

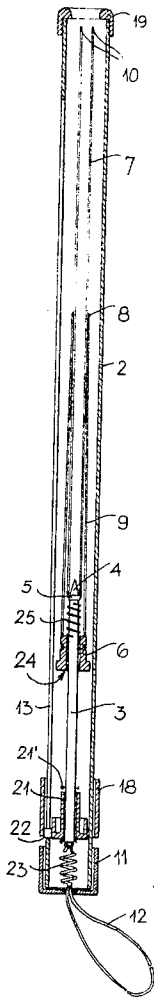
[72] Inventor **Sergio Vanzini**
Via Vetere 10, Milan, Italy
[21] Appl. No. **795,782**
[22] Filed **Feb. 3, 1969**
[45] Patented **Oct. 20, 1970**
Continuation-in-part of application Ser. No. 647,412, June 20, 1967, now Patent No. 3,435,836. This application Feb. 3, 1969, Ser. No. 795,782

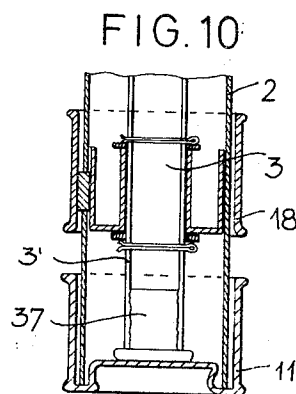
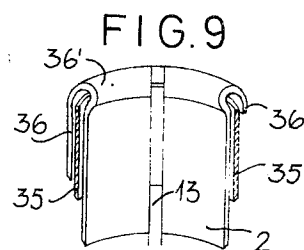
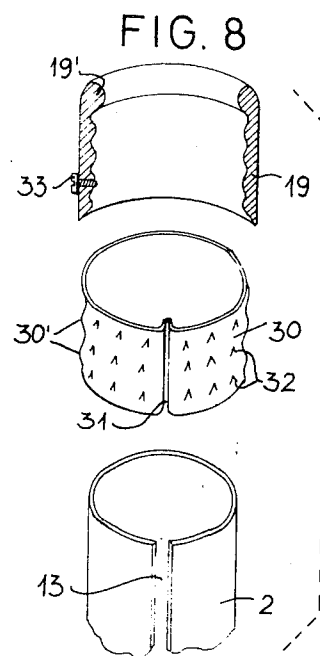
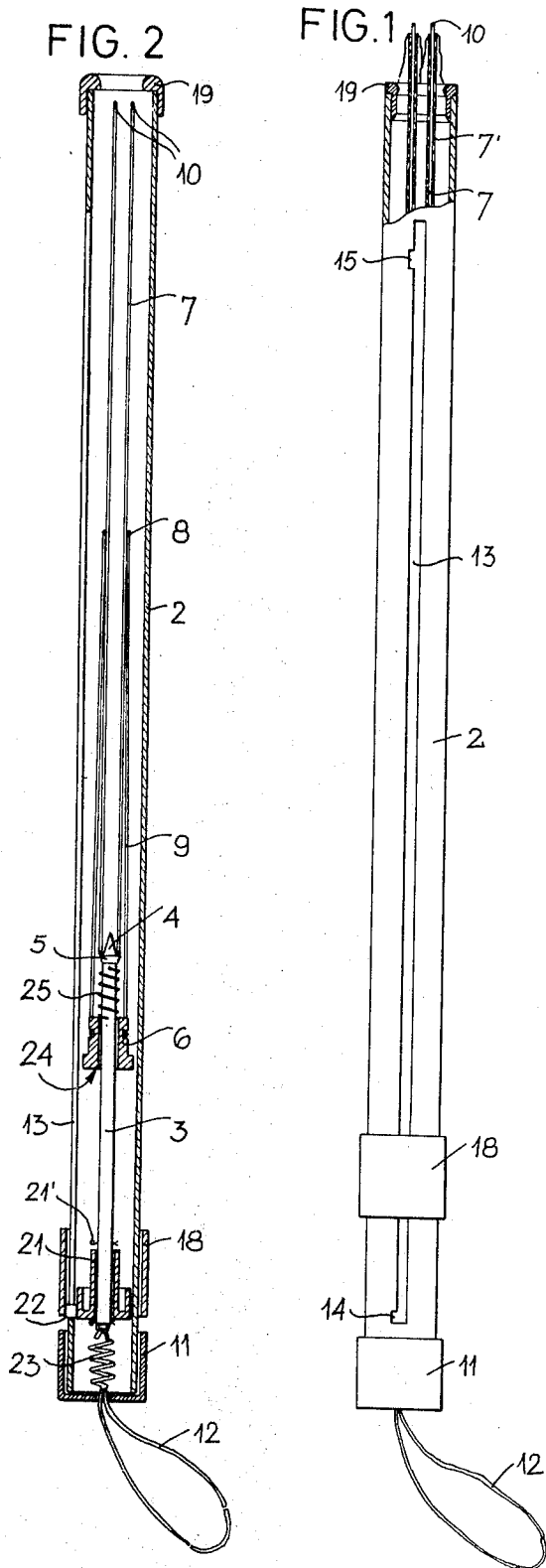
[54] **UMBRELLA CONSTRUCTION**
9 Claims, 17 Drawing Figs.
[52] U.S. Cl. **135/20,**
135/22
[51] Int. Cl. **A45b 19/00,**
A45b 25/14, A45b 25/16
[50] Field of Search. **135/16-**
-20, 22-26, I. C (U. Digest)

References Cited			
UNITED STATES PATENTS			
18,500	10/1857	Crosby	135/19
448,203	3/1891	Brice	135/19
498,224	5/1893	Baskerville	135/19
500,051	6/1893	Blake	135/19
629,460	7/1899	Nagell	135/19
2,507,919	5/1950	Mazzeo	135/ICU
2,734,124	2/1956	Funk	135/ICU
2,878,366	3/1959	Evans	135/ICU)

Primary Examiner—Peter M. Caun
Attorney—Benjamin J. Barish

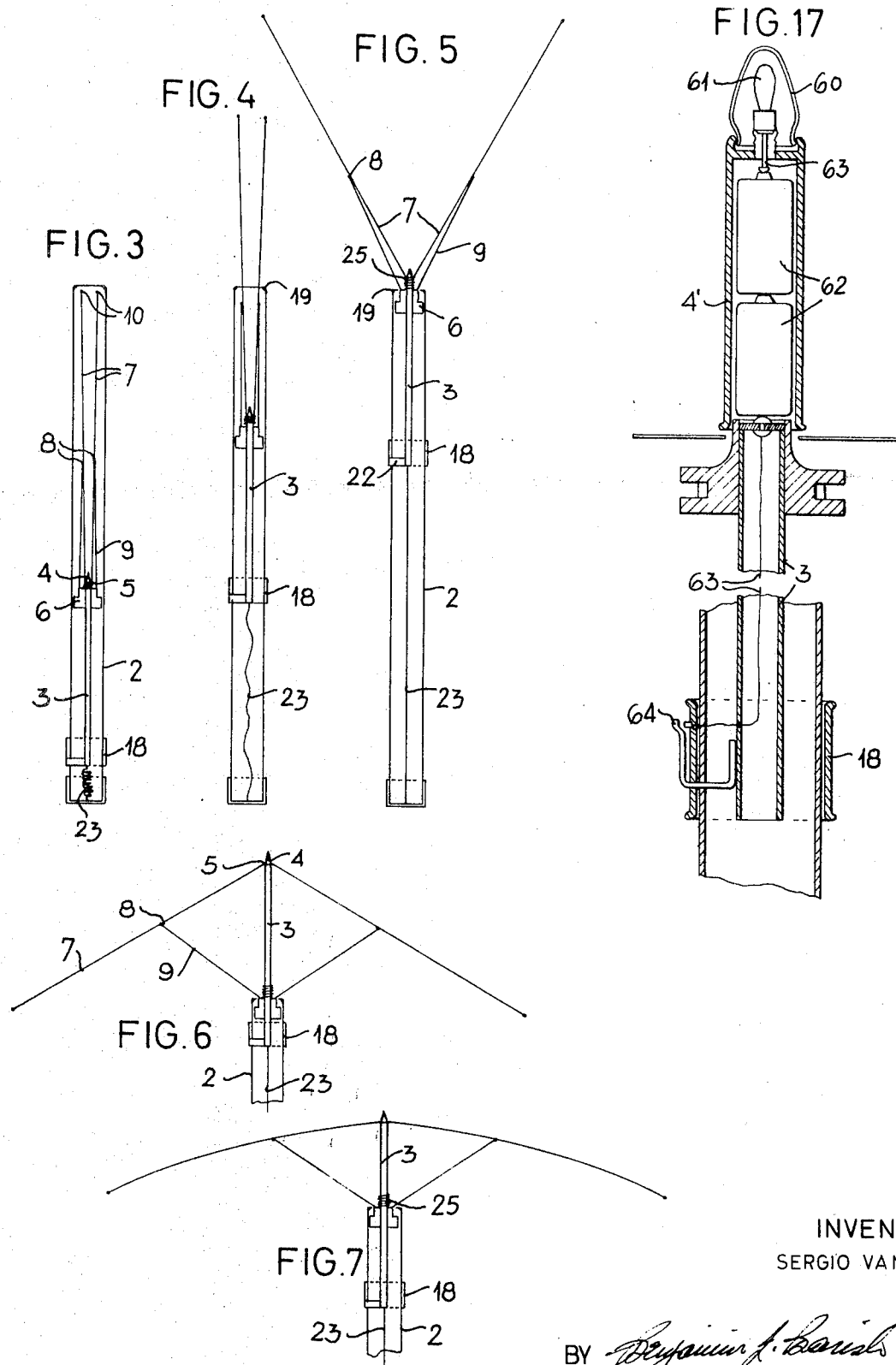
ABSTRACT: An umbrella is described in which the umbrella rod and covering material are received within a tube in the closed position of the umbrella and are movable through the upper end of the tube during opening of the umbrella, there being means for imparting a rotational movement to the rod and covering material during closing of the umbrella.





INVENTOR
SERGIO VANZINI

BY *Sergio Vanzini*
ATTORNEY



INVENTOR
SERGIO VANZINI

BY *Sergio F. Vanzini*
ATTORNEY

FIG. 15

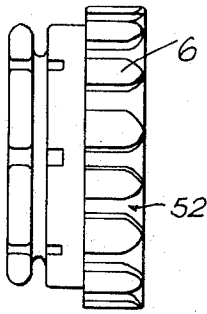


FIG. 16

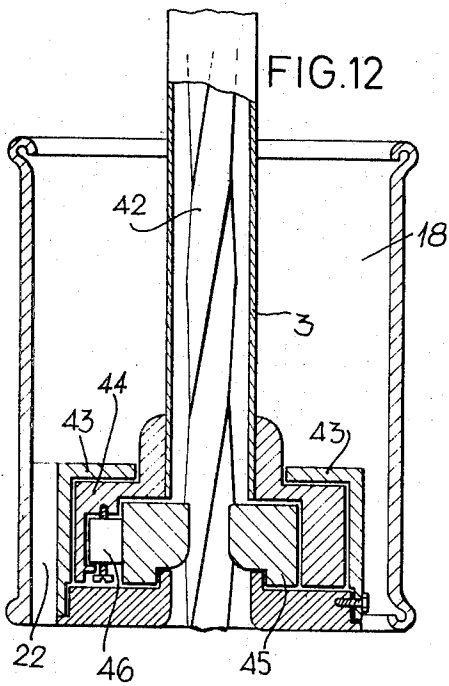
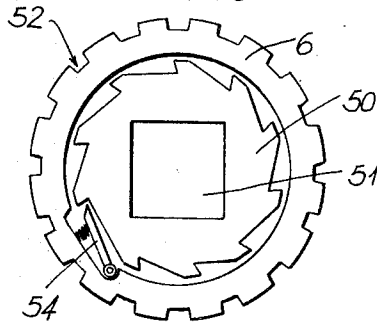


FIG. 14

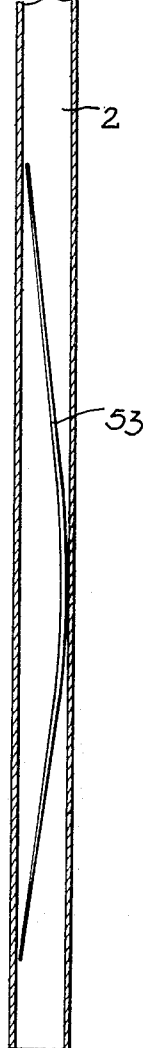
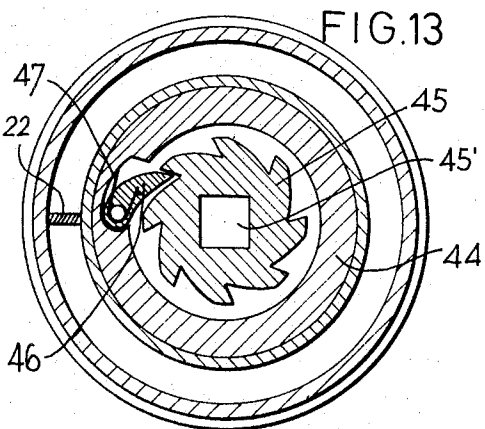
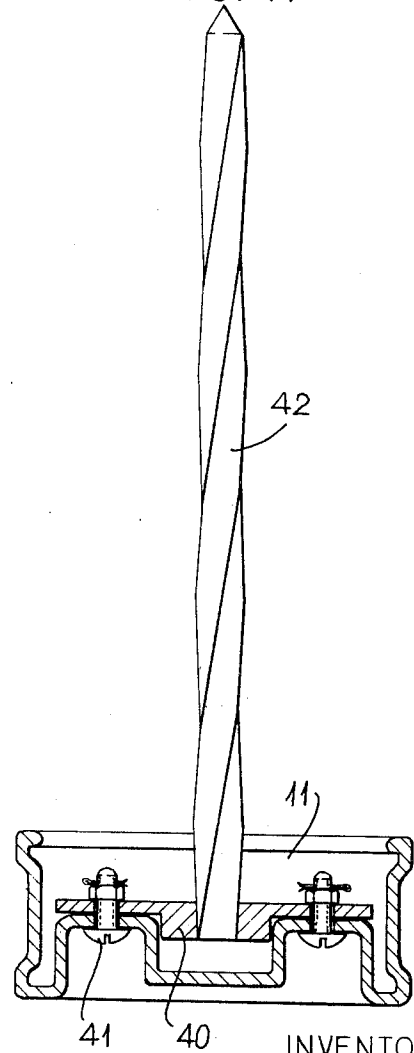


FIG. 11



INVENTOR
SERGIO VANZINI

BY

Sergio Vanzini

ATTORNEY

UMBRELLA CONSTRUCTION

BACKGROUND OF THE INVENTION

The present invention is a continuation-in-part of my U.S. Pat. application Ser. No. 647,412, filed June 20, 1967, now U.S. Pat. No. 3,435,836.

1. Field of the Invention

The invention relates to umbrellas which may be used for protecting against rain or sunshine.

2. Description of the Prior Art

As pointed out in my U.S. Pat. application Ser. No. 647,412, many different types of umbrella constructions are known, but for the most part they suffer from one or more of the following drawbacks: difficulty to open because of the hardness of the closing spring and/or the small distance between the stays and the umbrella ribs; difficulty to close in high wind; requirement for substantial space to open and close them, which is frequently inconvenient in densely populated areas or when entering or exiting from a motor vehicle; the tendency, if wet, to retain the water, the latter dripping when the umbrella is closed; the difficulty and inconvenience, if outer sheathes are used, in applying and removing them; and if outer sheathes are not used, the unneat and disorderly appearance they present.

My application Ser. No. 647,412 describes an umbrella construction which avoids the above-mentioned disadvantages, the umbrella therein described including an umbrella rod carrying the covering material at the upper end, both being received within a tube in the closed position of the umbrella and being movable through the upper end of the tube during opening the umbrella.

The present invention provides a number of improvements to umbrellas of the type of construction in my application Ser. No. 647,412.

SUMMARY OF THE PRESENT INVENTION

According to one broad feature of the present invention, an umbrella of the foregoing construction is provided with means for imparting a rotational movement to the umbrella rod and covering material during closing of the umbrella.

One such arrangement is described comprising a twisted bar of polygonal (e.g. square) section fixed centrally within the lower end of the tube, and a wheel coupled to the umbrella rod, which wheel has an opening of the same polygonal section as the twisted bar so as to receive it and to be rotated by it during closing of the umbrella. A second arrangement is described comprising a helical formation (e.g. a rib or groove) formed on the inner surface of the tube, and a collar coupled to the umbrella rod and formed with an external surface engageable with the helical formation of the tube for rotating the umbrella rod during closing of the umbrella. In both of the described arrangements, the umbrella rod and covering material are rotated only during closing of the umbrella, and not during opening.

Further features are described including an improved construction at the upper end of the tube for effecting opening of the umbrella as the umbrella rod is moved through the upper end of the tube.

According to a still further feature of the invention, the umbrella incorporates a light bulb including a battery and a switch for energizing it.

Additional features of the invention will be apparent from the description below.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is herein described, somewhat diagrammatically and by way of example only, with reference to the accompanying drawings, wherein:

FIG. 1 is a side elevational view, partly in section, of the umbrella described in my application Ser. No. 647,412;

FIG. 2 is a longitudinal sectional view of the umbrella of FIG. 1;

FIGS. 3—7 diagrammatically illustrate the opening movements of the umbrella of FIGS. 1 and 2.

FIG. 8 is an exploded view, partly in section, of an improved construction at the upper end of the umbrella tube of FIGS. 1 and 2;

FIG. 9 illustrates a variation in the construction corresponding to FIG. 8;

FIG. 10 is a fragmentary view, partly in section, illustrating an improved construction at the lower end of the umbrella tube;

FIGS. 11—13 illustrate one arrangement for imparting a rotational movement to the umbrella rod and covering material during closing of the umbrella.

FIGS. 14—16 illustrate another arrangement for imparting a rotational movement to the umbrella rod and covering material during closing of the umbrella; and

FIG. 17 schematically illustrates the feature in which a lighting device is incorporated in the umbrella.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference is first made to FIGS. 1 and 2 which illustrate the umbrella construction described in my application Ser. No. 647,412, and then to FIGS. 3—7 which illustrate the operation of such an umbrella.

The umbrella of FIGS. 1 and 2 includes a handle-case or tube 2 telescopically receiving an umbrella rod 3 formed with a pointed upper tip 4 and a collar or "whirl" 5 of conical shape. A slide or collar 6 is slidably disposed at the upper end of umbrella rod 3. The umbrella ribs 7 are pivotably mounted to collar 5 and radiate about the longitudinal axis of umbrella rod 3 and tube 2. At an intermediate point 8 on each rib 7, there is pivotably mounted one end of a forked rod or stay 9, the opposite end of the stays being pivotably mounted to collar 6. Ribs 7 carry the umbrella covering material 7', and their upper free ends are formed with knobs or buttons 10 as in conventional umbrellas.

The lower end of tube 2 is closed by a removable base or cap 11 to which is attached a loop 12 for use in carrying the umbrella or suspending it from a support. The tube is formed with a thin axial slit 13 and with widened portions or notches 14 and 15 at the upper and lower ends. Tube 2 carries an annular sleeve or slider 18 having a short arm or bridge 22 extending through slit 13.

Bridge 22 should be very thin to avoid the necessity of too large a slit 13. For this purpose, bridge 22 may be in the form of a lamination, preferably of metal. Notches 14 and 15 receive bridge 22 when the umbrella is in its closed and opened positions, respectively.

The upper end of tube 2 is open and is reinforced by a beaded border or rim 19, the latter being made of tough material having a very low coefficient of friction, such as nylon or Teflon (Reg. T.M.).

Umbrella rod 3 carries an inner sleeve 21 whose end is out-turned to form an enlarged cylindrical portion or piston in slidable contact with the inside surface of tube 2. Sleeve 21 is rotatable on rod 3 but is not slidable axially thereon, being limited by a pair of cotter pins 21' or the like. Bridge 22 is secured between inner sleeve 21 and outer sleeve 18 so that rod 3 moves with the outer sleeve. The lower end 24 of collar 6 is also formed with an enlarged cylindrical portion snugly engaging the inner surface of tube 2, so that the movement of rod 3 is positively and smoothly guided within the tube.

A resilient element 23, in the form of a rubber band or the like, is affixed between cap 11 and the lower end of rod 3, and is adapted to be tensioned upon raising the rod. In addition, a spring 25 is interposed between collars 5 and 6.

Tube 2 is preferably of circular section, but may also be of polygonal section. It is of such dimension, both in cross section and length, to receive within it rod 3, ribs 7, and umbrella covering material 7', in the closed condition of the umbrella.

FIGS. 3—7 illustrate the position of the parts when the umbrella is moved from its closed to its open condition. In the closed condition (FIG. 3), ribs 7 are disposed within and substantially coaxially of tube 2 with their pivotable ends (i.e., those pivoted to collar 5) below their free ends (i.e., those car-

rying the buttons 10), which is the opposite condition in the conventional umbrellas. The stays 9 are also substantially coaxial of tube 2, the pivotable mountings 8 of the stays being above the pivotably mounting of ribs 7, which again is opposite to the condition in the conventional umbrellas.

In order to open the umbrella, sleeve 18 is rotated slightly to unseat bridge 22 from notch 14, and is then moved upwardly, which causes rod 3 also to move upwardly. The upper free ends of ribs 7 pass through the open upper end of tube 2 (FIG. 4) until the condition is reached (FIG. 5) wherein the upper end of collar 6 abuts the thickened rim on stop 19 at the upper end of tube 2. Further raising of sleeve 18 causes rod 3 and collar 5 also to rise, but collar 6 cannot rise further because of rim 19, the latter serving as a limit for limiting the further movement of collar 6 after the predetermined movement of the rod has been attained. Thus, the condition (FIG. 6) is reached where the umbrella is fully opened. It will be seen that in this condition the pivotable mountings (collar 5) for ribs 7 have been raised so as to be above the pivotable mountings 8 of stays 9 to the ribs 7.

During this opening movement of the umbrella, rubber band 23 is tensioned so that as sleeve 18 is released, this band will pull the sleeve and rod 3 downwardly a short distance (FIG. 10). The resilience of the rubber band is not sufficient to close the umbrella, it being merely sufficient to apply a slight tension to rod 3 and thereby to stiffen the umbrella parts in the open condition. The umbrella is locked in the open condition by rotating sleeve 18 to seat bridge 22 into the upper notch 15.

To close the umbrella, sleeve 18 is rotated to unseat bridge 22 from notch 15 and is then moved downwardly. The parts will be moved in the reverse manner described above to the fully closed condition of the umbrella as shown in FIG. 3.

Rim 19 is a very important element in the disclosed construction and must have a rounded and smooth surface to prevent tearing the umbrella material 7' as the umbrella is opened and closed in the manner described above. This rim may be riveted to tube 2, as described in my application Ser. No. 647,412, so that the heads of the rivets may also serve the function of the stops limiting the movement of collar 6 during opening of the umbrella as described. Rim 19 may be attached to tube 2 in other manners, for example by gluing or threading, or it may be produced integral with tube 2 forming an internal annular stop at the end of the tube.

FIGS. 8 and 9 illustrate an improvement in which the slit 13 in tube 2 is not limited to the length of the stroke of sleeve 18 but extends over the entire length of the tube. This arrangement reinforces tube 2 and prevents the notches 14 and 15 from forming weakened areas in tube 2 liable to start tearing.

In the arrangement shown in FIG. 8, a ring stop 30 is applied to the outer face at the top of tube 2. Ring 30 may be made of very thin sheet metal (e.g., 0.1 mm. thickness) and contains an inwardly extending axial fold 31 which fits into slit 13 of tube 2. This ring is fixed to the upper end of tube 2 by pressure, and its surface has tabs 32 bent inwardly and upwardly so as to press against the wall of tube 2 to firmly secure the ring to the tube.

Ring 30 may be externally threaded, as shown at 30', to receive internally threaded rim 19. The upper inside end of rim 19 is formed with an annular border 19' protruding into rod 2, this border serving the function of the limit or stop engageable with collar 6 during the opening of the umbrella as described above. A screw 33 may be used for firmly securing rim 19 to ring 30.

In the arrangement of FIG. 9, the slit 13 extends over the entire length of tube 2, as in FIG. 8, and a ring 35 of sheet metal or the like is applied over the upper end of tube 2. Ring 35 may be similar to ring 32 in the inclusion of a fold (corresponding to fold 31 in FIG. 8) extending axially and inwardly of the sleeve so as to be fitted into slit 13 of the tube. In FIG. 9, however, ring 35 is preferably sturdier than ring 30 and the upper edge of tube 2 is folded over the edge of the ring, forming an inner annular bulge or border 36' serving the same function as border 19' in FIG. 8.

FIG. 10 illustrates a modification in the construction of rod 3, the latter being extended under the sleeve 18 forming a projection 3' provided with a rubber button 37 adapted to engage base 11. Rubber button 37 serves to cushion the impact of the rod against base 11 when the umbrella is closed, and also to keep apart the upper surface of base 11 from the lower surface of sleeve 18 to prevent pinching the operator's fingers between them when the umbrella is closed.

FIGS. 11—13 illustrate a further improvement to the foregoing type of umbrella construction, namely an arrangement for imparting a rotational movement to the umbrella rod 3, ribs 7 and covering material 7' as the umbrella is closed. This rotational movement facilitates the entry of the umbrella covering material into the tube 2 by avoiding the pile-up of the cloth against rim 19. FIGS. 14—16 illustrate another arrangement for providing this function.

In the embodiment illustrated in FIGS. 11—13, a metal plate 40 is attached to the base 11 by means of bolts 41. Plate 40 fixedly supports a twisted or helical bar 42 having a polygonal (preferably square) cross section and having a length approximately equal to one-third the stroke of sleeve 18. The latter sleeve has an internal ring 43 fixed directly to bridge 22. Inside sleeve 43 is a rotatable cylindrical body 44 on which is fixed the umbrella rod 3. Rod 3 and body 44 are each formed with a central opening of sufficient diameter to receive twisted bar 42 during closing of the umbrella. A toothed wheel 45 is disposed within body 44 and is slightly spaced therefrom so as to be rotatable with respect to the body. The teeth of wheel 45 are engaged by a pawl 46 carried by body 44 and biases to seat within the teeth by spring 47. Toothed wheel 45 is formed at its center with an opening 45' of the same polygonal cross section (preferably square) as that of twisted bar 42.

The arrangement illustrated in FIGS. 11—13 operated as follows: upon closing the umbrella by moving sleeve 18 downwardly in the manner described above, the fixed twisted bar 42 enters the opening 45' in toothed wheel 45 at a point about one-third from the end of the downward stroke. As sleeve 18 is further lowered, toothed wheel 45 is rotated (counterclockwise in view of FIG. 16) and, through pawl 46, rotates therewith body 44 and umbrella rod 3. Thus the umbrella rod 3, ribs 7, and umbrella covering material 7' are given a rotational movement during the closing of the umbrella.

When the umbrella is opened by moving sleeve 18 upwardly in the manner described above, toothed wheel 45 is again rotated by twisted bar 42, but in the opposite direction (i.e. clockwise in the view of FIG. 13). Pawl 46 and the teeth of wheel 45 are arranged, as shown in FIG. 13, so that this rotation of wheel 45 does not rotate body 44, and therefore the umbrella rod 3 is not rotated upon opening the umbrella.

FIGS. 14—16 illustrate a different arrangement for imparting a rotational movement to the umbrella rod when closing the umbrella. In this arrangement a toothed wheel 50 is rotatably disposed within collar 6, and is formed with a central polygonal opening 51 (preferably square-cross-section), for receiving the umbrella rod (rod 3, in FIG. 12) which would be of the same cross section. The external surface of collar 6 is formed with a series of axial grooves 52 adapted to cooperate with a spiral or helical rib 53 formed on the inside surface of tube 2. A pawl 54 is carried by collar 6 and is spring-biased into engagement with the teeth of wheel 50.

The arrangement illustrated in FIGS. 14—16 operates as follows: as the umbrella is closed in the manner described above, collar 6 is moved downwardly until about the last one-third of the downward stroke (of sleeve 18, FIGS. 1—7) when one of the grooves 52 on collar 6 is engaged by spiral rib 53 formed on the inner surface of tube 2. Further downward movement of collar 6 causes the collar to rotate thereby also causing toothed wheel 50 to rotate. The umbrella rod, which as indicated above is of corresponding section as opening 51 and received therein, is also rotated with toothed wheel 50 during this closing movement of the umbrella.

When the umbrella is opened, toothed wheel 50 is not rotated because of the arrangement of the teeth of wheel 50 and pawl 54, as in the embodiment of FIGS. 11-13.

A further improvement is illustrated with respect to FIG. 17 schematically showing a lighting unit mounted on the umbrella, particularly at its upper tip. Such an arrangement is particularly suited to the umbrella described above since when the umbrella is closed, the upper tip carrying the lighting unit is completely protected on the inside of the umbrella tube 2. This lighting unit, for example a red light, is especially useful for making pedestrians readily visible in the rain, at night, or in poorly-lit areas. The lighting unit may even have sufficient lighting capacity to illuminate dark streets or other areas.

The lighting unit illustrated in FIG. 17 is disposed within the hollow tip 4' of the umbrella. A transparent cap 60 is attached at the upper end of tip 4'. A light bulb 61 is disposed within cap 60, and the batteries 62 for the light bulb are located within hollow tip 4'. The electrical circuit to the light bulb from the batteries is schematically illustrated by conductor 63 and switch 64, the latter being carried by sleeve 18 and used for energizing and deenergizing the light bulb.

Further modifications, variations, and applications of the invention, and the various features disclosed, will be apparent.

I claim:

1. An umbrella, comprising, a tube, an umbrella rod, a plurality of ribs pivotably mounted to the upper end of said umbrella rod and carrying the umbrella covering material, said umbrella rod, ribs and covering material being received within said tube in the closed condition of the umbrella and being movable through the upper end of the tube for opening the umbrella, a rotatable element carried by said umbrella rod, and an actuating element fixed with respect to said tube and engageable with said rotatable element during the closing movement of said umbrella rod for automatically rotating said rotatable element, umbrella rod, ribs and covering material during the closing of the umbrella.

2. An umbrella as defined in claim 1, further including a light bulb mounted at the upper end of said umbrella rod, a battery disposed at the upper end of said umbrella rod and supplying power to said light bulb, and a switch for energizing and deenergizing said light bulb, said switch being located at the upper end of said tube and being actuated by said sleeve when the latter is moved to the upper end of said tube for opening the umbrella, said light bulb being disposed within said tube and therefor protected thereby in the closed condition of said umbrella.

3. An umbrella as defined in claim 1, wherein said actuating element comprises a twisted bar of polygonal section fixed centrally within the lower end of said tube and coaxial therewith, and wherein said rotatable element comprises a wheel coupled to said umbrella rod, said wheel having an opening of the same polygonal section as said twisted bar so as to receive same and to be rotated thereby during the closing of said umbrella.

4. An umbrella as defined in claim 3, wherein said wheel is formed with external teeth and is coupled to said umbrella rod by a pawl pivotably mounted to a sleeve carried at the lower end of said umbrella rod, said pawl being spring-biased to engage said teeth for rotating said sleeve only during the closing movement of said umbrella rod.

5. An umbrella as defined in claim 1, wherein said actuating element comprises a helical formation formed on the inner surface of said tube, and wherein said rotatable element comprises a collar coupled to said umbrella rod and formed with

an external surface engageable with said helical formation of the tube for rotating the umbrella rod during the closing of the umbrella.

6. An umbrella as defined in claim 5, wherein said collar is coupled to said umbrella rod by a pawl pivotably mounted to the collar and spring-biased into engagement with the teeth of a wheel for rotating same only during the closing movement of said umbrella rod, the latter being of polygonal section and being receivable in an opening of the same polygonal section formed in said wheel.

7. An umbrella as defined in claim 1, further including a collar slidably mounted on said umbrella rod, a plurality of stays each pivotably mounted at one end to said collar and its opposite end to one of said ribs, a sleeve movable axially along the outer surface of said tube, a bridge connecting said sleeve to said umbrella rod, said tube being formed with an axial slit through which said bridge moves while the sleeve moves along the outer surface of said tube to move said umbrella rod and collar therewith, and a ring fixed to the upper end of said tube in alignment with said axial slit limiting the further movement of said collar after a predetermined movement of the umbrella rod, thereby effecting the opening of the umbrella by causing the downward pivoting of said ribs and stays.

8. An umbrella comprising a tube, an umbrella rod, a plurality of ribs pivotably mounted to the upper end of said umbrella rod and carrying the umbrella covering material, said umbrella rod, ribs and covering material being receivable within said tube in the closed condition of the umbrella and being movable through the upper end of the tube for opening the umbrella, a collar slidably mounted on said umbrella rod, a plurality of stays each pivotably mounted at one end to said collar and at its opposite end to one of said ribs, a sleeve movable axially along the outer surface of said tube, a bridge connecting said sleeve to said umbrella rod, said tube being formed with an axial slit extending to the upper end thereof through which said bridge moves while the sleeve moves along the outer surface of said tube to move said rod and collar therewith, a ring fixed to the outer surface of the upper end of said tube and closing said axial slit to limit the further movement of said collar after a predetermined movement of said umbrella rod, thereby effecting the opening of the umbrella by causing the downward pivoting of said ribs and stays, said ring being formed with a fold extending axially thereof and fitted into said axial slit of the tube.

9. An umbrella, comprising, a tube, an umbrella rod, a plurality of ribs pivotably mounted to the upper end of said umbrella rod and carrying the umbrella covering material, said umbrella rod, ribs and covering material being receivable within said tube in the closed condition of the umbrella and being movable through the upper end of the tube for opening the umbrella, a sleeve movable axially along the outer surface of said tube and connected to said umbrella rod for opening said umbrella when moved to the upper end of said tube and closing said umbrella when moved to the lower end of said tube, a light bulb mounted at the upper end of said umbrella rod, a battery disposed at the upper end of said umbrella rod and supplying power to said light bulb, and a switch for energizing and deenergizing said light bulb, said switch being located at the upper end of said tube and actuated by said sleeve when the latter is moved to the upper end of said tube for opening the umbrella, said light bulb being disposed within said tube and therefore protected thereby in the closed condition of said umbrella.