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(54) **SELF-WRINGING FLAT MOP**

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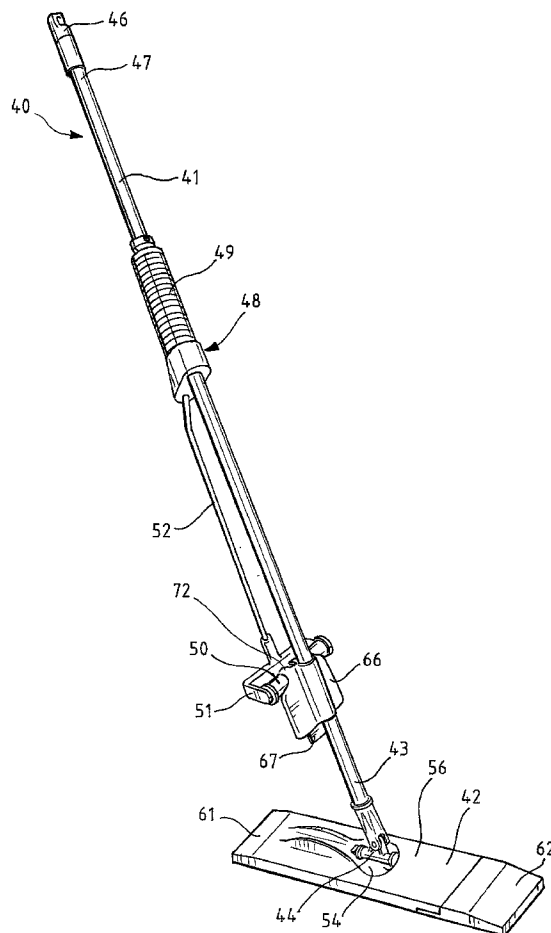
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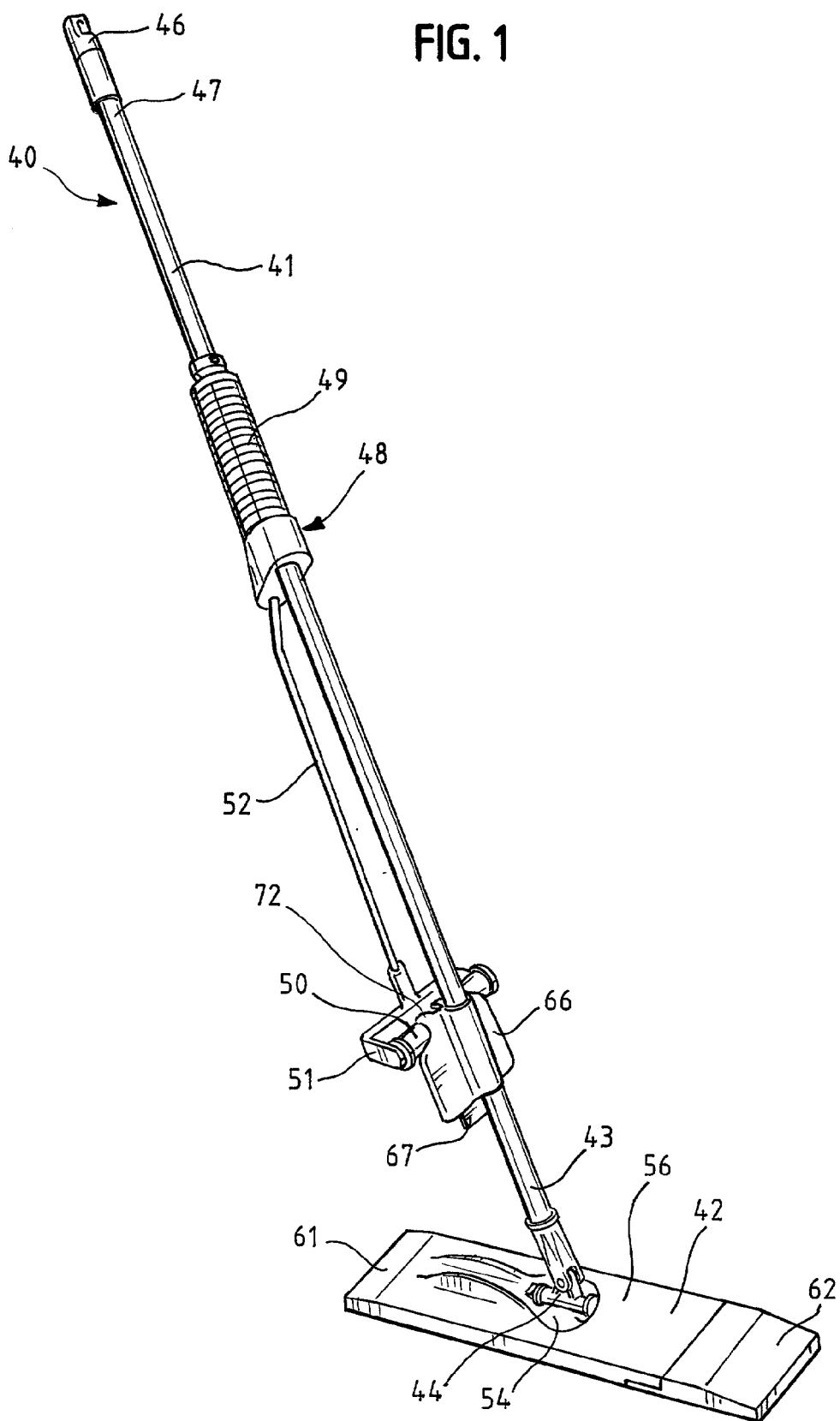
Related U.S. Application Data

(60) Provisional application No. 60/274,163, filed on Mar. 8, 2001.

(57) **ABSTRACT**

Disclosed is a self-wringing flat mop. The mop includes a shaft having an operator end and a cleaning end, a plate disposed at a cleaning end of the shaft and being pivotally connected thereto, and a wringing mechanism. A liquid absorbent member is disposed on the plate. The wringing mechanism includes a wringing handle that is disposed on a shaft and that is axially moveable with respect thereto, and a wringer connected to the wringing handle. When wringing the mop, the wringing handle is moved relative to the axis of the shaft to thereby move the wringer into a position wherein the wringer exerts a force on the plate compressing the liquid absorbent member between the plate and the wringer. The mop includes a retainer connected to the shaft for releasably retaining the plate in the wringing position.





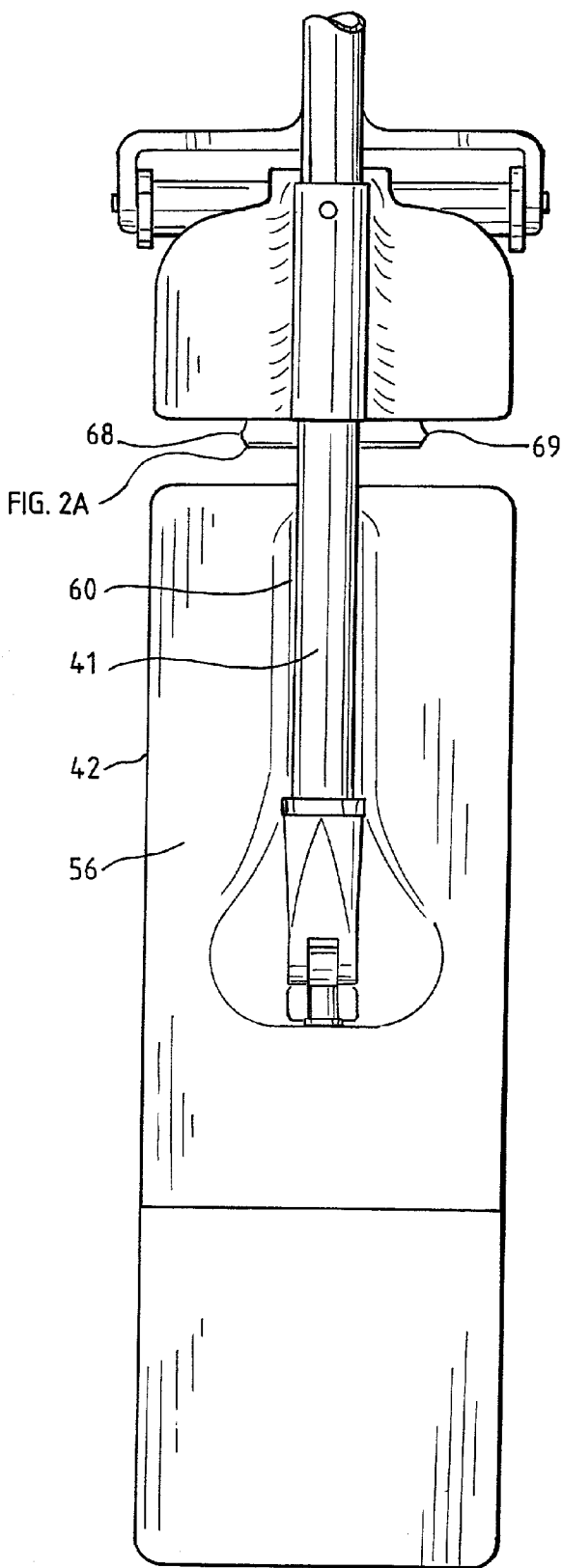
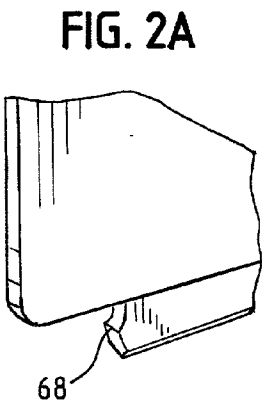
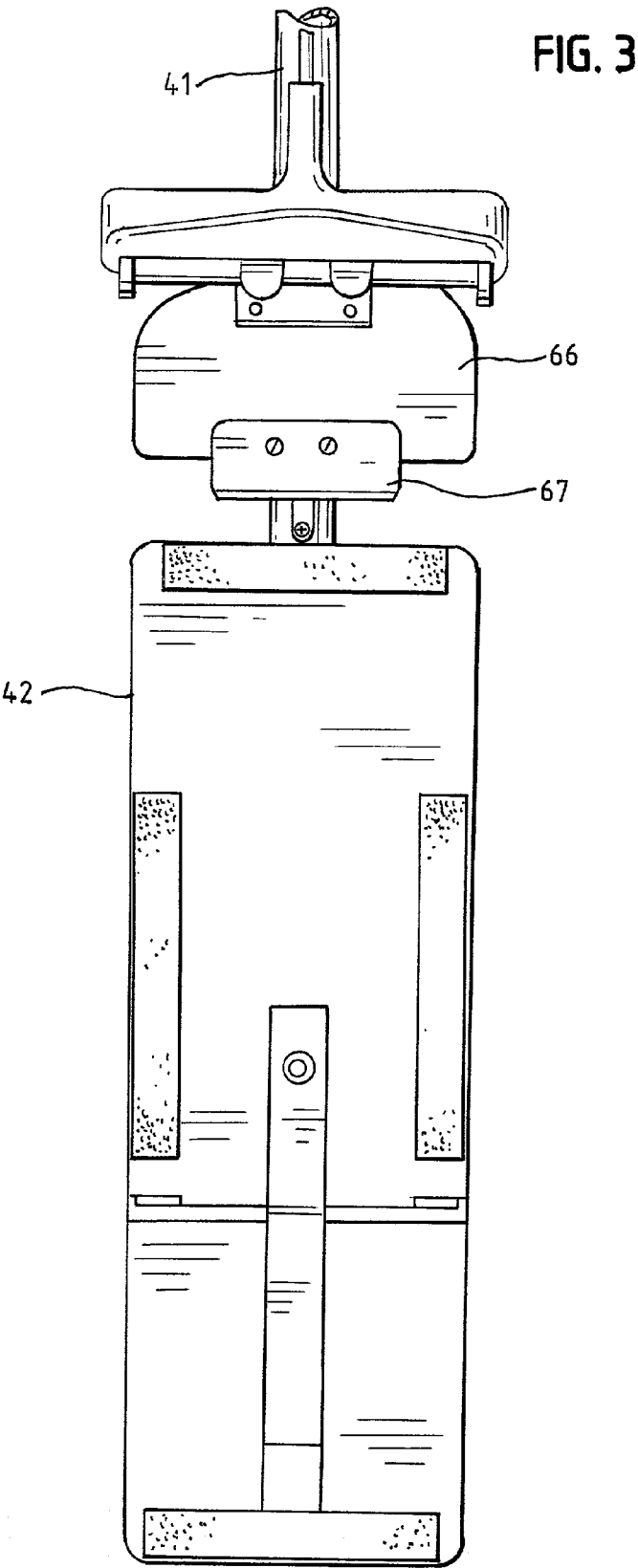


FIG. 2





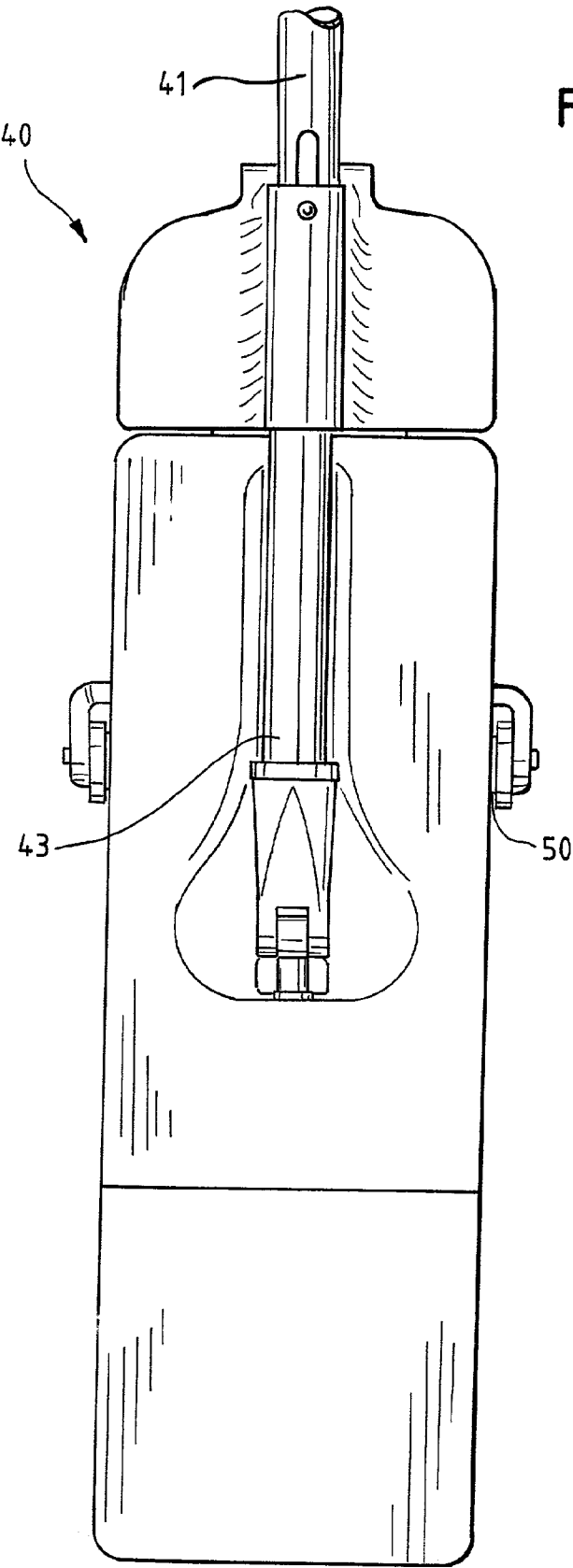


FIG. 4

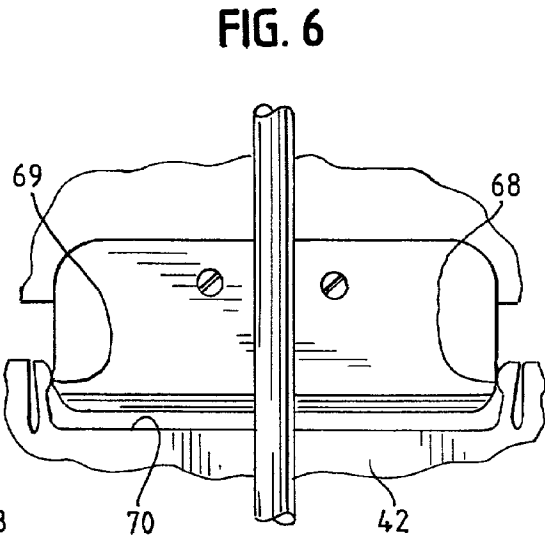
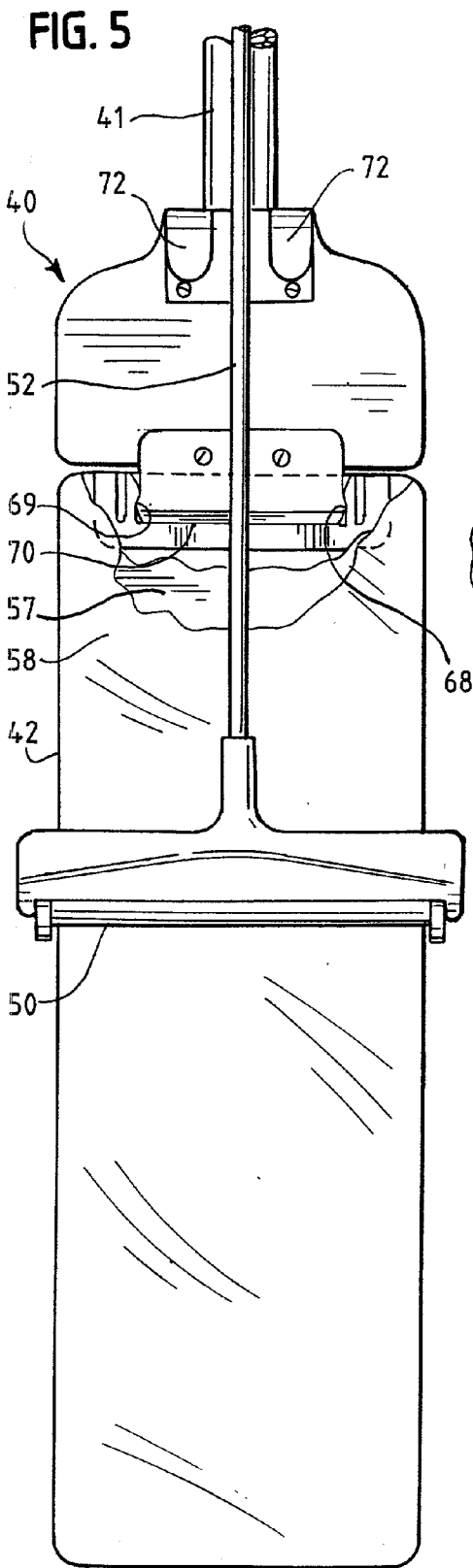
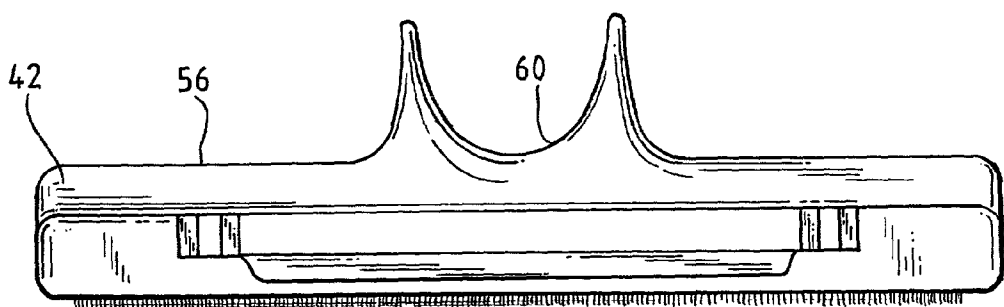


FIG. 7



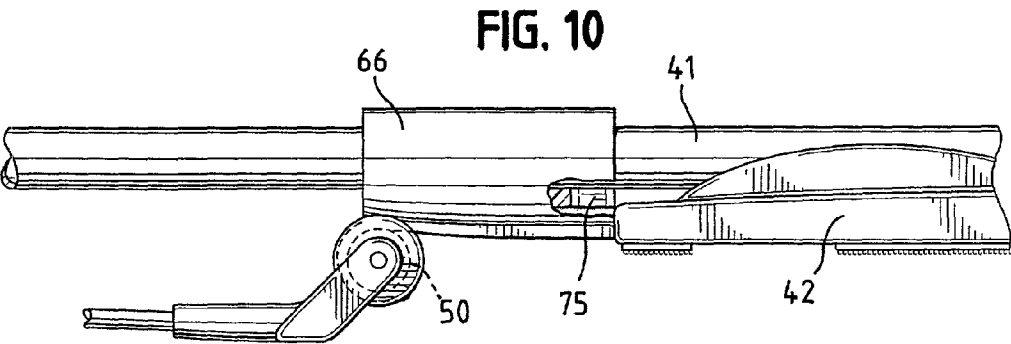
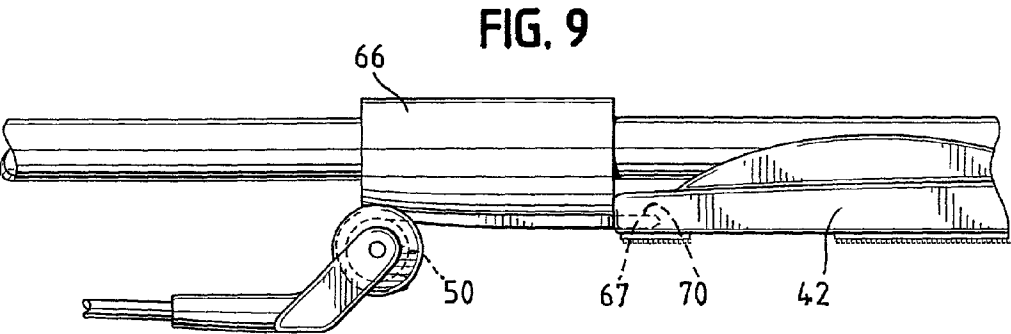
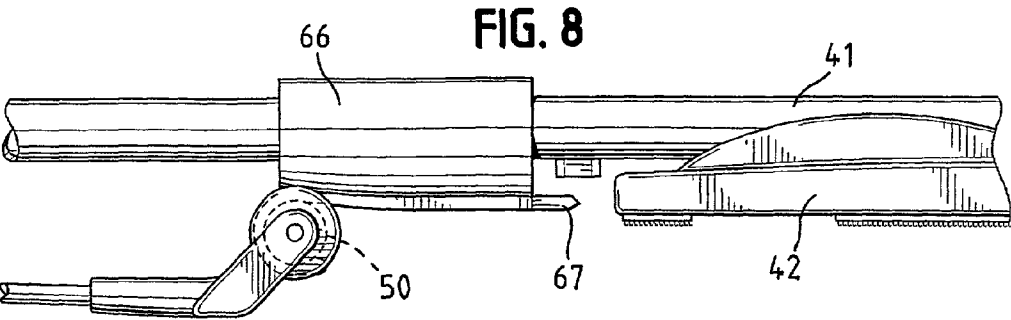


FIG. 11

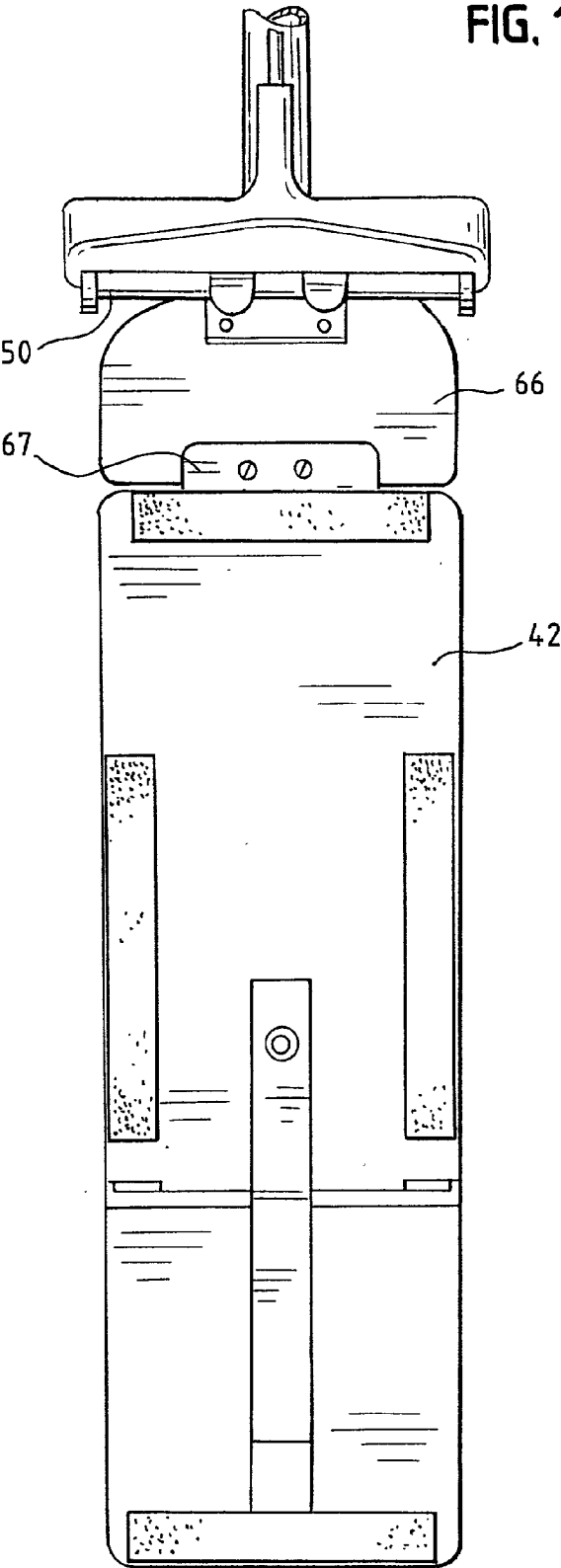
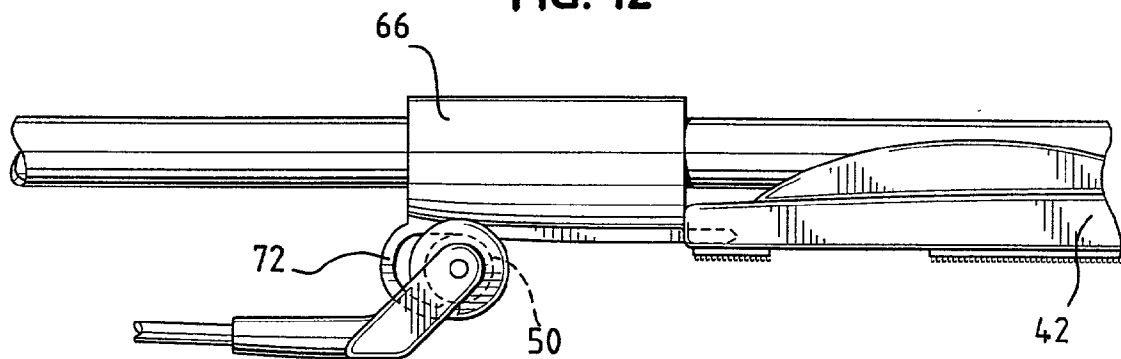


FIG. 12



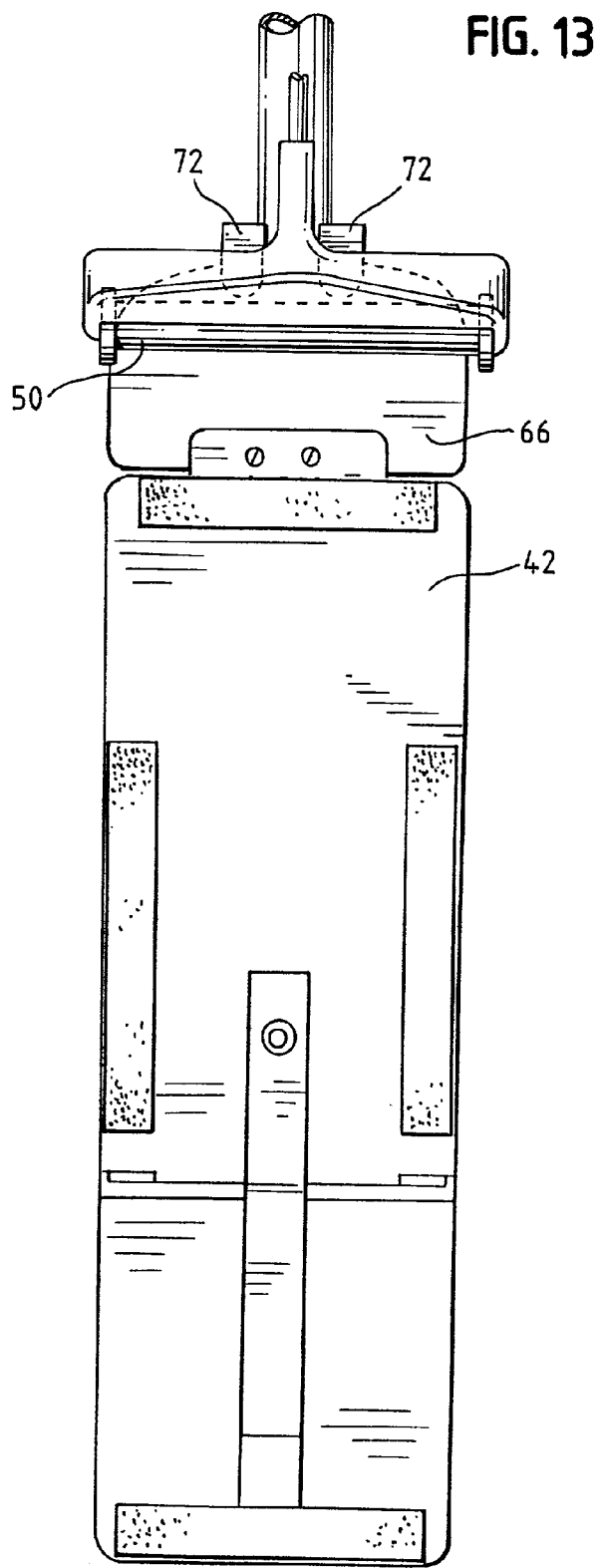


FIG. 13A

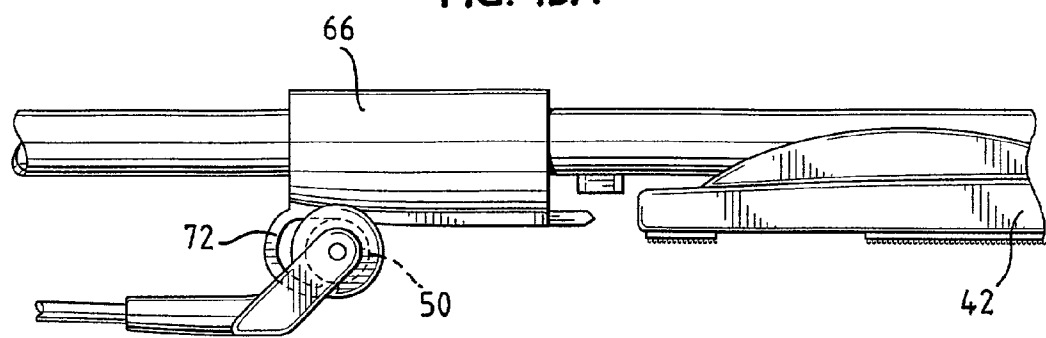


FIG. 14

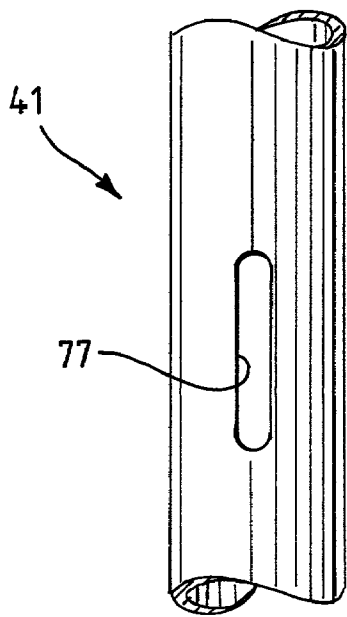


FIG. 15

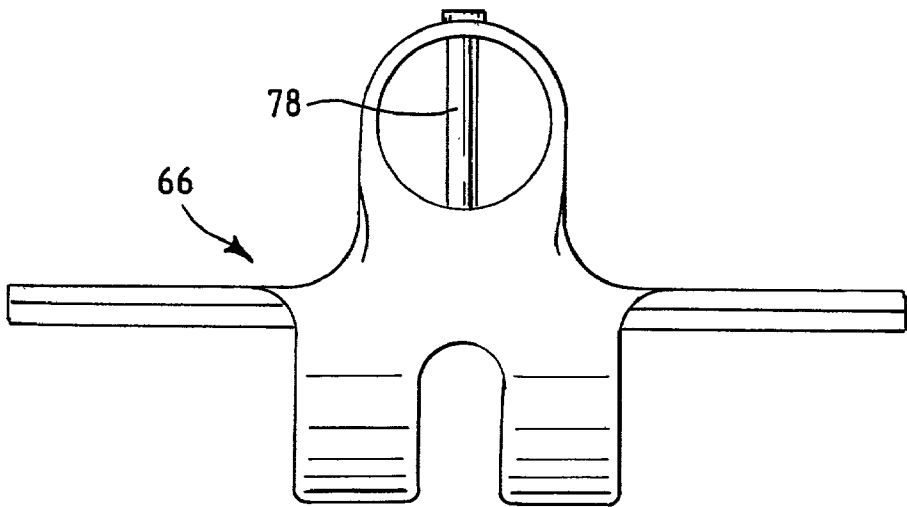


FIG. 16

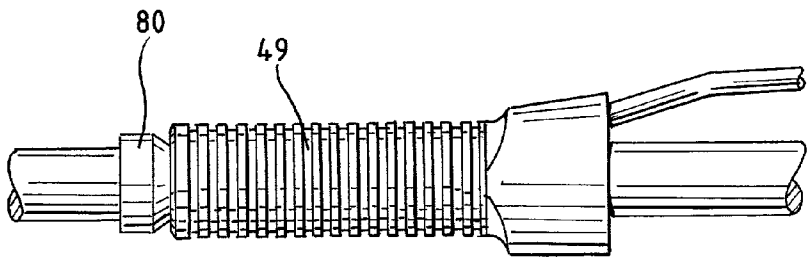


FIG. 17

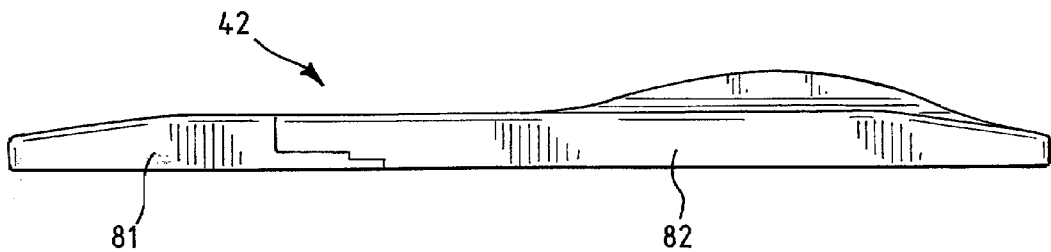


FIG. 18

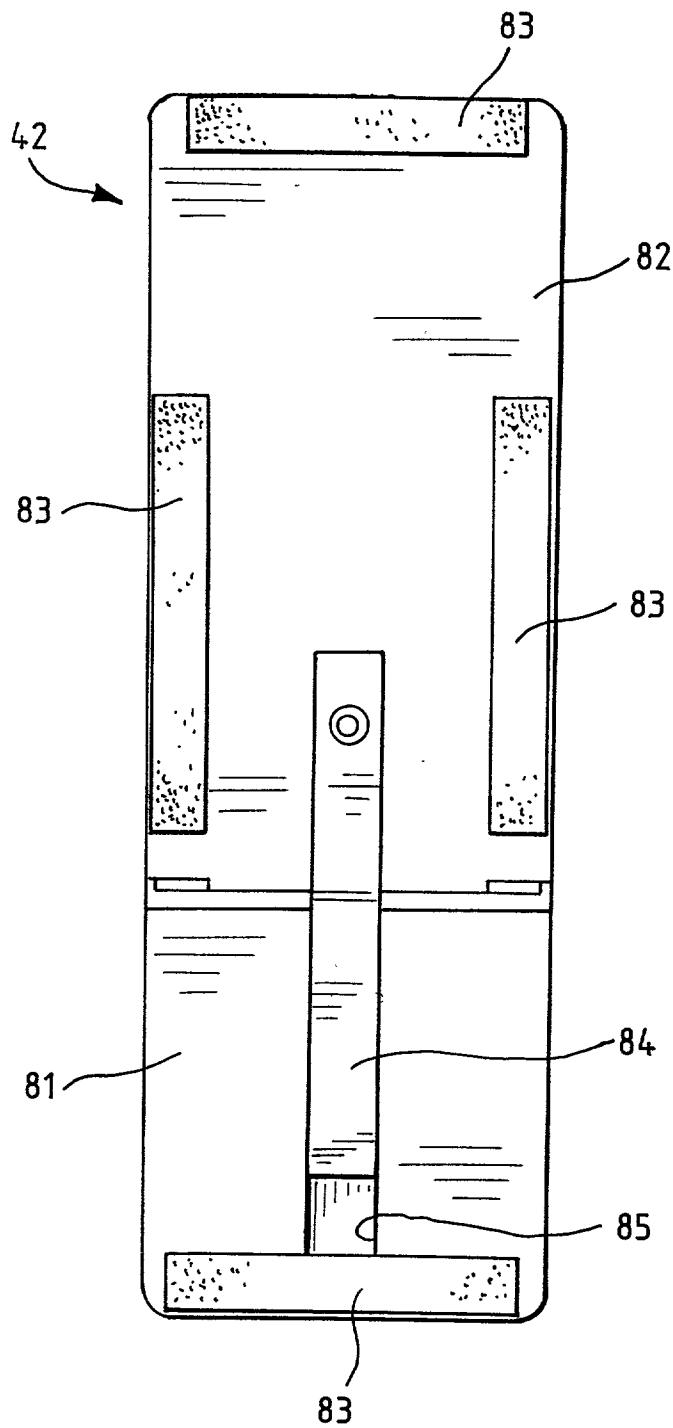


FIG. 19

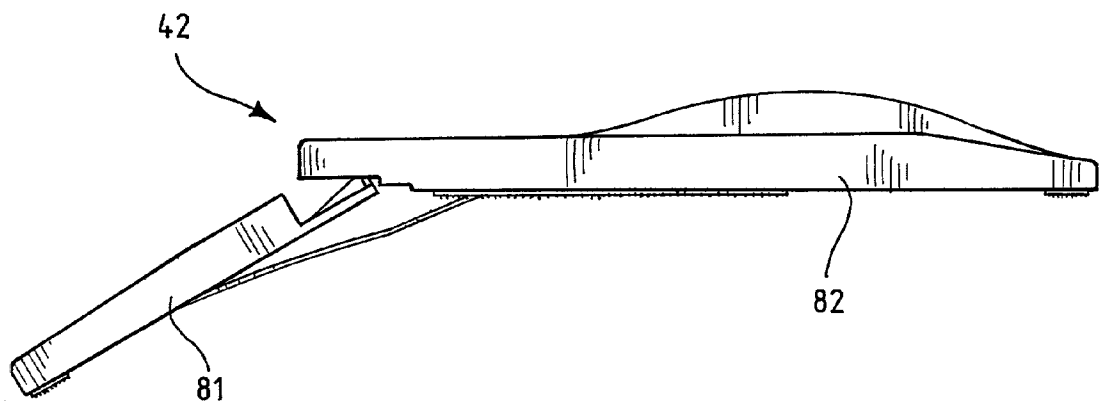


FIG. 20

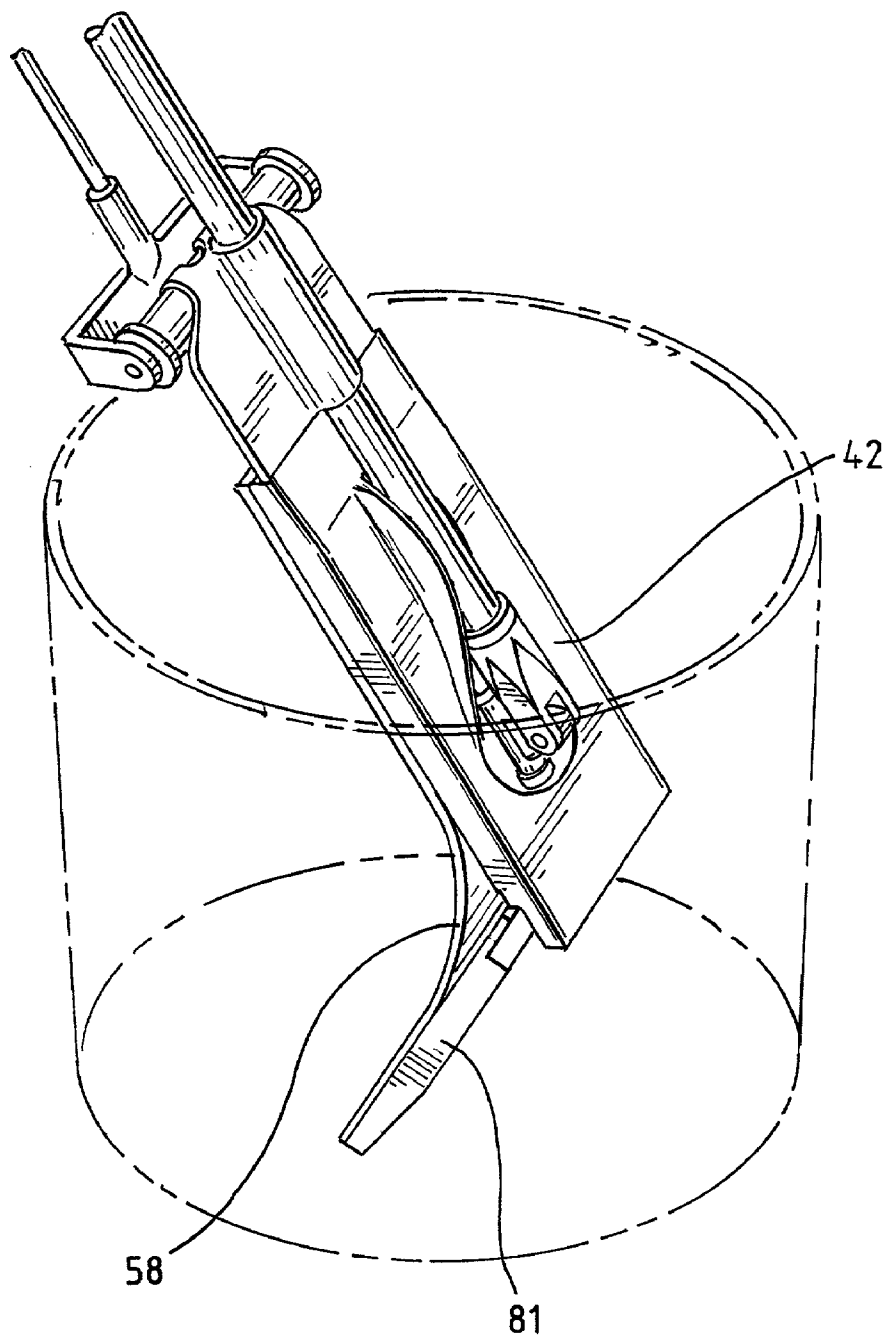


FIG. 21

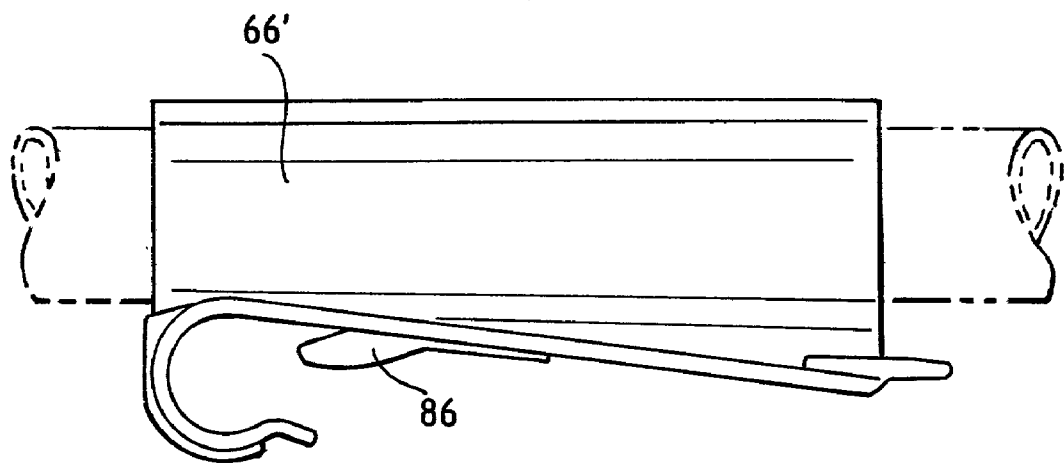


FIG. 22

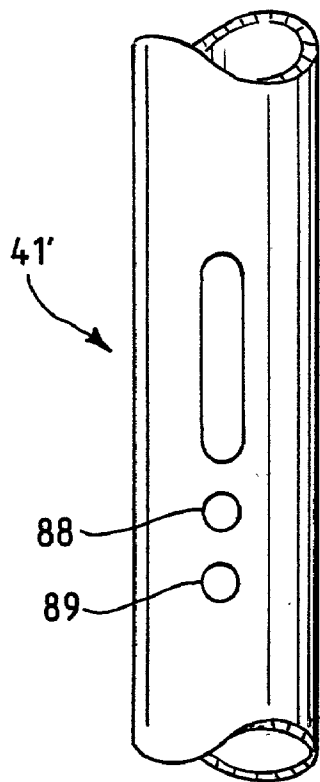


FIG. 23

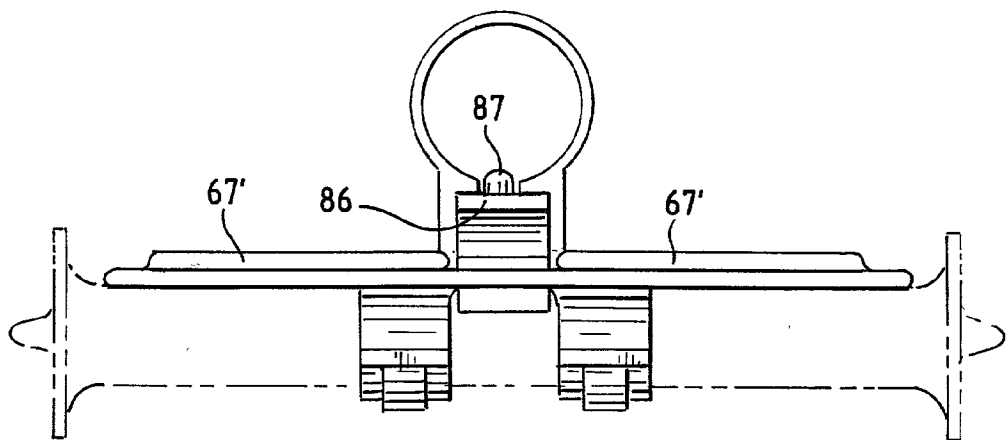


FIG. 24

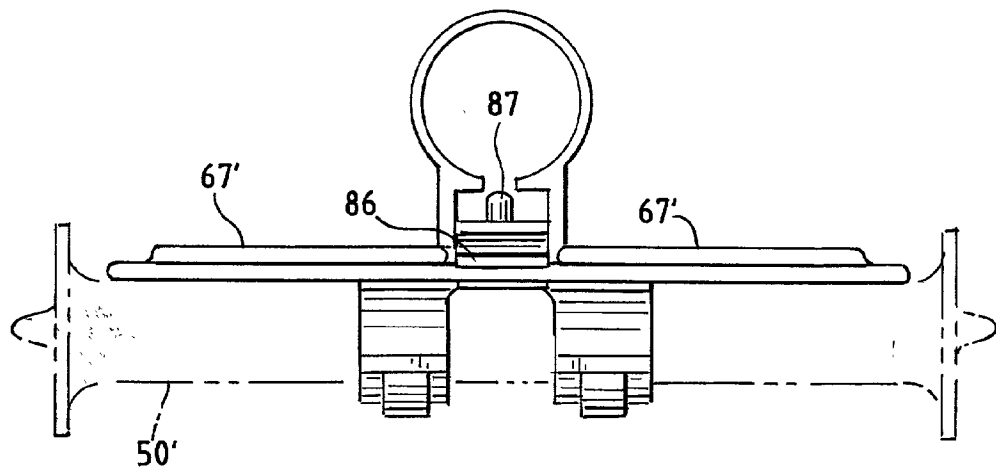


FIG. 25

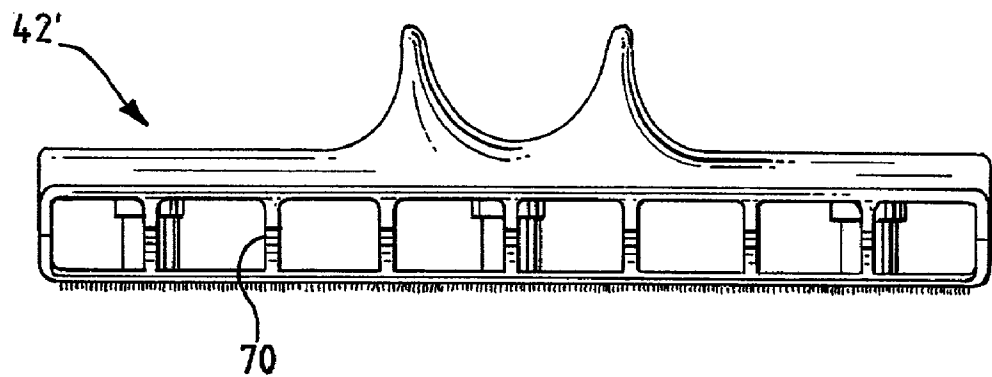


FIG. 26

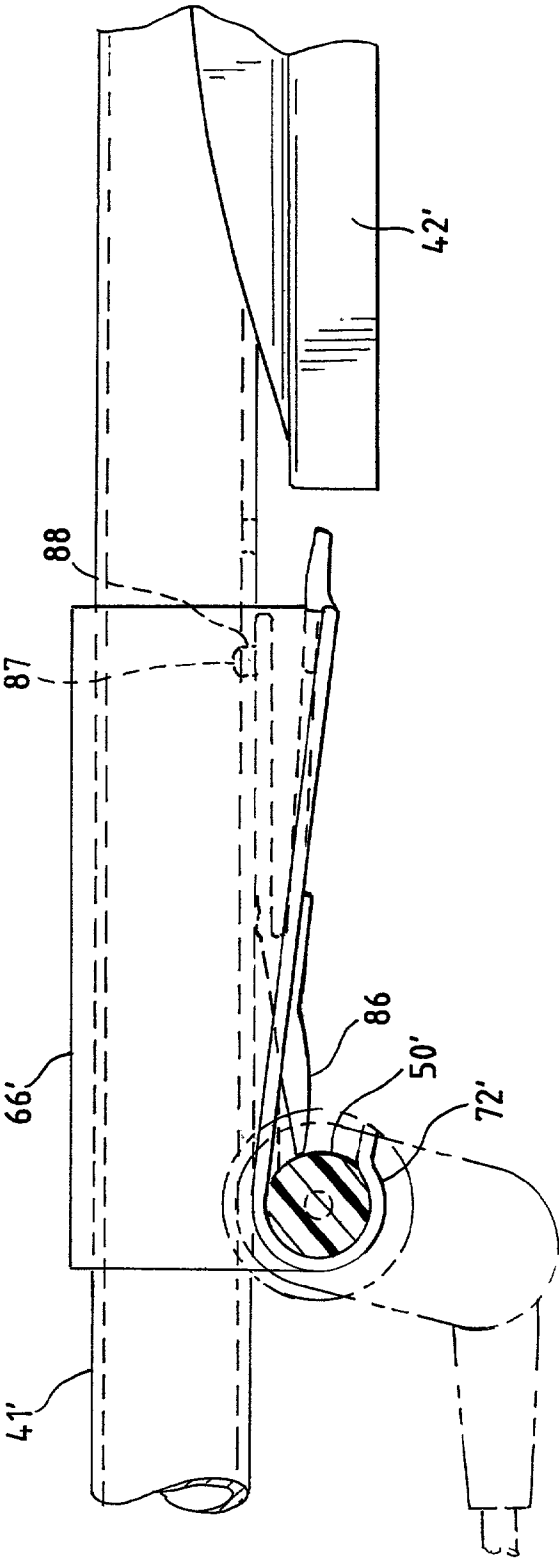


FIG. 27

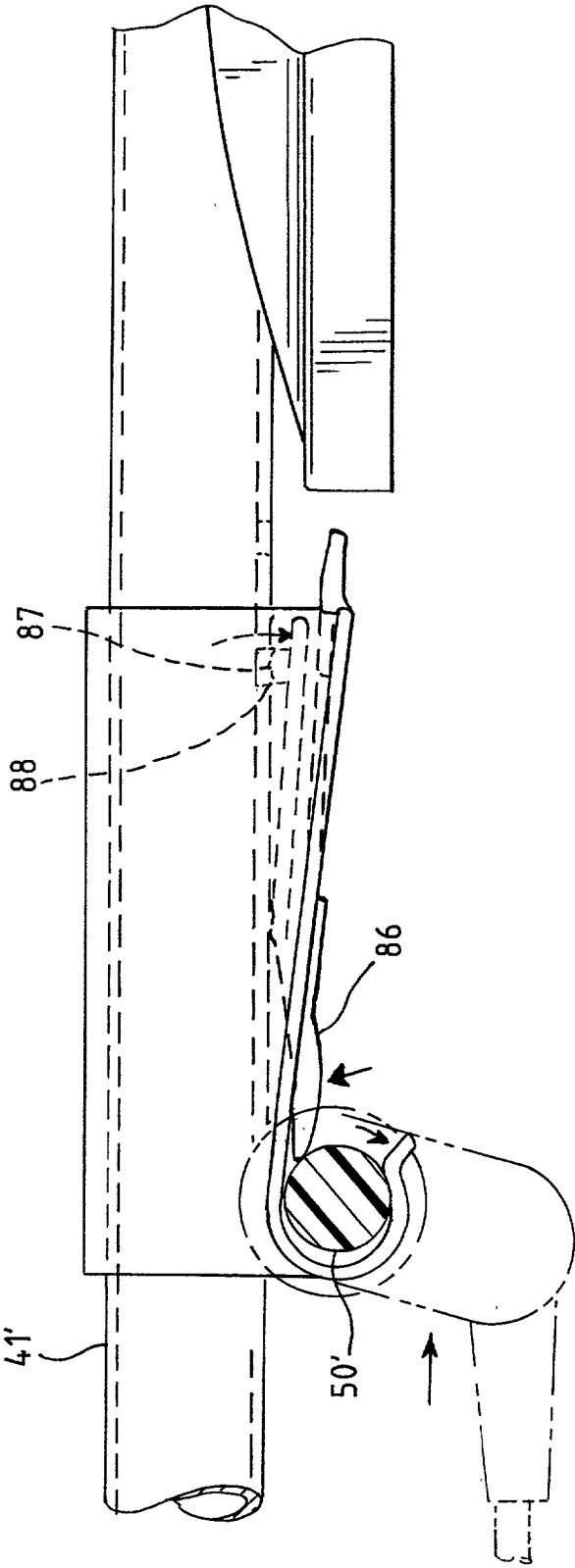


FIG. 28

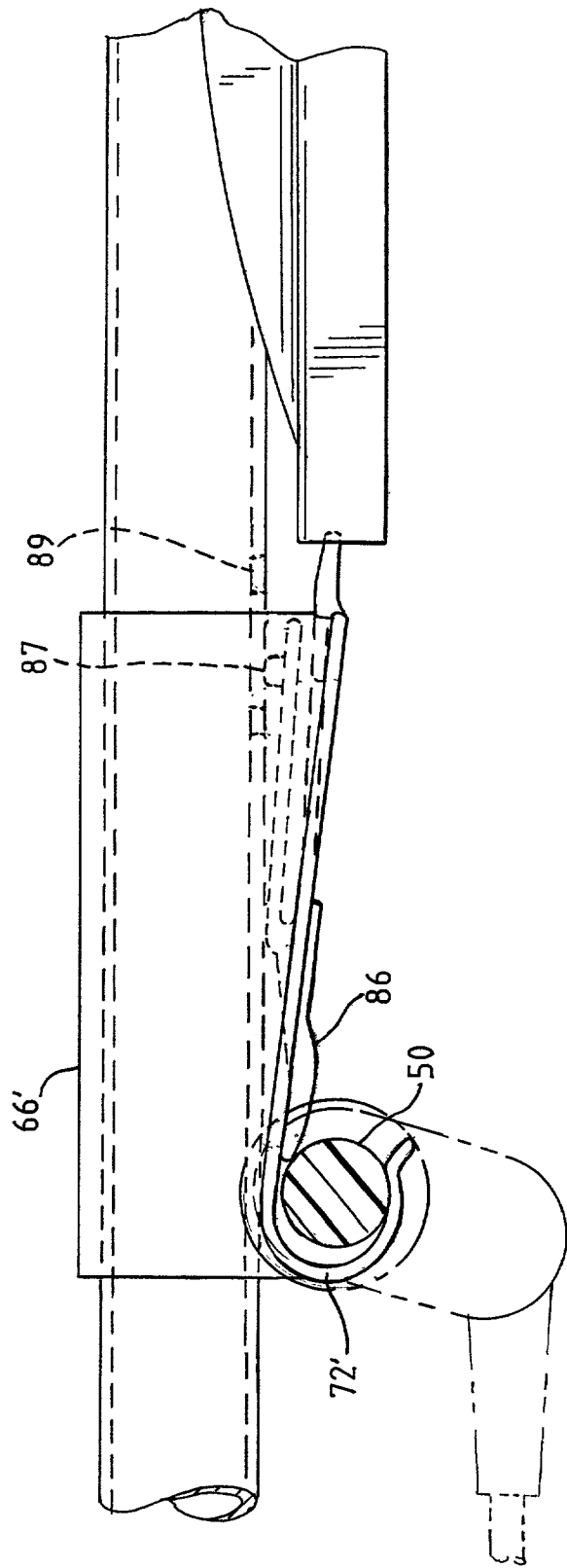


FIG. 29

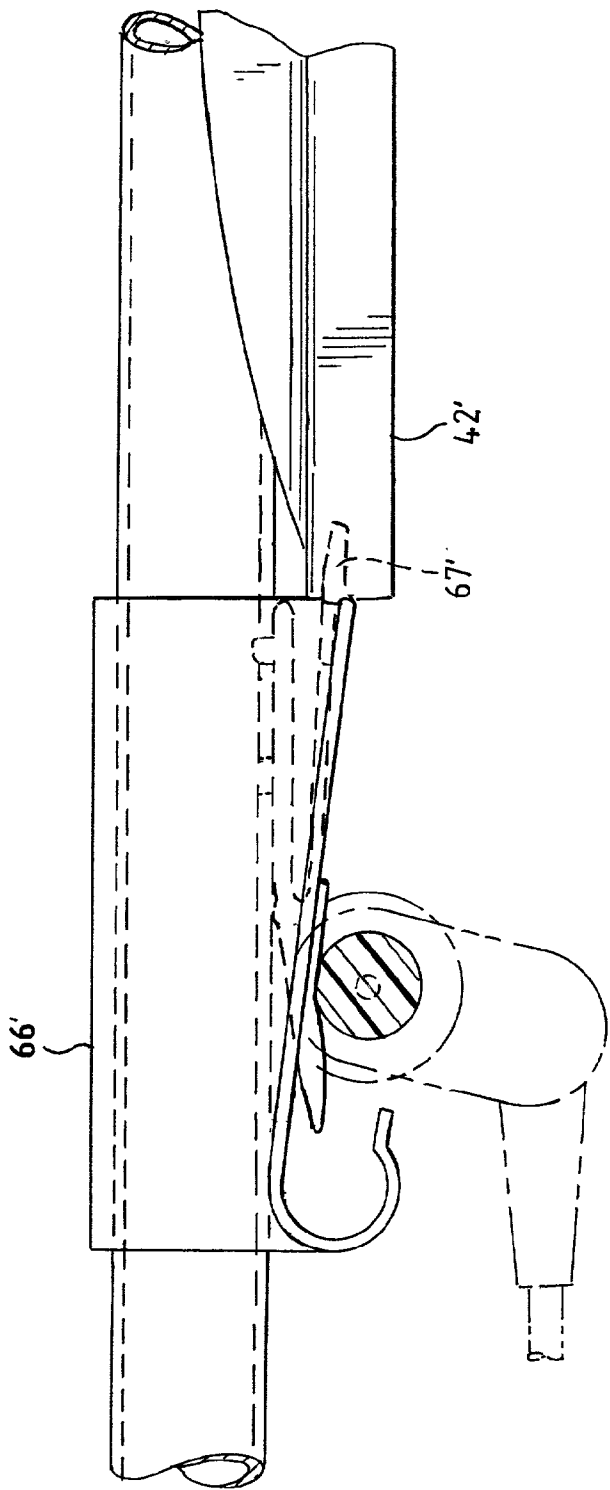
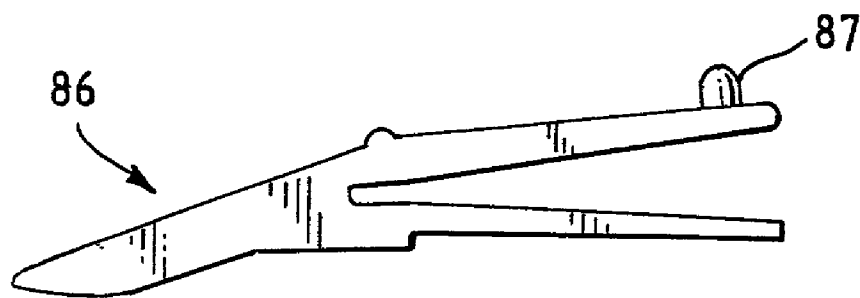


FIG. 30



SELF-WRINGING FLAT MOP

RELATED APPLICATION

[0001] This application claims priority to prior U.S. Patent Application Serial No. b **60/274,163**, filed Mar. 8, 2001. The entire contents of the prior application are hereby incorporated by reference in their entireties.

TECHINICAL FIELD OF THE INVENTION

[0002] The invention is in the field of cleaning implements, and more particularly is in the field of self-wringing mops.

BACKGROUND OF THE INVENTION

[0003] Numerous mops and cleaning utensils are known in the art. Conventional string mops comprise a handle and a mop head connected to one end of the handle, the mop head including numerous strands of a liquid absorbent material. Such mops require a wringer bucket or other wringing mechanisms to expel liquid from the mop head. More recently, one trend in the mop art has been towards "self-wringing" mops, which are mops (cleaning implements) that themselves include a wringer or wringing mechanism of one type or another to enable a user to wring the mop without the need for a separate wringer bucket. For example, the prior art has provided roller sponge mops, butterfly sponge mops, twist mops (a generic term for self-wringing string mops), handle-type sponge mops, and the like. The prior art also has provided flat mops, which are mops that have a liquid absorbent member covering a flat plate that is pivotally connected to the shaft of the mop. Such mops find favor with many consumers. Flat mops that include a self-wringing mechanism are known, but are believed to be unsatisfactory.

[0004] U.S. Pat. No. 6,260,226 ("the '226 patent"), issued Jul. 17, 2001, to one of the inventors of the present invention, discloses a self-wringing flat mop. This U.S. patent is hereby incorporated by reference in its entirety. The inventors of the present application believe that although the '226 patent discloses a cleaning implement that is superior to flat mops of the prior art, there is yet room for improvement. Accordingly, it is a general object of the invention to provide a self-wringing flat mop, and in particular one that improves in certain respects on the cleaning implement disclosed in the '226 patent.

THE INVENTION

[0005] In accordance with the invention, a cleaning implement having a shaft and a plate that is pivotally connected to the shaft is provided. The plate is movable with respect to the shaft over a range of travel between a wringing position and non-wringing positions. A liquid absorbent member is disposed on the cleaning side of the plate. The cleaning implement further includes a wringing mechanism, which has a wringing handle which is disposed on the shaft and movable with respect thereto and a wringer connected to the wringing handle. When the wringer is in a wringing position, the wringer compresses the liquid absorbent member between the wringer and the cleaning side of the plate. The mop further includes a retainer connected to the shaft for releasably retaining the plate in the wringing position.

[0006] Preferred embodiments of the invention are described hereinbelow.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] **FIG. 1** is a perspective view of one embodiment of the cleaning implement of the invention.

[0008] **FIG. 2** is a front elevational view of the cleaning implement illustrated in **FIG. 1**, shown with the plate in the wringing position and the wringer roller in a docked position.

[0009] **FIG. 2A** is an enlarged perspective view of the plug portion of the dock of the cleaning implement illustrated in **FIG. 2**.

[0010] **FIG. 3** is a rear elevational view of the cleaning implement shown in **FIG. 2**.

[0011] **FIG. 4** is a front elevational view of the cleaning implement shown in **FIG. 1**, shown in a position wherein the wringer roller has advanced approximately half way across the plate.

[0012] **FIG. 5** is a rear elevational view, partially broken away, of the cleaning implement shown in **FIG. 4**.

[0013] **FIG. 6** is an enlarged view of the plug portion of the cleaning implement illustrated in **FIG. 5**.

[0014] **FIG. 7** is a side elevational view of the plate of the cleaning implement shown in **FIG. 1**.

[0015] **FIG. 8** is a side view of the cleaning implement illustrated in **FIG. 1**, shown when the plate has been moved to a wringing position.

[0016] **FIG. 9** is a side view of the cleaning implement illustrated in **FIG. 7**, showing the dock advanced to retain the plate in its wringing position.

[0017] **FIG. 10** is a view similar to **FIG. 9**, but partially broken away.

[0018] **FIG. 11** is a rear elevational view of the cleaning implement as shown in **FIG. 9**.

[0019] **FIG. 12** is a side view of the cleaning implement shown in **FIGS. 7 and 9**, shown in a position further advanced in the wringing operation.

[0020] **FIG. 13** is a rear elevational view of the cleaning implement as shown in **FIG. 12**.

[0021] **FIG. 13A** is a side view of the cleaning implement shown in **FIG. 12**, shown as the wringer roller is being retracted.

[0022] **FIG. 14** is in a rear elevational view of the shaft of the cleaning implement illustrated in **FIG. 1**.

[0023] **FIG. 15** is a rear view of the dock of the cleaning implement illustrated in **FIG. 1**.

[0024] **FIG. 16** is a side elevational view of the handle and stop of the cleaning implement illustrated in **FIG. 1**.

[0025] **FIG. 17** is a front view of the plate of the cleaning implement illustrated in **FIG. 1**.

[0026] **FIG. 18** is a bottom view of the plate of the cleaning implement illustrated in **FIG. 1**.

[0027] FIG. 19 is a front view of the plate illustrated in FIG. 1, shown with the toe portion in a bent position.

[0028] FIG. 20 is a perspective view of the cleaning end of the cleaning implement illustrated in FIG. 1, shown with toe portion of the plate in a bent position.

[0029] FIG. 21 is a side view of an alternative embodiment of the dock.

[0030] FIG. 22 is a rear elevational view of an alternative embodiment of the shaft of a cleaning implement useful in conjunction with the dock illustrated in FIG. 21.

[0031] FIG. 23 is a front elevational view of the dock illustrated in FIG. 21.

[0032] FIG. 24 is a second front elevational view of the dock illustrated in FIG. 21, shown with the treadle spring engaging a wringer roller (the wringer roller being shown in phantom lines).

[0033] FIG. 25 is a side view of an alternative embodiment of a plate useful in conjunction with the dock illustrated in FIG. 21.

[0034] FIG. 26 is an enlarged side view of a cleaning implement that includes the dock illustrated in FIG. 21, shown with the plate having been brought into a wringing position.

[0035] FIG. 27 is an enlarged side view of the cleaning implement illustrated in FIG. 26, showing the wringer roller at the start of the wringing operation and engaging the treadle spring, with the locking nub of the treadle spring shown in hidden lines.

[0036] FIG. 28 is an enlarged side elevational view of the cleaning implement illustrated in FIGS. 26 and 27, showing the wringer roller having further advanced from the position illustrated in FIG. 27.

[0037] FIG. 29 is an enlarged side elevational view of the cleaning implement shown in FIGS. 26-28, illustrating the wringer roller having further advanced from the position shown in FIG. 28.

[0038] FIG. 30 is a side elevational view of the treadle spring of the cleaning implement shown in FIG. 26.

[0039] Terms such as "front," "side" and the like are used here in solely for convenient reference to the drawings, and it should be understood that in practice the cleaning implement may be used and oriented omnidirectionally. Likewise, term such as "enlarged" should be construed only in relating one figure to another.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0040] As shown in FIG. 1, the cleaning implement 40 includes a shaft 41 and a plate 42 pivotally connected to shaft 41 and disposed at the cleaning end 43 of the shaft. Preferably, as shown, the plate 42 is connected to the shaft 41 via a universal joint 44, which allows pivotal movement of the plate relative to the shaft in two directions perpendicular to the axis of the shaft 41. A hanger cap 46 is disposed at the operator end 47 of the shaft 41. The cleaning implement 40 further includes a wringing mechanism 48, which includes a handle 49 disposed on the shaft 41 and a wringer, the wringer in the illustrated embodiment compris-

ing a roller 50. The roller 30 in the illustrated embodiment is supported by a bearing 51, which is connected to the handle 49 via a tension rod 52. Other embodiments are possible; for instance, as disclosed in the '226 patent hereinbefore discussed, the wringing mechanism may include a pair of tension rods connecting the roller to the wringing handle. The rods may be connected to a bearing, or the rods may terminate in bent portions, which together form a journal for the roller.

[0041] The universal joint 44 rests in a bowl 54 in the plate 42 to thereby permit greater angular positioning of the shaft 41 with respect to the plate 42 than would be possible absent the bowl 54. The plate 42 has a shaft side 56 and a cleaning side 57 shown in FIG. 3 (but not shown in FIG. 1), with a liquid absorbent cleaning member 58 disposed on the cleaning side 57 of the plate 42, as best shown in FIG. 5.

[0042] As shown in more detail in FIGS. 2 and 3, the plate 42 may be brought into a wringing position with respect to the shaft 41. In this position, the shaft 41 is positioned within a channel 60 on the shaft side 56 of the plate 42, as best shown in FIG. 7. With reference again to FIG. 1, the plate has a socket end 61 and a toe end 62 and preferably is weighted more towards the socket end 61 such that an operator may cause the plate 42 to move into the wringing position by holding the shaft 41 in a horizontal position and allowing the weight of the plate 42 to guide the plate 42 into the wringing position. The universal joint 44 is mounted to the plate in a slightly off-center position to permit this weight distribution, and even more preferably the plate is constructed to have more material in the socket end 61 of the plate 42. It has been found that a weight distribution ranging from about 60:40 to about 75:25 in favor of the socket end 61 of the plate 42 is satisfactory.

[0043] Referring to FIGS. 4 and 5, the user may wring the mop by grasping the handle (not shown in FIGS. 4 and 5) and advancing the handle toward the cleaning end 43 of the shaft 41 thereby causing the roller 50 to move into a position wherein the cleaning member 58 (best shown FIG. 5) is compressed between the roller 50 and the plate 42 to thereby expel liquid from the cleaning member 58. The compression is caused by forces generated in the tension rod 52, as will be apparent to one skilled in the art. The force should be sufficient to cause at least some liquid to be expelled from the cleaning member 58 when the member is wet. In the embodiment illustrated in FIGS. 1-5, the plate 42 has a flat, unperforated cleaning side 57, although the cleaning side of plate alternatively may be provided with apertures to permit liquid to pass freely through the plate.

[0044] With further reference to FIGS. 1, 4, and 5, the cleaning implement 40 includes a retainer for retaining the plate in the wringing position. In the illustrated embodiment, the retainer takes the form of a dock 66. The dock 66 includes a plug portion 67 (best shown in FIG. 3) which has slightly barbed portions 68, 69 (shown in FIGS. 2 and 2A) for enabling a snap-fit connection with a socket 70 (shown in FIGS. 5 and 6) of the plate 42. Other configurations of the plug and the socket or the retainer generally are possible. With further reference to FIG. 1 and 5, the dock 66 further includes at least one clip 72 (two are shown in the illustrated embodiment) for releasably retaining the roller 50 with respect to the dock 66.

[0045] The function of the dock 66 as retainer for the plate 42 is further illustrated in FIGS. 8-13A. When the plate 42

has moved to a wringing position, as shown in FIG. 8, the plug portion 67 of the dock 66 is not engaged with the plate 42. As the operator advances the wringing handle, thereby advancing the roller 50 toward the cleaning end of the shaft 41, the dock 66 remains engaged with the roller 50, and thus travels with the roller 50 until the plug portion 67 fits within the socket 70 of the plate 42, as shown in FIGS. 9 and 11. The shaft 41 may be provided with a stop 75 (shown in FIG. 10) to limit the range of travel of the dock 66. Once the dock 66 has reached the end of its range of travel and the plate 42 is retained in the wringing position, upon further advancement of the roller 50, the dock 66 will disengage from and cease to travel with the roller 50, as shown in FIGS. 12 and 13. The roller 50 then may be continued to be advanced to cover the plate 42 and the cleaning member 58 (as shown for instance in FIG. 5). The advancement of the roller may be limited by the engagement of the handle with the dock.

[0046] After liquid has been expelled from the cleaning member, the roller 50 is then retracted. In the illustrated embodiment, the dock 66 and the plate 42 can remain engaged until the roller 50 is retracted to a position wherein it engages the dock 66 by contacting the clip 72, at which point the dock travels with the roller axially as the roller is retracted. The roller 50 is then retracted until the plate 42 has been disengaged from the dock 66, as shown in FIG. 13A. As the roller 50 is further retracted, the dock 66 reaches the other extreme of its range of travel, and, upon further retraction of the roller 50, the roller 50 can be caused to seat within the clips 72, as shown in FIG. 8. The limit of the range of travel of the roller 50 towards the operator end of the shaft preferably is defined by a slot 77 in the shaft 41, as illustrated in FIG. 14. As shown in FIG. 15, the dock 66 is provided with a pin 78, which travels in the slot and which serves to delimit the range of travel of the dock 66 and also to inhibit relative rotation of the dock and shaft. The slot 77 also may delimit the range of travel of the dock towards the cleaning end of the shaft 41, thus obviating the need for the stop 75 shown in FIG. 10. As shown in FIG. 16, a handle stop 80 prevents the operator from retracting the handle 49 axially beyond the handle stop 80, thus preventing accidental damage to the dock.

[0047] With reference to FIGS. 17 and 18, the plate 42 preferably comprises a toe portion 81 and a major portion 82 which are hingedly connected to one another. As shown in FIG. 18, the plate 42 preferably includes several units of a set of hook-and-loop fasteners 83 for mating with a corresponding set of fasteners (not shown) provided on the cleaning member. In this manner, the cleaning member may be releasably attached to the plate 42. Preferably, the toe portion 81 is normally biased into alignment with respect to the major portion 82 via a flat spring 84, as shown in FIG. 18 which is attached to one of the toe portion 81 and the major portion 82 and which travels in a groove 85 in the other of the toe portion 81 and the major portion 82 upon bending of the toe portion with respect to the major portion, as shown for instance in FIG. 19. With further reference to FIG. 20, this relationship permits the toe portion 81 to bend to allow the plate 42 to be immersed in liquid contained in a bucket (shown in phantom in FIG. 20) that is not sized to fully receive the plate 42 when the plate 42 is unbent.

[0048] The various components of the mop may be provided in numerous alternative embodiments. For instance, as shown in FIG. 21, the dock 66' may be provided with a

treadle spring 86 (the spring 86 is shown in full in FIG. 30). With further reference to FIGS. 23 and 30, the spring 86 includes a locking nub 87 which fits within one of two holes 88, 89 in the shaft 41' (shown FIG. 22) to thereby axially retain the dock 66' relative to the shaft 41'. When the roller 50' passes over the treadle spring 86, as shown in FIG. 24, the treadle spring 86 engages the roller 50' and biases the locking nub 87 away from the shaft, thereby permitting relative axial movement between the dock 66' and the shaft.

[0049] Operation of a cleaning implement as constructed is shown in FIGS. 26-29. As shown in FIG. 26, the plate 42' may be brought into the wringing position with the roller 50' engaged with dock 66' and seated in the clips 72'. As the roller advances, initially the dock 66' is restricted from axial movement. The roller 50' advances and engages the treadle spring 86, causing the locking nub 87 to become disengaged from the operator end hole 88 in the shaft 41', as shown in FIG. 27. As the roller 50' is further advanced, the dock 66' travels with the roller 50' over a portion of the range of travel of the roller 50', as shown in FIG. 28. In these positions, the roller 50' no longer engages the treadle spring 86 but is still engaged by the clips 72' of the dock 66'. As the roller 50' is further advanced, as shown in FIG. 30, the locking nub 87 engages the cleaning end hole 89 of the shaft 41' thus axially retaining the dock 66' with respect to the shaft 41' in the advanced position, whereby the plate 42' is retained relative to the shaft 41'. The slot 77' should be sized to permit axial movement of the dock relative to the shaft sufficient to allow the locking nub to engage both the operator end hole and the cleaning end hole. As shown, in FIGS. 23 and 24, the dock 66' includes two plugs 67' for engaging the socket 70' shown in FIG. 25, the socket retaining the plugs via a press-fit connection. The roller then may be further advanced to cause liquid to be expelled from the cleaning member.

[0050] Upon retraction of the roller 50', the sequence of events is essentially reversed. First, the roller 50' engages the treadle spring 86, causing the locking nub 87 to become disengaged from the cleaning end hole 89 in the shaft 41'. Subsequently, the dock 66' will travel with the roller 50' as the roller 50', is retracted until the locking nub 87 engages the operator end hole 88. Upon further retraction of the roller 50', the roller 50' will seat in the clips 72'.

[0051] The shaft preferably is made of a metal such as steel or aluminum, the tension rod preferably is made of a spring steel, and the other components of the mop preferably are made of injection mold engineering grade plastic or other material suitable for use in conjunction with preparation of cleaning elements. The cleaning member may be any suitable liquid absorbent material, such as a fibrous cloth or other fibrous material, or a non-fibrous material. The component parts of the mop may be made and assembled via conventional techniques.

[0052] It is thus seen that the present invention provides a self-wringing flat mop. The invention further encompasses other cleaning implements, and the cleaning implement of the invention may be used for dusting or other cleaning purposes.

[0053] While particular embodiments of the invention have been shown, the invention is not limited thereto, and

indeed the invention is susceptible to various modifications. The invention is therefore deemed to encompass the subject matter defined by the following claims and equivalents thereof.

What is claimed is:

1. A cleaning implement comprising:
 - a shaft having an operating end and a cleaning end;
 - a plate having a shaft side and a cleaning side and being pivotally connected to said shaft at said cleaning end and movable over a range of travel between a plate wringing position and non-wringing positions;
 - a liquid absorbent member disposed on the cleaning side of said plate;
 - a wringing mechanism including a wringing handle disposed on said shaft and being moveable with respect thereto and including a wringer connected to said wringing handle and movable to wringing positions, said wringer in said wringing positions compressing said liquid absorbent member between said wringer and said cleaning side of said plate; and
 - a retainer connected to said shaft for releasably retaining said plate in said plate wringing position.
2. A cleaning implement according to claim 1, said plate being connected to said shaft via a universal joint which allows pivotal movement of said plate relative to said shaft in two directions perpendicular to the axis of said shaft.
3. A cleaning implement according to claim 1, wherein said wringer is a roller.

4. A cleaning implement according to claim 3, said wringing mechanism including at least one tension rod connecting said wringing handle to said roller.

5. A cleaning implement according to claim 1, said retainer being disposed on said shaft and being movable with respect thereto, said retainer being movable over a range of travel between a plate retaining position and non-retaining positions.

6. A cleaning implement according to claim 5, said retainer comprising a dock releasably retaining said wringer with respect to said dock when said wringer is in a fully retracted position.

7. A cleaning implement according to claim 6, said dock traveling with said retainer with respect to said shaft over a portion of the range of travel of said wringer with respect to said shaft, whereby said dock may be moved into and out of said plate retaining position by moving said wringer with respect to said shaft.

8. A cleaning implement according to claim 7, said dock including a shaft retainer, a portion of said shaft retainer engaging said shaft and enabling releasable retention of said dock with respect to said shaft.

9. A cleaning implement according to claim 8, said shaft retainer comprising a treadle spring, said treadle spring engaging said wringer over a portion of range of travel of said wringer with respect to said shaft.

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