee safe evacuation.

[0005] Foam extinguishers are efficient, but since the foam is particularly bulky even before it is deployed, such arrangements can be used only to a limited extent, and it cannot be expected that they will be used completely rationally when panic has arisen. This is of major significance due to the short period during which output of foam from a container of limited size can take place. Powder extinguishers are principally associated with the disadvantage of having a very limited radius of action and a very limited time of action.

[0006] Document US-A-4 047 571 discloses a fire extinguishing arrangement comprising all the features set out in the preamble of claim 1.

[0007] The aim of the invention has been to achieve a simple and cheap arrangement that is efficient enough to make it possible to evacuate a building, means of transport, etc.

[0008] The invention has been designed in accordance with the attached claims, in order to achieve this and other aims.

[0009] Some embodiments of the invention are shown in the attached drawings for the purpose of example.

Figure 1 thus shows in principle a water pipe with an attached device for the production of foam.

Figure 2 shows a water pipe with an attached extinguishing unit.

Figure 3 constitutes a plan view of a part of a building with a fire extinguishing arrangement according to the invention.

Figure 4 shows a perspective view of a modified arrangement, and

Figure 5 constitutes a section through the arrangement according to Figure 4, and finally,

Figure 6 constitutes a frontal view of a fixed fire extinguishing unit.

[0010] According to the invention, problems of the type described above during the extinguishing of a fire are solved through a compound, which will be referred to as "foam compound", that forms an extinguishing foam when combined with water, and which is maintained until the occasion of use separate from the water, and through the said water, which acts not only in the formation of the foam but also as propellant for it, is placed under pressure. It is also appropriate that the water is obtained from a water pipe of essentially conventional design.

[0011] A foam compound is used for the production of extinguishing foam by being mixed with water in predetermined proportions. The foam that is developed in this way has a significantly greater volume than the combined volume of the water and the compound, and it must be realised that it will be possible, by storing only the relatively low volume of foam compound, to achieve a very great volume of foam, since the amount of water is added gradually, at least in buildings that have a fixed water supply installation. One litre of foam compound provides approximately 1 m³ of foam.

[0012] The arrangement in its simplest form according to Figure 1 comprises a water pipe 1, provided with a number of outlets 2 and the stopcocks 3 associated with these. A tube 4 can be connected to each of these outlets, which tube communicates via a second tube 5 with a dosing device 6, which in turn is connected through a tube 7 to a container 8 containing the foam compound.

[0013] When the stopcock 3 is opened, water under pressure will flow through the tube 4 towards a spreader nozzle 9 that is connected to the tube. The dosing device 6, however, achieves mixing of the water during its passage through the tube 4 with a specific amount of foam compound, leading to the medium that leaves the relevant nozzle consisting of foam.

[0014] It is appropriate in practice to combine the container that contains the foam compound with the dosing device to create a foam extinguisher unit that can be connected in a simple manner to any outlet on the water pipe, and it is further appropriate to construct the dosing device in such a manner that it is controlled directly by the water pressure.

[0015] Figure 2 constitutes an example of such a device. The foam extinguishing unit has been given the general reference numeral 10, and it is constituted by a tube 11 that forms at one end an externally directed connection flange 12. A throttle nozzle 13 and a diffusion nozzle 14 are arranged in the tube 11, and the tube demonstrates a thread 15 or similar for the attachment of a

spreader nozzle 16 at the opposite end to that of the flange 12. The tube 11 is in communication via a thinner tube 17 with a closed container 18, which contains the foam compound 19. It is appropriate that a hole 20 for air intake, which is normally held closed by a check valve 21, is arranged in the upper part of the container. The nozzles 13 and 14 are designed and arranged relative to each other and to the tube 17 such that they form, in combination with the said tube 17 and the tube 11, an ejector pump, and it will be realised that the water that is held under pressure will, on the opening of the stopcock, achieve not only the dosed mixing of water and foam compound, but also the formation of foam and the output of foam. Naturally, the stopcock 3 should be designed such that it can be rapidly turned to a fully open position, and naturally, known devices can be arranged to achieve instantaneously the desired suction effect through hoses.

[0016] Arrangements of the type described here can be so designed that they can produce continuous pathways or carpets of foam, and such an design is shown in Figure 3, intended for, for example, passage from a hotel room to a lift or similar.

[0017] In this connection, 24 denotes hotel rooms and 25 denotes corridors leading to a lift 26. By laying down a water pipe 1 according to Figure 3 and by attaching to several of the outputs from this pipe foam extinguishing units 10 with spreader nozzles oriented according to a system determined in advance, it is possible when the units are activated to achieve continuous carpets of foam 27, on which the hotel guests can advance to reach the lift 26.

[0018] Naturally, it is possible to automate the procedure of extinguishing the fire to a high degree by, for example, allowing a fire alarm to initiate the procedure for extinguishing the fire a short time after the actual alarm has been given.

[0019] In order to exploit the available amount of foam compound, arrangements can be made in order to interrupt the process after a predetermined period and subsequently resume it, either automatically after a predetermined period or following manual influence.

[0020] It is also possible to design the foam extinguishing units 28, according to Figure 4, in such a manner that they normally adopt a position of preparedness, from which they very rapidly can be brought into an operational position. In the design shown, a number of such foam extinguishing units 28 each hang from a thread 29, attached for example to the ceiling directly above an outlet 2 in a water pipe 1. The foam extinguishing units in this way demonstrate control sections 31a, 31b that maintain them in a straddle position above the pipe 1. The container 32 for each of the units can thus be positioned under the pipe 1 and a tube 33 can be placed in connection through a thinner tube 34 with the container 32 in essentially the same manner as the tube 17 in Figure 2, and the tube 33 can thus via a bent section open out above the relevant outlet 2. The outlet can, in this way, demonstrate a valve seating 35, and a valve body 36 can

interact in a sealing manner with the valve seating 35 through the effect of the water pressure, appropriately supported by a spring 37. A release rod 38 for the foam extinguishing unit is so arranged that when the foam extinguishing unit is allowed to fall, through the cutting, for example, of the thread 29, it rapidly opens the valve 36 and in this way initiates the extinguishing procedure. In the design shown, a calibrated ball 39 suspended in the tube 33 is intended to provide the negative pressure that ensures that an amount of foam proportional to the amount of flowing water is added to the water for the production of foam.

[0021] Naturally, the water pipe 1 does not need to be stationary, and a hose fed by a motor-driven pump can be envisaged, which pipe demonstrates a number of outputs or, where relevant, preinstalled extinguishing units according to the invention. Naturally it is also possible to connect, for example, a high-pressure pump for the purposes of increasing the pressure. A mobile arrangement can thus be combined with a fixed arrangement, for example, of the type described above, and interaction between fire extinguishing arrangements that are present on the site and mobile arrangements brought into place by, for example, the fire service, can thus arise, resulting in a particularly efficient fire extinguishing process.

[0022] It can be mentioned as an example that 200 litres of foam per minute have been achieved at a working pressure of 2.5 kg, and approximately 500 litres per minute at a pressure of 6 kg.

[0023] Using a container with a volume of 3 litres, a period of action of approximately 15 minutes is achieved at a working pressure of 2.5 kg, which can be compared to the period of action of approximately 20-30 seconds offered by a powder extinguisher. At the same time, a distance of action of 4-5 metres is obtained, while it is necessary to approach essentially right up to the fire when using a powder extinguisher.

[0024] The fire extinguishing unit in the embodiment shown in Figure 6 has the form of a cabinet 40 that demonstrates on its front surface an opening 41 through which a length of hose 42 designed for the intended use can be inserted and removed. The venturi tube 17 that is used for withdrawal by suction of the foam compound from the exchangeable container 18 is terminated at its lower end by a strainer or a filter 43, and the supply of water takes place through a throttle valve 44, which is connected to the actual ejector, and which is calibrated according to the dimension of the hose that is being used in the particular situation. The spreader nozzle 45 is located readily available in the upper, open part of the cabinet. The fire extinguishing operation is produced by means of a stopcock 46, the control lever of which is located easily accessible on the front surface of the cabinet.

Claims

1. A fire extinguishing arrangement comprising a pipe (1) that contains water under pressure, at least one container (8, 18, 32) containing a compound that can form, in combination with water, a fire-extinguishing foam and means (2-7, 9) for connecting the water pipe with the container and with a spreader nozzle (9) or similar, in such a manner that fire-extinguishing foam is produced and ejected through the said nozzle, **characterised in that** a number of containers (8) are arranged along the extension of the pipe, each containing a foam extinguisher compound, that the said containers are connected to branches or outlets each through a dosing device (6) that is constituted by an ejector pump (11, 13, 14, 17), that spreader nozzles (9) are arranged and that stopcocks (3) are arranged in order to hold the compound and the water normally separate from each other, while in the event of use allowing the compound to be mixed with water to form a foam and the output of the said foam through the spreader nozzles.
2. The arrangement according to claim 1, **characterised in that** a container (18) for foam compound is arranged in a cabinet (40), together with an ejector pump connected to the container, a stopcock (46) that normally prevents communication of the water pipe with the container and the ejector pump, and a hose (42) connected to the outlet side of the ejector pump, which pipe when in its folded condition is contained within a volume in the cabinet equipped with an outlet opening (41) and terminated by a nozzle (45).
3. The arrangement according to claim 1, **characterised in that** a water pipe in a building has such an extent that it principally follows the main routes of escape, that the containers are placed at such a distance from each other, have such a capacity and have nozzles so directed that when in use essentially continuous carpets of foam are formed in order to make rapid evacuation of the building possible.
4. The arrangement according to claim 1, **characterised in that** containers with their associated dosing devices, connection pipes and spreader nozzles are designed as a unit (10), which is installed such that it can be rapidly placed in connection with outlets (2) from a water pipe and to establish, appropriately in association with the connection, communication between the interior of the water pipe and the interior of the unit.
5. The arrangement according to claim 1, **characterised in that** the container and means (3) for achieving connection of the water pipe with the container such that output of the foam is made possible are combined to one unit (10) and that the pipe demonstrates a number of outlets (2) each of which said outlet and units (10) offers elements that can interact with each other by means of which a rapid connection and communication can be achieved.
6. The arrangement according to claims 1-5, **characterised in that** the units (28) are suspended such that they are normally located immediately above the pipe (1) and are thus not in contact with the pipe, while on activation or breakage of the suspension (29) they will automatically come into contact and communication with the pipe.
7. The arrangement according to claim 1, **characterised in that** devices are arranged for connection of the water pipe with the containers, which devices achieve the said connection following a signal from a fire-detection means and it is appropriate that the said devices at the same time emit warning signals.
8. The arrangement according to claim 2, **characterised in that** a throttle valve (44) is connected to the ejector pump.

Patentansprüche

1. Eine Feuerlöscheinrichtung mit einem Löschschlauch (1) mit unter Druck stehendem Wasser und mit mindestens einem Behälter (8, 18, 32) mit einem Mittel, das bei Zuführung von Wasser einen Feuerlöschschaum bildet, sowie Einrichtungen (2-7, 9) zum Anschluss des Wasserschlauchs an den Behälter und einem Schaumrohr (9) o.ä. in einer Weise, dass Feuerlöschschaum durch besagtes Schaumrohr erzeugt und ausgeworfen wird, **dadurch gekennzeichnet, dass** eine Reihe von Behältern (8), die jeweils ein Löschschaummittel enthalten, so entlang des Rohrverlängerungsstücks angeordnet sind, dass die besagten Behälter jeweils mittels einer Dosiereinrichtung (6), die aus einer Strahlsaugpumpe (11,13,14, 17) besteht, an die Zweigleitungen bzw. Auslassöffnungen angeschlossen sind, und dass desweiteren Schaumrohre (9) eingerichtet sind sowie Absperrhähne (3), damit Löschschaummittel und Wasser normal von einander getrennt sind, aber im Einsatzfall das Löschschaummittel mit dem Wasser gemischt werden kann, um Löschschaum zu bilden und den Auswurf des besagten Löschschaums durch die Schaumrohre zu bewirken.
2. Die Einrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** ein Behälter (18) für das Schaummittel in einem Schrank (40) eingerichtet ist, zusammen mit einer an den Behälter angeschlossenen Strahlsaugpumpe, einem Absperrhahn (46), der normalerweise den Durchfluss vom Wasserrohr zum

Behälter und zur Strahlsaugpumpe unterbricht, und einem Schlauch (42), der an der Auslassseite der Strahlsaugpumpe angeschlossen ist, deren Schlauchrohr in zusammengefaltetem Zustand in einem Bereich des Schrankes aufbewahrt wird und mit einer Auslassöffnung (41) und einer Spritzdüse (45) ausgerüstet ist.

3. Die Einrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** ein Wasserschlauch in einem Gebäude über ein solches Ausmaß verfügt, dass er sich hauptsächlich über die Hauptfluchtwege erstreckt, und dass die Behälter in solchen Abständen von einander angeordnet sind, über eine solche Kapazität verfügen und ihre Spritzdüsen so ausgerichtet haben, dass sie im Einsatz im Wesentlichen durchgehende Schaumteppiche bilden, damit eine schnelle Evakuierung des Gebäudes ermöglicht wird.
4. Die Einrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Behälter jeweils mit ihren zugehörigen Dosiereinrichtungen, Anschlussschläuchen und Schaumrohren als ein einzelnes Gerät (10) konstruiert sind, das entsprechend so installiert wird, dass es sich in kürzester Zeit an die Auslassöffnungen (2) eines Wasserschlauchs anschließen lässt und entsprechend angemessen mit diesem Anschluss eine Verbindung zwischen dem Inneren des Wasserschlauchs und dem Inneren des Geräts herstellt.
5. Die Einrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** Behälter und Einrichtungen (3), die den Anschluss des Wasserschlauchs an den Behälter in einer Weise bewirken, dass er den Auswurf des Schaums ermöglicht, in einem Gerät (10) kombiniert werden, und dass der Schlauch eine Reihe von Auslassöffnungen (2) aufweist, wobei sich jede dieser besagten Auslassöffnungen und jedes der besagten Geräte (10) durch Elemente auszeichnet, die miteinander kommunizieren können, wodurch sich ein rapide schneller Anschluss und eine rapide schnelle Verbindung erzielen lassen.
6. Die Einrichtung nach Ansprüchen 1 bis 5, **dadurch gekennzeichnet, dass** die Geräte (28) so hängend angeordnet werden, dass sie sich gewöhnlich unmittelbar oberhalb des Schlauchs (1) befinden und somit nicht mit dem Schlauch in Berührung kommen, während sie bei einer Aktivierung bzw. Unterbrechung der aufhängung (29) automatisch mit dem Schlauch in Berührung kommen und eine Verbindung herstellen.
7. Die Einrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** Vorrichtungen zum Anschluss des Wasserschlauchs an die Behälter eingerichtet werden, wobei die Vorrichtungen den besagten An-

schluss nachfolgend eines Signals von einer Brandmeldeeinrichtung bewirken, und es ist entsprechend angemessen, dass besagte Vorrichtungen ebenfalls im selben Moment Warnsignale abgeben.

8. Die Anordnung nach Anspruch 2, **dadurch gekennzeichnet, dass** eine Drosselklappe (44) an die Strahlsaugpumpe angeschlossen ist.

Revendications

1. Un dispositif d'extinction de feu comprenant un tuyau (1) qui contient de l'eau sous pression, au moins un récipient (8, 18, 32) contenant une préparation qui, associée à l'eau, est susceptible de former une mousse d'extinction de feu, ainsi que des dispositifs (2-7, 9) de connexion entre le tuyau d'eau et le récipient et une buse (9), ou similaire, de manière à ce que la mousse d'extinction de feu puisse se former et être éjectée par ladite buse, **caractérisée par le fait qu'un certain nombre de récipients (8) sont disposés le long du tuyau, contenant chacun une préparation de mousse d'extinction, et que lesdits récipients sont connectés à des branchements ou à des sorties, chacun par l'intermédiaire d'un dispositif de dosage (6) constitué d'une pompe d'éjection (11, 13 14, 17), et que des buses (9) sont disposées ainsi que des robinets d'arrêt (3), afin de maintenir séparées, en temps normal, la préparation et l'eau, tout en permettant, en cas d'utilisation, à la préparation de se mélanger à l'eau pour former une mousse, ainsi que l'éjection de celle-ci par les buses.**
2. Une installation conforme à l'exigence 1, **caractérisée par le fait qu'un récipient (18) réservé à la préparation de mousse est disposé dans une armoire (40), avec une pompe d'éjection reliée au récipient, un robinet (46), qui en temps normal empêche la communication entre le tuyau d'eau et le récipient avec la pompe d'éjection, ainsi qu'un tuyau (42) connecté au côté sortie de la pompe d'éjection, et que ce tuyau, quand il est plié, est disposé dans un espace de l'armoire équipé d'une ouverture de sortie (41), et se termine par une buse (45).**
3. Une installation conforme à l'exigence 1, **caractérisée par le fait que, dans un bâtiment, le tuyau d'eau est disposé de manière à suivre les principales voies d'évacuation, que les récipients sont disposés à telle distance l'un de l'autre, ont la capacité suffisante, et sont munis de buses dirigées de telle manière qu'en cas d'utilisation, des tapis continus de mousse se forment afin de permettre l'évacuation rapide du bâtiment.**
4. Une installation conforme à l'exigence 1, **caractérisée par le fait que les récipients avec leurs dispo-**

sitifs de dosage, leurs tuyaux de connexion et leurs buses sont conçus comme un ensemble (10), installé de manière à pouvoir être rapidement relié aux sorties (2) d'un tuyau d'eau et à établir, de préférence au moment de la connexion, la communication entre l'intérieur du tuyau d'eau et l'intérieur de l'ensemble.

5. Une installation conforme à l'exigence 1, **caractérisée par le fait que** le récipient et les dispositifs (3) prévus pour établir la connexion entre le tuyau d'eau et le récipient, afin de permettre l'éjection de la mousse, sont réunis en un seul ensemble (10), que le tuyau comporte un certain nombre de sorties (2) et que chaque sortie et les ensembles (10) présentent des éléments capables d'interagir afin de permettre l'obtention d'une connexion et d'une communication rapides.
6. Une installation conforme aux exigences 1-5, **caractérisée par le fait que** les ensembles (28) sont suspendus de manière à être normalement situés directement au-dessus du tuyau (1), et, par conséquent, ne sont pas en contact avec celui-ci, tandis qu'en cas d'activation ou de suspension (29) défectueuse, ils entrent automatiquement en communication avec le tuyau.
7. Une installation conforme à l'exigence 1, **caractérisée par le fait que** les dispositifs sont disposés en vue de la connexion du tuyau d'eau avec les récipients, et que ces dispositifs effectuent ladite connexion à la suite d'un signal provenant des dispositifs de détection du feu, tout en émettant des signaux d'alarme.
8. Une installation conforme à l'exigence 2, **caractérisée par le fait qu'une** soupape d'étranglement (44) est connectée à la pompe d'éjection.

5

10

15

20

25

30

35

40

45

50

55

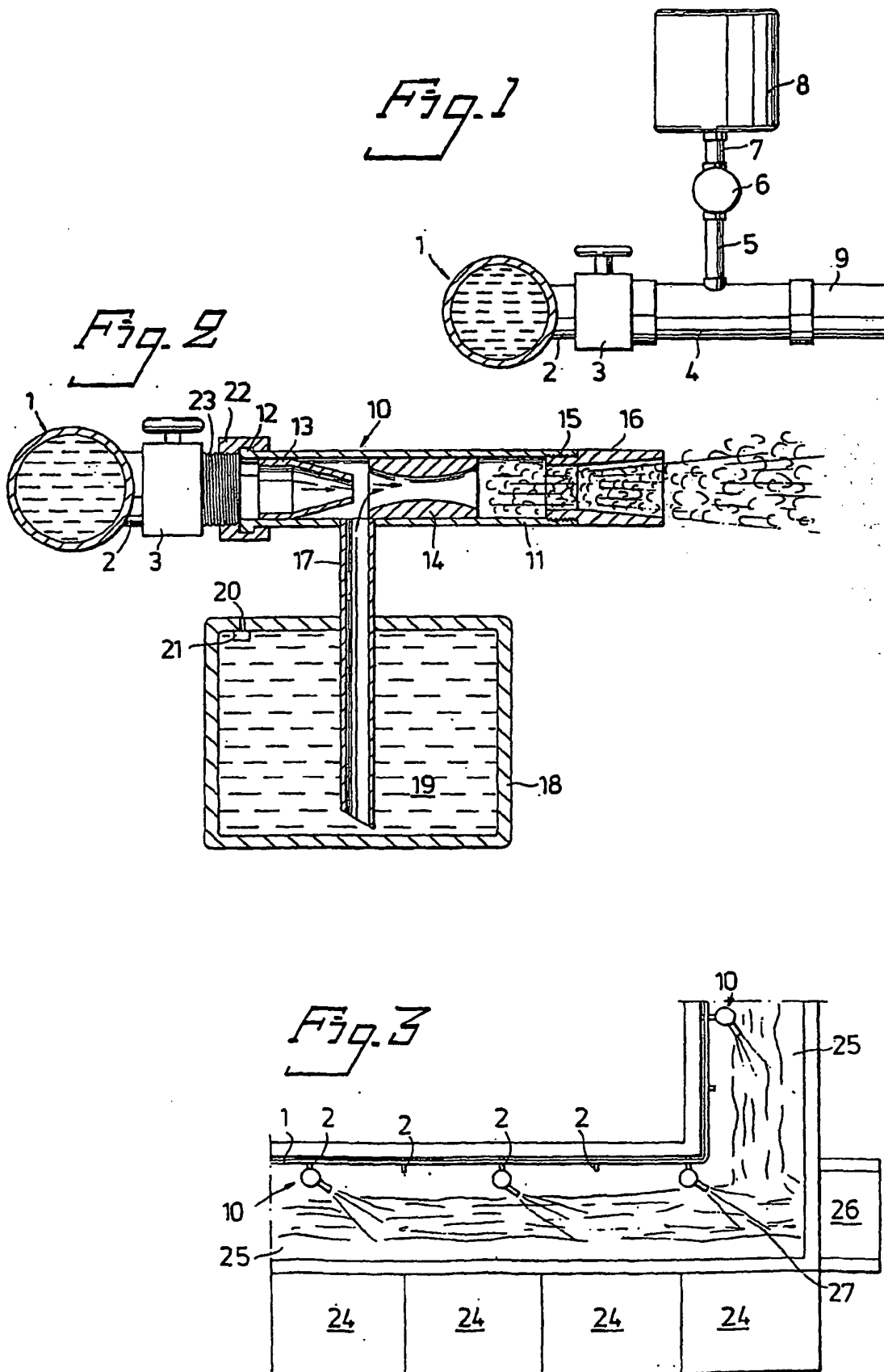


Fig. 4

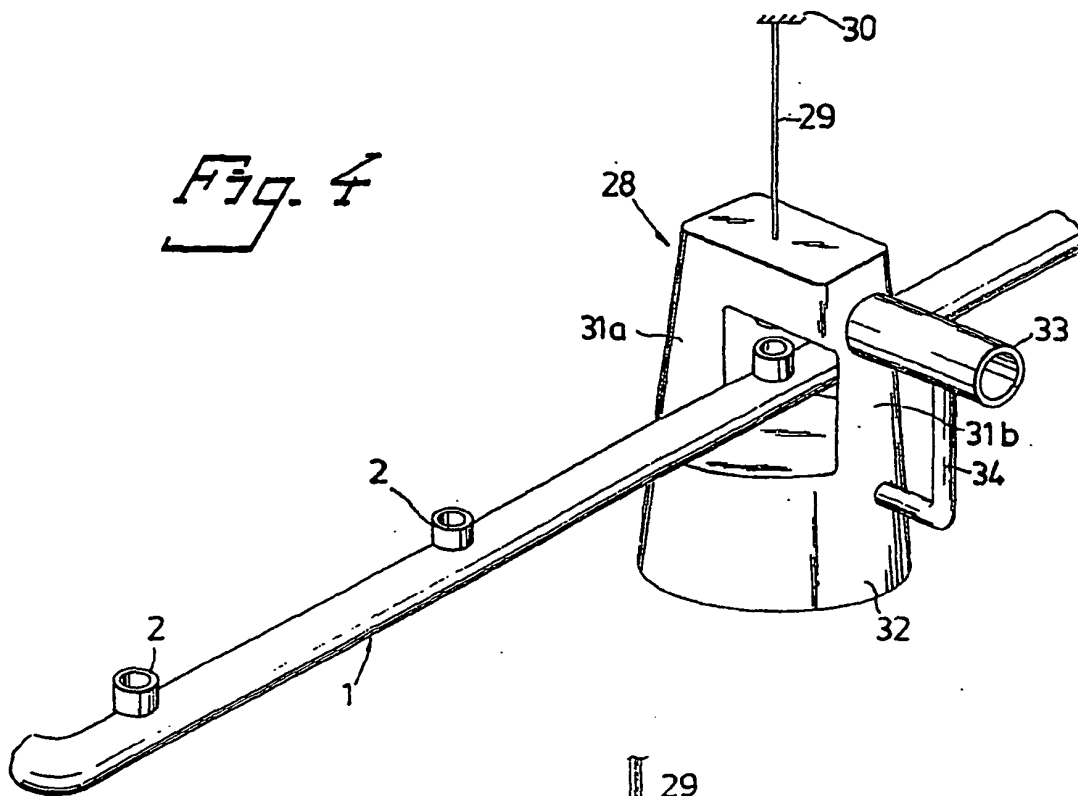
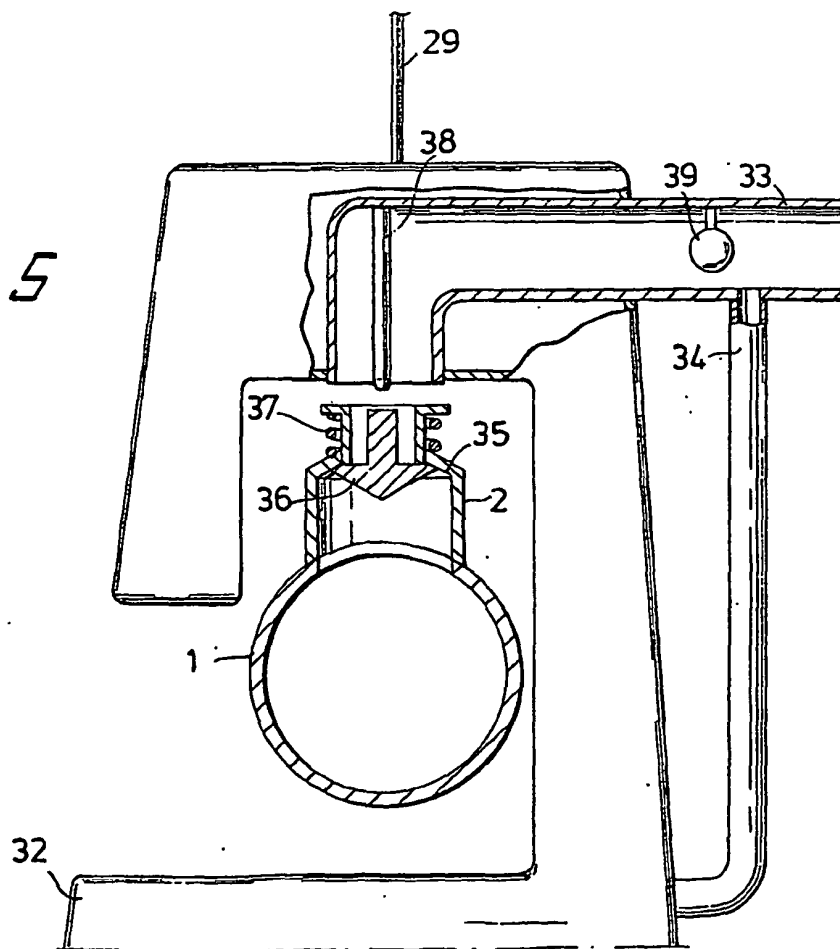
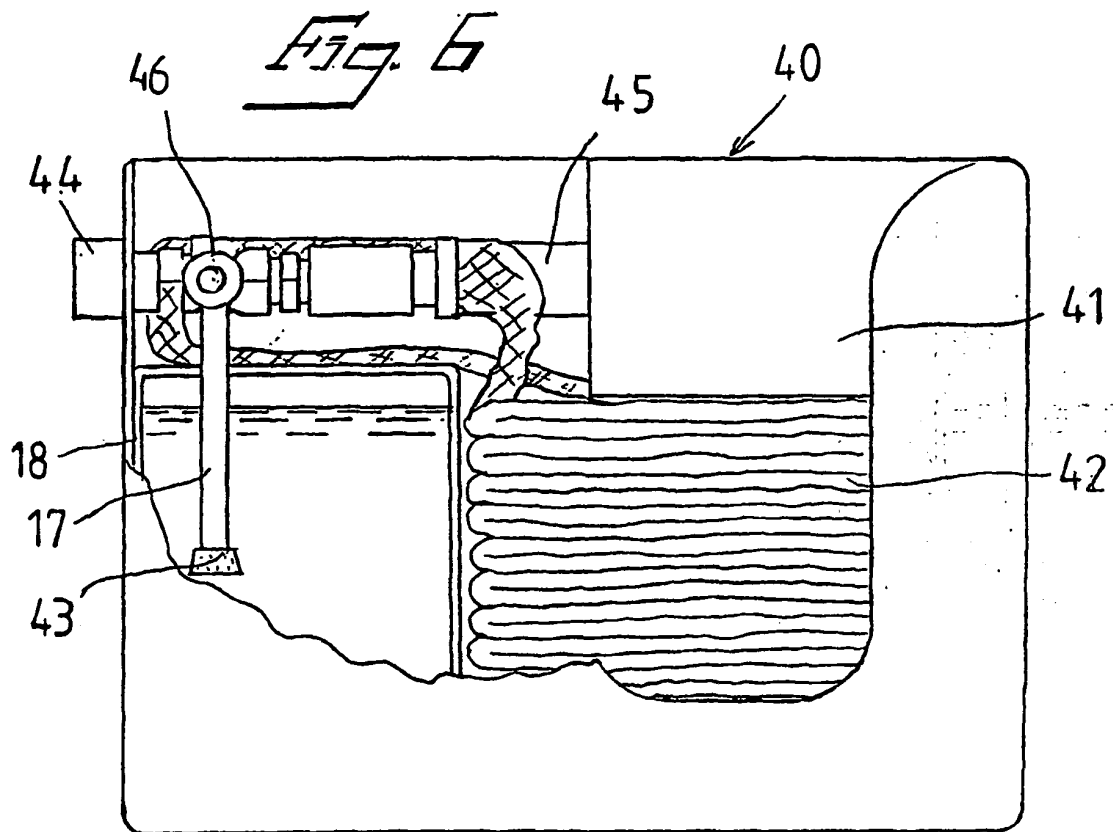


Fig. 5





REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 4047571 A [0006]