(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 398 294 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
26.10.2011 Bulletin 2011/43

(51) Int Cl.:
B67D 7/40 *(2010.01)*

(21) Application number: **03445101.3**

(22) Date of filing: **11.09.2003**

(54) **Device and method for handling a fuel-hose**

Vorrichtung und Verfahren zum Handhaben eines Kraftstoffschlauchs

Dispositif et méthode pour manipuler un tuyau de carburant

(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 RO SE SI SK TR

(30) Priority: **16.09.2002 SE 0202755**

(43) Date of publication of application:
17.03.2004 Bulletin 2004/12

(73) Proprietor: **Dresser Wayne Aktiebolag**
200 61 Malmö (SE)

(72) Inventor: **Petersen, Kenneth**
21574 Malmö (SE)

(74) Representative: **Milanov, Nina Vendela Maria et al**
Awapatent AB
P.O. Box 5117
200 71 Malmö (SE)

(56) References cited:
WO-A-00/15542
DE-U- 8 708 333
DE-U- 8 806 268
US-B1- 6 334 457

EP 1 398 294 B1

Printed by Jouve, 75001 PARIS (FR)

Description

Field of the Invention

[0001] The present invention relates to a device and a method for handling of a hose according to the preamble to the respective independent claims, see US-B1-6 334 457. The invention also concerns a fuel delivery unit, such as a fuel or petrol pump, provided with such a device.

Background Art

[0002] A fuel pump or petrol pump typically comprises a pump part standing on the ground, a display part positioned above the pump part and showing the chosen type of fuel, such as petrol or diesel, cash readout, volume readout etc, and a column to which one or more fuel hoses are connected.

[0003] When the tank of a vehicle is to be filled up, the driver parks the vehicle beside the fuel pump and opens the cover or cap of the vehicle's fuel tank. Then the driver selects the desired type of fuel or petrol and places the nozzle mounted at the end of the hose in the inlet of the vehicle's tank and puts in the desired volume of fuel.

[0004] In some types of payment procedures, it is necessary to pay before filling-up can be started. For instance, charge card payment must in most cases be initiated by means of a card and code in an associated terminal before the pump is activated.

[0005] A difficulty that may arise in connection with filling-up is that the hose does not reach to the vehicle if parked a distance from the petrol pump. The reason why the vehicle has not been parked sufficiently close to the pump may be difficulty in manoeuvring owing to a limited space round the petrol pump. It may also happen that the vehicle is first parked at a terminal for charge card payment. In that case the hose is usually not long enough and the driver must move the vehicle once more, which is time-consuming, so that it stands close to the petrol pump. To allow the hose to reach to the vehicle, it is usually necessary for the driver to park his vehicle so that the side of the vehicle where the filler cap is positioned faces the petrol pump. It is not always known to a driver of an unfamiliar vehicle whether the filler cap is positioned on the left or right side. This may result in the driver by mistake parking the vehicle on the wrong side of the pump and thus not being able to fill up the tank without moving the vehicle to the other side of the petrol pump since the hose does not reach all the way round the vehicle.

[0006] One way of facilitating access to the petrol pump is to provide it with a longer hose. This may, however, cause problems since a longer hose may tend to land on the ground when not used and thus get stuck in or be damaged by passing cars or other vehicles. To prevent this, the column may be provided with some kind of returning mechanism for the hose.

[0007] A fuel pump with automatic return of the hose to the column is disclosed in EP-A1-0 379 742. In this prior-art construction, the hose extends in the column round a number of stationary small rolls and round a spring-loaded wheel which is vertically movable. The hose is fixed to the ceiling of the column at the rear side and is passed along the rear side down and round the wheel. From the wheel the hose is passed upwards at the front side to the rolls and then over the rolls to the rear side of the column. The hose is hanging freely down from the rolls and has thus been made to extend one turn in the column.

[0008] The spring load causes the hose to be pulled into the column after use, but also acts in a counteracting manner when pulling out the hose. The counteracting effect gives the drawback that it will be heavy work to pull out the hose, and it is therefore common that a driver does not utilise the advantages of a longer hose in terms of parking the vehicle further away from or on an optional side of the petrol pump. If the spring load is reduced for the purpose of reducing the counteracting force, the hose will not be pulled in just as efficiently and risks remaining outside the column after use.

[0009] A further example of such a construction is disclosed in EP-B1-0 255 979, which however also suffers from the above drawbacks as to returning action and counteracting force.

[0010] One more example of a similar construction is disclosed is NL-A-8 403 718. As is evident from the drawings of this publication, the construction comprises a vertically movable, spring-loaded wheel and a fixedly mounted wheel round which wheels the hose extends inside the column. The hose is fixed to the ceiling of the column and is passed along the rear side of the column down and round the movable wheel. From there the hose is passed up along the front side to the fixedly mounted wheel and then over the fixedly mounted wheel to the rear side of the column. The hose is hanging freely down from the fixedly mounted wheel and has thus been made to extend one turn in the column. Similar to the above constructions, also this one suffers from corresponding problems as to returning action and counteracting force.

[0011] An additional example of returning mechanism is disclosed in PCT Application WO 00/15542. A problem of this returning mechanism is that the hose exits close to the ground, which means that the hose may easily be dragging on the ground. Besides, pulling out such a hose is a sluggish operation while at the same time the available hose length is small relative to the volume of the hose storage space.

[0012] An admittedly well-functioning hose handling device is described in the applicant's own Swedish patent No. 0100993. The device comprises a hose returning means having a rocker unit which, to allow pulling out and returning of the hose, is pivotable relative to a hose storage space. The rocker unit comprises a hose supporting part and the unit is pivoted out of the storage space when the hose is pulled. A drawback of this device is that the rocker unit protrudes out of the hose storage space during use, which is detrimental out of an aesthetic

point of view as well as due to safety aspects. The safety aspects concern the fact that the rocker unit may be damaged or may damage or injure something or someone coming in its way. Moreover, there is a risk that the hose is pulled sideways to such an extent that the rocker unit will not be able to return smoothly into the hose storage space.

[0013] Another hose handling device is disclosed by the applicant in the Swedish patent application No. 0200224-4, which device facilitates sideways pulling out of the hose. The device comprises an annular guiding element encompassing the hose.

Summary of the Invention

[0014] An object of the present invention is to provide a solution to the above problems by improving handling of a hose in connection with a fuel delivery unit.

[0015] This and other objects are achieved by a device, a method, and a fuel delivery unit comprising the features of the enclosed respective independent claims. Preferred embodiments are set forth in the enclosed dependent claims and in the following description.

[0016] The inventive device for handling a hose allows the hose to be pulled out from and returns the hose to a hose storage space and comprises a hose returning means comprising a carrier, a pivoting unit, and a guiding element provided on the pivoting unit. The fact that the guiding element is arranged on the pivoting unit and engages the hose implies that the hose can be pulled out in almost any direction and returned in a smooth and stable way. The joint support of the supporting part, which supports the hose, also contributes to a stable arrangement.

[0017] By, according to an embodiment of the inventive device, the pivoting unit being adapted to be pivoted in a first direction when pulling out the hose and in a second opposite direction when the hose is returned, makes it possible to move the supporting part (supported by the pivoting unit) in a way for facilitating the pulling out and returning of the hose. By using a movable construction a long hose can be stored in a relatively small storage space.

[0018] According to an embodiment the carrier and the pivoting unit are provided with elongated recesses in which the supporting part is hung up. The design of the recesses may be adjusted to yield a smooth and stable movement of the supporting part along a certain pathway. Preferably, such that the hose returning means and the supporting part remains within the hose storage space during use. The recesses may be designed to allow return of the pivoting unit, the supporting part, and the hose, by means of gravity.

[0019] Optionally, the pivoting unit is provided with a returning element to ensure the complete return of the pivoting unit and the hose.

[0020] According to the invention, the device for handling the hose further comprises a second hose returning means which cooperates sequentially with the first upper hose returning means. This gives the advantage that a longer hose can be stored in the column and, when necessary, be pulled out. Pulling out will not be the same heavy work as in conventional columns provided with hose returning means, since the returning force is shared by two hose returning means which do not operate in a counteracting manner simultaneously. The hose which the device is capable of returning is at least of the same length or in many cases longer than the hose which a conventionally designed hose returning device can return when both hose returning devices act with the same counteracting force while pulling out the hose.

[0021] The two hose returning means are preferably adapted to store, in the form of potential energy, at least part of the energy that corresponds to the work that is required to pull out the hose. As a result, this energy can be used to provide the return of the hose.

[0022] The hose returning means are suitably adapted to allow sequential pulling out of the hose and store energy sequentially, which strengthens the above advantages.

[0023] Moreover, the hose returning means are suitably adapted to return the hose sequentially, which further emphasises the above advantages.

[0024] According to a preferred embodiment of the invention, at least one of the hose returning means applies on the hose a returning force which increases gradually while returning the hose. As a result, the advantage is obtained that, when returning the outermost part of the hose, a sufficiently great force acts to introduce this part into the column, without the counteracting force in pulling out being unnecessarily great.

[0025] Furthermore, the returning force, which during returning is the last to act on the hose, is preferably adapted to apply on the hose a returning force which increases gradually while returning the hose. This increases the above advantage still more when returning the outermost part of the hose.

[0026] The inventive method for handling a hose provides advantages corresponding to those related to the device for handling a hose according to the above.

[0027] The fuel pump assembly according to the invention is characterised in that it has a device for handling of hose of the above-mentioned type. This gives the advantage that the hose is easily and safely pulled and returned in a stable and smooth manner and does not remain outside the assembly after use, which is particularly important in connection with inflammable liquids, such as petrol, diesel or other fuels, that could leak out if the hose is damaged. Besides, the hose returning device of the above type requires less space compared with prior-art hose returning devices with a corresponding hose length capable of being pulled out.

Brief Description of the Drawings

[0028] The invention will now be described in more de-

tail with reference to the accompanying schematic drawings which by way of example illustrate a currently preferred embodiment of the invention.

Fig. 1 is a front view of a fuel delivery unit.
Fig. 2 is a side view of the interior of a column.
Figs 3 and 4 correspond to Fig. 2, but illustrate other positions of the hose.
Fig. 5 shows in great detail an embodiment of an inventive upper hose returning means.

Detailed Description of the Preferred Embodiment

[0029] As is evident from Fig. 1, the main components of the fuel pump assembly or fuel delivery unit are a column 1, a pump housing 2 with a pump P and a measuring device M, and a display unit 3. The fuel pump assembly is connected to an underground fuel container (not shown). When filling up the tank of a vehicle, the fuel is pumped from the underground container by means of the pump P in the pump housing 2, and from there to the column 1 via a fuel piping and out to a nozzle 4 via a fuel hose 5. When filling-up does not take place, the fuel hose 5 is accommodated in a hose storage space 6 and the nozzle 4 is inserted in a nozzle boot 7.

[0030] As is evident from Fig. 2, the fuel hose 5 is connected to the fuel piping of the fuel pump assembly in an upper and, relative to the user, rear portion of the hose storage space 6. The hose 5 is passed down round a deflecting roll 8 which is positioned in a lower and, relative to the user, rear portion of the hose storage space 6. From the roll 8, the fuel hose 5 is passed upwards in the hose storage space 6 and supported by a supporting roll 9 which is located in an upper and, relative to the user, front portion of the hose storage space 6. From the supporting roll 9, the fuel hose 5 is hanging in a bend and deflects upwards once more since the nozzle 4 arranged at the end of the fuel hose 5 is inserted into the nozzle boot 7 which is positioned approximately in the middle of the column 1 in the vertical direction and at the side of the column 1 which is the front side relative to the user.

[0031] The deflecting roll 8 is spring loaded and adapted to be moved in the vertical direction when pulling out and returning the fuel hose 5. The supporting roll 9 is adapted to be moved towards and away from the front of the hose storage space 6 when pulling out and returning the hose 5, respectively. The movement and function of these two components will now be described in more detail.

[0032] The supporting roll 9, which supports the hose 5, is movably supported by a first, upper hose returning means 10 comprising a carrier 11 mounted in the ceiling of the column 1 and a pivoting unit 12 arranged on the carrier 11 in a pivotable manner. The carrier 11 is a double-wall construction, see 11a, 11b in Fig. 5. Also the pivoting unit 12 comprises two walls 12a, 12b on and between which an annular, pivotable guiding element 13 is hinged at a point 16 at the part of the pivoting unit 12 closest to the front of the hose storage space 6. The hose 5 may slide through the guiding element 13.

[0033] When a user intends to use the fuel pump assembly, he removes the nozzle 4 from the boot 7 and pulls the fuel hose 5 outwards. In this operation, the hose will be straightened out and the "slack" will become accessible to the user with little or no movement of the guiding element 13, the pivoting unit 12 and the supporting roll 9. Then, as the hose 5 is pulled, the guiding element 13 will rise correspondingly and the pivoting unit 12 will be pivoted upwardly and outwardly towards the user. Consequently, the axis 17 of the supporting roll 9 will move towards the front ends of the recesses 14a, 14b, that is towards A in Fig. 5, and towards the lower ends of the recesses 15a, 15b, that is towards B in Fig. 5. That is the supporting roll 9 will be passed towards the front of the storage space 6. The hose 5 will still be supported by the supporting roll 9. The length of hose which may be obtained in this operation is the length that was positioned in the downward loop from the supporting roll 9 to the nozzle 4.

[0034] To return the hose 5, the pivoting unit 12 is provided with a spring 19 which is adapted to return the pivoting unit 12 and, thus, the hose 5 to its initial position (see Fig. 2) after use. The spring 19 is in this embodiment an elastic band whose one end is fixed at a fixing point 20 in the interior of the hose storage space 6 and whose other end is attached at a fixing point 21 which is positioned on the pivoting unit 12 at a distance from the pivot axis 18. The spring 19 stores the energy that is necessary for pulling out the hose 5 in the form of potential energy. By selecting the suitable relative positions of the fixing points 20 and 21 in relation to the pivot axis 18, and also selecting the spring constant of the spring 19, it is possible to achieve solutions where the hose returning force is optimised as regards return of the hose 5 and the required pulling-out force is optimised as regards user-friendliness. For instance, in the positions where the user has the least favourable working position, it may be ensured that the counteracting force exerted by the return spring 19 is as small as possible, while it may be ensured that the returning force is as great as possible in the last part of the return movement to ensure that the hose 5 is returned into the hose storage space 6.

[0035] When the hose 5 has been pulled out to the position shown in Fig. 3, further pulling out of the hose 5 will make the deflecting roll 8 move essentially vertically upwards as illustrated in Fig. 4. In this vertical movement of the roll 8, an additional hose length is obtained, which can be used to pull out the hose to an incorrectly parked vehicle or round a vehicle to the other side to reach the tank connection of the vehicle. The roll 8 is connected to a spring 22 which is stretched when pulling out the hose 5. The spring 22 which is a tension spring is connected at one end to a fixing point 23 which accompanies the roll 8 and at the other end to a fixing point 24 which is fixed relative to the hose storage space 6. The spring 22 stores the work that is necessary to pull out the hose 5

in the form of potential energy. Since the vertical movement of the roll 8 in cooperation with the movement of the supporting roll 9 towards the front of the hose storage space 6 straightens out the hose 5, a great hose length is obtained relative to the work that is necessary to pull out the same. As the supporting roll 9 is moved towards the front of the hose storage space 6, the winding angle of the hose in respect of the deflecting roll 8 will decrease, which implies that the force needed to pull the roll 8 upwards will be less. Moreover, the movement of the supporting roll 9 towards the front of the storage space 6 implies that the deflecting roll 8 may be pulled to a very high level up behind (relative to a user) the supporting roll 9 which in turn leads to that extra hose length become accessible to the user.

[0036] The manner in which the fuel pump assembly is intended to be used will now be described. The driver who intends to fill up the tank of his vehicle drives to the side of the fuel pump assembly. The driver then chooses the type of fuel and removes the nozzle 4 from the boot 7. When pulling out the hose 5, first the "slack" of the hose will be straightened out, the guiding element 13 will rise, the pivoting unit 12 will be pivoted towards the front of the hose storage space 6 (the user) and the supporting roll 9 will be moved towards the front of the storage space 6 by the movement of its axis 17 in the recesses 14a, 14b and 15a, 15b of the carrier 11 and the pivoting unit 12, respectively. In this motion, the spring 19 will store the work that is required in the form of potential energy. If the nozzle 4 reaches the tank connection of the vehicle, the filling-up is started. If the vehicle is parked so that the nozzle 4 does not reach the tank connection of the vehicle, the driver will pull the hose 5 further, and as a result the pivoting unit 12 will possibly be pivoted further, but above all the roll 8 will be moved vertically upwards. Also in this case, the spring 22 will store the work that is required in the form of potential energy. When the filling-up is completed, the driver will remove the nozzle 4 from the tank connection of the vehicle and let the hose move back as first the spring 22 of the roll 8 and then the spring 19 of the pivoting unit 12 return the hose 5 to the hose storage space 6. Owing to this sequential effect between the first upper hose returning means 10 and the second hose returning means comprising the roll 8 both when pulling out and returning the hose 5, it is possible to optimise the return function while at the same time the construction can be made very user-friendly.

[0037] It will be appreciated that many modifications of the embodiment described are feasible within the scope of the invention, which is defined in the appended claims.

[0038] For instance, the pivoting unit can obtain other forms which satisfy the corresponding geometric conditions of pivot axis and fixing points. Moreover, the elastic band 19 and the tension spring 22 can be replaced with an optional spring or another element having the corresponding function, such as some kind of coil-spring-loaded fairlead or the like. One of the springs, or both, can each also be replaced with a weight.

[0039] According to an alternative embodiment, one and the same spring is used to return both the pivoting unit and the deflecting roll. In this case, the sequential effect can be obtained, for example by the pivoting unit and the deflecting roll being connected to the spring with a different degree of extension of the spring. The pivoting unit can, for example, be secured to one end of the spring while the deflecting roll is secured to the spring by means of a hook which is arranged on the spring and engages the roll after the spring has been stretched by a certain length.

[0040] According to an alternative embodiment of the invention the design of the first upper hose returning means 10 and especially the recesses 14a,b, 15a,b may be adjusted to allow return of the returning means and the supporting roll 9 by means of gravity, so that the spring 19 may be needless. A person skilled in the art may easily come to the proper dimensions and parameters as the invention now has been presented.

[0041] The hose storage space can be a more or less open space instead of the shown space which is relatively closed. The important thing is that the hose is returned to a position where it cannot be touched by passing vehicles or the like.

[0042] Furthermore, the hose supporting roll can be replaced with some kind of pin or some other construction which supports the hose and does not provide much resistance when pulling out the hose.

[0043] It is appreciated that the guiding element 13 can be constructed in various ways, such as by a plurality of wheels encompassing the hose.

[0044] It is also appreciated that a double-wall construction of the carrier 11 is not necessary and that a single wall with a recess plus some kind of guide along and opposite the recess would function in a similar way.

[0045] It is further appreciated that the pivoting unit 12 could be hinged in for example the ceiling of the column 1 instead of on the carrier 11.

Claims

1. A device for handling of a hose (5), which device allows the hose (5) to be pulled out from a hose storage space (6) and which is adapted to return the hose (5) to the hose storage space (6), comprising a hose returning means (10), said hose returning means (10) comprising a carrier means (11) and a pivoting unit (12) being movable in relation to the carrier means (11) and to the hose storage space (6), the carrier means (11) and the pivoting unit (12) being adapted for joint support of a supporting part (9) supporting the hose (5), the pivoting unit (12) being provided with a guiding element (13) engaging the hose (5), **characterised by** a second hose returning means (8, 22) which cooperates sequentially with the first hose returning means (10).

2. A device as claimed in claim 1, in which the pivoting unit (12) is adapted to be pivoted in a first direction when pulling out the hose (5) such that the supporting part (9) is moved towards a front end of the hose storage space (6), and when returning the hose (5) be pivoted in a second direction which is opposite to the first direction, bringing the supporting part (9) back to an initial position.

3. A device as claimed in claim 1 or 2, in which the supporting part (9) is movably hung up in elongated recesses (14a, 14b and 15a, 15b) provided in the carrier (11) and the pivoting unit (12), respectively.

4. A device as claimed in any one of claims 1-3, on which the hose returning means (10) further comprises a returning element (19) which is adapted to return the pivoting unit (12).

5. A device as claimed in any one of claims 1-4, in which the hose returning means (10) is adapted to store at least part of the energy which corresponds to the work of pulling out the hose (5) in the form of potential energy for returning of the hose (5).

6. A device as claimed in any one of claims 1-5, in which both hose returning means (8, 22 and 10) are adapted, when pulling out the hose (5), to store at least part of the energy which corresponds to the work of pulling out the hose (5) in the form of potential energy.

7. A device as claimed in any one of claims 4 or 5, in which said hose returning means (8, 22 and 10) are adapted to store energy sequentially upon sequentially pulling out the hose (5).

8. A device as claimed in any one of claims 1-7, in which the hose returning means (8, 22 and 10) are adapted to return the hose (5) sequentially.

9. A device as claimed in any one of claims 1-8, in which at least one of the hose returning means (8, 22 and 10) applies on the hose (5) a returning force which increases gradually while returning the hose (5).

10. A device as claimed in any one of claims 1-9, in which the hose returning means which, during returning of the hose (5) is the last to act on the hose (5), applies on the hose (5) a returning force which increases gradually while returning the hose (5).

11. A method for handling a hose (5), in which the hose (5) for use is pulled out from a hose storage space (6) and after use is returned to the hose storage space (6), wherein, when pulling out the hose (5), a pivoting unit (12), which is pivotable in relation to a carrier (11) and the hose storage space (6), is pivoted about a pivot axis (18), the hose (5) being supported by a supporting roll (9) which is jointly supported on the carrier (11) and the pivoting unit (12), and the pivoting unit (12), after use of the hose (5), is pivoted back and returns the hose (5) to the storage space (6),
characterised in that a second hose returning means (8, 22) cooperates sequentially with the first hose returning means (10).

12. A method as claimed in claim 11, in which the pivoting unit (12), during pivoting about the pivot axis (12) for pulling out of the hose (5), stores at least part of the energy which corresponds to the work of pulling out the hose (5) in the form of potential energy for returning the hose (5).

13. A method as claimed in claim 11 or 12, in which the pivoting unit (12) is pivoted in a first direction when pulling out the hose (5) and, when returning the hose, is pivoted by a returning means (19) which applies a returning force on the pivoting unit (12) at a distance from the pivot axis (18) in a second direction which is opposite to the first direction.

14. A method as claimed in claim 13, in which the returning means (19) applies the returning force in such a manner that a moment lever of the returning force relative to the pivot axis (18) is gradually extended during returning of the hose (5).

15. A method as claimed in claim 13 or 14, in which the returning means is made to operate as a spring element (19).

16. A method as claimed in any one of claims 11-15, in which both hose returning means (8, 22 and 10), when pulling out the hose (5), store at least part of the energy which corresponds to the work of pulling out the hose (5) in the form of potential energy.

17. A method as claimed in any one of claim 16, in which said hose returning means (8, 22 and 10) store energy sequentially upon sequentially pulling out the hose (5) .

18. A method as claimed in any one of claims 11-17, in which the hose returning means (8, 22 and 10) return the hose (5) sequentially.

19. A method as claimed in any one of claims 11-18, in which at least one of the hose returning means (10) applies on the hose (5) a returning force which increases gradually while returning of the hose (5).

20. A method as claimed in any one of claims 11-19, in which the hose returning means (10) which is the last to act on the hose when returning the hose (5),

applies on the hose (5) a returning force which increases gradually while returning the hose (5).

21. A fuel pump assembly, such as a petrol pump, **characterised in that** it has a hose handling device as claimed in any one of claims 1-10.

Patentansprüche

1. Vorrichtung zum Handhaben eines Schlauchs (5), wobei die Vorrichtung ermöglicht, dass der Schlauch (5) aus einem Schlauchaufbewahrungsraum (6) gezogen wird, und die dazu geeignet ist, den Schlauch (5) in den Schlauchaufbewahrungsraum (6) zurückzuführen, umfassend ein Schlauchrückführmittel (10), wobei das Schlauchrückführmittel (10) ein Trägermittel (11) und eine Schwenkeinheit (12) umfasst, die bezüglich des Trägermittels (11) und des Schlauchaufbewahrungsraums (6) beweglich ist, wobei das Trägermittel (11) und die Schwenkeinheit (12) zum gemeinsamen Stützen eines Stützteils (9) geeignet sind, das den Schlauch (5) stützt, wobei die Schwenkeinheit (12) mit einem Führungselement (13) versehen ist, das den Schlauch (5) in Eingriff nimmt, **gekennzeichnet durch** ein zweites Schlauchrückführmittel (8, 22), das sequenziell mit dem ersten Schlauchrückführmittel (10) zusammenwirkt.

2. Vorrichtung nach Anspruch 1, wobei die Schwenkeinheit (12) dazu geeignet ist, beim Herausziehen des Schlauchs (5) in eine erste Richtung geschwenkt zu sein, sodass das Stützteil (9) zu einem Vorderende des Schlauchaufbeahrungsraums (6) bewegt ist, und beim Zurückführen des Schlauchs (5) in eine zweite Richtung geschwenkt zu sein, die entgegengesetzt zur ersten Richtung verläuft, wodurch das Stützteil (9) zurück in die Anfangsposition gebracht ist.

3. Vorrichtung nach einem der Ansprüche 1 oder 2, wobei das Stützteil (9) in gestreckten Aussparungen (14a, 14b und 15a, 15b) aufgehängt ist, die in dem Träger (11) bzw. der Schwenkeinheit (12) vorgesehen sind.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, wobei das Schlauchrückführmittel (10) ferner ein Rückführelement (19) umfasst, das dazu geeignet ist, die Schwenkeinheit (12) zurückzuführen.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei das Schlauchrückführmittel (10) dazu geeignet ist, zumindest einen Teil der Energie, die der Arbeit des Herausziehens des Schlauchs (5) entspricht, in Form von potenzieller Energie zum Zurückführen des Schlauchs (5) zu speichern.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, wobei beide Schlauchrückführmittel (8, 22 und 10) dazu geeignet sind, beim Herausziehen des Schlauchs (5) zumindest einen Teil der Energie, die der Arbeit des Herausziehens des Schlauchs (5) entspricht, in Form von potenzieller Energie zu speichern.

7. Vorrichtung nach einem der Ansprüche 4 oder 5, wobei die Schlauchrückführmittel (8, 22 und 10) dazu geeignet sind, auf sequenzielles Herausziehen des Schlauchs (5) hin Energie sequenziell zu speichern.

8. Vorrichtung nach einem der Ansprüche 1 bis 7, wobei die Schlauchrückführmittel (8, 22 und 10) dazu geeignet sind, den Schlauch (5) sequenziell zurückzuführen.

9. Vorrichtung nach einem der Ansprüche 1 bis 8, wobei zumindest eines der Schlauchrückführmittel (8, 22 und 10) eine Rückführkraft auf den Schlauch (5) ausübt, die während des Zurückführen des Schlauchs (5) allmählich zunimmt.

10. Vorrichtung nach einem der Ansprüche 1 bis 9, wobei das Schlauchrückführmittel, das während des Zurückführens des Schlauchs (5) als letztes auf den Schlauch (5) einwirkt, eine Rückführkraft auf den Schlauch (5) ausübt, die während des Zurückführen des Schlauchs (5) allmählich zunimmt.

11. Verfahren zum Handhaben eines Schlauchs (5), wobei der Schlauch (5) zum Gebrauch aus einem Schlauchaufbewahrungsraum (6) gezogen wird und nach dem Gebrauch in den Schlauchaufbewahrungsraum (6) zurückgeführt wird, wobei beim Herausziehen des Schlauchs (5) eine Schwenkeinheit (12), die bezüglich eines Trägers (11) und des Schlauchaufbewahrungsraums (6) schwenkbar ist, um eine Drehachse (18) geschwenkt wird, wobei der Schlauch (5) durch eine Stützrolle (9) gestützt ist, die auf dem Träger (11) und der Schwenkeinheit (12) gemeinsam gestützt ist, und die Schwenkeinheit (12) nach dem Gebrauch des Schlauchs (5) zurückgeschwenkt wird und den Schlauch (5) in den Schlauchaufbewahrungsraum (6) zurückführt, **dadurch gekennzeichnet, dass** ein zweites Schlauchrückführmittel (8, 22) sequenziell mit dem ersten Schlauchrückführmittel (10) zusammenwirkt.

12. Verfahren nach Anspruch 11, wobei die Schwenkeinheit (12) beim Schwenken um die Drehachse (12) zum Herausziehen des Schlauchs (5) zumindest einen Teil der Energie, die der Arbeit des Herausziehens des Schlauchs (5) entspricht, in Form von potenzieller Energie zum Zurückführen des Schlauchs (5) speichert.

13. Verfahren nach Anspruch 11 oder 12, wobei die

Schwenkeinheit (12) beim Herausziehen des Schlauchs (5) in eine erste Richtung geschwenkt wird und beim Zurückführen des Schlauchs durch ein Rückführmittel (19), das eine Rückführkraft auf die Schwenkeinheit (12) in einem Abstand von der Drehachse (18) ausübt, in eine zweite Richtung geschwenkt wird, die entgegengesetzt zur ersten Richtung verläuft.

14. Verfahren nach Anspruch 13, wobei das Rückführmittel (19) die Rückführkraft derart ausübt, dass ein Momenthebel der Rückführkraft bezüglich der Drehachse (18) während des Zurückführens des Schlauchs (5) allmählich erweitert wird.

15. Verfahren nach einem der Ansprüche 13 oder 14, wobei das Rückführmittel zum Arbeiten als Federelement (19) hergestellt ist.

16. Verfahren nach einem der Ansprüche 11 bis 15, wobei beide Schlauchrückführmittel (8, 22 und 10) beim Herausziehen des Schlauchs (5) zumindest einen Teil der Energie, die der Arbeit des Herausziehens des Schlauchs (5) entspricht, in Form von potenzieller Energie speichern.

17. Verfahren nach Anspruch 16, wobei die Schlauchrückführmittel (8, 22 und 10) auf sequenzielles Herausziehen des Schlauchs (5) hin Energie sequenziell speichern.

18. Verfahren nach einem der Ansprüche 11 bis 17, wobei die Schlauchrückführmittel (8, 22 und 10) den Schlauch (5) sequenziell zurückführen.

19. Verfahren nach einem der Ansprüche 11 bis 18, wobei zumindest eines der Schlauchrückführmittel (10) eine Rückführkraft auf den Schlauch (5) ausübt, die beim Zurückführen des Schlauchs (5) allmählich zunimmt.

20. Verfahren nach einem der Ansprüche 11 bis 19, wobei das Schlauchrückführmittel (10), das während des Zurückführens des Schlauchs (5) als letztes auf den Schlauch einwirkt, eine Rückführkraft auf den Schlauch (5) ausübt, die während des Zurückführen des Schlauchs (5) allmählich zunimmt.

21. Kraftstoffpumpenbaugruppe, wie etwa eine Benzinpumpe, **dadurch gekennzeichnet, dass** sie eine Schlauchhandhabungsvorrichtung nach einem der Ansprüche 1 bis 10 aufweist.

Revendications

1. Dispositif de manipulation d'un tuyau flexible (5), lequel dispositif permet de tirer le tuyau flexible (5) hors d'un espace de stockage de tuyau flexible (6) et qui est adapté pour renvoyer le tuyau flexible (5) à l'espace de stockage de tuyau flexible (6), comprenant un moyen de renvoi de tuyau flexible (10), ledit moyen de renvoi de tuyau flexible (10) comprenant un moyen porteur (11) et une unité pivotante (12) étant déplaçable par rapport au moyen porteur (11) et à l'espace de stockage de tuyau flexible (6), le moyen porteur (11) et l'unité pivotante (12) étant adaptés pour soutenir mutuellement une partie de soutien (9) soutenant le tuyau flexible (5), l'unité pivotante (12) étant pourvue d'un élément de guidage (13) venant en prise avec le tuyau flexible (5), **caractérisé par** un second moyen de renvoi de tuyau flexible (8,22) qui coopère séquentiellement avec le premier moyen de renvoi de tuyau flexible (10).

2. Dispositif selon la revendication 1, dans lequel l'unité pivotante (12) est adaptée pour être pivotée dans une première direction quand le tuyau flexible (5) est tiré vers l'extérieur de sorte que la partie de soutien (9) soit déplacée vers une extrémité frontale de l'espace de stockage de tuyau flexible (6), et lors du renvoi du tuyau flexible (5) être pivotée dans une seconde direction qui est opposée à la première direction, en ramenant la partie de soutien (9) à une position initiale.

3. Dispositif selon la revendication 1 ou 2, dans lequel la partie de soutien (9) est suspendue de manière mobile dans des cavités allongées (14a,14b et 15a, 15b) prévues dans le moyen porteur (11) et l'unité pivotante (12), respectivement.

4. Dispositif selon une quelconque des revendications 1 à 3, sur lequel le moyen de renvoi de tuyau flexible (10) comprend en outre un élément de renvoi (19) qui est adapté pour renvoyer l'unité pivotante (12).

5. Dispositif selon une quelconque des revendications 1 à 4, dans lequel le moyen de renvoi de tuyau flexible (10) est adapté pour stocker au moins une partie de l'énergie qui correspond au travail de traction vers l'extérieur du tuyau flexible (5) sous la forme d'une énergie potentielle pour le renvoi du tuyau flexible (5).

6. Dispositif selon une quelconque des revendications 1 à 5, dans lequel les deux moyens de renvoi de tuyau flexible (8,22 et 10) sont adaptés, quand le tuyau flexible (5) est tiré vers l'extérieur, pour stocker au moins une partie de l'énergie qui correspond au travail de traction vers l'extérieur du tuyau flexible (5) sous la forme d'énergie potentielle.

7. Dispositif selon une quelconque des revendications 4 ou 5, dans lequel lesdits moyens de renvoi de tuyau flexible (8,22 et 10) sont adaptés pour stocker de

l'énergie séquentiellement lorsque le tuyau flexible (5) est séquentiellement tiré vers l'extérieur.

8. Dispositif selon une quelconque des revendications 1 à 7, dans lequel les moyens de renvoi de tuyau flexible (8,22 et 10) sont adaptés pour renvoyer le tuyau flexible (5) séquentiellement.

9. Dispositif selon une quelconque des revendications 1 à 8, dans lequel au moins un des moyens de renvoi de tuyau flexible (8,22 et 10) applique sur le tuyau flexible (5) une force de renvoi qui augmente graduellement lors du renvoi du tuyau flexible (5).

10. Dispositif selon une quelconque des revendications 1 à 9, dans lequel le moyen de renvoi de tuyau flexible qui, pendant le renvoi du tuyau flexible (5) agit en dernier sur le tuyau flexible (5), applique sur le tuyau flexible (5) une force de renvoi qui augmente graduellement lors du renvoi du tuyau flexible (5).

11. Procédé de manipulation d'un tuyau flexible (5), dans lequel le tuyau flexible (5) à utiliser est tiré hors d'un espace de stockage de tuyau flexible (6) et après utilisation est renvoyé à l'espace de stockage de tuyau flexible (6), dans lequel, quand le tuyau flexible (5) est tiré vers l'extérieur, une unité pivotante (12), qui peut être pivotée par rapport à un moyen porteur (11) et l'espace de stockage de tuyau flexible (6), est pivoté autour d'un axe de pivot (18), le tuyau flexible (5) étant soutenu par un rouleau de soutien (9) qui est conjointement soutenu sur le porteur (11) et l'unité pivotante (12), et l'unité pivotante (12), après utilisation du tuyau flexible (5) est pivotée en arrière et renvoie le tuyau flexible (5) à l'espace de stockage (6), **caractérisé en ce que** un second moyen de renvoi de tuyau flexible (8,22) coopère séquentiellement avec le premier moyen de renvoi de tuyau flexible (10).

12. Procédé selon la revendication 11, dans lequel l'unité pivotante (12), pendant le pivotement autour de l'axe de pivot (12) pour la traction vers l'extérieur du tuyau flexible (5), stocke au moins une partie de l'énergie qui correspond au travail de traction vers l'extérieur du tuyau flexible (5) sous la forme d'énergie potentielle pour renvoyer le tuyau flexible (5).

13. Procédé selon la revendication 11 ou 12, dans lequel l'unité pivotante (12) est pivotée dans une première direction quand le tuyau flexible (5) est tiré vers l'extérieur et, lors du renvoi du tuyau flexible, est pivotée par un moyen de renvoi (19) qui applique une force de renvoi sur l'unité pivotante (12) à une distance de l'axe de pivot (18) dans une seconde direction qui est opposée à la première direction.

14. Procédé selon la revendication 13, dans lequel le moyen de renvoi (19) applique la force de renvoi d'une manière telle qu'un levier de couple de la force de renvoi par rapport à l'axe de pivot (18) est graduellement étendu pendant le renvoi du tuyau flexible (5).

15. Procédé selon la revendication 13 ou 14, dans lequel le moyen de renvoi est fabriqué afin de fonctionner comme un élément de ressort (19).

16. Procédé selon une quelconque des revendications 11 à 15, dans lequel les deux moyens de renvoi de tuyau flexible (8,22 et 10), lorsque le tuyau flexible (5) est tiré vers l'extérieur, stockent au moins une partie de l'énergie qui correspond au travail de traction vers l'extérieur du tuyau flexible (5) sous la forme d'énergie potentielle.

17. Procédé selon la revendication 16, dans lequel lesdits moyens de renvoi de tuyau flexible (8,22 et 10) stockent de l'énergie séquentiellement quand le tuyau flexible (5) est séquentiellement tiré vers l'extérieur.

18. Procédé selon une quelconque des revendications 11 à 17, dans lequel les moyens de renvoi de tuyau flexible (8,22 et 10) renvoient séquentiellement le tuyau flexible (5).

19. Procédé selon une quelconque des revendications 11 à 18, dans lequel au moins un des moyens de renvoi de tuyau flexible (10) applique sur le tuyau (5) une force de renvoi qui augmente graduellement lors du renvoi du tuyau flexible (5).

20. Procédé selon une quelconque des revendications 11 à 19, dans lequel le moyen de renvoi de tuyau flexible (10), qui agit en dernier sur le tuyau flexible lors du renvoi du tuyau flexible (5), applique sur le tuyau flexible (5) une force de renvoi qui augmente graduellement lors du renvoi du tuyau flexible (5).

21. Ensemble de pompe à carburent, comme une pompe à essence, **caractérisé en ce qu'**il comporte un dispositif de manipulation de tuyau flexible selon une quelconque des revendications 1 à 10.

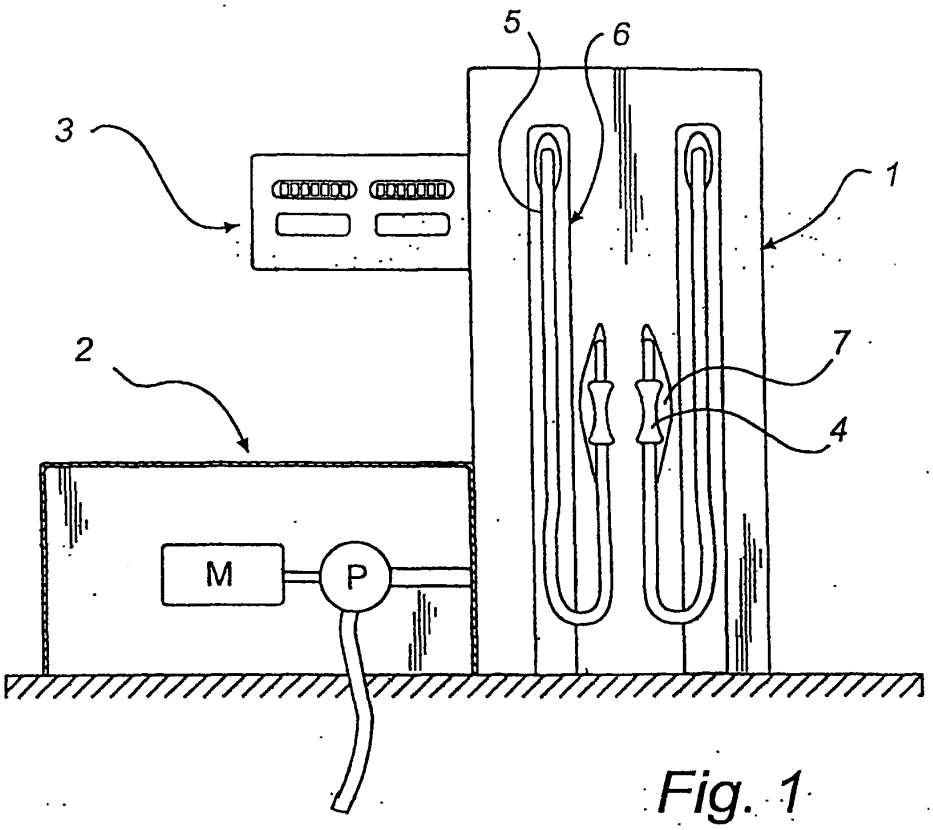

Fig. 1

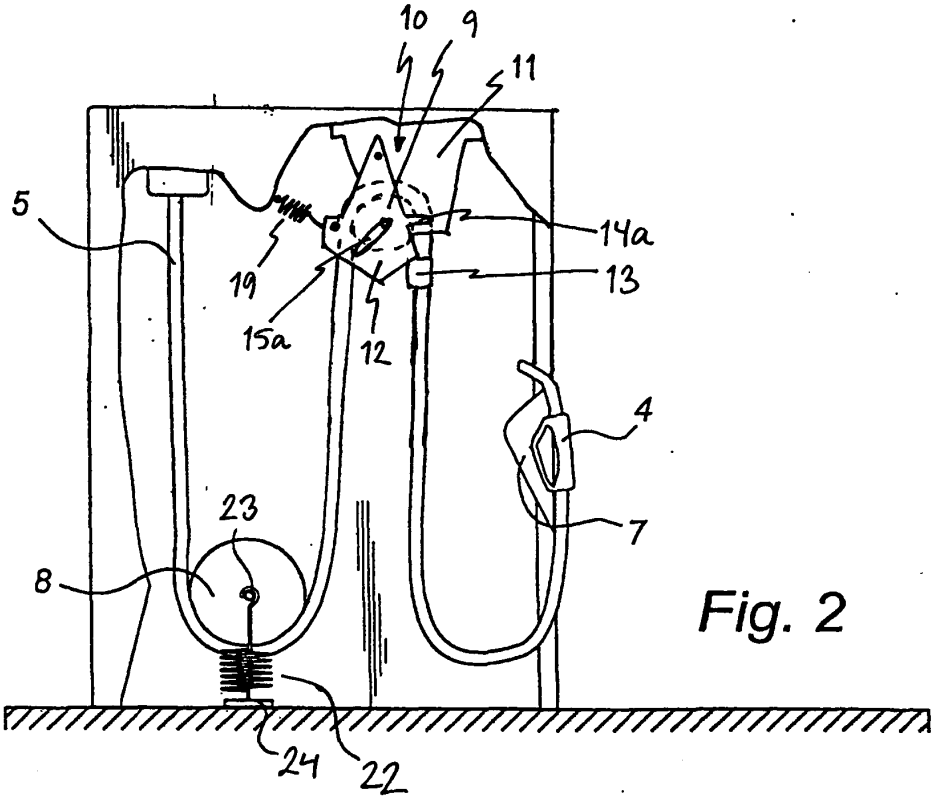

Fig. 2

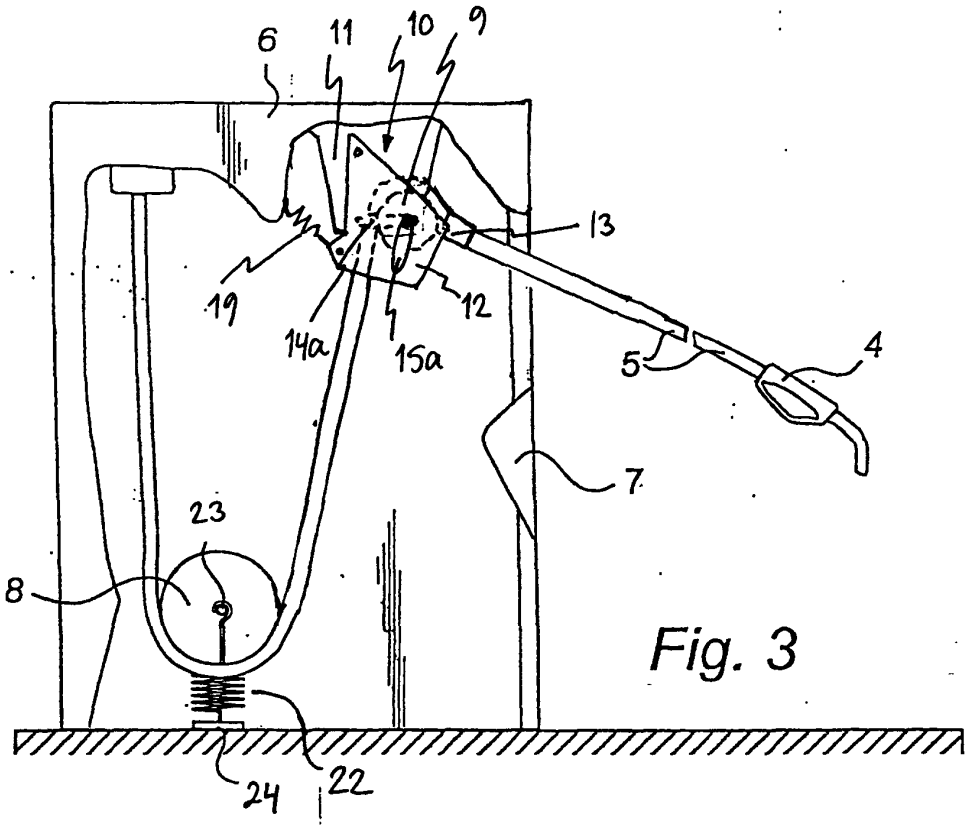
6
11
10
9
13
19
14a
15a
12
5
4
7
23
8
24
22

Fig. 3

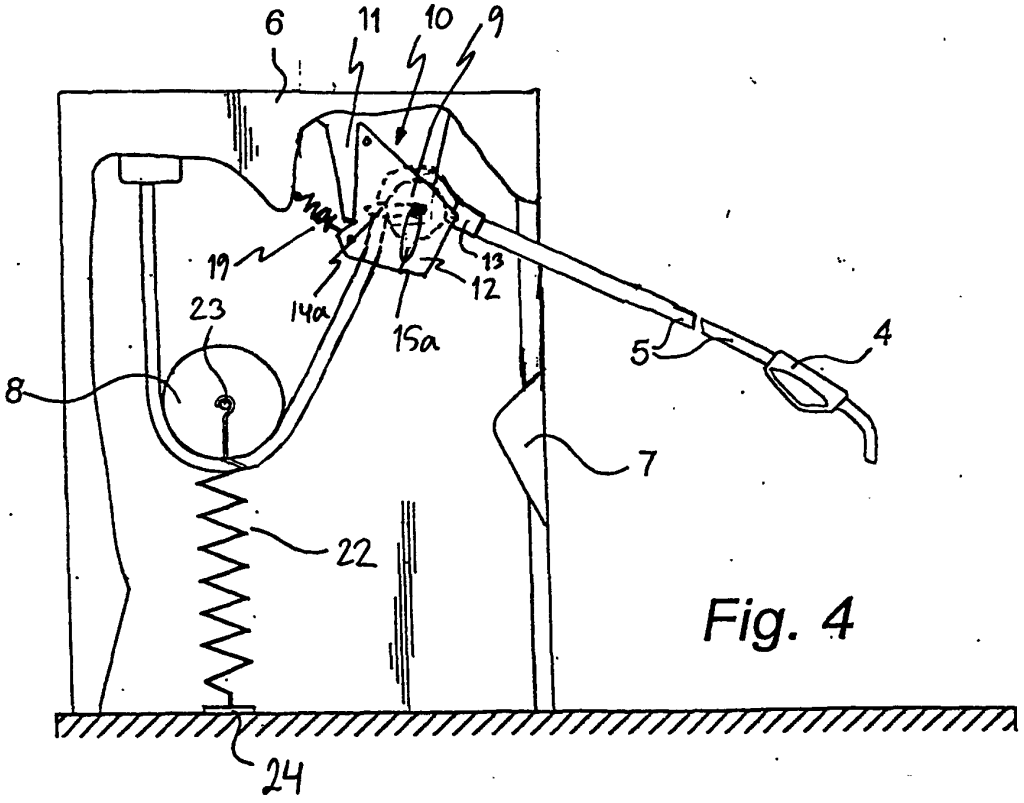
6
11
10
9
19
14a
15a
13
12
23
5
4
8
7
22
24

Fig. 4

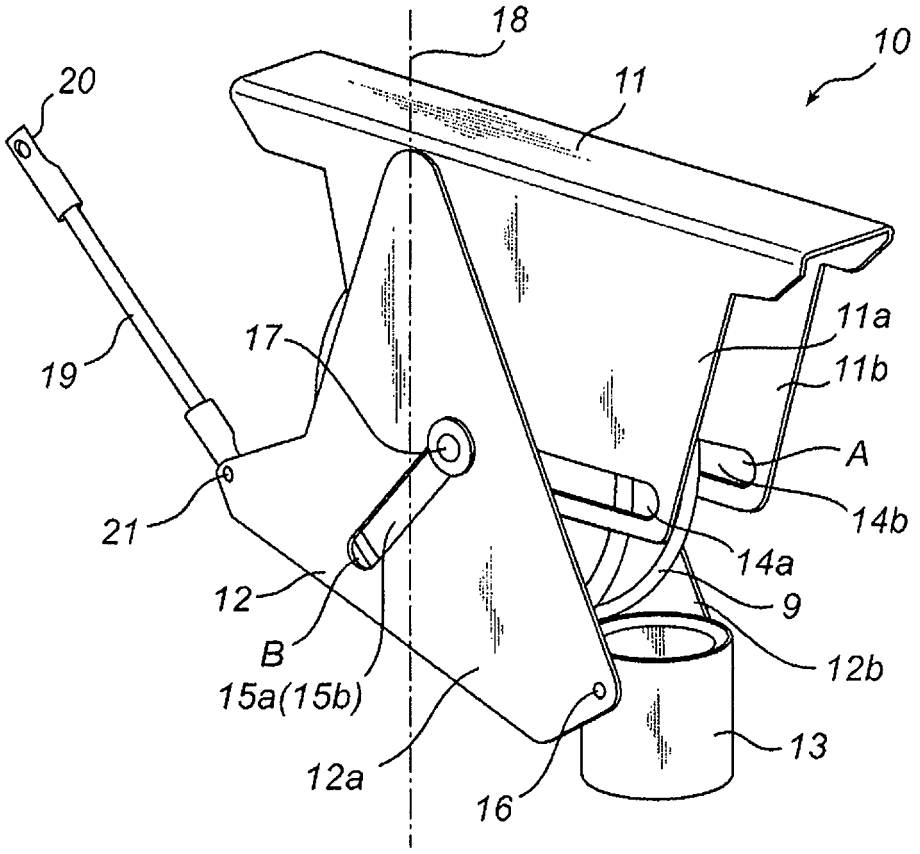

Fig. 5

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 6334457 B1 **[0001]**
- EP 0379742 A1 **[0007]**
- EP 0255979 B1 **[0009]**
- NL 8403718 A **[0010]**
- WO 0015542 A **[0011]**
- SE 0100993 **[0012]**
- SE 02002244 **[0013]**