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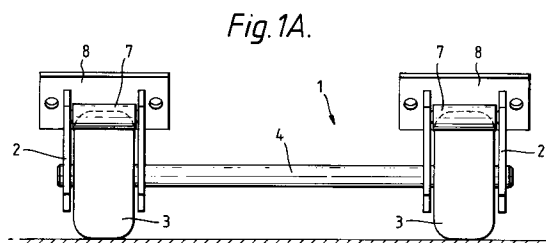
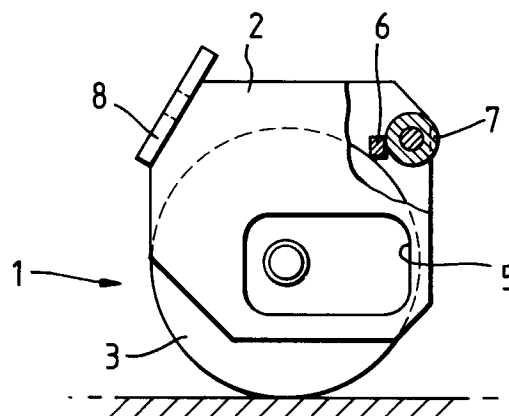
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NL-3130 AC Vlaardingen (NL)(54) **Floor cleaning machine.**

(57) A floor cleaning machine is provided, comprising a motor-driven or operator-pushed movable body carrying one or more rotatable scrubbers, reservoirs for storing fresh and spent cleaning liquid, a means for dosing fresh cleaning liquid on to the floor and a vacuum pick-up system comprising a suction head including a squeegee. The machine is provided with a lifting arrangement (1) attached to the bottom side thereof and comprising a housing (2) and one or more wheels (3), whereby the housing includes means which can cooperate with said wheels such that the squeegee or scrubbers are automatically raised respectively lowered when the machine is moved in a rearward respectively forward direction. Furthermore, said lifting arrangement is provided.

*Fig. 1B.***EP 0 621 004 A1**

FIELD OF THE INVENTION

The present invention relates to automatic floor-treating and -cleaning machines. More particularly, the invention relates to such machines which are used for the cleaning of carpets or hard surfaces of floor areas, such as in hotels, factories, office buildings, shopping centres and the like.

BACKGROUND OF THE INVENTION

In general, such automatic floor-treating and -cleaning machines comprise an operator-pushed or motor-driven movable body carrying one or more motor-driven rotatable scrubbers, reservoirs for storing fresh and spent cleaning liquid, a means for dosing fresh cleaning liquid on to the floor and a squeegee/vacuum pick-up system for recovering spent liquid from the floor. The operation of said vacuum pick-up system is usually as follows. During the cleaning operation spent liquid is recovered using a squeegee which is connected to the spent liquid reservoir by way of a suction head. The suction operation is effectuated by an under-pressure in the spent liquid reservoir and the squeegee, the under-pressure being generated by a vacuum motor.

It has been recognised in the past that the squeegee may be damaged if it is not raised or lifted when the machine is moved in a rearward direction. As a consequence, several types of lifting arrangements have been disclosed. For instance, US-A-4,334,335 relates to a floor scrubbing machine having a squeegee which can be hydraulically raised and lowered. This machine is provided with a flow sensing device which recognizes the flow direction of the hydraulic fluid needed for driving the wheels of the machine and which automatically lifts the squeegee when the wheels are driven in reverse.

Another type of floor scrubbing machine including a mechanism for raising the squeegee assembly when the scrubber is moved rearwardly, is disclosed by US-A-4,619,010. The device described in this document is a walk-behind scrubbing machine including a hand-operated handle for moving the machine. When this handle is pushed, it also operates a switch which activates an electric drive for moving a lever or rack such that the squeegee assembly is lowered. When the handle is pulled, the mechanism including the switch is operated to raise the squeegee assembly.

Yet another type of floor treating machine with a lift-off mechanism is disclosed by US-A-3,983,592. This document describes a rug shampooing machine including means for producing dry foam, a rotatable brush for working such foam into a carpet, and a vacuum nozzle/squeegee assembly for pick-

ing up the resulting dirty solution. In this machine, there is also provided a reverse stroke brush lift-off mechanism comprising a linkage system for producing a lift-off of the brush from the surface to be cleaned when the machine is in its backward movement.

As can be noticed in the above documents, the lifting arrangements disclosed by the prior art are concerned with rather complicated, often partly electrically and/or hydraulically operating mechanisms for raising the squeegee or the rotatable brushes.

In view of this, it is an object of the present invention, to provide a floor treating machine including a fully mechanically operating mechanism for automatically raising or lowering the squeegee or brushes. It is a further object to provide such a machine, wherein said mechanism has a simple mechanical construction.

We have now, surprisingly, found that these and other objects can be achieved by the floor treating machine according to the present invention.

DEFINITION OF THE INVENTION

The present invention provides a floor cleaning machine, comprising a motor-driven or operator-pushed movable body carrying one or more rotatable scrubbers, reservoirs for storing fresh and spent cleaning liquid, a means for dosing fresh cleaning liquid on to the floor and a vacuum pick-up system comprising a suction head including a squeegee, characterised in that the machine is provided with a lifting arrangement attached to the bottom side thereof and comprising a housing and one or more wheels, whereby the housing includes means which can cooperate with said wheels such that the squeegee or scrubbers are automatically raised respectively lowered when the machine is moved in a rearward respectively forward direction. The invention also provides said lifting arrangement which is suitable for use attached to the bottom side of the floor cleaning machine according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The first aspect of the present invention is a floor cleaning machine which is operator-pushed or motor-driven and comprises a mechanically operating lifting arrangement for automatically raising or lowering the squeegee or scrubbers. This lifting arrangement has a simple construction and may, generally, be attached to any suitable part of the bottom side of the floor treating machine. It is preferably located near the suction head, more preferably tightly fixed to it, so as to enable the squeegee to be automatically raised and lowered

depending on the direction of movement of the floor cleaning machine. The lifting arrangement can be fixed equally at the back and in the front of the suction head, as seen in the direction of the forward movement of the floor cleaning machine.

In general, the lifting arrangement comprises a housing and one or more wheels. The housing is preferably tightly fixed to the suction head. The level at which the housing is attached to the suction head is desirably adjustable so as to enable the operator of the floor cleaning machine to apply several types of squeegees with varying heights.

The housing, generally, includes means which can cooperate with the wheels such that the squeegee is automatically lifted or lowered depending on the direction of movement of the machine. These means preferably include openings for the axis of the wheels to be movably attached therein, whereby the dimensions of said openings are larger than the diameter of the axis. These openings can have varying sizes and shapes. Preferably, they have a rectangular or square shape.

Furthermore, the means which cooperate with the wheels desirably comprise one or more projections which can cooperate with the wheels for lifting the squeegee when the machine is moved in a rearward direction. These projections can have varying dimensions and shapes, such as square, rectangular, oval and round shapes. They can be tightly fixed to the housing at one specific location or the location of their fixation can be adjustable.

Preferably, the means which cooperate with the wheels also include one or more turnable rolls which can have any suitable size but are preferably smaller than the wheels and which cooperate with the wheels as long as the floor cleaning machine is moved in reverse. These rolls can be connected to each other or have separate bearings. Their position with respect to the wheels can be adjustable or fixed. Furthermore, these rolls can be mounted to be freely rotating; however, for practical reasons (i.e. to ensure that the squeegee is lifted quickly when needed) the rolls are preferably mounted such that they are dragging.

These rolls as well as the wheels can be made of several types of material, such as metal, rubber or plastic, and their surface can vary from very smooth to very rough.

A varying number of wheels can be applied in the lifting arrangement of the invention. When more than one wheel is applied, the wheels can be connected or have separate bearings. Preferably, two wheels are used which are effectively connected by one axis.

The second aspect of the invention relates to a lifting arrangement which is suitable for use in a floor cleaning machine of the invention.

The invention will now be better explained by way of the following preferred embodiment, and with reference to the accompanying drawings, in which:

Figures 1 A and B show schematic cross-sectional views of a lifting arrangement according to the invention, as seen from the front and from the side respectively;

Figures 2 A,B, and C show schematic cross-sectional side-views of the same lifting arrangement attached to a suction head of a floor cleaning machine,

(A) when moving the machine in a forward direction,

(B) just after starting to move the machine in a backward direction, and

(C) when continuously moving the machine backwardly.

Figures 1 A and B show two schematic cross-sectional views of the lifting arrangement (1) of the invention. This lifting arrangement features a housing (2) divided into two separate parts and surrounding two wheels (3) which are connected by an axis (4). This housing can be attached to the suction head of a floor cleaning machine by way of the plates (8). Furthermore, Figure 1B schematically shows the preferred means which can cooperate with the wheels (3) such that the squeegee is automatically raised or lowered depending on the direction of movement of the floor cleaning machine. These means include the rectangular openings (5) which are located in the plate-form elements of the housing adjacent to the wheels (3) and of which the dimensions are clearly larger than the diameter of the axis (4). The other means which can cooperate with the wheels are shown to be the projections (6) and the rolls (7). These means are described in more detail below.

In Figures 2 A,B and C, it is shown what happens when moving the floor cleaning machine forward and subsequently changing the direction of movement of the machine. These three Figures show schematic cross-sectional side views of the lifting arrangement tightly fixed to the suction head (9) of a floor cleaning machine. Also shown is a squeegee (10) consisting of two rubber blades, which are tightly but removably attached to the suction head. The direction of movement is indicated with large arrows.

Figure 2A depicts the situation wherein the floor cleaning machine is moved forward. The wheels (3) are turning freely in the housing (2), while the axis (4) of said wheels is located at the lefthand side of the openings (5). As a result, the vertical position of the suction head (9) is not influenced by the lifting arrangement.

Figure 2B shows the situation just after changing the direction of the movement of the floor

cleaning machine from forward to backward movement. Because of this changed direction of movement, the axis (4) of the wheels (3) is moved slightly towards the righthand side of the openings (5) and said wheels are pushed towards the projections (6). As a consequence, the housing (2) as well as the suction head (9) including the squeegee are pushed upward, as shown.

When backward movement is continued, the housing (2) and the suction head (9) are automatically lifted up further by exertion of the upward directed force resulting from the force with which the wheels (3) are pushed towards the projections (6). Concurrently the axis of said wheels moves towards the lower righthand side of the openings (6).

In Figure 2C, the situation is shown after a short period of backward movement of the floor cleaning machine. It can be seen that in this situation the wheels (3) are free to rotate and not in contact with the projections (6) anymore, and that the axis (4) of the wheels is now positioned at the righthand side of the openings (5). As the axis (4) cannot move further and the upward directed force has stopped, the final lifted position of the suction head including the squeegee has been reached in this situation. It can be noticed that in this situation the wheels (3) are turning against the rolls (7). As a result, a steady lifted position of the suction head during backward movement of the floor cleaning machine, is ensured.

When the direction of movement is changed again to forward movement, the axis (4) of the wheels will promptly start moving towards the left hand side of the openings (5) and, as a consequence, the housing (2) and the suction head (9) will be lowered automatically such that the squeegee can again properly perform its cleaning function.

It is emphasized that the dispenser shown in the Figures illustrates a only preferred embodiment of the invention and that various constructional alternatives will be immediately evident to the man skilled in the art, without departing from the scope of the present invention.

Claims

1. Floor cleaning machine, comprising a motor-driven or operator-pushed movable body carrying one or more rotatable scrubbers, reservoirs for storing fresh and spent cleaning liquid, a means for dosing fresh cleaning liquid on to the floor and a vacuum pick-up system comprising a suction head including a squeegee, characterised in that the machine is provided with a lifting arrangement attached to the bottom side thereof and comprising a housing and one or more wheels, whereby the housing in-

cludes means which can cooperate with said wheels such that the squeegee or scrubbers are automatically raised respectively lowered when the machine is moved in a rearward respectively forward direction.

2. Floor cleaning machine according to claim 1, wherein the lifting arrangement is tightly fixed to the suction head so as to enable the squeegee to be automatically raised or lowered.
3. Floor cleaning machine according to claim 1 or 2, wherein the means which can cooperate with the wheels include one or more openings for an axis of the wheels to be movably attached therewith and wherein the dimensions of said openings are larger than the diameter of the axis.
4. Floor cleaning machine according to any of claims 1-3, wherein said means comprise one or more projections which can cooperate with the wheels for lifting the squeegee when the machine is moved in a rearward direction.
5. Floor cleaning machine according to any of claims 1-4, wherein said means include one or more turnable rolls which cooperate with the wheels as long as the machine is moved rearwardly.
6. Floor cleaning machine according to any of claims 1-5, wherein the axis is provided with two wheels.
7. Lifting arrangement suitable for use in the floor cleaning machine according to any of claims 1-6, characterised in that the arrangement comprises a housing and one or more wheels, whereby the housing includes means which cooperate with said wheels such that the squeegee or scrubbers of the floor cleaning machine are automatically raised respectively lowered when the structure is attached to the bottom side of the machine and said machine is moved in a rearward respectively forward direction.

Fig. 1A.

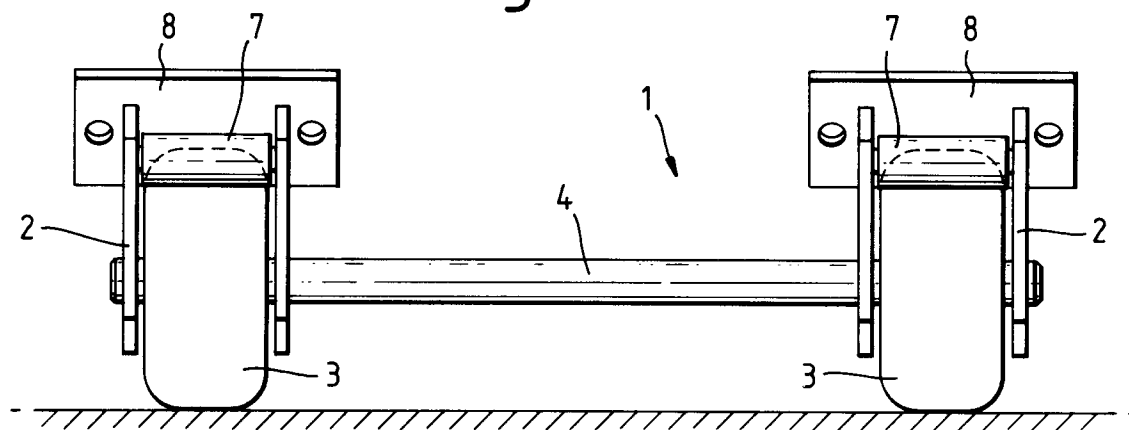


Fig. 1B.

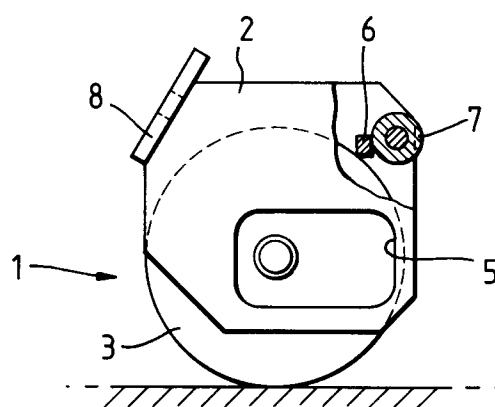


Fig.2A.

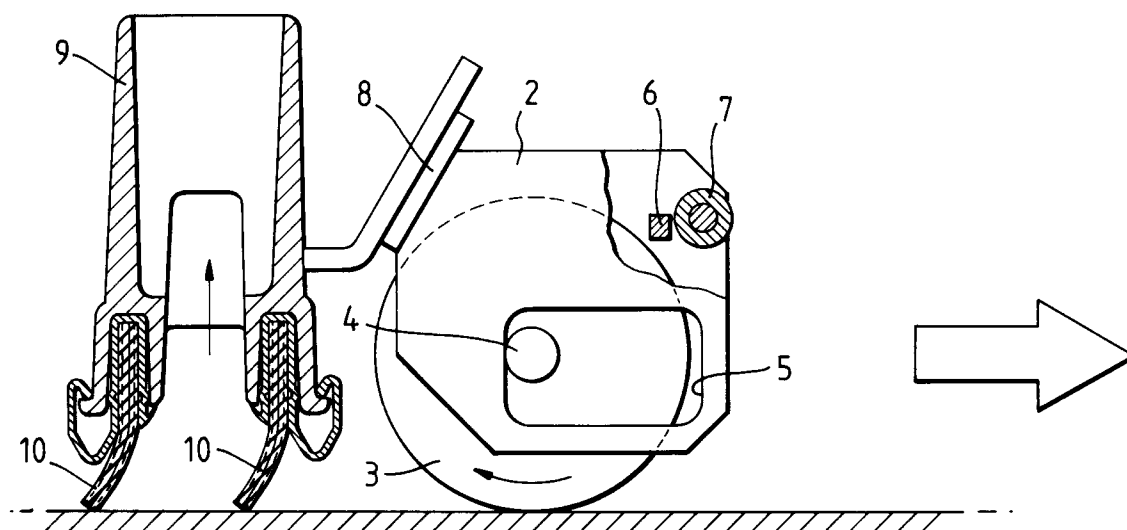


Fig.2B.

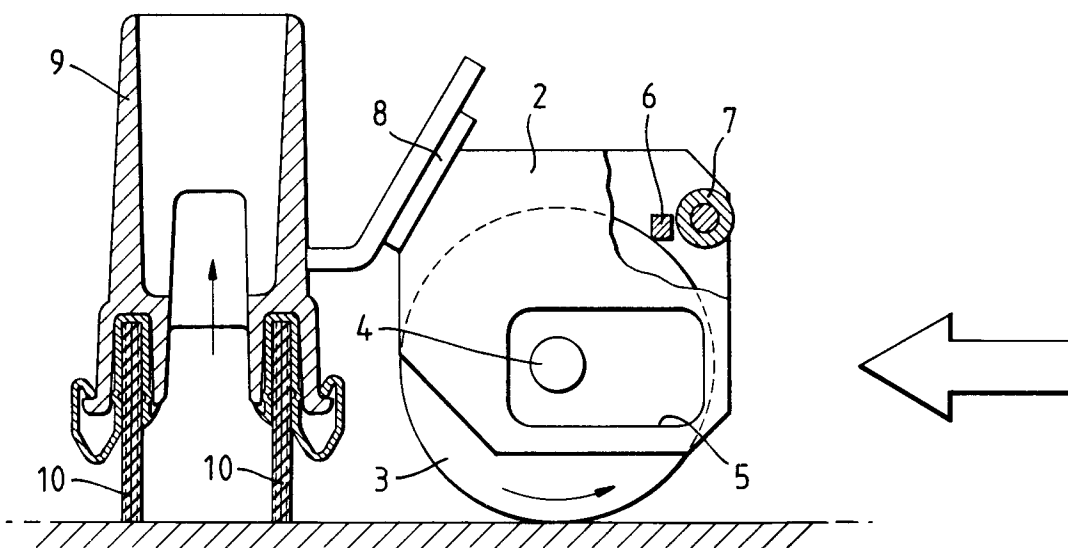
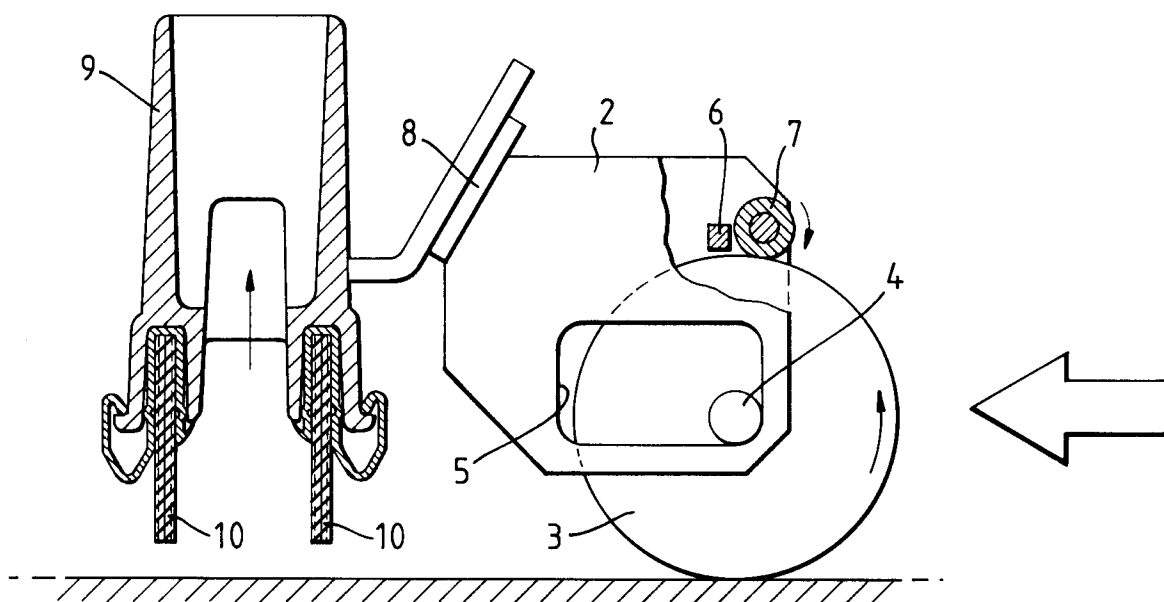


Fig. 2C.





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EUROPEAN SEARCH REPORT

Application Number

EP 93 20 1122

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-1 506 016 (LUNDGREN) * page 3, line 7 - line 52; figures 1,2,8-10 * ---	1,2,6,7	A47L11/30 A47L11/40
A	US-A-3 092 862 (SHERBONDY) * column 3, line 42 - column 4, line 9; figures 2,4 * ---	1,3,7	
A	US-A-1 993 296 (CUMMINS) * page 1, right column, line 14 - line 40; claim 1; figures * ---	1,3,7	
A	US-A-2 841 807 (PULLEN) * column 2, line 16 - line 37; figures 3,4 * ---	1,7	
A	US-A-2 645 798 (THIELE) * column 4, line 35 - column 5, line 63; figures 1,2 * -----	1,3,7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A47L
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 20 SEPTEMBER 1993	Examiner KANAL P.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			