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Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) Mop with rotatable head

(57) The fringe mop has a handle (10) and a rotatable head (20).
The handle (10) has an outer tube (11), a spiral shaft (112), an inner tube (12), a transmitter (121) and a guide (122). The spiral shaft (112) is held within the outer tube (11). The inner tube (12) is rotatably and longitudinally slidably mounted in the outer tube (11) around the spiral shaft (112). The transmitter (121) is a sleeve attached to the inner surface of the inner tube (12) and has multiple basal teeth (1213). The guide (122) rotatably and slidably engages the spiral shaft (122) and has multiple driving teeth (1222). The driving teeth (1222) engage the basal teeth (1213).
The rotatable head (20) is for cleaning, and is attached to the inner tube (12).

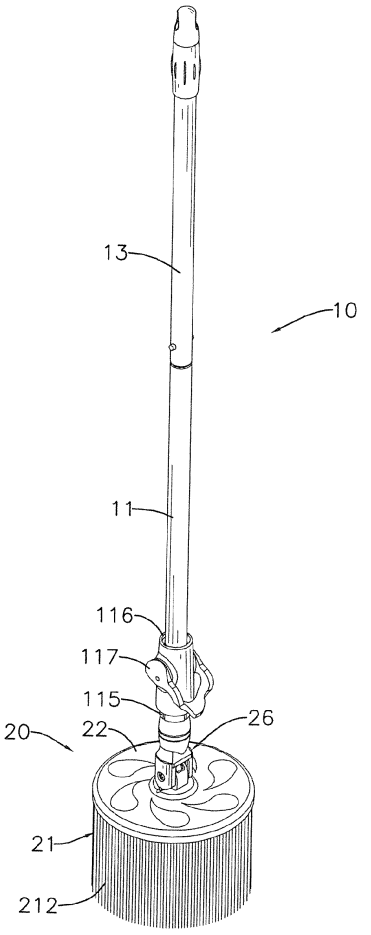

FIG. 1

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Description

[0001] The present invention relates to a mop, especially to a mop with a rotatable head.

[0002] A conventional mop is used to wash floors and comprises a handle and a head. The handle comprises two ends. The head is attached to one end of the handle and comprises a cleaning means, preferably a cluster of fabric strips, which absorbs water in use.

[0003] However, removing water from the head is tedious and dirty work, which is unavoidable when using the conventional mop.

[0004] To overcome the shortcomings, the present invention provides a mop to mitigate or obviate the aforementioned problems.

[0005] The main objective of the invention is to provide a mop capable of removing water easily.

[0006] The mop in accordance with the present invention has a handle and a head.

[0007] The handle has an outer tube, a spiral shaft, an inner tube, a transmitter and a guide. The spiral shaft is held within the outer tube. The inner tube is rotatably and longitudinally mounted slidably in the outer tube around the spiral shaft and has an inner surface. The transmitter is a sleeve attached to the inner surface of the inner tube and has multiple basal teeth. The guide is rotatably and slidably mounted around the spiral shaft and has multiple driving teeth. The driving teeth engage the basal teeth.

[0008] The head is for cleaning and is attached to the inner tube.

[0009] When the handle is forced to retract, the guide rotates and slides along the spiral shaft and drives the transmitter to rotate. When the handle is extended, the driving teeth leave basal teeth for preparing a next stroke without reverse-rotating the transmitter.

[0010] Other objectives, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

In the drawings:

[0011]

Fig. 1 is a perspective view of a mop in accordance with the present invention;
Fig. 2 is an exploded perspective view of the mop in Fig. 1;
Fig. 3 is a partial exploded perspective view of a handle of the mop in Fig. 1;
Fig. 4 is a perspective view of a guide and a transmitting sleeve in partial section of the handle of the mop in Fig. 1;
Fig. 5 is a side view in partial section of the handle of the mop in Fig. 1, wherein the handle is extended;
Fig. 6 is another side view in partial section of the handle of the mop in Fig. 1, wherein the handle is retracted;
Fig. 7 is an exploded perspective view of a head of the mop in Fig. 1;
Fig. 8 is an operational perspective view of the mop in Fig. 1 being used with a rotatable basket mounted in a pail.
Fig. 9 is a side view in partial section of the handle of the mop in Fig. 1; and
Fig. 10 is another side view in partial section of the handle of the mop in Fig. 9.

[0012] With reference to Figs. 1 and 2, a mop in accordance with the present invention comprises a handle (10) and a head (20).

[0013] With reference to Fig. 3, the handle (10) is a telescopic tube and comprises an outer tube (11), a spiral shaft (112), an inner tube (12), a transmitter (121), a guide (122), an optional body (13) and an optional rod (126).

[0014] The outer tube (11) comprises an inner surface, a first end (1101) and a second end (1102).

[0015] The spiral shaft (112) is held within the outer tube (11) and comprises a first end (1121) and second end (1122). The first end (1121) of the spiral shaft (112) is positioned between the first end (1101) and the second end (1102) of the outer tube (11).

[0016] Preferably, the handle (10) further comprises a holder (111). The holder (111) is for holding the spiral shaft (112) within the outer tube (11) and is attached to the inner surface of the outer tube (11) between the first end (1101) and second end (1102) of the outer tube (11).

[0017] Preferably, the handle (10) further comprises a weight (113). The weight (113) is for stabilizing the spiral shaft (112) and attached to the spiral shaft (112) between the first end (1121) and the second end (1122) of the shaft (112).

[0018] More preferably, the handle (10) further comprises a cap (114). The cap is for holding the weight (113) attached to the spiral shaft (112) and is attached to the spiral shaft (112) between the weight (113) and the second end (1122) of the shaft (112).

[0019] Preferably, the outer tube (11) further comprises two fastening holes (119) and the handle (10) further comprises an inner sleeve (115) and an outer sleeve (116). The two fastening holes (119) are for connecting the outer tube (11) to the inner tube (12) and are defined beside the second end (1102) of the outer tube (11). The inner sleeve (115) is mounted around the outer tube (11), covering the fastening holes (119) and comprises two internal protrusions (1151). The two internal protrusions (1151) respectively penetrate through the fastening holes (119). The outer sleeve (116) is mounted around the inner sleeve (115).

[0020] With reference to Figs. 9 and 10, more preferably, the handle (10) further comprises a lock (117), wherein the inner sleeve (115) further comprises multiple slits (1152) and the outer sleeve (116) further comprises two pear-shaped holes (1161). Each of the pear-shaped holes (1161) has a smooth pear-shaped inner surface. The slits (1152) are longitudinally formed and equally di-

viding a lower portion of the inner sleeve (115).

[0021] The pear-shaped holes (1161) are respectively formed through the outer sleeve (116) and corresponding to each other. The lock (117) pivotally clamps the outer sleeve (116) and comprises two arc-shaped blocks (1171). The arc-shaped blocks (1171) are respectively inserted into the pear-shaped holes (1161) and each comprises an arc-shaped outer surface. The outer surfaces of the arc-shaped blocks (1171) abut to the inner surfaces of the pear-shaped holes (1161) respectively. When the user turns the lock (117), the arc-shaped blocks (1171) pushes the inner surfaces of the pear-shaped holes (1161) and forces the outer sleeve (116) to move downwards. The downward-moving outer sleeve (116) receives the inner sleeve (115).

[0022] The lower portion of the inner sleeve (115), when received in the outer sleeve (115), is radially and inwardly pressed by the outer sleeve (115) and thus firmly hold the inner tube (12) from sliding.

[0023] The inner tube (12) is telescopically mounted in the outer tube (11) around the spiral shaft (112). The inner tube (12) is capable of rotating and longitudinally sliding within the outer tube (11) and comprises an inner surface, a first end (1201) and a second end (1202).

[0024] With reference to Figs. 3 and 4, the transmitter (121) is a sleeve attached to the inner surface of the inner tube (12) between the first end (1201) and the second end (1202) of the inner tube (12) around the spiral shaft (112) and comprises an outer surface, a first opening (1211), an inner flange (1212) and multiple basal teeth (1213). The inner flange (1212) comprises a first surface. The first surface of the inner flange (1212) faces the first opening (1211). The basal teeth (1213) are formed on the first surface of the inner flange (1212) facing the first opening (1211).

[0025] The guide (122) engages the spiral shaft (112) between the first end (1121) of the spiral shaft (112) and the inner flange (1212) of the transmitter (121) and comprises a through hole (1221) and multiple driving teeth (1222). The multiple driving teeth (1222) are for engaging the basal teeth (1213) of the transmitter (121).

[0026] With further reference to Figs. 5 and 6, preferably, when the outer tube (11) further comprises two fastening holes (119) and the handle (10) further comprises an inner sleeve (115) and an outer sleeve (116), the handle (10) further comprises a collar (123). The collar (123) is for engaging the internal protrusions (1151) and is attached to the outer surface of the transmitter (121). The collar (123) is positioned between the first end (1101) of the outer tube (11) and the internal protrusions (1151) and is capable of sliding therebetween.

[0027] More preferably, the transmitter (121) further comprises an outer flange (1214) and a first portion, and the handle (10) further comprises a plug (124). The outer flange (1214) is defined on the outer surface of the transmitter (121) and comprises an outer diameter, a first surface and a second surface, wherein the second surface of the outer flange (1241) engages the first end (1201) of the inner tube (12). The first portion is defined between the first opening (1211) of the transmitter (121) and the first surface of the outer flange (1214) and comprises an outer diameter. The plug (124) is for limiting the guide (122) inside the transmitter (121) and is plugged into the first opening (1211) of the transmitter (121).

[0028] The aforementioned plug (124) may further comprise an enlarged portion (1241). The enlarged portion (1241) extends radially and comprises a diameter. The diameter of the enlarged portion (1241) is larger than the outer diameter of the first portion of the transmitter (121), but smaller than the outer diameter of the outer flange (1214). Preferably, the collar (123) is attached to the outer surface of the transmitter (121) between the enlarged portion (1241) and the first surface of the outer flange (1214).

[0029] With reference to Figs. 1 and 2, the optional body (13) is mounted to the first end (1101) of the outer tube (11). The user may hold the body (13) and the outer tube (11) to operate the mop in accordance with the present invention.

[0030] Preferably, the body (13) is tubular and comprises a first end (1301) and a second end (1302). The second end (1302) of the body (13) is connected to the first end (1101) of the outer tube (11).

[0031] More preferably, the outer tube (11) further comprises two clipping holes (118) and the body (13) further comprises two clip holes (131) and a fastener (133). The two clipping holes (118) is defined beside the first end (1101) of the outer tube (11). The two clip holes (131) respectively correspond to the two clipping holes (118) and are defined beside the second end (1302) of the body (13). The fastener (133) is resilient and is for mounting the body (13) to the first end (1101) of the outer tube (11). The fastener (133) comprises two sides and two external protrusions. The two external protrusions are defined respectively on the two sides. One of the external protrusions is inserted in one of the clipping hole (118) as well as in one clip hole (131). The other external protrusion is inserted in the other clipping hole (118) and the other clip hole (131).

[0032] More preferably, the body (13) further comprises a seal (134) and a hanger (135). The seal (134) is attached to the first end (1301) of the body (13). The hanger (135) is attached to the seal (134) and comprises a hanging hole (1351). The hanging hole (1351) is for hanging the mop and allows air-drying of the mop after use.

[0033] The head is for cleaning applications, especially for cleaning floors, and attached to the second end (1202) of the inner tube (12).

[0034] With reference to Fig. 7, the inner tube (12) may further comprise two head holes (127). The two head holes (127) are defined beside the second end (1202) of the inner tube (12).

[0035] The optional rod (126) is for attaching the head (20) to the second end (1202) of the inner tube (12) and mounted in the inner tube (12) at the second end (1202).

The rod (126) comprises a rod hole (1261). The rod hole (1261) corresponds to the two head holes (127).

[0036] Preferably, the head (20) is pivotally connected to the second end (1202) of the inner tube (12) and comprises a joint (26), a pin (27), a cleaning means (21) and a connector (23).

[0037] The joint (26) is connected to the rod (126) and the second end (1202) of the inner tube (12) and comprises an outer surface, a recess (264), two joint holes (263), a pair of receiving clamps (261) and two receiving holes (2612).

[0038] The recess (264) receives the second end (1202) of the inner tube (12). The two joint holes (263) is defined through the outer surface of the joint (26), communicating with the recess (264), corresponding to the rod hole (1261) of the rod (126) and respectively corresponding to the two head holes (127) of the inner tube (12). The receiving clamps (261) are rotatable relative to the recess (264) and comprise two arms (2611). The two receiving holes (2612) are respectively defined through the arms (2611).

[0039] The joint (26) may further comprise an annular slot (265). The annular slot (265) is formed on the outer surface of the joint (265).

[0040] The pin (27) is inserted through the joint holes (263), the head holes (127) and the rod hole (1261). The pin (27) may further comprises a c-ring (271) for locking on the outer surface of the joint (265), preferably, inserted in the annular slot (265), in order to hold the pin (27) in the joint holes (263), the head holes (127) and the rod hole (1261).

[0041] The cleaning means (21) is used for cleaning applications. One preferred embodiment of the cleaning means (21) comprises a basal plate (211) and multiple fabric strips (212). The basal plate (211) is attached to the aforementioned cover (22). Since the cover (22) is clamped between the reinforcing member (25) and the connector (23), which is pivotally connected to the joint (26), the basal plate (211) is thus indirectly connected to the second end (1202) of the inner tube (12) through the joint (26). The fabric strips (212) are a preferred implementation for cleaning floors and are attached to the basal plate (211).

[0042] The connector (23) is for connecting the cleaning means (21) to the joint (26) and comprises a stem (231). The stem (231) is pivotally received in the receiving clamps (261) between the arms (2611).

[0043] More preferably, the connector (23) further comprises a stem hole (232) and a radially extending disc (233), while the head (20) further comprises a reinforcing member (25), a cover (22) and an annular pad (24).

[0044] The stem hole (232) is for pivotally connecting the stem (231) to the receiving clamps (261), defined through the stem (231) and corresponding to the receiving holes (2612).

[0045] The reinforcing member (25) is mounted between the receiving clamps (261) and the connector (23) and comprises two walls (251) and two wall holes (252). The two walls (251) receive the stem (231) therebetween. The wall holes (252) are respectively defined through the two walls (251). The wall holes (252) correspond to the stem hole (232) and respectively correspond to the receiving holes (2612).

[0046] The cover (22) is clamped between the reinforcing member (25) and the disc (233) of the connector (23) and comprising a central hole (221). The central hole is penetrated by the stem (231).

[0047] The annular pad (24) is for preventing slippage between the cover (22) and the connector and is mounted between the disc (233) and the cover (22).

[0048] With further reference to Figs. 5 and 6, when the handle (10) is forced to retract, the guide (122) rotates and slides along the spiral shaft (112) and drives the transmitter (121) to rotate. When the handle (10) is extended, the driving teeth (1222) of the reverse-rotating guide (122) leave basal teeth (1212) and make a next stroke possible without reverse-rotating the transmitter (121). In addition, the transmitter (121), the inner tube (12) and the head (20) are left rotating while the handle (10) is extending for the next stroke.

[0049] The next stroke is preformed by retracting the handle (10), which forces the guide (122) to rotate and accelerate the transmitter (121) with the driving teeth (1222).

[0050] Performing strokes by reciprocatorily moving the handle (10) allows the head (20) to continue rotate with the inner tube (12) and the transmitter (121). Water absorbed in the head (20) is centrifuged out from the rotating head (20). Thus the user can easily remove water from the head (20) without doing the same by hand.

[0051] With reference to Fig. 8, the structure of the mop in accordance with the present invention may be used in a pail (30) that collects water centrifuged-out from the head (20). Preferably, the pail (30) comprises a rotatable basket (40) receiving the head (20) and capable of rotating with the same.

Claims

1. A mop comprising a handle (10) and a head (20) and **characterized in that**
   the handle (10) is a telescopic tube and comprises
   an outer tube (11) comprising
   a first end (1101); and
   a second end (1102);
   a spiral shaft (112) held within the outer tube (11) and comprising
   a first end (1121) positioned between the first end (1101) and second end (1102) of the outer tube (11); and
   a second end (1122);
   an inner tube (12) rotatably and longitudinally slidably mounted in the outer tube (11) around the spiral shaft (112) and comprising

an inner surface;
a first end (1201); and
a second end (1202);
a transmitter (121) being a sleeve attached to the inner surface of the inner tube (12) between the first end (1201) and the second end (1202) of the inner tube (12) around the spiral shaft (112) and comprising
an outer surface;
a first opening (1211);
an inner flange (1212) comprising
a first surface facing the first opening (1211); and multiple basal teeth (1213) formed on the first surface of the inner flange (1212) facing the first opening (1211); and
a guide (122) rotatably and slidably engaging the spiral shaft (112) between the first end (1121) of the spiral shaft (112) and the inner flange (1212) of the transmitter (121) and comprising
a through hole (1221) receiving the spiral shaft (112); and multiple driving teeth (1222) for engaging the basal teeth (1213) of the transmitter (121); and
the head (20) is for cleaning applications and attached to the second end (1202) of the inner tube (12).

2. The mop as claimed in claim 1, wherein
the mop further comprises
a body (13) mounted to the first end (1101) of the outer tube (11).

3. The mop as claimed in claim 2, wherein
the body (13) is tubular and comprises
a first end (1301);
a second end (1302) connected to the first end (1101) of the outer tube (11).

4. The mop as claimed in claim 3, wherein
the outer tube (11) further comprises
two clipping holes (118) defined beside the first end (1101) of the outer tube (11); and
the body (13) further comprises
two clip holes (131) respectively corresponding to the two clipping holes (118) and defined beside the second end (1302) of the body (13); and
a fastener (133) for mounting the body (13) to the first end (1101) of the outer tube (11), being resilient and comprises
two sides; and
two external protrusions defined respectively on the two sides and one of which inserted in one clipping hole (118) as well as in one clip hole (131) while the other in the other clipping hole (118) and the other clip hole (131).

5. The mop as claimed in claim 3, wherein
the body (13) further comprises
a seal (134) attached to the first end (1301) of the body (13); and a hanger (135) attached to the seal (134) and comprising
a hanging hole (1351).

6. The mop as claimed in claim 1, wherein
the handle (10) further comprises a weight (113) for stabilizing the spiral shaft (112) and attached to the spiral shaft (112) between the first end (1121) and the second end (1122) of the shaft (112).

7. The mop as claimed in claim 6, wherein
the handle (10) further comprises a cap (114) for holding the weight (113) and attached to the spiral shaft (112) between the weight (113) and the second end (1122) of the shaft (112).

8. The mop as claimed in claim 1, wherein
the outer tube (11) comprises
an inner surface; and
the handle (10) further comprises
a holder (111) for holding the spiral shaft (112) and attached to the inner surface of the outer tube (11) between the first end (1101) and second end (1102) of the outer tube (11);

9. The mop as claimed in claim 1, wherein
the outer tube (11) further comprises
two fastening holes (119) defined beside the second end (1102) of the outer tube (11); and
the handle (10) further comprises
an inner sleeve (115) mounted around the outer tube (11), covering the fastening holes (119) and comprising
two internal protrusions (1151) respectively penetrating through the fastening holes (119);
an outer sleeve (116) mounted around the inner sleeve (115); and a collar (123) for engaging the internal protrusions (1151) and attached to the outer surface of the transmitter (121) and slidably positioned between the first end (1101) of the outer tube (11) and the internal protrusions (1151); and

10. The mop as claimed in claim 9, wherein
the transmitter (121) further comprises
an outer flange (1214) defined on the outer surface of the transmitter (121) comprising
an outer diameter;
a first surface; and
a second surface engaging the first end (1201) of the inner tube (12); and
a first portion defined between the first opening (1211) of the transmitter (121) and the first surface of the outer flange (1214) and comprising
an outer diameter; and
the handle (10) further comprises
a plug (124) for limiting the guide (122) inside the transmitter (121) and plugged into the first opening (1211) of the transmitter (121).

11. The mop as claimed in claim 10, wherein
the plug (124) further comprises
an enlarged portion (1241) extending radially and comprising
a diameter larger than the outer diameter of the first portion of the transmitter (121) but smaller than the outer diameter of the outer flange (1214); and
the collar (123) is attached to the outer surface of the transmitter (121) between the enlarged portion (1241) and the first surface of the outer flange (1214).

12. The mop as claimed in claim 10, wherein
the handle (10) further comprises
a ring (125) for stabilizing the spiral shaft (112) attached to the plug (124) around the spiral shaft (112).

13. The mop as claimed in claim 1, wherein
the inner tube (12) further comprises
two head holes (127) defined beside the second end (1202);
the mop further comprises
a rod (126) for attaching the head (20) to the second end (1202) of the inner tube (12), mounted in the inner tube (12) at the second end (1202) and comprising
a rod hole (1261) corresponding to the two head holes (127); and
the head (20) comprises
a cleaning means (21);
a joint (26) connected to the rod (126) and the second end (1202) of the inner tube (12) and comprising
an outer surface;
a recess (264) receiving the second end (1202) of the inner tube (12);
two joint holes (263) defined through the outer surface of the joint (26), communicating with the recess (264), corresponding to the rod hole (1261) of the rod (126) and respectively corresponding to the two head holes (127) of the inner tube (12);
a pair of receiving clamps (261) rotatable relative to the recess (264) and comprising
two arms (2611); and
two receiving holes (2612) respectively defined through the arms (2611);
a pin (27) inserted through the joint holes (263), the head holes (127) and the rod hole (1261); and
a connector (23) for connecting the cleaning means (21) to the joint (26) and comprising
a stem (231) pivotally received in the receiving clamps (261) between the arms (2611).

14. The mop as claimed in claim 13, wherein
the connector (23) further comprises
a stem hole (232) for pivotally connecting the stem (231) to the receiving clamps (261), defined through the stem (231) and corresponding to the receiving holes (2612); and
a radially extending disc (233);
the head (20) further comprises
a reinforcing member (25) mounted between the receiving clamps (261) and the connector (23) and comprising
two walls (251) receiving the stem (231) therebetween;
and
two wall holes (252) respectively defined through the two walls (251), corresponding to the stem hole (232) and respectively corresponding to the receiving holes (2612);
a cover (22) clamped between the reinforcing member (25) and the disc (233) of the connector (23) and comprising
a central hole (221) penetrated through by the stem (231);
and
an annular pad (24) for preventing slippage between the cover (22) and the connector (23) and mounted between the disc (233) and the cover (22).

15. The mop as claimed in claim 13, wherein
the joint (26) further comprises
an annular slot (265) formed on the outer surface of the joint (26);
and
the pin (27) further comprises a c-ring (271) inserted in the annular slot (265) for holding the pin (27) in the joint holes (263), the head holes (127) and the rod hole (1261).

Amended claims in accordance with Rule 137(2) EPC.

1. A mop comprising a handle (10) and a rotatable head (20), wherein the handle (10) is a telescopic tube and comprises
an outer tube (11) comprising a first end (1101) and a second end (1102);
a spiral shaft (112) held within the outer tube (11) and comprising a first end (1121) positioned between the first end (1101) and second end (1102) of the outer tube (11); and
a second end (1122);
an inner tube (12) rotatably and longitudinally slidably mounted in the outer tube (11) around the spiral shaft (112) and comprising an inner surface; a first end (1201); and a second end (1202);
a transmitter (121) being a sleeve attached to the inner surface of the inner tube (12) between the first end (1201) and the second end (1202) of the inner tube (12) around the spiral shaft (112) and comprising an outer surface; a first opening (1211); an inner flange (1212) comprising a first surface facing the first opening (1211); and multiple basal teeth (1213) formed on the first surface of the inner flange (1212) facing the first opening (1211); and

a guide (122) rotatably and slidably engaging the spiral shaft (112) and situated in the transmitter (121) between the first end (1121) of the spiral shaft (112) and the inner flange (1212) of the transmitter (121) and comprising a through hole (1221) receiving the spiral shaft (112); and multiple driving teeth (1222) for engaging the basal teeth (1213) of the transmitter (121); and the head (20) is for cleaning applications and attached to the second end (1202) of the inner tube (12); and **characterized in that** the handle (10) further comprises a weight (113) for stabilizing the spiral shaft (112) and attached to the spiral shaft (112) between the first end (1121) and the second end (1122) of the shaft (112);
the handle (10) further comprises a cap (114) for holding the weight (113) and attached to the spiral shaft (112) between the weight (113) and the second end (1122) of the shaft (112); and that
the handle (10) further comprises a holder (111) for holding the spiral shaft (112) and attached to the inner surface of the outer tube (11) between the first end (1101) and second end (1102) of the outer tube (11).

2. The mop as claimed in claim 1, wherein the mop further comprises a body (13) mounted to the first end (1101) of the outer tube (11).

3. The mop as claimed in claim 2, wherein the body (13) is tubular and comprises
a first end (1301);
a second end (1302) connected to the first end (1101) of the outer tube (11).

4. The mop as claimed in claim 3, wherein the outer tube (11) further comprises
two clipping holes (118) defined beside the first end (1101) of the outer tube (11); and the body (13) further comprises
two clip holes (131) respectively corresponding to the two clipping holes (118) and defined beside the second end (1302) of the body (13); and a fastener (133) for mounting the body (13) to the first end (1101) of the outer tube (11), being resilient and comprising
two sides; and two external protrusions defined respectively on the two sides and one of which inserted in one clipping hole (118) as well as in one clip hole (131) while the other in the other clipping hole (118) and the other clip hole (131).

5. The mop as claimed in claim 3, wherein the body (13) further comprises
a seal (134) attached to the first end (1301) of the body (13); and
a hanger (135) attached to the seal (134) and comprising
a hanging hole (1351).

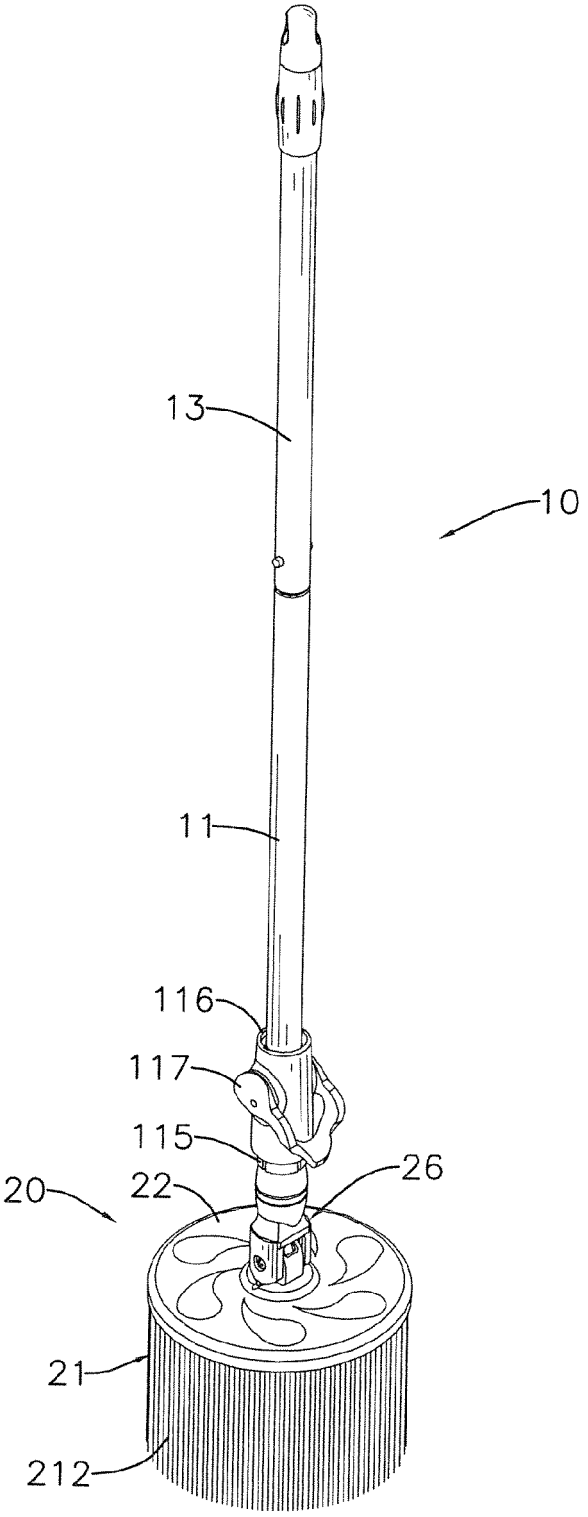

FIG. 1

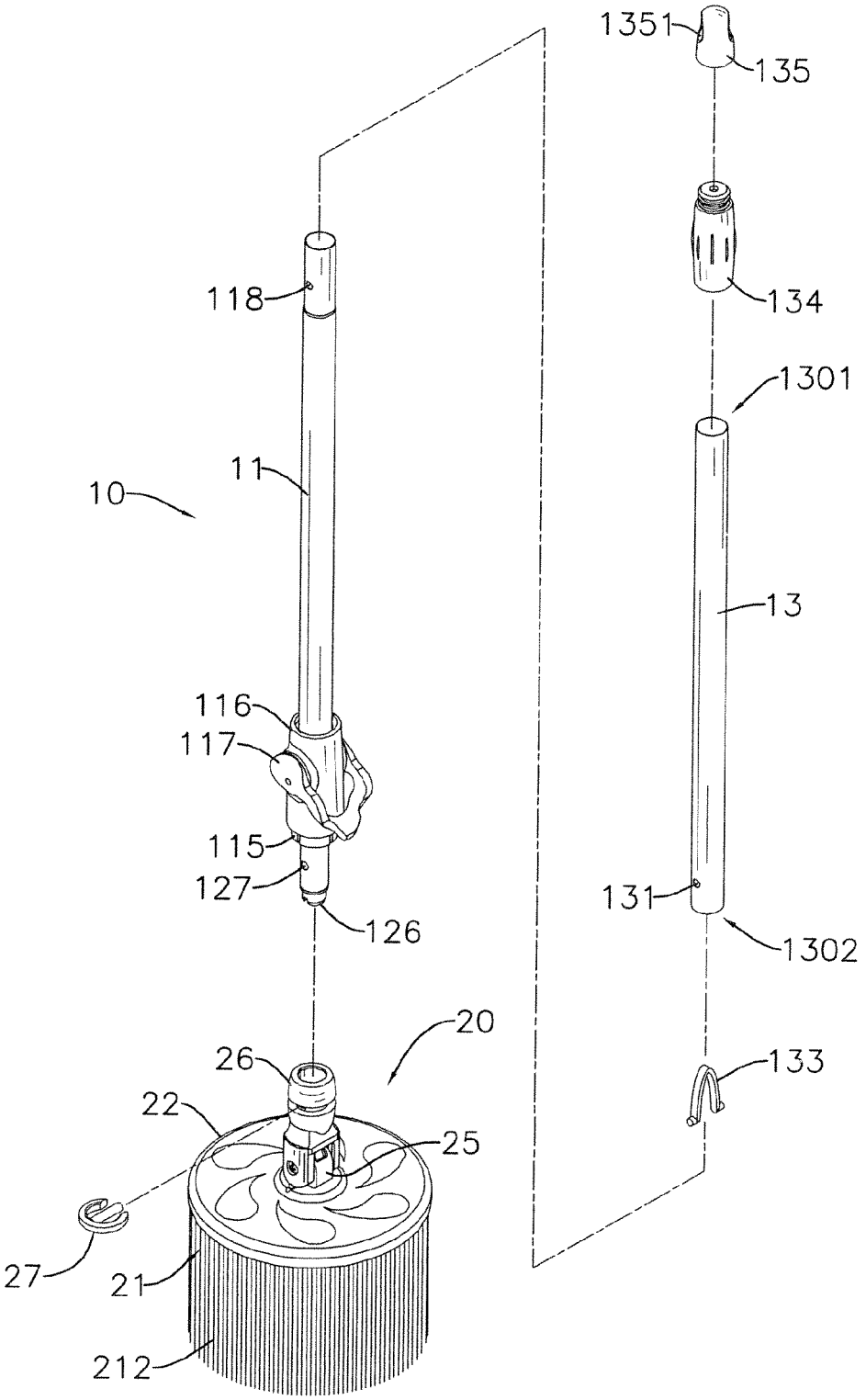
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FIG. 2

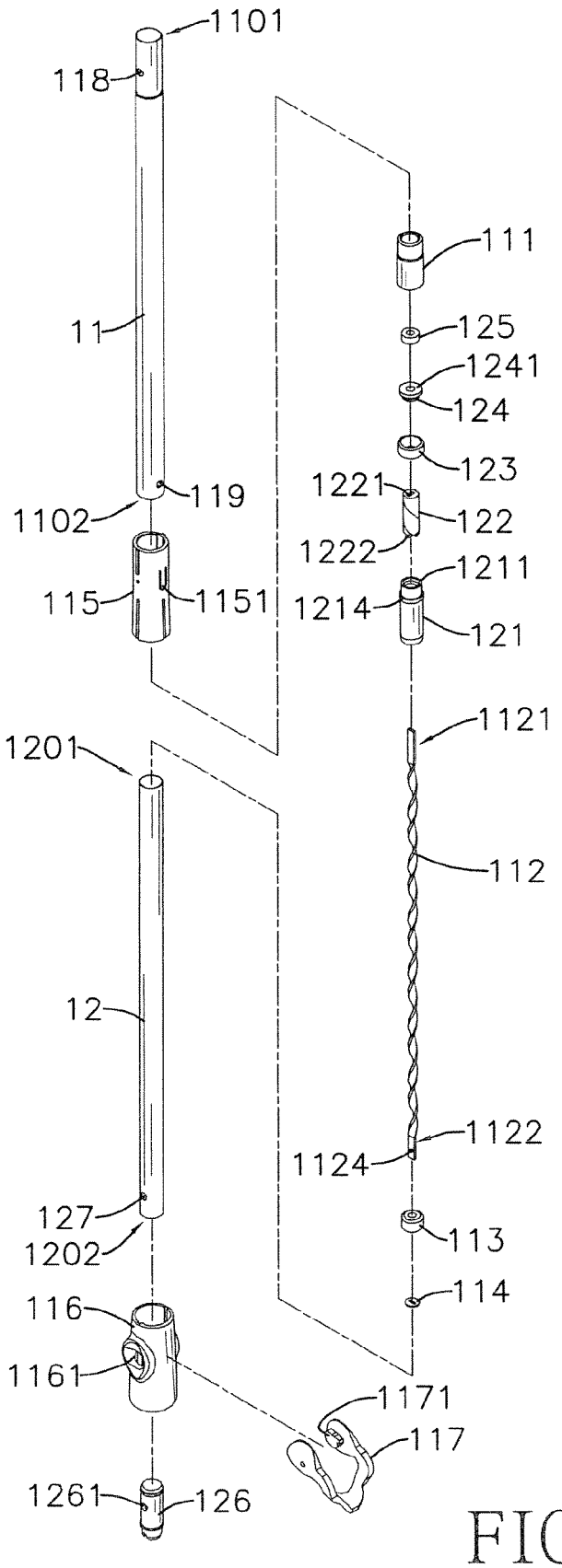
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FIG. 3

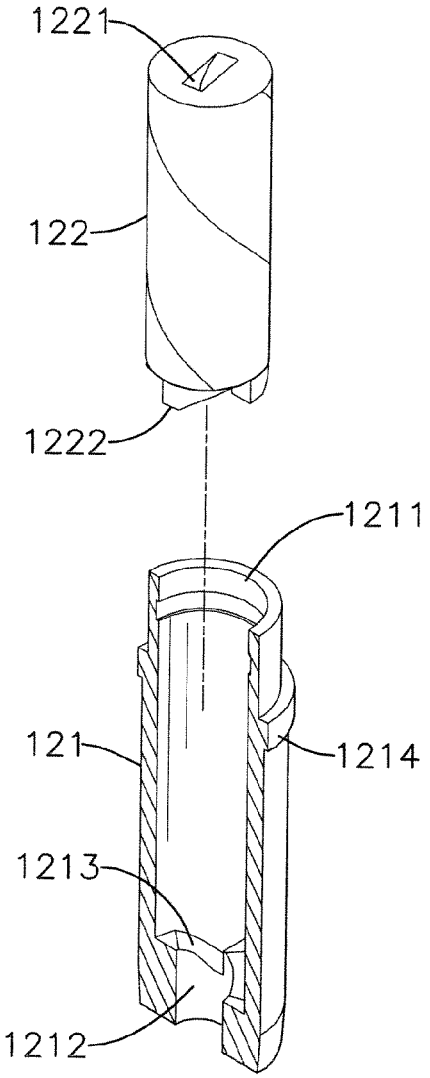

FIG. 4

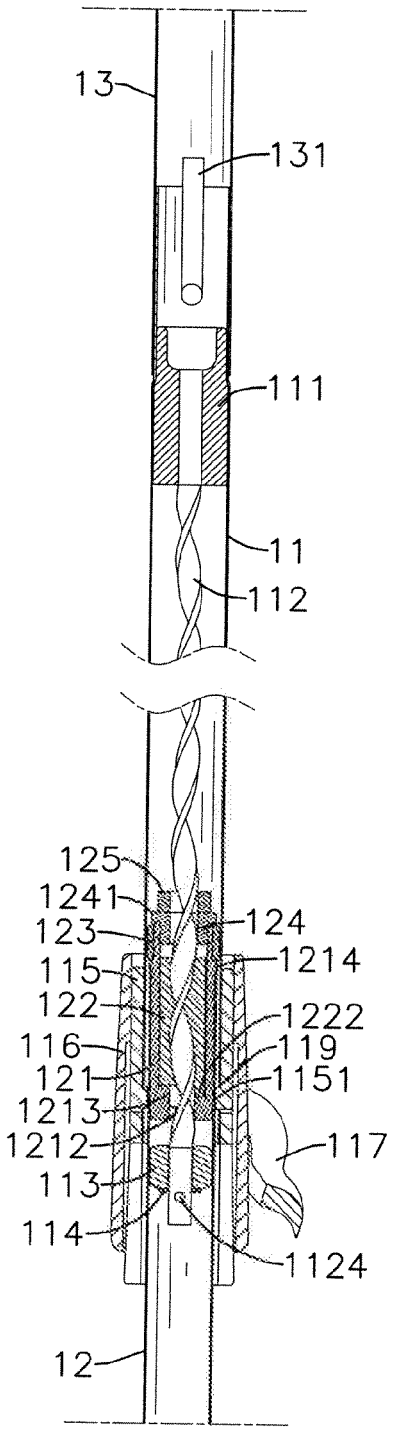
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FIG. 5

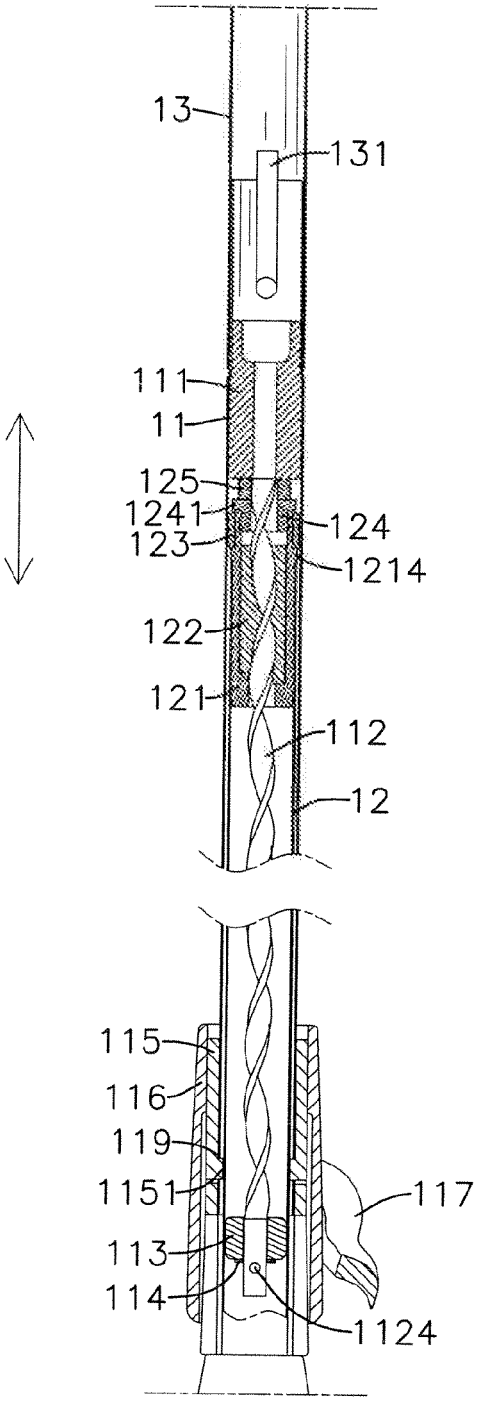
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FIG. 6

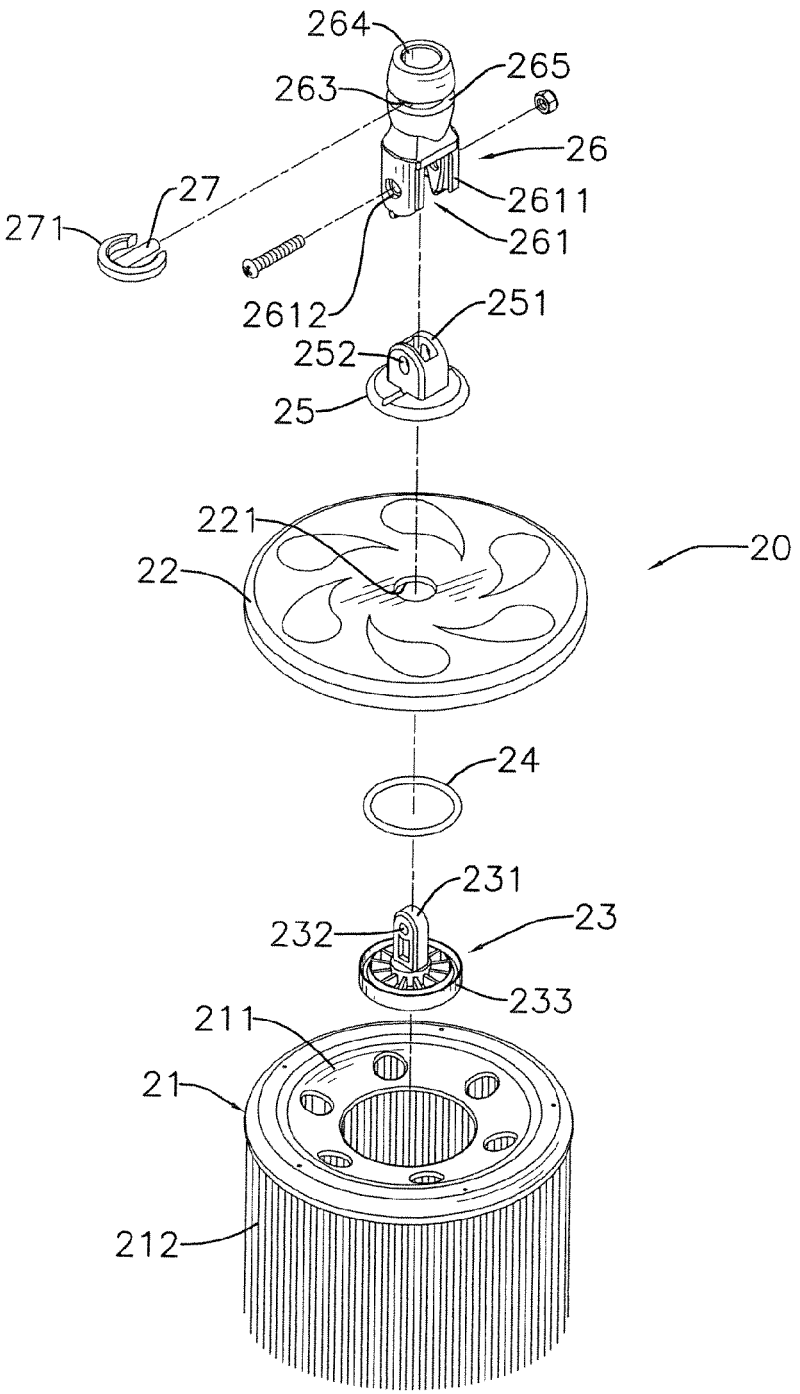
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FIG. 7

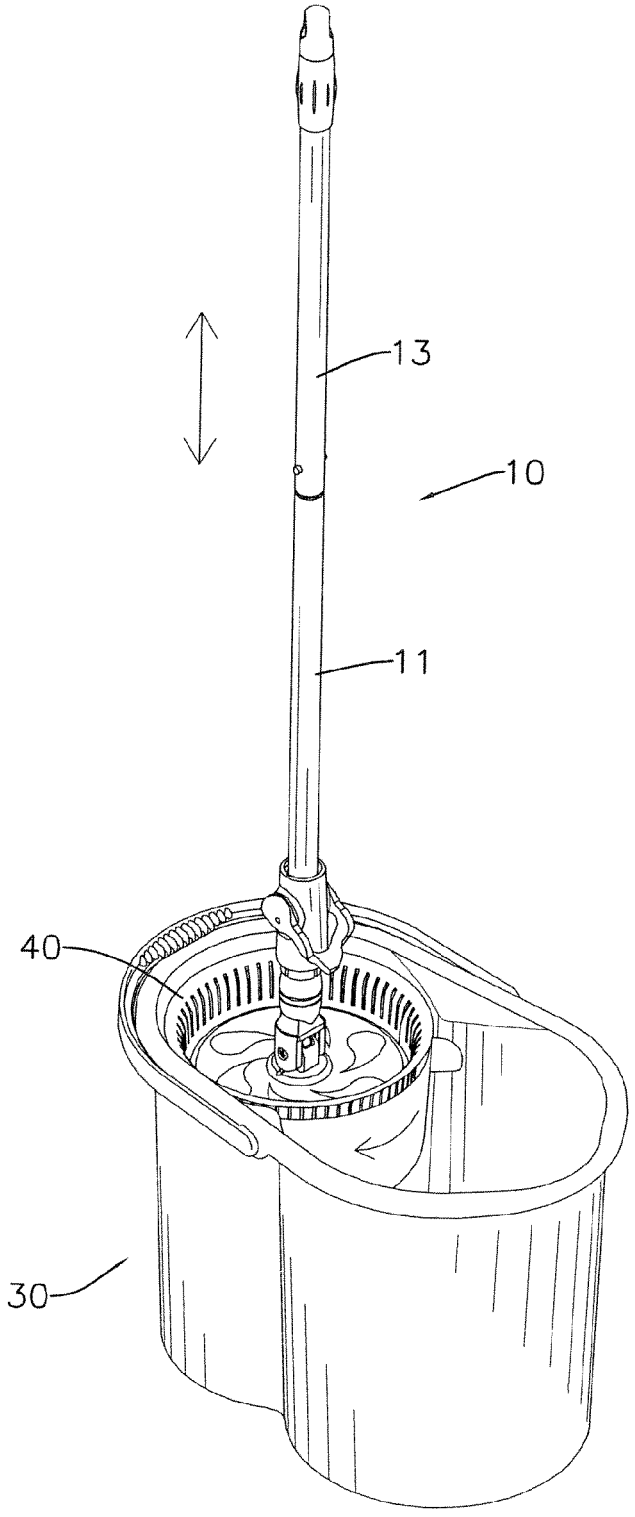

FIG. 8

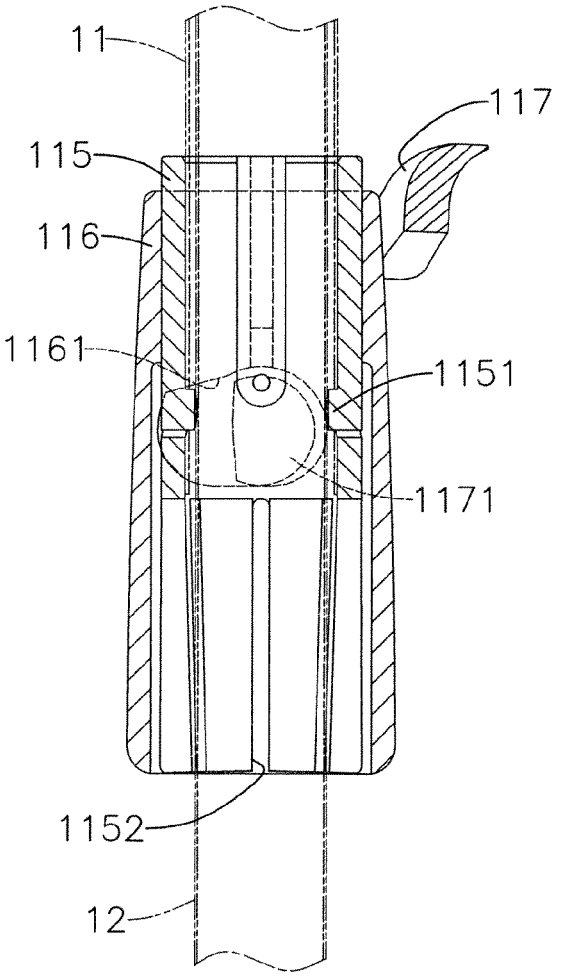

FIG.9

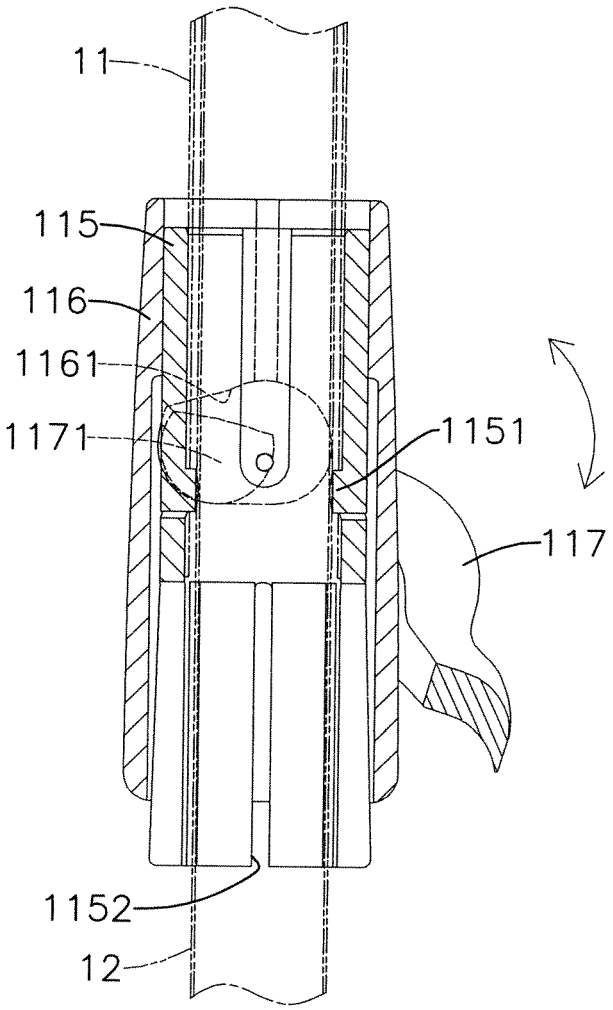

FIG. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 10 16 3568

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A47L
B25G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 September 2010	Baumgärtner, Ruth

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15-09-2010

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