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(54) **A DEVICE AND A SYSTEM FOR SUPPLYING MATERIAL TO AN APPLICATION SITE AND USE OF SUCH A DEVICE AND SYSTEM**

VORRICHTUNG UND SYSTEM ZUR ZUFÜHRUNG VON MATERIAL AN EINE ANWENDUNGSSTELLE UND VERWENDUNG SOLCH EINER VORRICHTUNG UND SOLCH EINES SYSTEMS

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(56) References cited:
CN-U- 203 556 086
US-A- 4 762 257
US-A- 5 433 288
US-A1- 2010 001 028

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Description

FIELD OF THE INVENTION

[0001] The invention relates to a device for supplying a hardening and pumpable or blowable or sprayable building material to a material application site. This type of device is, for example, used for supplying a moist, wet, liquid, semi-liquid or paste material to an application site or a surface, such as a floor, a roof or a wall structure, wherein the material hardens to form a solid surface or coating. A device according to the invention is useful for flooring, wherein a flooring material, such as a cementitious flooring material, anhydrite flooring material or similar, is supplied to a floor structure. One common type of flooring materials of this type is screed, underlayment, overlayment and other floor levelling materials. Such devices can also be used for supplying façade materials, such as rendering materials, and other types of materials, such as plaster, resin, etc. to a wall structure or other types of structures. The invention also relates to a system for supplying a hardening and pumpable or blowable building material to a material application site. The invention also relates to the use of such a device and the use of such a system.

PRIOR ART

[0002] Flooring material, such as screed, is generally provided by means of a truck containing said flooring material. The flooring material is supplied from the truck to an application site through a hose by pumping. The pump is, for example, arranged on the truck. The hose is connected to a material supply of said truck and extends to the application site, such as into a building structure. According to the prior art the hose is handled manually by an operator to distribute the flooring material, wherein the operator carries the hose and positions a free end of the hose at the desired application site. Generally, the hose is handled manually by a first operator and a second operator, wherein the first operator handles an outlet end of the hose for application of the flooring material at the desired position, and wherein the second operator lifts and moves the hose in suitable positions between the outlet and the truck to facilitate for the first operator to position the outlet end of the hose at the desired position.

[0003] One problem with prior art systems for supplying a flooring material to a floor structure is that the working conditions are adverse. The operators are subject to heavy loads during long periods of time. Hence, there is a need for improvement of the working conditions for the operators during supply of heavy pumpable or blowable or sprayable materials for flooring or render applications. Know prior art devices and systems are shown in US 5 433 288, US 4 762 257, US 2010/001028 and CN 203 556 086 U.

SUMMARY OF THE INVENTION

[0004] As a result of extensive research it has been found that the working posture of a flooring operator applying flooring material on an application site according to the prior art is adverse, wherein the operator is subject to increased risk for musculoskeletal disorders, particularly in the neck and the lower back. When flooring operations are performed by a first operator handling an outlet end of a hose for supplying the flooring material, and a second operator positioning a middle portion of the hose according to the prior art, the first operator may be subject to increased risk of disorders in the neck and lower back due to forward bending in combination with heavy loads during long periods of time, wherein the second operator may be subject to increased risk of disorders in the neck, lower back and shoulders due to repetitive lifting, pulling and carrying of the hose.

[0005] An object of the invention is to avoid the above mentioned problem of the prior art and provide a device and a system for supplying a hardening and pumpable or blowable or sprayable building material to a material application site which result in improved working conditions and reduces the risk of musculoskeletal disorders for at least one of the operators. Building materials of this type are generally heavy and often requires a heavy duty hose to be conducted a substantial distance by pumping or blowing. Hence, the combination of hose and material is heavy and cumbersome for manual handling according to the prior art.

[0006] The present invention relates to a device for supplying a hardening and pumpable or blowable or sprayable building material to a material application site, comprising a hose for conducting said material from a material supply to an operator manually distributing said material on the application site by means of the device, the device comprises a load distribution support and a connector, wherein the load distribution support is connectable to the operator and comprises one or more connecting devices, and wherein the connector is connected to the hose and is connectable to the one or more connecting devices of the load distribution support to form an articulated connection between the support and the hose, so that the hose is supported on the operator through the articulated connection when the device is operated by the operator to distribute said material on the application site. The device according to the invention results in a favourable load distribution during operations, such as flooring operations with flooring materials in the form of screed, cementitious flooring materials, anhydrite flooring materials and similar, and improved working conditions for the operators.

[0007] The load distribution support can comprise a waist belt and optionally one or two shoulder straps to form a harness. Such a load distribution support can quickly and easily be connected to the operator and distributes the load efficiently to the hip and shoulders of the operator.

[0008] The device comprises a flexible tube connected to the hose. The hose can be a heavy duty hose adapted for transportation of cementitious materials, wherein the hose is quite rigid and heavy and is not easily bent or handled manually by the operator. The flexible tube can more easily be bent and carried over the shoulder of the operator than the hose. Further, the flexible tube can facilitate distribution of the material as it more easily than the hose can be bent in the desired direction. The flexible tube can be lighter and more flexible than the hose. Hence, the flexible tube results in a device which is easier and lighter to handle for the operator, which further reduces the risks of musculoskeletal disorders for the operator.

[0009] The flexible tube can be connected to a rigid tube to be gripped and handled by the operator, wherein the flexible tube is arranged between the hose and the rigid tube. The rigid tube can be lighter than the hose. Hence, the rigid tube forms a manoeuverable part of the device, which can be directed in different directions due to the flexible tube.

[0010] The rigid tube can be connected to a foldable tubing, such as a soft rubber tubing, to be manually folded by the operator to more easily prevent material from dripping from the device, e.g. when a pump for pumping the material or a compressor for blowing the material has been turned off and the device is to be moved to another position or location. The foldable tubing can be more flexible than the hose and the flexible tube, wherein the foldable tubing is easier to fold manually than the hose and the flexible tube. Hence, undesired drops of the hardening material on a floor structure can more easily be avoided.

[0011] The connecting device can be arranged on a back part of the load distribution support, such as on the back part of the waist belt or on the back part of a harness. The connecting device can be arranged in a lower central part of such a harness. Hence, the hose can be connected to the back of the load distribution support, wherein the flexible tube can be arranged over the shoulder of the operator while the rigid tube is handled in front of the operator to efficiently distribute the load and provide a favourable working posture for flooring operations. Alternatively, the connecting device can be arranged at a side part of the load distribution support, such as on a side part of the waist belt or the harness, so that the hose can be carried at the hip of the operator while the flexible tube and the rigid tube can extend in the front of the operator to provide efficient load distribution and a favourable working posture.

[0012] The connector can be connected to the hose through a swivel, so that the connector is rotatable around the hose. Hence, adverse effects due to forces applied on the connector by the hose can be avoided when the hose is positioned and moved around at a building site or similar.

[0013] The connector can be displaceable along the hose. Hence, the connector can be positioned at the desired position along the hose. Further, the flexible tube, the rigid tube and the foldable tubing can be removed, e.g. intentionally or due to disorders, wherein the connector can be positioned correctly and be connected to the load distribution support while the hose is arranged on the shoulder of the operator or is handled directly by the operator in another way.

[0014] The connecting device can be arranged as a wire extending between side portions of the load distribution support, wherein the connector is displaceable along said wire. The wire results in increased movability of the hose and flexible tube in the lateral direction, which is particularly useful when the flexible tube is arranged over the shoulder of the operator. Further, the wire can be connected to the load distribution support through quick release fasteners, such as pins, wherein the wire rapidly can be disconnected from the load distribution support in an emergency.

[0015] The shoulder strap or both of the shoulder straps can be provided with a guide, such as a soft, bent or moulded article forming a groove, for receiving and engaging a part of the flexible tube or the hose on the shoulder of the operator. Hence, by means of the guide the flexible tube is held safely in position on the shoulder of the operator. The shoulder strap and/or the guide can comprise a soft and/or insulating material to reduce impact from the hose or flexible tube and insulate from cold material.

[0016] The connector can be arranged on a handle, such as a handle arranged between the connector and the hose, wherein the hose with the connector easily can be lifted, moved and connected to the connecting device.

[0017] The invention also relates to a system for supplying a hardening and pumpable or blowable or sprayable building material to a material application site, comprising a device as mentioned above, said device comprising a first load distribution support to be used by a first operator applying said material on the application site, wherein the system comprises a second load distribution support to be used by a second operator positioning a portion of the hose, and a tool with a connector for connection with a connecting device of the second load distribution support. Hence, an efficient system is provided, e.g. for flooring applications, wherein improved working conditions for the first and second operators are achieved.

[0018] Further characteristics and advantages of the present invention will become apparent from the description of the embodiments below, the appended drawings and the dependent claims.

SHORT DESCRIPTION OF THE DRAWINGS

[0019] The invention will now be described more in detail with the aid of embodiment examples and with reference to the appended drawings, in which

Fig. 1 is a schematic view illustrating a first operator

and a second operator handling a device for supplying hardening and pumpable or blowable or sprayable building material to a material application site according to one embodiment of the present invention,

Fig. 2 is a schematic side view of the first operator and a part of the device according to Fig. 1, wherein a part of a hose, a flexible tube, a rigid tube, a foldable tubing and a load distribution support of the device are illustrated more in detail,

Fig. 3 is a schematic view of a back of the first operator, illustrating a back part of the load distribution support, a part of the hose and a part of the flexible tube according to one embodiment,

Fig. 4 is a schematic view of the back of the first operator illustrating the back part of the load distribution support, a part of the hose and a part of the flexible tube according to one alternative embodiment,

Figs. 5 and 6 are schematic views of a portion of the device according to one embodiment, illustrating the foldable tubing more in detail,

Figs. 7 and 8 are schematic views of a portion of the device according to one alternative embodiment, illustrating the foldable tubing more in detail,

Figs. 9 and 10 are schematic views of a tool with a connector for connecting the hose to the load distribution support according to one embodiment,

Fig. 11 is a schematic view illustrating a first operator and a second operator handling a system and the device for supplying a hardening and pumpable or blowable or sprayable building material to a material application site according to one embodiment of the present invention,

Fig. 12 is a schematic view illustrating a first operator and a second operator handling the system and the device for supplying a hardening and pumpable or blowable or sprayable building material to a material application site according to an alternative embodiment of the present invention,

Fig. 13 is a schematic view of the first operator and a part of the device according to Fig. 12, wherein a part of the hose, the load distribution support, the flexible tube, the rigid tube and the foldable tubing are illustrated more in detail,

Fig. 14 is schematic view of a tool connected to the hose according to one embodiment,

Fig. 15 is schematic view of the second operator using the tool according to Fig. 14,

Fig. 16 is schematic view of the tool connected to the hose according to one alternative embodiment,

Fig. 17 is schematic view of the second operator using the tool according to Fig. 16,

Figs. 18 and 19 are schematic views of the connector according to another embodiment, and

Figs. 20-23 are schematic front and side views illustrating a tool for gripping and carrying the hose according to one embodiment.

THE INVENTION

[0020] Referring to Fig. 1 a device 10 for supplying a hardening and pumpable or blowable or sprayable building material to a material application site is illustrated schematically according to one embodiment. The device 10 is arranged for manual distribution of a material, such as a moist, wet or liquid material e.g. in the form of cementitious flooring material, an anhydrite flooring material or similar types of materials, an underlayment or overlayment, on a floor structure, a foundation or similar. For example, the device 10 is arranged for supplying the material to a substantially horizontal surface. Alternatively, the device 10 is also arranged for supplying a material, such as plaster, rendering, a resin and similar materials to a surface, such as a wall structure or other types of structures. For example, the device 10 is arranged for a relatively heavy material, e.g. having a density of at least 400 kg/m^3, 1000 kg/m^3 or 2000 kg/m^3. The device 10 is intended for use on a construction site for building, repairing or renovating a structure.

[0021] The device 10 comprises a hose 11, such as a main hose, and a load distribution support 12. The hose 11 is arranged for conducting the material from a material supply (not illustrated in the drawings) to an operator 13 manually distributing said material on the application site by means of the device 10. For example, the material supply is a remote material supply arranged several meters, such as at least 5 or 10 meters from the application site. For example, the material supply comprises a considerable amount of material, such as at least 100 kg, 500 kg or 1000 kg, and cannot be carried by the operator 13. For example, the hose 11 is connected to a truck comprising the material supply. The hose 11 is arranged for conducting the material from the material supply to the application site by pumping or blowing. For example, the truck is provided with a pump or a compressor for conducting the material by pumping or blowing. Alternatively, the hose 11 or material supply is connected to a separate pump or compressor for pumping or blowing the material through the hose 11. Alternatively, the hose 11 is connected to a material supply in the form of a tank, bag or silo provided nearby the application site, wherein

the material is pumped or blown to the application site by a pump or compressor. Alternatively, the material is mixed nearby the application site in a mixer, wherein the hose 11 is connected to the mixer and then conducted through the hose 11 by means of the pump or compressor. For example, the device 10 is arranged for supplying material continuously from the material supply to the application site through the hose 11 during a material supplying operation, such as a flooring operation.

[0022] In the embodiment of Fig. 1 the device 10 is operated by a first operator 13a, wherein the hose 11 or a portion of the hose 11 is handled by a second operator 13b. The first operator 13a distributes the material on the application site and the second operator 13b adapts the position of the hose 11 between the first operator 13a and the material supply. Hence, the second operator 13b moves suitable portions of the hose 11 to facilitate for the first operator 13a to position a material outlet to the desired position.

[0023] The load distribution support 12 is arranged for distributing the load of the hose 11 and any material inside the hose 11 to facilitate distribution of the material and improve the working conditions of the first operator 13a. In the embodiment of Fig. 1 the first operator 13a uses the load distribution support 12, wherein the second operator 13b supports the hose 11 directly on his shoulder.

[0024] With reference also to Fig. 2 the device 10 comprises a connector 14 for connecting the hose 11 to the load distribution support 12. The connector 14 is attached to the hose 11. The load distribution support 12 comprises a connecting device 15 for connection to the connector 14. For example, the connector 14 and the connection device 15 are arranged for releasable connection to each other, so that the hose 11 with the connector 14 can be detachably fastened to the load distribution support 12. The connector 14 and the connecting device 15 are arranged to form an articulated connection between the load distribution support 12 and the hose 11 to facilitate for the operator 13 to move during application operations.

[0025] The load distribution support 12 is arranged to be fastened to the first and/or the second operator 13a, 13b. In the embodiment of Fig. 1 the load distribution support 12 is only fastened to the first operator 13a. The load distribution support 12 according to the illustrated embodiment comprises a waist belt 16 and at least one shoulder strap 17. The waist belt 16 is arranged to extend around the waist of the operator 13, wherein the shoulder strap 17 is arranged to extend from a back portion of the waist belt 16, over the shoulder of the operator 13 to a front portion of the waist belt 16. In the embodiment of Figs. 1 and 2 the load distribution support 12 is formed as a harness to be worn by the first operator 13a. During use the operator 13 wears the load distribution support 12, wherein the hose 11 is connected to the load distribution support 12 through the connector 14 and the connecting device 15 so that the hose 11 is supported on the operator 13 by means of the load distribution support 12 when the device 10 is operated by the operator 13 to distribute the material on the application site.

[0026] In the illustrated embodiment the device 10 comprises a flexible tube 18 connected to the hose 11. In the illustrated embodiment the device 10 further comprises a rigid tube 19 and a foldable tubing 20. The hose 11 is arranged between the material supply and the flexible tube 18 and is arranged for conducting the material to the flexible tube 18. For example, the load distribution support 12 is arranged for distributing the load from an end part of the hose 11, the flexible tube 18 and the rigid tube 19 and also any material therein. Alternatively, not being part of the invention, the hose 11 is used to distribute the material on the application site without the flexible tube 18, the rigid tube 19 and the foldable tubing 20, wherein the material outlet is formed by the hose 11. Then, the hose 11 is supported by the load distribution support 12 and gripped and manoeuvred by the operator 13 to distribute the material on the application site. For example, the hose 11 extends over the shoulder of the first operator 13a.

[0027] According to one embodiment, the hose 11 is a relatively stiff and robust steel mesh reinforced rubber hose for pumping flooring materials, concrete and similar materials. For example, the hose 11 is arranged to withstand a pressure for pumping such materials several stories up, such as at least 10 m up and, for example, through a hose 11 that is at least 20 m long. The hose 11 is connected to the flexible tube 18, for example through a coupling 21. In the embodiment of Fig. 2 the connector 14 is arranged substantially at an end of the hose 11 to be connected to the connecting device 15, for example at a lower back position of the first operator 13a.

[0028] The flexible tube 18 is more flexible than the hose 11. Not being covered by the invention, the flexible tube 18 is replaced by a rigid tube arranged with a desired predetermined form, such as a U-shape to be fitted over the shoulder of the operator 13. In the illustrated embodiment the flexible tube 18 is arranged to extend from the coupling 21 at one end of the hose 11 and over the shoulder of the operator 13. For example, the flexibility of the flexible tube 18 allows for the flexible tube 18 to substantially follow the shape of the shoulder of the operator 13. For example, the flexible tube 18 is a relatively light tube, wherein the flexible tube 18 is lighter than the hose 11. For example, the flexible tube 18 is a rubber hose or plastic hose optionally having steel reinforcement, glass fibre reinforcement or other suitable type of reinforcement. According to one embodiment (not illustrated) the device 10 comprises an overflow tube, e.g. at the connection between the hose 11 and the flexible tube 18, to avoid leakage and protect the operator 13 from the material if the flexible tube 18 should break.

[0029] According to Fig. 2 the load distribution support 12 comprises a guide 22 for retaining the flexible tube 18 or the hose 11 at the shoulder of the operator 13. The guide 22 is attached to the exterior side of the shoulder strap 17 and is arranged to extend substantially upwards

when in use. For example, the guide 22 is arc-shaped and is arranged as a shaped, bent or moulded article forming a groove for receiving a portion of the flexible tube 18 or the hose 11 to be supported on the shoulder of the operator 13. For example, the guide 22 is made of a soft and/or insulating material.

[0030] The rigid tube 19 is connected to the flexible tube 18, wherein the flexible tube 18 is arranged between the rigid tube 19 and the hose 11. The rigid tube 19 is arranged to be gripped and handled by the first operator 13a. The rigid tube 19 is more rigid than the flexible tube. For example, the rigid tube 19 is more rigid than the hose 11. For example, the rigid tube 19 is a plastic tube. In the embodiment of Fig. 2 the rigid tube 19 is connected to a foldable tubing 20 forming the material outlet. The foldable tubing 20 is soft and arranged to be folded by the operator 13 between material distribution operations to avoid dripping of material more easily. For example, the foldable tubing 20 is made of soft rubber or other suitable materials. The foldable tubing 20 is more flexible than the flexible tube 18 to be manually folded by the operator 13.

[0031] The connector 14 is, for example, connected to the hose 11 through a sleeve 23. The sleeve 23 is fixed to the hose 11 and encloses a portion thereof. According to one embodiment the sleeve 23 comprises a swivel with the connector 14, wherein the connector 14 is rotatable in relation to the hose 11.

[0032] In the embodiments of Figs. 1-3 the connecting device 15 is arranged at a back portion of the load distribution support 12. For example, the connecting device 15 is arranged at a lower back portion of the load distribution support 12, such as at the waist belt 16. For example, the connecting device 15 is arranged at a central position of the lower back portion of the load distribution support 12. In the embodiment of Fig. 3 the load distribution support 12 comprises a plate 24 arranged at the lower back portion thereof, wherein the connecting device 15 is attached to the plate 24. In the embodiment of Fig. 3 the load distribution support 12 comprises two shoulder straps 17, which optionally are joined in a common vertical back strap 25 as illustrated in Fig. 3. The plate 24 is, for example, attached to the back strap 25 or the waist belt 16.

[0033] The connector 14 and the connecting device 15 are arranged as a detachable connection, such as a quick release connection, e.g. in the form of a link to provide the articulated connection. For example, the connector 14 and the connecting device 15 are arranged as a hook and a loop, respectively, forming the articulated connection between the hose 11 and the load distribution support 12. For example, the connector 14 and/or the connecting device 15 comprise a spring hook. In the embodiment of Fig. 3 the connector 14 is arranged as a loop, for example of metal, which is connected to the hose 11 through the coupling 21. The coupling 21 is, for example, provided with a swivel, so that the connector 14 is rotatable around the hose 11, which is illustrated by the arrows A in Fig. 3. According to one embodiment the articulated connection formed by the connector 14 and the connecting device 15 is arranged so that the hose 11 is articulated or rotatable around a longitudinal axis extending along the hose 11, wherein the hose 11 can be moved somewhat in the lateral direction in relation to the load distribution support 12. For example, the articulated connection formed by the connector 14 and the connecting device 15 is arranged so that the hose 11 is articulated or rotatablearound a lateral axis extending perpendicular to the longitudinal axis, wherein the hose 11 can be moved somewhat in a vertical direction in relation to the load distribution support 12 to compensate for a jerking or pulling effect during pumping of the material through the hose 11. For example the articulated connection formed by the connector 14 and the connecting device 15 is arranged as a link, wherein the articulated connection is articulated in substantially any direction to compensate for twitching and pulling effects of the hose 11 during pumping of the material and also to facilitate for the operator 13 to move around during the application operation. For example, the connecting device 15 comprises an actuator 26 for releasing the connector 14, which actuator 26 is manually operable by the operator 13. The connecting device 15 is, for example, arranged as a spring hook or similar, which can be opened by means of the actuator 26. In the embodiment of Fig. 3, the connector 14 is attached to the coupling 21 through a pivot 27 having an axis of rotation in a direction perpendicular to the longitudinal direction of the hose 11. Alternatively, the connector 14 is attached to the hose 11 through the sleeve 23 in a corresponding manner.

[0034] With reference to Fig. 4 an alternative embodiment is illustrated, wherein the connector 14 is formed as a hook and the connecting device 15 comprises a wire 28. In the embodiment of Fig. 4 the connector 14 is connected to the hose 11 through the coupling 21. For example, the coupling 21 is provided with the swivel, so that the connector 14 is rotatable around the longitudinal axis of the hose 11 as illustrated by the arrows B in Fig. 3. For example, the connector 14 is also pivotable around an axis extending laterally in relation to the longitudinal axis of the hose 11. According to the illustrated embodiment the connector 14 is also rotatable around the wire 28. The connector 14 is detachably connected to the load distribution support 12 through the wire 28. The wire 28 is attached to the load distribution support 12. For example, the wire 28 is attached to side portions of the waist belt 16 through connections 29, wherein the wire 28 extends at least partially in the lateral direction from a left side of the load distribution support 12 to a right side thereof. The connections 29 are, for example, quick release connections manually releasable by the operator 13, such as by pulling a pin of the connection 29 to release the wire 28 from it. The connector 14 is movably connected to the wire 28 and can slide along the wire 28 between the connections 29 as illustrated by means of the arrows C in Fig. 4. For example, the load distribution

support 12 comprises a protecting skirt or plate (not illustrated), e.g. of a plastic material, covering a backside and/or the hip of the operator 13 below the waist to avoid wear of clothing and discomfort for the operator 13 due to contact with the connector 14 or other parts of the device 10.

[0035] With reference to Figs. 5 and 6 a part of the device 10 is illustrated according to one embodiment. The hose 11 is connected to the connector 14 through the sleeve 23 and to the flexible tube 18 through the coupling 21, wherein the flexible tube 18 is connected to the rigid tube 19 provided with the foldable tubing 20. In Fig. 5 the foldable tubing 20 is illustrated in its unfolded position forming an outlet for the material, so that the material can be distributed at the application site through the foldable tubing 20. The foldable tubing 20 is foldable as illustrated by the arrow D in Fig. 6 to its folded position, in which the material is prevented from exiting the folded tubing 20 provided that the pump is turned off. Hence, the foldable tubing 20 is arranged for preventing material from dripping off the material outlet of the device 10 formed by the foldable tubing 20 in the embodiment of Figs. 5 and 6.

[0036] With reference to Figs. 7 and 8 a part of the device 10 is illustrated according to an alternative embodiment, wherein the hose 11 is connected to the connector 14 through the sleeve 23 and to the flexible tube 18 through the coupling 21, wherein the flexible tube 18 is connected to the rigid tube 19 through the foldable tubing 20. In Fig. 7 the foldable tubing 20 is illustrated in its unfolded position forming a conduit for the material, so that the material can be conducted to the rigid tube 19 through the foldable tubing 20. The foldable tubing 20 is foldable as illustrated by the arrow E in Fig. 8 to its folded position, in which the material is prevented from being conducted through the folded tubing 20 to the rigid tube 19 provided that the pump is turned off. Hence, the foldable tubing 20 is arranged for preventing material from reaching the rigid tube 19 to prevent material from dripping from the material outlet of the device 10 formed by the rigid tube 19 in the embodiment of Figs. 7 and 8.

[0037] With reference to Figs. 9 and 10 a tool 30 comprising the sleeve 23 and the connector 14 are illustrated on a portion of the hose 11 according to one embodiment, wherein the sleeve 23 is releasable for positioning of the sleeve 23 and the connector 14 along the hose 11. For example, the sleeve 23 comprises the swivel, so that the connector 14 can be rotated around the hose 11 as described above. Hence, the sleeve 23 with the connector 14 is displaceable along the hose 11 as illustrated by means of the arrows F in Fig. 10, wherein the sleeve 23 can be fixed at the desired position. For example, the sleeve 23 is fixed at the desired position by means of tightening screws 31, which can be loosened for moving the sleeve 23 to another position. Hence, the sleeve 23 forms a hose receiving portion. In the embodiment of Figs. 9 and 10 the device 10 comprises a handle 32 connected to the sleeve 23, wherein the handle 32 can be used for lifting and handling the sleeve 23 with the connector 14 and the part of the hose 11 connected to the sleeve 23. The handle 32 is arranged to be gripped by the operator 13 to facilitate lifting of the hose 11 and connection of the connector 14 to the connecting device 15 of the load distribution support 12.

[0038] With reference to Fig. 11 a system is illustrated according to one embodiment, wherein the first operator 13a wears a first load distribution support 12a and the second operator 13b wears a second load distribution support 12b. The first load distribution support 12a is arranged according to any of the embodiments as described above, i.e. for example, with a waist belt 16 and at least one shoulder strap 17. The hose 11 is connected to the lower back of the first load distribution support 12a by means of the connector 14 and the connecting device 15, wherein the flexible tube 18 extends over the shoulder of the first operator 13a and the first operator 13a handles the rigid tube 19 for distributing the material at the desired application site. Hence, the system comprises the first and second load distribution supports 12a, 12b, the hose 11, the flexible tube 18 and the rigid tube 19 and optionally also the foldable tubing 20. The second load distribution support 12b comprises at least the waist belt 16 and optionally also one or more of the shoulder straps 17. For example, the second load distribution support 12b comprises one or more of the connecting devices 15.

[0039] The system further comprises a hose holding tool 33 connected to the second load distribution support 12b. The hose holding tool 33 is arranged for carrying the hose 11, wherein the weight of the hose 11 and its contents around a carrying point is distributed to the waist belt 16 on the second operator 13b. The hose holding tool 33 comprises a U-shaped hose receiving portion for receiving a portion of the hose 11. For example, the hose holding tool 33 is detachably connected to the second load distribution support 12b, such as by means of a spring hook or similar interacting with a loop or hook or similar structure.

[0040] With reference also to Fig. 12 a system and a device according to an alternative embodiment is illustrated, wherein the first operator 13a is equipped with a load distribution support 12 in the form of a first load distribution support 12a, and the second operator 13b is equipped with the second load distribution support 12b and the hose holding tool 33 according to Fig 11. The first load distribution support 12a according to Fig. 12 is illustrated more in detail in Fig. 13. In Fig. 12 the first load distribution support 12a comprises the waist belt 16 and the shoulder straps 17, wherein the second load distribution support 12b only comprises the waist belt 16. Alternatively, the first and second load distribution supports 12a, 12b are similar.

[0041] The load distribution support 12 of Fig. 13 comprises the waist belt 16, the shoulder straps 17 and the connecting device 15 for connection to the connector 14. The connecting device 15 according to the embodiment of Fig. 13 is arranged at a side portion of the load distri-

bution support 12, such as at a side portion of the waist belt 16. For example, the connecting device 15 is arranged as a spring hook having the actuator 26 or similar as described above. Hence, the load distribution support 12 is arranged so that the hose 11 is carried at the side of the first operator 13a, such as at the hip. The connector 14 is connected to the hose 11, e.g. through the sleeve 23. The hose 11 is connected to the flexible tube 18, which is connected to the rigid tube 19. Optionally, the device 10 also comprises the foldable tubing 20 as described above. According to the embodiment of Fig. 13 the device 10 is arranged so that the first operator 13a manually can handle the rigid tube 19 while the weight of the hose 11 and the material inside the hose 11 are distributed to the body of the first operator 13a through the connecting device 15 of the load distribution support 12 at the hip of the first operator 13a.

[0042] In the embodiment of Fig. 13 the load distribution support 12 is provided with a lamp 34 for illuminating the material application site for the first operator 13a. For example, the lamp 34 is arranged at a lower front portion of the load distribution support 12, such as at a front portion of the waist belt 16. Hence, the lamp 34 is positioned to give the first operator 13a improved visibility of the application site, which can result in a more upright posture of the first operator 13a during the application operation. A more upright working posture has an ergonomically favourable effect.

[0043] With reference to Figs. 14 and 15 a hose lifting and holding tool 35 is illustrated according to one embodiment. The tool 35 comprises a hose receiving portion in the form of a hose clamp 36 for connection to the hose 11. For example, the hose clamp 36 comprises a hinge 37, wherein the hose clamp 36 can be opened for insertion of a portion of the hose 11 and then closed and tightened by screws 38 or similar to attach the hose clamp 36 to the hose 11. The hose clamp 36 is connected to a handle 39 so that the tool 35 can be manually lifted and handled by one of the operators 13 and particularly the second operator 13b. For example, the hose clamp 36 includes a swivel, wherein the handle 39 can be rotated around the hose 11. The handle 39 is provided with the connector 14 for connection with the connecting device 15 of the load distribution support 12. Hence, the tool 35 is arranged to be fastened to the hose 11, wherein the hose 11 can be lifted and moved by means of the tool 35 and also fastened to the load distribution support 12 to be carried by the operator 13. For example, the handle 39 is rotatable around its own longitudinal axis. In the illustrated embodiment the connector 14 is arranged as a loop for interaction with the connecting device 15. The connecting device 15 is, for example, arranged as a spring hook. Alternatively, the connector 14 is arranged as a spring hook or similar, wherein the connecting device 15 is arranged as a loop. The load distribution support 12 is, for example, arranged as described above with reference to Fig. 13, i.e. with a waist belt 16 and optionally at least one shoulder strap 17, wherein the connecting device 15 is arranged at a lower side portion, such as at a side portion of the waist belt 16, so that the connecting device 15 is arranged at the hip of the operator 13.

[0044] With reference to Figs 16 and 17 an alternative embodiment of a hose lifting and holding tool 40 is illustrated. The tool 40 according to the embodiment of Figs. 16 and 17 comprises a hose receiving portion 41 in the form of a curved structure with open ends forming a groove for holding a portion of the hose 11. The hose receiving portion 41 is connected to a handle 42 so that the tool 40 can be manually lifted and handled by one of the operators 13 and particularly the second operator 13b. The handle 42 is connected to one side of the hose receiving portion 41 leaving an opening upwards for insertion of the hose 11, so that the hose receiving portion 41 engages a lower portion of the hose 11. The handle 42 is provided with a connector 14 for connection with the connecting device 15 of the load distribution support 12. Hence, the tool 40 is arranged to engage the hose 11 from below, wherein the hose 11 extends through the hose receiving portion 41, so that the hose 11 can be lifted and moved by means the tool 40 and also fastened to the load distribution support 12 by means of the connector 14. For example, the tool 40 is displaceable along the hose 11. For example, the connector 14 and the connecting device 15 are arranged as a loop and hook, respectively. The load distribution support 12 is, for example, arranged as described above with reference to Fig. 13, i.e. with a waist belt 16 and optionally at least one shoulder strap 17, wherein the connecting device 15 is arranged at a lower side portion, such as at a side portion of the waist belt 16, so that the connecting device 15 is arranged at the hip of the operator 13.

[0045] With reference to Figs. 18 and 19 a connector 14 according to one embodiment is illustrated, wherein the connector 14 is connected to the hose 11. The connector 14 according to the embodiment of Figs. 18 and 19 is arranged as a hook 43, such as a spring hook, provided with the actuator 26. The hook 43 is arranged on a bar 44 connected to the hose 11, e.g. through the sleeve 23 or similar. In the illustrated embodiment, the bar 44 is connected to the sleeve 23 through a pivot 45. The bar 44 is connected to a grip portion 46 to be gripped by the operator 13 when operating the actuator 26. The actuator 26 extends from the hook 43 and is displaceable towards the grip portion 46 for opening the hook 43 to release the connector 14 from the connecting device 15 as illustrated by means of the arrow G in Fig. 19.

[0046] With reference to Figs. 20-23 a tool 47 for gripping and carrying the hose 11 is illustrated according to one embodiment. The tool 47 comprises a hose receiving portion 48, a handle 49 and an elongated bar 50 extending between the hose receiving portion 48 and the handle 49. The tool 47 is arranged with an opening, e.g. in the lateral direction, for inserting the hose 11 into the hose receiving portion 48. The tool 47 also comprises a blocking means 51 for blocking said opening, and an actuator 52 for operating the blocking means 51. For example,

the actuator 52 is displaceable, which is illustrated by means of the arrow H in Fig. 22, to displace the blocking means 51 correspondingly to open the opening, which is illustrated by means of the arrow I in Fig. 23. In the open position of the tool 47, which is illustrated in Fig. 23, the hose 11 can be inserted into the hose receiving portion 48. In the closed position of the tool 47, which is illustrated in Fig. 21, the opening into the hose receiving portion 48 is blocked by the blocking means 51 to prevent the hose 11 from unintentionally leaving the hose receiving portion 48. For example, the actuator 52 is spring biased towards the closed position. Alternatively, the actuator 52 is manually displaceable to close the opening, wherein the actuator optionally is spring biased towards the open position. For example, the tool 47 comprises the connector 14 (not illustrated), wherein the tool 47 is connectable to the load distribution support 12.

Claims

1. A device (10) for supplying a hardening and pumpable or blowable or sprayable building material to a material application site, comprising a hose (11) for conducting said material from a material supply to an operator (13) manually distributing said material on the application site by means of the device (10), the device (10) comprises a load distribution support (12) and a connector (14), wherein the load distribution support (12) is connectable to the operator (13) and comprises one or more connecting devices (15), and wherein the connector (14) is connected to the hose (11) and is connectable to the one or more connecting devices (15) of the load distribution support (12) to form an articulated connection between the support (12) and the hose (11), so that the hose (11) is supported on the operator (13) through the articulated connection when the device (10) is operated by the operator (13) to distribute said material on the application site, **characterised in that** the device comprises a flexible tube (18) connected to the hose (11), wherein the hose (11) is arranged between the material supply and the flexible tube (18), and wherein the flexible tube (18) is more flexible than the hose (11).

2. A device according to claim 1, wherein the load distribution support (12) comprises a waist belt (16).

3. A device according to claim 1 or 2, wherein the load distribution support (12) comprises at least one shoulder strap (17).

4. A device according to any of the preceding claims, comprising a rigid tube (19) connected to the flexible tube (18), wherein the flexible tube (18) is arranged between the rigid tube (19) and the hose (11), wherein the rigid tube (19) is more rigid than the flexible tube (18), and wherein the rigid tube (19) is arranged to be gripped and handled by the operator (13) to distribute said material on the application site.

5. A device according to claim 4, comprising a foldable tubing (20) connected to the rigid tube (19), wherein the foldable tubing (20) is arranged to be manually folded by the operator (13) to prevent material from leaving the device (10) when the distribution of said material on the application site has been stopped.

6. A device according to any of the preceding claims, wherein one or more of said connecting devices (15) is/are arranged on a side portion of the load distribution support (12) and/or on a back portion thereof.

7. A device according to any of the preceding claims, wherein the the connector (14) is connected to the hose (11) through a swivel, so that the connector (14) is rotatable around a longitudinal axis of the hose (11).

8. A device according to any of the preceding claims, wherein the connector (14) is displaceable along the hose (11).

9. A device according to any of the preceding claims, wherein the connecting device (15) is arranged as a wire (28) extending between side portions of the load distribution support (12), wherein the connector (14) is displaceable along said wire (28).

10. A device according to claim 9, wherein the wire (28) is connected to the load distribution support (12) through at least one releasable connection (29).

11. A device according to any of the preceding claims and claim 3, wherein the at least one shoulder strap (17) is provided with a guide (22) for engaging and supporting a portion of the hose (11) or of the flexible tube (18) on the shoulder of the operator (13).

12. A device according to any of the preceding claims, wherein the connector (14) is arranged on a handle (39, 42).

13. A system for supplying a hardening and pumpable or blowable or sprayable building material to a material application site, comprising a device (10) according to any of the preceding claims, said device (10) comprising a first load distribution support (12a) to be used by a first operator (13a) applying said material on the application site, wherein the system comprises a second load distribution support (12b) to be used by a second operator (13b) positioning a portion of the hose (11), and a tool (30, 33, 35, 40) with a connector (14) for connection with a connecting device (15) of the second load distribution sup-

port (12b).

14. A system according to claim 13, wherein the tool (30, 33, 35, 40) comprises a hose receiving portion (23, 36, 41) for engaging a portion of the hose (11), and a handle (32, 39, 42) for manually operating the tool (30, 33, 35, 40) for lifting and moving the hose (11).

15. A system according to claim 14, comprising a tool (47) arranged with a lateral opening for inserting the hose (11) into a hose receiving portion (48), and wherein the tool (47) comprises blocking means (51) for blocking the lateral opening, and an actuator (52) for operating the blocking means (51) to open and/or close the lateral opening.

16. Use of a device according to any of claims 1-12 or a system according to any of claims 14-16 to distribute a hardening building material on a surface by pumping or blowing or spraying.

17. Use of a device or a system according to claim 16 to distribute a cementitious flooring material.

Patentansprüche

1. Vorrichtung (10) zum Zuführen eines aushärtenden und pumpbaren oder blasbaren oder sprühbaren Baumaterials zu einer Materialauftragsstelle, umfassend einen Schlauch (11) zum Leiten des Materials von einer Materialzufuhr zu einem Anlagenbediener (13), der das Material manuell an der Auftragsstelle mittels der Vorrichtung (10) verteilt,
die Vorrichtung (10) einen Lastverteilungsträger (12) und einen Verbinder (14) umfasst, wobei der Lastverteilungsträger (12) mit dem Anlagenbediener (13) verbindbar ist und eine oder mehrere Verbindungsvorrichtungen (15) umfasst, und wobei der Verbinder (14) mit dem Schlauch (11) verbunden ist und mit einen oder mehreren Verbindungsvorrichtungen (15) des Lastverteilungsträgers (12) verbindbar ist, um eine gelenkige Verbindung zwischen dem Träger (12) und dem Schlauch (11) zu bilden, so dass der Schlauch (11) über die gelenkige Verbindung am Anlagenbediener (13) abgestützt ist, wenn die Vorrichtung (10) von dem Anlagenbediener (13) betätigt wird, um das Material auf der Auftragsstelle zu verteilen, **dadurch gekennzeichnet, dass** die Vorrichtung ein mit dem Schlauch (11) verbundenes flexibles Rohr (18) umfasst, wobei der Schlauch (11) zwischen der Materialzufuhr und dem flexiblen Rohr (18) angeordnet ist, und wobei das flexible Rohr (18) flexibler als der Schlauch (11) ist.

2. Vorrichtung nach Anspruch 1, wobei der Lastverteilungsträger (12) einen Hüftgurt (16) umfasst.

3. Vorrichtung nach Anspruch 1 oder 2, wobei der Lastverteilungsträger (12) mindestens einen Schultergurt (17) umfasst.

4. Vorrichtung nach einem der vorhergehenden Ansprüche, umfassend ein starres Rohr (19), das mit dem flexiblen Rohr (18) verbunden ist, wobei das flexible Rohr (18) zwischen dem starren Rohr (19) und dem Schlauch (11) angeordnet ist, wobei das starre Rohr (19) steifer als das flexible Rohr (18) ist und wobei das starre Rohr (19) so angeordnet ist, dass es von dem Anlagenbediener (13) ergriffen und gehandhabt werden kann, um das Material auf der Auftragsstelle zu verteilen.

5. Vorrichtung nach Anspruch 4, umfassend ein faltbares Rohr (20), das mit dem starren Rohr (19) verbunden ist, wobei das faltbare Rohr (20) so angeordnet ist, dass es vom Anlagenbediener (13) manuell gefaltet werden kann, um zu verhindern, dass Material aus der Vorrichtung (10) austritt, wenn die Verteilung des Materials auf der Auftragsstelle gestoppt wurde.

6. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei eine oder mehrere der Verbindungsvorrichtungen (15) an einem Seitenabschnitt des Lastverteilungsträgers (12) und/oder an einem Rückenabschnitt davon angeordnet ist/sind.

7. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei der Verbinder (14) mit dem Schlauch (11) über ein Drehgelenk verbunden ist, so dass der Verbinder (14) um eine Längsachse des Schlauchs (11) drehbar ist.

8. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei der Verbinder (14) entlang des Schlauches (11) verschiebbar ist.

9. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei die Verbindungsvorrichtung (15) als Draht (28) angeordnet ist, der sich zwischen den Seitenabschnitten des Lastverteilungsträgers (12) erstreckt, wobei der Verbinder (14) entlang des Drahtes (28) verschiebbar ist.

10. Vorrichtung nach Anspruch 9, wobei der Draht (28) über mindestens eine lösbare Verbindung (29) mit dem Lastverteilungsträger (12) verbunden ist.

11. Vorrichtung nach einem der vorstehenden Ansprüche und Anspruch 3, wobei der mindestens eine Schultergurt (17) mit einer Führung (22) zum Eingreifen und Abstützen eines Abschnitts des Schlauches (11) oder des flexiblen Schlauches (18) an der Schulter des Anlagenbedieners (13) versehen ist.

12. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei der Verbinder (14) an einem Griff (39, 42) angeordnet ist.

13. System zum Zuführen eines aushärtenden und pumpbaren oder blasbaren oder sprühfähigen Baumaterials zu einer Materialauftragsstelle, umfassend eine Vorrichtung (10) gemäß einem der vorhergehenden Ansprüche, wobei die Vorrichtung (10) umfasst einen ersten Lastverteilungsträger (12a), der von einem ersten Anlagenbediener (13a) verwendet wird, der das Material auf die Auftragsstelle aufträgt, wobei das System einen zweiten Lastverteilungsträger (12b), der von einem zweiten Anlagenbediener (13b) verwendet wird, der einen Abschnitt des Schlauchs (11) positioniert, umfasst, und ein Werkzeug (30, 33, 35, 40) mit einem Verbinder (14) zur Verbindung mit einer Verbindungsvorrichtung (15) des zweiten Lastverteilungsträgers (12b).

14. System nach Anspruch 13, wobei das Werkzeug (30, 33, 35, 40) einen Schlauchaufnahmeabschnitt (23, 36, 41) zum Eingriff an einen Abschnitt des Schlauchs (11) und einen Griff (32, 39, 42) zum manuellen Betätigen des Werkzeugs (30, 33, 35, 40) zum Anheben und Bewegen des Schlauches (11) umfasst.

15. System nach Anspruch 14, umfassend ein Werkzeug (47), das mit einer seitlichen Öffnung zum Einführen des Schlauchs (11) in einen Schlauchaufnahmeabschnitt (48) ausgestattet ist, und wobei das Werkzeug (47) Blockiermittel (51) zum Blockieren der seitlichen Öffnung und ein Stellglied (52) zum Betätigen der Blockiermittel (51) zum Öffnen und/oder Schließen der seitlichen Öffnung umfasst.

16. Verwendung einer Vorrichtung nach einem der Ansprüche 1-12 oder eines Systems nach einem der Ansprüche 14-16 zum Verteilen eines aushärtenden Baumaterials auf einer Oberfläche durch Pumpen, Blasen oder Sprühen.

17. Verwendung einer Vorrichtung oder eines Systems nach Anspruch 16 zum Verteilen eines zementgebundenen Bodenbelags.

Revendications

1. Dispositif (10) pour distribuer à un site d'application de matériau un matériau de construction durcissant et apte à être pompé ou soufflé ou pulvérisé, comprenant un tuyau (11) pour conduire ledit matériau d'une alimentation en matériau à un opérateur (13) distribuant manuellement ledit matériau sur le site d'application au moyen du dispositif (10),
le dispositif (10) comprenant un support de répartition de charge (12) et un raccord (14), le support de répartition de charge (12) étant apte à être relié à l'opérateur (13) et comprenant un ou plusieurs dispositifs de raccordement (15), et le raccord (14) étant relié au tuyau (11) et étant apte à être relié à un ou plusieurs dispositifs de raccordement (15) du support de répartition de charge (12) pour former un raccordement articulé entre le support (12) et le tuyau (11), de telle sorte que le tuyau (11) est supporté sur l'opérateur (13) par l'intermédiaire du raccordement articulé lorsque le dispositif (10) est actionné par l'opérateur (13) pour distribuer ledit matériau sur le site d'application, **caractérisé par le fait que**
le dispositif comprend un tube flexible (18) relié au tuyau (11), le tuyau (11) étant disposé entre l'alimentation en matériau et le tube flexible (18), et le tube flexible (18) étant plus flexible que le tuyau (11).

2. Dispositif selon la revendication 1, dans lequel le support de répartition de charge (12) comprend une ceinture (16).

3. Dispositif selon la revendication 1 ou 2, dans lequel le support de répartition de charge (12) comprend au moins une courroie d'épaule (17).

4. Dispositif selon l'une quelconque des revendications précédentes, comprenant un tube rigide (19) relié au tube flexible (18), le tube flexible (18) étant disposé entre le tube rigide (19) et le tuyau (11), le tube rigide (19) étant plus rigide que le tube flexible (18), et le tube rigide (19) étant agencé pour être saisi et manipulé par l'opérateur (13) pour distribuer ledit matériau sur le site d'application.

5. Dispositif selon la revendication 4, comprenant un tube pliable (20) reliée au tube rigide (19), le tube pliable (20) étant agencé pour être plié manuellement par l'opérateur (13) pour empêcher le matériau de quitter le dispositif (10) lorsque la distribution dudit matériau sur le site d'application a été arrêtée.

6. Dispositif selon l'une quelconque des revendications précédentes, dans lequel un ou plusieurs des dispositifs de raccordement (15) sont disposés sur une partie latérale du support de répartition de charge (12) et/ou sur une partie arrière de celui-ci.

7. Dispositif selon l'une quelconque des revendications précédentes, dans lequel le raccord (14) est relié au tuyau (11) par l'intermédiaire d'une liaison rotule, de telle sorte que le raccord (14) est apte à tourner autour d'un axe longitudinal du tuyau (11).

8. Dispositif selon l'une quelconque des revendications précédentes, dans lequel le raccord (14) est déplaçable le long du tuyau (11).

9. Dispositif selon l'une quelconque des revendications précédentes, dans lequel le dispositif de raccordement (15) se présente sous la forme d'un câble (28) s'étendant entre des parties latérales du support de répartition de charge (12), le raccord (14) étant déplaçable le long dudit câble (28).

10. dispositif selon la revendication 9, dans lequel le câble (28) est relié au support de répartition de charge (12) par l'intermédiaire d'au moins une liaison libérable (29).

11. Dispositif selon l'une quelconque des revendications précédentes et la revendication 3, dans lequel l'au moins une courroie d'épaule (17) comporte un guide (22) pour engager et supporter une partie du tuyau (11) ou du tube flexible (18) sur l'épaule de l'opérateur (13) .

12. Dispositif selon l'une quelconque des revendications précédentes, dans lequel le raccord (14) est disposé sur une poignée (39, 42).

13. Système pour distribuer à un site d'application de matériau un matériau de construction durcissant et apte à être pompé ou soufflé ou pulvérisé, comprenant un dispositif (10) selon l'une quelconque des revendications précédentes, ledit dispositif (10) comprenant un premier support de répartition de charge (12a) à utiliser par un premier opérateur (13a) appliquant ledit matériau sur le site d'application, le système comprenant un second support de répartition de charge (12b) à utiliser par un second opérateur (13b) positionnant une partie du tuyau (11), et un outil (30, 33, 35, 40) avec un raccord (14) pour raccordement un dispositif de raccordement (15) du second support de répartition de charge (12b).

14. Système selon la revendication 13, dans lequel l'outil (30, 33, 35, 40) comprend une partie de réception de tuyau (23, 36, 41) pour engager une partie du tuyau (11), et une poignée (32, 39, 42) pour actionner manuellement l'outil (30, 33, 35, 40) pour lever et déplacer le tuyau (11).

15. Système selon la revendication 14, comprenant un outil (47) muni d'une ouverture latérale pour introduire le tuyau (11) dans une partie de réception de tuyau (48), et l'outil (47) comprenant des moyens de blocage (51) pour bloquer l'ouverture latérale, et un actionneur (52) pour actionner les moyens de blocage (51) pour ouvrir et/ou fermer l'ouverture latérale.

16. Utilisation d'un dispositif selon l'une quelconque des revendications 1 à 12 ou d'un système selon l'une quelconque des revendications 14 à 16 pour distribuer un matériau de construction durcissant sur une surface par pompage ou soufflage ou pulvérisation.

17. Utilisation d'un dispositif ou d'un système selon la revendication 16 pour distribuer un matériau de revêtement de sol cimentaire.

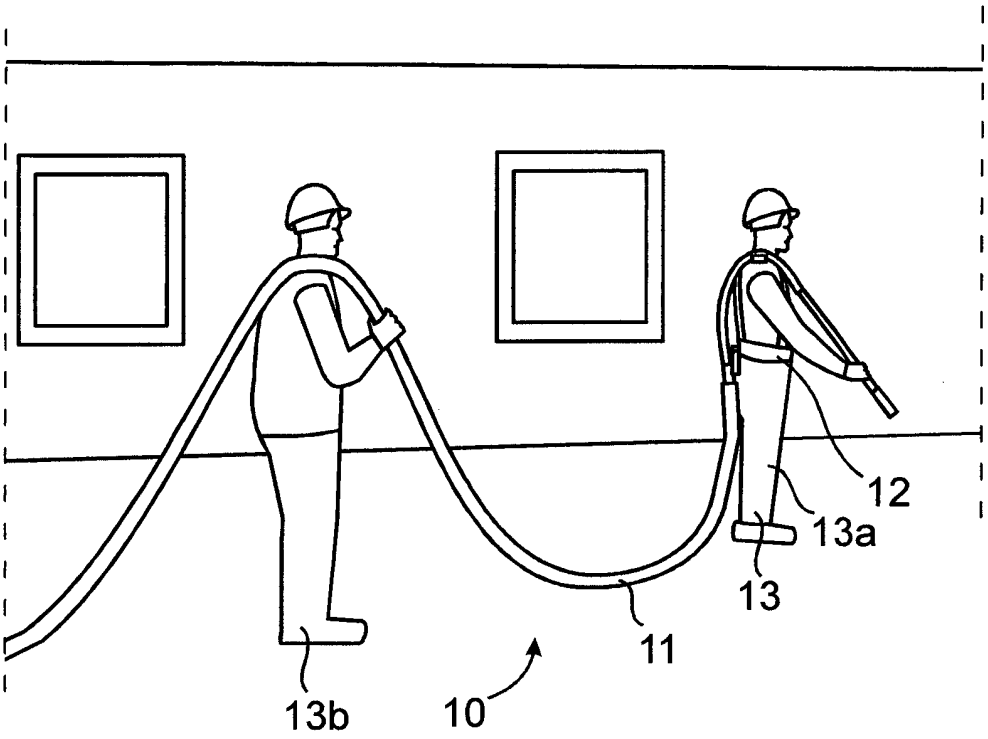


Fig. 1

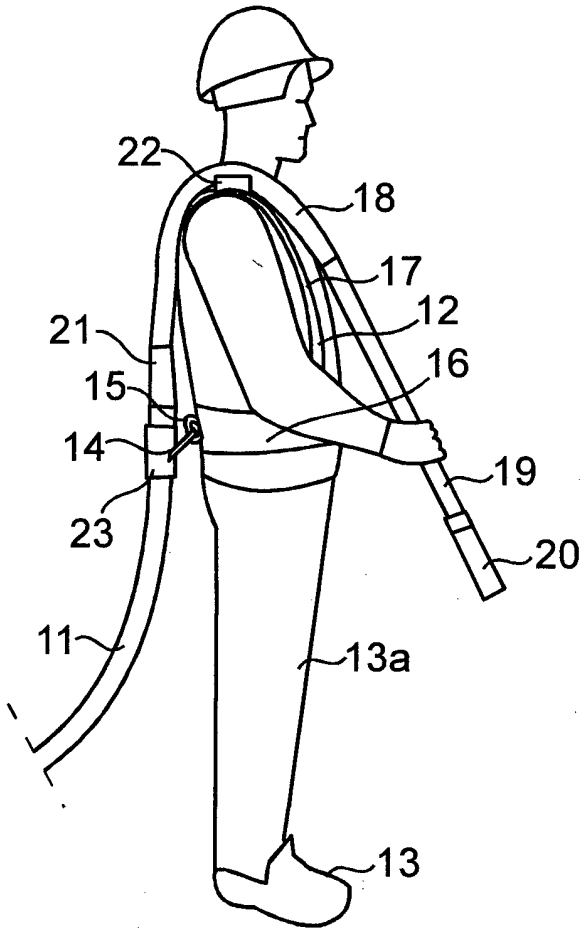


Fig. 2

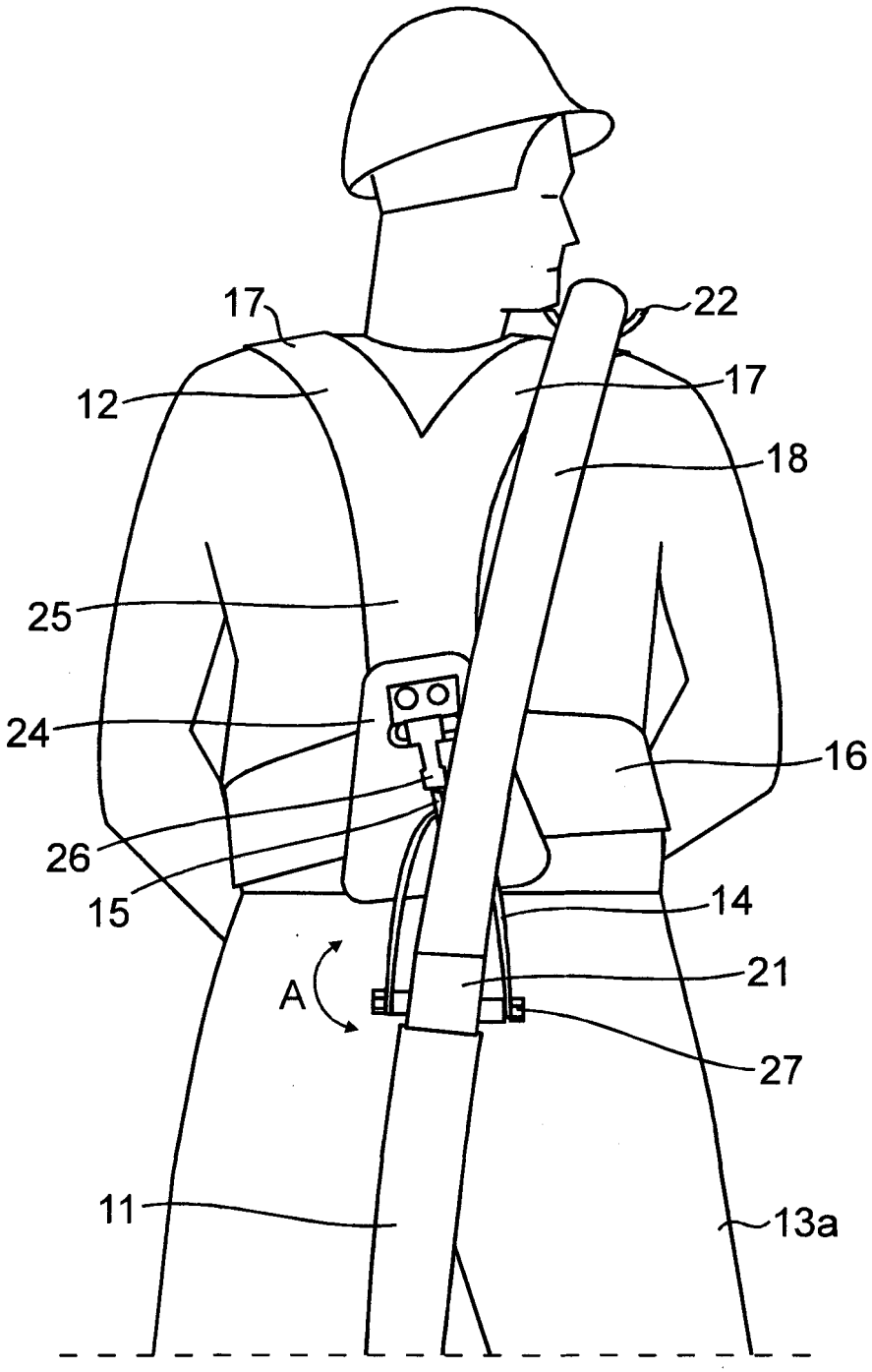


Fig. 3

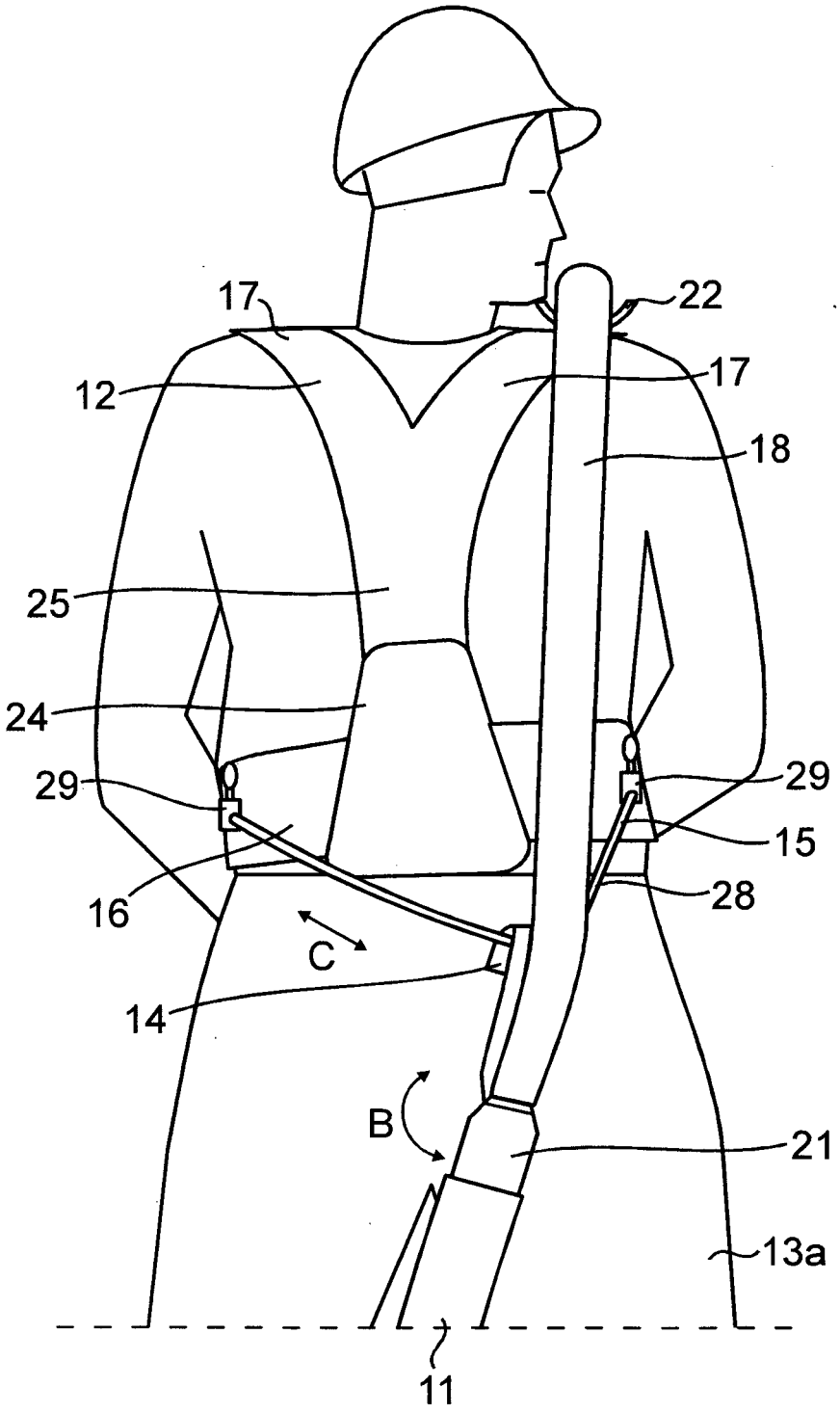


Fig. 4

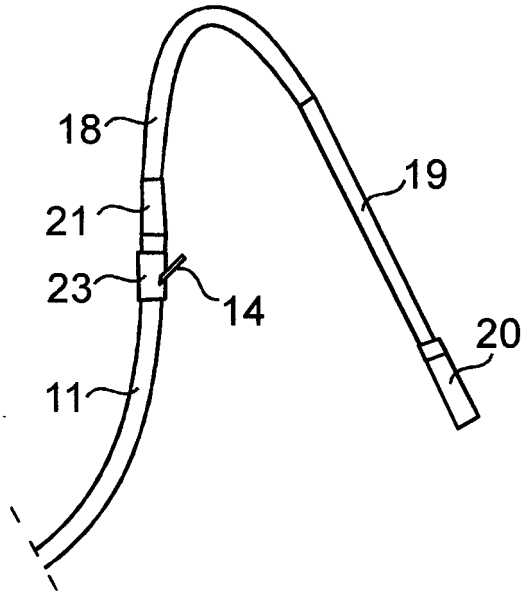


Fig. 5

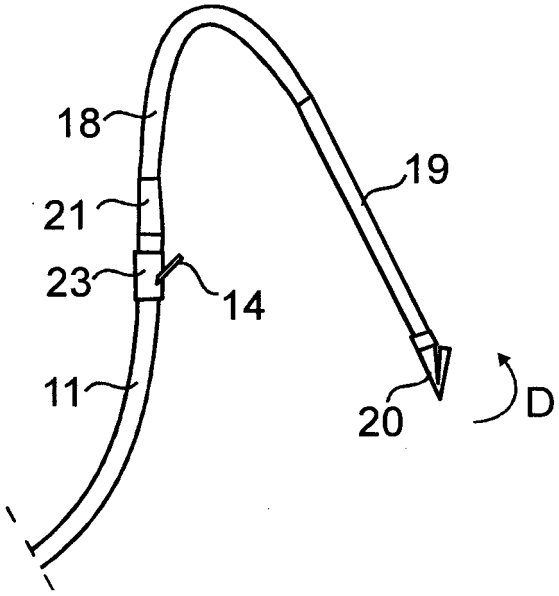


Fig. 6

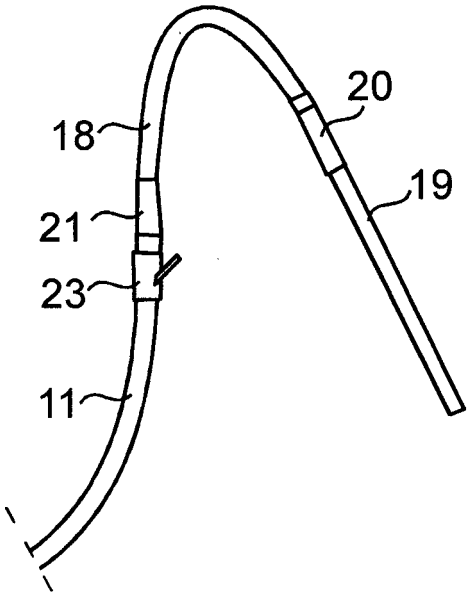


Fig. 7

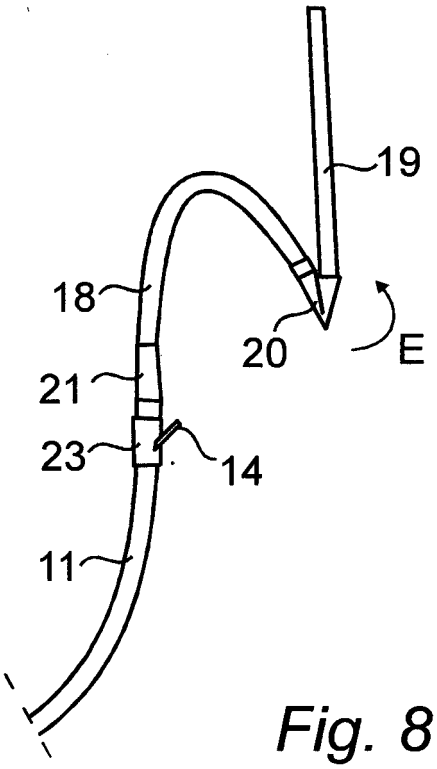


Fig. 8

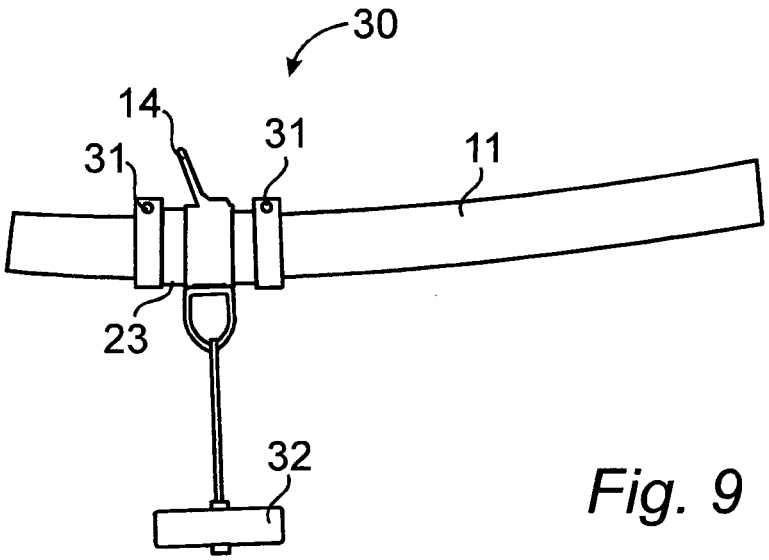


Fig. 9

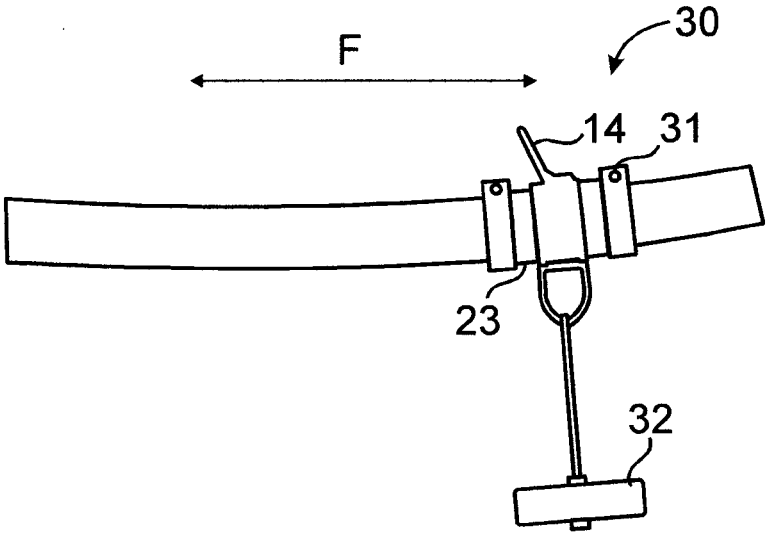


Fig. 10

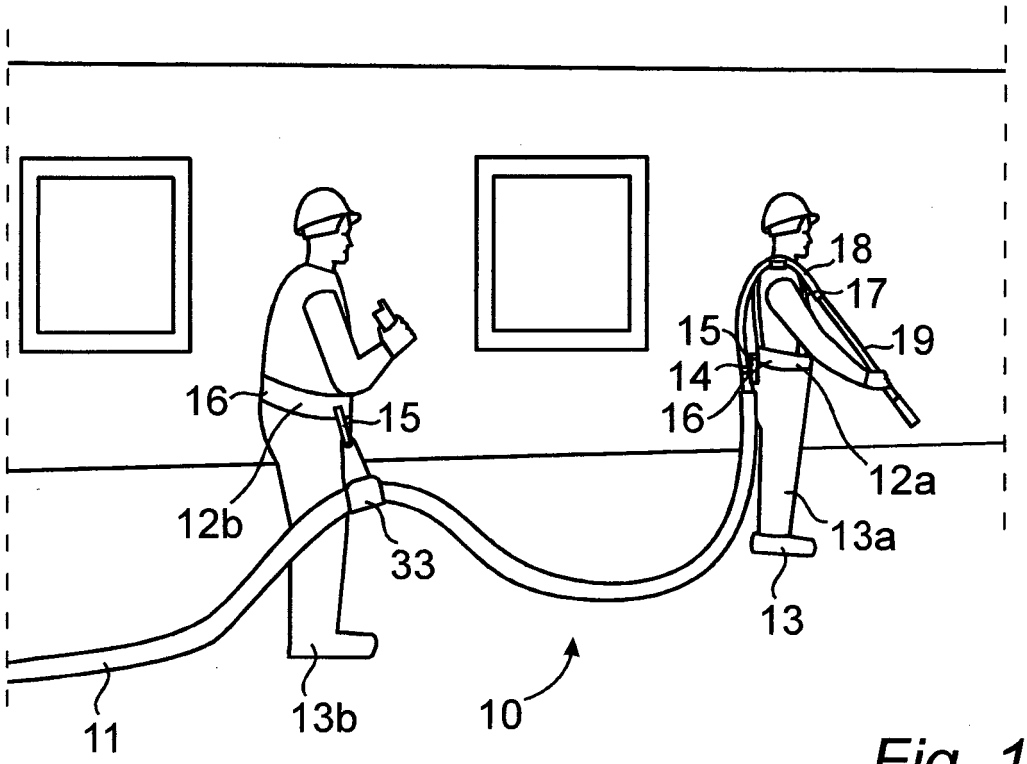
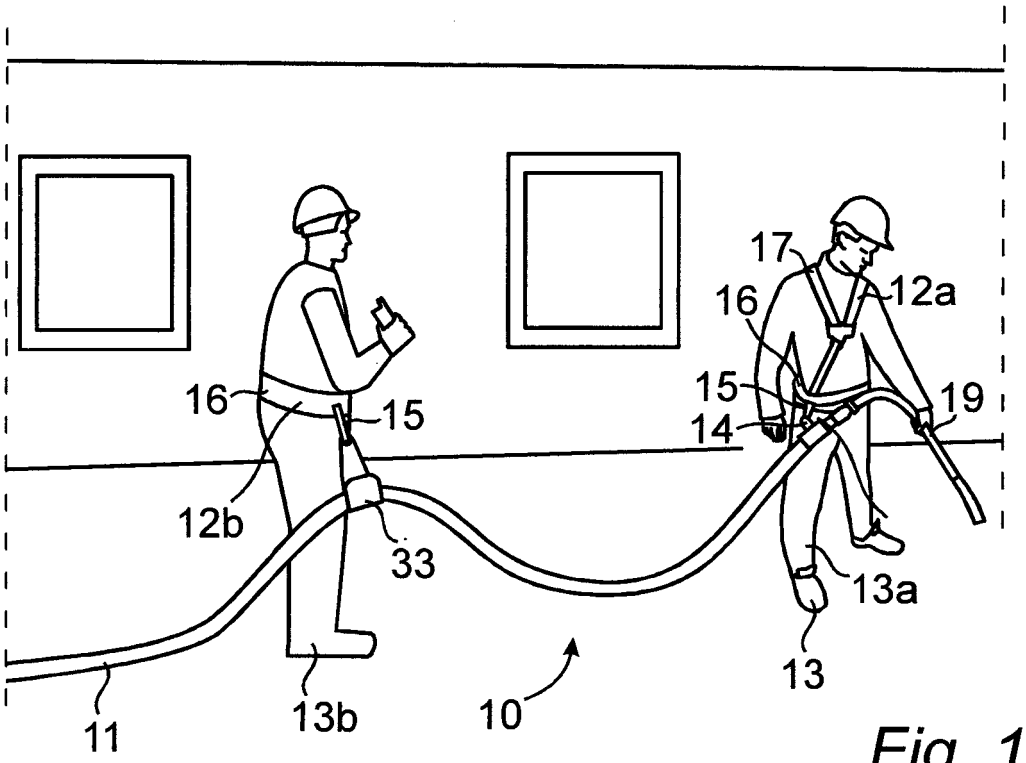

18
17
15
19
14
16
16
15
12a
12b
13a
33
13
11
13b
10

Fig. 11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12a
15
19
14
16
15
12b
33
13a
13
11
13b
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Fig. 12

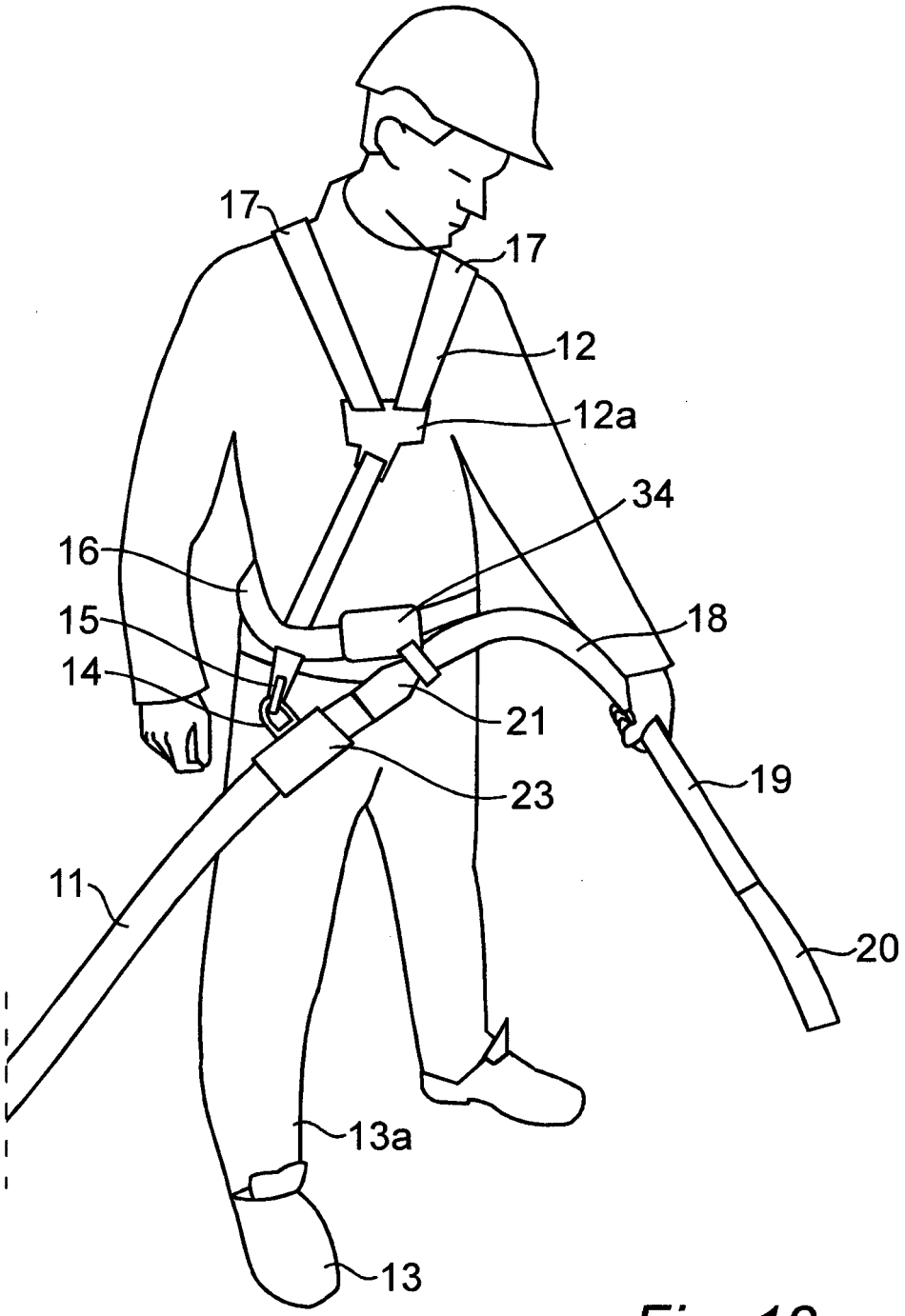

Fig. 13

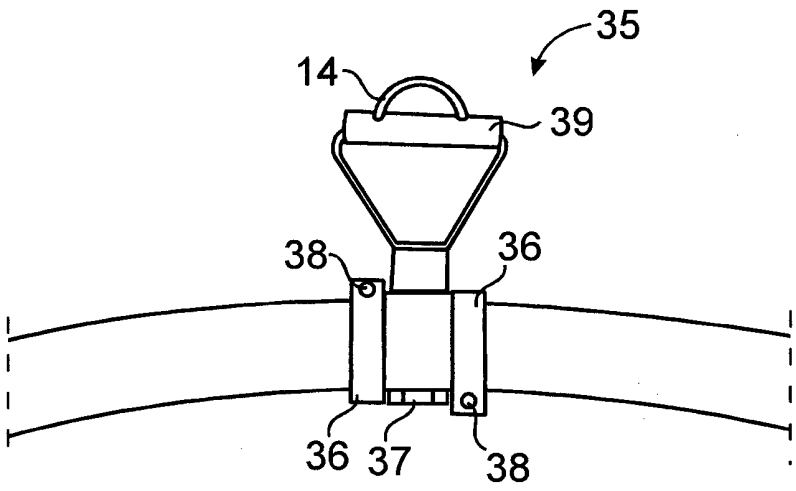

Fig. 14

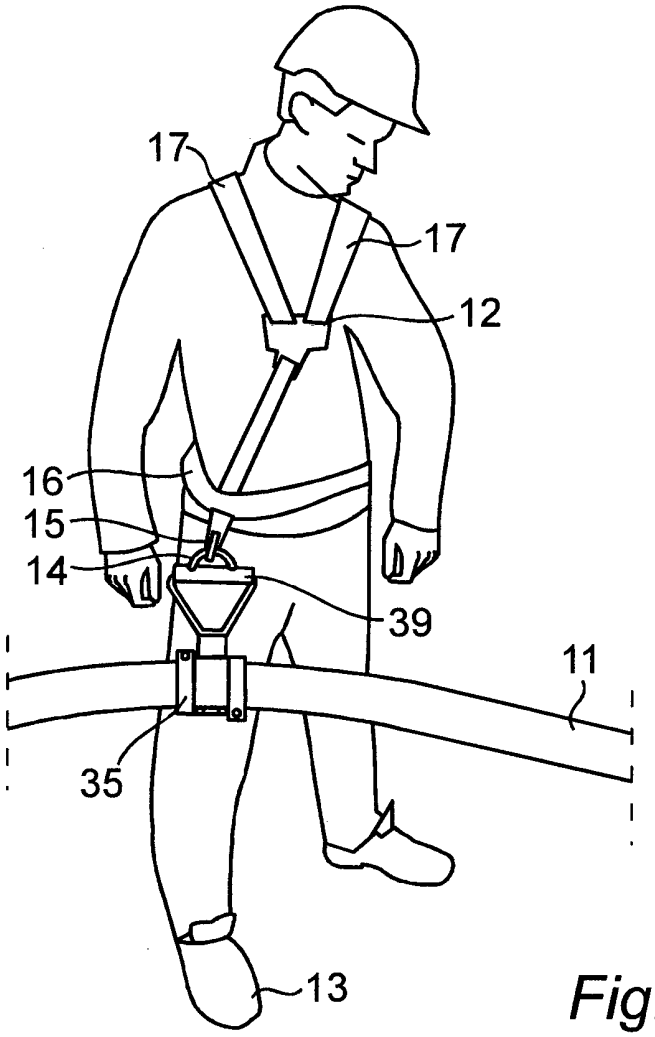

Fig. 15

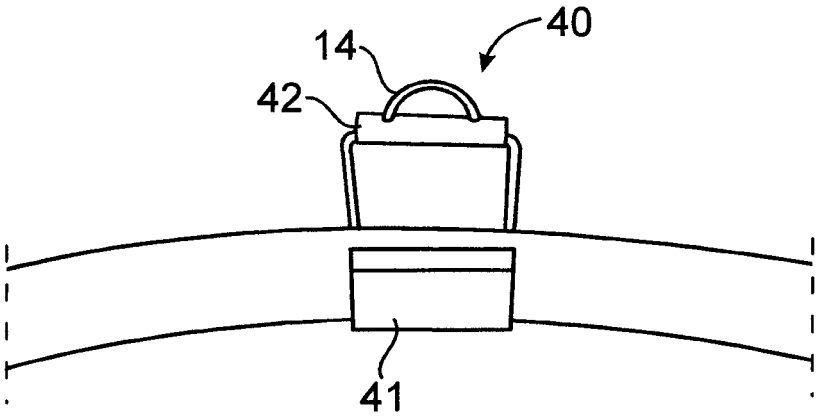

Fig. 16

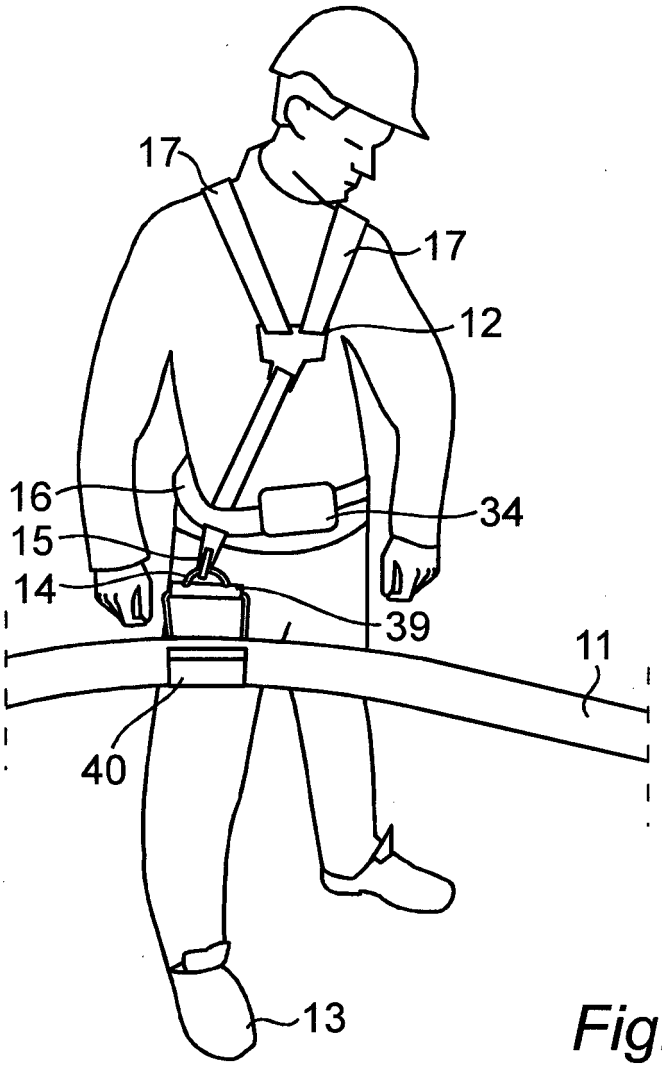

Fig. 17

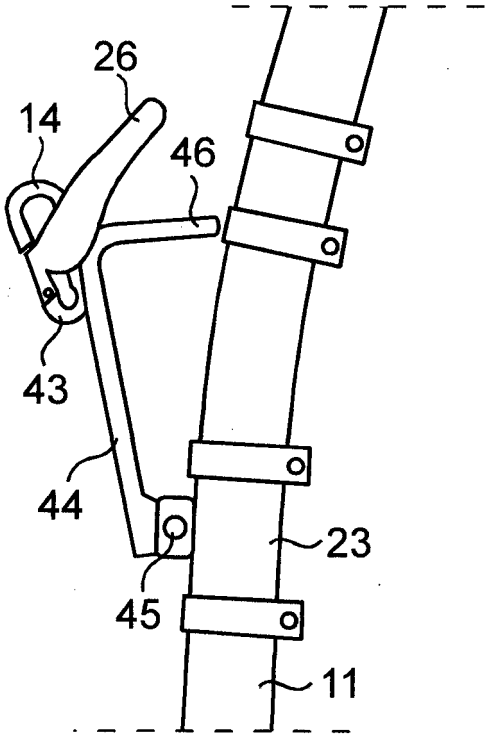

Fig. 18

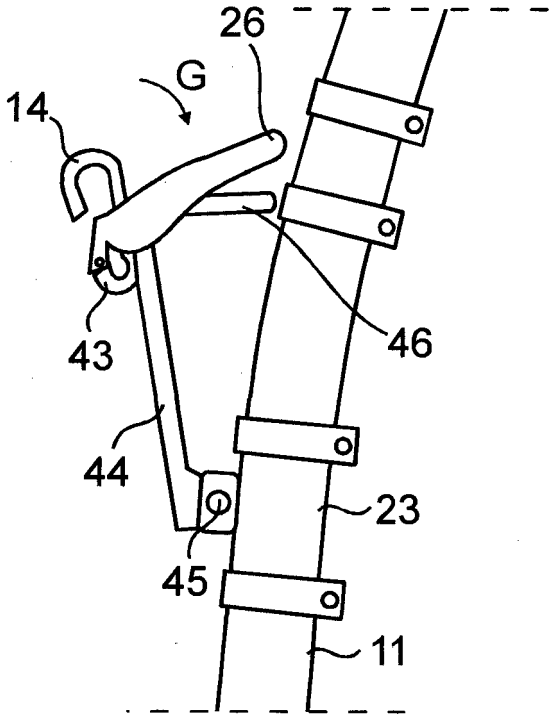

Fig. 19

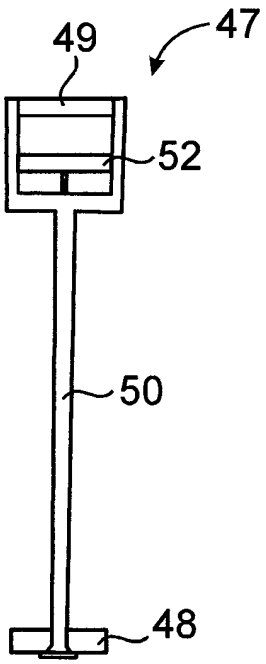

Fig. 20

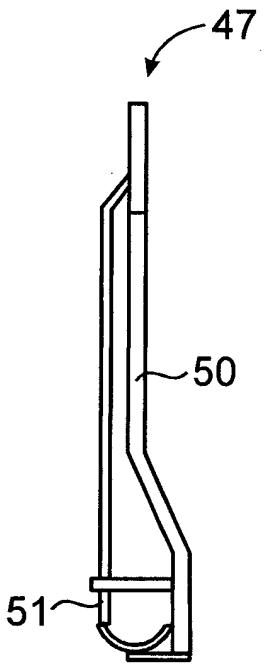

Fig. 21

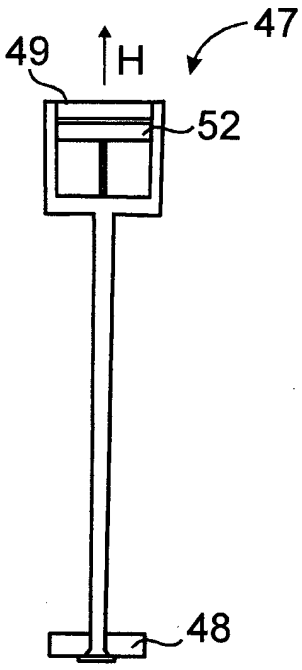

Fig. 22

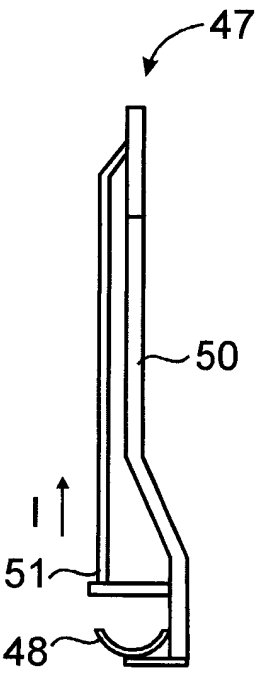

Fig. 23

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5433288 A **[0003]**
- US 4762257 A **[0003]**
- US 2010001028 A **[0003]**
- CN 203556086 U **[0003]**