

[54] **COLLAPSIBLE UMBRELLA WITH
AUTOMATIC AND MANUAL DOME-
RIB LOCKING MEANS**

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many

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[58] Field of Search.....135/44, 26, 22, 23

[56] **References Cited**

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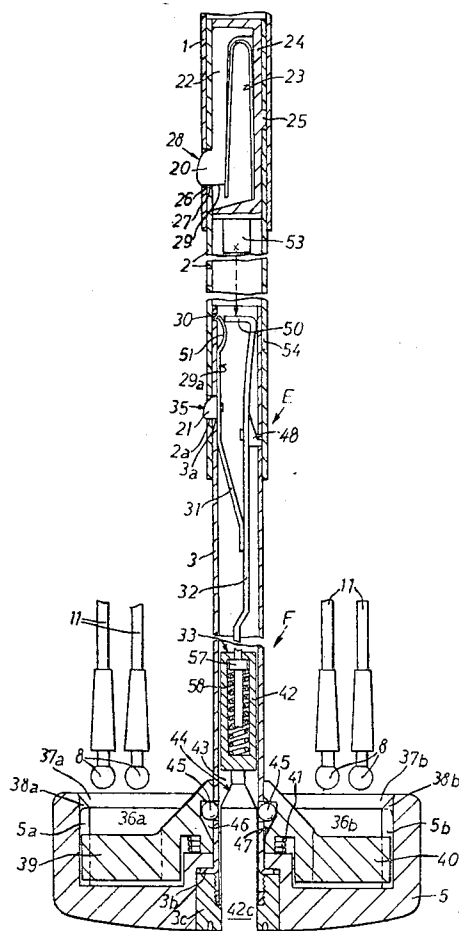
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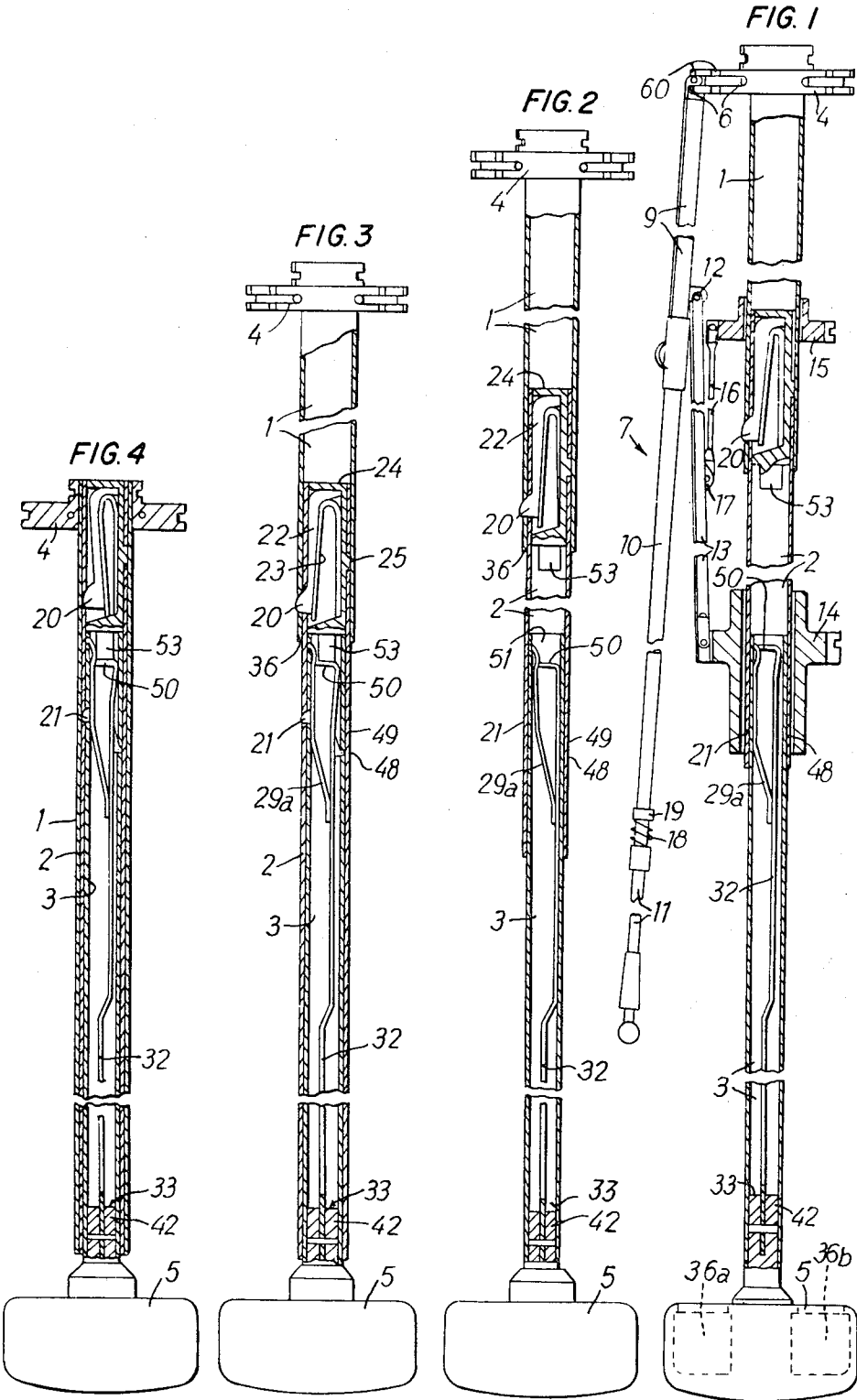
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[57] **ABSTRACT**

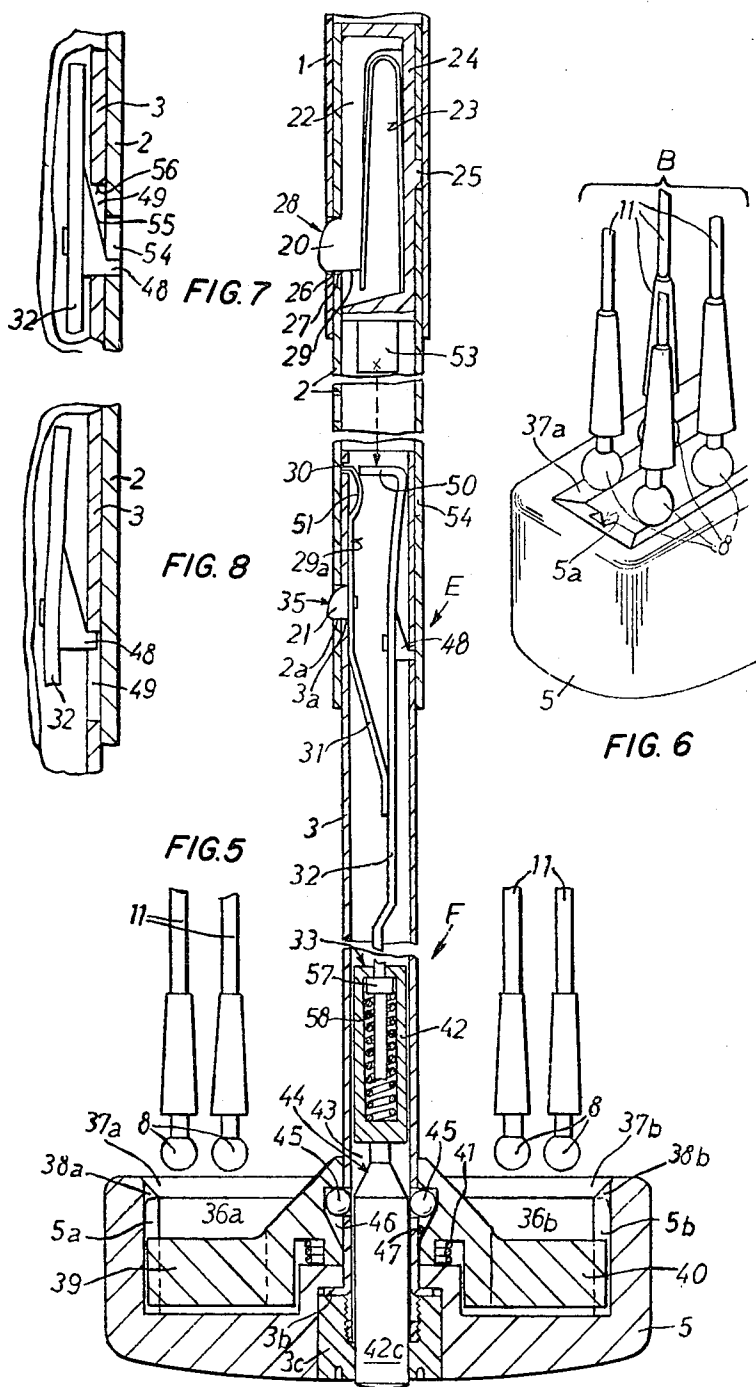
An umbrella having a telescoping stick and collapsible ribs whereby clamping means are provided in the handle for gripping the ends of the dome ribs when the umbrella is collapsed. Linkage is provided in the telescopic stick connecting an actuation lever in the stick and the clamping means in the handle for automatically releasing or gripping the dome ribs when the stick is extended to a certain length or being reduced to that length.

8 Claims, 14 Drawing Figures



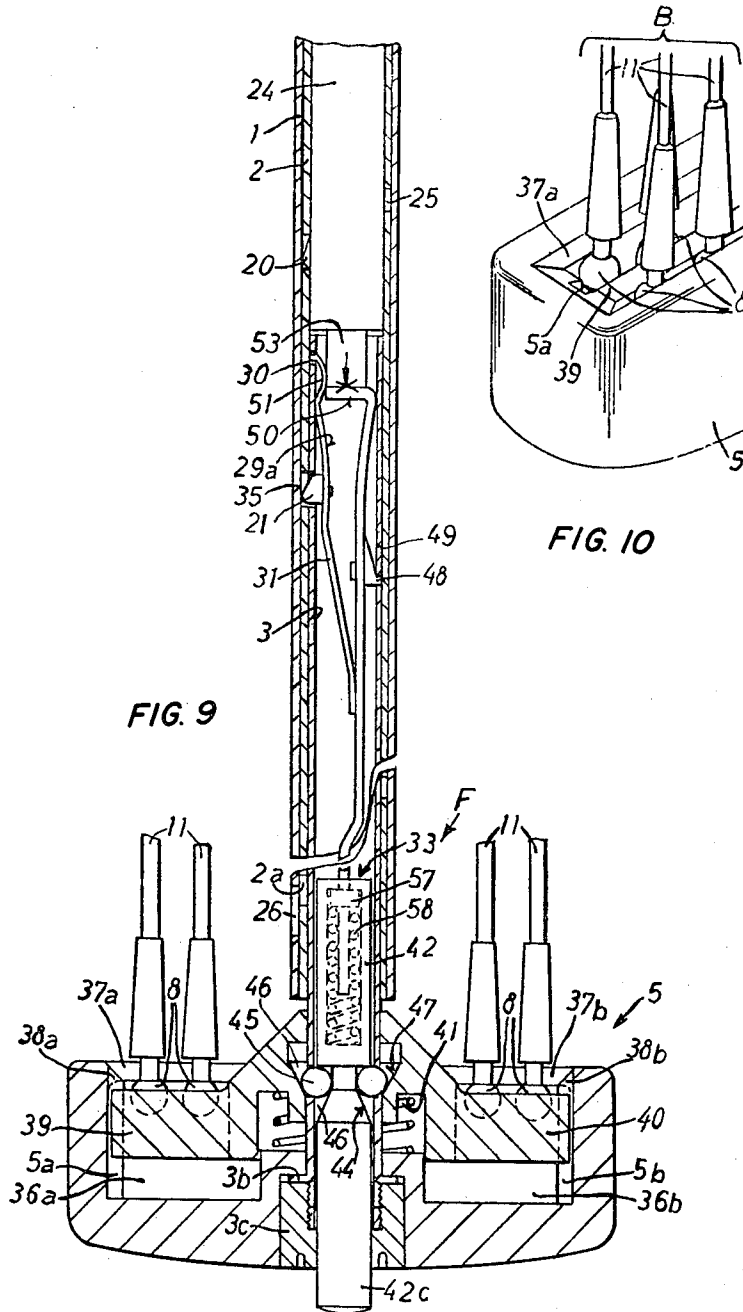


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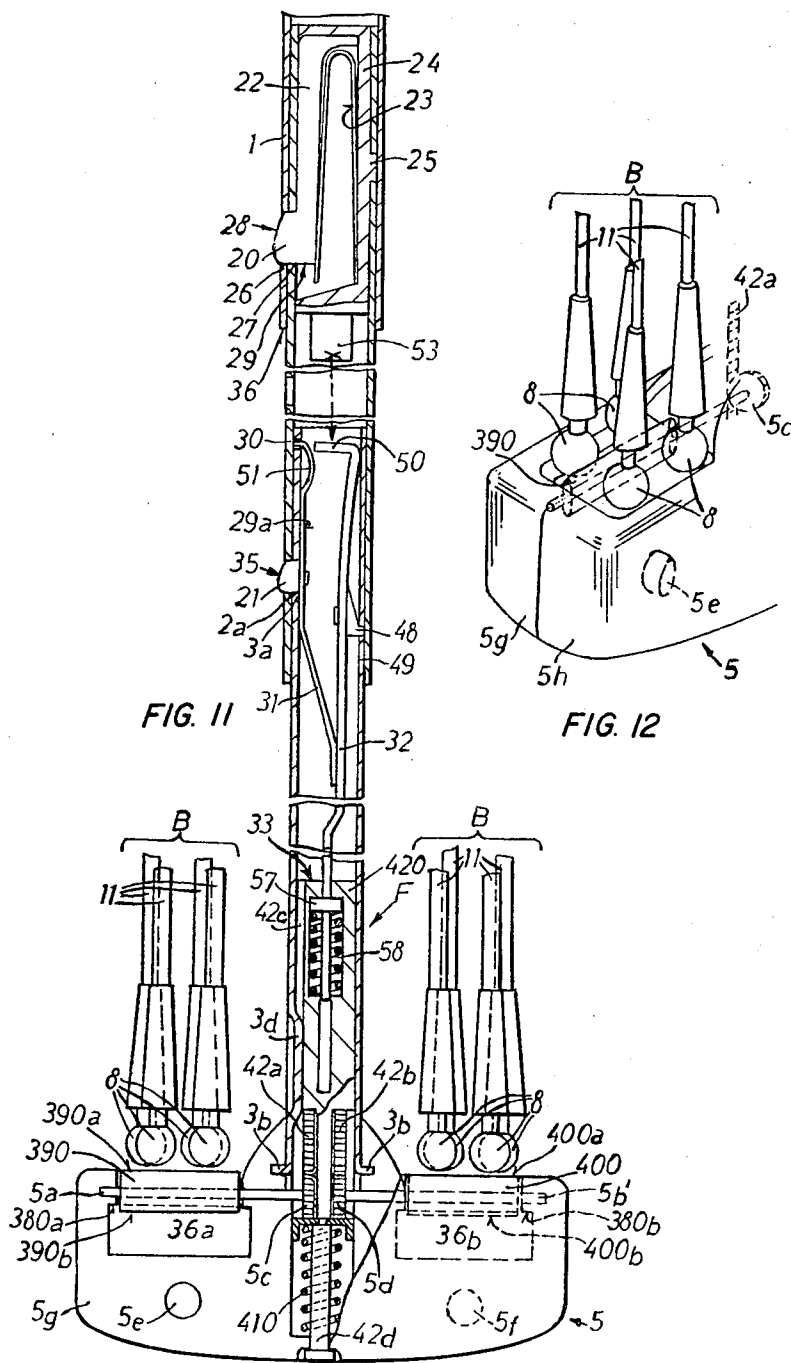
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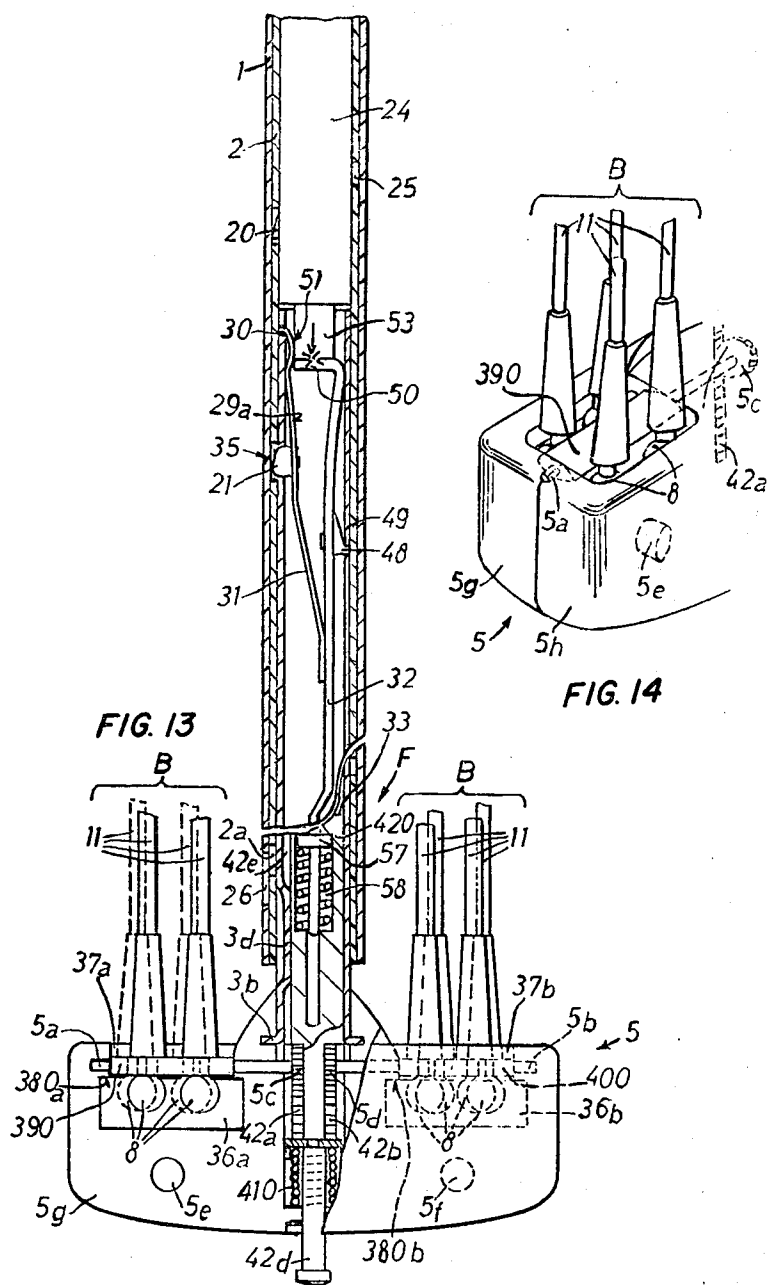
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COLLAPSIBLE UMBRELLA WITH AUTOMATIC AND MANUAL DOME-RIB LOCKING MEANS

BACKGROUND OF INVENTION

1. Field of Invention

The invention relates to a shortenable umbrella frame consisting of members capable of telescoping into each other, dome ribs hinged to a crown and stick parts capable of being pushed together, struts hinged both the dome rib members and to a main slide, a handle having at least one recess for the accommodation of the thickened ends of the dome ribs, and with a locking member arranged on or in the said handle which, in the locked position, holds the thickened ends of the dome ribs in the said handle.

2. Description of Prior Art

Shortenable umbrella frames are already known in which the thickened ends of the dome ribs are automatically locked upon entering the relevant recess in the handle. In one design of umbrella frame, the lock (United States application 682,871) may be released manually when the umbrella frame is in any desired position of use.

In another variation of a shortenable umbrella frame, however, the said lock cannot be released manually, but is released automatically, depending on the telescoping action of the stick and dome rib members. The locking in the latter variation is especially advantageous because it is rendered inoperative automatically only at the correct moment, namely when all of the dome rib members have been completely extended, so that any operating instructions are superfluous and inexpert manipulation is largely avoided. On the other hand, the locking member, or the automatic mechanism which actuates it may possibly fail to act, thus embarrassing the user in an emergency by making it impossible for him to use the umbrella.

In order to provide a remedy for this, the invention provides that the locking member for locking the thickened ends of the dome ribs may be rendered operative or inoperative both automatically, by the telescoping action of the stick members, and manually, independently of the automatic operation, by means of a grip, the said grip being connected to the mechanism actuated in dependence upon the telescopic movement of the stick members, for automatically locking and unlocking the thickened ends of the dome ribs, by the interposition of a release.

According to one advantageous design of the invention, the said release may consist of a spring-loaded slide guided in a slide arranged in the bottom stick member.

A release designed in such a manner provides a simple configuration which functions satisfactorily if a spring seeks to move the locking member into the locked position, the said spring being weaker than the spring in the release.

If the umbrella frame is equipped with flat auxiliary and main slides, a flat handle, a bundle of dome ribs and struts hinged on each side of the stick, and with two diametrically opposite chambers at the end of the stick to accommodate the thickened ends of the dome ribs after the manner of a so-called flat umbrella, then each of the said chambers may be provided with a locking member which arranges the thickened ends of the dome ribs and the two bundles of dome ribs, allowing

them to enter the said chambers only when so arranged, and retaining them therein.

A simple configuration of the locking member or members is obtained when it or they consist of an axially movable slide.

In a further configuration of the invention, however, the said locking member may also consist of at least one bolt which pivots transversely to the stick.

A simple arrangement and design of grip for manually actuating the locking member or members is obtained, according to one preferred form of the invention, by making the grip in the form of a continuation of the slide accommodating the release.

BRIEF DESCRIPTION OF THE DRAWINGS

Two forms of execution of the invention are explained hereinafter in greater detail and are illustrated in the drawing, wherein:

FIG. 1 shows a longitudinal section through an umbrella frame according to the invention which is flat when retracted, but is shown fully extended and with the dome closed;

FIGS. 2 to 4 show longitudinal sections through the stick of the frame in FIG. 1 in different shortening phases;

FIG. 5 is a longitudinal section through the bottom part of the frame in FIG. 1 to an enlarged scale;

FIG. 6 is a part view of the handle area in FIG. 5 in perspective;

FIG. 7 is a view of the detail marked E in FIG. 5;

FIG. 8 shows the detail in FIG. 7 with the push rod mounted in the stick in a different position;

FIG. 9 shows the frame in FIG. 5, but with the stick parts retracted and the heads of the dome ribs locked;

FIG. 10 is a part view of the handle area in FIG. 9 in perspective;

FIG. 11 is a longitudinal section, to an enlarged scale, of the bottom part of the frame in FIG. 1 with another form of execution of the lock according to the invention;

FIG. 12 is a part view of the handle area in FIG. 11 in perspective;

FIG. 13 shows the sectional representation and variant according to FIG. 11, but with the dome rib heads locked and the stick parts retracted; and

FIG. 14 is a part view of the handle area in FIG. 13 in perspective.

As indicated by the broken lines, the dome ribs, stick and strut linkages have had to be shown shorter than their actual length, since otherwise it would have been impossible to show the details with adequate clarity.

In the umbrella frame illustrated, the stick consists of three telescoping hollow members 1, 2 and 3, member 3 telescoping into member 2 and member 2 into member 1. At its free end, member 1 carries an umbrella crown 4, while member 3 carries at its free end a handle 5. Handle 5 may be secured against rotation and attached to the stick in the manner indicated, by means of bent tabs 3b on stick member 3 (FIGS. 11, 13) or by means of the said tabs and a nut 3c (FIGS. 5, 9).

By means of hinges 6 and grooves 60, the dome ribs generally marked 7 are hinged to crown 4 on each side of the stick in the form of two bundles B (FIGS. 6, 10, 12, 14). The free ends of dome ribs 7 are provided with ball heads 8 (so called tips) and, like the stick, the said

dome ribs consist of three telescoping parts, namely an inner part 9, a central part 10, and an outer part 11. The inner ends of central part 10, of which only one eye 12 is visible in FIG. 1, are each hinged by means of a strut 13, known as the main strut, to a slide 14, known as the main slide, which moves along the stick.

Main slide 14 is fixed in the position shown in FIG. 1 by means of an appropriate lock. When the umbrella frame is open, the said slide may also be locked to the stick in the vicinity of the crown. Suitable locks for this purpose are known and are not shown in the drawing in order to avoid complexity.

Arranged between main slide 14 and crown 4 is another slide 15, known as the auxiliary slide which also moves along the stick. Each main strut 13 is hinged to auxiliary slide 15 by an auxiliary strut 16 which is hinged to its associated main strut 13 at 17. As may be gathered from the jib-like shape with a bundle B of dome ribs hinged on each side of the stick, crown 4, auxiliary slide 15 and main slide 14 are made flat and are in alignment with handle 5 which is also flat. This produces what is called a flat umbrella frame which has a circular dome when open, but is flat when folded.

Central part 10 and outer part 11 of each dome rib may be locked together in the extended position. Locks of this kind are also known and are therefore not shown in detail in the drawing. When a dome rib is extended, the lock snaps in automatically. When the dome rib is subsequently retracted, parts 10 and 11 initially remain locked together.

Thus movement takes place first of all between dome rib parts 9 and 10. After about half the travel has been completed, a ring 19 mounted on dome rib part 10 and moving against a helical spring 18 strikes the outer end of inner dome rib part 9, thus releasing the lock.

For the purpose of locking stick members 1, 2 and 3 together, use is made of two spring-mounted tabs 20, 21. Tab 20 locks together stick members 1 and 2, and according to FIGS. 5 and 11, is part of an arm 22 which is acted upon by a hairpin spring 23. Arm 22 and spring 23 are mounted in a sleeve 24 attached to the top of stick member 2 by means of a pin 25. In the locked position, as shown in FIGS. 1 to 3, 5 and 11, tab 20 engages stick members 1 and 2 through slots 26 and 27. Edge 28 of the said tab is shaped in such a manner that the tab moves back into the interior of the stick when the stick parts are pushed together by forces acting inwardly on crown 4 and handle 5. In this direction, therefore, the locking action of tab 20 is only frictional. In the opposite direction, i.e., when the stick is being extended, an edge 29 prevents the stick members from becoming separated.

Tab 21 serves to lock together stick members 2 and 3. The said tab is attached to a leaf spring 29a, the end of which is locked in a hole 30 in the wall of stick member 3, and which is therefore not axially displaceable.

The other end 31 of leaf spring 29a rests upon a spring push-pull rod 32 which forms part of a control member 33, the purpose of which is described in greater detail below. In the locked position shown in FIGS. 5 and 11, tab 21, like tab 20, projects through slots 2a and 3a in stick members 2 and 3. Edge 35 of tab 21 is shaped in such a manner that, when the frame is extended, the lock is positive in both directions.

Thus, when the frame is telescoped together by pressure on both ends of the stick, tab 20, which locks merely by friction, gives way first of all, whereas tab 21 remains in the locked position shown in FIGS. 5 and 11. The result of this is that during closing only stick members 1 and 2 move in relation to each other and no relative movement takes place between stick members 2 and 3. However, bottom edge 36 of stick member 1 eventually reaches tab 21 and presses it radially inwards, so that it reaches the position shown in FIGS. 4, 9 and 13. This occurs shortly before stick members 1 and 2 have been fully pushed together. From now on the positive lock between stick members 2 and 3 is removed by tab 21 as far as pushing together is concerned. Tab 21 therefore yields to pushing together pressure on stick members 2 and 3, and the stick may therefore be pushed fully together into the position shown in FIGS. 4, 9 and 13. When the stick is being extended, however, when tab 21 falls into slot 2a it forms a positive lock, even when it is pushed inwardly by stick member 1, so that members 2 and 3 cannot become completely separated. This ensures that, upon pushing together, the initial displacement is between stick member 1 and still locked stick members 2 and 3, whereas movement between stick members 2 and 3 can begin only when the movement between stick members 1 and 2 has almost ended.

When the stick is extended, the sequence of events is somewhat different as described hereinafter.

On the side facing umbrella crown 4, handle 5 is provided with two chambers 36a and 36b serving to accommodate dome rib heads 8. The said chambers have chamfered openings 37a, 37b to facilitate the entry of the said dome rib heads, the passage between the said openings being somewhat less than the periphery of the underlying chambers by reason of shoulders 38a, 38b.

Mounted axially displaceably in the two chambers are two locking members. According to the example of execution in FIGS. 5, 6, 9 and 10, the said locking members consist of two flat slides 39, 40 guided in chambers 36a, 36b in grooves 5a, 5b in handle 5, the said slides dividing chambers 36a, 36b into two spaces such that the said spaces can accept only two of dome rib heads 8 of the two bundles B of dome ribs on each side of the stick. The said two flat slides preferably form a single unit which is under the action of helical spring 41.

This spring endeavours to move flat slides 39, 40 into the locked position shown in FIGS. 9 and 10.

According to the other example of execution illustrated in FIGS. 11 to 14, the locking members are in the form of bolts 390 and 400 capable of pivoting transversely to the stick. The said bolts are mounted to pivot about axes 5a', 5b' in handle 5 and they engage, by means of pinions 5c, 5d with racks 42a, 42b on a pin 420 described in greater detail hereinafter.

In order to facilitate the incorporation of pivotable bolts 390, 400, handle 5 may consist of two similar halves 5g, 5h joined together by means of insert pins 5e, 5f as shown in FIGS. 12 and 14.

When the frame is pushed together, the heads of the dome ribs arranged in bundles B on both sides of the stick enter chambers 36a, 36b. Due to the division of the two chambers 36a, 36b and chamber openings 37a, 37b, only one gap matching the diameter of heads 8 is

available, and this arranges dome rib bundles B, when they enter chambers 36a, 36b in such a manner that one head 8 comes to rest between a part fixed to the handle and the inner wall of the chamber on the one hand, and one of the locking members on the other hand.

When the frame has almost been pushed together, flat slides 39, 40 or bolts 390, 400 pass from the positions shown in FIGS. 5, 6, 11 and 12 to the locked positions shown in FIGS. 9, 10, 13 and 14.

In these positions, the dome rib heads 8, in the example of execution according to FIGS. 5 and 9 are locked between the side faces of flat slides 39, 40 and locking edges 38a, 38b fitted to chamber openings 37a, 37b. In the example of execution according to FIGS. 11 and 13, dome rib heads 8 are locked between the two edges 390a, 390b and 400a, 400b of the two bolts 390, 400 on the one hand and locking edges or shoulders 380a, 380b on chambers openings 390a, 400a in handle 5. The manner in which the locking members 39, 40 pass over into the locked position only when the frame has been almost completely pushed together is explained hereinafter.

For the purpose of rendering locking members 39, 40 operative and inoperative at the correct moments, the control member 33 is provided, the said control member consisting of the pin 42 mounted displaceably in stick member 3 and connected to push-pull rod 32. Pin 42 may be prevented from rotating by a groove lock 42c, and rib 3d (FIGS. 11, 13). In the variant according to FIGS. 5 and 9, control rod 33 is of a configuration such that in moving from the position in FIG. 9 to the position in FIG. 5, i.e., towards the umbrella crown 4, it moves locking members 39, 40 precisely in the opposite direction, i.e., towards the handle end, and conversely. To this end, pin 42 has a conical recess 46, and slides 39, 40 have a conical surface 47 which is angled in the opposite direction to conical surface 44 on the pin 42.

Recess 46 accepts balls 45 when the locking member is in the unlocked position shown in FIG. 5. In the position shown in FIG. 5, control member 33, by means of balls 45, prevents locking members 39, 40 from passing into the locked position under the action of spring 41. Only after control member 33 has moved into the position shown in FIG. 9 can balls 45 pass into recess 43, where they release the locking members, allowing them to pass into the locked position shown in FIG. 9. This, therefore, requires control member 33 to move towards the handle end of the stick. Conversely, when control member 33 is moved from the position shown in FIG. 9 towards umbrella crown 4, conical surface 44 forces balls 45 outwards, and these in turn force conical surface 47, and thus locking members 39, 40 into the position shown in FIG. 5. In order that it may be possible, in the event of failure of the automatic locking of heads 8 depending upon the telescoping action of the frame, to render the locking inoperative, control member 33 or pin 42 is provided with a button 42c which, with the aid of a mechanism described in greater detail hereinafter, allows locking members 39, 40 to be actuated manually also. This enables the user of the umbrella to use the said umbrella if the automatic lock becomes jammed or otherwise fails.

In the example of execution according to FIGS. 11 and 13, racks 42a and 42b already mentioned are fitted to control member 33 connected to push-pull rod 32 or to pin 420 guided displaceably in the third stick member, the said racks being in engagement with drive pinions 5c, 5d on bolts 390, 400.

The pin 420 is loaded by means of a spring 410 towards the umbrella frame tip. Spring 410 therefore endeavours to hold pin 420 and thus, via pinions 5c, 5d, bolts 390, 400 in the unlocked position shown in FIGS. 11 and 12. Pin 420 is also provided with a button 42d which makes it possible, in a manner described in greater detail hereinafter, to unlock bolts 390, 400 manually in case the automatic lock governed by the telescoping process should fail.

Control member 33 is moved in both directions by push-pull rod 32 through central stick member 2. The two positions which the said control member can assume, as shown in FIGS. 5', 9 and 11, 13 are determined by a stop tab 48 which is attached to rod 32 and is in permanent engagement with a slot 49, acting as a catch, in stick member 3, the axial length of which is equal to the path to be travelled by locking members 39, 40 and 390, 400 in passing from the position shown in FIGS. 5, 11 to that shown in FIGS. 9, 13. In both end positions, control member 33 is secured frictionally by a tab 50 and a spring cup 51 arranged at the top of leaf spring 29a.

Control member 33 is moved from the position shown in FIGS. 5 and 11 to that shown in FIGS. 9 and 13 by a stop 53 in sleeve 34, when the said stop strikes tab 50 near the end of the second phase of pushing together. Heads 8 of the dome ribs, which entered chambers or subcompartments 36a, 36b divided by slides 39, 40 or bolts 390, 400 during the pushing together, are locked by locking members 39, 40 or bolts 390, 400 passing into the locking position shown in FIGS. 9 and 13. Because of the positively-secured sequence in which the stick members are pushed together (first 1 over 2, then 1 and 2 over 3), this locking cannot occur prematurely. If the frame is extended again, rod 32, and with it control member 33, remain in the position shown in FIGS. 9 and 13 because of the lock effected by cup 51. This involves passing through the positions shown in FIGS. 3 and 2 and because of tab 21 stick members 1 and 2 are first moved in relation to each other and locked. Towards the end of the extension of members 2 and 3, tab 48 drops into a catch recess 54 in stick member 2. If by then stick members 2 and 3 are not fully extended, i.e., until tab 21 has been released, then the dropping of tab 48 in catch recess 54, as in FIGS. 2 and 7, will interrupt any further movement of push-pull rod 32 and pin 42. When stick member 3 is moved on into its end position, tab 50 slides over cup 51, and locking members 39, 40 and 390, 400 are moved into the release position by push-pull rod 32. During this phase, tab 48 is lifted out of catch recess 54 over sloping surface 55, as shown in FIG. 7 by an edge 56 which forms the upper limit of slot 49, acting as a catch, in stick member 3 so that the said stick member may be moved on into its end position.

In order to provide for the manual actuation, already mentioned, of locking member 39, 40 and 390, 400 by means of keys 42c, 42d, a release F is interposed between control member 33 and push-pull rod 32. In

the example of execution illustrated, this release is in the form of a guide for rod 32 spring loaded towards stop 53. To this end, rod 32 is guided in pins 42 or 420 by means of a piston 57 and is held by a spring in the position indicated. If buttons 42c, 42d are actuated in their positions according to FIGS. 9 or 13, the pins 42 or 420 moves towards stop 53 without displacing rod 32. Springs 58 and 41 or 410 then yield, and as a result of the alternating movement of balls 45 between cones 44 and 47, or the drive by racks 42b and pinions 5c, locking members 39, 40 or 390, 400 move out of the locked positions shown in FIGS. 9 and 13 into the release positions shown in FIGS. 5, 11. The procedure described above then takes place under the action of springs 58 and 41 or 410 in the reverse direction for locking, as soon as keys 42c or 42d are released.

I claim:

1. A collapsible umbrella comprising a substantially hollow stick including at least two telescoping portions; a plurality of roof-supporting ribs respectively comprising at least an inner and outer portion telescopically related to each other, said ribs being hingedly connected adjacent the free end of said outer rib portions adjacent one end of said stick, said outer rib portions including respective knob members at the free ends thereof; a main runner reciprocally mounted on said stick for movement axially thereof; a plurality of main struts each pivotally connected to said main runner and to an intermediate portion of said roof-supporting ribs; a handle on the other end of said stick and including a space for receiving said knob members therein when said stick and roof-supporting members are fully telescoped, said handle including displaceable locking means in said space for locking said knobs therein; and control means in said stick and operatively connected to said locking means for operating the same in relation to telescoping and extension of said stick, said control means including means for retaining said locking means in a non-locking condition when said knob members are not in a position to be locked in said space, said last-mentioned means being operable for locking said knob members in said space, the improvement wherein: said control member includes a manually-operable portion projecting from said handle and having an external portion accessible at a portion of said handle for releasing said knob members from said locking means, said roof-supporting ribs being disposed in two diametrically opposed distinct groups for affording a relatively flat configuration when the umbrella is collapsed for storage, said

space in said handle comprising diametrically opposed chambers for receiving the knob members of the respective groups of roof-supporting ribs, said locking means comprising a member dividing said opposed chambers in sub-compartments for receiving sub-divided groups of said knob members, said handle including portions overlying said sub-compartments and cooperating with said member sub-dividing the chambers for lockingly engaging said knob members and retaining the respective subdivided groups of the knob members in the sub-compartments.

2. The structure as claimed in claim 1 in which said manually operable portion comprises a spring-urged element reciprocally received in said handle and reciprocally received in said control member.

3. The structure as claimed in claim 2 in which said locking means includes spring means normally urging said locking means toward a locked position with respect to said knob members, the spring means acting on said locking means having a greater force than that to which said spring-urged member of said control member is subjected.

4. The structure as claimed in claim 1 in which said sub-dividing members of said lock means are axially displaceable within said diametrically opposed chambers and comprises an elongated body projecting radially from the longitudinal axis of said stick.

5. The structure as claimed in claim 1 in which said sub-dividing member of said lock means is pivotally mounted on an axis of rotation transverse to the longitudinal axis of said stick, said pivotal member being substantially flat in transverse cross section and pivotal to substantially overly said sub-compartments formed thereby to overlie and engage above said knob members after the same have entered the respective sub-compartments.

6. The structure as claimed in claim 5 including a pivot shaft on which said sub-dividing members are mounted, and mechanically-operated means engaged with said pivot shaft for rotating said sub-dividing members, said mechanically-operated means being operatively connected to said control member.

7. The structure as claimed in claim 6 in which said mechanically-operated means comprises a gear-and-rack assembly operatively connected between said control member and said pivot shaft.

8. The structure as claimed in claim 7 including spring means normally urging the control member toward a position permitting the respective groups of knob members to enter said sub-compartments.

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