(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 572 602 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
02.07.2014 Bulletin 2014/27

(51) Int Cl.:
A45B 19/04 *(2006.01)* ***A45B 25/14*** *(2006.01)*

(21) Application number: **11182677.2**

(22) Date of filing: **26.09.2011**

(54) **Shaft structure of automatic umbrella**

Wellenstruktur eines automatischen Regenschirms

Structure de tige de parapluie automatique

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(43) Date of publication of application:
27.03.2013 Bulletin 2013/13

(73) Proprietor: **Su, Peter**
Taipei (TW)

(72) Inventor: **Su, Peter**
Taipei (TW)

(74) Representative: **Brown, Michael Stanley**
Alpha and Omega,
Chine Croft
East Hill
Ottery St. Mary
Devon, EX11 1PJ (GB)

(56) References cited:
US-A- 5 505 222 **US-A- 6 112 755**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 572 602 B1

Printed by Jouve, 75001 PARIS (FR)

Description

(a) Technical Field of the Invention

[0001] The present invention generally relates to an improved structure of automatic umbrella, and more particularly to an improvement made on a shaft assembly of the automatic umbrella, so that the improved automatic umbrella allows of an easier and more efficient operation of a last stage of compressing and closing the umbrella thereby remarkably reducing the potential risk caused in compressing and closing the umbrella.

(b) Description of the Prior Art

[0002] An early automatic umbrella comprises a control structure and operated in such a way as disclosed in US Patent No. 6,684,893B2. Such a known umbrella control structure is arranged inside a handle and comprises a hollow main body receiving therein a control ring. A control bar is rotatably attached to the bottom of one side of the control ring. A push button is arranged at one side of the main body and is exposed through a side opening of the handle. Expansion and collapse of the shaft of the umbrella is controlled through the above described arrangement. However, such an automatic umbrella shows a major drawback in the process of compressing and closing the umbrella, for closing umbrella requires an operation of compressing an expansion spring arranged inside the shaft of the umbrella. The expansion spring has an overall length substantially corresponding to the total length of three sections of the shaft and this render the expansion spring an elongate elastic element that shows high strength and large spring force. Consequently, a user's hand must apply a great effort to compress and close the umbrella and must have this done in a single operation. Incaution or negligence in the application of force or compression often lead to accidental release of the expansion spring that springs the shaft back to cause damage of the hand or other body portion of the user. In summary, the known automatic umbrella shows several shortcomings in practical use, which are briefly described as follows:

(1) Depressing the push button to close the umbrella can only collapse the umbrella ribs and the canopy carried thereby, but the shaft still maintains the fully expanded condition with all the three sections thereof extended to the extremes. This makes it difficult for a woman or a young child whose hands are usually short to tightly grip and depress the shaft toward the handle.

(2) Since the length of the expansion spring spans from the first section to the third section of the shaft, such a great length imposes a great strength and spring force to the spring. A user must apply a great force with his or her hands to compress and close the umbrella. This makes compressing and closing the umbrella a difficult operation for a woman or a young child whose hands are generally less strong and powerful.

(3) Due to the great strength and spring force of the expansion spring, any incaution or negligence occurring in the application of force to compress and close the umbrella may lead to undesired spring back of the shaft by the released great spring force of the expansion spring. This may cause physical injuries to the hands or other body portions of the user.

[0003] Apparently, the known automatic umbrella is generally imperfect in respect of the structural arrangement thereof and may cause inconvenience and danger in operating the umbrella. Improvement is desired to overcome such problems.

[0004] In US Patent Specification No. 6,112,755 there is described an automatic umbrella comprising a handle and a shaft assembly,

an operation and control unit being received in the handle and comprising a push button and a control ring,

the control ring including a control bar and a projecting bar, and

the shaft assembly comprising first, second and third shaft sections telescopically received in each other, a top cap fixed to the upper end of the third shaft section, a runner movably fitted over the shaft assembly, a bullet-like member arranged inside the shaft assembly, an expansion spring and a plurality of ribs coupled between the top cap and the runner, with each rib being acted upon by a collapse spring.

[0005] It is an object of the present invention to provide an improved automatic umbrella that can be opened and closed with minimum risk of injury to the user of the umbrella.

SUMMARY OF THE INVENTION

[0006] According to the present invention there is provided an automatic umbrella comprising a handle and a shaft assembly,

an operation and control unit being received in the handle and comprising a push button and a control ring,

the control ring including a control bar and a projecting bar, and

the shaft assembly comprising first, second and third shaft sections telescopically received in each other, a top cap fixed to the upper end of the third shaft section, a runner movably fitted over the shaft assembly, a bullet-like member arranged inside the shaft assembly, an expansion spring and a plurality of ribs coupled between the top cap and the runner, with each rib being acted upon by a collapse spring,

characterized in that the shaft assembly comprises

an internal plug received and fixed inside a top portion of the second shaft section and an inner tube received in the second shaft section and having its top end fixed to the internal plug,

the internal plug having a top end to which an end of a runner cable is attached,
the runner cable having an opposite end extending upwardly and wrapping around a pulley fixed inside the top cap and extending outwardly for attachment to a top end of the runner,
the inner tube receiving therein an operation tube that has a top end fixed to the bottom of the top cap,

[0007] the operation tube having a bottom end that is fitted into and fixed to an operation plug in which a through hole and a fixing hole are formed,
the inner tube having a top portion receiving and retaining therein a pin or pulley around which an operation cable is wrapped in such a way that an end of the operation cable extends through the through hole for attachment to the top of the bullet-like member and an opposite end of the operation cable is received and fixed in the fixing hole of the operation plug.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG 1 is a cross-sectional view of an umbrella according to the present invention in a compressed and ready-to-use condition.
FIG 2 is a cross-sectional view of the umbrella according to the present invention in an open condition.
FIG 3 is a cross-sectional view of the umbrella according to the present invention in a closed condition.
FIG 4 is a partial exploded view of a shaft assembly according to the present invention.
FIG 5 is an enlarged view of circled portion A of FIG 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] The following description provides a convenient illustration for implementing exemplary embodiments of the invention. Various changes to the described embodiments may be made in the function and arrangement of the elements described without departing from the scope of the invention as set forth in the appended claims.

[0010] Referring to FIG 1, a shaft structure of an automatic umbrella according to the present invention will be described by taking a three-fold umbrella as an example. The umbrella according to the present invention generally comprises a handle (10), an operation and control unit (20), a shaft assembly (30), a runner (40), a top cap (41), a bullet-like member (50), an expansion spring (60), and a plurality of ribs (70) and collapse springs (71). The operation and control unit (20) is arranged inside the handle (10) and comprises a hollow main body that receives therein a control ring (21) and a push button (22) that is arranged inside an opening defined in a sidewall of the handle (10) and exposed outside the handle. The control ring (21) comprises a control bar (23) arranged at the bottom of one side thereof and the control ring (21) also comprises a projecting bar (24) arranged at an opposite side thereof for engaging and releasably retaining the runner (40) to hold the umbrella in a collapsed condition. The shaft assembly (30) comprises a first shaft section (31), a second shaft section (32), and a third shaft section (33) that are telescopically received in each other. The third shaft section (33) has a top end to which and the top cap (41) is fixed. The second shaft section (32) has a top portion receiving and fixing therein an internal plug (35) that fixes an inner tube (34). The first shaft section (31) of the shaft assembly (30) has a bottom end fixed to the main body of the operation and control unit (20). The expansion spring (60) is received inside the first shaft section (31) and the second shaft section (32) of the shaft assembly (30). Each of the ribs (70) is coupled between the runner (40) and the top cap (41).

[0011] FIGS. 2, 4, and 5 feature the structure of the shaft assembly (30) of the umbrella, which is structured in such a way that an internal plug (35) is fixed to the top end of a second shaft section (32) and an inner tube (34) has a top end fixed to the internal plug (35). The internal plug (35) has a top end to which an end of a runner cable (42) is attached. An opposite end of the runner cable (42) extends upward and wraps around a pulley arranged inside the top cap (41) to extend outward for attaching to a top end of the runner (40). The inner tube (34) receives therein an operation tube (36), and the operation tube (36) has a top end fixed to a bottom of the top cap (41). The operation tube (36) has a bottom end that is fit into and fixed to an operation plug (38) in which a through hole (381) and a fixing hole (382) are formed. The inner tube (34) has a top portion receiving and retaining therein a pulley (37) around which an operation cable (39) wraps in such a way that an end of the operation cable (39) extends through the through hole (381) to attach to a top of the bullet-like member (50) and an opposite end is received and fixed in the fixing hole (382) to thereby attach to the operation plug (38).

[0012] Referring back to FIG 1, the automatic umbrella is shown in a condition of being compressed and ready to use. The expansion spring (60) contained in the shaft assembly (30) is depressed by the internal plug (35) of the second shaft section (32) and shows a compressed condition. The runner (40) is caught and retained in position by the projecting bar (24) of the control ring (21). At the same time, the control bar (23) is depressed downward by the shaft assembly (30) to show an inclined condition. The bullet-like member (50) is depressed by the inner tube (34) and biased by the spring plate (311) to engage and thus retain in a retention hole formed in the first shaft section (31).

[0013] Referring to FIG 2, to open the umbrella, the push button (22) is pressed down and the control ring (21) is thus pushed inward to separate the projecting bar (24) from the runner (40), whereby the spring force of the expansion spring (60) contained in the shaft assembly (30) forcibly drives the second shaft section (32) upward. At this moment, the bullet-like member (50) is stilled re-

tained in the retention hole of the first shaft section (31), so that the operation cable (39) and the pulley (37) together move the operation tube (36) upward to push up the top cap (41) thereby moving the third shaft section (33) upward. Under this condition, the runner (40) is pulled upward by the runner cable (42) to expand the ribs (70) thereby completing automatic opening of the umbrella. It is noted that under this condition, the collapse spring (71) of each of the ribs (70) is set in an elongated condition. Further, the control bar (23) is allowed to move to a horizontal condition and engage the bullet-like member (50).

[0014] Referring to FIG 3, to close the umbrella, the push button (22) is pressed again so that the control bar (23) pushes the bullet-like member (50) away to disengage from the retention hole of the first shaft section (31). Under this condition, the force induced by the operation cable (39) is removed so that the spring forces of the collapse springs (71) of the ribs (70) cause the ribs (70) and the umbrella canopy to collapse together and force the runner (40) to move downward and at the same time make the third shaft section (33) telescoping downward over the second shaft section (32). Consequently, the expanded the shaft assembly (30) is now turned into a length of only two sections. This allows the subsequent operation of closing the umbrella to be carried out in an easier and more efficient manner.

[0015] The above description of the structure of the shaft of an automatic umbrella is made with respect to a three-fold umbrella. However, it will be appreciated that the present invention is equally applicable to a four-fold or five-fold automatic umbrella, where the fourth section and/or the fifth section of the shaft is or are telescopically coupled below the second section of the shaft.

Claims

1. An automatic umbrella comprising a handle (10) and a shaft assembly (30),
   an operation and control unit (20) being received in the handle (10) and comprising a push button (22) and a control ring (21),
   the control ring (21) including a control bar (23) and a projecting bar (24), and
   the shaft assembly comprising first, second and third shaft sections (31, 32, 33) telescopically received in each other, a top cap (41) fixed to the upper end of the third shaft section (33), a runner (40) movably fitted over the shaft assembly (30), a bullet-like member (50) arranged inside the shaft assembly (30), an expansion spring (60) and a plurality of ribs (70) coupled between the top cap (41) and the runner (40), with each rib (41) being acted upon by a collapse spring (71),
   characterized in that the shaft assembly (30) comprises
   an internal plug (35) received and fixed inside a top portion of the second shaft section (32) and an inner tube (34) received in the second shaft section (32) and having its top end fixed to the internal plug (35), the internal plug (35) having a top end to which an end of a runner cable (42) is attached,
   the runner cable (42) having an opposite end extending upwardly and wrapping around a pulley fixed inside the top cap (41) and extending outwardly for attachment to a top end of the runner (42),
   the inner tube (34) receiving therein an operation tube (36) that has a top end fixed to the bottom of the top cap (41),
   the operation tube (36) having a bottom end that is fitted into and fixed to an operation plug (38) in which a through hole (381) and a fixing hole (382) are formed,
   the inner tube (34) having a top portion receiving and retaining therein a pin or pulley (37) around which an operation cable (39) is wrapped in such a way that an end of the operation cable (39) extends through the through hole (381) for attachment to the top of the bullet-like member (50) and an opposite end of the operation cable (39) is received and fixed in the fixing hole (382) of the operation plug (38).

2. An automatic umbrella as claimed in Claim 1, **characterized in that** the shaft assembly (30) includes a fourth section telescopically coupled below the second shaft section (32).

Patentansprüche

1. Automatischer Schirm, der einen Griff (10) und eine Wellenanordnung (30) umfasst,
   wobei eine Betriebs- und Steuereinheit (20) im Griff (10) aufgenommen ist und einen Drückknopf (22) und einen Steuerring (21) umfasst,
   wobei der Steuerring (21) eine Steuerleiste (23) und eine vorstehende Leiste (24) enthält, und
   wobei die Wellenanordnung erste, zweite und dritte Wellenabschnitte (31, 32, 33), die ineinander teleskopisch aufgenommen sind, eine obere Kappe (41), die am oberen Ende des dritten Wellenabschnitts (33) befestigt ist, eine Laufschiene (40), die beweglich über die Wellenanordnung (30) angeordnet ist, ein kugelähnliches Element (50), das innerhalb der Wellenanordnung (30) angeordnet ist, eine Expansionsfeder (60) und eine Mehrzahl von Rippen (70) umfasst, die zwischen der oberen Kappe (41) und der Führungsschiene (40) verbunden sind, wobei auf jede Rippe (41) eine Klappfeder (71) wirkt,
   dadurch gekennzeichnet, dass die Wellenanordnung (30) umfasst:

   einen internen Stopfen (35), der innerhalb eines oberen Teils des zweiten Wellenabschnitts (32) aufgenommen und befestigt ist, und ein inneres

Rohr (34), das im zweiten Wellenabschnitt (32) aufgenommen ist, dessen oberes Ende am internen Stopfen (35) befestigt ist,
wobei der interne Stopfen (35) ein oberes Ende aufweist, an dem ein Ende eines Führungskabels (42) angebracht ist,
wobei das Führungskabel (42) ein gegenüberliegendes Ende aufweist, das sich nach oben erstreckt und eine Riemenscheibe umwickelt, das innerhalb der oberen Kappe (41) befestigt ist, und sich nach außen erstreckt, um an einem oberen Ende der Führungsschiene (42) befestigt zu werden,
wobei das innere Rohr (34) ein Betriebsrohr (36) darin aufnimmt, das ein oberes Ende hat, das am Boden der oberen Kappe (41) befestigt ist,
wobei das Betriebsrohr (36) ein unteres Ende aufweist, das in einen Betriebsstopfen (38) gepasst und an diesem befestigt ist, in dem eine Durchgangsbohrung (381) und eine Befestigungsbohrung (382) gebildet sind,
wobei das innere Rohr (34) einen oberen Abschnitt aufweist, der einen Zapfen oder eine Riemenscheibe (37) aufnimmt und darin festhält, um den bzw. die ein Betriebskabel (39) gewickelt ist, so dass sich ein Ende des Betriebskabels (39) durch die Durchgangsöffnung (381) erstreckt, um am oberen Bereich des kugelförmigen Elements (50) befestigt zu werden, und wobei ein gegenüberliegendes Ende des Betriebskabels (39) in der Befestigungsbohrung (382) des Betriebsstopfens (38) aufgenommen und befestigt ist.

2. Automatischer Schirm nach Anspruch 1, **dadurch gekennzeichnet, dass** die Wellenanordnung (30) einen vierten Abschnitt enthält, der unter dem zweiten Wellenabschnitt (32) teleskopisch verbunden ist.

Revendications

1. Parapluie automatique comprenant une poignée (10) et un ensemble tige (30),
une unité d'actionnement et de commande (20) étant reçue dans la poignée (10) et comprenant un bouton-poussoir (22) et une bague de commande (21),
la bague de commande (21) comprenant une barre de commande (23) et une barre de projection (24), et l'ensemble tige comprenant des première, deuxième et troisième sections de tige (31, 32, 33) reçues de manière télescopique l'une dans l'autre, un capuchon supérieur (41) fixé à l'extrémité supérieure de la troisième section de tige (33), un coulisseau (40) monté de façon mobile sur l'ensemble tige (30), un élément en forme de balle (50) agencé à l'intérieur de l'ensemble tige (30), un ressort d'extension (60) et une pluralité de baleines (70) couplées entre le capuchon supérieur (41) et le coulisseau (40), chaque baleine (41) étant actionnée par un ressort de compression (71),
caractérisé par le fait que l'ensemble tige (30) comprend
un bouchon interne (35) reçu et fixé à l'intérieur d'une partie supérieure de la deuxième section de tige (32) et un tube intérieur (34) reçu dans la deuxième section de tige (32) et ayant son extrémité supérieure fixée au bouchon interne (35),
le bouchon interne (35) ayant une extrémité supérieure à laquelle est fixée une extrémité d'un câble de coulisseau (42),
le câble de coulisseau (42) ayant une extrémité opposée s'étendant vers le haut et s'enroulant autour d'une poulie fixée à l'intérieur du capuchon supérieur (41) et s'étendant vers l'extérieur pour une fixation à une extrémité supérieure du coulisseau (42),
le tube intérieur (34) recevant dans celui-ci un tube d'actionnement (36) qui a une extrémité supérieure fixée à la partie inférieure du capuchon supérieur (41),
le tube d'actionnement (36) ayant une extrémité inférieure qui est montée dans et fixée à un bouchon d'actionnement (38) dans lequel sont formés un trou traversant (381) et un trou de fixation (382),
le tube intérieur (34) ayant une partie supérieure recevant et retenant dans celle-ci une goupille ou poulie (37) autour de laquelle est entouré un câble d'actionnement (39), d'une manière telle qu'une extrémité du câble d'actionnement (39) s'étend à travers le trou traversant (381) pour une fixation à la partie supérieure de l'élément en forme de balle (50) et qu'une extrémité opposée du câble d'actionnement (39) est reçue et fixée dans le trou de fixation (382) du bouchon d'actionnement (38).

2. Parapluie automatique selon la revendication 1, **caractérisé par le fait que** l'ensemble tige (30) comprend une quatrième section couplée de manière télescopique au-dessous de la deuxième section de tige (32) .

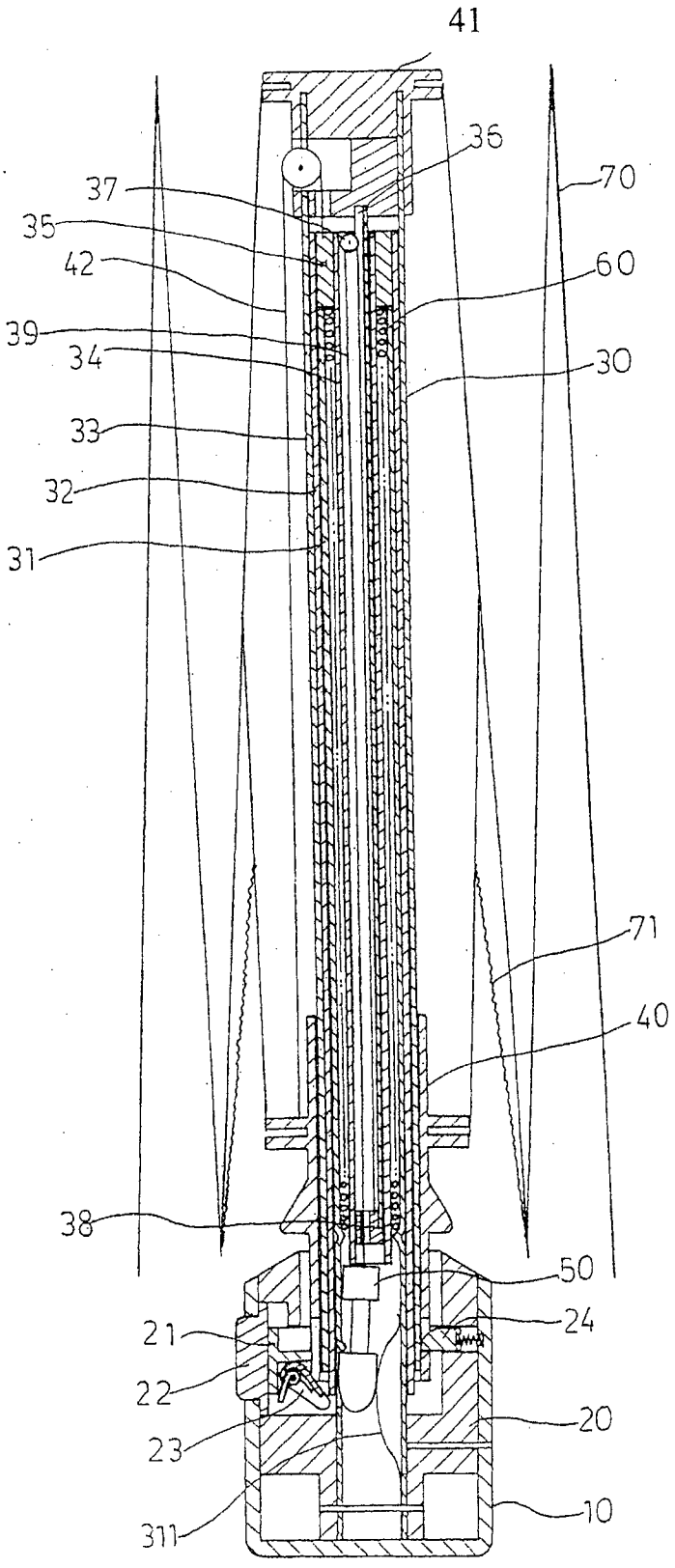


FIG.1

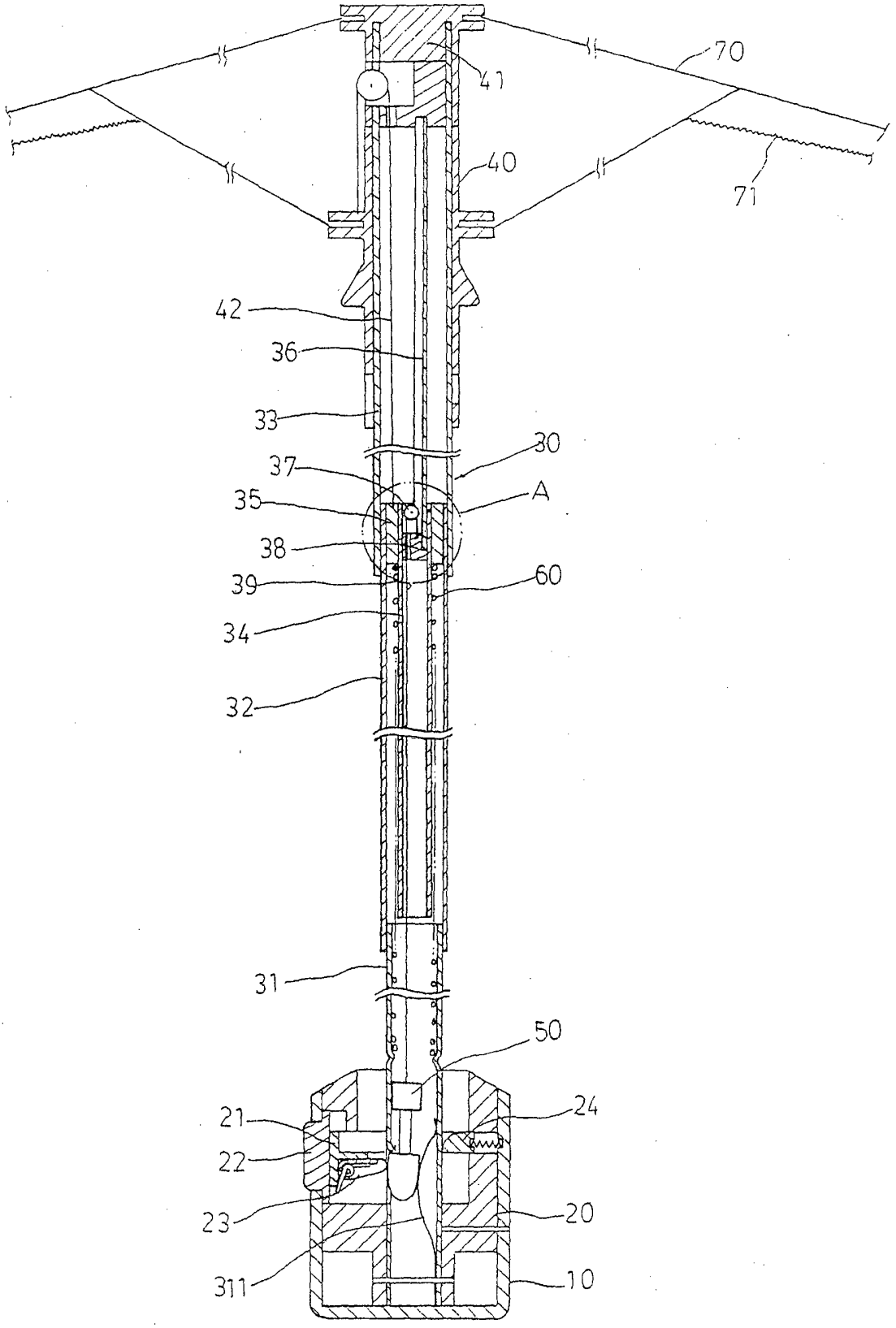

70
41
40
71
42
36
33
30
37
A
35
38
60
39
34
32
31
50
21
24
22
23
20
311
10

FIG.2

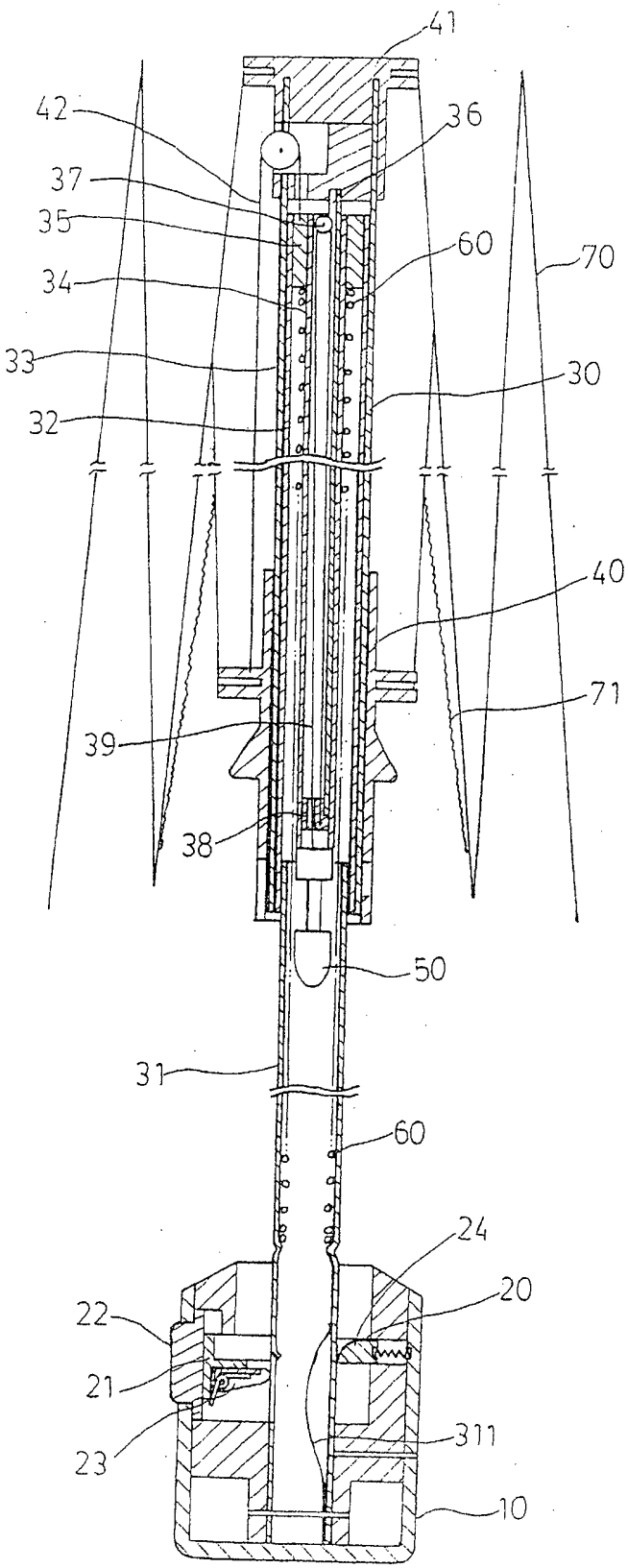

41
42
36
37
35
60
70
34
33
30
32
40
71
39
38
50
31
60
24
20
22
21
311
23
10

FIG.3

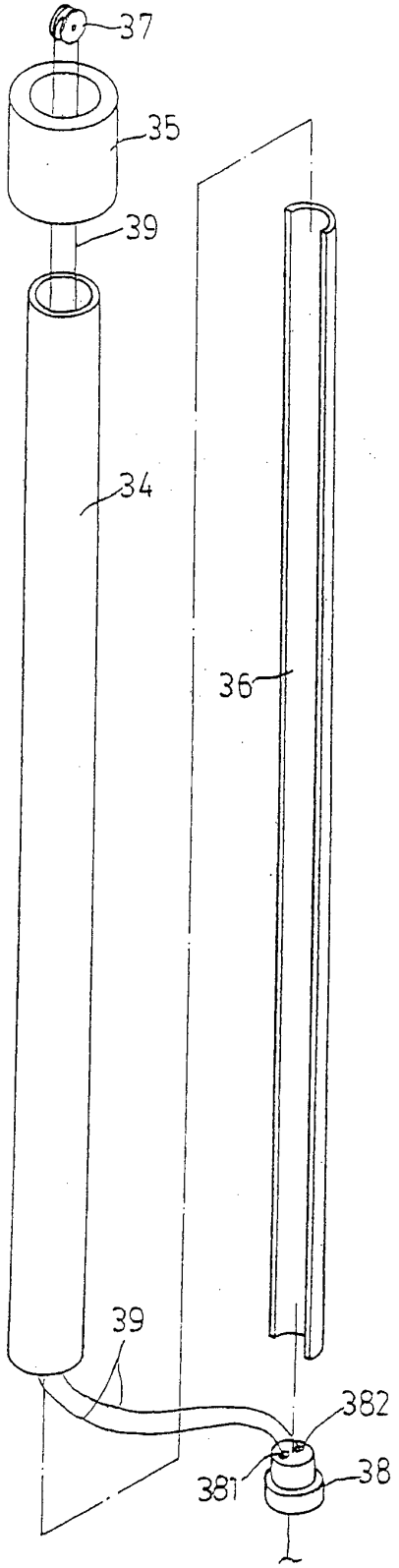


FIG.4

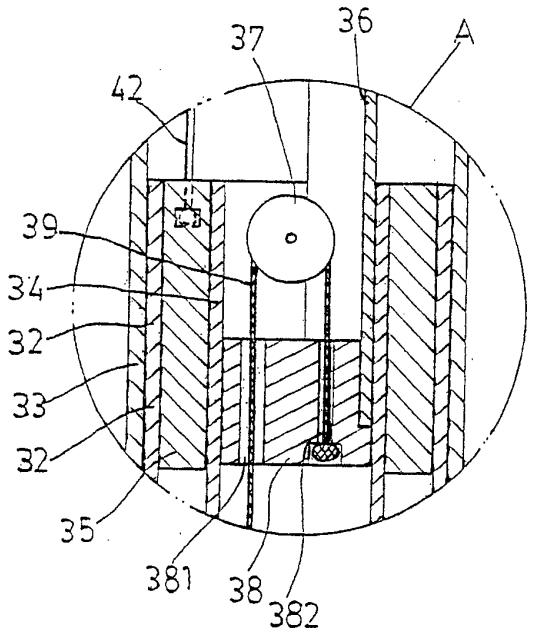


FIG.5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 6684893 B2 **[0002]**
- US 6112755 A **[0004]**