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(54) **MOTORIZED MOP**

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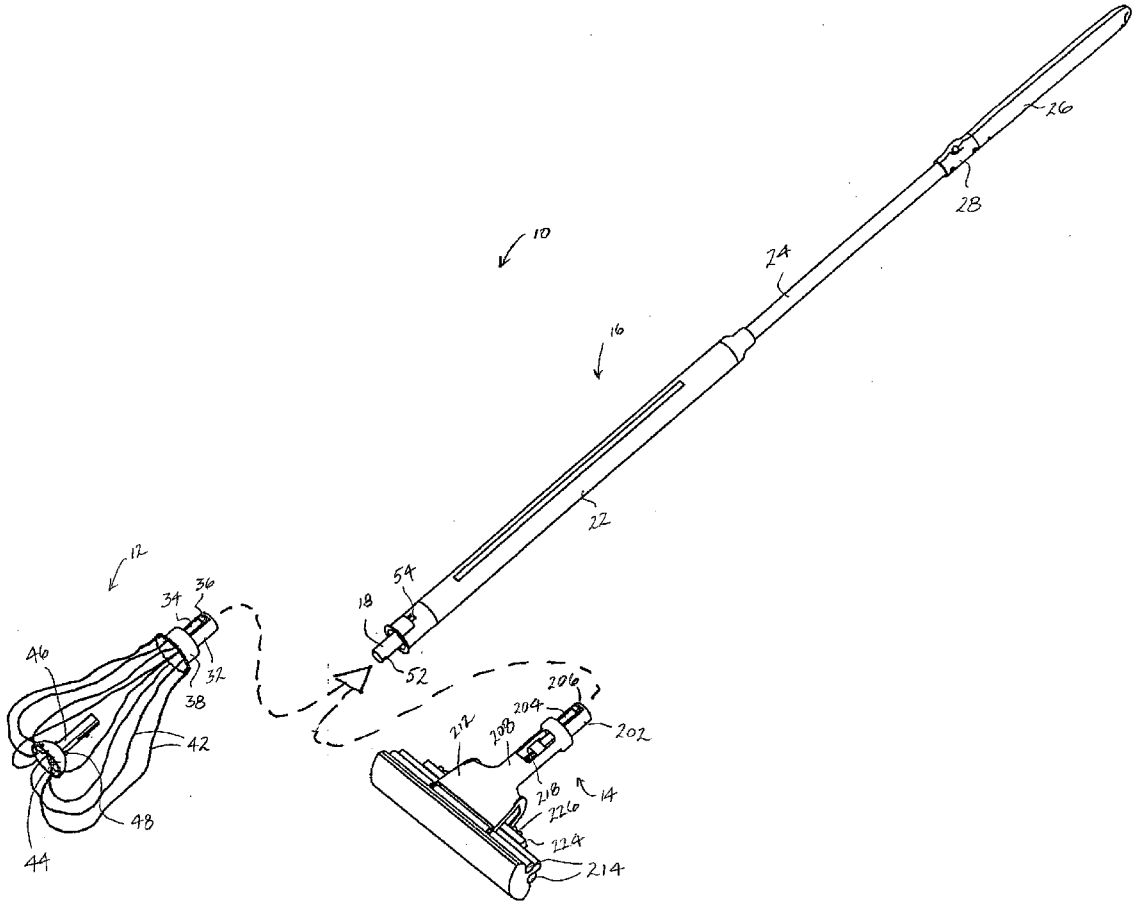
(52) **U.S. Cl.** **15/119.2**; 15/120.1

(57) **ABSTRACT**

A mop includes an elongated handle portion, a movable member slidably mounted on the handle portion, a rotary motor disposed in at least one of the elongated handle portion and the movable member, a controller in electrical communication with the motor and an associated power source, and a mop head. The controller regulates power to the motor as a function of a number of rotations of the motor. The mop head is detachably connected to at least one of the elongated handle portion and the movable member. The mop head is selectively connected to the motor.



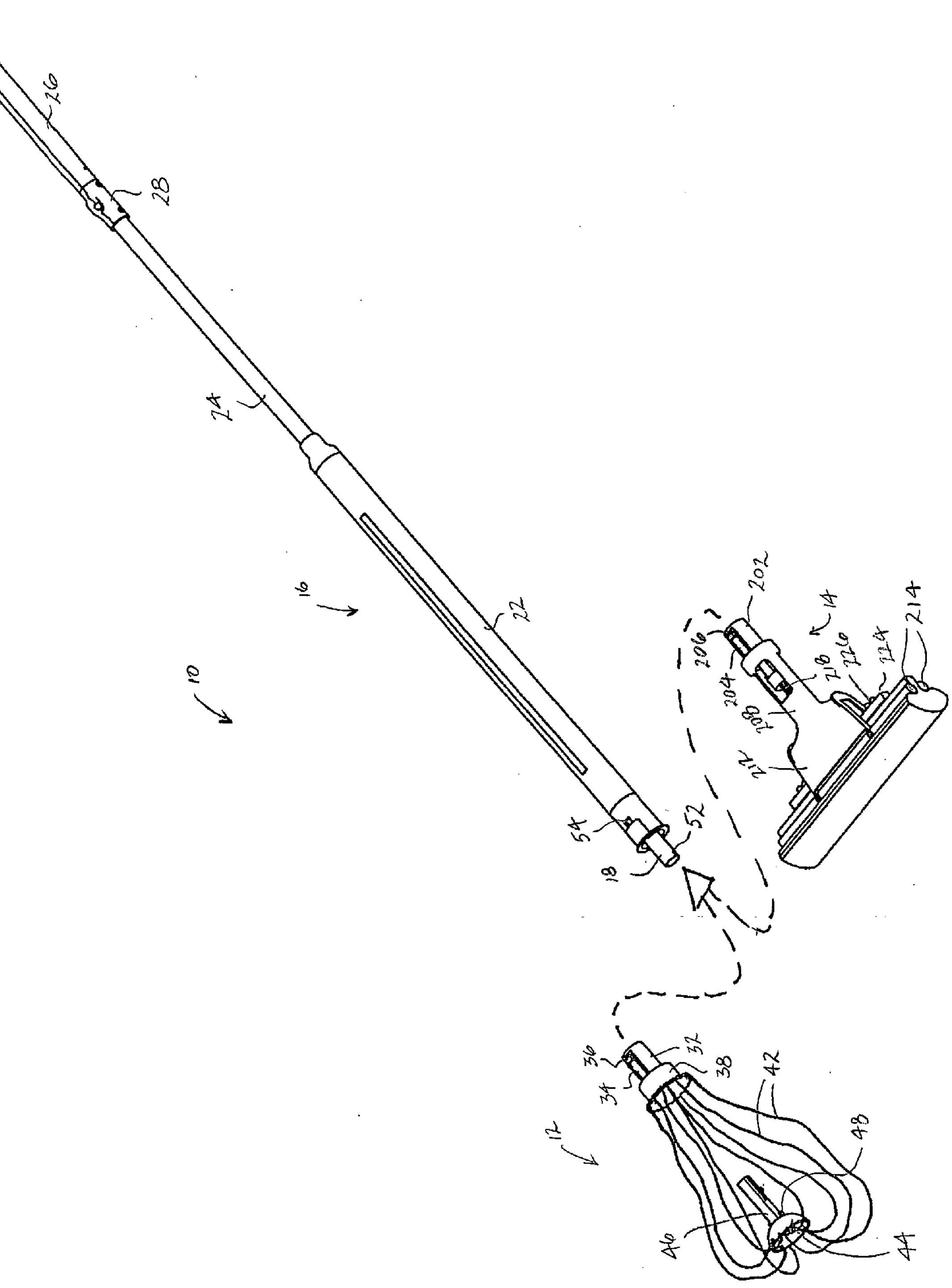

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FIG. 1

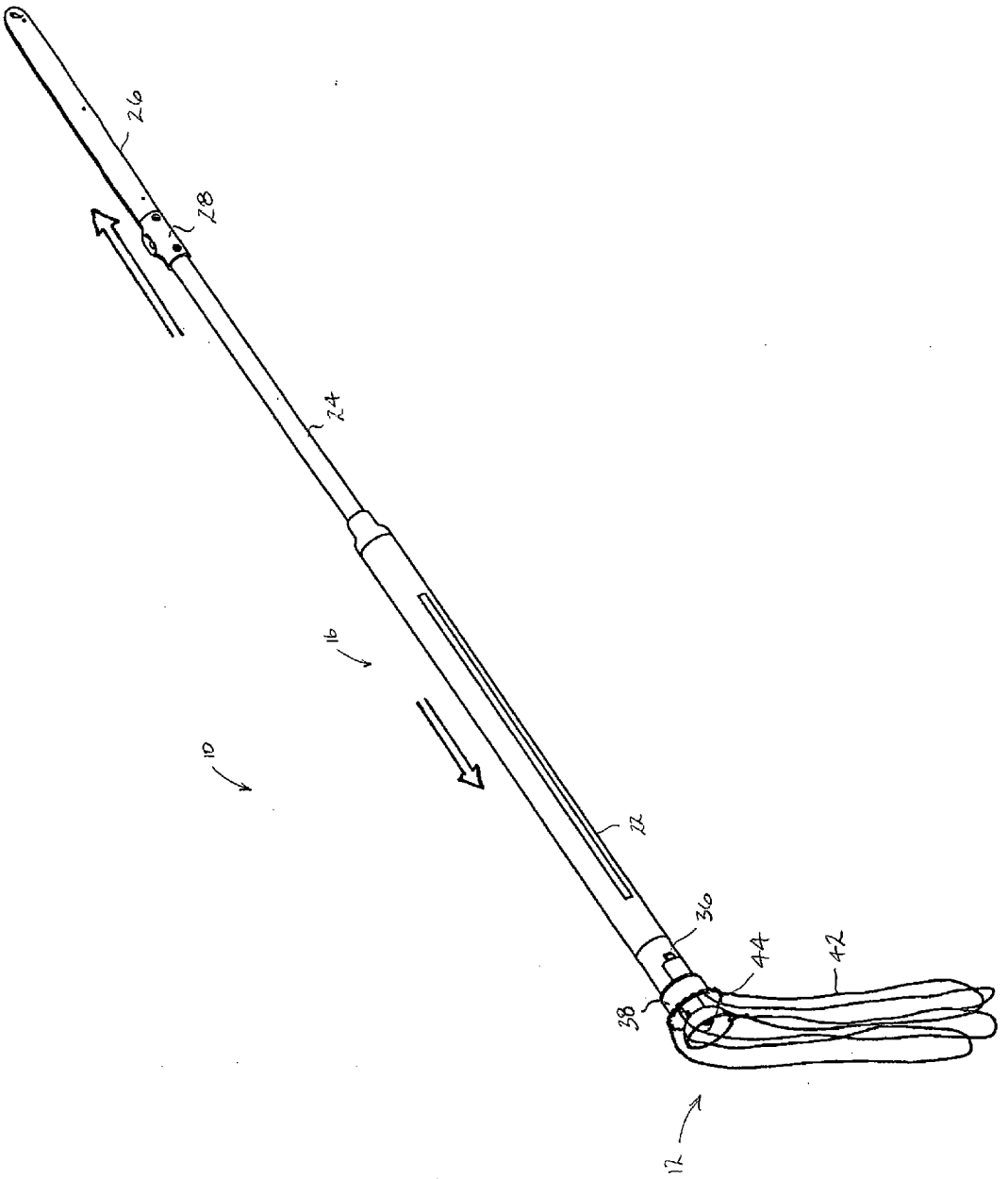

FIG 2

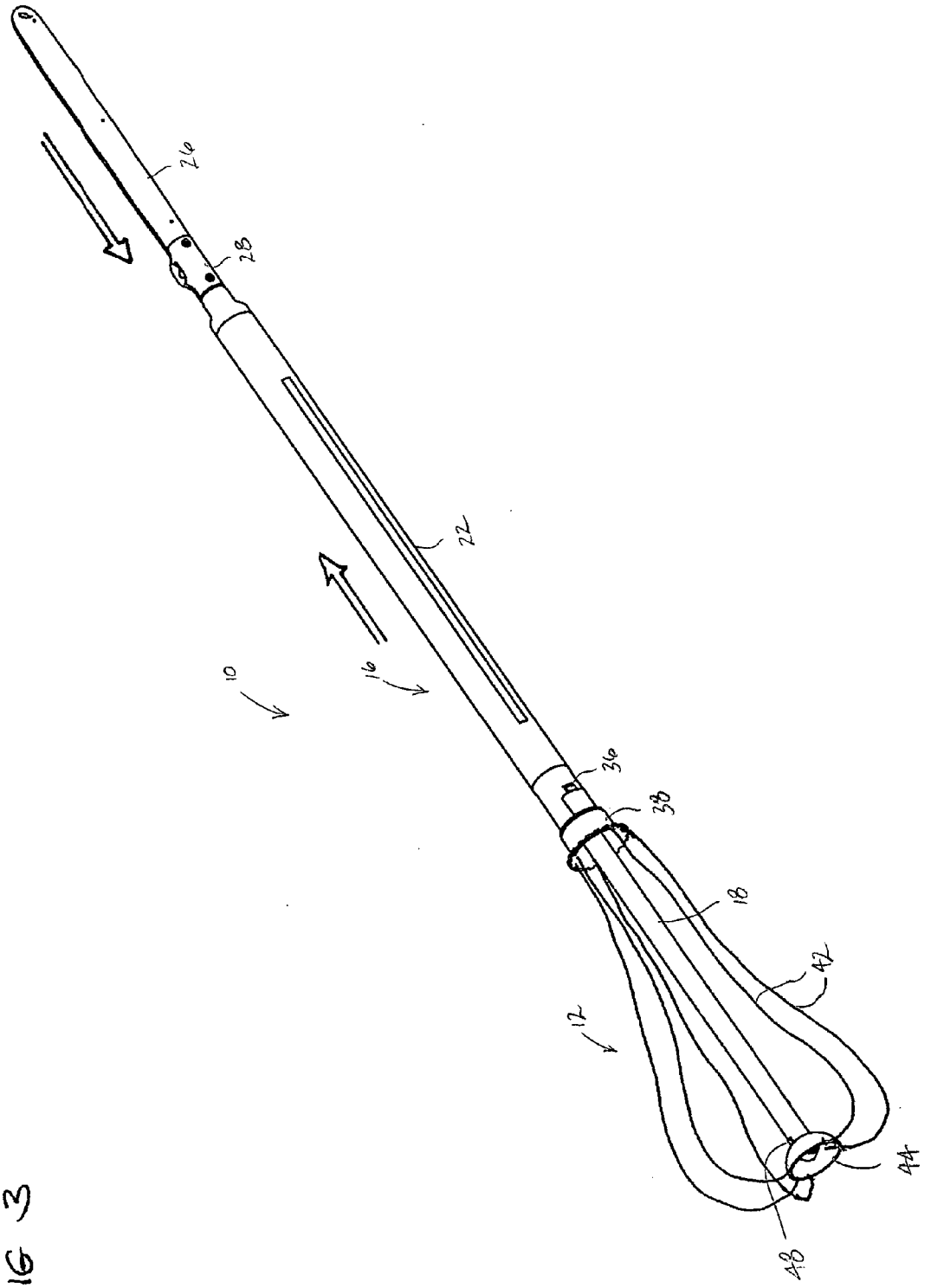

FIG 3

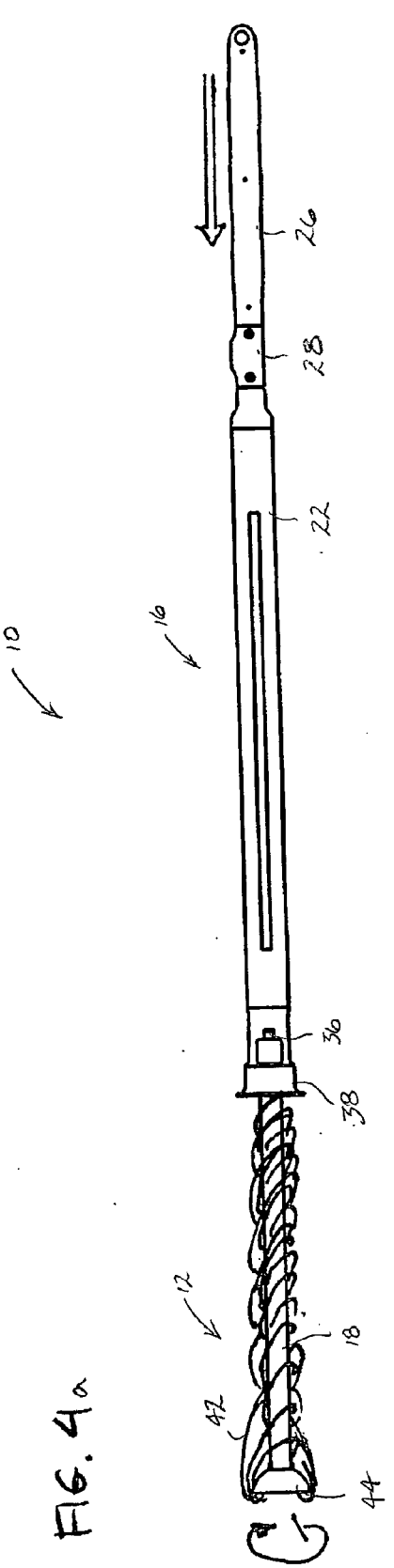

FIG. 4a

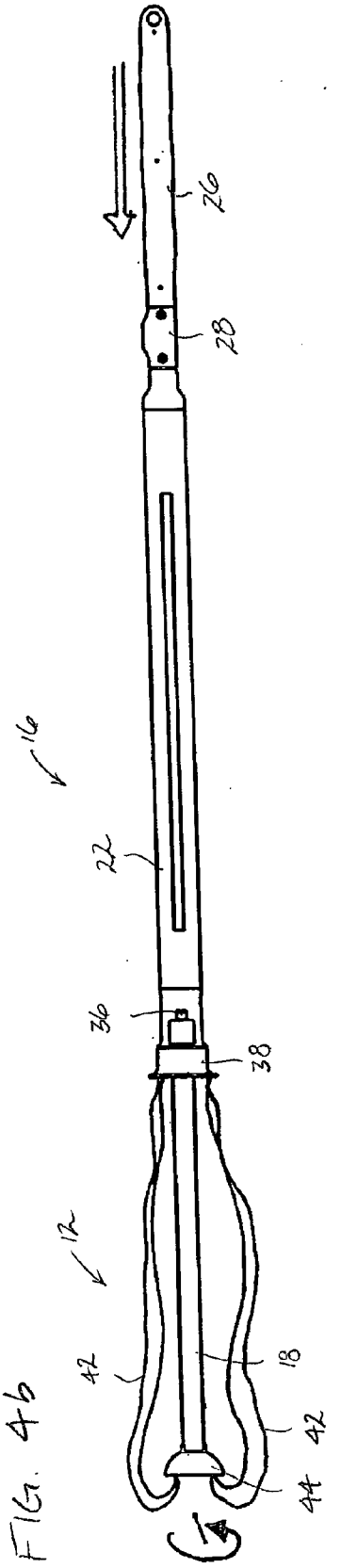

FIG. 4b

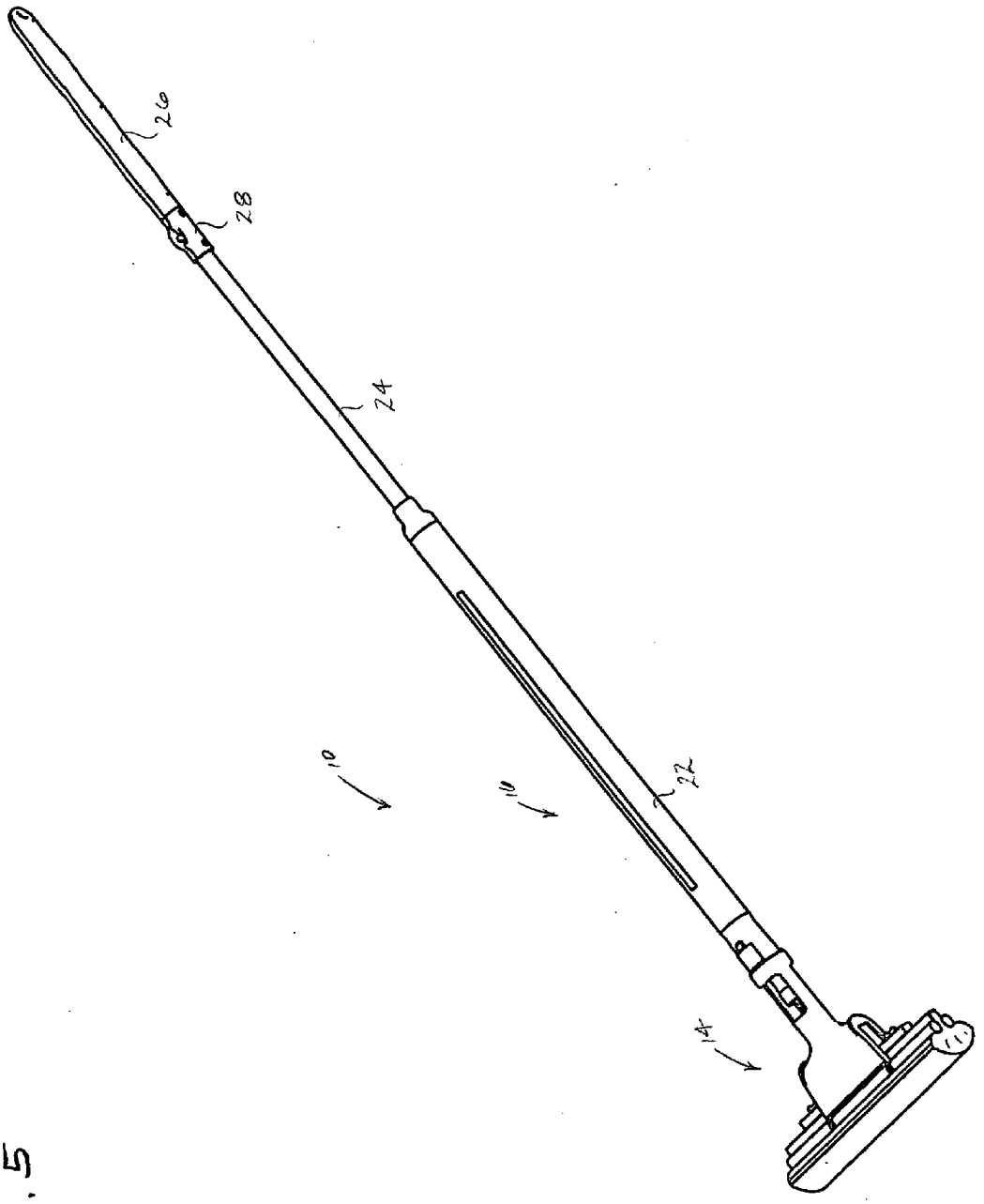

FIG. 5

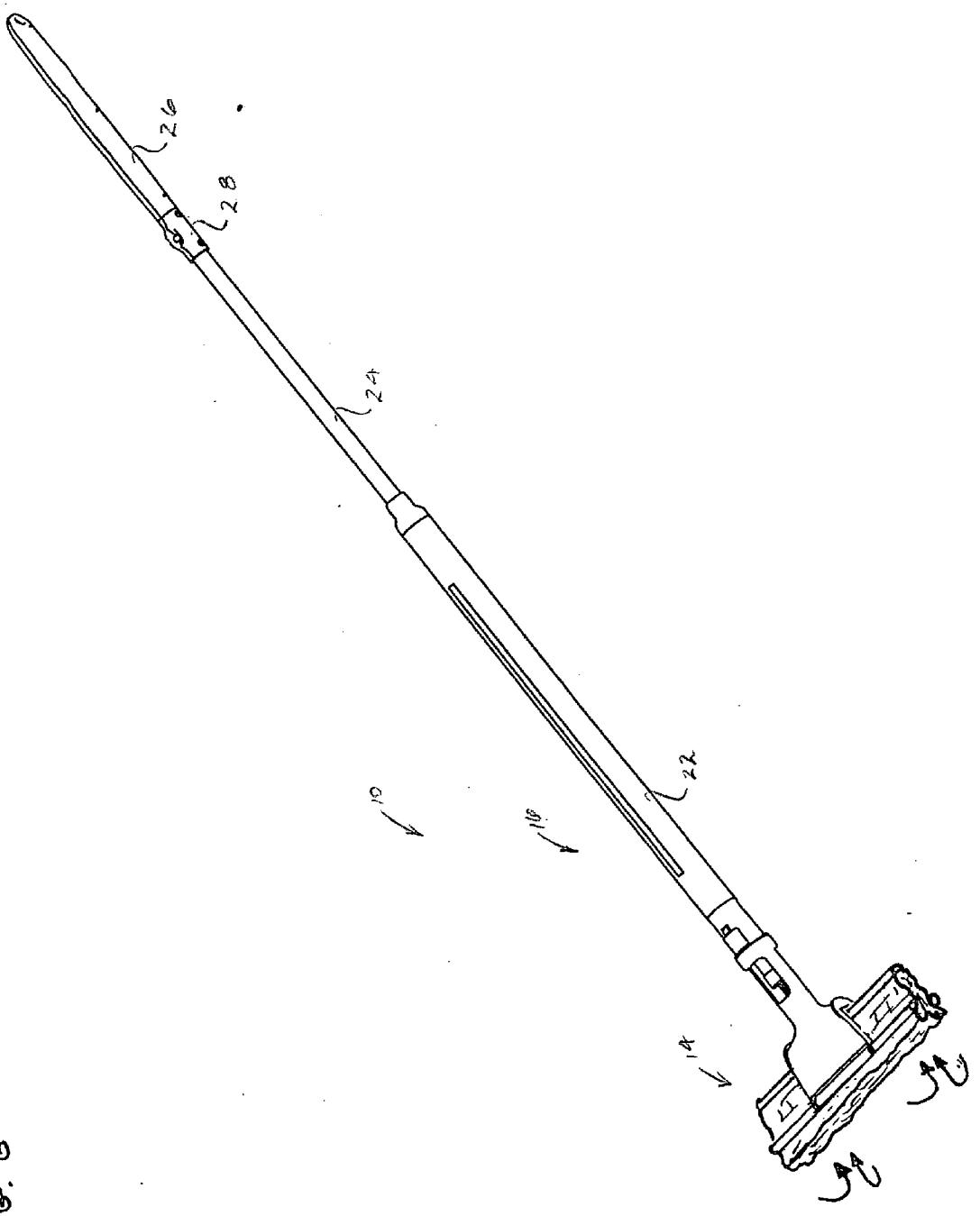

FIG. 6

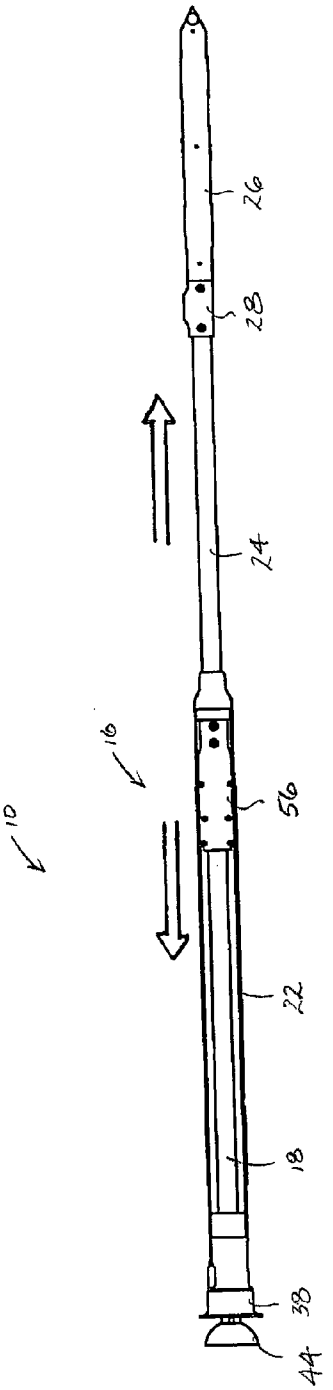

FIG. 7a

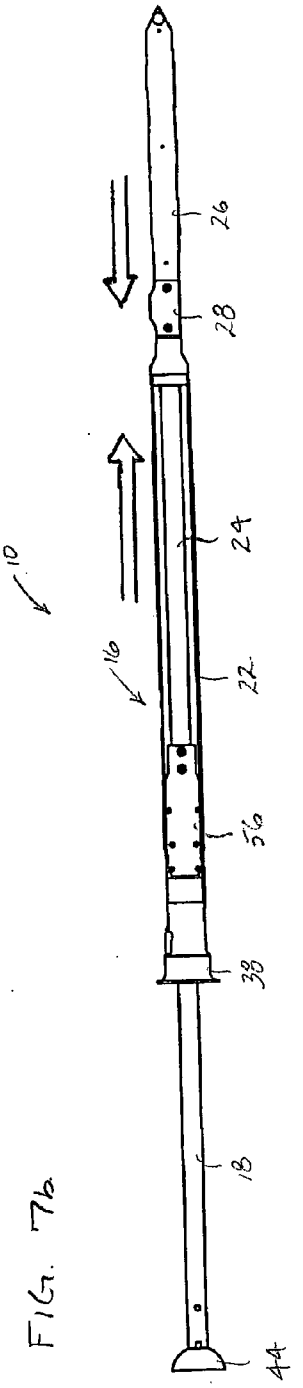

FIG. 7b

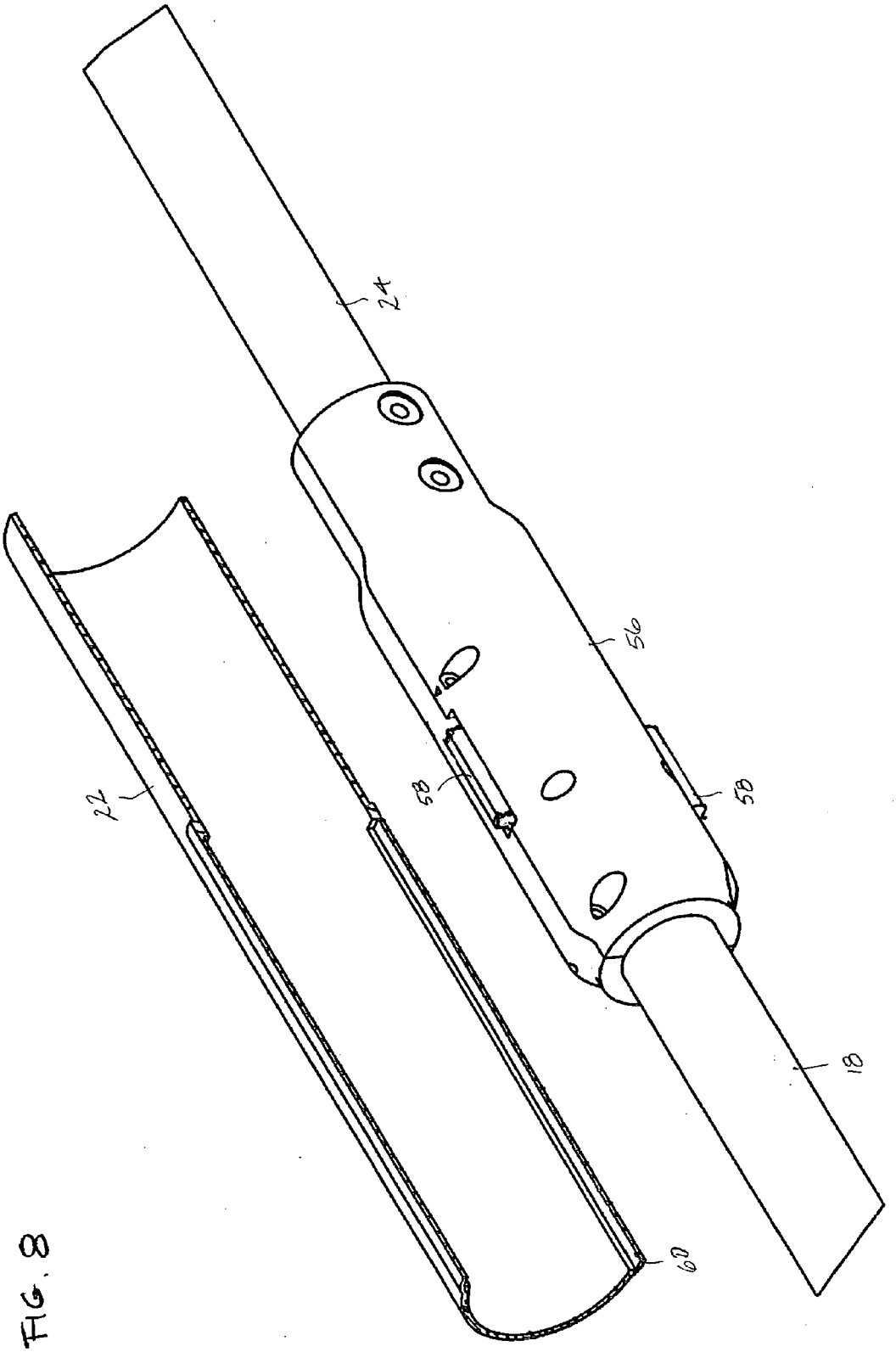

FIG. 8

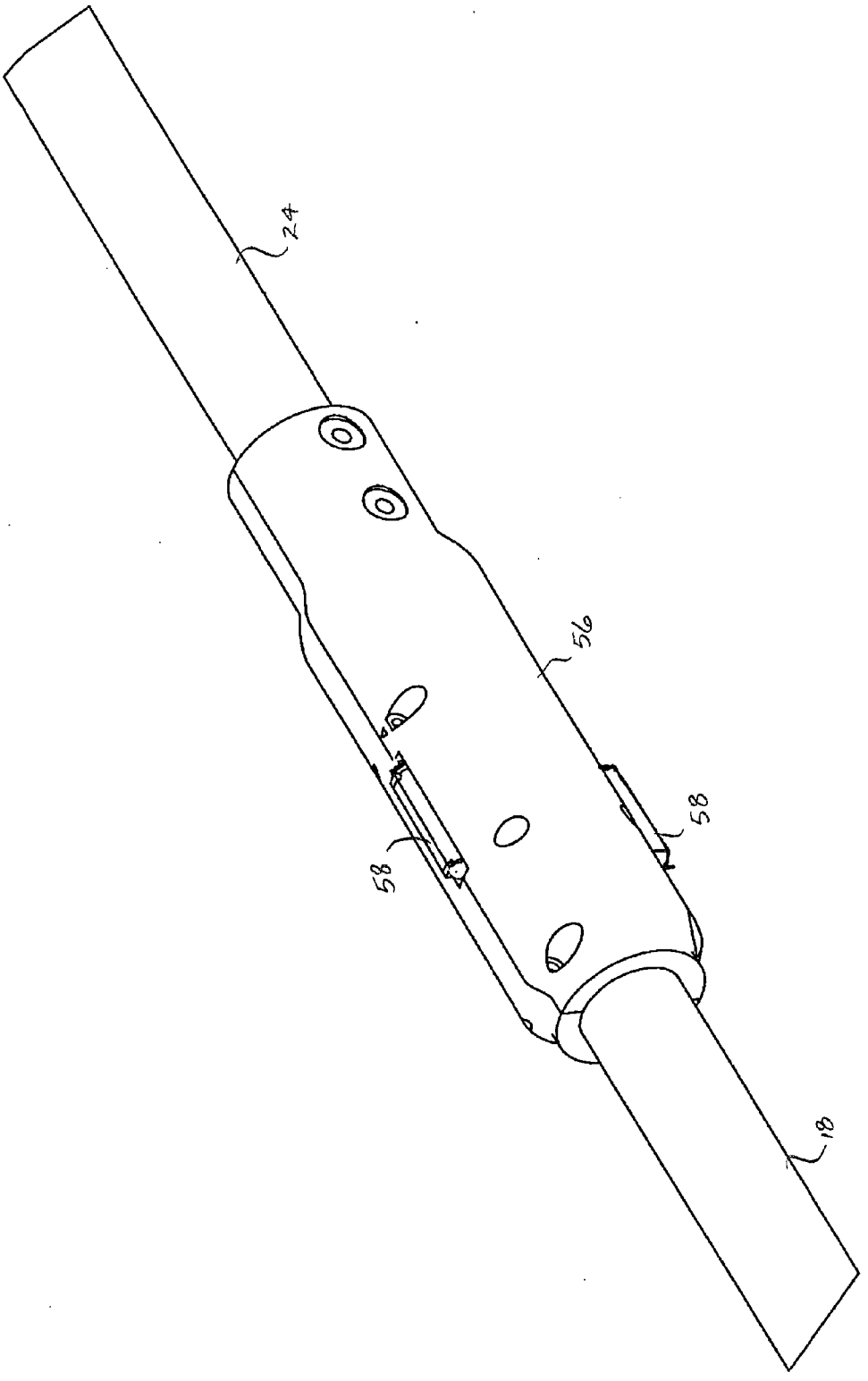

FIG. 9

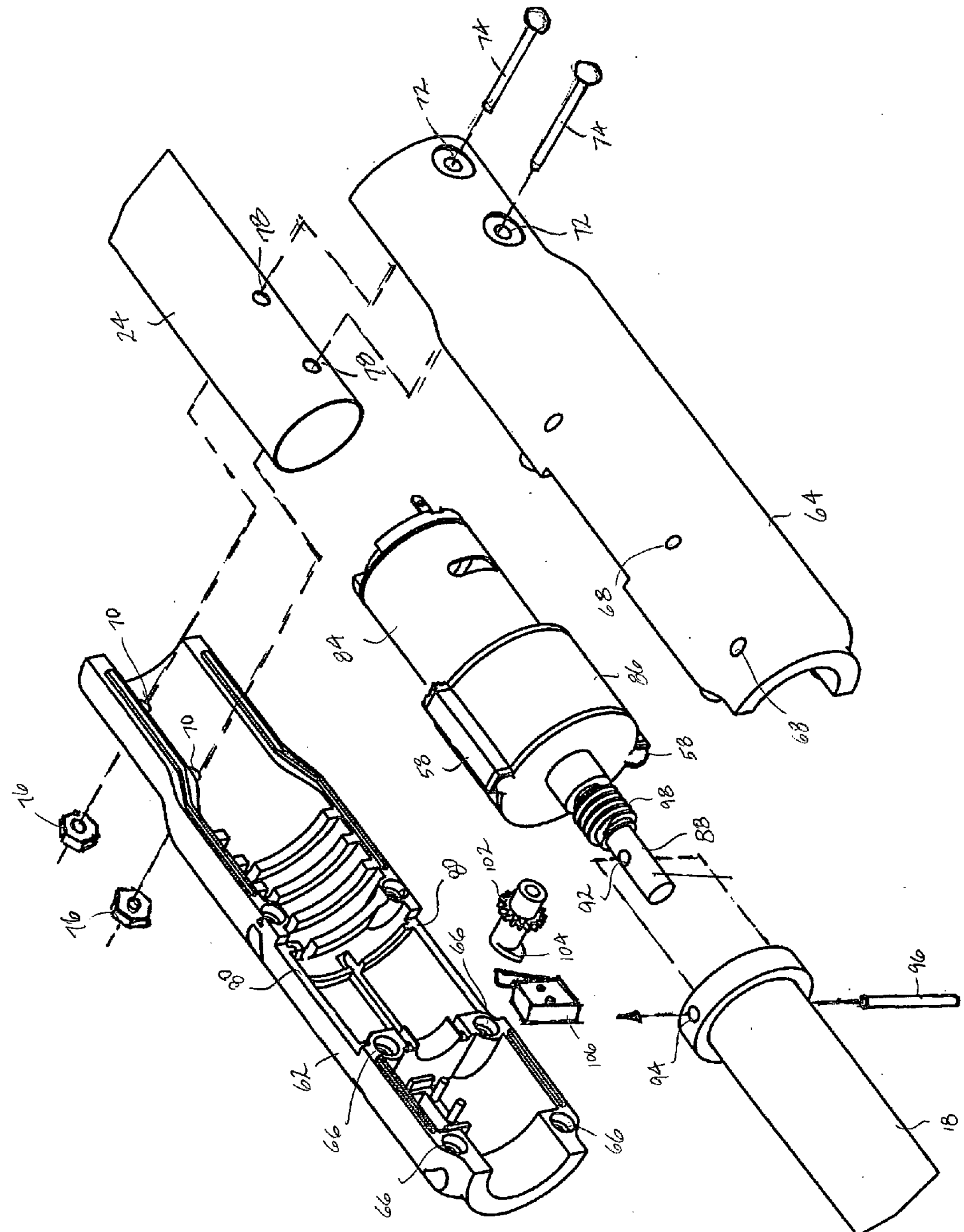
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FIG. 10

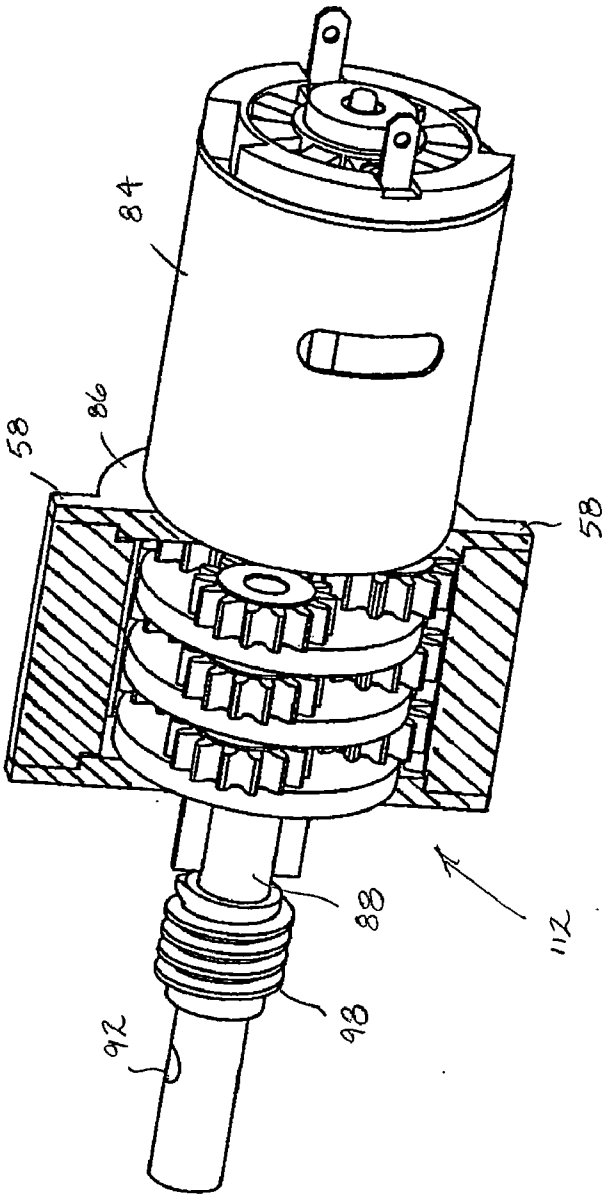

FIG. 11

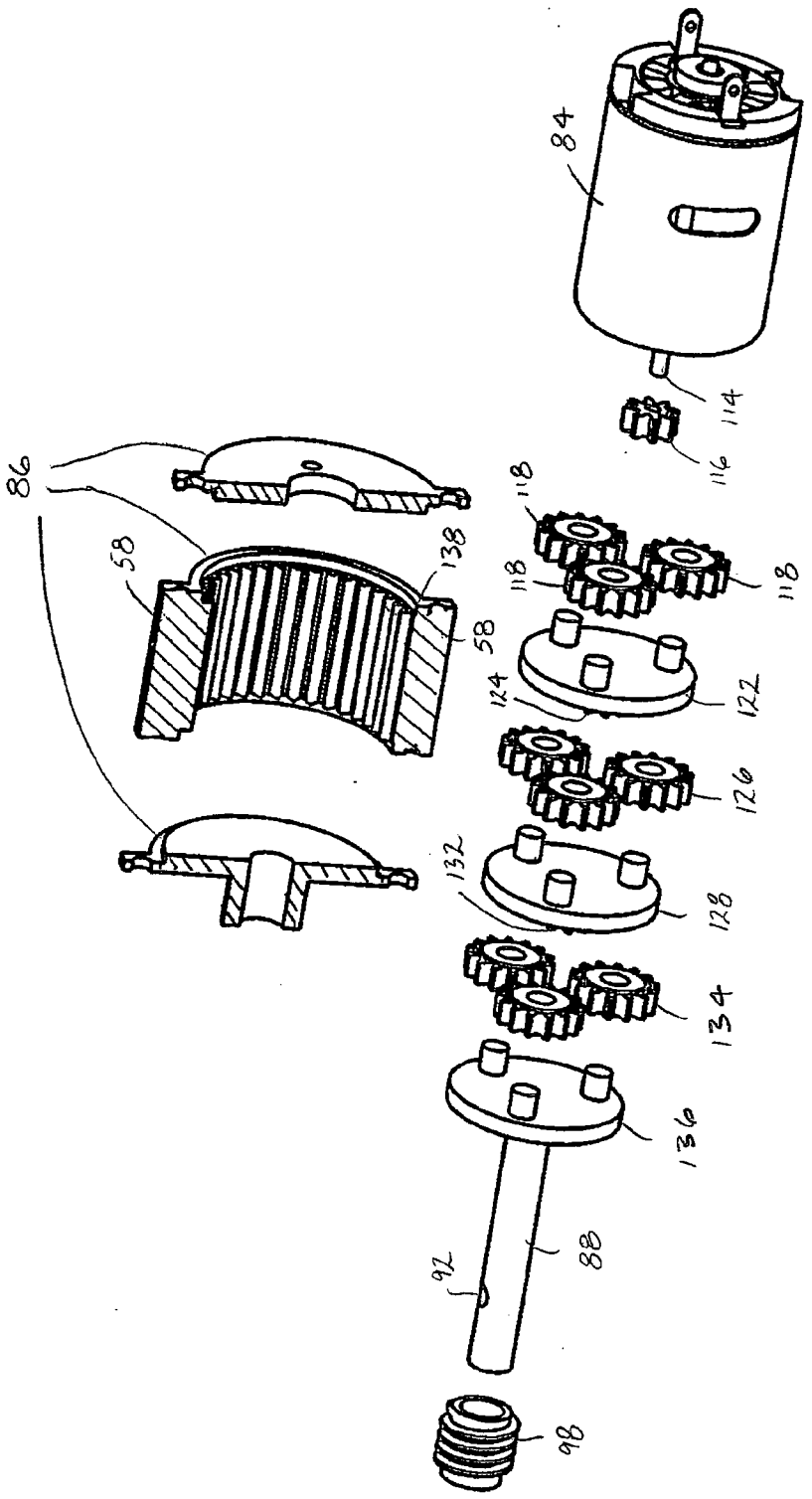
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FIG. 12

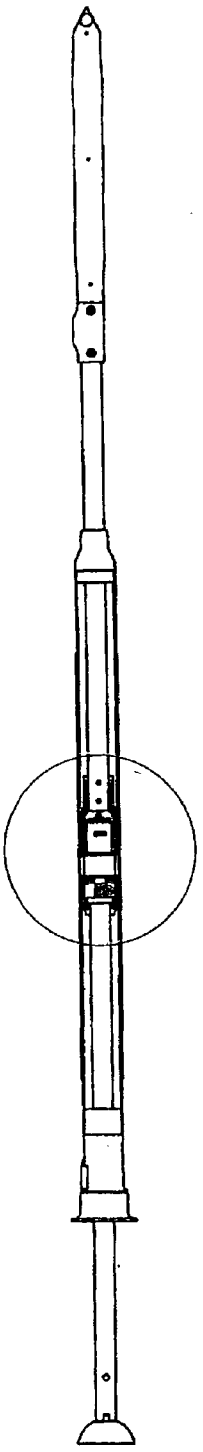


FIG. 13a

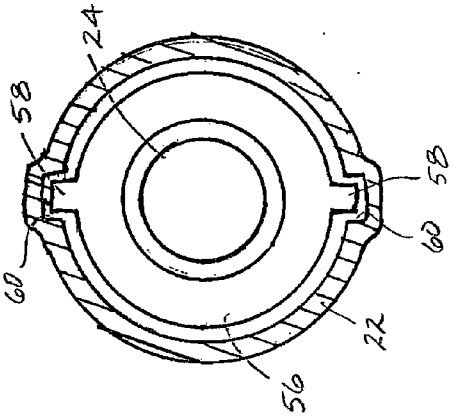


FIG. 13c

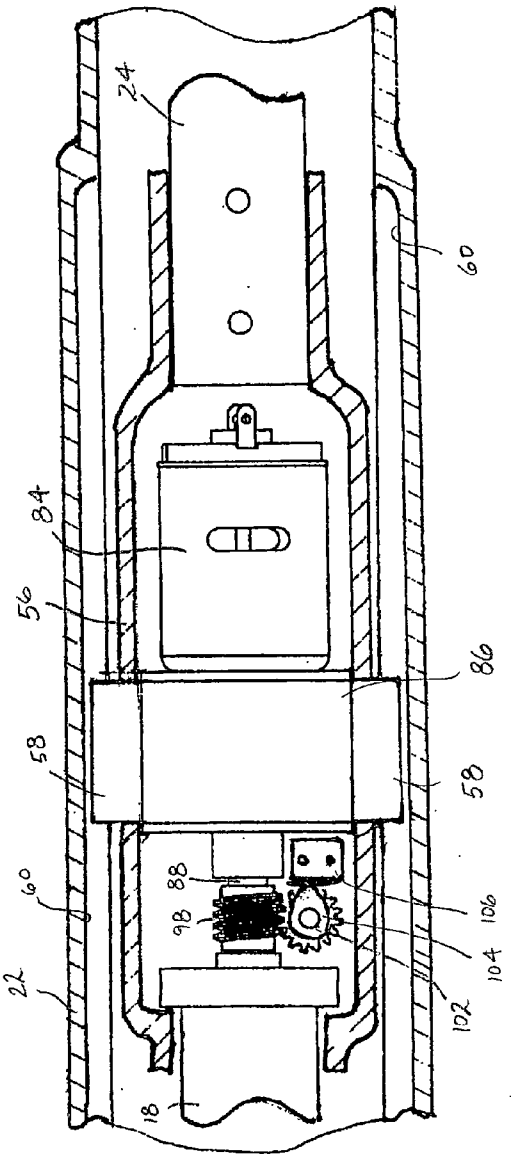


FIG. 13b

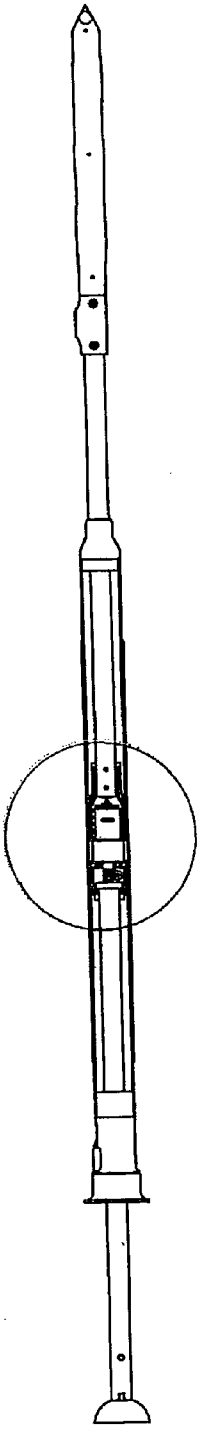


FIG. 14a

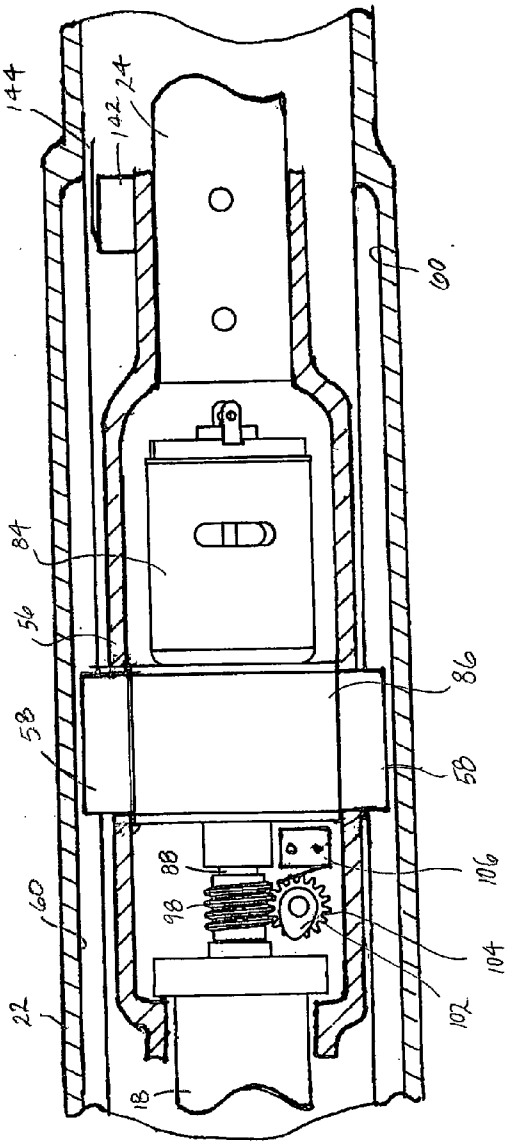


FIG. 14b

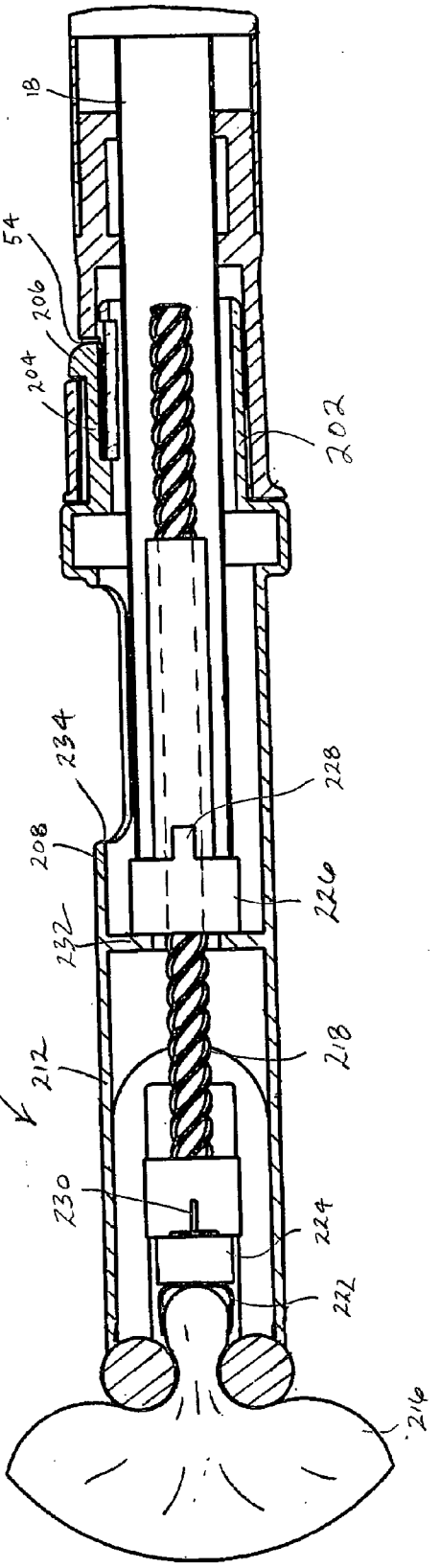


FIG. 15a

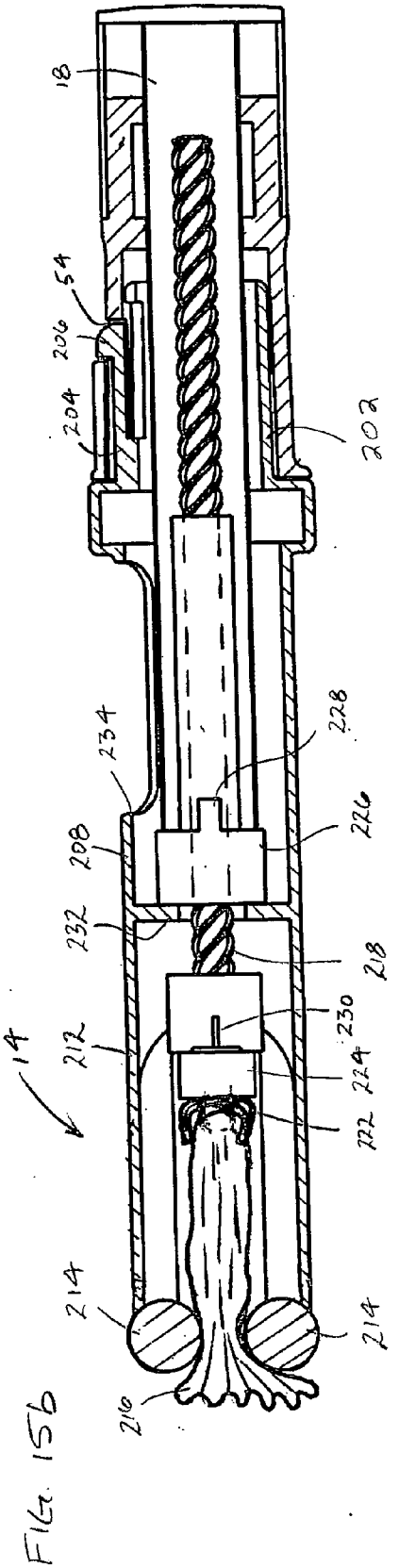


FIG. 15b

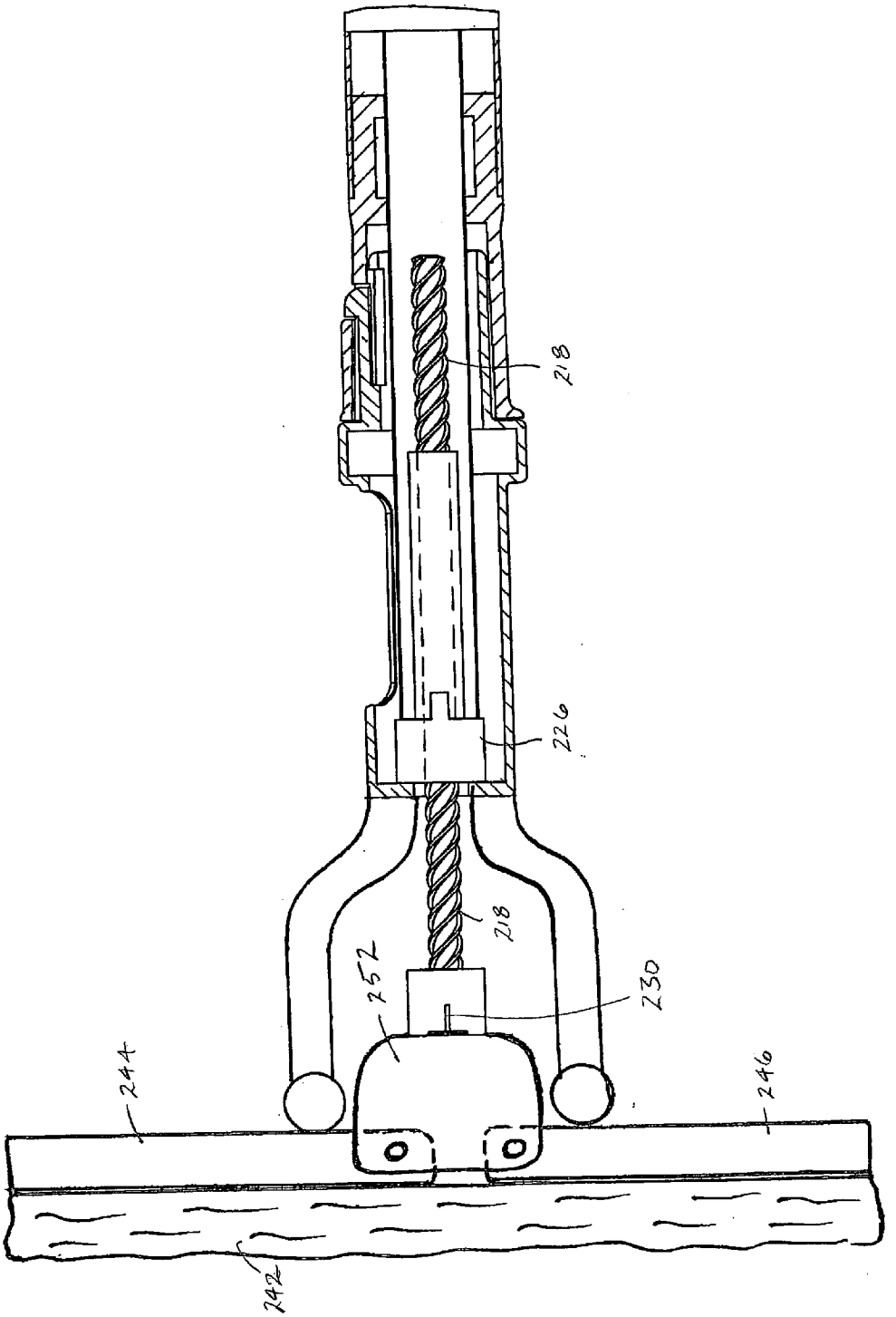


FIG. 16

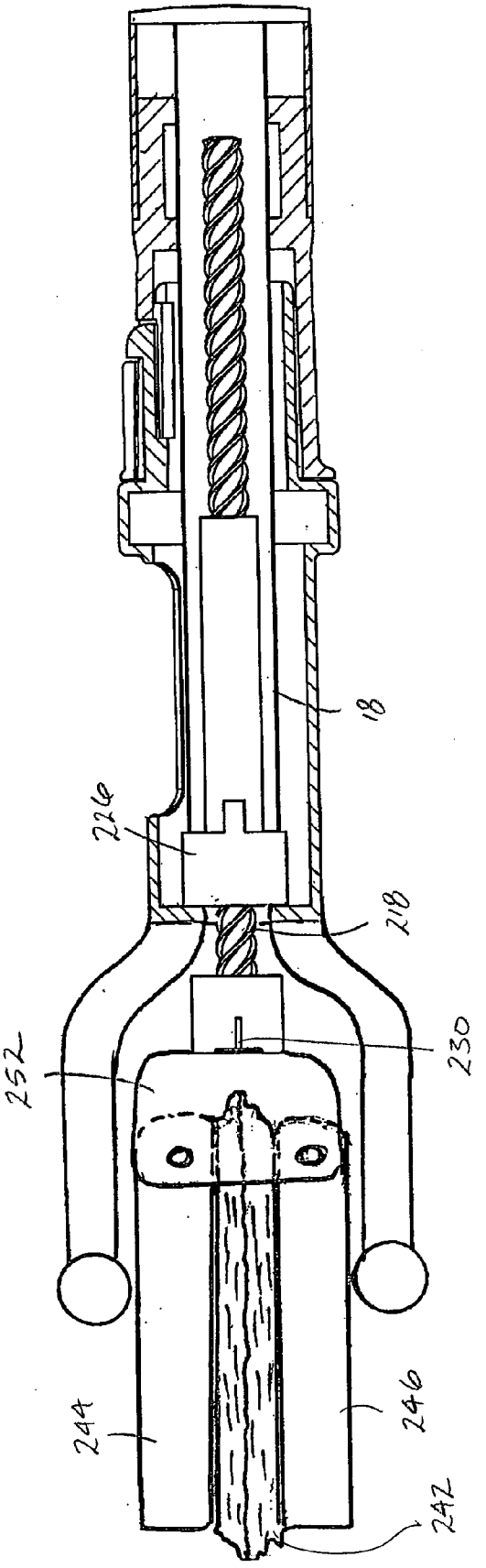


FIG. 17

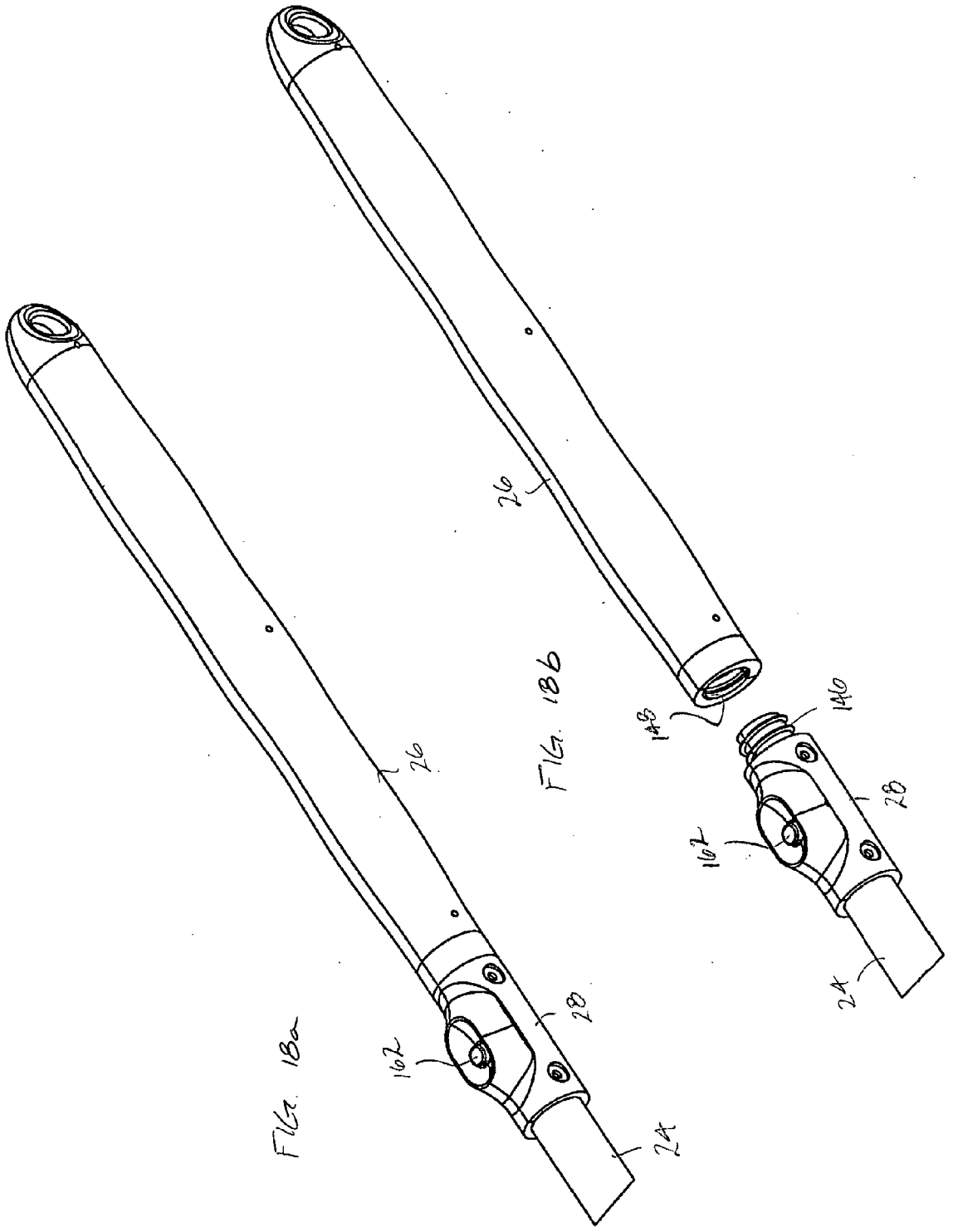


FIG. 18a

FIG. 18b

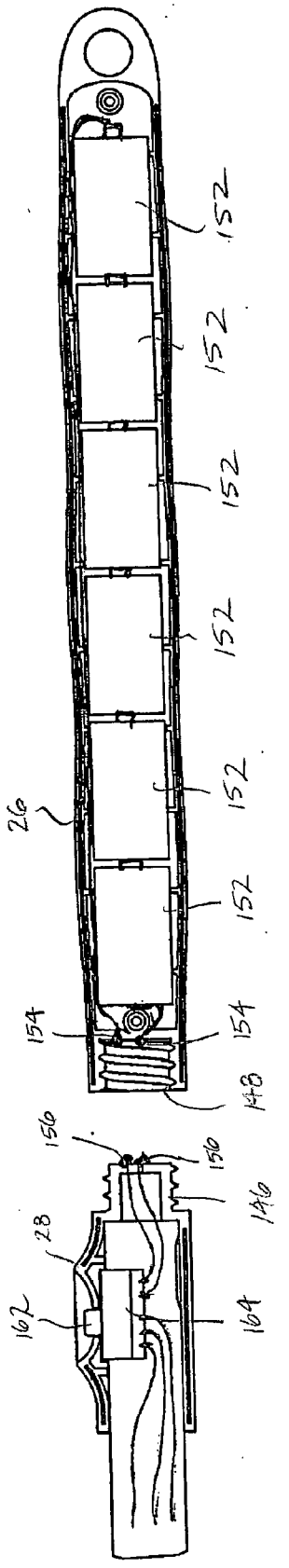


FIG. 19

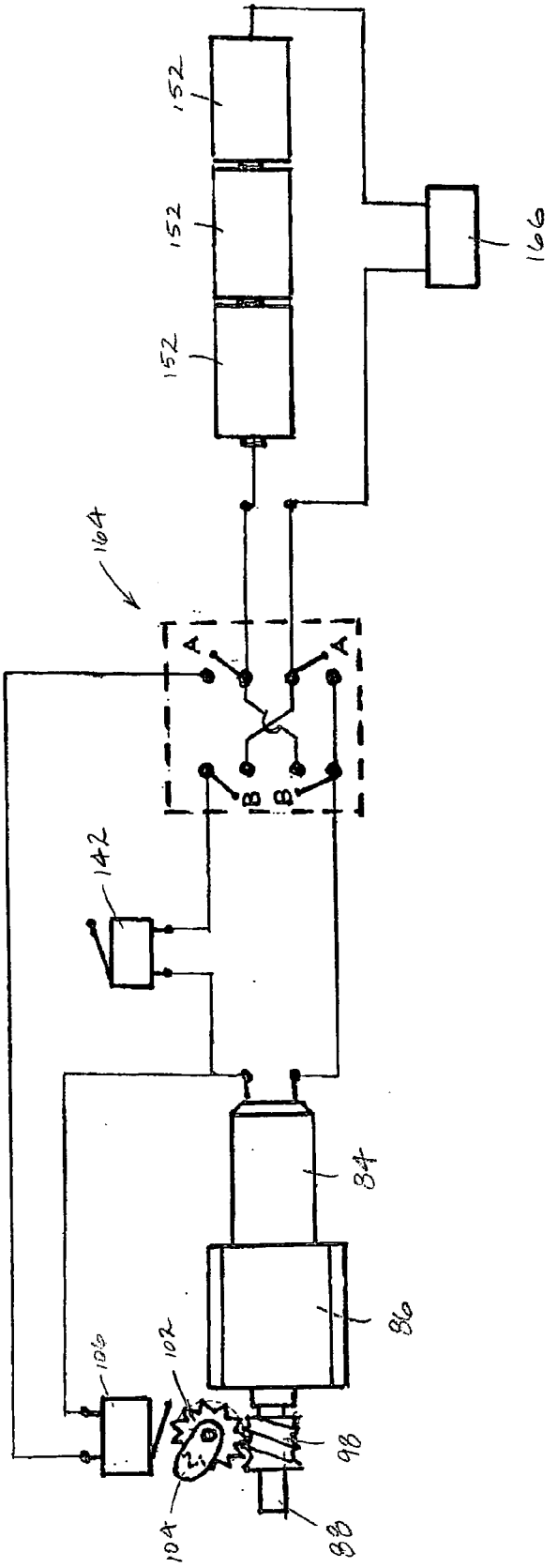
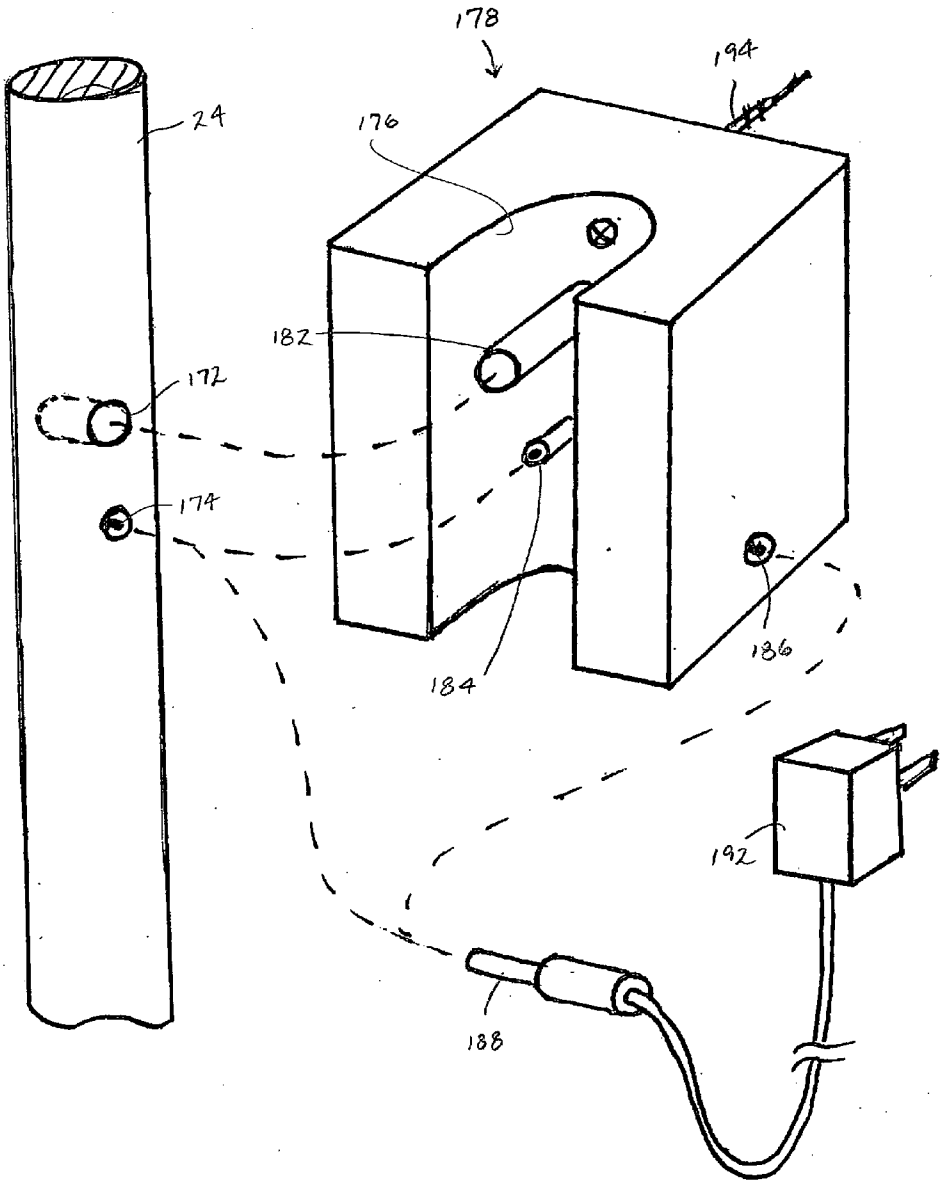


FIG. 20

FIG 21



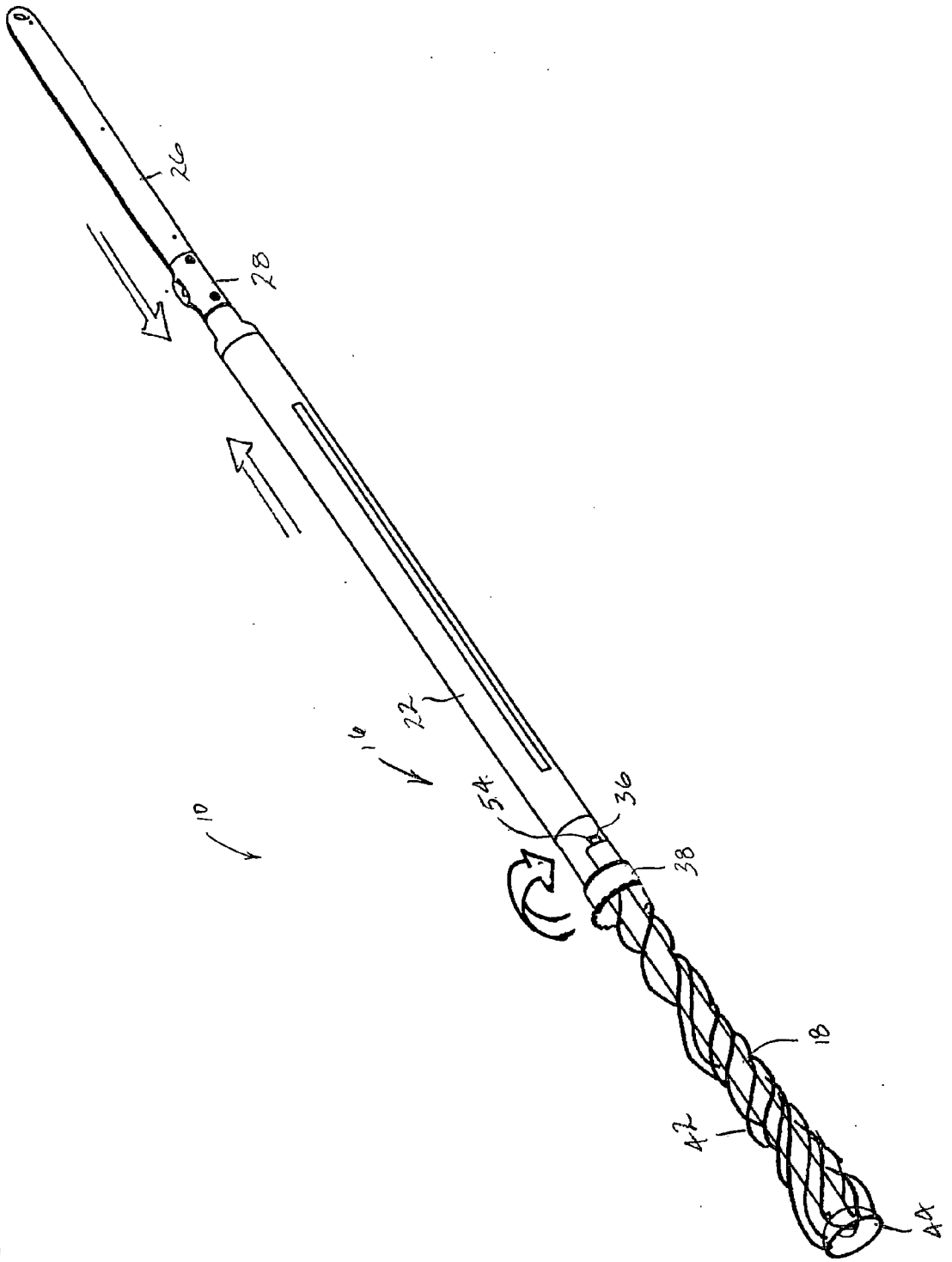


FIG. 22

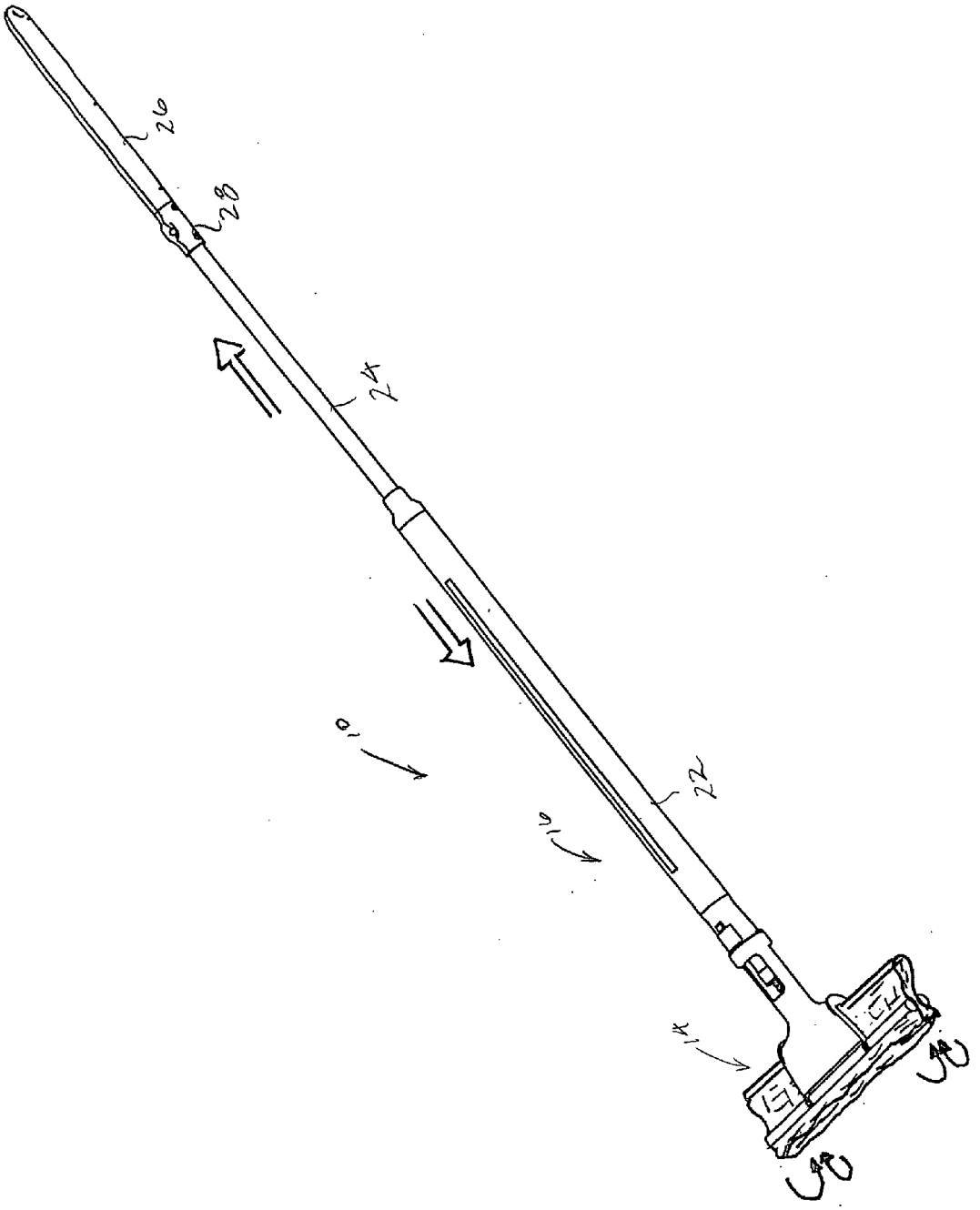


FIG. 23

MOTORIZED MOP

[0001] This application claims the benefit of U.S. Provisional Patent Application Ser. No. 60/554,122, which is herein incorporated by reference.

BACKGROUND

[0002] Mops are used to clean floors as well as other surfaces. When mopping a floor, the head of the mop can become very dirty. Both rinsing and wringing of the mop head are required during the mopping of the floor or surface. It is desirable to provide a mop that has a head that can be wrung out without requiring the user of the mop to touch the dirty mop head.

[0003] Power wringer mops are known. Once such mop includes a reversible motor that rotates a socket shaft. The socket shaft includes a receptor or opening at its bottom. A first end of a mop head is received in the opening of the socket shaft and a second end of the mop head is sandwiched between a clamp and the base of the handle. To wring the mop, the motor rotates the motor shaft which rotates the socket shaft and the first end of the mop rotates.

SUMMARY

[0004] A mop includes an elongated handle portion, a movable member slidably mounted on the handle portion, a rotary motor disposed in at least one of the elongated handle portion and the movable member, a controller in electrical communication with the motor and an associated power source, and a mop head. The controller regulates power to the motor as a function of a number of rotations of the motor. The mop head is detachably connected to at least one of the elongated handle portion and the movable member. The mop head is selectively connected to the motor.

[0005] A self-wringing mop includes an elongated handle, a movable member slidably connected to the handle, an electric reversible motor disposed in at least one of the handle and the movable member, a mop head attached to the elongated handle and the movable member, and a switch element in electrical communication with the motor and an associated power source. The mop head is operably connected to the motor. The mop head is movable between a use position and a wringing position by sliding movement of the movable member. The switch element comprises a first switch for delivering current to the motor in a first direction and a second switch for delivering current to the motor in a second, opposite, direction.

[0006] A self-wringing mop includes a handle, a slidable member slidably connected to the handle, a rotating member connected to the handle, a mop head connected to the slidable member and the rotating member, a motor operably connected to the rotating member, a power source compartment disposed in at least one of the handle portion and the slidable member, and a limit switch in electrical communication with the motor and the power source compartment. The mop head is connected to the rotating member and includes an absorbent material. The motor drives the rotating member which moves the absorbent material between a wrung and an unwrung position. The limit switch opens in response to the position of the absorbent material.

BRIEF DESCRIPTION OF THE FIGURES

[0007] A mop will take form in certain parts and arrangements of parts, embodiments of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof and wherein:

[0008] **FIG. 1** is a partially exploded view of a motorized mop showing a strand mop head and a sponge mop head removed from a handle portion.

[0009] **FIG. 2** is a perspective view of the motorized mop of **FIG. 1** having a strand mop head mounted thereto where the mop head is in a first or mopping ready position.

[0010] **FIG. 3** is a perspective view of the motorized mop of **FIG. 1** having a strand mop head mounted thereto where the mop head is in a second or wringing ready position.

[0011] **FIG. 4***a* is a side view of the mop of **FIG. 2** in a third or wrung position with strands of the mop head wound around a front tube of the mop.

[0012] **FIG. 4***b* is a side view of the mop of **FIG. 2** in the second position.

[0013] **FIG. 5** is a perspective view of the mop of **FIG. 1** having a sponge mop head attached thereto, where the sponge mop head is in a first or mopping ready, position.

[0014] **FIG. 6** is a perspective view of the mop of **FIG. 1** having a sponge mop head attached thereto, where the sponge mop head is in a second or wrung position.

[0015] **FIG. 7***a* is a partial sectional view of the mop of **FIG. 2** with strands removed and shown in the first position.

[0016] **FIG. 7***b* is a partial sectional view of the mop of **FIG. 2** with strands removed and shown in the second position.

[0017] **FIG. 8** is a perspective view of a section of an outer housing of the mop of **FIG. 1** to show internal components of the mop.

[0018] **FIG. 9** is a perspective view of a power unit housing of the mop of **FIG. 1**.

[0019] **FIG. 10** is an exploded view of the components inside the power unit housing shown in **FIG. 9**.

[0020] **FIG. 11** is a cross section of a gear box inside the power unit housing shown in **FIG. 10**.

[0021] **FIG. 12** is an exploded view of a transmission shown in **FIG. 11**.

[0022] **FIG. 13***a* is a side view in partial cross section of the mop of **FIG. 2** with the strands removed.

[0023] **FIG. 13***b* is a close-up view of a circled portion of the mop of **FIG. 13***a*.

[0024] **FIG. 13***c* is a cross section of the mop of **FIG. 13***b*.

[0025] **FIG. 14***a* is a side view in partial cross section of the mop of **FIG. 2** with the strands removed.

[0026] **FIG. 14***b* is a close-up view of the circled portion of the mop of **FIG. 14***a*.

[0027] **FIG. 15***a* is a side cross sectional view of the sponge mop head of **FIG. 1** connected to the outer housing where the sponge mop head is in a first or mopping position.

[0028] **FIG. 15***b* is a side cross sectional view of the sponge mop head of **FIG. 1** connected to the outer housing where the sponge mop head is in a second or wrung position.

[0029] **FIG. 16** is a top plan view, in partial cross section, of a second embodiment of a sponge mop connected to the handle portion of the mop of **FIG. 1**, where the sponge mop head is in a first or mopping position.

[0030] **FIG. 17** is a top plan view, in partial cross section of the mop of **FIG. 16** with the mop head shown in a second or wrung position.

[0031] **FIG. 18***a* is an enlarged perspective view of a switch compartment and battery compartment of the mop of **FIG. 1**.

[0032] **FIG. 18***b* is an enlarged exploded perspective view of the battery compartment removed from the switch compartment of the mop of **FIG. 1**.

[0033] **FIG. 19** is an enlarged cross sectional view of the switch compartment and battery compartment of the mop of **FIG. 1**.

[0034] **FIG. 20** is a schematic view of the circuitry of the mop of **FIG. 1**.

[0035] **FIG. 21** is a schematic view of a charger housing and a portion of the mop of **FIG. 1**.

[0036] **FIG. 22** is a perspective view of the mop of **FIG. 2** showing manual wringing of the strand mop head.

[0037] **FIG. 23** is a perspective view of the mop of **FIG. 5** showing manual wringing of the sponge mop head.

DETAILED DESCRIPTION

[0038] Referring now to the drawings, wherein the showings are for purposes of illustrating embodiments of a mop only and not for purposes of limiting the invention to only the described embodiments, **FIG. 1** shows a motorized mop **10** that includes a mop head, which can include a string mop head **12** and/or a sponge mop head **14**, attached to a handle portion **16**. The handle portion **16** includes a first or front tube **18** received in an outer housing **22**. The first tube **18** is slidably mounted in the outer housing **22** so that it can reciprocate in the housing. A second or rear tube **24** is also received in and can slide along the length of the outer housing **22**. The first tube **18** and the second tube **24** connect with one another, as will be described in more detail below. A battery compartment **26**, which houses the power source, attaches to a switch compartment **28** that is attached to an end of the second tube **24**.

[0039] The string mop head **12** selectively attaches to the handle portion **16**. The string mop head **12** includes a hollow cylindrical portion **32**. A resilient tab **34** having a small protrusion **36** formed at the end of the tab is formed in the hollow cylindrical portion **32**. The cylindrical portion **32** extends from an attachment ring **38** to which a plurality of mop strands **42** are secured at one end of each mop strand. The mop strands **42** are secured at an opposite end to a flared end **44** that extends from a shaft **46**. A biased button **48** extends from a side wall of the shaft **46**.

[0040] The shaft **46** selectively attaches to the front tube **18**. More specifically, the shaft **46** is received in the front tube **18** and the button **48** pops out into an opening **52** near a distal end of the front tube. Accordingly, by pushing the button **48** inwardly (towards a longitudinal axis of the shaft **46**) the shaft **46** can be selectively attached to or removed from the front tube **18**. For the shaft **46** to be received by the first tube **18**, the attachment ring **38** and the hollow cylindrical portion **32** have an opening through which both the first tube **18** and the shaft **46** can protrude. It should be appreciated, however, that the shaft **46** can attach to the front tube **18** in other known ways, including being threaded onto or into the front tube **18**.

[0041] The hollow cylindrical portion **32** selectively attaches to the outer housing **22**. An opening **54** is located adjacent an end of the outer housing **22**. The protrusion **36** at the end of the resilient tab **34** on the cylindrical portion **32** fits into the opening **54** to attach the string mop head **12** to the outer housing **22**. However, the cylindrical portion **32** can be attached to the outer housing **22** in other known ways, for example a threaded connection, using fasteners, and the like.

[0042] As mentioned above, the front tube **18** and the rear tube **24** are slidable within the outer housing **22**, as shown by the arrows in **FIG. 2**. For use, the front tube **18** is slid into the outer housing **22** and the mop head **12** is positioned to mop the floor. With reference now to **FIG. 3**, the front tube **18** is extended out of the outer housing **22** when the mop head **12** is positioned to wring. As shown in **FIGS. 2 and 3**, when the front tube **18** extends from the outer housing **22** the rear tube **24** retracts into the outer housing **22**. Likewise, when the front tube **18** retracts into the outer housing **22**, the rear tube **24** extends from the outer housing.

[0043] For wringing, and with reference to **FIG. 4***a*, the strands **42** of the mop head **12** wind around the front tube **18**. The front tube **18** rotates about its longitudinal axis while the attachment ring **38** and the outer housing **22** remains stationary. Therefore, the end of the strands **42** attached to the flared end **44** rotate and the end of the strands **42** attached to the attachment ring **38** do not rotate so that the strands **42** wind around the front tube **18**. **FIG. 4***b* shows the strands **42** in an unwound, or unwrung, condition.

[0044] With reference to **FIG. 7***a*, the connection between the front tube **18** and the rear tube **24** is shown. The front tube **18** connects to a power unit housing **56** at an end opposite the mop head **12** or **14** (not shown in **FIG. 7***a*). The rear tube **24** connects to the power unit housing **56** at an end opposite the switch compartment **28**. As seen in **FIGS. 7***a* and **7***b*, the power unit housing **56** slides within the outer housing **22**.

[0045] With reference to **FIG. 8**, a pair of wings **58**, which can be spaced 180 degrees apart from one another, protrude from the power unit housing **56**. The wings **58** are received in channels **60** formed on the inside of the outer housing **22**. Accordingly, the power unit housing **56** slides parallel to the longitudinal axis of the outer housing **22**, and the wings **58** remain in the channels **60** to preclude rotation of the power unit housing **56** about the longitudinal axis. While a pair of wings is illustrated, it should be appreciated that one, three or more wings could also be employed. Moreover, other known means of preventing the rotation of the power unit housing about the longitudinal axis of the mop can also be used.

[0046] With reference now to **FIG. 10**, the power unit housing **56** can include a first section **62** that attaches to a second section **64** to enclose a plurality of internal components. The front of the power unit housing **56**, the portion adjacent the front tube **18**, includes a plurality of openings

66 that correspond with a plurality of openings 68 in the second section 64. Fasteners (not shown) extend through the openings 66 and 68 to attach the first section 62 to the second section 64. Other known means for attaching the housing sections, such as adhesives, clips, rivets and the like could also be used to attach the sections.

[0047] Likewise, the rear of the power unit housing 56, the portion adjacent the rear tube 24, includes a pair of openings 70 in the first section 62 that align with openings 72 in the second section 64. Fasteners 74 extend through the openings 70 and 72 to engage nuts 76 to attach the rear portion of the first section 62 to the rear portion of the second section 64 of the power unit housing 56. The rear tube 24 includes a pair of openings 78 that align with the openings 70 and 72 so that fasteners 74 can protrude through the openings 78 in the rear tube 24 to affix the rear tube 24 to the power unit housing 56. Connection of the rear tube 24 to the power unit housing 56 precludes the rotation of the rear tube 24 with respect to the power unit housing. Connection of the rear tube 24 to the power unit housing 56 secures together these parts for reciprocating movement inside the outer housing. The rear tube 24 and the power unit housing 56 can also be secured together via other conventional means.

[0048] Disposed in the power unit housing 56, is a motor 84 that, via a transmission, which is disposed in a gear box 86 and will be described in more detail below, drives the rotational movement of the front tube 18. The motor 84 in a preferred embodiment is an electric reversible motor. If desired, the transmission can be a planetary gear transmission. It should be appreciated that other conventional drive mechanisms can also be used to power the front tube 18. An output shaft 88, which is connected to the transmission disposed in the gear box 86, attaches to the front tube 18. The output shaft 88 includes an opening 92 that aligns with a pair of aligned openings 94 (only one shown) in the front tube 18. A connecting pin 96 extends through the openings 92 and 94 to connect the front tube 18 to the output shaft 88.

[0049] With continued reference to FIG. 10, the first section 62 also includes a pair of aligned notches 80 that are dimensioned to receive the wings 58 of the gear box 86. Likewise, the second section 64 includes a pair of aligned notches 82 that align with the notches 80 of the first section 62. Accordingly, with the wings 58 received in the notches 80 and 82 of the power unit housing 56, the gear box 86 does not rotate with respect to the power unit housing. Also, with the wings 58 received in the channels 60 of the outer housing 22, the gear box 86 and the power unit housing 56 do not rotate with respect to the outer housing 22 but can be slid up and down inside the outer housing 22. Even though the wings 58 have been described as attached or integral with the gear box 86, the wings 58 can also attach to the power unit housing 56 to preclude its rotation. In such an embodiment, the gear box 86 would be fixed in the power unit housing 56 so that it could not rotate with respect to the power unit housing.

[0050] A worm gear 98 attaches to or is received on the output shaft 88. The worm gear 98 engages a limit gear 102 that rotates about an axis perpendicular to the worm gear. The limit gear 102 is attached to and coaxial with a cam 104. As the output shaft 88 rotates, the worm gear 98 also rotates driving the limit gear 102 to rotate the cam 104. The cam 104 engages a limit switch 106, which is electrically connected to the motor 84 and a power source, which will be described in more detail below. The cam 104 and the gears 98 and 102 are designed such that after a predetermined number rotations of the output shaft 88 and thus the motor 84, the cam 104 engages the switch 106 to stop the delivery of power to the motor 84. Even though a mechanical limit switch has been described, other conventional limit switches, or controllers including electronic limit switches, reed sensors and the like, can also be used to control the delivery of power to the motor 84.

[0051] With reference to FIG. 11, the motor 84 drives the output shaft 88 through a planetary transmission 112. Even though a planetary transmission 112 is disclosed, other conventional transmissions, including other gear reduction mechanisms, can be used with the motor 84. With reference to FIG. 12, the motor 84 drives a drive shaft 114 having a pinion 116 mounted thereto. The pinion 84 drives a plurality of first planetary gears 118 mounted to a first carrier plate 122. A first carrier pinion 124 attaches to a side of the first carrier plate 122 opposite the side to which the first planetary gears 118 mount. In this embodiment, the first carrier pinion 124 mounts to the carrier plate 122 axially aligned with the drive shaft 114 and the output shaft 88.

[0052] The first carrier plate pinion 124 can engage a plurality of second planetary gears 126 mounted to a second carrier plate 128. A second carrier pinion 132 attaches to a side of the second carrier plate 128 opposite the side to which the second planetary gears 126 mount. The second carrier pinion 132 also axially aligns with the drive shaft 114 and the output shaft 88.

[0053] The second carrier pinion 132 can engage a third plurality of planetary gears 134 which are mounted to a third carrier plate 136. It is apparent that the output shaft 88 protrudes from the third carrier plate 136. The motor 84 drives the drive shaft 114 rotating the pinion 116. The pinion 116 engages the planetary gears 118 which engage an inside surface 138 of the gear box 86. Since the gear box 86 does not rotate because the wings 56 are retained by the power unit housing 56 and the channels 60 of the outer housing 22, the first carrier plate 122 rotates about an axis defined by the drive shaft 114 and the output shaft 88. The rotation of the first carrier plate 122 results in the rotation of the first carrier pinion 124 which drives the second set of planetary gears 126. The second set of planetary gears 126 also engage the inside surface 138 of the gear box 56 resulting in rotation of the second carrier plate 128. Rotation of the second carrier plate 128 results in rotation of the second carrier pinion 132 which engages the third plurality of planetary gears 134. The third plurality of planetary gears 134 engages the inside surface 138 of the gear box 86 resulting in the rotation of the third carrier plate 136 which results in the rotation of the output shaft 88.

[0054] As mentioned above, the front tube 18 rotates to wring the string mop head 12. With reference to FIG. 13*b*, the cam 104 contacts the limit switch 106 in an off position so that power is no longer delivered to the motor 84 to stop the rotation of the front tube 18. With reference to FIG. 14*b*, when the cam 104 no longer contacts the switch 106, the switch is in the on position and power is being delivered to the motor 84.

[0055] With continued reference to FIG. 14, a second limit switch 142 can prevent operation of the motor 84 when

the front tube **18** is retracted into the outer housing **22**. The switch **142**, which is optional, is located on power unit housing **56** near the connection to the rear tube **24** and is aligned with one of the tracks **60** in the outer housing **22**. When the switch **142** is located outside of the track **60**, an arm **144** of the switch **142** is depressed and the switch prevents power from being delivered to the motor. The switch **142** is located outside of the track when the front tube **18** is retracted into the outer housing **22** and the rear tube **24** is extended from the outer housing, i.e., the mopping position. When the switch **142** is located in the track **60**, the arm **144** is extended and the switch allows power to be delivered to the motor **84**. The switch is located in the track **60** when the front tube **18** is extended from the outer housing **22** and the rear tube **24** is retracted in the outer housing, i.e., the wringing position. Even though a limit switch **142** has been described, other controllers can be used to regulate power to the motor, including sensors, e.g. optical sensors, magnetic sensors and the like.

[**0056**] With reference to **FIG. 18***a*, the battery compartment **26** selectively attaches to the switch compartment **28**. While one means of providing power to the motor **84** is the battery compartment **26**, it should be appreciated that the motor could also be powered from a wall outlet via a conventional electric cord and a transformer (not illustrated). The benefit of employing battery power for this purpose is to enable the user to move the mop as need without being tied to an electrical outlet. Referring to **FIG. 18***b*, the switch compartment **28** includes a male threaded end **146** that is received in a female threaded end **148** of the battery compartment **26**. With reference to **FIG. 19**, the battery compartment holds a plurality of batteries **152**, which is this embodiment can be C batteries. Alternatively, the one or more batteries in the battery compartment can be rechargeable cells. A pair of contacts **154** are located in the female end **148** of the battery compartment **26** that contact a pair of contacts **156** located on the male end **146** of the switch compartment **28** when the battery compartment **26** attaches to the switch compartment **28**.

[**0057**] With reference again to **FIG. 18***a*, the user of the mop **10** depresses a button **162** to actuate the wringing of the mop head **12**. The button **162** controls a main switch **164**, which is electrically connected to the batteries **152** and the motor **84**. With reference to **FIG. 20**, the main switch **164** includes internal switches A and B. When the button **162** (**FIG. 18**) is depressed, switch A opens and switch B closes so that the motor turns in a first, wringing, direction. When the button **162** is released, switch B opens and switch A closes so that the motor turns in a second, unwinding, direction, which is opposite the first direction. As mentioned, the limit switch **106** controls the delivery of power to the motor **84** when button **162** is released.

[**0058**] While the switch **106** controls the power to the motor **84**, the position of the cam **104** controls the operation of the switch. In this manner, the switch **106** can be referred to as self-positioning because power will be delivered to the motor **84** until the cam **104** returns to a predetermined position whereby the switch **106** is returned to the off position and power is no longer delivered to the motor **84**.

[**0059**] As also seen in **FIG. 20**, the second limit switch **142** can also control the delivery of power to the motor **84**. The second limit switch can be referred to as a safety switch since it precludes the delivery of power to the motor **84** when the front tube **18** is retracted in the outer housing **22**.

[**0060**] The circuitry for the mop **10** can also include an overload switch **166**. The overload switch **166** can be a bi-metal switch that cuts out or shorts when the current being delivered to the motor **84** is too high over a predetermined time. The overload switch can prevent motor burnout and save batteries. A current at which the overload switch **166** cuts out can be dependent upon the type of electric motor **84** and power source. The overload switch **166** cuts out power when the motor **84** stalls, such as when the string mop head **12** is fully twisted and continues to try to twist.

[**0061**] In addition to, or in lieu of, using conventional batteries to power the mop **10**, the mop can include a rechargeable power source. With reference to **FIG. 21**, the rear tube **24** can include a mounting opening **172** and a plug inlet **174**. The rear tube **24** is received in a recess **176** formed in a charger/hanger housing **178**. A mounting hook **182** and an electric plug **184** are positioned in the recess **176**. The mounting hook **182** is received in the mounting opening **172** to retain the rear tube **24**. The plug **184** is received in the plug inlet **174** to deliver power to the rechargeable power source.

[**0062**] The charger/hanger housing **178** electrically connects to a conventional wall outlet (not shown). The housing **178** can include a plug inlet **186** that is electrically connected to the plug **184**. The plug inlet **186** receives a plug **188** which is electrically connected to a wall transformer **192** that plugs into the conventional wall outlet. The wall transformer **192** is generally known in the art and can include a class 2 power supply. The housing **178** can include a fastener **194** so that the housing **178** can mount to a wall so that the entire unit can be hung and recharged at the same time.

[**0063**] In the event of a power failure, or when desirable, a user of the mop **10** can also manually wring the mop head **12**. To wring manually, the attachment ring **38** is rotated when the front tube **18** is extended from the outer housing **22**. To rotate the attachment ring **38**, the attachment ring **38** is removed from the outer housing **22** by removing the protrusion **36** from the opening **54** in the outer housing **22**. The attachment ring **38** can then be rotated.

[**0064**] With reference back to **FIG. 1**, the sponge mop head **14** can also selectively attach to the handle portion **16**. The sponge mop head **14** includes a hollow cylindrical portion **202** received in the outer housing **22**. A resilient tab **204** having a protrusion **206** is formed in the hollow cylindrical portion **202**, similar to the string mop head **12**. The protrusion **206** extends into the opening **54** in the outer housing **22** to attach the sponge mop head **14** to the outer housing. As seen in **FIGS. 5 and 6**, the sponge mop head **14** can also be automatically wrung.

[**0065**] With reference to **FIGS. 15***a* and **15***b*, the cylindrical portion **202** of the sponge mop head **14** projects from a head frame **208** having a U-shaped end **212**. A pair of rollers **214** attach at each end of the U-shaped end **212**. A sponge **216** is retractable into an interior space defined by the U-shaped end. In one means of attachment, the sponge **216** attaches to a lead screw **218**, which is aligned with the longitudinal axis of the front tube **18** when the head **14** is attached to the outer housing **22**, through a clamp **222** and bar **224**. The sponge **216** is selectively removable from the clamp **222** by loosening wing nuts **230** located on the bar **224**.

[0066] A lead screw nut **226** is threadably received on the lead screw **218**. Included is an attachment member **228** to attach the lead screw nut **226** to the front tube **18**. The lead screw nut **226** is retained by an internal wall **232** of the head frame **208**. Accordingly, as the front tube **18** is rotated by the motor **84**, the front tube turns the lead screw nut **226**. Since the lead screw nut **226** can not move axially along the lead screw **218** because of the internal wall **232**, the lead screw **218** is drawn axially into the front tube **18** as the lead screw nut **226** is tightened. The limit switches **106**, **142** and **166** discussed above can control the movement of the lead screw **218**.

[0067] An opening **234** is also provided in the head frame **208** to provide access to the attachment member **228**. The opening **234** allows the user of the mop **10** to reach in and disconnect the front tube **18** from the lead screw nut **226** so that the sponge mop head **14** can be removed from the handle portion **16**.

[0068] With reference to **FIG. 16**, a flat sponge **242** can also be selectively attached to the handle portion **16**. The flat sponge **242** attaches to a first plate **244** and a second plate **246**. The first plate **246** pivotally mounts to a hinge **252** and the second plate **246** also pivotally mounts to the hinge **252**. In this embodiment, the hinge attaches to the lead screw **218**, described above. The lead screw **218** cooperates with the lead screw nut **226** and the front tube **18** in a similar manner to the mop head **14** described above. In the embodiment depicted in **FIGS. 16 and 17**, the space defined by the U-shaped portion of the frame can be larger to accommodate the flat sponge **242** and the plates **244** and **246**.

[0069] With reference to **FIG. 23**, the user of the mop **10** with the sponge mop head **14** can also manually wring the sponge mop head when so desired. To manually wring the sponge mop head **14**, the front tube **18** is retracted into the outer housing **22** and the rear tube **24** is pulled from the outer housing. With reference back to **FIGS. 15***a* and **15***b*, this action pulls the lead screw nut **226** away from the internal wall **232**, which pulls the lead screw **218** toward the rear of the handle portion. This pulls the sponge **216** back into the space defined by the U-shaped end **212** so that the sponge is forced between the rollers **214**.

[0070] The mop has been described with reference to preferred embodiments. Modifications and alterations will occur to those upon reading the preceding description. All such modifications that come within the appended claims, or the equivalents thereof, are intended to be covered.

1. A mop comprising:

an elongated handle portion;

a movable member slidably mounted on the handle portion;

a rotary motor disposed in at least one of the elongated handle portion and the movable member;

a controller in electrical communication with the motor and an associated power source, wherein the controller regulates power to the motor as a function of a number of rotations of the motor; and

a mop head including an absorbent material, the mop head being detachably connected to at least one of the elongated handle portion and the movable member, and being selectively connected to the motor.

2. The mop of claim 1, wherein the absorbent material comprises a sponge.

3. The mop of claim 1, wherein the absorbent material comprises a plurality of fiber strands.

4. The mop of claim 1, wherein the mop head includes a first latch element and the movable member includes a second latch element, the first and second latch elements cooperating to selectively secure the mop head to the movable member.

5. The mop of claim 1, further comprising a battery compartment for storing batteries to power the motor.

6. The mop of claim 5, futher comprising an on-off switch in electrical communication with the battery compartment and the motor.

7. The mop of claim 1, wherein the control further comprises a mechanical limit switch for controlling the number of rotations of the motor in at least a first rotational direction.

8. The mop of claim 1, further comprising a switch in electrical communication with the motor and the associated power source, wherein the switch controls the amount of current flowing to the motor.

9. The mop of claim 1, further comprising a switch in electrical communication with the motor and the associated power source, wherein the switch controls power to the motor as a function of the location of the movable member in relation to the handle portion.

10. The mop of claim 1, wherein at least one of the movable member and the handle portion is configured to limit rotational movement of at least a portion of the handle portion with respect to the movable member.

11. The mop of claim 1, wherein the mop head is movable between a use position and a wringing position by sliding movement of the movable member.

12. A self-wringing mop comprising:

an elongated handle;

a movable member slidably connected to the handle;

an electric reversible motor disposed in at least one of the handle and the movable member;

a mop head attached to the elongated handle and the movable member, and operably connected to the motor, wherein the mop head is movable between a use position and a wringing position by sliding movement of the movable member; and

a switch element in electrical communication with the motor and an associated power source, wherein the switch element comprises a first switch for delivering current to the motor in a first direction and a second switch for delivering current to the motor in a second, opposite, direction.

13. The self-wringing mop of claim 12, further comprising a button for activating the switch element, wherein upon pressing the button the first switch is closed and the second switch is open, and upon releasing the button the second switch is closed and the first switch is open.

14. The self-wringing mop of claim 12, further comprising a limit switch in electrical communication with the motor and the power source, wherein the limit switch is opened and closed in response to movement of the mop head.

15. The self-wringing mop of claim 12, further comprising an overload switch in electrical communication with the motor and the power source, wherein the overload switch opens at a predetermined current.

16. The self-wringing mop of claim 12, wherein the mop head comprises a sponge mop and when the first switch is closed current is delivered to the motor in the first direction so that the sponge mop moves from a use position to a wrung position and when the second switch is closed current is delivered to the motor in the second direction so that the sponge mop moves from the wrung position to the use position.

17. The self-wringing mop of claim 12, wherein the mop head comprises a plurality of fiber strands and when the first switch is closed current is delivered to the motor in the first direction so that the fiber strands are wound in a first rotational direction and when the second switch is closed current is delivered to the motor in the second direction so that the fiber strands are unwound in a second rotational direction.

18. A self-wringing mop comprising:

a handle;

a slidable member slidably connected to the handle;

a rotating member connected to the handle;

a mop head connected to the slidable member and the rotating member, the mop head comprising an absorbent material;

a motor operably connected to the rotating member, wherein the motor drives the rotating member which moves the absorbent material between a wrung and an unwrung position;

a power source compartment disposed in at least one of the handle and the slidable member for receiving an associated power source; and

a limit switch in electrical communication with the motor and the power source compartment, the limit switch opens in response to the position of the absorbent material.

19. The self-wringing mop of claim 18, wherein the mop head is movable between a use position and a wringing position by sliding movement of the slidable member.

20. The self-wringing mop of claim 19, further comprising a button, and a switch element in selective contact with the button, wherein the switch element comprises a first switch for delivering current to the motor in a first direction and a second switch for delivering current to the motor in a second, opposite, direction.

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