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(54) **Brush accessory for electrical appliances, particularly vacuum cleaners, electric brooms and the like provided with a suction tube**

(57) A brush accessory (1) for electrical appliances, particularly vacuum cleaners, electric brooms and the like, provided with a suction tube, comprising a substantially flat box-like body (3) that has a polygonal plan shape, a layer (5) of material for cleaning a surface, which is supported on a face (4) of the flat body that is

considered as the downward face, and at least one articulated coupling (7) for the suction tube; the polygonal box-like body forms at least one slender and elongated vertex (8) for passing in confined spaces and is provided with a means (9) for supporting and guiding the brush accessory located on the upper opposite face (6) thereof.

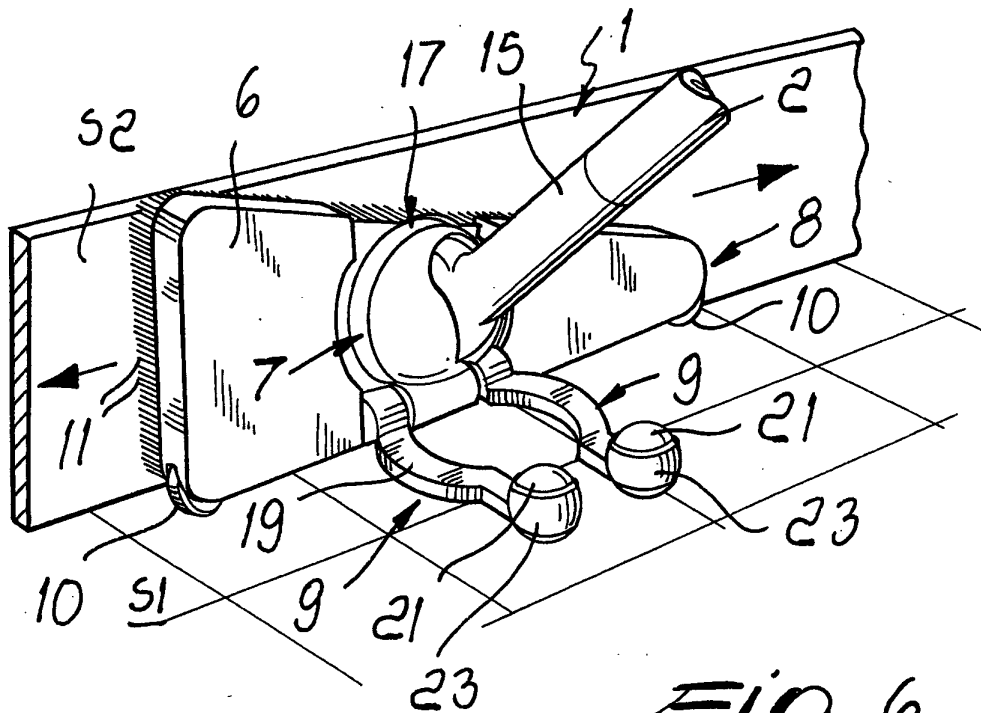


Fig. 6

Description

[0001] The present invention relates to a brush accessory for electrical appliances, particularly vacuum cleaners, electric brooms and the like, provided with a suction tube.

[0002] Various accessories have long been known and used which can be connected to the end of the suction hoses of vacuum cleaners, electric brooms and the like in order to eliminate dust and small waste particles from furniture and floors.

[0003] These known accessories substantially comprise a narrow-tipped lance, a wide nozzle optionally provided with bristles, or an actual box-like brush: all these accessories are internally hollow and have a rear opening for fitting, as mentioned, at the end of the suction tube with which said electrical appliances are normally provided.

[0004] In order to reach more easily the tightest spaces, such as corners and gaps between the bases of furniture and the floor, some of said known brushes have, at the connection of the rear opening on the brush body, an articulation that allows the rotation on one plane of the tube, which acts not only as an element for the passage of the collected impurities toward the inside of the collection region of the electrical appliance but also as a handling grip for the user.

[0005] This articulation, associated with a bend of the rear opening for the tube at an obtuse angle, allows to maneuver the brush during its use, making it rotate over the surface to be cleaned in order to allow it to pass edgeways even within substantially confined spaces.

[0006] In any cases, each one of said accessories has a specific function and is provided, for this reason, as equipment for a single electrical appliance and must be changed in each instance during work.

[0007] Moreover, known accessories, particularly brushes, even if they are articulated, do not allow to clean vertical surfaces, although resting on a horizontal plane: this is the case, for example, of the skirting board that perimetrically surrounds a floor of a room: to clean such skirting board it is in fact necessary to fit a specific accessory among those cited above and to manually support during work the tube and the accessory fitted thereon; this, in the long term, becomes tiring also because of the constant pressure to be applied so that the suction inlet of the accessory remains in contact with the skirting board along its entire length.

[0008] The aim of the present invention is to eliminate the above-mentioned drawbacks of the known art, by providing a brush accessory for electrical appliances, particularly vacuum cleaners, electric brooms and the like, which have a suction tube that allows to clean joined horizontal and vertical surfaces with the same accuracy and ease while using a single accessory.

[0009] Within this aim, an object of the present invention is to provide a brush accessory that is simple, safe in use, effective in operation and has a relatively low

cost.

[0010] This aim and this object are achieved by the present brush accessory for electrical appliances, particularly vacuum cleaners, electric brooms and the like, provided with a suction tube, said accessory being constituted by a substantially flat box-like body that has a polygonal plan shape, by a layer of material for cleaning a surface, which is supported on a face of said flat body that is considered as the lower face, by at least one articulated coupling for said suction tube, characterized in that said polygonal box-like body forms at least one slender and elongated vertex for passing in confined spaces and is provided with a means for supporting and guiding said brush accessory located on the upper opposite face thereof.

[0011] Further characteristics and advantages of the present invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of a brush accessory for electrical appliances, particularly vacuum cleaners, electric brooms and the like, which have a suction tube, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a brush accessory according to the present invention, in a possible operating configuration;

Figure 2 is a perspective view of a brush accessory according to the present invention, in another possible operating configuration;

Figure 3 is another perspective view of the use of the brush accessory according to the present invention to clean a horizontal surface;

Figure 4 is a front detail view of the operating condition shown in Figure 3;

Figure 5 is a perspective view of an operating condition of the brush accessory according to the present invention for cleaning a vertical surface;

Figure 6 is a more explanatory view of the operating condition of the brush accessory according to the invention to clean a portion of skirting board;

Figure 7 is a view of an operating condition of the brush accessory according to the present invention, wedged between two pieces of furniture, which are shown schematically in phantom lines;

Figure 8 is a plan view of the brush accessory according to the invention in the operating condition of Figure 7;

Figures 9a and 9b are side views, in phantom lines, of the brush accessory according to the invention in a condition allowing free rotation of the articulated coupling in two positions of the cleaning means;

Figure 10 is a plan view of a lower half-body that composes the brush accessory according to the invention;

Figure 11 is a schematic sectional view, taken along the line XI-XI of Figure 1, of the flat box-like body that constitutes the brush accessory according to

the invention.

[0012] With reference to the figures, the reference numeral 1 generally designates a brush accessory for electrical appliances, particularly vacuum cleaners, electric brooms and the like, which are provided with a suction tube 2, said accessory being essentially constituted by a substantially flat box-like body 3 whose plan shape is polygonal and, in the specific case, triangular.

[0013] A layer 5 of material for cleaning a surface "S1" is coupled on a lower face 4 of the box-like body 3, while on an opposite upper face 6 there is an articulated coupling 7 for the suction tube 2.

[0014] The triangular box-like body 3 forms at least one slender and elongated vertex 8, which is suitable to be inserted in tight spaces; moreover, the box-like body 3 has a means 9 for supporting and guiding the brush accessory 1, which is located on the upper face 6 thereof.

[0015] The flat box-like body 3 has, on at least one side 3a, two freely rotating wheels 10, whose axes are perpendicular to the faces 4 and 6, for resting and sliding on surfaces "S2" that meet at an angle the surface "S1" to be cleaned.

[0016] The layer 5 of cleaning material is constituted, in a first possible embodiment of the invention, by a plurality of bristles 11 (Figures 3 to 7), which protrude from the lower face 4; in a second possible embodiment, the layer 5 can be constituted (Figures 1 and 2), by at least one textile or sponge-like pad 12 which is substantially laminar and rigidly coupled to the lower face 4.

[0017] The articulated coupling 7 is constituted by a head 13, which is mounted so that it can rotate to the left and to the right on the upper face 6 of the flat box-like body 3, with a rotation axis that is perpendicular thereto and is provided with at least one slotted opening 14 which is located laterally and in an upper region and is substantially vertical.

[0018] A tube-like rear opening 15 protrudes from the head 13 and is connected, at one end, to corresponding means 16 for connection to the inside of the flat box-like body 3; the tube-like rear opening 15 passes through the slotted opening 14, oscillates therein and constitutes the connection, at the opposite end, for a mating end of the suction tube 3.

[0019] The head 13 is substantially shaped like a spherical dome and is provided, at its base, with a selector 17, which is suitable to lock or release its rotation.

[0020] The means 16 for connecting the end of the tube-like rear opening 15 are constituted by an extension of said end, which forms a second dome 18 that is rigidly coupled thereto and is mounted in sliding contact inside the spherical dome that constitutes the head 13.

[0021] The supporting and guiding means 9 is constituted by at least one fork 19, which has two prongs which are mutually joined at the base by a connecting pivot (not shown in the drawings) and is articulated to the flat box-like body 3; said base of the fork 19 is parallel to

the side 3a provided with the two freely rotating wheels 10.

[0022] The fork 19 can be arranged alternately in an upright position that is perpendicular to the upper face 6 (Figures 2, 5, 6) or in a reclined position (Figures 1, 3 and 7), which is substantially parallel and transverse with respect to the upper face 6.

[0023] The prongs of the fork 19 protrude from said upper face and are both provided with respective elements 20 for resting and sliding on a surface S1 or S2; said elements are constituted, for each prong, by at least one ball 21, which is contained so that it can rotate freely in a respective receptacle 22 which is shaped like a sleeve 23 and is rigidly coupled to the free end of the respective prong, with an axis that is substantially perpendicular thereto; the sleeve 23 is shorter than the diameter of the ball 21, so that the polar portions of the ball 21 protrude from the open ends of said sleeve.

[0024] In the preferred embodiment of the brush accessory 1, both the spherical dome-shaped head 13 and the fork 19 can be accommodated, respectively in a stable fashion and in a reclined arrangement, in a corresponding hollow seat 24 provided to size in the upper face 6 of the flat box-like body 3: the prongs of the fork 19, when said fork is in the reclined position, lie on either side of the spherical dome-shaped head 13 and are substantially co-planar with respect to the upper face 6.

[0025] The flat box-like body 3 is composed of two half-bodies which interpenetrate telescopically; at least one of said half-bodies, i.e., the lower half-body, designated by the reference numeral 104, can be moved parallel to itself with respect to the other upper half-body, designated by the reference numeral 103, which contains the preceding half-body and supports the articulated coupling 7 and the supporting and guiding means 9, while the second lower half-body 104 bears the layer 5 of cleaning material.

[0026] Elastic means 105 for contrasting the movement of the lower half-body 104 with respect to the upper half-body 103 are interposed between the upper half-body 103 and the lower half-body 104.

[0027] The selector 17 is constituted by a half-ring 25, in which the diametrical ends 26 are articulated at 27 to the spherical dome-shaped head 13; in the preferred embodiment of the invention, both ends 26 of the half-ring 25 have respective pins 28, which protrude at right angles with respect to the half-ring 25 and are directed toward the lower half-body 104, which has a double pair of openings, which are alternately through openings, designated by the reference numeral 29, and concave blind openings, designated by the reference numeral 30, for engagement with the pins 28; the half-ring 25 can rotate about the articulations 27 of the diametrical ends 26, between a position in which it is raised with respect to the upper half-body 103, in which the pins 28 are disengaged from all the openings 29 and 30, consequently allowing the free rotation of the head 13 with respect to the flat box-like body 3, and a lowered position that is

flush with the upper face 6 and in which the pins 28 are in a configuration for engaging a pair of said openings, either the pair 29 or the pair 30, consequently locking the rotation of the head 13 with respect to the box-like body 3.

[0028] When the head 13 is rotated so as to align the pair of concave blind openings 30 and the corresponding pair of pins 28, the lowering of the half-ring 25 produces a thrust on the lower half-body 104 and the corresponding sliding thereof toward the outside of the box-like body 3 with respect to the upper half-body 103; in this manner, the layer 5 of cleaning material protrudes stably from the lower portion of the box-like body 3.

[0029] The elastic contrast means 105 are constituted by at least one helical spring 106, which can be loaded by compression and is interposed between the upper half-body 103 and the lower half-body 104; the turns of the spring 106 are wound coaxially on a pivot 107, which protrudes at right angles from the lower face of the upper half-body 103 and passes through an opening that is coaxial to the pivot 107 (not visible in the drawings) and is formed in the lower half-body 104; the free end of the pivot 107 forms a receptacle 108 for containing one end of the spring 106, whose opposite end rests on the lower face of the upper half-body 103.

[0030] The operation of the brush accessory 1 according to the present invention is as follows: said brush accessory is fitted onto the end of a suction tube 2 of an electrical appliance, for example a vacuum cleaner, by mutually coupling in a bayonet fashion the mating ends of the suction tube 2 and the end of the rear opening 15.

[0031] The user then chooses whether to use the brush accessory 1 so that it can float freely or to fix the angular position of the flat box-like body 3 with respect to the rear opening 15 and therefore with respect to the suction tube 2, which also acts as a handling grip.

[0032] The choice between these two options is made by acting on the selection half-ring 25: by arranging it in the raised position (Figure 9), the free rotation of the box-like body 3 with respect to the rear opening 15 is achieved, while by rotating it into the lowered position said rotation is locked in an angularly predefined position.

[0033] Moreover, if said predefined rotation makes the pins 28 coincide with the through openings 29, the lowering of the half-ring 25 causes the penetration of said pins into the openings, locking said rotation, but with no effect on the lower half-body 104 and therefore on the layer 5 of cleaning material, which therefore remains contained within the box-like body 3; in the alternative case of alignment between the pins 28 and the concave and blind openings 30, the lowering of the half-ring 25 causes the mutual engagement of the pins 28 and said concave and blind openings 30, and the consequent thrust of said pins on said openings: the thrust determines a telescopic sliding of the lower half-body 104 with respect to the upper half-body 103 and the exit of the layer 5 of cleaning material from the base of the

box-like body 3.

[0034] The thrust occurs in contrast with the spring 106, which is compressed and tends to return the lower half-body 104, contained in the upper half-body 103, to its normal arrangement.

[0035] For normal use for cleaning a flat and horizontal surface S1, the fork 19 is left in the reclined position, so that the prongs are contained within the hollow seat 24 and protrude from the side that lies opposite the side 3a, so that the balls 21 rest on the surface S1 together with the bristles 11 or the pad 12, giving greater stability to the brush accessory 1 and keeping it constantly parallel to said surface S1 during rubbing.

[0036] In the corners formed between the floor and the wall, i.e., between the surfaces S1 and S2 that meet at a corner, the fork 19 is raised and arranged vertically with respect to the faces 6 and 4 of the flat box-like body 3; this allows to move closer with the side 3a thereof directed toward the vertical surface S2 and to rest on said surface both the wheels 10 and the balls 21, so as to be able to slide easily back and forth the brush accessory 1, keeping it stable during the back-and-forth sliding.

[0037] When the surface to be cleaned is vertical (S2), the brush accessory 1 is turned through 90°, making the head 13 rotate so as to arrange the slot 14 so that it is directed diagonally upward.

[0038] The fork 19 is still kept in the position in which it is raised from its hollow seat 24 so as to provide, with the balls 21, support on the horizontal surface S1 during back-and-forth sliding.

[0039] The flat box-like body 3 is thus arranged edge-ways, making the bristles 11 or the pad 12 adhere to the vertical surface S2; the back-and-forth sliding of the brush accessory 1 is also facilitated by the wheels 10 which, by performing a translational motion while resting on said horizontal flat surface S1, keep the box-like body 3 slightly raised from it and eliminate all friction.

[0040] The angular mutual position of the rear opening 15 and the box-like body 3 is determined by the conditions of use of the brush accessory 1; for example, Figure 8 shows the configuration of minimum possible transverse space occupation, in which the rear opening 15 is directed away from the slender vertex 8, in order to be able to pass said vertex between two contiguous elements, such as two pieces of furniture; Figures 1 to 6 instead illustrate the configuration of maximum transverse space occupation, in which the rear opening 15 is arranged transversely to the flat box-like body 3, which in this manner can have a larger active front.

[0041] In practice it has been found that the described invention achieves the proposed aim and object.

[0042] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0043] All the details may further be replaced with other technically equivalent ones.

[0044] In practice, the materials used, as well as the

shapes and the dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the present invention.

[0045] The disclosures in Italian Patent Application No. M02001A000255, from which this application claims priority, are incorporated herein by reference.

[0046] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

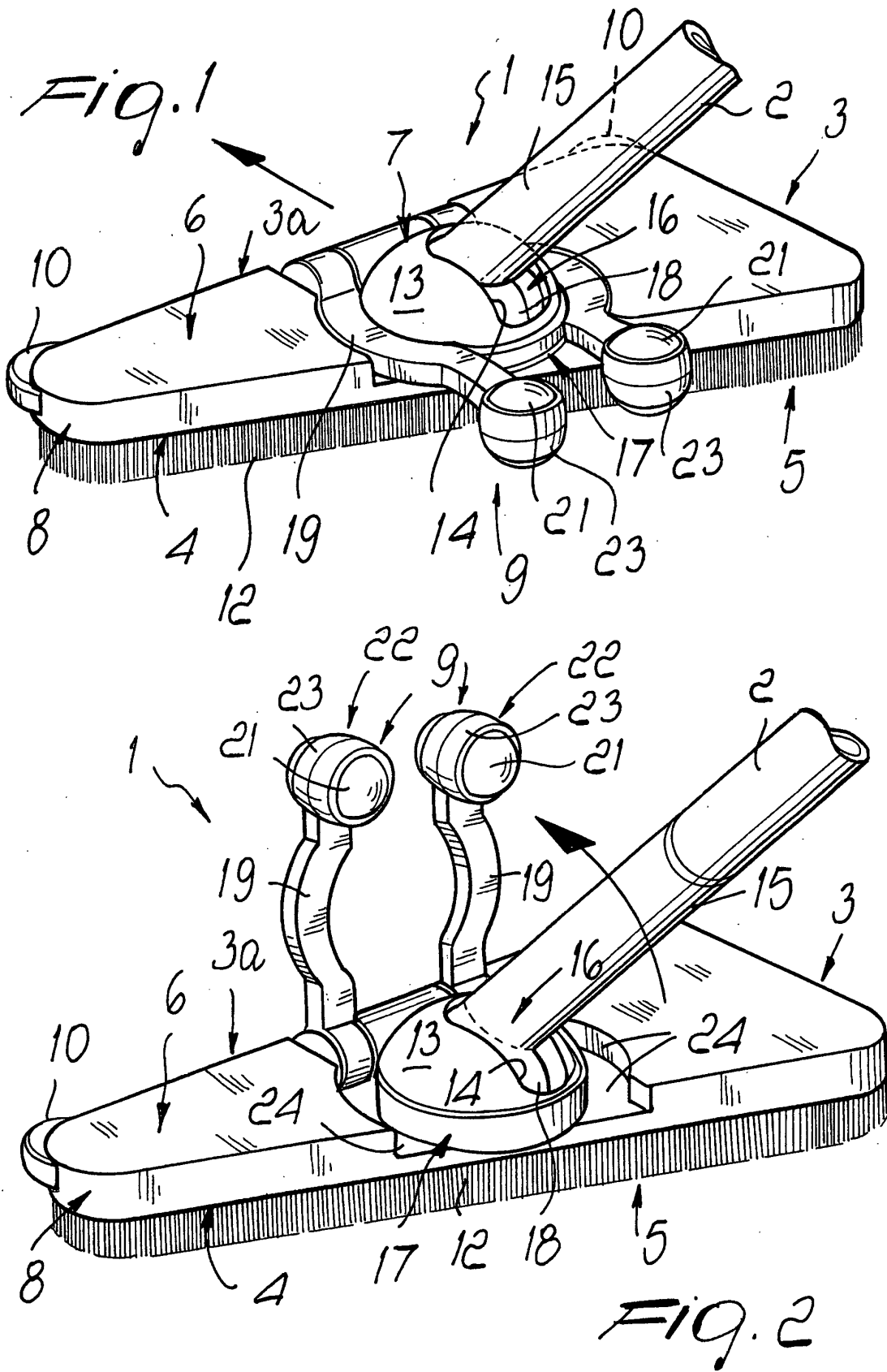
Claims

1. A brush accessory for electrical appliances, particularly vacuum cleaners, electric brooms and the like, provided with a suction tube, said accessory being constituted by a substantially flat box-like body that has a polygonal plan shape, by a layer of material for cleaning a surface, which is supported on a face of said flat body that is considered as the lower face, by at least one articulated coupling for said suction tube, **characterized in that** said polygonal box-like body forms at least one slender and elongated vertex for passing in confined spaces and is provided with a means for supporting and guiding said brush accessory located on the upper opposite face thereof.
2. The brush accessory according to claim 1, **characterized in that** said flat box-like body has a substantially triangular plan shape.
3. The brush accessory according to claims 1 and 2, **characterized in that** said flat box-like body has, on at least one side, two wheels which can rotate freely with axes that are perpendicular to said faces, for support and sliding on surfaces that meet at an angle the surface to be cleaned.
4. The brush accessory according to claim 1, **characterized in that** said layer of cleaning material is constituted by at least one row of bristles that protrudes from said lower face of said flat box-like body.
5. The brush accessory according to claim 1, **characterized in that** said layer of cleaning material is constituted by at least one textile and/or sponge-like pad, which is substantially laminar and is rigidly coupled to said lower face of said flat box-like body.
6. The brush accessory according to claim 1, **characterized in that** said articulated coupling is constituted by a head, which is mounted, so that it can rotate to the left and to the right, on said upper face of said flat box-like body with a rotation axis that is perpendicular thereto and is provided with at least one slotted opening that is arranged in an upper lateral region and has a substantially vertical longitudinal plane of symmetry, by a tube-like rear opening, which is connected at one end to corresponding means for connection to the inside of said flat box-like body and protrudes outward from it through said slotted opening, for engagement to the opposite end of a corresponding end of said suction tube.
7. The brush accessory according to claim 6, **characterized in that** said head is substantially shaped like a spherical dome and has, at its base, a selector for locking or releasing the rotation thereof with respect to said flat box-like body.
8. The brush accessory according to claims 6 and 7, **characterized in that** said means for connecting said end of said rear opening are constituted by an extension of said end of said rear opening, which forms a second dome that is rigidly coupled thereto and is mounted in sliding contact inside said spherical dome that constitutes said head.
9. The brush accessory according to claims 1 and 3, **characterized in that** said supporting and guiding means of said brush accessory is constituted by at least one fork, which has a base that is articulated to said flat box-like body and is parallel to said side provided with said pair of freely rotating wheels and can alternately be arranged upright at right angles to said upper face or reclined and substantially parallel and transverse with respect to said upper face, the prongs of said fork protruding from said face and having respective elements for support and sliding on a surface.
10. The brush accessory according to claim 9, **characterized in that** said elements for sliding over a surface are constituted, for each prong of said fork, by at least one ball which is contained so that it can rotate freely in a respective sleeve-like receptacle, which is rigidly coupled to the free end of said prong with an axis that is substantially perpendicular thereto, said sleeve being shorter than the diameter of said ball in order to make polar portions of said ball protrude from the ends of said sleeve.
11. The brush accessory according to claim 1, **characterized in that** said flat box-like body is composed of two half-bodies which interpenetrate telescopically, at least one of said half-bodies being movable parallel to itself relative to the other half-body.
12. The brush accessory according to claim 11, **characterized in that** a first upper one of said half-bodies contains a second lower half-body, said first up-

per half-body supporting said articulated coupling and said supporting and guiding means, said second lower half-body supporting said layer of cleaning material.

13. The brush accessory according to one or more of the preceding claims, **characterized in that** said spherical dome-shaped head and said fork can be accommodated in a corresponding hollow seat, which is formed to size in said upper face of said flat box-like body, the prongs of said fork, in the configuration in which said fork is reclined in said hollow seat, being arranged on either side of said spherical dome-shaped head so that they are substantially co-planar to said upper face.
14. The brush accessory according to claims 11 and 12, **characterized in that** elastic means for contrasting the movement of said lower half-body with respect to the upper half-body are interposed between said upper half-body and said lower half-body.
15. The brush accessory according to claims 7, 11 and 14, **characterized in that** said selector is constituted by a half-ring in which the diametrical ends are articulated to said spherical dome-shaped head and at least one of said ends is provided with a respective pin that protrudes toward said lower half-body for interlocking engagement with corresponding through openings formed in its upper face, said half-ring being able to rotate about said articulated diametrical ends between a position in which it is raised from the upper half-body for disengagement of said pin from said openings and for the free rotation of said head with respect to said flat box-like body, and a lowered position for the engagement of said pin in one of said openings, with locking of said rotation.
16. The brush accessory according to claims 7, 14 and 15, **characterized in that** said lower half-body has, on said upper face, at least one concave and blind opening for rotationally alternating engagement with one of said through openings, the engagement of said pin in said concave and blind opening pushing said pin on said lower half-body and making said lower half-body slide toward the outside of said box-like body with respect to said upper half-body.
17. The brush accessory according to claims 15 and 16, **characterized in that** said pins are two, one for each end of said half-ring, and **in that** said through openings and said concave and blind openings are at least two pairs, which are arranged so as to be mutually alternated and at right angles to each other.
18. The brush accessory according to claim 14, **char-**

acterized in that said elastic contrast means are constituted by at least one helical spring, which can be loaded by compression and is interposed between said upper half-body and said lower half-body and is wound coaxially around a pivot that protrudes at right angles from the lower face of said upper half-body and passes through an opening that is coaxial to said pivot and is formed in said lower half-body, the free end of said pivot forming a receptacle for containing said spring.



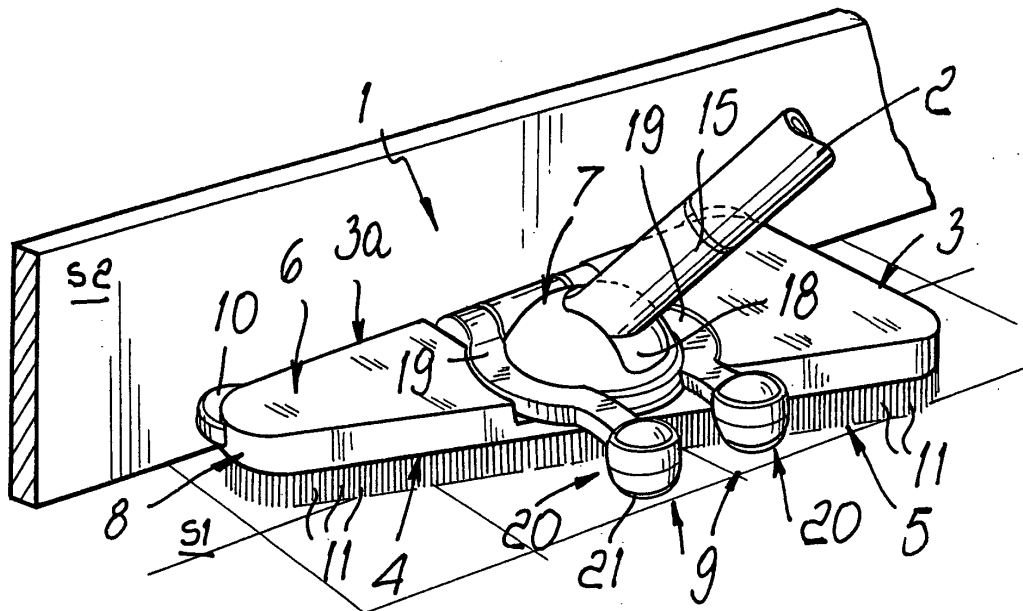


Fig. 3

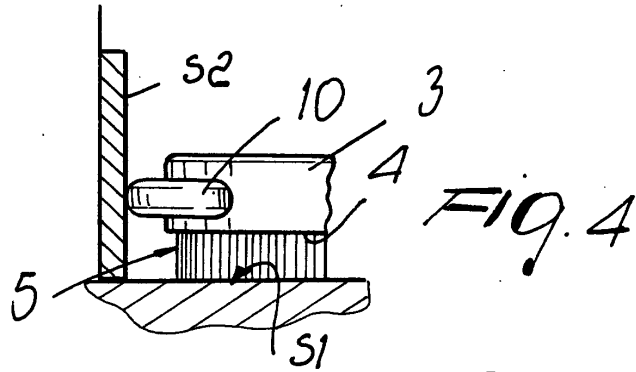


Fig. 4

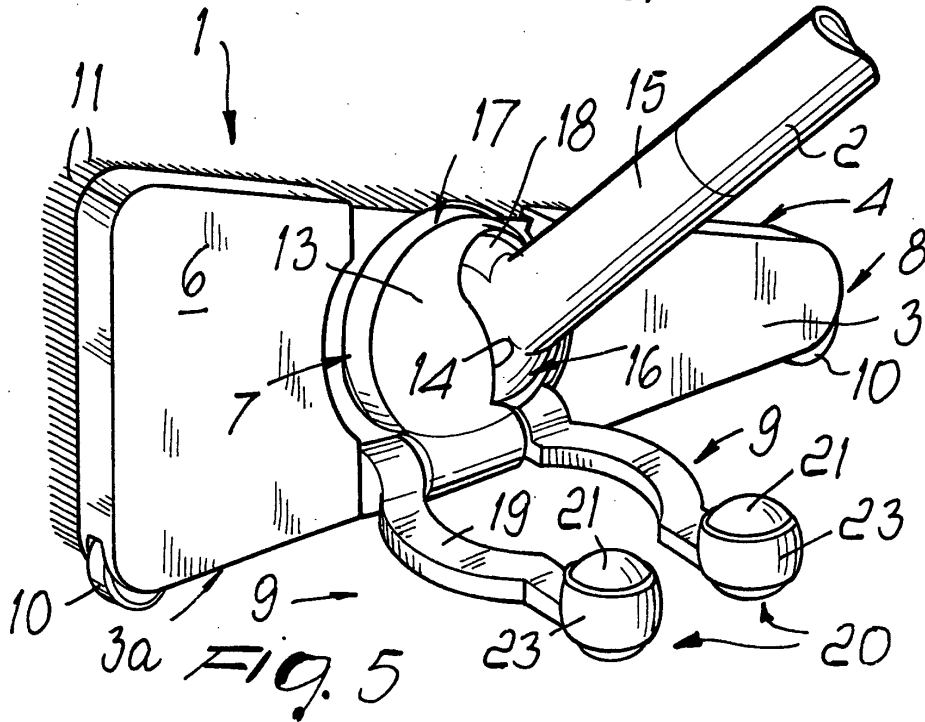
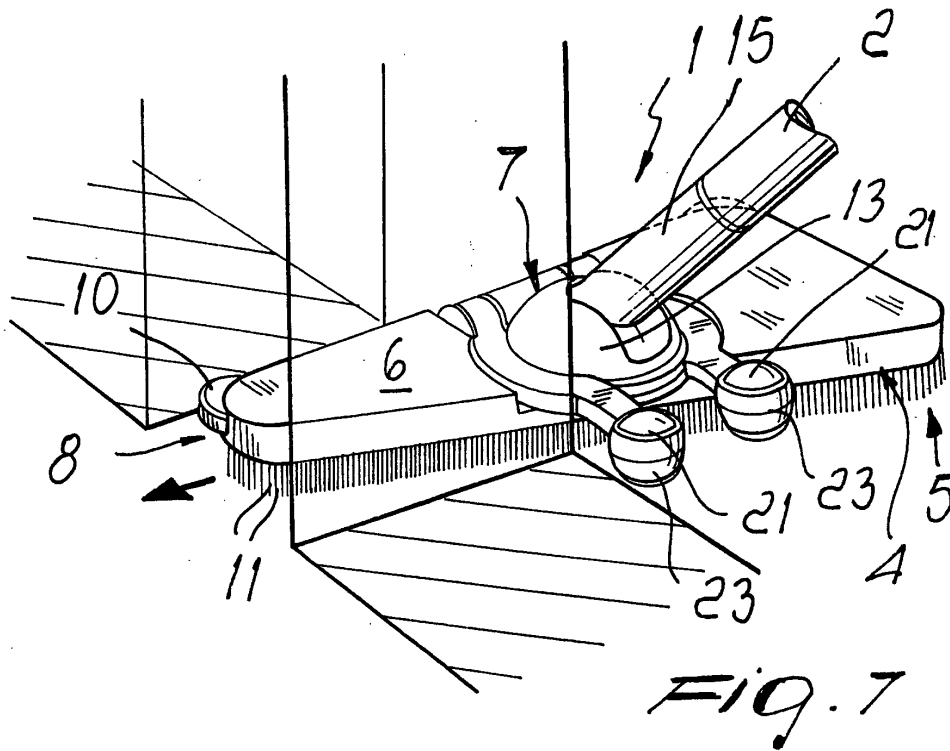
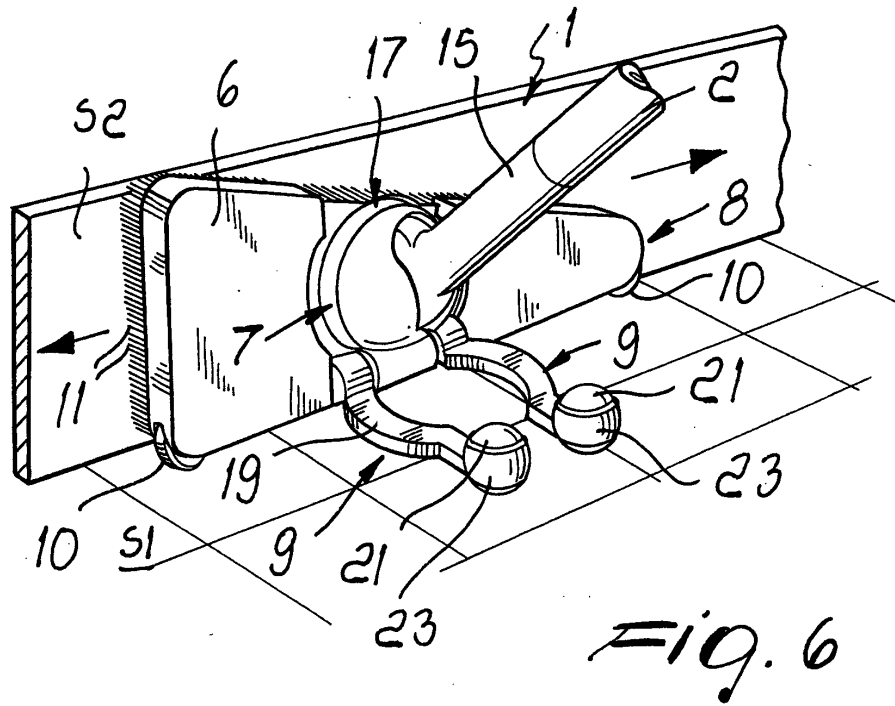
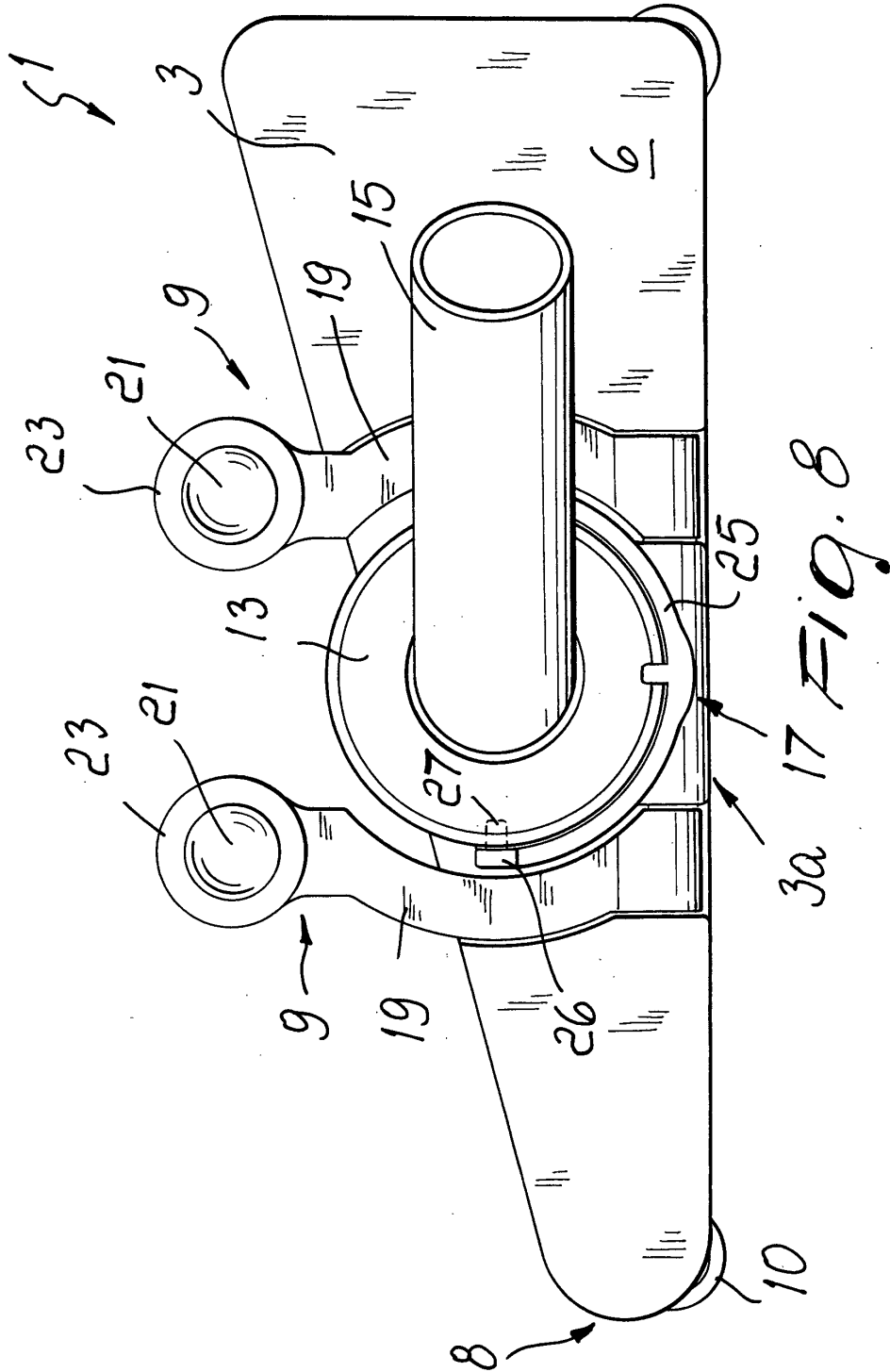
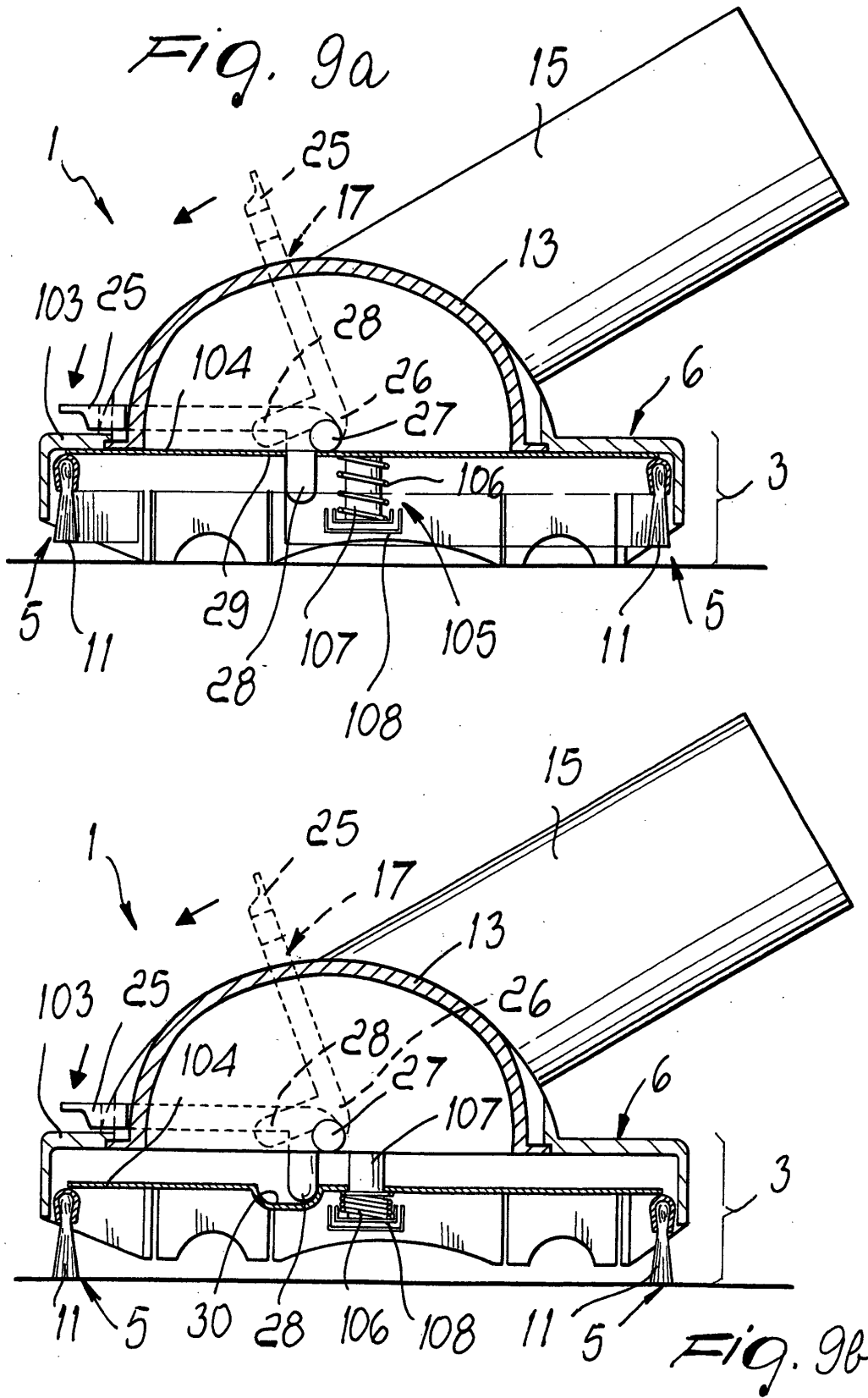


Fig. 5





3a 17 FIG. 8



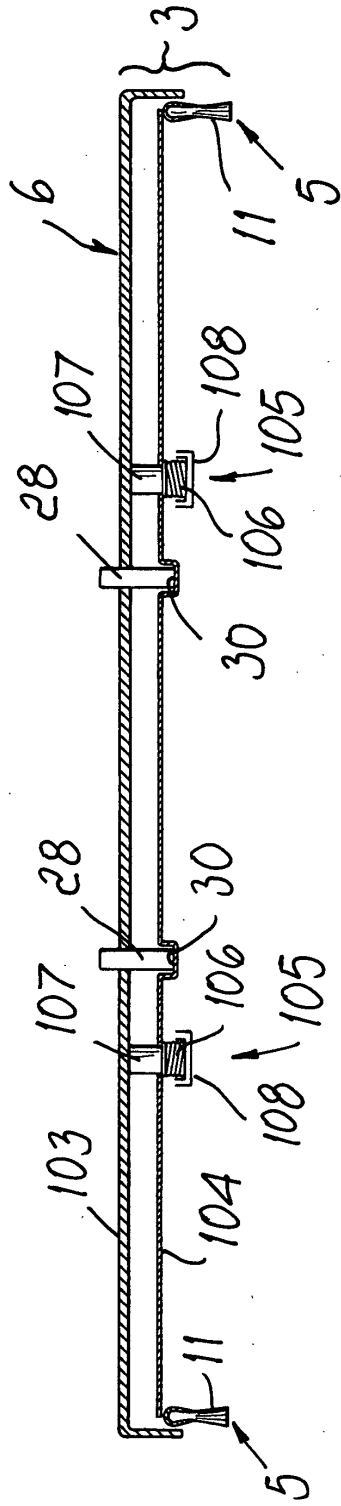


Fig. 11

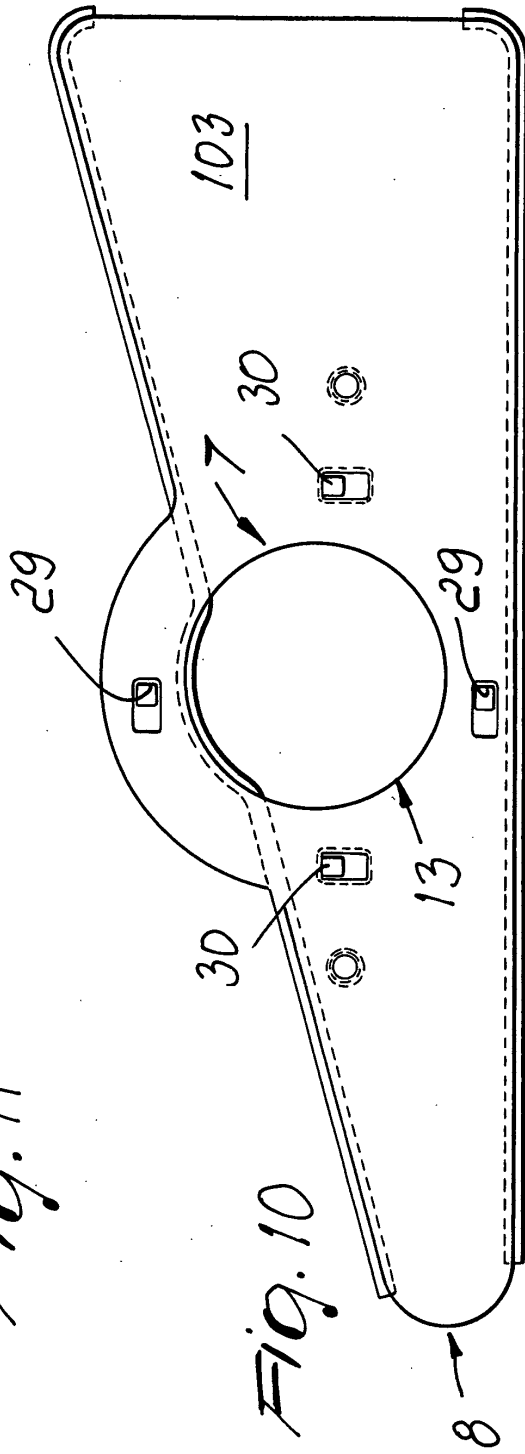


Fig. 10