Nov. 19, 1968 H. WEBER 3,411,519

TELESCOPIC COLLAPSIBLE UMBRELLA FRAME

Filed June 30, 1967 3 Sheets-Sheet 1

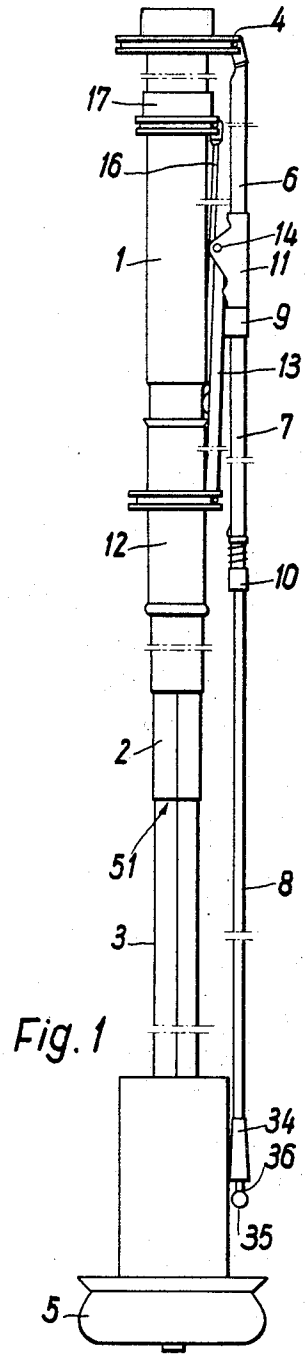

Fig. 1

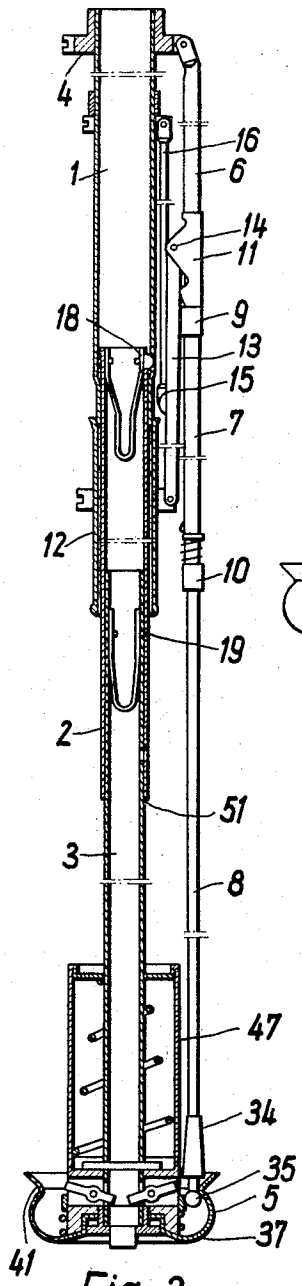

Fig. 2

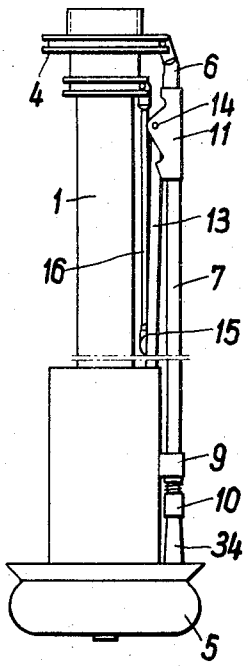

Fig. 3

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TELESCOPIC COLLAPSIBLE UMBRELLA FRAME

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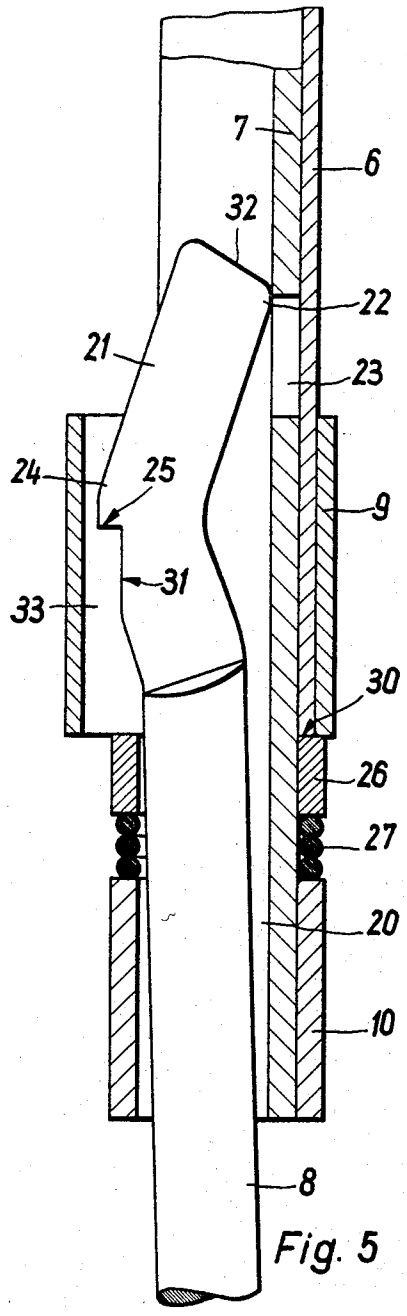

Fig. 5

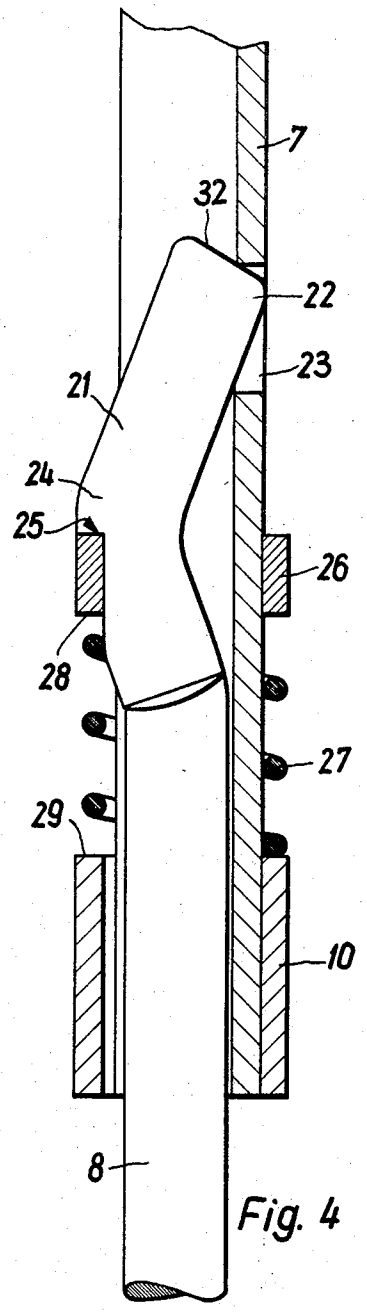

Fig. 4

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TELESCOPIC COLLAPSIBLE UMBRELLA FRAME

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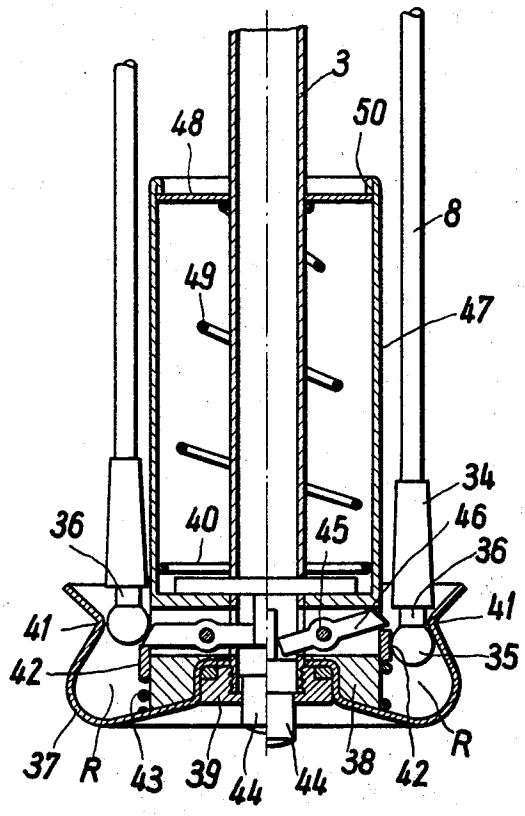

Fig. 6

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TELESCOPIC COLLAPSIBLE UMBRELLA FRAME

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6 Claims. (Cl. 135—26)

ABSTRACT OF THE DISCLOSURE

Telescopic collapsible umbrella frame includes a stick, a plurality of roof-supporting ribs each having a hollow innermost portion pivotally connected to an end of the stick, a hollow center portion telescopically slideable within the innermost portion and an outermost portion telescopically slideable within the center portion. The outermost portion is received with clearance within the center portion and is tiltable therein. A runner is slideably mounted on the stick and a plurality of struts are provided, each pivotally linked with the center portion of one of the supporting ribs. Also included are means for locking the outermost and the innermost rib portions together in extended condition thereof, the locking means comprising a head disposed at an end of the outermost rib portion located within the center rib portion, the head being tiltable in the extended condition of the rib so as to be at least partly inserted in a recess formed in the center rib portion, and biasing means operatively engageable with the head in the extended condition of the rib for maintaining the head in latching engagement within the recess of the center rib portion and for preventing subsequent tilting of the outermost rib portion being telescopically slideable over the center rib portion so as to operatively engage the biasing means for disengaging the biasing means from the head whereby the outermost rib portion is again tiltable so as to remove the head from the recess and thereby unlatch the center and outermost rib portions one from another.

SPECIFICATION

My invention relates to telescopic collapsible umbrella frame and, more particularly, to a frame of the type having roof-supporting ribs that are divided in three parts.

Collapsible umbrellas are constructed either with telescoping or folding umbrella frames. In umbrellas having telescoping frames, both the umbrella stick and the roof-supporting ribs are telescopically slideable one within the other. In umbrellas with folding frames, however, although the stick is of telescoping construction, the roof-supporting ribs do not telescope but are rather foldable, i.e. the parts thereof are hinged.

In the case of so-called pocketbook umbrellas, i.e. umbrellas that can be shortened so that they may be carried in a lady's handbag, for example, and that have three-piece roof-supporting rib construction, the umbrella stick retains its telescopic construction. However, many methods of shortening the roof-supporting ribs of the umbrella are known. A hybrid construction is particularly known wherein the roof-supporting ribs which are divided into three portions are partly telescopic and partly foldable. In another known construction, roof-supporting ribs having three portions are entirely telescopic. The invention of the instant application relates to a construction of the latter type.

In the field of umbrella frames there has developed two principal methods of producing the necessary opening and closing of the umbrella wherein the roof comprises

a plurality of tripartite mutually telescopically insertable roof-supporting rib portions. These methods of production differ in that in one case the struts which are articulatingly connected to the umbrella runner or slider are also articulatingly connected with the inner ends of the outer roof-supporting rib portions whereas in the other case the articulating connection is between the struts that are articulatingly connected to the runner or slider and the inner ends of the middle roof-supporting rib portions. In the first case just mentioned, the strut linkage appears to be relatively complicated. With regard to simplicity of construction and light weight, the second-mentioned type of construction therefore is more advantageous. Accordingly, the invention of the instant application relates to an umbrella frame of the second-mentioned type of construction.

The second-mentioned type of construction provides locking mechanisms between the inner ends of the outer roof-supporting rib portions and the outer ends of the center roof-supporting rib portions. Such locking mechanisms are also known in the art. They automatically change to the locking condition thereof whenever the roof-supporting ribs are completely extended, and they are automatically unlocked by the inner roof-supporting rib portions whenever the roof-supporting ribs are slid together again. In the known types of construction, they have the shape of resilient or springy tongues, which slip into notches formed in the associated roof-supporting rib portions.

The unlocking or releasing of the roof-supporting rib locking device between the center and the outer roof-supporting rib member by the inner roof-supporting rib member requires, in the case of the known umbrellas (German Patent No. 969,418), that the inner roof-supporting rib portion be articulatingly connected to the umbrella crown, the middle roof-supporting rib portion be so constructed that it is slideable over the inner roof-supporting rib member, and consequently must be hollow, and must have a larger diameter than the inner rib portion, while the outer roof-supporting rib member is slideable in turn over the middle portion and consequently must also have a hollow construction and must have the largest diameter of all the rib members. This is of course an unsuitable construction with respect to the bendability of roof-supporting ribs when the umbrella roof is open. It is undesirable because each roof-supporting rib then has a support at an end thereof, when the umbrella roof is opened, whose cross section, according to the laws of mechanics, should, by all reason, decrease from the clamping location outwardly rather than increase. It is a fact that for known umbrellas of this type of construction, the springly tongues serving as the locking members have to be punched or stampled out of the thin sheet metal of which the roof-supporting rib portions of hollow profile are constructed. The tongues are therefore very delicate and tend to be readily subject to metal fatigue so that frequent rupture thereof must be anticipated.

It is accordingly an object of my invention to provide telescopically collapsible umbrella frame having tripartite roof-supporting ribs which avoids the aforementioned disadvantages of the heretofore known collapsible umbrellas of this type wherein the conventional graduation of the roof-supporting ribs is maintained.

A further and more specific object of my invention is to provide telescopic collapsible umbrella frame with tripartite roof-supporting ribs, wherein the hollow roof-supporting rib portions do not require any resilient tongues to be stamped or punched out therefrom.

With the foregoing and other objects in view I provide in accordance with my invention telescopic collapsible umbrella frame with tripartite roof-supporting

ribs, each comprising a respective inner hollow roof-supporting rib portion articulatingly connected to the umbrella crown, a center roof-supporting rib portion similarly hollow but having a smaller diameter than the inner rib portion, and an outer roof-supporting rib portion connected to the middle rib portion, the outer rib portion having the smallest cross section of the three rib portions and being solid throughout.

More specifically, in accordance with my invention, the middle roof-supporting rib portion has a U-profile or cross section, and the outer roof-supporting rib portion is tiltably mounted with clearance within the hollow middle roof-supporting rib portion. The inner end of the outer roof-supporting rib portion has a cranked head which has a first and second nose, the first nose of which, in the locking position of the umbrella, is received in a recess formed in the middle roof-supporting rib portion, the second nose projecting out of the open side of the U-profile of the middle roof-supporting rib portion. In the locking position of the umbrella, a ring, displaceable against the biasing action of a spring toward the center roof-supporting rib portion, abuts the second nose and prevents tilting motion of the outer roof-supporting rib portion until it is shoved by the inner roof-supporting rib portion which is slidable over the center roof-supporting rib portion in a direction outwardly from the cranked head against the biasing action of the spring. Thus, the preferred division of the roof-supporting ribs in three parts, as viewed from the umbrella crown to the free end of the ribs, is maintained by having successive stiff, less stiff and least stiff roof-supporting rib portions.

In order that the roof-supporting ribs be entirely locked in the region between the middle and the outer roof-supporting rib portions when the collapsed and telescoped umbrella frame is extended, the free roof-supporting rib ends are secured at the handle of the umbrella. In accordance with a further feature of the invention, there is accordingly provided means for locking the free roof-supporting rib ends at the umbrella handle with a form-locking or positive operation and ensuring that the roof-supporting ribs, when extended, will actually be entirely extended and, when the frame is collapsed and the umbrella roof is closed, will likewise be positively slid or telescoped one within another in their entirety.

Other features which are considered as characteristic for the invention are set forth in the appended claims.

Although the invention is illustrated and described herein as embodied in telescopic collapsible umbrella frame with tripartite roof-supporting ribs, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range of equivalents of the claims.

The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

FIG. 1 is a longitudinal view of an umbrella constructed in accordance with my invention, wherein the roof is closed or collapsed but the umbrella has not yet been shortened or telescoped;

FIG. 2 is a longitudinal section through the umbrella of FIG. 1 in an intermediate condition thereof wherein the ends of the roof-supporting ribs are secured to the handle thereof;

FIG. 3 is a view of a third condition of the umbrella of FIGS. 1 and 2 in which it is telescoped and its length is shortened;

FIG. 4 is an enlarged longitudinal sectional view of a fragment of the umbrella shown in FIGS. 1 to 3, namely through the outer end of the center roof-supporting rib portion thereof and through the inner end of the outermost roof-supporting rib portion thereof in the mutual locking condition of the middle and outermost rib portions;

FIG. 5 is another view of FIG. 4 at the instant the end latching head of the outermost roof-supporting rib portion has been removed from the recess of the center rib portion; and

FIG. 6 is an enlarged view of the lower portion of the umbrella shown in section in FIG. 2.

Referring now to the drawings and first particularly to FIGS. 1 to 3 thereof, there is shown an umbrella frame including an umbrella stick formed of three telescoping members or portions **1**, **2** and **3** which carries at the upper end of the stick member **1** as shown in FIG. 1, for example, a conventional umbrella crown **4** and at the lower end of the stick member **3** a handle **5** to be described hereinafter in greater detail. Roof-supporting ribs are articulatingly connected in a conventional manner to the crown **4**. Each roof-supporting rib is formed of three telescoping portions **6**, **7** and **8** which are mutually slideable one within another. The rib portions **6** and **7** have a U-shaped cross section, the open side thereof being located at the left hand side of the portions **6** and **7** as viewed in FIG. 1, for example. The portion **6** has a larger cross sectional area than the portion **7**, consequently, upon collapsing the umbrella, the rib portion **7** can slide within the U-shaped channel of the rib portion **6**. The outer rib portion **8** is of solid construction and is received within the U-shaped channel of the rib portion **7** when the umbrella is collapsed and shortened telescopically as shown in FIG. 3. Means serving for mutual guidance of the roof-supporting rib portions are a sleeve **9** seated at the outer end of the inner-most roof-supporting rib portion **6** and slideable on the roof-supporting rib portion **7**, a sleeve **10** seated on the outer end of the center roof-supporting rib portion **7**, and slideable on the roof-supporting rib portion **8**, and a slotted sleeve **11**, a so-called shortening bracket of conventional construction mounted at the inner end of the center roof-supporting rib portion **7**. The fabric or other covering material for the umbrella is attached to the crown **4**, the shortening bracket **11**, the sleeve **10** and the free ends of each of the roof-supporting ribs. In the interest of clarity, the covering material is not shown in the drawing.

A runner or slider, a so-called main runner **12**, is mounted for movement by hand on the umbrella stick. In the lowermost position of the runner **12**, as viewed in FIGS. 1 and 2, it is held stationary in a conventional manner by means of a nose or latch which is either mounted on the stick or on the runner proper. Likewise, means are provided for holding the runner **12** stationary in its customary upper or raised position assumed thereby when the umbrella is opened. Means for securing the main runner in both of the just-mentioned positions are generally known and are consequently omitted from the drawing in the interest of clarity.

Each roof-supporting rib is connected with the main runner **12** by means of a main strut **13** which is in turn connected by a pivot pin **14** to the inner end of the center roof-supporting rib portion **7**. The pivot pin **14** simultaneously provides the means for connecting the shortening bracket **11** to the inner end of the center roof-supporting rib portion **7**. Each main strut **13** is connected in a conventional manner by means of a pivot **15** with an auxiliary strut **16**. All of the auxiliary struts **16** are articulatingly secured to an auxiliary runner **17**, which is displaceable along the stick between the main runner **12** and the crown **4** and serves to support the opened roof-supporting frame.

The stick, the roof-supporting ribs and the struts are shown foreshortened in the drawing because the reproduction of an umbrella frame in its entire length in the figures would obscure the individual structural features and details thereof.

In the extended condition of the umbrella stick as shown in FIG. 1, for example, the three portions or members **1**, **2** and **3** of the stick are locked by springy or re-

silient stop elements or detents **18** passing through suitable registered recesses in the innermost and center rib portions and operating on the force-locking principle. The detents **18** yield when sufficiently strong pressure is exerted in the axial direction on the ends of the stick so that the stick can be telescoped.

Although, when the umbrella is open, the center roof-supporting rib portions **7** are prevented from sliding into the inner-most roof-supporting rib portions **6** respectively by means of the main struts **13** supported by the auxiliary struts **16** and thereby, require no special locking devices, a special locking means is necessary however between the center and outermost roof-supporting rib portions **7** and **8**. Such locking means constructed in accordance with my invention is shown in FIGS. 4 and 5 of the drawing.

The outermost roof-suporting rib portion **8** is disposed with a predetermined clearance **20** within the U-profiled and consequently hollow center roof-supporting rib portion **7**, as shown in FIGS. 4 and 5. The roof-supporting rib portion **8** can execute a tilting motion relative to the roof-supporting rib portion **7** within specific and quite narrow limits. The inner end of the outermost roof-supporting rib portion **8** has a cranked head **21** formed with a nose **22** which, in the locking position illustrated in FIG. 4, is inserted in the recess or aperture **23** formed in the center roof-supporting rib portion **7**. The cranked head **21** also has a second nose **24** extending in a direction substantially opposite to the direction in which the nose **22** extends, and projecting out of the open side of the U-shaped roof-supporting rib portion **7**. The nose **24** has a shoulder surface **25** against which a ring **26**, displaceable along the roof-supporting rib portion **7**, abuts in the locking condition shown in FIG. 4. In the locking condition, the ring **26** is biased against the shoulder **25** by a helical spring **27** which abuts the outer face **28** of the ring **26** at one end thereof and the inner face **29** of the sleeve **10** at the other end thereof. The cranked head **21** of the outer roof-supporting rib portion **8** is held stationary by the ring **26**, the roof-supporting rib portion **8** being thus prevented from tilting relative to the roof-supporting rib portion **7** in spite of the remaining clearance **20** between the roof-supporting rib portion **8** and the roof-supporting rib portion **7**, and the nose **22** is held stationary within the recess or aperture **23** so that the roof-supporting rib portions **7** and **8** cannot be displaced relative to one another.

If the roof-supporting ribs are to be telescoped after the roof of the umbrella has been closed, the roof-supporting rib portions **6** and **7** are no longer prevented by the main struts **13** from sliding one within the other as the shortening bracket **11** travels in a direction toward the crown **4** while the sleeve **9** simultaneously approaches the inner end of the outer roof-supporting rib portion **8**. Shortly before the roof-supporting rib portions **6** and **7** are completely slid together, the lower edge **30** of the inner roof-supporting rib portion **6** (together with the sleeve **9**) engages the ring **26** and slides it against the biasing action of the helical spring **27** into the position shown in FIG. 5. The ring **26** is thereby separated from the shoulder **25** and from a surface **31** formed on the head **21** and located below the shoulder **25** and extending parallel to the axis of the outermost roof-supporting rib portion **8**, and assumes the position shown in FIG. 5 in which the ring **26** no longer prevents the outermost roof-supporting rib portion **8** from tilting relative to the center roof-supporting rib portion **7**. Since the inner end of the cranked head **21** extending in a direction toward the umbrella crown **4** has an inclined surface **32**, a slight pressure in the axial direction applied to the ends of the roof-supporting ribs in sufficient for forcing the nose **22** out of the recess or aperture **23** in order to effect a transition from the condition illustrated in FIG. 4 to the condition illustrated in FIG. 5 and to free the outermost roof-supporting rib portion **8** so that it can be slid telescopingly into the center roof-supporting rib portion **7**.

In order to permit the cranked inner end of the outermost roof-supporting rib portion **8** to assume the position shown in FIG. 5, the sleeve **9** is provided with an arched or curved surface **33** which provides space for the shoulder **25** if the roof-supporting rib portions are slid together or telescoped while the roof-supporting rib portion **8** is being pivoted or tilted.

If, on the other hand, the roof-supporting rib portions are being slid apart or extended, the portions **6** and **7** are first displaced relative to one another so that the outer end of the innermost roof-supporting rib portion **6** with its end surface **30** and the sleeve **9** are removed from the vicinity of the cranked end **21** of the outermost roof-supporting rib portion **8**. Under the action of tension stress applied at the ends of the roof-supporting ribs and the additional effect of the thereby released ring **26**, which the spring **27** tends to force toward and against the shoulder **25**, the nose **22** again extends into the recess **23** so that the locked condition shown in FIG. 4 is again produced.

It is not to be expected that the user of an umbrella constructed in accordance with my invention should be required to pull out each of the eight or ten roof-supporting ribs of the umbrella individually in order to open the umbrella and to slide them together individually in order to shorten the umbrella. The roof-supporting rib ends, that is the outer ends of the outermost roof-supporting rib portions **8** must therefore be lockable at the handle of the umbrella in such a way that a single pull or push on the umbrella handle is sufficient by itself to lock the umbrella in the locking position shown in FIG. 4 or to loosen it therefrom into a position such as is shown in FIG. 5 of the drawing.

In order to lock the roof-supporting rib ends at the handle of the umbrella in accordance with my invention, I make use of the fact that the roof-supporting rib ends are always provided with heads **34** on which the covering material of the umbrella is able to be sewed and which have an enlarged spherical head or projection **35** which serves as protection against possible injury. The heads **34** are either mounted on the roof-supporting rib ends as separate members or are made of one piece, i.e. are integral, with the roof-supporting ribs. An annular groove **36** is almost always found between the shaft of the head **34** and the sphere **35**. By means of this annular groove **36**, the roof-supporting ribs are secured at the handle of the umbrella in all of the hereinafter described embodiments of the umbrella of my invention. Such an annular groove **36** is not however absolutely necessary for the invention of this application. It is sufficient that the roof-supporting ribs have an enlargement of any type at the ends thereof.

It is possible to lock the ends of the roof-supporting ribs in many different ways at the handle of the umbrella. However, I show only one embodiment in FIG. 6 for effecting the locking of the rib ends at the umbrella handle. The right-hand half of FIG. 6 shows a roof-supporting rib in locking position and the left-hand half of FIG. 6 shows a roof-supporting rib at the moment it is unlocked by hand.

As shown in FIG. 6, a portion of the handle is formed of a sheet metal cap **37** containing a plastic member **38**. The portions **37** and **38** are secured to one another by means of a nut **39** which is threaded on the free end of the telescoping portion **3** of the umbrella stick. Thus, the upper side of the plastic member **38** as viewed in FIG. 6 abuts against a cross-pin **40** extending through a suitably provided bore in the stick.

A radially inwardly extending annular bulge or bead **41** is formed in the sheet metal cap **37**, which engages in the groove **36** of the roof-supporting rib head in the locking position shown in the right-hand half of FIG. 6. In this position, the roof-supporting rib heads **34** are held stationary by a ring **42** form-locked at the umbrella handle and are thus positively secured. They are then enclosed by form-locking within the annular space R. The

ring 42, which in the locking position of the heads 34, prevents radially inward movement thereof from taking place and thereby prevents the release thereof from the annular bulge or bead 41, is axially displaceably mounted on the plastic portion 38 and is subjected to the biasing action of a helical spring 43 which tends to maintain it in locking position. A push-button 44 mounted on the face of the handle serves for unlocking the roof-supporting ribs by hand. When the push-button 44 is pressed, the ring 42, as shown in the left-hand half of FIG. 6, is moved against the biasing action of the spring 43 by two tilting or pivoting levers 46 mounted on pins 45. The pivot levers 46 have an inclined edge at the outer ends thereof so as not to prevent the entry or removal of the spherical projection 35 from the space R.

On the plastic portion 38 there is formed a sleeve-shaped projection 47 which affords a larger surface area for engagement by the hand of the user for carrying the opened umbrella than would be available ordinarily if only the relatively short sheet metal cap 37 served as the handle for the umbrella. The sleeve 47, however, also has an essentially practical function in that it lends greater stability to the entire handle of the umbrella. For this purpose it has an axially displaceable disc 48 which, in the unshortened condition of the umbrella, is maintained by a conical spring 49 in the position shown in FIG. 6 in which it abuts against a radially inwardly extending rim 50 of the sleeve 47. If the umbrella is shortened, the end 51 of the middle stick portion 2 which faces the handle, moves toward the disc 48 and slides it entirely within the sleeve-shaped projection 47 whereby the windings of the conical spring 49 become disposed in a common plane at the base of the sleeve 47 as viewed in FIG. 6.

If the umbrella roof is closed, the umbrella frame initially takes the position shown in FIG. 1 in which the heads 34 have a specific spacing or clearance from the cap 37. If the umbrella is shortened, the outer roof-supporting ends 8 are clamped by hand or are tied around the sleeve 47 by means of a conventional non-illustrated rubber band, ribbon or the like. Thereafter, the portions of the stick are slid together or telescoped so that the condition shown in FIG. 2 is attained. In the condition of FIG. 2, the roof-supporting rib heads 34 with their spherical projections 35 are inserted within the cap 37 whereby they initially slide the ring 42 downwardly against the spring 43 until the grooves 36 reach the vicinity of the annular bulge or bead 41 and the spherical ends of the outer roof-supporting rib portions 8 extend into the annular space R, in which position the ring 42 snaps back into the locking position. Thus, all of the roof-supporting ribs are positively locked at the handle and by further sliding together all of the portions of the ribs the umbrella frame can be placed in the shortened condition thereof shown in FIG. 3. In the course of this latter movement, the locking engagement between the roof-supporting rib portions 7 and 8 aforedescribed and illustrated in FIGS. 4 and 5 is broken or released.

When the umbrella is to be used again, the frame is once more extended or drawn apart until the position shown in FIG. 2 is attained. In this position, all of the center and outer roof-supporting rib portions 7 and 8 have automatically become mutually locked once again. Thereafter the push-button 44 is pressed so that the roof-supporting rib ends can be released from the handle and the stick can be completely drawn apart or extended to again attain the condition shown in FIG. 1.

I claim:

1. Telescopic collapsible umbrella frame comprising a stick; a plurality of roof-supporting ribs each having a hollow innermost portion pivotally connected to an end of said stick, a hollow center portion telescopically slideable within said innermost portion, and an outermost portion telescopically slideable within said center portion, said outermost portion being received with clearance within said center portion and tiltable therein; a runner slideably mounted on said stick; a plurality of struts, each pivotally linked with the center portion of one of said roof-supporting ribs and pivotally linked with said runner; and means for locking said outermost and said center rib portions together in extended condition thereof, said locking means comprising a head disposed at an end of said outermost rib portion located within said center rib portion, said outermost rib portion being tiltable in said extended condition of the rib so as to insert said head at least partly in a recess formed in said center rib portion, and biasing means operatively engageable with said head in said extended condition of the rib for maintaining said head in latching engagement within said recess of said center rib portion and for preventing subsequent tilting of said outermost rib portion, said innermost rib portion being telescopically slideable over said center rib portion so as to operatively engage said biasing means for disengaging said biasing means from said head whereby said outermost rib portion is again tiltable so as to remove said head from said recess and thereby unlatch said center and said outermost rib portions one from the other.

2. Umbrella according to claim 1, wherein said hollow center rib portion has a substantially U-shaped cross section and, said head at the end of said outermost rib portion is cranked relative to the longitudinal axis of said outermost rib portion and has a first nose portion insertable in said recess formed in said center rib portion and a second nose portion projecting out of the open side of the U-shaped cross section of said center rib portion, said second nose portion being engageable by said biasing means for maintaining said first nose portion in latching engagement in said recess in the extended condition of the rib.

3. Umbrella according to claim 2, wherein said biasing means comprises a ring mounted on said center rib portion and spring biased in the longitudinal direction of said center rib portion into abutting engagement with said second nose portion for binding said first nose portion in said recess of said center rib portion.

4. Umbrella according to claim 3, including a handle located at the end of the stick opposite the end thereof at which said roof-supporting ribs are connected, said handle having means for locking all of the roof-supporting ribs thereto in the extended condition of said ribs.

5. Umbrella according to claim 4, wherein the outermost rib portions have an enlargement at the respective free ends thereof and said locking means comprises a cap wherein said enlargements are received, and a ring member manually actuable for frictionally engaging said enlargements and binding them in said cap.

6. Umbrella according to claim 1, wherein said stick comprises at least three telescoping portions, and including resilient detent means for locking said portions of said stick together in the extended condition thereof.

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PETER M. CAUN, *Primary Examiner.*