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(54) Cleaning device, cleaning cloth and method of cleaning

(57) The present inventuon relates to a cleaning device comprising a stem portion (1) and an elongated support portion (6 or 8) connected to the stem portion for supporting a cleaning cloth, the direction of the elongation being normal to the direction of the main cleaning movement. The cleaning cloth (9) forms an endless cleaning cloth loop arranged to be threaded to surround the elongated portion (6 or 8) through an end opening thereof. The cleaning cloth loop (9) is also arranged rotatably around the elongated portion (6 or 8) in a direction of rotation normal to the direction of the elongation. The invention relates further to a cleaning cloth and method of cleaning.

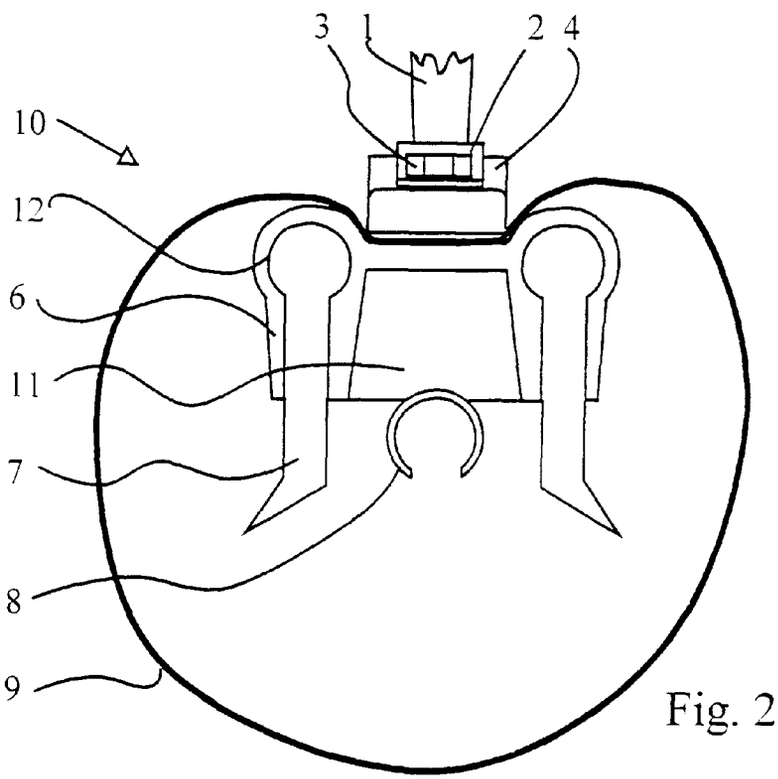

Fig. 2

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a cleaning device for cleaning surfaces, such as floors, walls, windows, doors, tables, roofs, etc. The invention relates further to a cleaning cloth for use in connection with a cleaning device. The invention relates also to a method of cleaning.

BAKGROUND OF THE INVENTION

[0002] A widely used prior art solution in cleaning surfaces is to use a mop supported by a supporting framework or similar support portion of a cleaning device. The mop is fixedly attached, i.e. arranged in a non-movable relation to the framework during sweeping of e.g. a floor surface. The mop can be made of suitable material, such as cotton, felt, or artificial fibres. Various solutions for the sweeping mops and for the attachment thereof are known e.g. from US patents Nos. 3,029,454, 3,711,886, 4,715,081 and 4,914,778 or from FI patents Nos. 68514 and 88670 and FI patent applications Nos. 955346 and 961107. In all of these the size and form of the mop cloth corresponds substantially the size and shape of the supporting framework. Said mop can also be provided with "yarns" or the like extending from the edges of the mop cloth.

[0003] US patent 5,542,143 in turn discloses a cleaning device in which a water absorbing member is movably assembled in relation to the body portion of the device. In this a circularly cleaning swab structure is mainly composed of a grip stem, a casing and an annular water-absorbing member, wherein the casing is connected at the lower end of the grip stem and defines an interior close water-containing room. The water-absorbing member is disposed around outer periphery of the casing and formed with inner engaging teeth for engaging with corresponding teeth of a rotary wheel rotatably disposed on an outer lateral side of the casing. A top portion of the water-absorbing member is inserted within a clearance defined between the casing and a upper cover of the casing while a bottom portion of the water-absorbing member is located under a bottom of the casing for contacting the ground. The arrangement is such that after swabbing the ground, the contaminated bottom portion of the water-absorbing member can be one-way circularly driven into the interior of the casing to be soaked into a detergent or a liquid and squeezed.

SUMMARY OF THE INVENTION

[0004] The prior art arrangements have some disadvantages. The non-movable solution do not allow an efficient use of the entire surface area of the mop cloth for the cleaning, but they are arranged to sweep only by the lower or bottom side thereof. Due to the fact that the mop becomes dirty from the lower surface during the sweeping it has to be frequently removed from the supporting framework and washed, or then it has to be replaced by a clean mop. This causes breaks to the actual sweeping operation, or a need to use more than one mop for the sweeping. The washing devices or arrangements and/or amount of replacement mops increases the total costs of the cleaning work, and makes the overall control and management of the required cleaning equipment and material more complicated.

[0005] A problem relies also in the fact that in connection with prior art solutions several different cleaning means, such as separate dust sweeping arrangements, washing cloths and drying devices, are required. The transportation and carrying of various separate cleaning means makes the cleaning work more difficult. The separate devices are expensive to purchase and increase further the above mentioned problems related to the control and management of the cleaning equipment.

[0006] Even though US patent 5,542,143 discloses a movable annular water absorbing member, it does not provide any appropriate means for providing an increased sweeping surface, but provides only a narrow sweeping surface area. In addition, the device and the water absorbing member thereof can be used only for the purpose of washing surfaces.

[0007] It is an object of the present invention to overcome the disadvantages of the prior art solutions and to provide a new type of solution for cleaning apparatus and method of cleaning.

[0008] A further object of the present invention is to provide a method and arrangement in which the cleaning cloth means need to be changed less frequently as is the case with the prior art mop clothes.

[0009] A further object of the present invention is to provide a method and arrangement in which the available sweeping surface area of the mop is substantially larger than in the known solutions.

[0010] A further object of the present invention is to provide a cleaning device for multipurpose use. An additional object is an apparatus and a method by means of which the washing and subsequent sweeping can be accomplished by a single device.

[0011] A further object of the present invention is to provide a cleaning device in which the sweeping cloth is attached in a new manner relative to the frame of the device.

[0012] According to a first aspect the objects are obtained by a cleaning device comprising a stem portion and an elongated support portion connected to the stem portion for supporting a cleaning cloth, the direction of the elongation being normal to the direction of the main cleaning movement. The cleaning cloth forms an endless cleaning cloth loop arranged to be threaded to surround the elongated portion through an end opening thereof, and the cleaning cloth loop is rotatable around the elongated portion in a direction of rotation normal to the direction of the elongation.

[0013] The cleaning device may further comprise means for holding the cleaning cloth in its position in engagement with the body portion. Said holding means may consist of a biased spring element attached to the support portion. The arrangement is then such that the cleaning cloth loop can be moved relative to the support portion only in case the spring element is in its opened position. The stem portion is preferably attached to the spring element, wherein the spring element is arranged to be opened by means of the stem portion. According to one alternative the elongated support portion consist of a bar attached from the other end thereof to a body portion of the cleaning device and extending substantially parallel with the body portion. The bar can be of hollow construction and provided with a longitudinally extending slot for receiving a cloth holding bulb into the bar. According to a still further embodiment a cleaning device comprises two sweeping blades, the blades extending in parallel with the support portion, wherein the sweeping edge of the first blade is arranged to sweep in a first direction of cleaning movement and the sweeping edge of the second blade is arranged to sweep in a second direction of cleaning movement. The bar may extend between the two blades.

[0014] According to second aspect the invention provides a cleaning cloth forming an endless loop having an opening at least in the other end thereof and arranged to be supported by an elongated support portion of a cleaning device provided with an stem portion. The cleaning cloth loop is arranged to be rotated around the elongated support portion in a direction of rotation normal to the elongated direction of the support portion.

[0015] According to a further aspect the invention provides a method of cleaning by a cleaning device comprising a stem portion and elongated means for supporting a looped cleaning cloth, wherein the looped cleaning cloth is threaded around the elongated means for supporting the looped cleaning cloth through an opening in the end thereof. The method comprises steps of rotating the looped cleaning cloth around the elongated means in a direction of rotation normal to the elongated direction of the elongated means and holding the looped cleaning cloth against the elongated means when the movement of the cloth is not desired.

[0016] Remarkable advantages are obtained by means of the present invention. These include, for instance, a possibility to reduce the amount of different kinds of cleaning clothes or fabrics and also the amount of cleaning cloth changes. These have a positive effect on the costs of the cleaning work. In addition, it is possible to reduce the amount of different kind of equipment needed in the cleaning, since the same cleaning device can be used both for the washing and the subsequent drying or finishing sweeping. Since the same cleaning device can be used for several different work stages, it is possible to easily combine / interlace the work stages, whereby the overall duration of the cleaning work can be shortened. The invented cleaning device provides many-sided properties and can be used for instance as a means for cleaning floors or a window cleaner.

[0017] In the following the present invention and the other objects and advantages thereof will be described in an exemplifying manner with reference to the annexed drawings, in which similar reference characters throughout the various figures refer to similar features. It is noted herein that the term cleaning refers widely to all such operations in which surfaces are swept, washed, polished or otherwise treated for the purposes of cleaning, polishing, protecting etc.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Figures 1a and 1b disclose a schematic side views of cleaning devices in accordance with the present invention;

Figure 2 discloses an end view of the figure la device and a cleaning cloth supported by it;

Figure 3 is similar to figure 2, but discloses another possibility of mounting the cleaning cloth;

Figures 4a and 4b disclose some ways to use the solution of figure 3; and

Figures 5 to 7 disclose some further embodiments.

DETAILED DESCRIPTION OF THE DRAWINGS

[0019] Figure 1a discloses one elongated cleaning cloth support or holder frame 10 of cleaning device in accordance with the invention. A corresponding cleaning device is disclosed in figure 2 as seen from the left end thereof and provided with a looped cleaning cloth or fabric 9.

[0020] The support comprises a body portion 6 provided with slots 12 which receive special sweeping blades or lips 7. The body portion 6 can be made e.g. from steel, aluminium, plastics or the like material suitable for this purpose. The sweeping blades 7 can be made e.g. from rubber, plastic or foamed plastic, or then they can be formed by means of suitable brushes. The sweeping blades 7 can be provided, if desired, with sharp sweeping or drying edges 17. The blades are threaded into their position within the slots 12 of the body portion 6 from the other end of the body portion 6 in a per se known manner. It is noted herein that it is possible to have only one blade instead of two blades, and that the blade or lip 7 is not the essential part of the invention, but that the invention can also be implemented without any blades, as will be described later.

[0021] A spring element 4 has been attached by screws 5 on top of the body portion 6. The spring element 4 is biased such that it slightly bears against the upper surface of the body 6. It can be lifted off from the body surface, i.e. is movable relative to the body portion 6 in a manner illustrated by the two-headed arrow. The spring element 4 can be made from a spring steel level

rod, as is the case in figures 1a and 2, or e.g. from a suitably formed spring wire structure. Various suitable spring elements for providing the biased holding of the cleaning cloth which can be utilised in the invention are well known by the skilled person, and will thus not be explained in more detail.

[0022] An attachment pivot structure 2 of the stem portion 1 is mounted on the upper side of the free end of the spring element 4 by means of screws 3. The stem 1 is shown only partially, but the skilled person understands that it can be of any suitable length, such as between 0,5 to 1,5 meters long. The stem 1 and the pivot structure 2 enabling a pivoting attachment of the stem 1 to the body portion 6 can be of any known type, e.g. any of the solutions disclosed in the above referred prior art publications.

[0023] Figure 1b corresponds otherwise figure 1a, but discloses an embodiment in which the elongated cleaning cloth support 10 is of an essentially long structure. In such case it may occur that the biasing force of the spring element 4 is not sufficient enough. In such case the spring element 4 can be locked from the free end thereof to the body 6 by means of a clamp or locking device 14. The clamp can be of any appropriate type providing releasable locking.

[0024] Figure 2 discloses an embodiment in which a cleaning cloth 9 has been threaded to cover the body portion 6. The cleaning cloth 9 is annular, i.e. has a shape of an endless loop, and is arranged to be threaded around a support portion of the cleaning device support frame 10 through an opening in the other side edge of the loop. The material of the cleaning cloth 9 can consist of any appropriate material used for cleaning cloths in general, such as clothes made from cotton, terry, felt, microfibers, artificial fibers, woven linen, etc. It is also possible to turn the looped cloth 9 around, i.e. inside up, so that utilisation of both sides of the loop is enabled.

[0025] As disclosed by figure 2, the sweeping cloth 9 is threaded to surround the supporting body portion 6 through the other end opening thereof and is placed to lie under the spring element 4 so as to be held in its desired position by means of the spring element. Therefore the cloth 9 remains steadily in its position during the cleaning procedures. When a need to move i.e. "rotate" the cloth 9 relative to the support body 6 arises, the spring element 4 is lifted off from the body surface, e.g. by means of lifting the stem 1 as illustrated by the arrows in figures 1a and 1b. By rotating the cloth 9 it is possible to obtain a clean or dry portion of the cloth against the surface to be swept, whereas the dirty or wet portion of the cloth is placed on the top side, i.e. in a position where it is not in use and cannot touch the surface. By means of he solution it is possible to utilise the entire surface area of the cloth 9 from both sides thereof (i.e. both the inner and outer surface of the loop) which has a positive effect to both the overall duration time of the cleaning (smaller need for changing and/or washing or drying the cleaning cloth) and the costs for the cleaning equipment (smaller amount of cleaning clothes is required).

[0026] According to the alternative disclosed by figure 3 the looped cleaning cloth 9 is adapted to be attached to the cleaning device by threading the looped cloth around a bar means 8 extending below the body portion 6 from the other end 11 thereof. As illustrated by figure 3, the bar means 8 can be fixed to an end plate 11 provided in the other end of the body 6.

[0027] A difference to the solution of figure 2 is that now it is possible to use the blade 7, and more precisely the sharp edge 17, for sweeping or drying the surface when this is desired. In the embodiment of figure 2 the blades 7 provide bearing support for the cleaning cloth as it is pushed against the surface to be cleaned. In case a need to use the edge 17 of the blade arises, the cloth 9 has to be removed around the body portion 6.

[0028] Figures 4a and 4b illustrate the use of the figure 3 arrangement. As can be noted from figure 4a, only the other of the blades 7 is used to bear the cloth 9 against the surface (not shown) whereas the other blade remains free. This other blade can be utilised for precleaning of the surface, for example for cleaning away stones etc. small particles or rubbish which otherwise would enter into the cleaning cloth 9. In figure 4b the cloth 9 is swung around the body portion 6, whereby it is possible to use the other of the blades 7 for e.g. drying purposes. This solution provides advantage e.g. when washing windows, since only one device is needed which can be used both for the washing (by means of the replaceable / rotatable cloth 9) and for drying by mean of the blade 7.

[0029] According to one embodiment the bar means 8 and the slot between at least the other of the blades 7 is arranged to be substantially narrow, or even such that the blade 7 bears against the bar means 8. This provides a corresponding holding effect as what is achieved by means of the spring element 4.

[0030] The bar means 8 may also be provided with a slot or opening 21 extending over the entire length thereof, whereby the bar means 8 form a C-shaped structure. As the figure 5 discloses, a cleaning cloth 19 can be threaded into this kind of structure, said cleaning cloth being provided with a special retaining bulb 20, such as a narrow rod etc. sewed within the cleaning cloth. The bulb 20 is threaded inside the bar means 8 such that it becomes retained by the bar means. This solution enables a use of both sides of the cloth by one attachment while the blades 7 can be used e.g. for the purposes of drying. According to the disclosure of figure 5 it is not always necessary to provide the cleaning device with a spring element of figures 1 to 4.

[0031] Figure 6 discloses a solution in which the cleaning device is provided with a cleaning cloth 9A and/or 9B which does not form a loop.

[0032] Figures 1 to 6 disclose an elongated cleaning cloth support 10 which is provided with two blades 7 which in turn are provided with drying tips or edges 17. In addition to the sweeping and/or scraping properties,

these blades can be utilised in the actual cleaning operation, as they can be used as elements bearing the cloth against the surface to be cleaned. Some advantages are obtained in the cleaning by bearing by means of the disclosed blade e.g. due to reason that the surface area by which the cloth or fabric is pressed against the surface to be cleaned remains essentially narrow while the pressure against the surface to be cleaned can be held in a substantially high level. For instance, a wet cloth slides easily on the surface while the cleaning effect thereof is at its highest level.

[0033] As can be seen from figure 4a, the left hand side blade 7 bears the cloth against the surface while the device is moved to the right. The remaining part of the cloth follows the support device, and it can absorb / dry any water left behind on the surface while the device is forwarded.

[0034] Figure 7 discloses one additional embodiment. In this the body portion 6 is provided to have a substantially flat structure. A cleaning cloth 29 used in this has a looped shape, but now such that the other end thereof is closed. The open end of the cloth is threaded through the opening 30, as disclosed by arrow, to surround the body frame 6. A flap or loop 31 can be used when drawing the cloth loop around the body 6. When the cleaning cloth 29 is completely threaded to surround the body portion 6, a spring element 4 is released so that it may bear against the body portion 6 and retain the cloth in its position. It is possible to provide the flap portion 31 with suitable means for attachment and the surface of the end of the cloth 29 with appropriate counterparts so that the flap portion can also be utilised in closing the end opening 30 and in holding the cleaning cloth 29 around the support frame 6.

[0035] It is to be noted that the cleaning device in accordance with the present invention can be intended for sweeping floor or roof surfaces or similar, in which case the stem portion is provided by means of a subtantially long pivoted stem, or then a hand held cleaning device in which the stem portion is provided by means of a substantially short stem with no pivoting parts or similar short hand grip, for cleaning e.g. windows or table surfaces.

[0036] Thus, the invention provides an apparatus and a method by which a significant improvement can be achieved in cleaning work. It should be noted that the foregoing examples of the embodiments of the invention are not intended to restrict the scope of the invention to the specific forms presented above but the present invention is meant rather to cover all modifications, similarities and alternatives which are included in the spirit and scope of the present invention, as defined by the appended claims.

Claims

1. A cleaning device comprising a stem portion (1) and an elongated support portion (6 or 8) connected to the stem portion for supporting a cleaning cloth, the direction of the elongation being normal to the direction of the main cleaning movement, **characterized** in that

   the cleaning cloth forms an endless cleaning cloth loop (9) arranged to be threaded to surround the elongated portion (6 or 8) through an end opening thereof, and
   the cleaning cloth loop (9) is rotatable around the elongated portion (6 or 8) in a direction of rotation normal to the direction of the elongation.

2. A cleaning device according to claim 1, **characterized** in that it further comprises means for holding the cleaning cloth (9) in its position in engagement with the body portion (6), said holding means consisting of a biased spring element (4) attached to the support portion (6), said spring element biasing against the support portion, wherein the arrangement is such that the cleaning cloth loop (9) can be moved relative to the support portion (6) only in case the spring element (4) is in its opened position.

3. A cleaning device according to claim 2, **characterized** in that the stem portion (1) is attached to the spring element (4), wherein the spring element is arranged tc be opened by means of the stem portion.

4. A cleaning device according to claims 2 or 3, **characterized** by further comprising a locking member (14) for locking the spring element (4) to a position clamping the cloth.

5. A cleaning device according to claim 1, **characterized** in that the elongated support portion consist of a bar (8) attached from the other end thereof to a body portion (6) of the cleaning device (10) and extending substantially parallel with the body portion.

6. A cleaning device according to claim 5, **characterized** in that the bar (8) is of hollow construction and provided with a longitudinally extending slot (21) for receiving a cloth holding bulb (20) into the bar.

7. A cleaning device according to any of claims 1 to 6, **characterized** in that it comprises two sweeping blades (7,7'), the blades extending in parallel with the support portion (6), wherein the sweeping edge (17) of the first blade (7) is arranged to sweep in a first direction of cleaning movement and the sweeping edge (17') of the second blade (7') is arranged to sweep in a second direction of cleaning movement.

8. A cleaning device according to claim 7, **characterized** in that the bar (8) extends between the two blades (7,7').

9. A cleaning cloth forming an endless loop having an opening at least in the other end thereof and arranged to be supported by an elongated support portion (6 or 8) of a cleaning device (10) provided with an stem portion (1), **characterized** in that the cleaning cloth loop (9) is arranged to be rotated around the elongated support portion (6 or 8) in a direction of rotation which is normal to the elongated direction of the support portion (6 or 8).

10. A method of cleaning by a cleaning device (10) comprising a stem portion (1) and elongated means (6 or 8) for supporting a looped cleaning cloth, wherein the looped cleaning cloth (9) is threaded around the elongated means (6 or 8) for supporting the looped cleaning cloth through an opening in the end thereof, **characterized** by steps of rotating the looped cleaning cloth around the elongated means (6 or 8) in a direction of rotation normal to the elongated direction of the elongated means (6 or 8) and holding the looped cleaning cloth against the elongated means when the movement of the cloth is not desired.

11. A method in accordance with claim 10, **characterized** in that the looped cleaning cloth (9) is held in the position by means of a biased spring element (4) bearing against the elongated means (6), and that the biasing force is removed by pulling the spring element (4) off from the elongated means (6) by means of the stem portion (1) attached to the spring element.

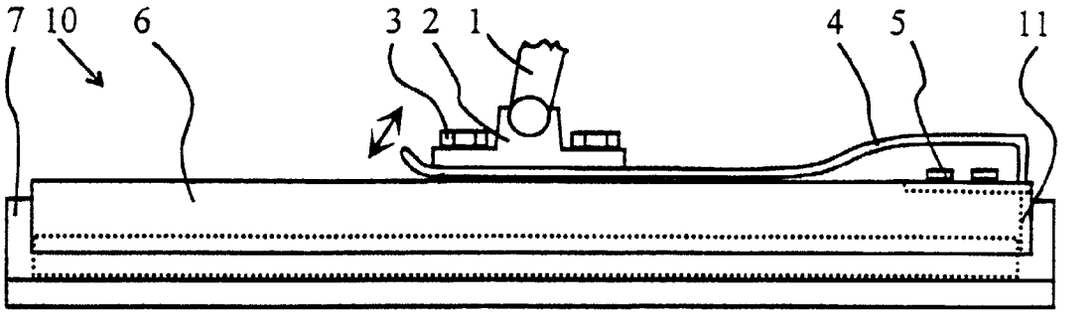

Fig. 1a

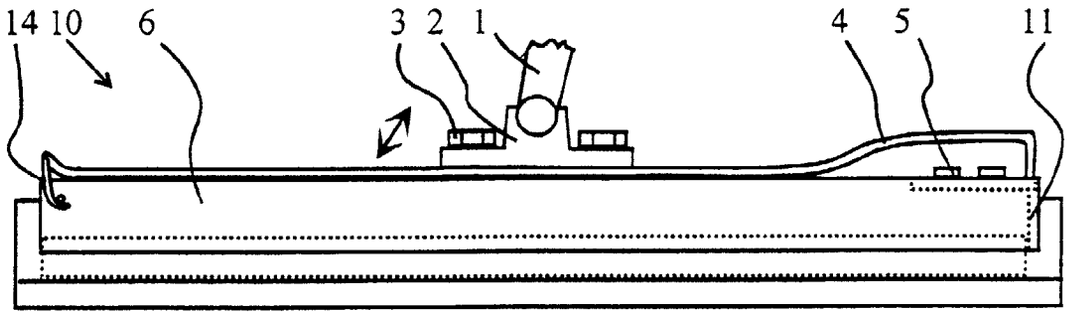

Fig. 1b

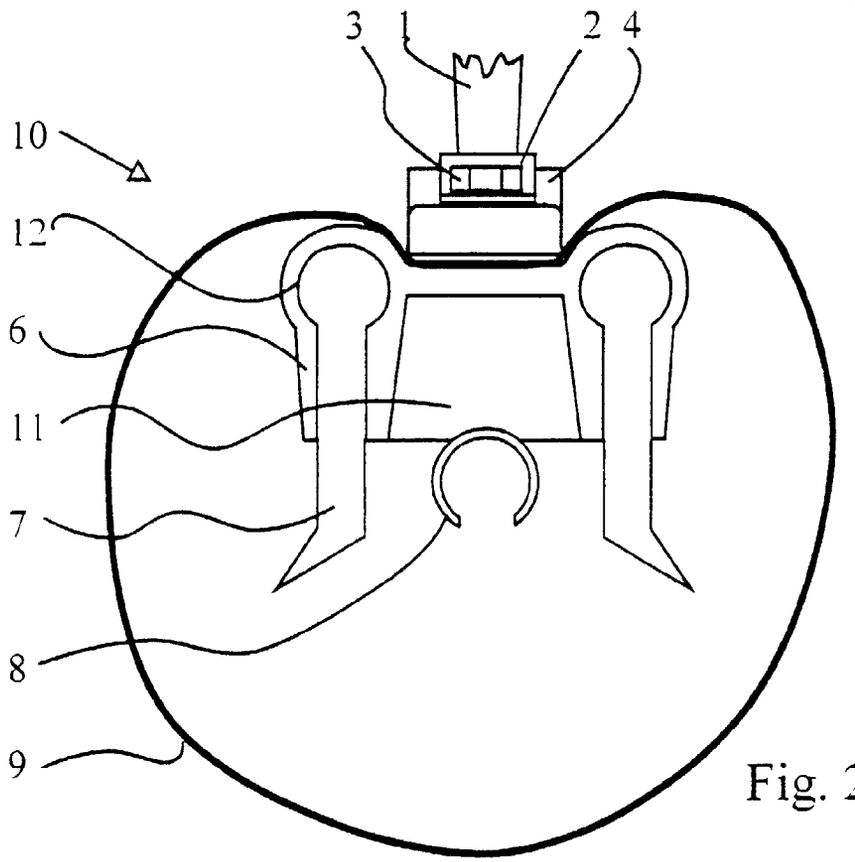

Fig. 2

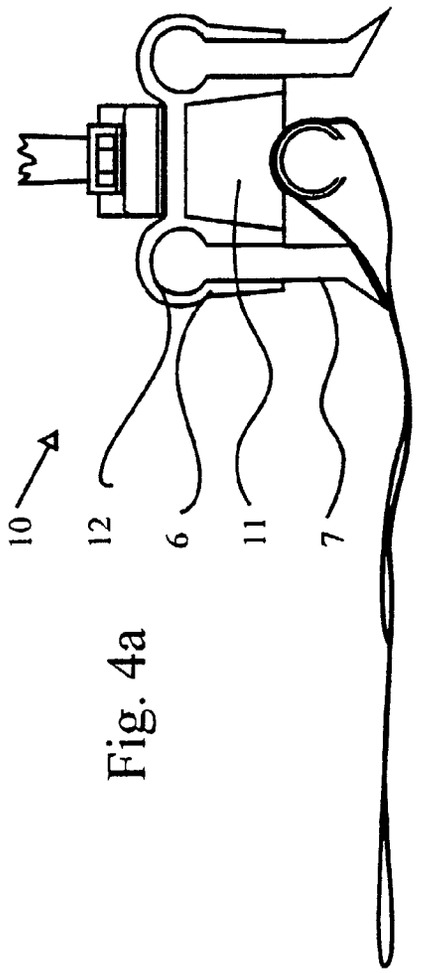

Fig. 4a

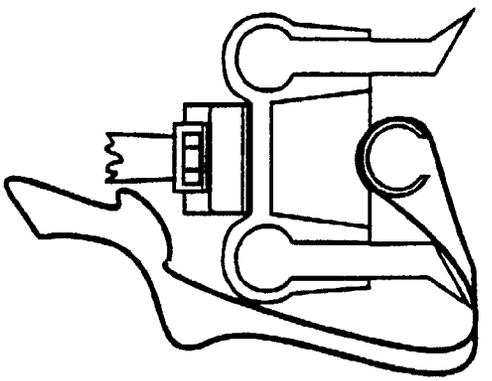

Fig. 4b

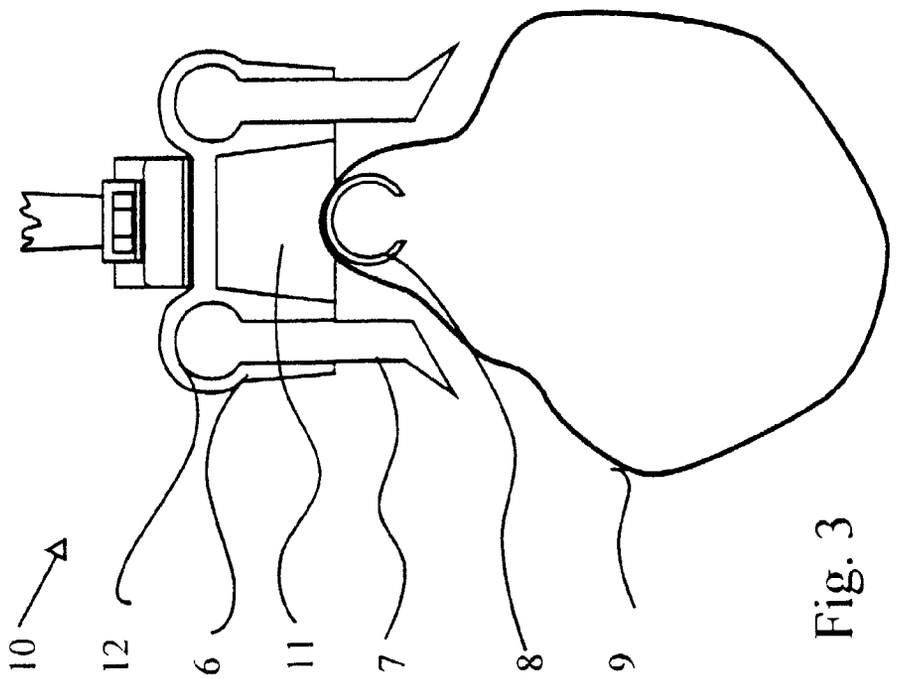

Fig. 3

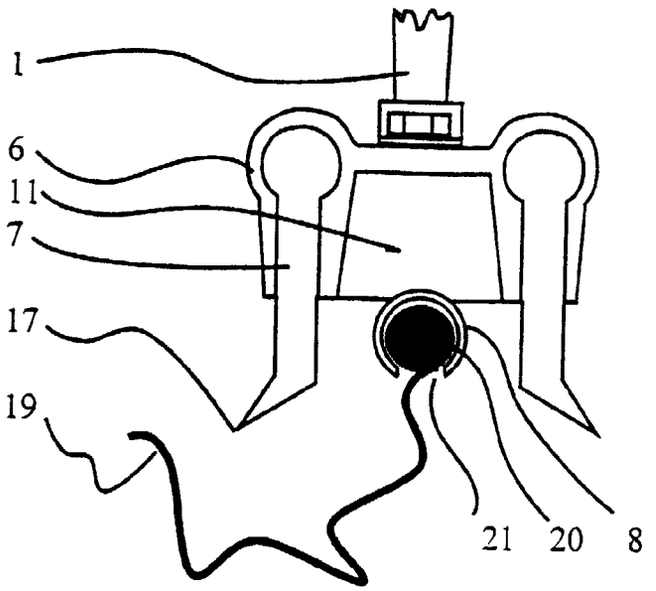

Fig. 5

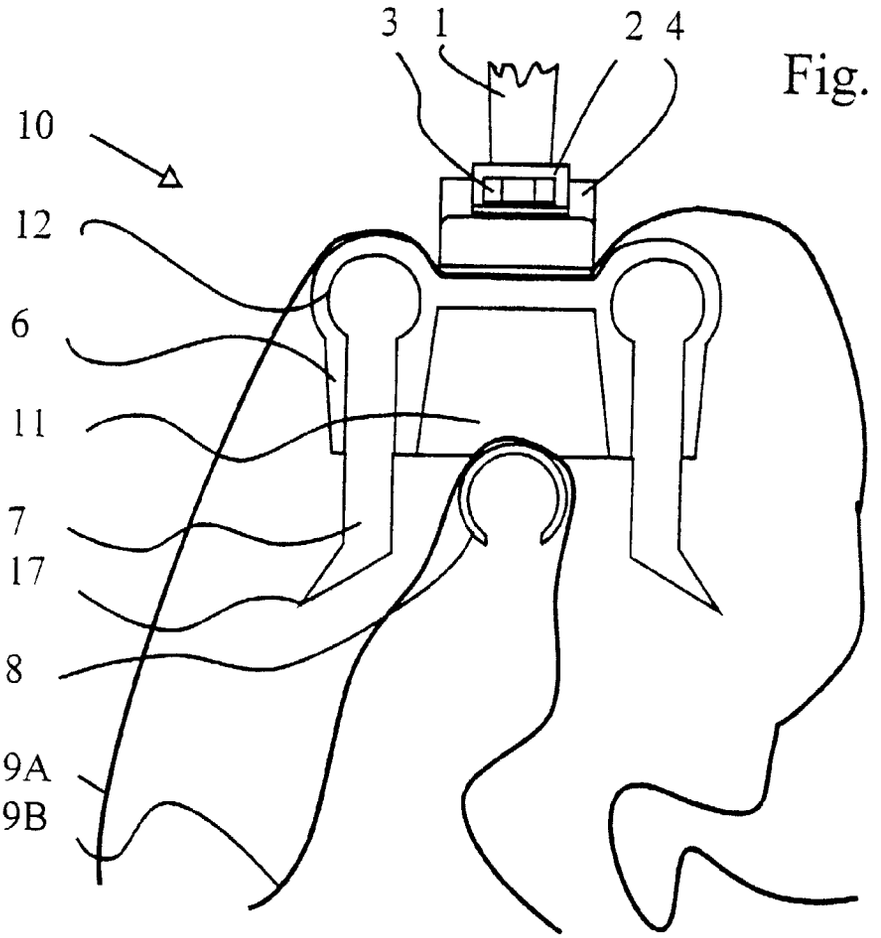

Fig. 6

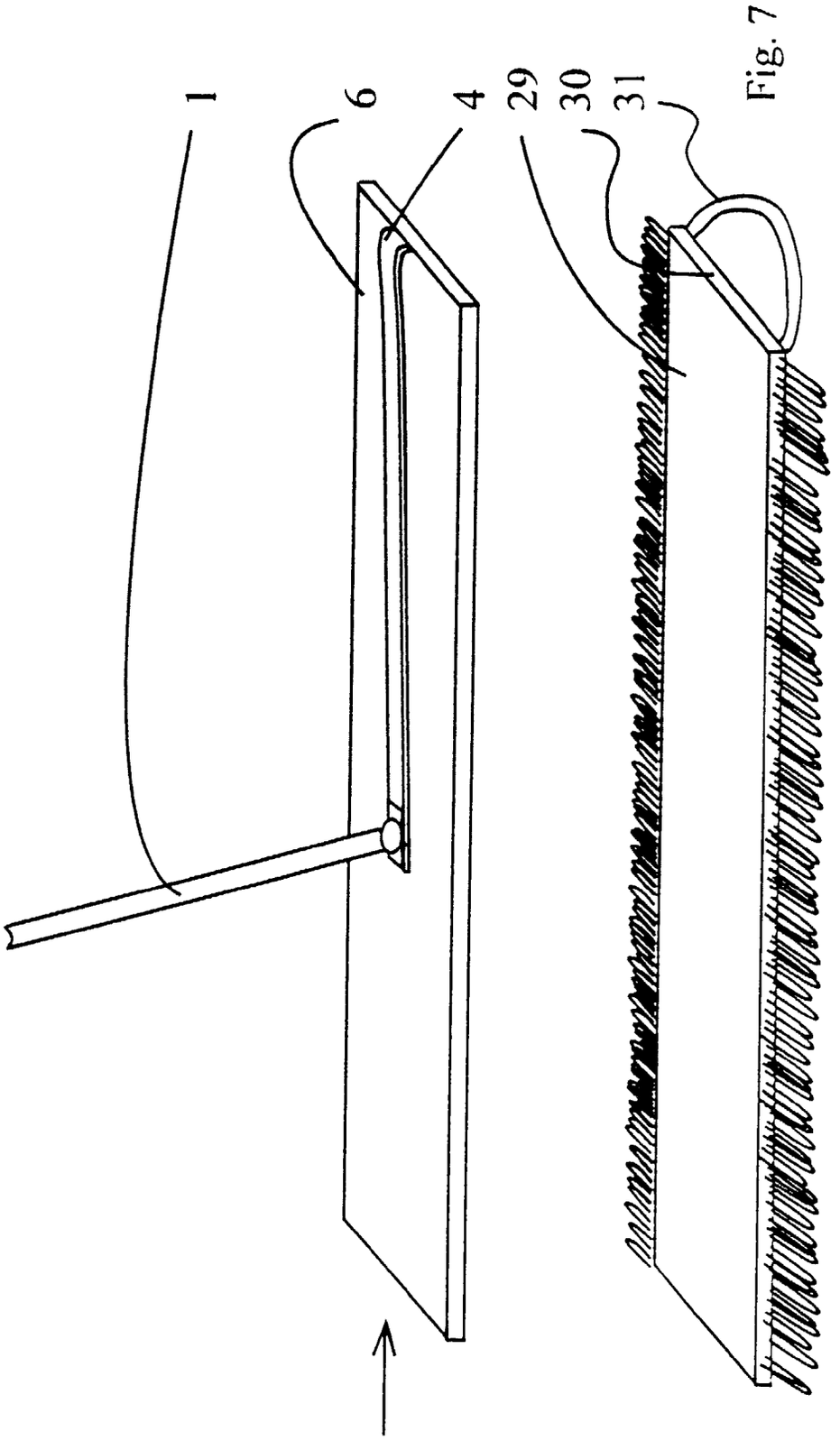

Fig. 7