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## (54) Multifunctional terminal for external suction tubes of vacuum-operated electrical domestic appliances

(57) The multifunctional terminal (1) for external suction tubes (2) of vacuum-operated electrical domestic appliances comprises a tubular body (3) forming a spear-shaped mouth (4) at a distal end (5) and a cylindrical mouth (6) at the opposite, proximal end (7) capable of being coupled by pressure-fitting to the head of the said external suction tube (2), at least one pair of parallel guides (8) formed in diametrically opposite positions on the external surface of the said tubular body (3), at least one cleaning accessory (9) comprising an active end (11) and, opposite to the latter, a tubular base (12) provided with means (13) for twist-and-slide coupling to the said parallel guides (8) for longitudinal sliding therein between the said proximal end (7) and distal end (5), and vice versa, of the said tubular body (3) and the rotation of the said accessory (9) at the distal end (5) for the coaxial fitting of the said base (12) on the said distal end (5) of the said tubular body (3), and means (14) for retaining the said cleaning accessory (9) in the substantially proximal position of non-use of the said guides (8).

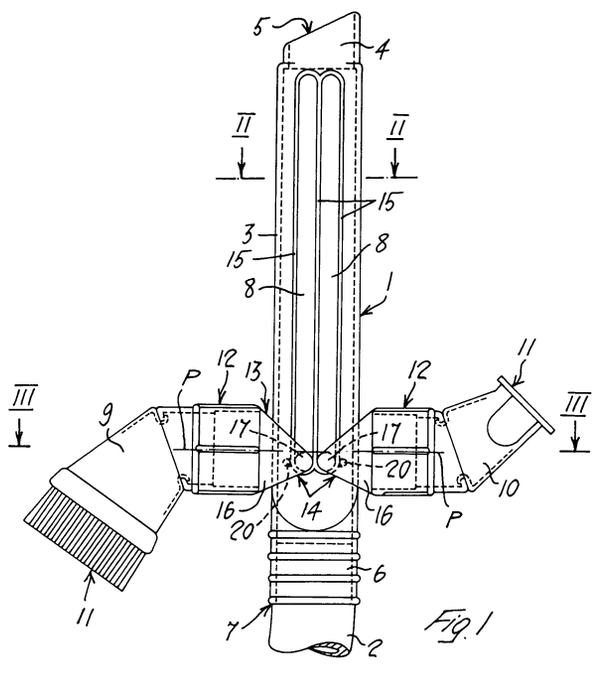



Fig. 1

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## Description

**[0001]** The present invention relates to a multifunctional terminal for external suction tubes of vacuum-operated electrical domestic appliances.

**[0002]** It is known that the electrical domestic appliances used for cleaning are provided with tubes which connect the suction body to a number of accessories that have been appropriately designed and produced for various uses.

**[0003]** These accessories essentially comprise at least one nozzle having a narrow opening and a brush provided with a hollow central body and with a mouthpiece to be used on fabrics and "quilted" materials.

**[0004]** Other, even more specialized accessories may of course be provided, but the basic equipment is substantially as described above.

**[0005]** These accessories are used alternatively, being pressure-fitted from time to time on the free end of the external suction tube; when they are not in use, they are normally put away by the user in an appropriate compartment provided in the suction body of the electrical domestic appliance or, in the absence of such a compartment, are kept within the box constituting the packaging of the electrical domestic appliance; in other cases, they are placed on shelves or the like normally used for storage.

**[0006]** In all cases described above, the accessories are inconvenient to use because the user must, on each occasion, find the accessory to be used, remove the one previously used and put it away and fit the one now selected.

**[0007]** In the event that the accessories are put away in a place dedicated to the purpose, finding the accessory or accessories to be used is a very easy task, but, in the event that the accessories are put away in temporary and unexpected places, time is wasted on finding them and this added to the time required for the various removal and assembly manoeuvres.

**[0008]** Even in the event that the accessories are put away in places intended for that purpose, they are not in any event immediately available and the user has to discontinue the operation of the electrical domestic appliance on each occasion until he has been able to replace the accessory.

**[0009]** It is an object of the present invention to eliminate the disadvantages of the prior art complained of above by selecting a multifunctional terminal for external suction tubes of vacuum-operated electrical domestic appliances which permits users to have immediate manual access to the basic accessories normally provided with the abovementioned vacuum-operated electrical domestic appliances.

**[0010]** These objects are all achieved by the present multifunctional terminal for external suction tubes of vacuum-operated electrical domestic appliances, characterized in that it comprises a tubular body forming a nozzle-type mouth at a distal end and a cylindrical mouth at the opposite, proximal end capable of being coupled by pressure-fitting to the head of the said external suction tube, at least one pair of parallel guides formed in diametrically opposite positions on the external surface of the said tubular body, at least one cleaning accessory comprising an active end and, opposite to the latter, a tubular base provided with means for twist-and-slide coupling to the said parallel guides for longitudinal sliding therein between the said proximal end and distal end, and vice versa, of the said tubular body and the rotation of the said accessory at the distal end of the said guides for the coaxial fitting of the said base on the said distal end of the said tubular body, and means for retaining the said cleaning accessory in the substantially proximal position of non-use of the said guides.

**[0011]** Further features and advantages of the present invention will be more apparent from the detailed description of a preferred, though not exclusive, form of embodiment of a multifunctional terminal for external suction tubes of vacuum-operated electrical domestic appliances illustrated by way of indication, but without implying any limitation, in the attached pages of drawings, in which:

Figure 1 is an overall lateral view of the multifunctional terminal according to the invention, provided with two accessories shown in the position of non-use;

Figure 2 is a cross section through the multifunctional terminal in the plane marked II-II in Figure 1;

Figure 3 is a cross section of the multifunctional terminal in a plane marked III-III in Figure 1;

Figure 4 is a detail of a longitudinal section of the multifunctional terminal in a plane marked IV-IV in figure 3;

Figure 5 shows the multifunctional terminal with a first brush-type accessory fitted in the position of use;

Figure 6 shows the multifunctional terminal in partial section at the distal end, the movement for fitting the brush-type accessory according to Figure 5 being shown in broken lines; and

Figure 7 again shows the multifunctional terminal in partial section at the distal end, on which is fitted a second mouthpiece-type cleaning accessory for quilted materials and fabrics together with, in broken lines, the movement for the fitting thereof.

**[0012]** With particular reference to the said figures, 1 globally designates a multifunctional terminal for external suction tubes 2 with which vacuum-operated electrical domestic appliances are normally equipped, such as vacuum cleaners and electrical brooms, these not being illustrated because they are known.

**[0013]** The terminal 1 essentially comprises a tubular body 3 which is preferably rectilinear and forms a nozzle-type mouth 4 at one, distal end 5 and a cylindrical mouth 6 at the opposite, proximal end 7, susceptible of

allowing the coupling by pressure-fitting of the abovementioned distal end 5 to the head of the external suction tube 2.

**[0014]** Along the flanks of the tubular body 3, whilst specifically on the external surface thereof, are made two pairs of guides 8 which are parallel and diametrically opposite one another.

**[0015]** The terminal 1, in the preferred form of embodiment, is provided with two cleaning accessories, a brush-type accessory 9 and a mouthpiece-type accessory 10 that can be used on "quilted" materials and fabrics.

**[0016]** Each of the accessories 9 and 10 comprises an active end 11 and, opposite thereto, a base 12 which is likewise tubular and provided with means 13 for twist-and-slide coupling to the two pairs of parallel guides 8; the means 13 permit the longitudinal sliding of the accessories 9 and 10 along the abovementioned pairs of parallel guides 8 between the said proximal end 7 and distal end 5 and vice versa.

**[0017]** When one of the accessories 9 and 10 reaches the distal end 5 of the pairs of guides 8, it can rotate in order to be fitted by its base 12 onto the nozzle-type distal end 5 of the tubular body 3.

**[0018]** Provided at the distal end 7 of the latter are means 14 for securing both, or alternatively one, of the cleaning accessories 9 and 10 when these are not in use by the user.

**[0019]** The two pairs of guides 8 are formed by respective parallel ribs 15 projecting outwards from the perimetral surface of the body 3, diametrically opposite to one another and joined at their ends by a curved closure section: the said perimetral surface forms, together with the said guides 8, blind holes.

**[0020]** The twist-and-side coupling means 13 of the bases 12 of the cleaning accessories 9 and 10 comprise, for each accessory, a pair of parallel brackets 16 which project from the bases 12, with no substantial break in continuity, and are susceptible of encompassing the diametrically opposed guides 8.

**[0021]** From the internal surfaces of the brackets 16 there project, orthogonally thereto, two respective cylindrical buttons 17 coaxially facing one another and capable of engagement in the guides 8 or blind holes.

**[0022]** The brackets 16 exhibit, in plan view, substantially the shape of a scaling triangle with uniform vertices 18 coinciding with the respective ends opposite to the base 12; the said vertices 18 and the cylindrical buttons are disposed eccentrically relative to a theoretical perpendicular plan of symmetry of the base 12, designated "P".

**[0023]** The retention means 14 for retaining each accessory 9 and 10 in the proximal position when they are not in use comprise two pairs of pawls 20 projecting from, solidly fixed to and diametrically opposite to the external surface of the tubular body 3, in the position of the proximal ends of the guides 8.

**[0024]** The above mentioned means 14 further comprise, correspondingly, hollow seatings 21 for accommodating the pawls 30, which are made in both the brackets 16 of each accessory 9 and 10 and form entries provided with a flare portion 22 having the function of guiding the fitting and forming, at the point of junction with the hollow seatings 21, retention teeth 23 over which the abovementioned pawls 20 can hook by resilient latching.

**[0025]** In the preferred form of embodiment of the multifunctional terminal 1, the cross section of the tubular body 3 is, with the exception of the section which defines the said proximal end 7 for pressure-fitting to the head of the external suction tube 2, of helixoidal form with at least two rectilinear and mutually parallel sections opposite and perpendicular to the minor diameter, on which the parallel guides 8 are made.

**[0026]** The functioning of the multifunction cap 1 is as follows: it is fitted in a conventional manner, specifically by pressure-fitting on the end of an external tube 2 provided for an electrical domestic appliance, for example a vacuum cleaner, which is connected to the suction body thereof.

**[0027]** When the user has to employ the nozzle-type mouth 4 alone, he withdraws the cleaning accessories 9 and 10 towards the proximal end of the guides 8, causing the buttons 17 with which they are provided at the ends of the brackets 16 to slide in the said guides until the hollow seatings 21 made therein engage by latching onto the pawls 20, hooking over the retention teeth 23 with which the abovementioned hollow seatings 21 are provided.

**[0028]** In this configuration, the cleaning accessories 9 and 10, although remaining at a distance from the active zone of the nozzle-type mouth 4, are nevertheless within reach when it is necessary to make use thereof.

**[0029]** In this case, the user extracts, by exerting light pressure on the accessory to be used, the seatings 21 from the pawls 30, causing the said accessory to slide along the longitudinal guides 8 until the buttons 17 come into abutment against the end closure sections of the ribs 15 which constitute the said guides 8; in that position, the buttons 17 act as a fulcrum for the rotation of the preselected accessory, until the mouth of the tubular base 12 thereof is coaxially aligned with the said nozzle-type mouth 4.

**[0030]** Once the above mentioned alignment has been completed, the accessory is again caused to move back along the guides 8 for a short distance until the tubular base 12 engages on the distal end of the multifunction cap 1.

**[0031]** The eccentricity of the buttons 17 relative to the normal plane of symmetry "P" of the base 12 permits the free rotation of the accessory, before its final fitting, there being no interference between the corners of the nozzle-type mouth 4 and the perimetral edges of the base 12.

**[0032]** The accessory fitted on the distal end 5 is removed by following the opposite procedure: in practice,

by pulling the accessory gently outwards, in other words causing the buttons 17 to slide until they again come into abutment against the closure sections of the ribs 15, the tubular base 12 is first disengaged from the nozzle-type mouth 4; the accessory is then rotated outwards and is withdrawn along the guides 8 until the hollowing seatings 21 of the brackets 16 once again engage onto respective pins 20, locking the accessory previously used in that retracted position.

**[0033]** By acting upon the other in the same manner as described, it is rapidly replaced in the fitted position of use.

**[0034]** It has been found in practice that the invention described achieves the proposed objects, in other words makes it possible to replace the accessories rapidly on the terminal 1 and have them constantly within reach.

**[0035]** The invention is capable of numerous modifications and variations, all of which fall within the scope of protection as defined by the wording of the claims that follow.

**[0036]** Moreover, any detail may be replaced by another technically equivalent detail.

**[0037]** In practice, the materials used, and the shapes and dimensions, may be of any type dictated by requirements, without thereby departing from the scope of protection of the present invention.

## Claims

1. Multifunctional terminal (1) for external suction tubes (2) of vacuum-operated electrical domestic appliances, **characterized in that** it comprises a tubular body (3) forming a spear-shaped mouth (4) at a distal end (5) and a cylindrical mouth (6) at the opposite, proximal end (7) capable of being coupled by pressure-fitting to the head of the said external suction tube (2), at least one pair of parallel guides (8) formed in diametrically opposite positions on the external surface of the said tubular body (3), at least one cleaning accessory (9) comprising an active end (11) and, opposite to the latter, a tubular base (12) provided with means (13) for twist-and-slide coupling to the said parallel guides (8) for longitudinal sliding therein between the said proximal end (7) and distal end (5), and vice versa, of the said tubular body (3) and the rotation of the said accessory (9) at the distal end of the said guides (8) for the coaxial fitting of the said base (12) on the said distal end (5) of the said tubular body (3), and means (14) for retaining the said cleaning accessory (9) in the substantially proximal position of non-use of the said guides (8).

2. Multifunctional terminal according to Claim 1, **characterized in that** the said guides are formed by respective parallel projecting ribs diametrically opposite to the external surface of the said tubular body, joined at the ends by respective curved closure sections and forming, together with the said outer surface, blind holes.

3. Multifunctional terminal (1) according to Claims 1 and 2, **characterized in that** the said means (13) for the twist-and-slide coupling of the said base (12) of the said cleaning accessory (9) comprise a pair of parallel and mutually spaced brackets (16) projecting from the said base (12) and susceptible of encompassing the said diametrically opposed guides (8), a pair of respective cylindrical buttons (17) projecting transversely and orthogonally from the said brackets (16) and facing one another coaxially for clamping engagement in the said guides (8).

4. Multifunctional terminal (1) according to Claim 3, **characterized in that** the said brackets (16) exhibit, in plan view, substantially the shape of a scalene triangle with uniform vertices (18) coinciding with the respective ends opposite to the said base (12) and from within which the said cylindrical buttons (17) project.

5. Multifunctional terminal (1)according to Claims 3 and 4, **characterized in that** the said vertices (18) and cylindrical buttons (17) are disposed eccentrically relative to a theoretical perpendicular plan (P) of symmetry of the said base (12) of the said cleaning accessory (9).

6. Multifunctional terminal (1) according to Claim 1, **characterized in that** the said retention means (14) for retaining the said accessory (9) in the proximal position of non-use comprise at least one pawl 20 solidly fixed to and projecting from the external surface of the said tubular body (3) in proximity of the said proximal end (7), a hollow seating (21) for accommodating the said pawl (20) made in at least one of the said brackets (16) and forming an entry provided with a flared guide (22) and a spring-latched hook-over retaining tooth (23).

7. Multifunctional terminal (1) according to Claim 1, **characterized in that** the said pairs of guides (8) are two in number and the said cleaning accessories (9, 10) are two in number, each being mounted to slide along a respective pair of the said guides (8).

8. Multifunctional terminal (1) according to Claim 7, **characterized in that** the said cleaning accessories (9, 10) have, in the position of use where they are fitted onto the said distal end (5) of the said tubular body (3), their respective active ends (11) uniformly folded back relative to the respective tubular

bases (12) at an obtuse angle relative to the longitudinal axis of the said tubular body (3).

**9.** Multifunctional terminal (1) according to any one of the preceding claims, **characterized in that** the cross section of the said tubular body (3) is, apart from the said proximal end (7) for pressure-fitting engagement with the head of the said external suction tube (2), of ellipsoidal form having at least two sections diametrically opposite and perpendicular to the minor diameter which are rectilinear and mutually parallel and on which the said parallel guides (8) are made.

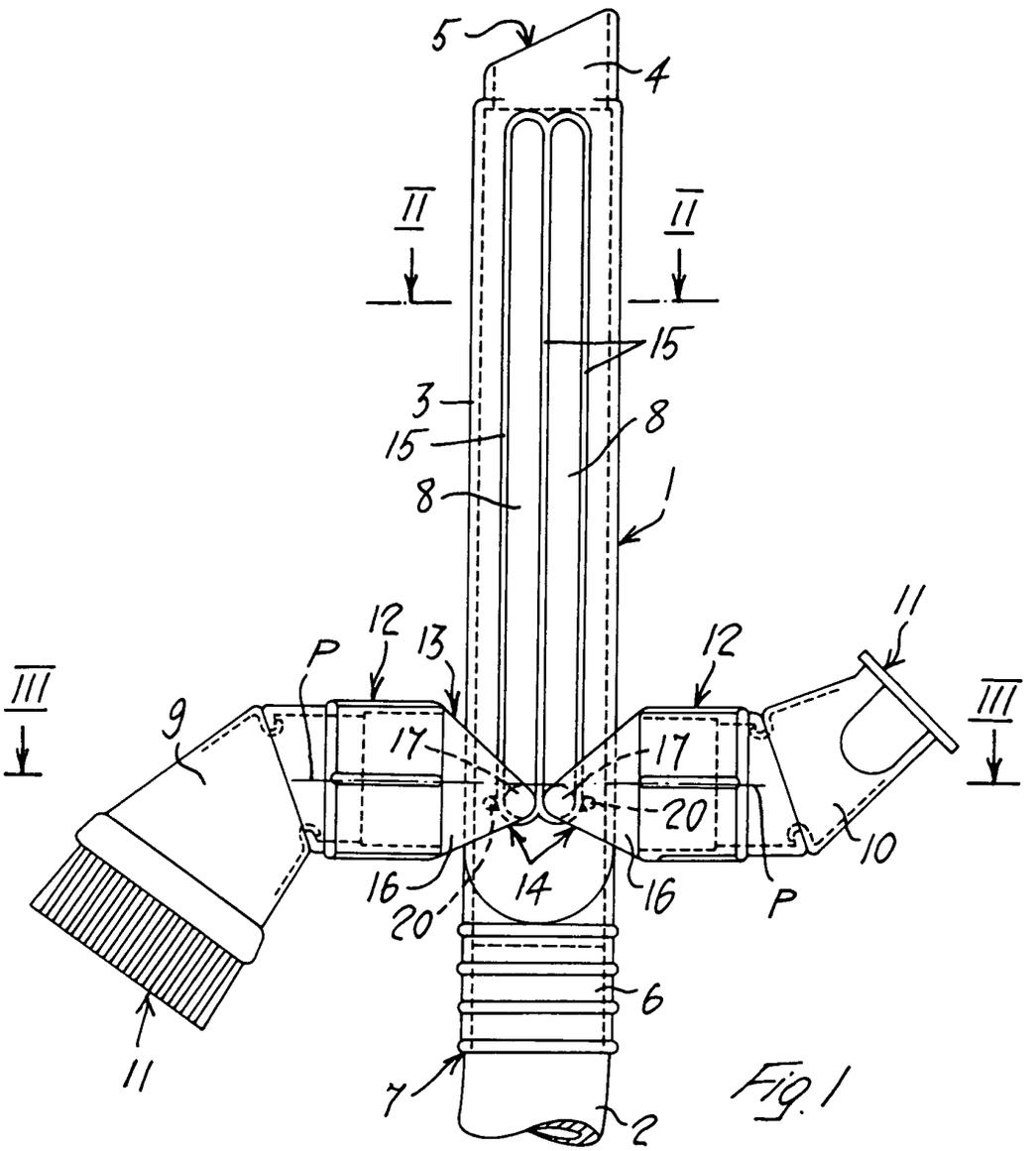

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Fig. 1

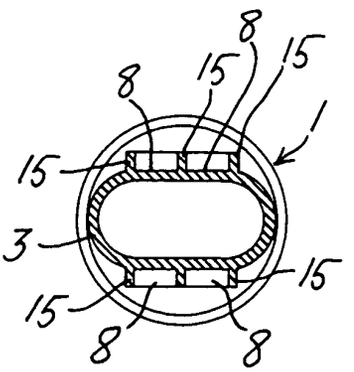

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8

Fig. 2

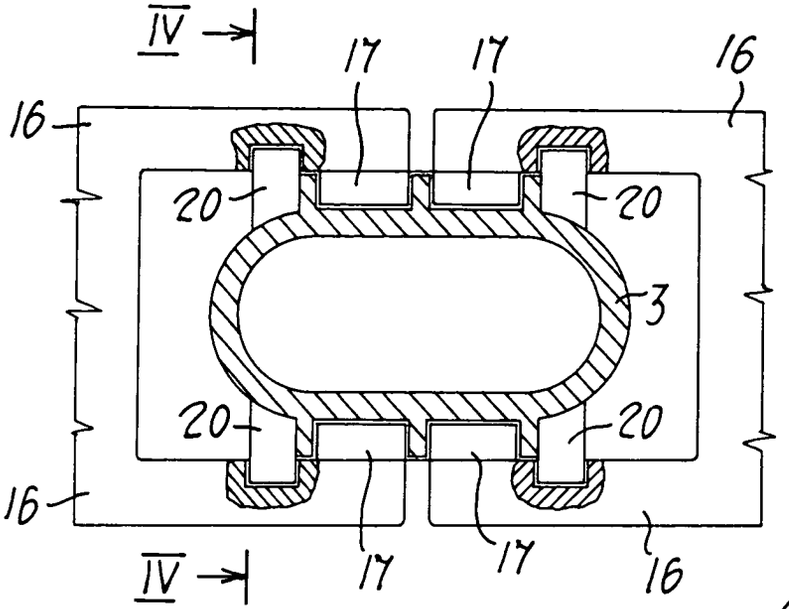

IV
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16
IV
17
17
16

Fig. 3

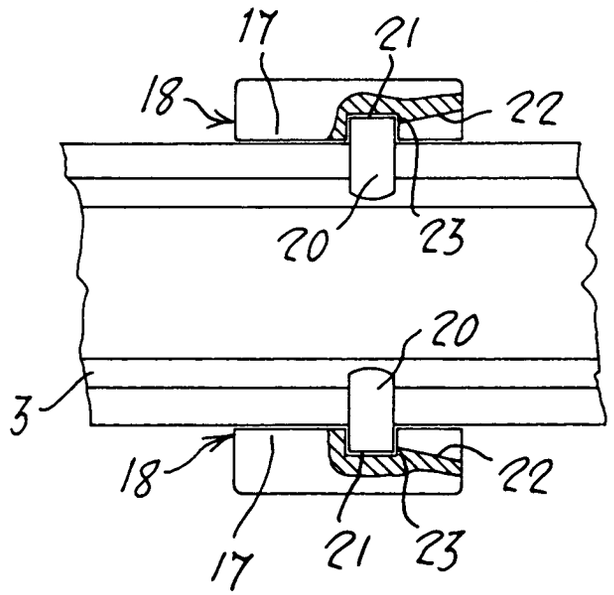

17
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21
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Fig. 4

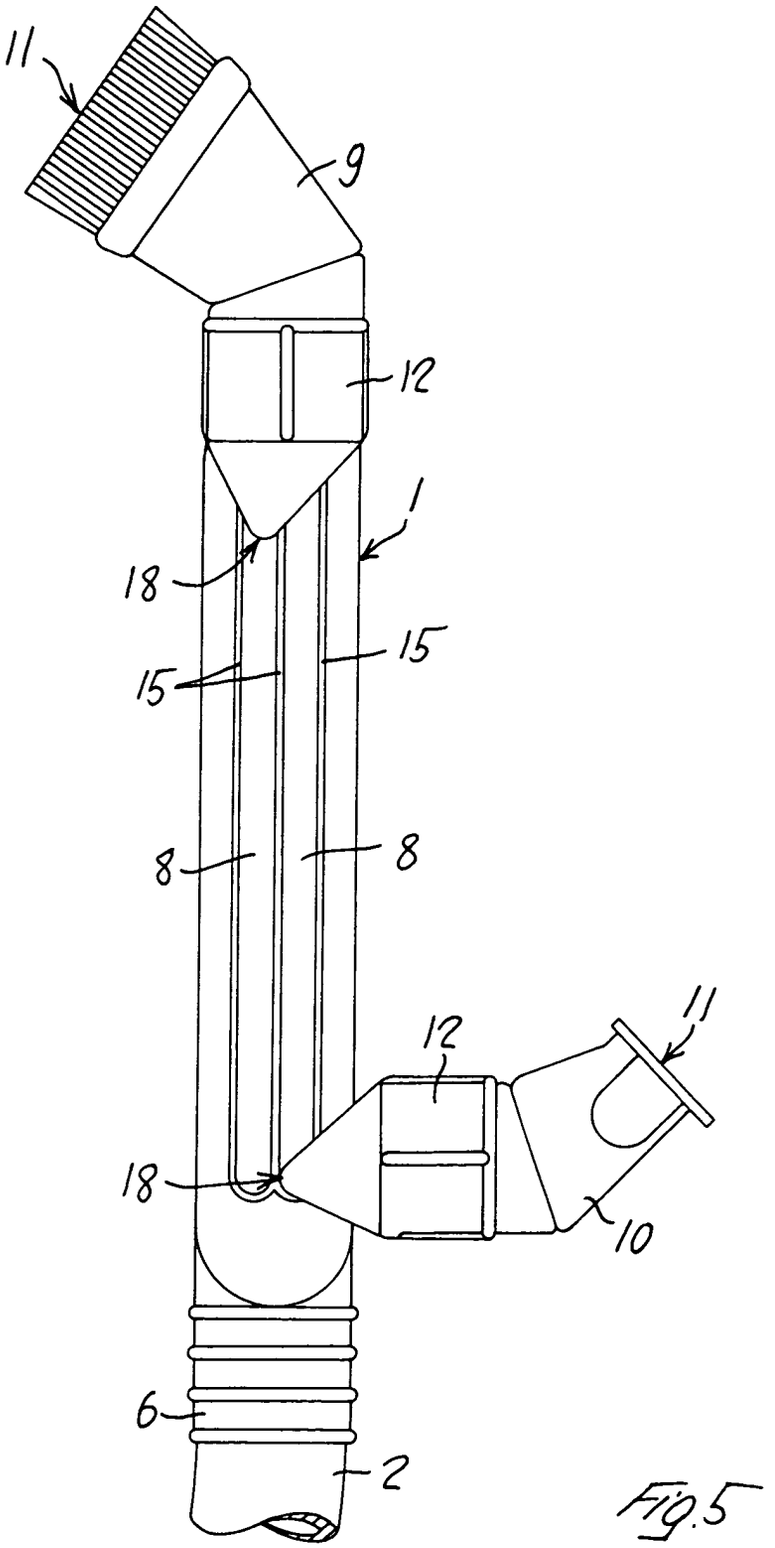



Fig.5

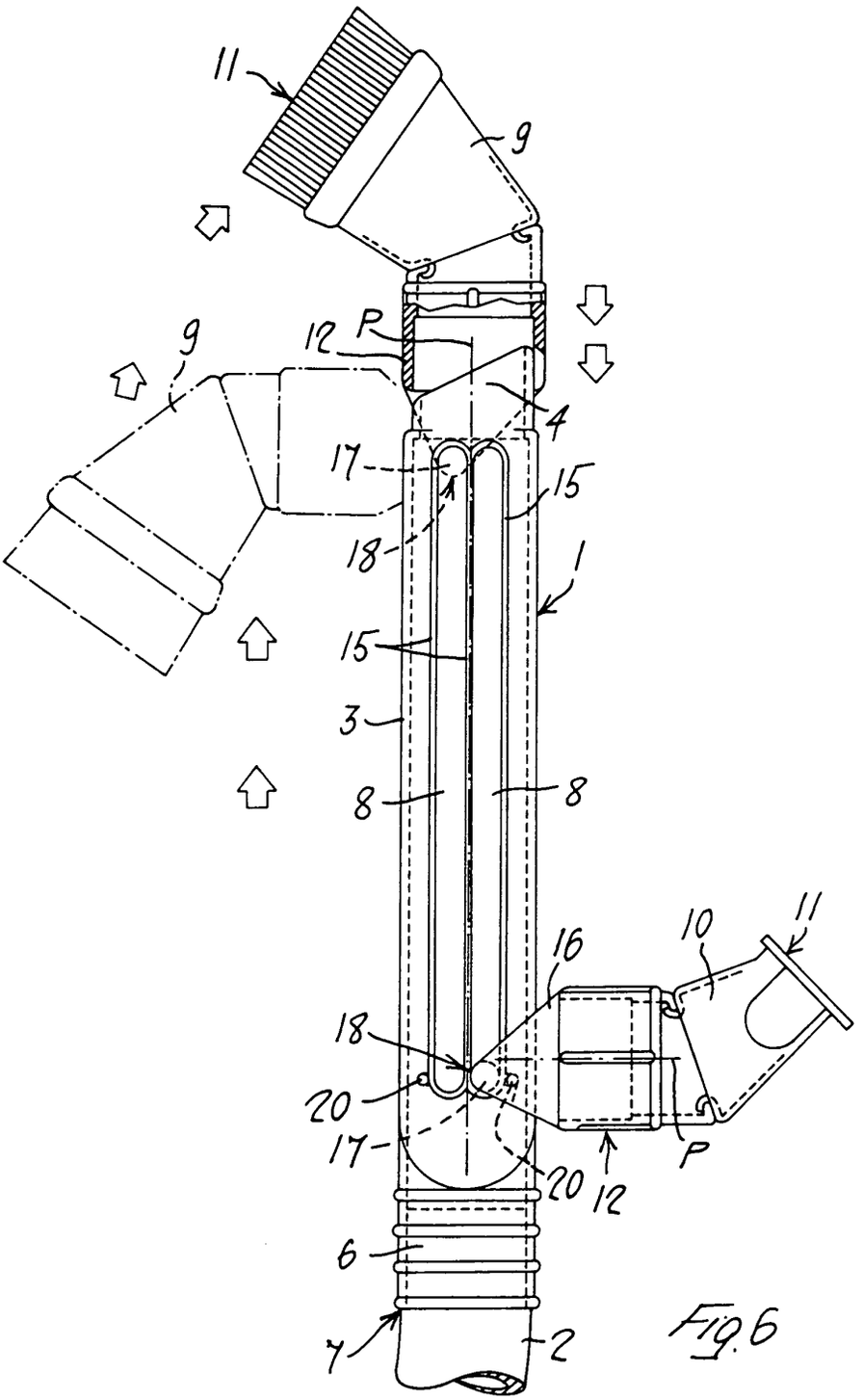



Fig. 6

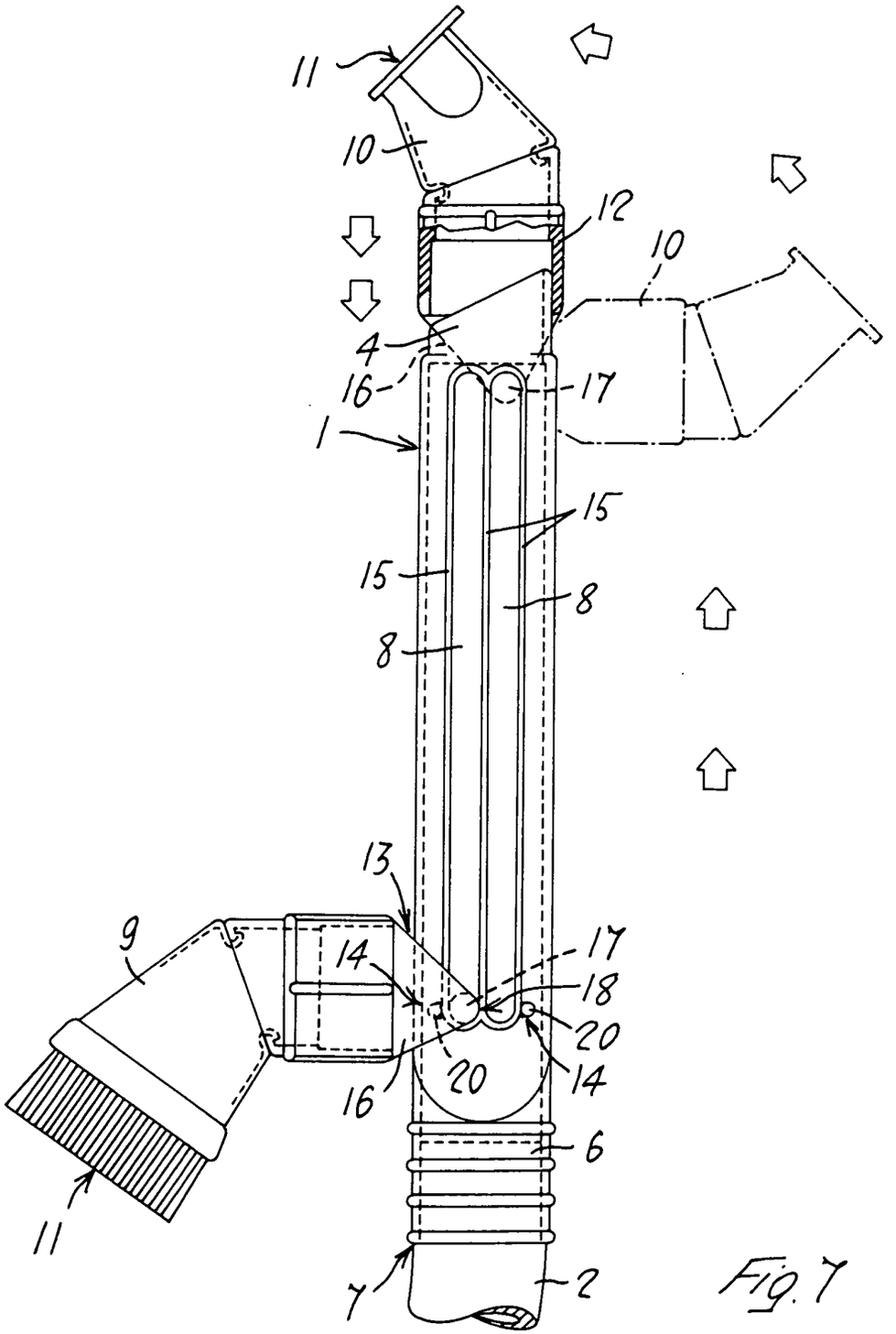



Fig. 7