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(54) **Portable electric cleaning device**

(57) The present invention relates to a portable electric cleaning device (10, 100, 200) for cleaning various household items. The cleaning device (10, 100, 200) comprises a housing (20), a motor (30), a cleaning module (50, 120), and a battery set (60). The housing (20) has a handle (22, 130, 230) and a chassis (24, 110, 210). The motor (30) is installed in the chassis (24, 110, 210) of the housing (20) and comprises a rotating axle (32, 38). The cleaning module (50, 120) has a cleaning head (54, 300, 400, 500, 600, 700, 800, 900, 1000) for cleaning various home appliances and home environments, and a connecting end (52) installed on the rotating axle (32, 38). The battery set (60) is installed in the housing (20) for driving the motor (30) so as to rotate the cleaning module (50, 120).

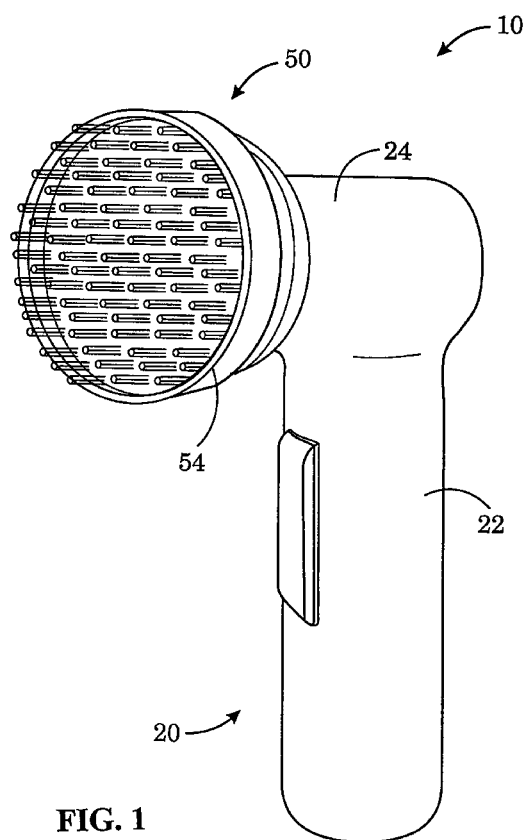


FIG. 1

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Description

[0001] The present invention relates to a portable electric cleaning device according to the pre-characterizing portion of claim 1.

[0002] Grease, dust and dirt relentlessly collected on the floor, walls and ceiling of a kitchen or bathroom make household cleaning a non-ending tiresome chore. New chemical detergents for cleaning different household items such as toilets, bathtubs, kitchen appliances or furniture are constantly coming on the market but they are only as effective as the cleaning devices with which they are used.

[0003] Most cleaning equipment on the market today such as mops, brushes and scouring pads require a high level of energy expenditure, requiring the user to clean the respective appliances by hand. This not only requires an inordinate amount of time but also is ineffective as in this way the user cannot thoroughly clean the appliances. Furthermore, continued use of such devices may lead to health problems of the waist and back.

[0004] Portable electric cleaning devices of the kind specified in the pre-characterizing portion of claim 1 are on the market in the form of portable vacuum cleaners, but these are suitable only to collect loosely occurring dust or the like.

[0005] With these problems in mind, the present invention aims at providing a portable electric cleaning device for facilitating all kinds of brushing, scrubbing or scouring work normally occurring in a household in an attempt to remove dirt.

[0006] This is achieved by the present invention as claimed in claim 1. In that the portable electric cleaning device of the present invention comprises a cleaning module having a rotatable cleaning head it is possible to perform all kinds of brushing, scrubbing, scouring and even polishing work occurring in a household with ease.

[0007] In the following, the invention is illustrated by way of examples with reference to the accompanying drawings, in which

Fig.1 is a perspective view of an electric cleaning device according to the present invention,

Fig.2 is a component diagram of the cleaning device of Fig.1

Fig.3 shows an alternate cleaning device with its cleaning module and motor directly connected by male and female screw threading,

Fig.4 is a sectional view of an electric cleaning device with a loop-shaped handle according to the present invention,

Fig.5 is a sectional view of an electric cleaning device with a stick-shaped handle according to the present invention,

Fig.6 is a top view of an electric cleaning device with a tiltably mounted chassis according to the present invention,

Fig.7 is a side view of the electric cleaning device with a tiltably mounted chassis of Fig.6,

Figs.8 and 9 show a first embodiment of the cleaning head according to the present invention,

Figs.10 and 11 show a second embodiment of the cleaning head according to the present invention,

Figs. 12 to 15 show a third embodiment of the cleaning head according to the present invention,

Fig. 16 shows a fourth embodiment of the cleaning head according to the present invention,

Fig.17 shows a fifth embodiment of the cleaning head according to the present invention, and

Figs.18 to 20 show other embodiments of the cleaning head according to the present invention.

[0008] Please refer to Figs.1 and 2. Fig.1 is a perspective view of an electric cleaning device 10 according to the present invention. Fig.2 is a component diagram of the cleaning device 10. The electric cleaning device 10 comprises a housing 20 having a handle 22 and a chassis 24, a direct current motor 30 installed in the chassis 24 of the housing 20, a rotating axle 32 protruding from a center portion of a front surface of the motor 30, a motor case 34 for fixing the motor 30 in the chassis 24, a cleaning module 50 installed on the rotating axle 32 through a transmission element 40 for cleaning various home appliances and environment, a transmission element 40 installed between the rotating axle 32 and the cleaning module 50 and mounted on the rotating axle 32 so that the motor 30 can use the transmission element 40 to rotate the cleaning module 50, an elastic device 70 elastically installed between the cleaning module 50 and the transmission element 40, and a battery set 60 installed inside the handle 22 for driving the motor 30 so as to rotate the cleaning module 50. The battery set 60 comprises a plurality of dry batteries or rechargeable batteries. The rear side of the cleaning module 50 comprises a connecting end 52 which can be directly attached to or detached from the transmission element 40. The front side of the cleaning module 50 comprises a cleaning head 54 for cleaning various home appliances. The cleaning module 50 may be attached to a wide variety of cleaning heads 54 as well as a host of other cleaning tools.

[0009] The transmission element 40 comprises a protruded edge 42, a base plate 44 with openings, and a square shaped protruded bar 46. The connecting end 52 of the cleaning module 50 comprises a plurality of elastic hooks for engaging the protruded edge 42 of the transmission element 40, and a square shaped slot 58 for insertion of the protruded bar 46 which drives the device. The elastic hooks at the connecting end 52 comprise elastic material and enable a user to directly attach the connecting end 52 of the cleaning module 50 to the transmission element 40 by hand. When the elastic hooks of the connecting end 52 are secured by the protruded edge 42, the cleaning module 50 can make slight movements relative to the transmission element

40 along an axial direction. The connecting end 52 of the cleaning module 50 can also be detached from the protruded edge 42 directly by hand.

[0010] The elastic device 70 comprises a spring 74 installed within a buffer cap 72. The rear end of the buffer cap 72 is hooked onto the base plate 44 of the transmission element 40. When the connecting end 52 of the cleaning module 50 is attached to the protruded edge 42, the connecting end 52 will be pushed against the front end of the buffer cap 72. The elastic device 70 will elastically push the elastic hooks of the connecting end 52 toward the protruded edge 42 to firmly secure the cleaning module 50 and to provide an elastic force that can prevent damage to the appliance during cleaning. Moreover, it will enhance control of the cleaning device 10 and prevent damage to the motor 30 caused by repetitive collisions.

[0011] The electric cleaning device 10 further comprises a metallic ring 80 installed on a matched opening 26 of the housing 20 between the matched opening 26 and the cleaning module 50. When the connecting end 52 of the cleaning module 50 is installed on the transmission element 40, the end of the connecting end 52 close to the cleaning head 54 of the cleaning module 50 can be fitted with another metallic ring 56 for rotatably engaging with the metallic ring 80 of the matched opening 26. The metallic ring 80 can reduce the friction generated during rotation of the cleaning module 50, and prevent wobbling of the cleaning module 50.

[0012] Please refer to Fig.3. Fig.3 shows an alternate cleaning device with its cleaning module 50 and motor 30 directly connected by male and female screw threading 36. When the connecting end 52 of the cleaning module 50 and the rotating axle 38 are installed with corresponding male and female screw threading 36, the cleaning module 50 can be directly installed on the rotating axle 38 of the motor 30, and different cleaning modules 50 can be attached to or detached from the rotating axle 38. However, the screw threading has to be made along a direction opposite to the movement direction of the cleaning module when driven by the motor to prevent loosening of the cleaning module 50. Furthermore, the connecting end 52 of the cleaning module 50 can be connected with the rotating axle 38 by way of riveting, welding or joggling.

[0013] The electric cleaning device 10 can be provided with different handles 22 to satisfy different demands. Please refer to Figs.4 and 5. Figs. 4 and 5 are sectional views of other electric cleaning devices 100, 200 according to the present invention. The electric cleaning devices 100, 200 differ from the electric cleaning device 10 in the shapes of the handle and chassis of the housing 20. The electric cleaning device 10 shown in Fig.1 is used for general cleaning of home appliances, thus the handle 22 and the rotating axle 32 are nearly perpendicular, and the handle 22 is relatively short enabling the user to easily hold the handle 22 during cleaning. However, the handle 22 and the rotating

axle 32 can also be designed to form an obtuse or acute angle depending on different cleaning needs. The housing of the electric cleaning device 100 in Fig.4 comprises a handle 130 and a loop- or bow-shaped chassis 110 with a front end and a rear end. The cleaning module 120 is positioned at the front end of the chassis 110. The handle 130 is a loop-shaped handle fixed on the rear end of the chassis 110 so that a user can easily hold the loop-shaped handle 130 for cleaning objects with greater surface area or requiring greater manpower. The housing of the electric cleaning device 200 in Fig.5 comprises a stick-shaped handle 230. The stick-shaped handle 230 can be manufactured in various lengths and can be made extensible. It is fixed on the chassis 210 at a predetermined oblique angle so that a user can easily hold the handle 230 for cleaning items such as toilets, ceilings, or household items in hard to reach places. The handle 230 can also be adjustable for changing its working angle.

[0014] The chassis of the electric cleaning device according to the present invention can also be designed tiltably mounted on the handle. Please refer to Figs.6 and 7. Fig. 6 is a top view of an electric cleaning device with a tiltably mounted chassis. Fig.7 is a side view of the cleaning device in Fig.6. The chassis 210 and the handle 230 of the stick-shaped electric cleaning device 200 in Fig.5 can be installed in a tiltable manner as shown in Figs.6 and 7. The chassis 210 and the handle 230 are interconnected by a connecting rod 240, and fastened or released through the use of a winged screw 250 so that the chassis 210 and the handle 230 can be adjusted to various angles.

[0015] Please refer to Figs.8 to 20. Figs.8 and 9 show a first embodiment of the cleaning head 300 according to the present invention. Figs.10 and 11 show a second embodiment of the cleaning head 400 according to the present invention. Figs. 12 to 15 show a third embodiment of the cleaning head 500 according to the present invention. Fig.16 shows a fourth embodiment of the cleaning head 600 according to the present invention. Fig.17 shows a fifth embodiment of the cleaning head 700 according to the present invention. Figs.18 to 20 show other embodiments of the cleaning heads 800, 900, 1000 according to the present invention. The cleaning head of the electric cleaning device comprises a variety of selections to comply with various cleaning requirements. The cleaning head 300 of Figs.8 and 9 is a circular shaped cleaning head 300. It comprises brushes 350 installed on its front side, and a plurality of cloth fasteners 310 installed on its rear side for fixing thin cleaning material 320 such as a cotton cloth or emery cloth. Each of the cloth fasteners 310 comprises a plurality of elastic plates 330 with narrow openings 340 between them for clamping the cleaning material 320 on the cleaning head 300. Please refer to the cleaning head 400 in Figs.10 and 11. As shown in Fig.11, in addition to the brushes 410, the cleaning head 400 also comprises a plurality of narrow openings 420 for fixing

thin cleaning material 430 onto the cleaning head 400. Please refer to the cleaning head 500 in Figs.12 to 15. Except for brushes 510, the cleaning head 500 comprises a plurality of grooves 520 forming a gear-wheel shaped edge 530 for engaging and rotating cleaning material 540 such as a scouring pad. The cleaning material 540 can be made with an indented central portion and a gear-wheel shaped inner edge 550. When the cleaning material 540 is attached to the cleaning head 500, the inner edge 550 is engaged with the gear-wheel shaped edge to secure the cleaning material 540. Fig.15 is a side view of the cleaning material 540. Fig.16 shows a stick-shaped cleaning head 600. It comprises a stick-shaped brush 610 for cleaning items such as glass bottles or milk bottles. Fig.17 shows a crowned cleaning head 700 comprising brushes 710 in a convex shape for cleaning bowl-shaped items such as bowls and bathtubs. The brushes 350, 410, 510, 610, 710 of the cleaning heads 300, 400, 500, 600, 700 can be directly replaced by items such as scouring pads, cotton cloths or emery cloths to form the cleaning heads 800, 900, 1000 as shown in Figs.18 to 20.

[0016] The electric cleaning device makes use of rotation of the electric cleaning head for cleaning thus requiring less manpower. The wireless design makes it light and portable. There is a wide selection of material in many shapes and sizes that can be attached to or detached from the cleaning device by hand thus offering the user a wide selection of different cleaning heads. In addition to the cleaning heads, there is also a wide variety of handles from which to choose that further increase the flexibility of the control of the cleaning device. Therefore, the portable electric cleaning device is specifically designed to solve various household cleaning problems.

Claims

1. A portable electric cleaning device (10; 100; 200) comprising:
 - a housing (20) having a handle (22; 130; 230) and a chassis (24; 110; 210),
 - an electric motor (30) installed in the chassis and having a rotating axle (32; 38),
 - and a battery set (60) installed in the housing (20) for feeding the motor (30),
 - characterized in that**
 - said electric cleaning device (10; 100; 200) further comprises a cleaning module (50; 120) having a rotatable cleaning head (54; 300; 400; 500; 600; 700; 800; 900; 1000) and a connecting end (52) connected to the rotating axle (32; 38) of the motor (30).
2. The cleaning device (10; 100; 200) of claim 1, wherein a transmission element (40) is installed between the rotating axle (32; 38) of the motor (30) and the cleaning module (50; 120), a first end of the transmission element being mounted on the rotating axle and a second end thereof being engaged with the cleaning module.
3. The cleaning device (10; 100; 200) of claim 1 or 2, wherein the connecting end (52) of the cleaning module (50; 120) is releasably attached to the rotating axle (32) of the motor (30) or, respectively, the second end of the transmission element (40).
4. The cleaning device (10; 100; 200) of claim 3, wherein the connection of the connecting end (52) of the cleaning module (50; 120) with the rotating axle (32) of the motor (30) or, respectively, the second end of the transmission element (40) is a snap fit connection.
5. The cleaning device (10; 100; 200) of claim 4 in combination with claim 2, wherein the transmission element (40), on its second end, comprises a protruded edge (42) and the connecting end (52) of the cleaning module (50; 120) comprises at least one elastic hook for engaging said protruded edge.
6. The cleaning device (10; 100; 200) of any one of the claims 1 to 3, wherein the connecting end (52) of the cleaning module (50; 120) is attached to the rotating axle (38) of the motor (30) or, respectively, the second end of the transmission element (40) by screw threading (36).
7. The cleaning device (10; 100; 200) of claim 1 or 2, wherein the connecting end (52) of the cleaning module (50; 120) is jointed to the rotating axle (32) of the motor (30) or, respectively, the second end of the transmission element (40) by riveting, welding or joggling.
8. The cleaning device (10; 100; 200) of any one of the preceding claims, wherein an elastic device (70) is installed between the connecting end (52) of the cleaning module (50; 120) and the rotating axle (32; 38) of the motor (30).
9. The cleaning device (10; 100; 200) of any one of the preceding claims, wherein the connecting end (52) of the cleaning module (50) is rotatably supported by a metallic ring (80) installed on the chassis (24; 110; 210) so as to avoid wobbling of the cleaning module (50; 120) during rotation.
10. The cleaning device (10; 100; 200) of any one of the preceding claims, wherein the handle (22; 130; 230) of the housing (20) and the rotating axle (32; 38) of the motor (30) extend in different directions.
11. The cleaning device (10; 200) of any one of the pre-

ceding claims, wherein the handle (22; 230) is stick-shaped.

12. The cleaning device (200) of claim 11, wherein the handle (230) is adjustably attached to the chassis (210) as regards its angular position. 5
13. The cleaning device (10; 200) of claim 11, wherein the handle (22; 230) is fixedly attached to the chassis (24; 210), the center lines thereof entrapping a right, obtuse or acute angle. 10
14. The cleaning device (200) of any one of the claims 11 to 13, wherein the handle (230) is extensible in length. 15
15. The cleaning device (10; 100; 200) of any one of the preceding claims, wherein the chassis (24; 110; 210) is of substantially circular shape, the cleaning module (50; 150) is positioned at one end of the chassis and the handle (22; 130; 230) extends from the opposite end. 20
16. The cleaning device (100) of claim 15, wherein the handle (130) is loop-shaped. 25
17. The cleaning device (10; 100; 200) of any one of the preceding claims, wherein the cleaning head (54; 300; 400; 500; 700; 800; 1000) is of a circular shape. 30
18. The cleaning device (10; 100; 200) of claim 17, wherein the cleaning head (700; 1000) is crowned at its face. 35
19. The cleaning device (10; 100; 200) of any one of the claims 1 to 16, wherein the cleaning head (600; 900) is stick-shaped. 40
20. The cleaning device (10; 100; 200) of any one of the preceding claims, wherein the cleaning head (54; 300; 400; 500; 600; 700) comprises a brush (350; 410; 510; 610; 710) 45
21. The cleaning device (10; 100; 200) of any one of the preceding claims, wherein the cleaning head (300; 400; 500) comprises a cleaning material in the form of scouring pads, cotton cloths or emery cloths. 50
22. The cleaning device (10; 100; 200) of claim 21, wherein the cleaning head (300; 400; 500) comprises at least one cleaning material fastener (310; 410; 530, 550) for fastening said cleaning material to said cleaning head. 55
23. The cleaning device (10; 100; 200) of claim 22, wherein said cleaning material fastener (310; 420;

530, 550) is in the form of a cloth fastener.

24. The cleaning device (10; 100; 200) of claim 23, wherein said cloth fastener comprises a plurality of elastic plates (330) or slots (420) for engaging said cleaning material.
25. The cleaning device (10; 100; 200) of claim 22, wherein said cleaning material fastener comprises a plurality of grooves (520) for engaging cleaning material (540) having a corresponding shape.
26. The cleaning device (10; 100; 200) of any one of the preceding claims, wherein the battery set (60) is positioned in the handle (22; 130; 230).
27. The cleaning device (10; 100; 200) of any one of the preceding claims, wherein the battery set (60) comprises at least one dry battery or rechargeable battery.

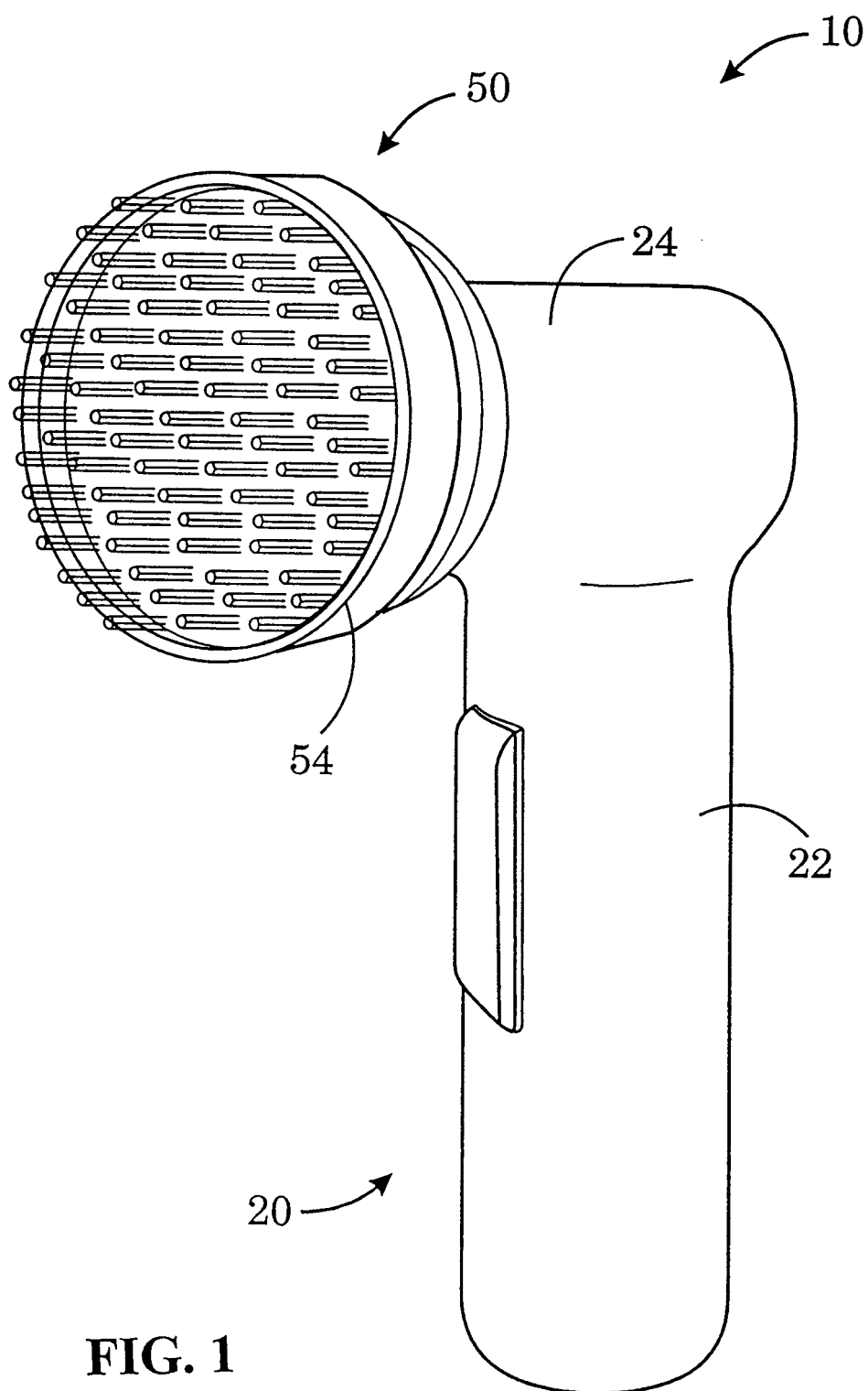


FIG. 1

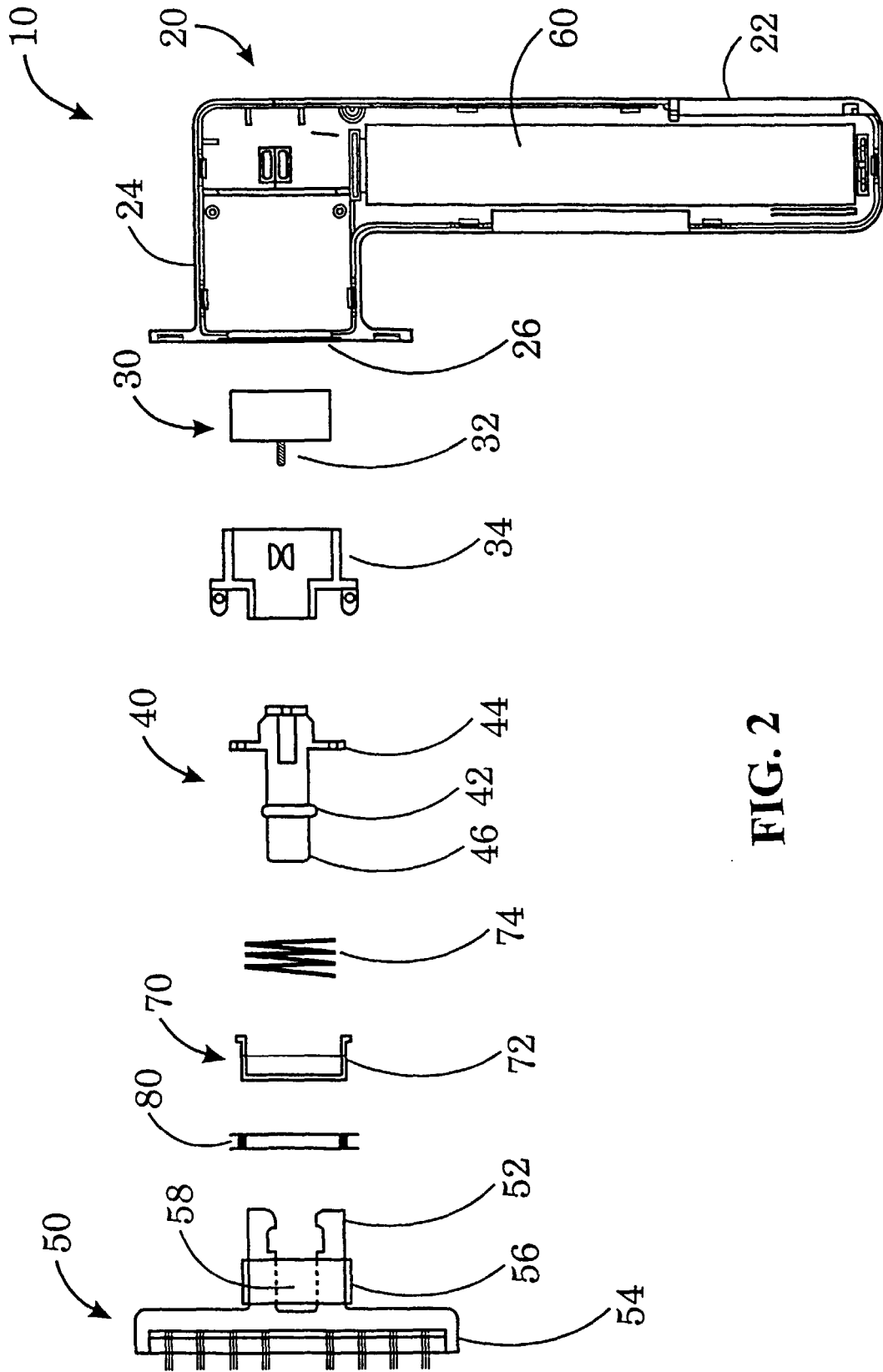


FIG. 2

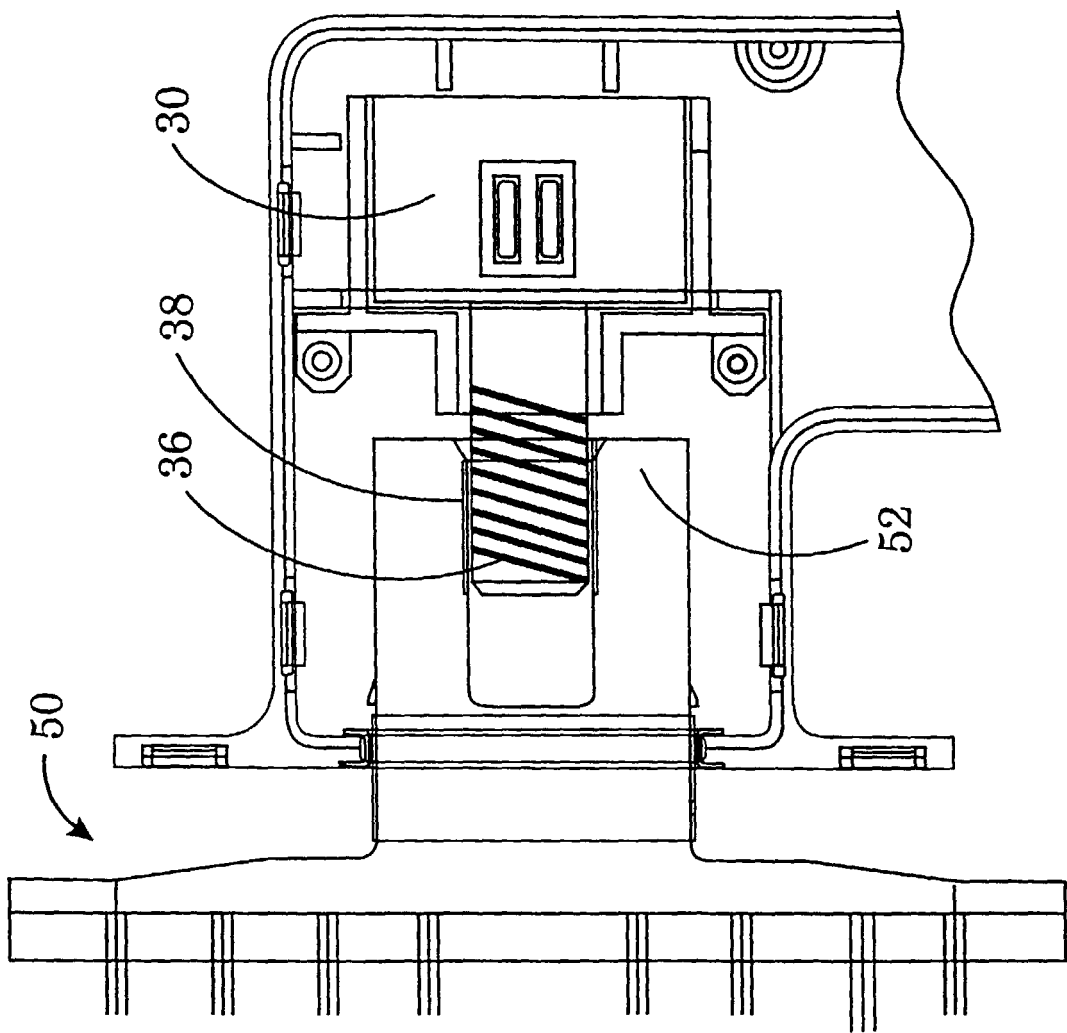


FIG. 3

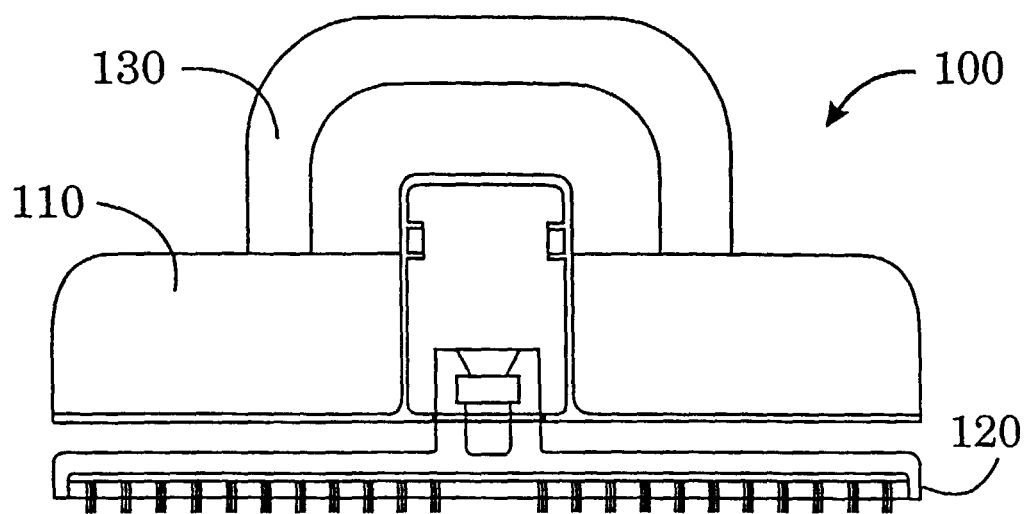


FIG. 4

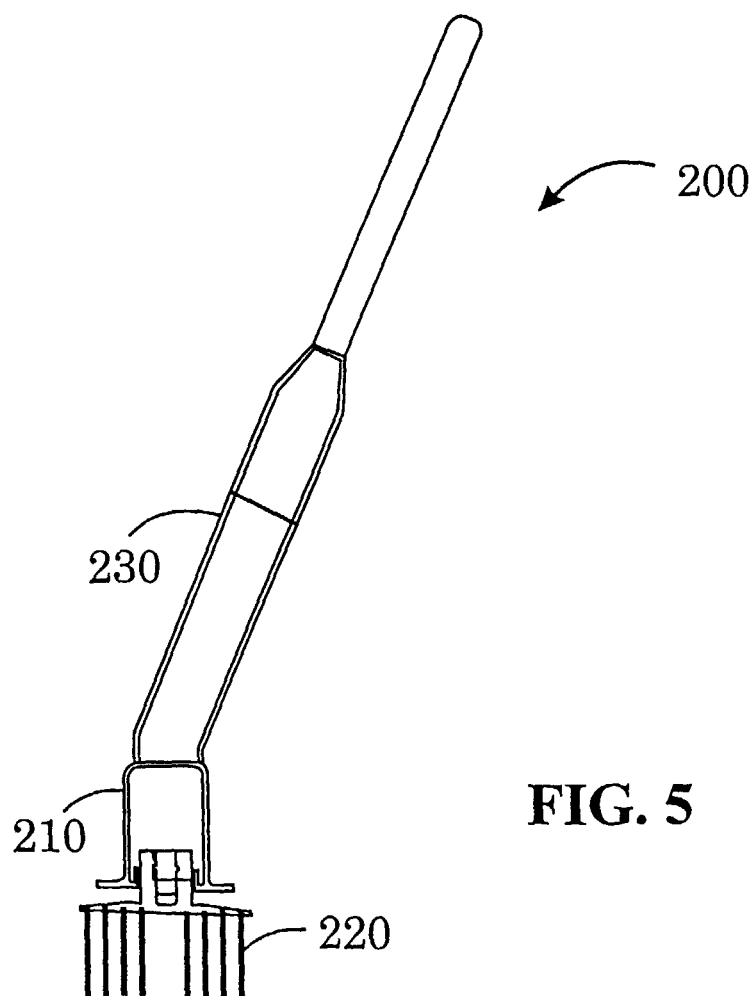
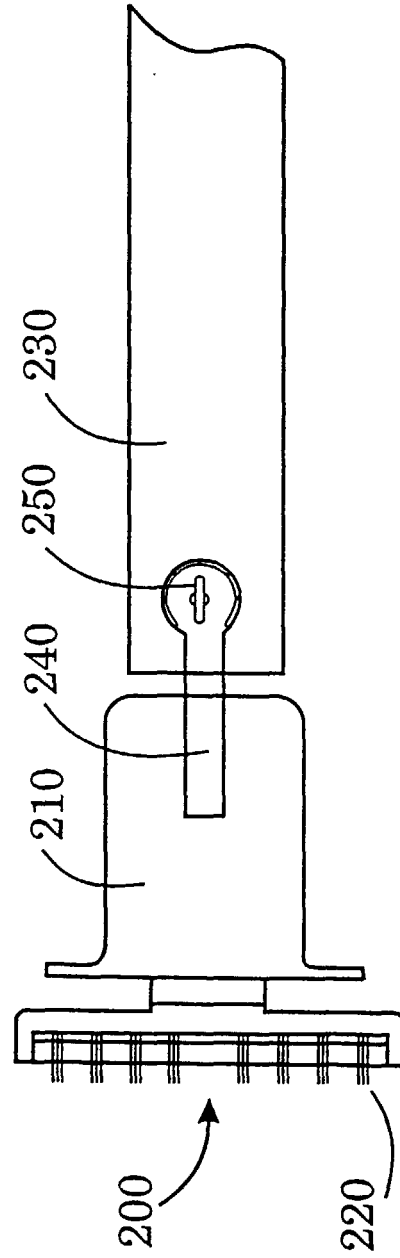
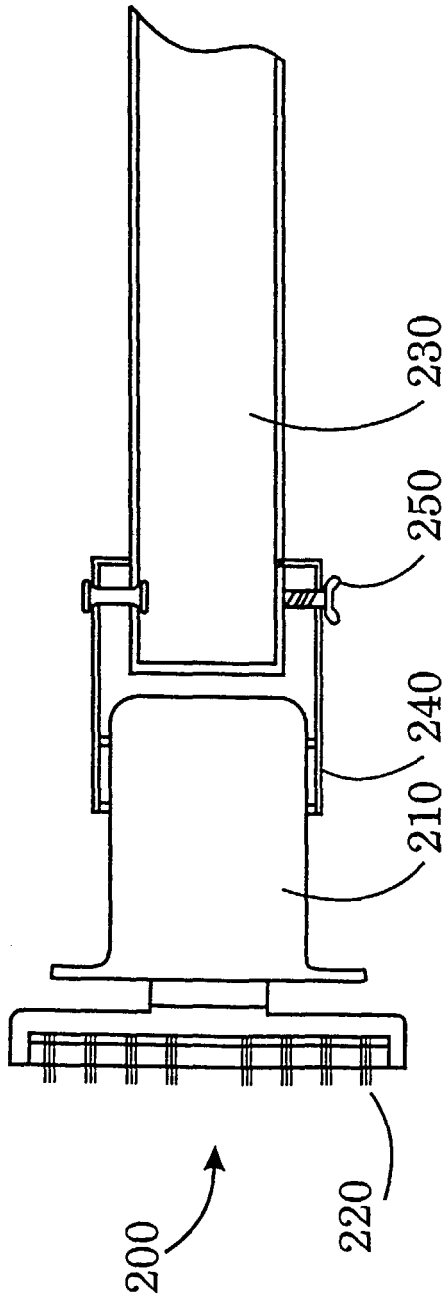


FIG. 5



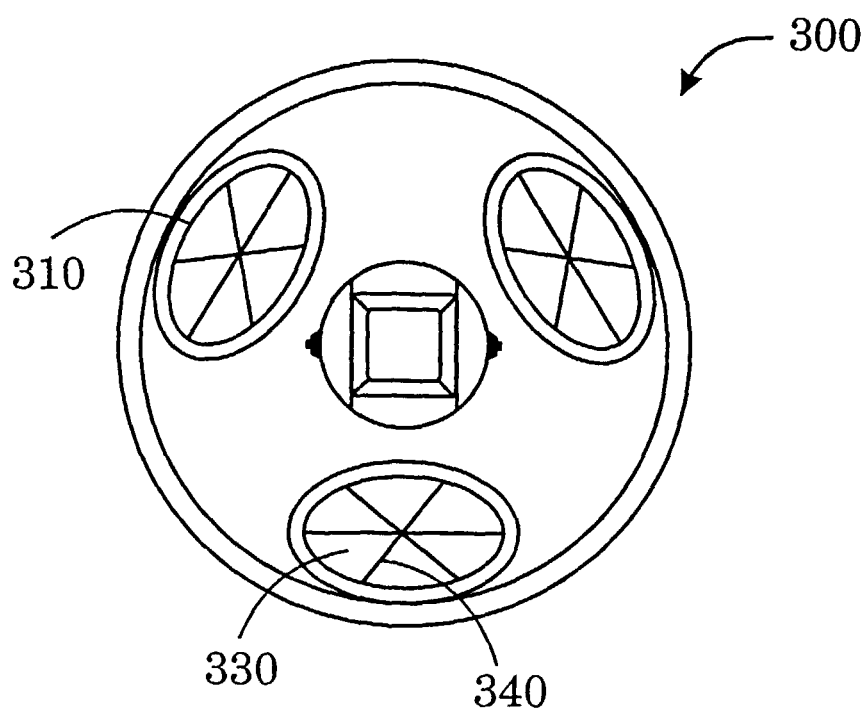


FIG. 8

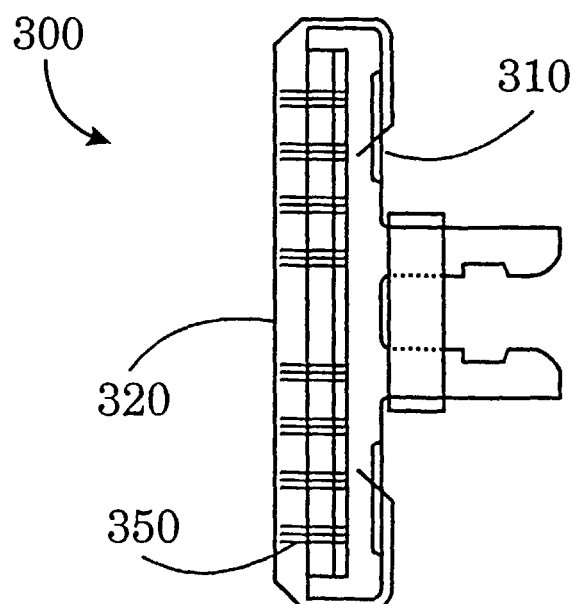


FIG. 9

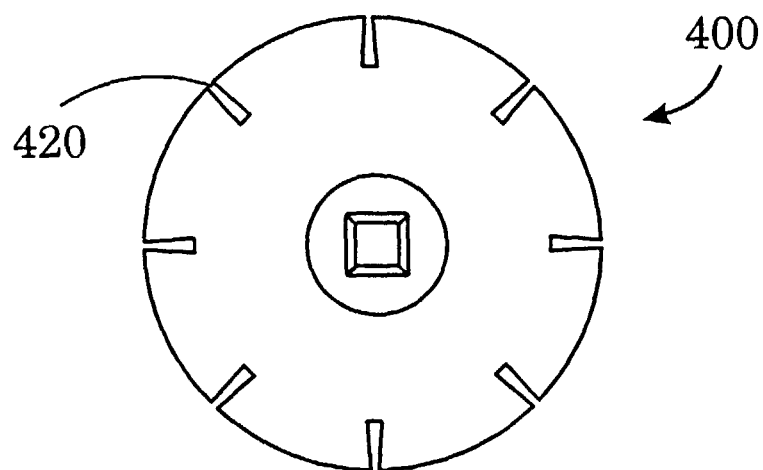


FIG. 10

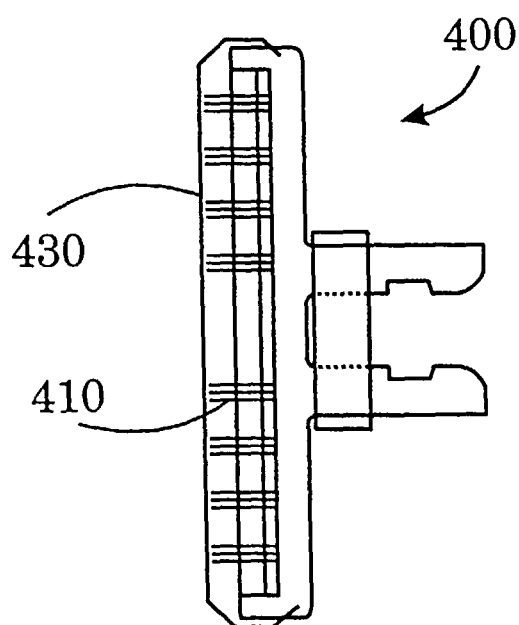
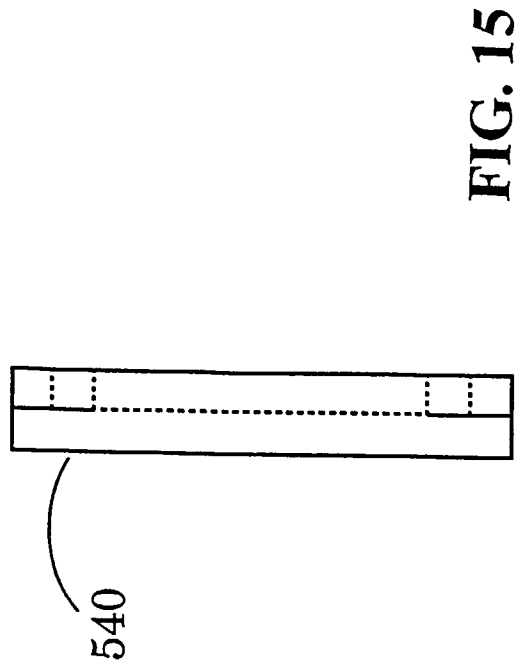
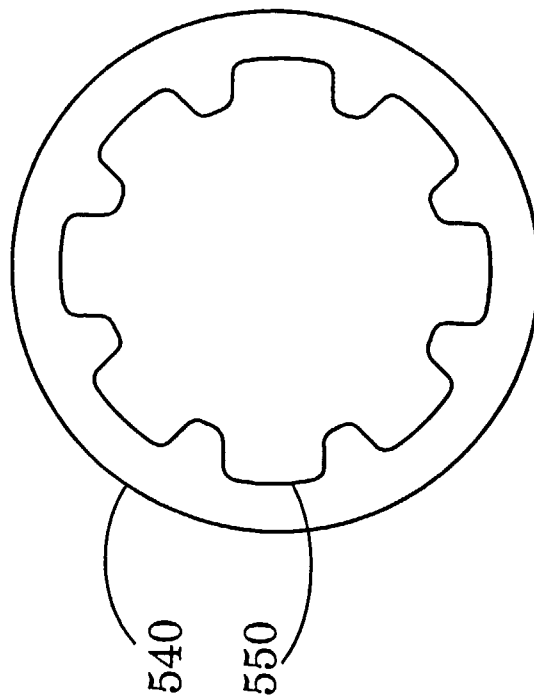
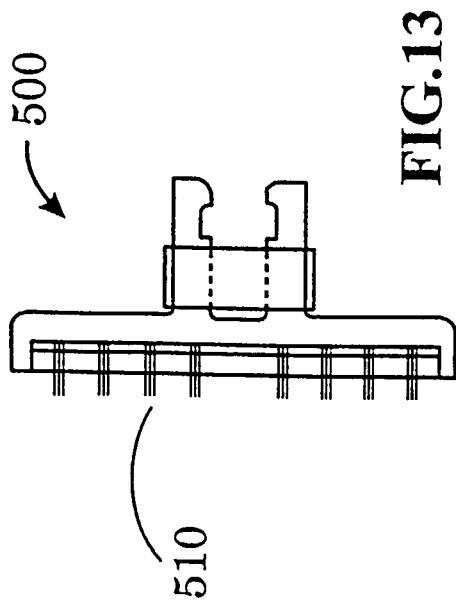
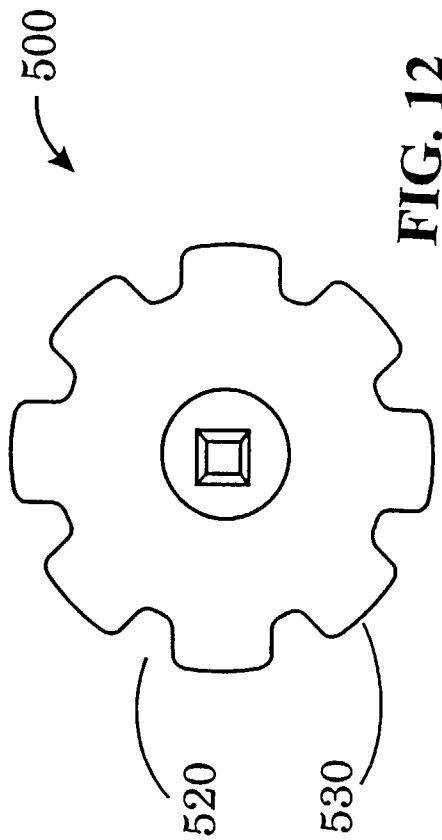


FIG. 11



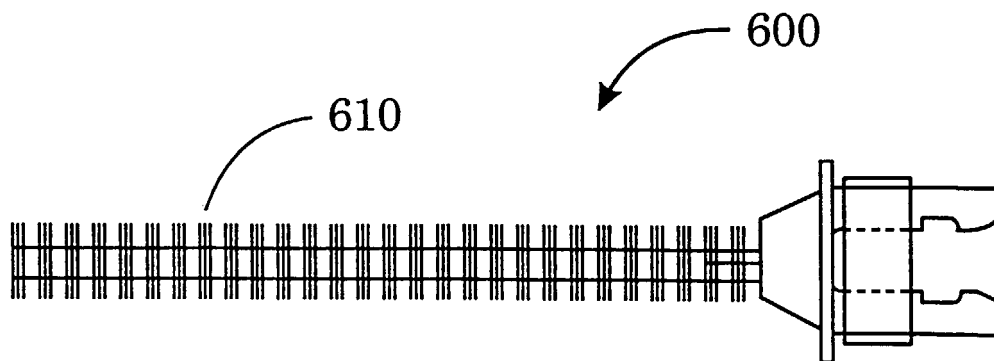


FIG. 16

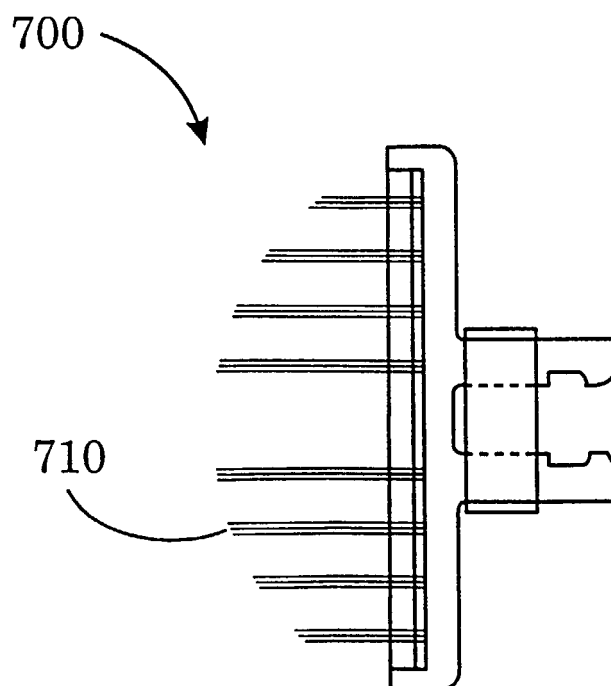


FIG. 17

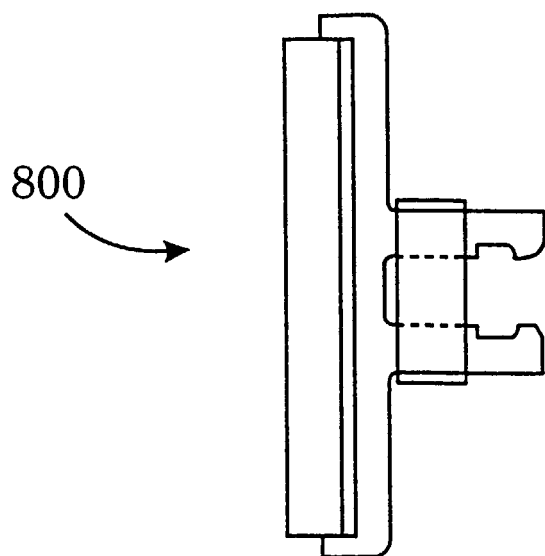


FIG. 18

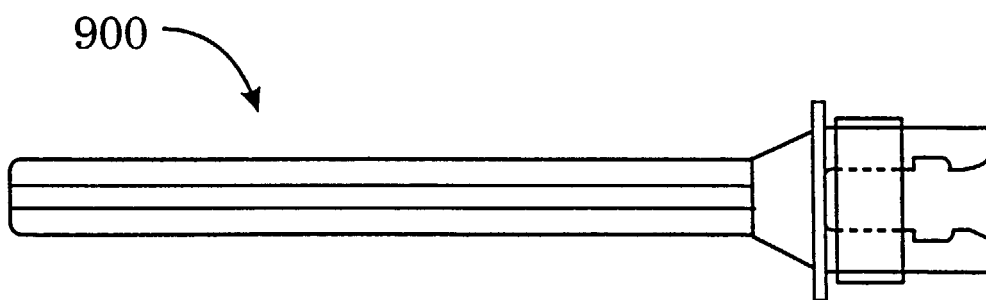


FIG. 19

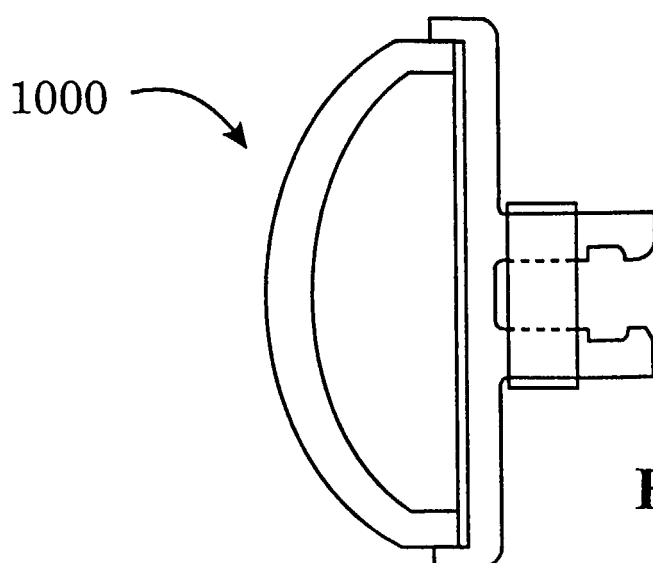


FIG. 20