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(54) Steam cleaning appliance

(57) Steam cleaning appliance comprising: a handgrip (1), a modular pole (3) with a plurality of tubular parts (3a, 3b, 3c) connected detachably to each other and to this handgrip (1), a final steam dispensing head (4), connected to a cleaning tool (5) and to this modular pole (3), and steam generating means (6); these steam generating means (6) are connected detachably and by suitable means (206, 306, 406, 506, 13a, 103b) of connection between two successive tubular parts (3a, 3b) of this plurality of tubular parts (3a, 3b, 3c) or between this handgrip (1) and the first tubular part (3a) of this plurality of tubular parts (3a, 3b, 3c) or between the last tubular part (3c) of this plurality of tubular parts (3a, 3b, 3c) and the final steam dispensing head (4); each of these tubular parts (3a, 3b, 3c) of this modular pole (3) contains pipes (17a, 17b, 17c, 24a, 24b, 24c) capable of transporting the steam from these steam generating means (6) to this final steam dispensing head (4) via suitable steam dispensing control means (2, 27).

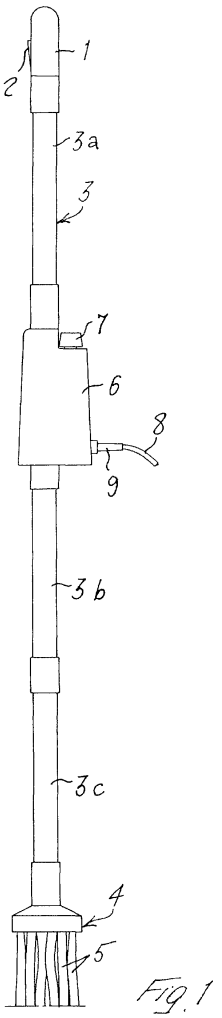

Fig. 1

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Description

[0001] The present invention relates to a steam appliance for cleaning surfaces such as floors or the like.

[0002] The prior art already includes steam cleaning appliances comprising a handgrip, a modular pole with a plurality of tubular parts connected detachably to each other and to this handgrip, a final steam dispensing head connected to a cleaning tool and to this pole, and steam generating means. These steam generating means may be housed in this final steam dispensing head, which also carries cleaning tools such as cloths, brushes or the like. This head of the appliance may also contain a tank for supplying water to the said steam generating means, but the tank could alternatively be positioned for example on the handgrip. There are a number of drawbacks with such appliances, due mostly to the necessarily large size of the final steam dispensing head, since it must house the steam generating means and optionally also the water tank, and to its lack of adaptability to the diverse requirements of space and usage encountered in practice by a person using the appliance for normal cleaning work.

[0003] It is an object of the present invention to overcome the drawbacks of the known appliances referred to above, by means of a steam cleaning appliance that is compact and allows the user to position these steam generating means wherever he chooses along the length of the modular pole of the appliance.

[0004] This object is achieved by the present invention with a steam cleaning appliance comprising: a handgrip, a modular pole with a plurality of tubular parts connected detachably to each other and to this handgrip, a final steam dispensing head, connected to a cleaning tool and to this modular pole, and steam generating means, the said appliance being characterized in that these steam generating means are connected detachably and by suitable means of connection between two successive tubular parts of this plurality of tubular parts or between this handgrip and the first tubular part of this plurality of tubular parts or between the last tubular part of this plurality of tubular parts and the final steam dispensing head; each of these tubular parts of this modular pole contains pipes capable of transporting the steam from these steam generating means to the said final steam dispensing head via suitable steam dispensing control means.

[0005] In accordance with another aspect of the present invention these steam dispensing control means are positioned in this handgrip.

[0006] In accordance with yet another aspect of the present invention each of these tubular parts comprises an internal pipe for delivering steam to these control means positioned on the handgrip and a pipe for transporting steam from this handgrip to this final steam dispensing head; each of these steam delivery or return pipes of a first tubular part are connected detachably and by suitable means to the steam delivery or return pipe of a second tubular part adjacent to this first tubular part.

[0007] Other features and advantages of the present invention will become clearer in the course of the following description, considered as illustrative rather than restrictive, which refers to the accompanying drawings, in which:

- Fig. 1 is a side view of a steam cleaning appliance according to the present invention comprising an upper handgrip, a modular pole provided with a series of interconnected tubular parts, a final steam dispensing head to which a cleaning tool is attached, and a steam generator connected detachably between two successive tubular parts;
- Fig. 2 is a sectional side view of the steam generator connected between two successive tubular parts of the modular pole and containing an internal boiler;
- Fig. 3 is a partially sectioned side view of a pair of interconnected tubular parts inside which are pipes for carrying the steam;
- Fig. 4 is a sectional side view of the upper handgrip of the present appliance, with suitable means for controlling the dispensing of the steam;
- Fig. 5 is a sectional side view of the final steam dispensing head;
- Fig. 6 is a sectional side view of two sections of interconnected tubular parts containing two internal steam pipes with their safety valves;
- Figs. 7a, 7b, 7c are three side views of the present cleaning appliance with the steam generator connected to the modular pole at three different heights;
- Fig. 8a is a side view, with parts in dashes, of a steam mop with fixed, non-detachable tubular parts, having at its end button components for the control of the dispensing of the steam;
- Fig. 8b is a view similar to Fig. 8a, except that the steam dispensing control parts are omitted, the steam being released freely and continuously; and
- Fig. 9 shows the possibility of using the mop in combination with other steam cleaners, for which purpose it is not given its own steam generator but simply a steam pipe connectable in practice to, for example, a steam dispensing gun.

[0008] Referring to the accompanying drawings, and particularly to Fig. 1 thereof, the number 1 denotes a handgrip of a steam cleaning appliance according to the present invention. This handgrip 1 is provided with a button 2 for controlling the dispensing of steam and is connected detachably to a modular pole 3 consisting of a series of tubular parts, in this case the three intercon-

nected tubular parts 3a, 3b and 3c. Connected to the last tubular part 3c of the said series of tubular parts is a final steam dispensing head 4 to which a cleaning tool 5 is attached. In the present illustrative embodiment of the invention this tool 5 comprises a series of strips of cloth usable for cleaning a certain surface such as for example a floor. Between two successive tubular parts of the said series of tubular parts which make up the modular pole 3, in this case between the tubular part 3a and the tubular part 3b, a steam generator 6 is inserted. This last comprises a water filling cap 7 with a safety valve. This steam generator 6 is supplied with power by an electric lead 8 passing in through a cable guide 9.

[0009] Referring to Fig. 2 of the accompanying drawings, we see how this steam generator 6 is constructed and how it is connected to the tubular parts 3a and 3b. The steam generator 6 comprises a central body 106 containing a boiler 10 into which water is poured through the cap 7 with its safety valve. Externally and on the bottom of this boiler 10 is an electric resistor 11 supplied by the electric lead 8. The steam produced in this boiler 10 passes out through an upper discharge port 12. Relative to this central body 106 there are formed in the said steam generator 6 a first or upper tubular section 206 and a second or lower tubular section 306: the bottom end of the tubular part 3a is fitted into the upper tubular section 206, while the top end of the tubular part 3b is fitted onto the lower tubular section 306. This connection is preferably of the quick-release kind, the said tubular part 3a comprising a first lock/release button 13a which fits into a seat 406 formed in the said upper tubular section 206 of the steam generator 6, while the lower tubular section 306 comprises a second lock/release button 506 which fits into a seat 103b formed in the said tubular part 3b. Also, the bottom end of the said tubular part 3a abuts against an annular step 606 of reduced diameter formed in the said upper tubular section 206, while the bottom end of the said lower tubular section 306 abuts against an annular step 203b of reduced diameter formed in the said tubular part 3b. A tube 14 is connected to the steam outlet port 12 and is connected to the base of a first, upward-pointing internally hollow pin 15. This first pin 15 is inserted into a first housing 16 comprising a nozzle 18 which is in turn connected to a pipe 17a. This pipe 17a passes all the way along the tubular part 3a, and is capable of transporting the steam towards the handgrip 1 where (see Fig. 1) the steam dispensing control button 2 is located. Between the said first housing 16 and the said pin 15 are sealing means 21. Formed integrally with this first pin 15 is a second housing 19 having its own nozzle 20 connected to a pipe 22 which passes through the steam generator 6. A second, downward-pointing internally hollow pin 23 is inserted into the said second housing 19. This second pin 23 is formed integrally with the first housing 16 of the first pin 15 and is provided with a base to which is connected a pipe 24a carrying the steam returning from the said handgrip towards the said final dispensing head 4 illustrated in Fig. 1. This pipe 24a also runs all the way along the tubular part 3a. In the same way as described above, the tubular part 3b is provided with a pipe 17b for sending steam to this dispensing control button 2, and with a steam return pipe 24b. Of course, in this case, since the steam generator 6 is above the said tubular part 3b, the pipe 17b is inoperative. As regards the connection of the pipe 22, which passes internally through the steam generator 6, to the pipe 24b, this is done, exactly as seen earlier via the upward-pointing pin 23 fitted leaktightly into the housing 19.

[0010] As is observable in Fig. 3, all the tubular parts of the modular pole 3 - for instance the tubular parts 3b and 3c shown in the figure - carry the said steam delivery pipes 17b and 17c to the handgrip 1, and said steam return pipes 24b and 24c from the said handgrip 1. Also observable are the two pins 15 and 23 inserted in their respective housings 16 and 19, each containing a nozzle 18, 20, for the connection of the tubular part 3b to the tubular part 3c and the pin 23 projecting from the bottom end of the tubular part 3c and free to be coupled to another tubular part or, as in Fig. 1, to the final steam dispensing head 4.

[0011] Fig. 4 illustrates the upper handgrip 1 which contains the steam dispensing control button 2 and is connected, via the pins 15 and 23 inserted leaktightly in their housings 16 and 19, to the first tubular part 3a of the modular pole 3. This handgrip 1 comprises a lower tubular section 101 that is inserted into the final portion of the tubular part 3a and abuts against an annular step 203a of reduced diameter formed in the said tubular part 3a. A lock/release button 201 is also provided on this lower tubular section 101 and sits in a seat 103a formed in this tubular part 3a. Inside the said handgrip 1 are two tubes: a first tube 25 connected to the nozzle 18 of the housing 16 of the upward-pointing pin 15 and a second tube 26 connected to the base of the downward-pointing pin 23. The button 2 acts on a valve 27 that is known per se and lets steam from the tube 25, which is permanently connected to the pipe 17a, into the tube 26, which is permanently connected to the pipe 24a. This valve 27 is also provided with a spring 28 to oppose the pressure applied to the button 2, as will be seen in the description of the operation of the present appliance.

[0012] Fig. 5 shows the last tubular part 3c of the modular pole 3 connected to the final steam dispensing head 4. Connected to this head 4 by a lock nut 29 is a plate 30 which has both final steam dispensing nozzles 31 and a cleaning tool 5, the latter in this example comprising textile strips. Naturally, other types of cleaning tool such as a cloth or the like could be attached by means of this lock nut 29. Inside the head 4 is a housing 19 into which the pin 23 is inserted leaktightly, exactly as seen earlier. This housing 19 extends from the upper horizontal face 204 of the said head 4. The base of this pin 23 is connected to the steam return pipe 24c which passes all the way along the tubular part 3c. Above this head 4 is an upper tubular section 104 to which the said tubular part 3c of the modular pole 3 is connected. The said tubular

part 3c abuts against the said upper horizontal face 204 of the head 4 and is provided with a lock/release button 13c for the connection, which inserts into a seat 304 in the said upper tubular section 204 of the said head 4.

[0013] Fig. 6 shows in detail the area of the connection between two tubular parts of the modular pole 3, for instance tubular parts 3b and 3c. The pin 15 connecting the pipe 17c to the pipe 17b, which pipes carry the steam to the handgrip 1 where the control button 2 is housed, comprises a final section 115 with a decreasing internal cross section through which the steam passes. This final section 115 houses a ball valve 32 fitted with a restoring spring 33. This ball valve 32 engages on a needle 34 fixed to the base of the nozzle 18 in the housing 16 of the said pin 15. In the same way the pin 23 connecting the steam delivery pipes 24b and 24c to the final dispensing head 4 comprises a final steam-out section 123 of decreasing internal cross section housing another ball valve 35 with its own restoring spring 36 interacting with the needle 37 formed at the base of the nozzle 20 in the housing 19 of the said pin 23.

[0014] Figs. 7a, 7b and 7c show the present appliance with the steam generator 6 positioned at three different heights on the modular pole 3: in Fig. 7a the steam generator 6 is connected between the handgrip 1 and the first of the tubular parts of the modular pole 3, that is tubular part 3a; in Fig. 7b the steam generator 6 is connected between two tubular parts of the said modular pole, that is between tubular part 3b and tubular part 3c; and in Fig. 7c the steam generator 6 is connected between the last of the tubular parts of the modular pole 3, that is tubular part 3c, and the final steam dispensing head 4.

[0015] The present appliance works as follows: first of all, the steam generator 6 is positioned with the boiler 10, filled with water, at the desired height on the modular pole 3, for example between the two tubular parts 3a and 3b, in a manner described in Fig. 2; at this point the electrical resistor 11 supplied by the electrical lead 8 begins to heat the water in the boiler 10. The resulting steam passes up out of the port 12, through the tube 14, the pin 15 and the nozzle 18, and passes into the pipe 17a which passes all the way up the tubular part 3a. From the pipe 17a the steam passes through another pin 15 into the first tube 25 (see Fig. 4) connected to the valve 27 operated by the control button 2 located on the handle 1. As long as this button 2 is depressed and the spring 28 compressed, this valve 27 lets the steam pass from the said first tube 25 to the second tube 26, from which the steam begins its downward descent. The steam passes in sequence through the pipe 24a of the tubular part 3a, the pipe 22 inside the generator 6, the pipe 24b of the tubular part 3b, the pipe 24c of the last tubular part 3c and, via another pin 23 (see Fig. 5), reaches the final dispensing head 4, to which is connected the plate 30 with nozzles 31 for the cleaning tool 5. To ensure that when, after cleaning has been completed and the present appliance has finished being used, the steam still present in the tubular parts 3a, 3b, 3c of the modular pole 3 does not escape suddenly and dangerously when they are dismantled, the ball valves 32 and 35 automatically shut off the passage of the steam through the respective pins 15 and 16. When for example tubular part 3b is connected to tubular part 3c (see Fig. 6), the needle 34 presses the ball of the valve 32 downwards, compressing the spring 33 and so opening the steam passage through the final section 115 of decreasing internal cross section of the pin 15. When the said tubular parts 3a and 3b are separated during dismantling of the present appliance, the spring 33 relaxes and pushes the ball back against the final section 115 of decreasing internal cross section of the pin 15, immediately closing the steam passage. Lastly, as will be obvious, the steam passes from the pipes 17b and 17a to the pipes 24a, 24b and 24c because pressure is maintained on the control button 2 of the handgrip 1, which opens the valve 27. When this button 2 is released, the spring 28 closes the passage through the said valve 27. The cap 7 and its safety valve on the steam generator 6 allows steam to escape if there is too much steam in the present appliance.

[0016] Figs. 8a and 8b show a variant of the present appliance. In this variant the pole 103 is not modular but made up of two fixed tubular parts connected to the steam generator 6. In the variant shown in Fig. 8a, the steam is conveyed from the generator 6 to the mop 4 via the control button 2, which is located on the handgrip 1 of the appliance. In the variant shown in Figure 8b, steam passes directly from the generator 6 to the mop 4 in an uninterrupted manner.

[0017] Finally, Figure 9 shows a variant of the appliance illustrated in the previous figures, with identical parts indicated by identical numbers. In the figure, the opposite end of the flexible tube T from that connected to the steam generator G is connected to a head L bearing a pin S that can be inserted into the control handgrip I. The latter has a dispensing button and a dispensing pin S', which in turn can be connected to the tubular pole 3 of the cleaning tool 5. In this variant the mop 4 will not have its own steam generator, but only steam pipes 3, and may be used as an accessory for other steam cleaners.

[0018] Clearly, the present invention is not limited to the embodiments illustrated and described, but encompasses all variants and modifications that come within the more general scope of the inventive concept.

Claims

1. Steam cleaning appliance comprising: a handgrip (1), a modular pole (3) with a plurality of tubular parts (3a, 3b, 3c) connected detachably to each other and to the said handgrip (1), a final steam dispensing head (4), connected to a cleaning tool (5) and to the said modular pole (3), and steam generating means (6), the said appliance being **characterized in that**

the said steam generating means (6) are connected detachably and by suitable means (206, 306, 406, 506, 13a, 103b) of connection between two successive tubular parts (3a, 3b) of the said plurality of tubular parts (3a, 3b, 3c) or between the said handgrip (1) and the first tubular part (3a) of the said plurality of tubular parts (3a, 3b, 3c) or between the last tubular part (3c) of the said plurality of tubular parts (3a, 3b, 3c) and the final steam dispensing head (4), each of the said tubular parts (3a, 3b, 3c) of the said modular pole (3) containing pipes (17a, 17b, 17c, 24a, 24b, 24c) capable of transporting the steam from the said steam generating means (6) to the said final steam dispensing head (4) via suitable steam dispensing control means (2, 27).

2. Steam cleaning appliance according to Claim 1, **characterized in that** the said steam dispensing control means (2) are positioned in the said handgrip (1).

3. Steam cleaning appliance according to Claim 2, **characterized in that** each of the said tubular parts (3a, 3b, 3c) comprises an internal pipe (17a, 17b, 17c) for delivering steam to the said control means (2) positioned on the handgrip (1) and a pipe (24a, 24b, 24c) for transporting steam from the said handgrip (1) to the said final dispensing head (4), each of the said steam delivery or return pipes (17b, 24b) of a first tubular part (3b) being connected detachably and by suitable means (15, 23, 16, 19) to the steam delivery or return pipe (17c, 24c) of a second tubular part (3c) adjacent to the first tubular part (3b).

4. Steam cleaning appliance according to Claim 1, **characterized in that** the said final steam dispensing head (4) comprises an upper tubular connecting section (104).

5. Steam cleaning appliance according to Claim 1, **characterized in that** the said handgrip (1) comprises a lower tubular connecting section (101).

6. Steam cleaning appliance according to any one of the preceding claims, **characterized in that** the said steam generating means (6) comprise an upper tubular section (406) connected to the final portion of a first tubular part (3a) or to the said lower tubular section (101) of the said handgrip (1) and a second lower tubular section (206) connected to the final portion of a second tubular part (3b) or to the said upper tubular section (104) of the said final steam dispensing head (4).

7. Steam cleaning appliance according to Claim 1, **characterized in that** the said means of connecting a first tubular part (3a, 3b, 3c) or tubular section (206, 306, 104, 101) to a successive second tubular part (3a, 3b, 3c) or tubular section (306, 406, 104, 101) comprise at least one button (13a, 506, 13c, 13b, 201) for locking and releasing the connection housed in a seat (304, 103a, 103b, 406) formed in the said successive second tubular part (3a, 3b, 3c) or tubular section (206, 306, 104, 101).

8. Steam cleaning appliance according to Claim 1, **characterized in that** an annular abutment step (203b, 606) is formed in the end of a first tubular part (3b) or tubular section (206) for the end of a successive second tubular part (3a) or tubular section (306) to be connected to the said first tubular part (3b) or tubular section (206).

9. Steam cleaning appliance according to Claim 2, **characterized in that** the said steam delivery and return pipes (17a, 24a) housed in a first tubular part (3a) are connected to the steam outflow and return pipes (17b, 24b) of a successive second tubular part (3b) by means of internally hollow pins (15, 23) inserted leaktightly in housings (16, 19) provided with steam dispensing nozzles (18, 20).

10. Steam cleaning appliance according to Claim 9, **characterized in that** the connecting pin (15) of two steam delivery pipes (17a, 17b) is formed integrally with the housing (19) of the connecting pin (23) of two steam return pipes (24a, 24b).

11. Steam cleaning appliance according to Claim 9, **characterized in that** the connecting pin (23) of two steam return pipes (24a, 24b) is formed integrally with the housing (19) of the connecting pin (15) of two steam delivery pipes (17a, 17b).

12. Steam cleaning appliance according to Claim 1, **characterized in that** the said steam generating means (6) comprise a boiler (10) having a steam dispensing port (12), attached to which is a tube (14) connected to the base of a pin (15) connected leaktightly to a housing (16), the nozzle (18) of which is connected to the steam delivery pipe (17a) of the tubular part (3a) immediately above the said steam generating means (6).

13. Steam cleaning appliance according to Claim 1, **characterized in that** the said steam generating means (6) comprise an internal pipe (22) for transporting steam to the said final dispensing head (4).

14. Steam cleaning appliance according to Claim 9, **characterized in that** the said control means comprise a button (2) acting on a valve (27) for controlling the passage of steam through the said handgrip (1), the said valve (27) acting on a first pipe (25) connected by a first pin (15) to the steam delivery pipe (17a) of the first tubular part (3a) of the modular pole

(3) and on a second pipe (26) connected by a second pin (23) to the steam return pipe (24a) of the said first tubular part (3a) of the modular pole (3).

15. Steam cleaning appliance according to Claim 9, **characterized in that** each of the connecting pins (15) between the steam delivery pipes (17a, 17b, 17c) of each of the said tubular parts (3a, 3b, 3c) comprises a final section (115) containing a valve (32) for the optional interruption of the flow of steam, the said valve (32) being acted upon by a needle (34) mounted on the base of the housing (16) of the said pin (15).

16. Steam cleaning appliance according to Claim 1, **characterized in that** each of the connecting pins (23) between the steam return pipes (24a, 24b, 24c) of each of the said tubular parts (3a, 3b, 3c) comprises a final section (123) containing a valve (35) for the potential interruption of the flow of steam, the said valve (35) being acted upon by a needle (37) mounted on the base of the housing (19) of the said pin (23).

17. Steam cleaning appliance according to Claim 1, **characterized in that** an interchangeable cleaning tool (5) is connected by a lock nut (29) to the said final steam dispensing head (4).

18. Steam cleaning appliance according to Claim 9, **characterized in that** the said dispensing head (4) comprises an internal housing (19) capable of accommodating the pin (23) of the last tubular part (3c) of the modular pole (3) or the pin (23) connected to the said pipe (22) internal to the steam generating means (6).

19. Steam cleaning appliance according to Claim 1, **characterized in that** the said cleaning tool (5) comprises a series of textile strips connected to a plate (30) containing steam dispensing nozzles.

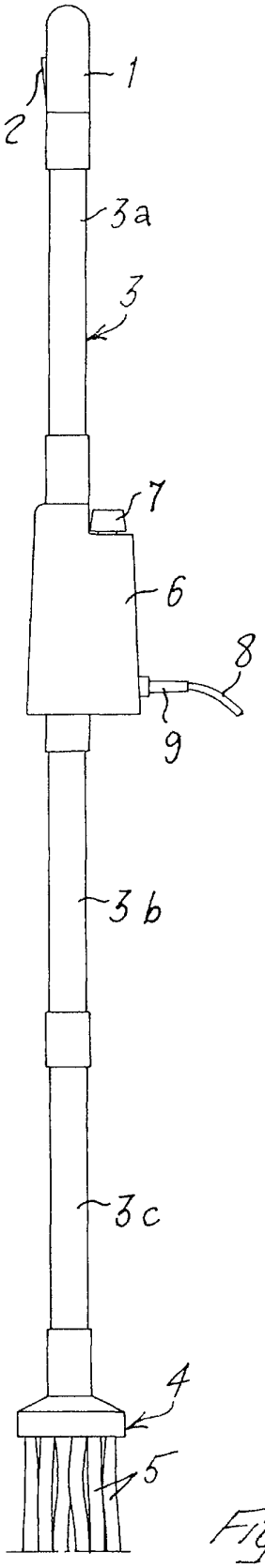
20. Steam cleaning appliance according to Claim 1, **characterized in that** the pole (103) is not modular but is made up of fixed tubular parts connected to the steam generator (6).

21. Steam cleaning appliance according to Claim 20, **characterized in that** the steam is conveyed from the generator (6) to the mop (4) via the control button (2) located in the handgrip (1) of the appliance.

22. Steam cleaning appliance according to Claim 20, **characterized in that** the steam passes directly from the generator (6) to the mop (4) without interruption.

23. Steam cleaning appliance according to Claim 1, **characterized in that** the mop (4) does not have its own steam generator, but only steam pipes (3), enabling it to be used as an accessory for other steam cleaners.

24. Steam cleaning appliance according to Claim 23, **characterized in that** the opposite end of a flexible tube (T) from that connected to a steam generator (G) is connected to a head (L) bearing a pin (S) that can be inserted into the control handgrip (I), which has both a dispensing button and a dispensing pin (S') connectable to the tubular pole (3) of the cleaning tool (5), the whole being as illustrated in Figure 9 of the accompanying drawings.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5

Fig. 1

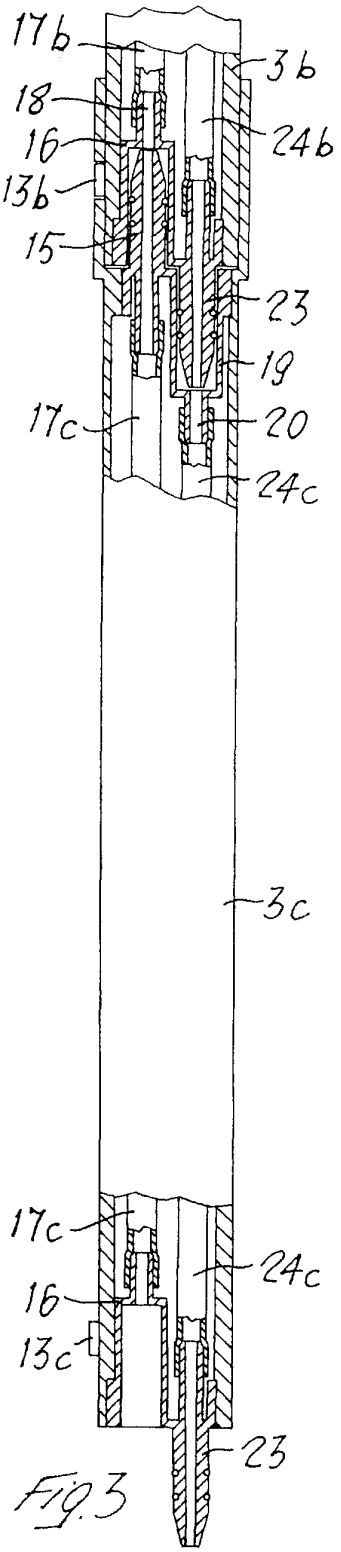
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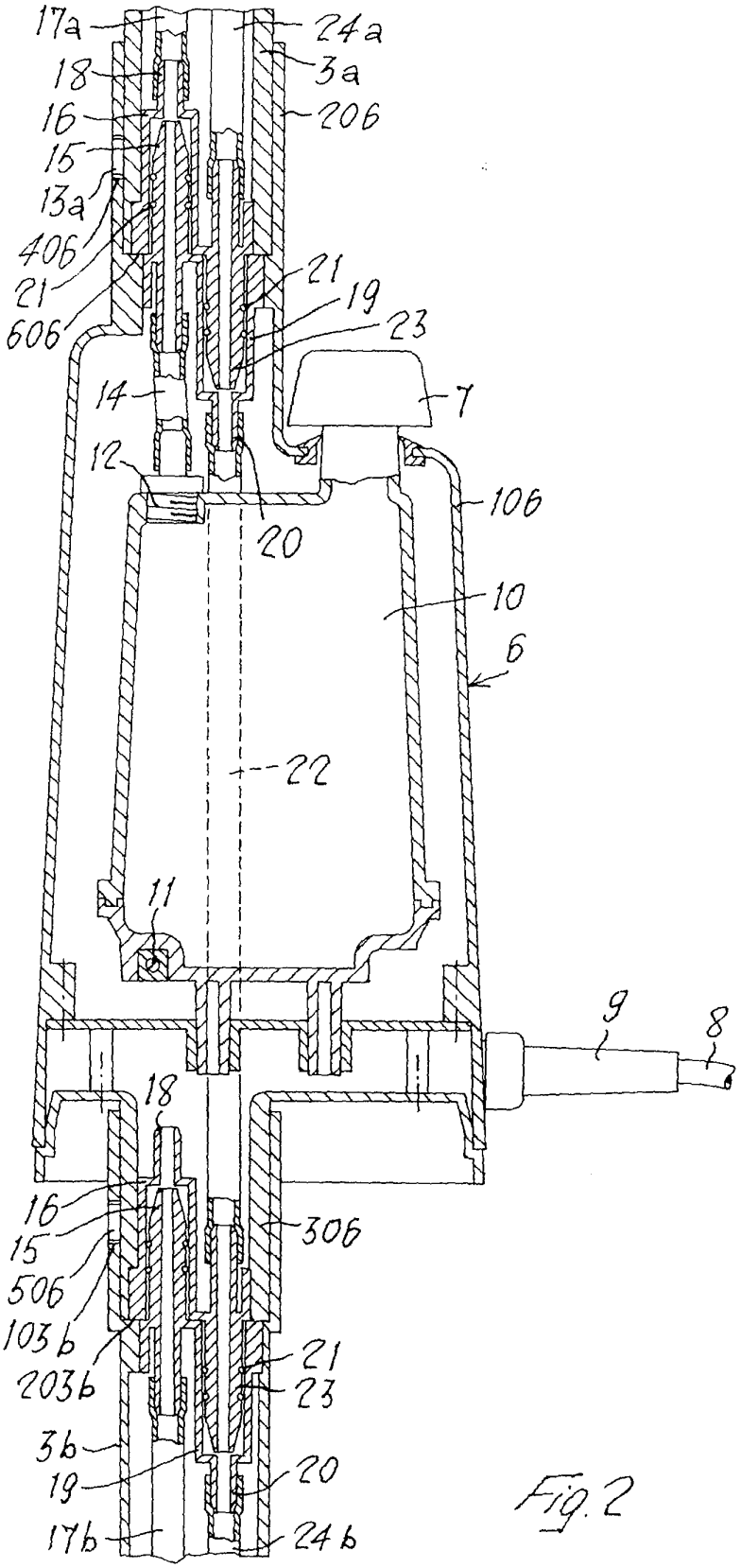
Fig. 3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6
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Fig. 2

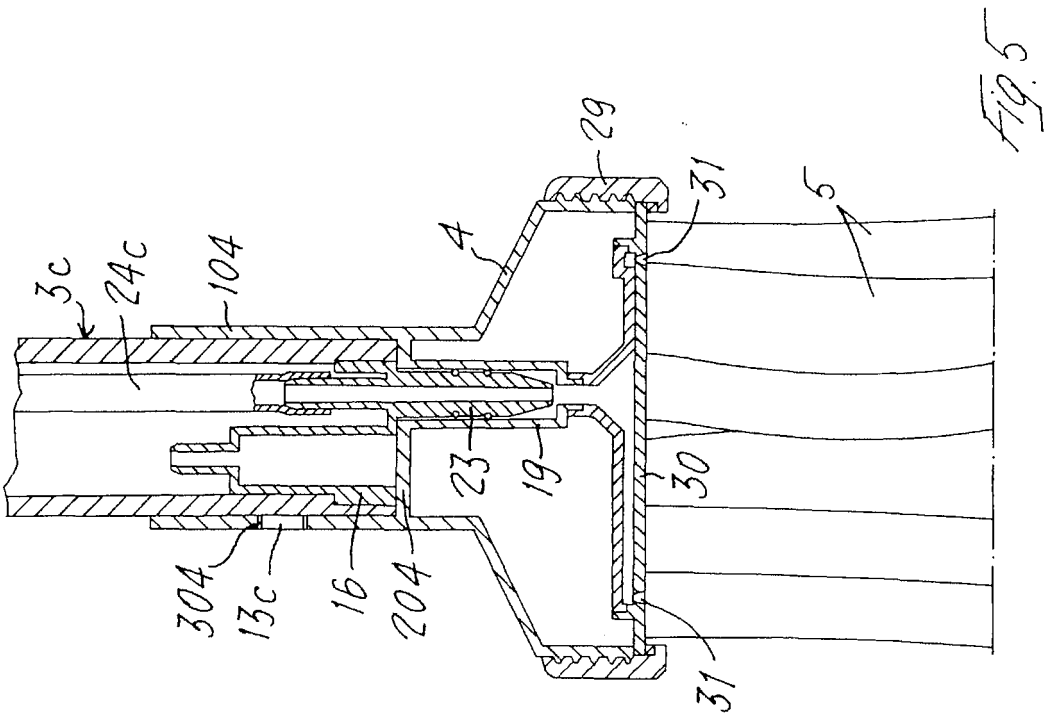
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Fig. 5

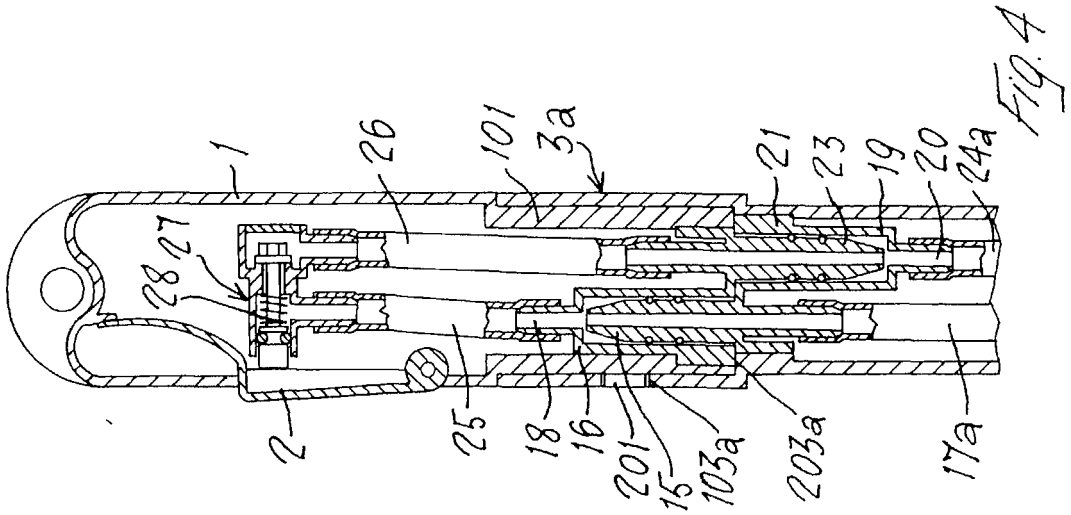
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Fig. 4

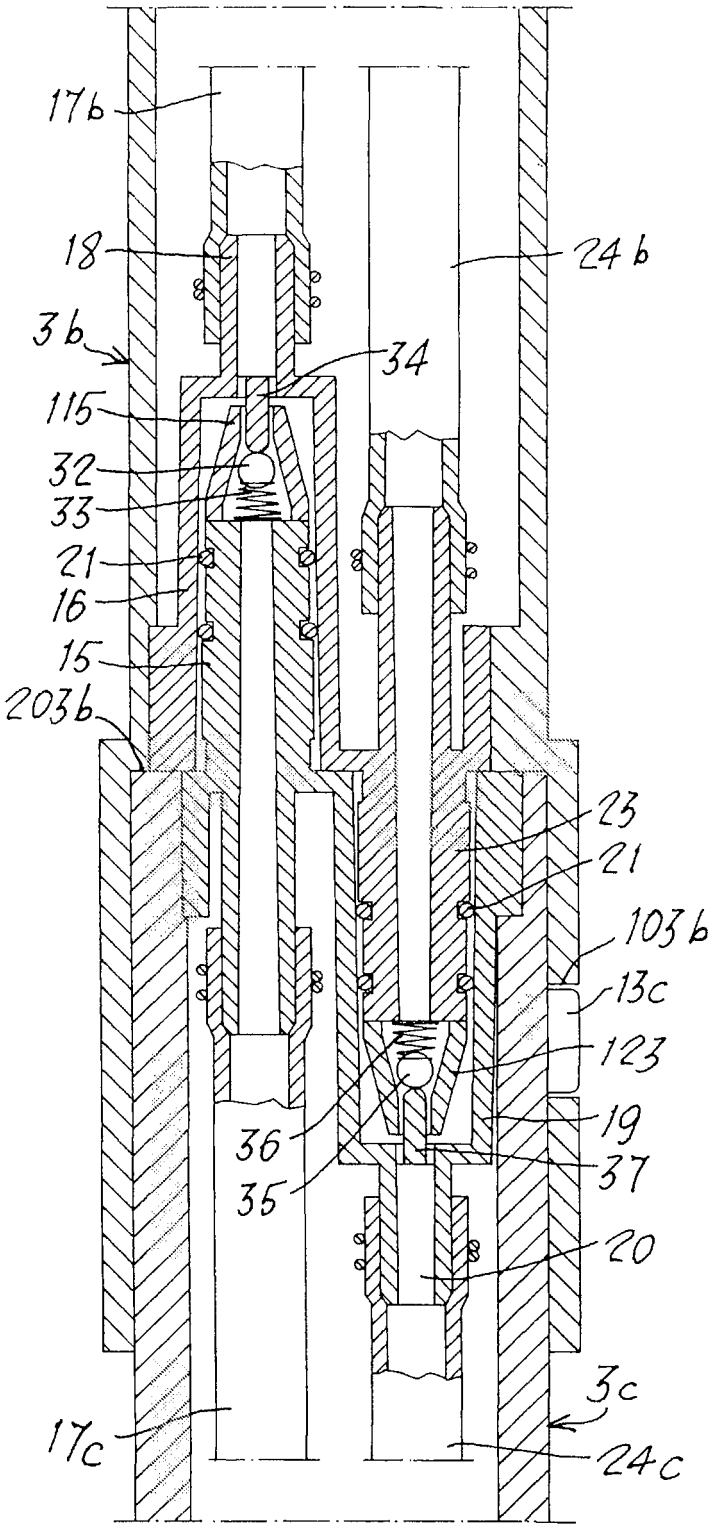
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Fig.6

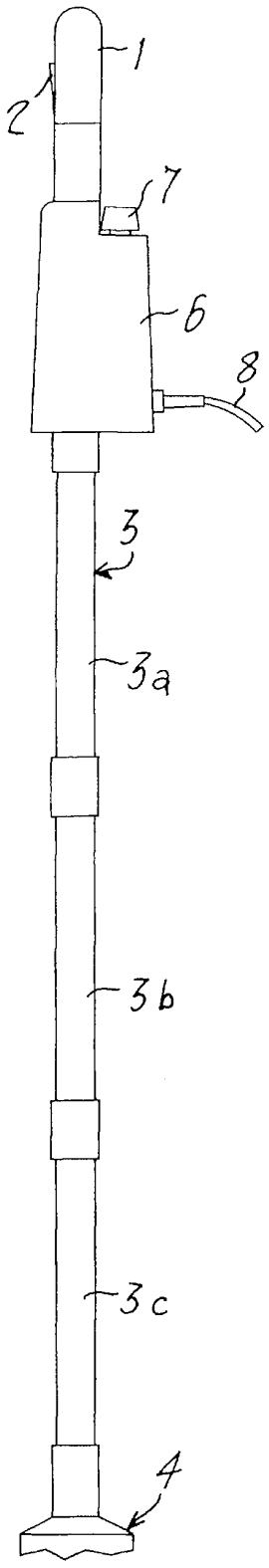

Fig. 7a

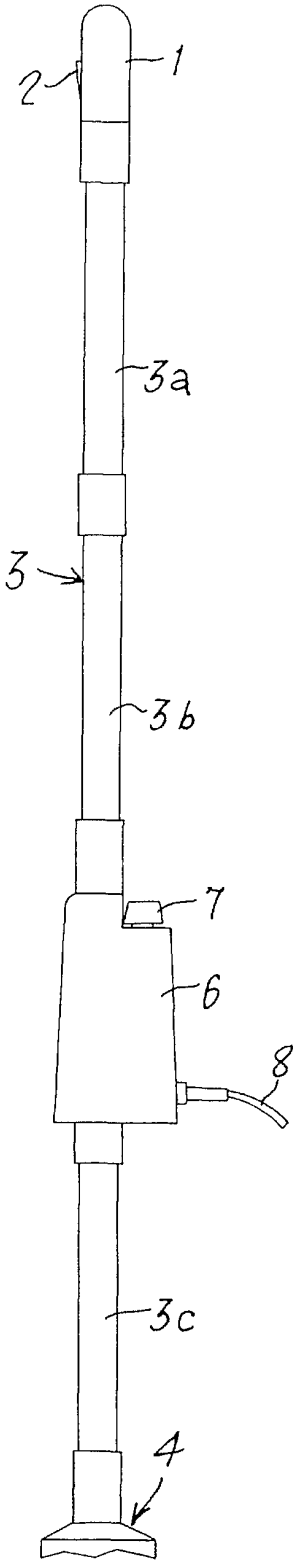

Fig. 7b

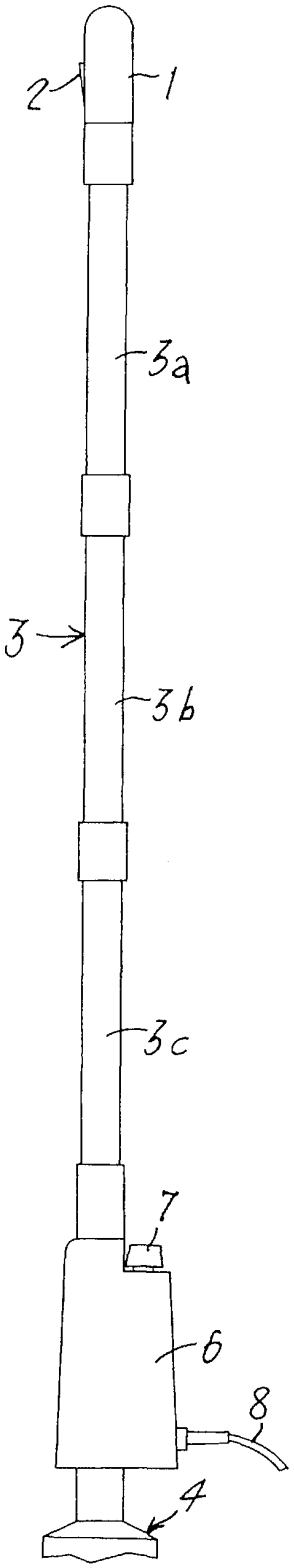

Fig. 7c

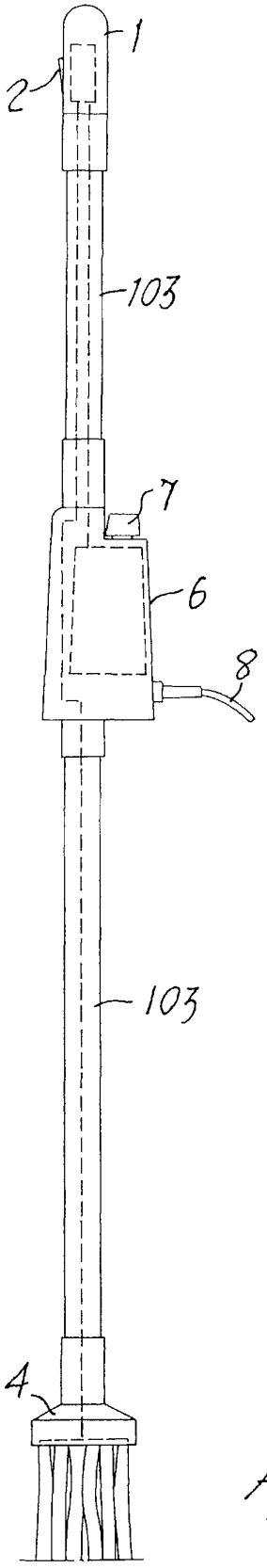

Fig. 8a

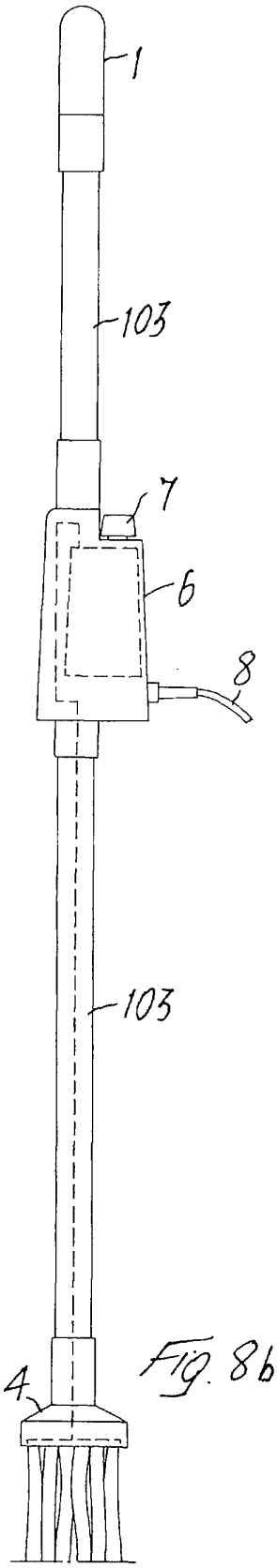

Fig. 8b

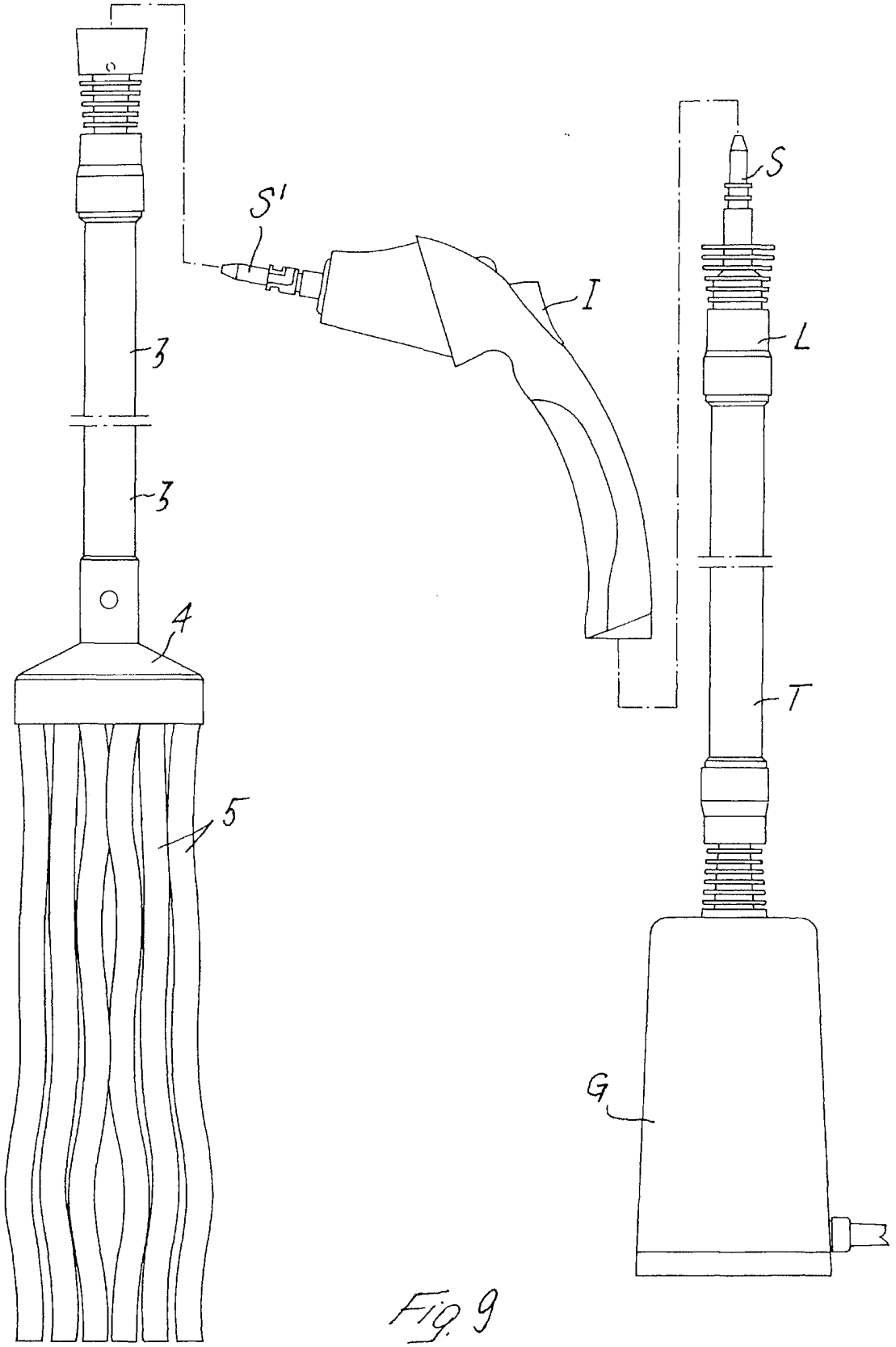

Fig. 9

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EUROPEAN SEARCH REPORT

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EP 06 10 0418

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Place of search	Date of completion of the search	Examiner
The Hague	24 May 2006	CONTRERAS APARICIO

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