United States Patent [19]

Weber

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[54] **SHORTENABLE UMBRELLA**

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[30] **Foreign Application Priority Data**

Jan. 9, 1971 Germany ..... P 21 00 912.1

[52] **U.S. Cl.** **135/26**

[51] **Int. Cl.** **A45b 19/06**

[58] **Field of Search** 135/20, 22, 25, 26

[56] **References Cited**

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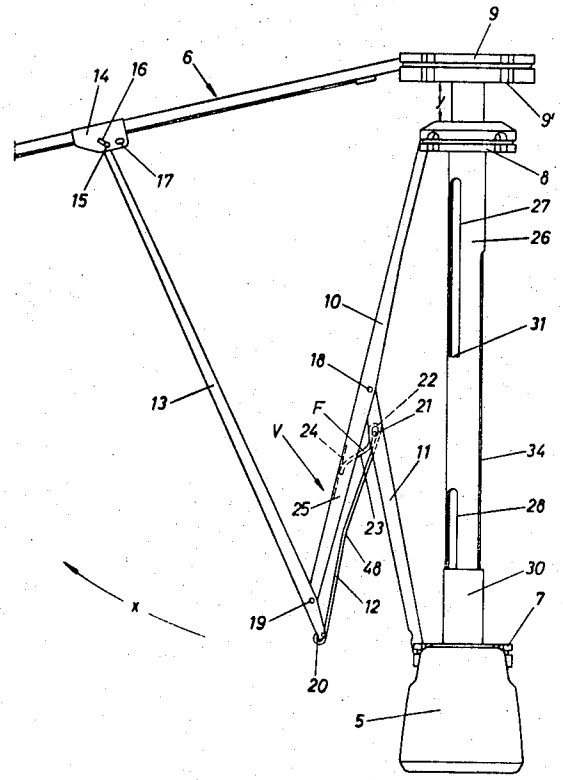
Primary Examiner—J. Karl Bell

Attorney—Alan Swabey

[57] **ABSTRACT**

A three-stage umbrella of the telescopic type in which all of the dome rib support members nest one within the other to form a compact umbrella of small outer dimensions when folded and the support members form a quadrilateral structure which is provided with spring means to urge the quadrilateral structure open when the dome ribs are closed to give the support members an initial opening pivoting movement when it is required to open the umbrella.

10 Claims, 11 Drawing Figures



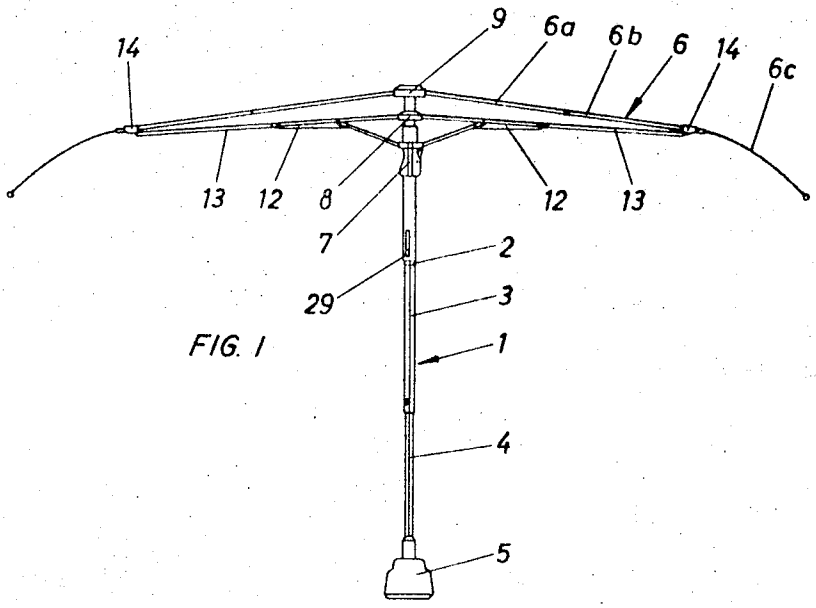


FIG. 1

FIG. 10

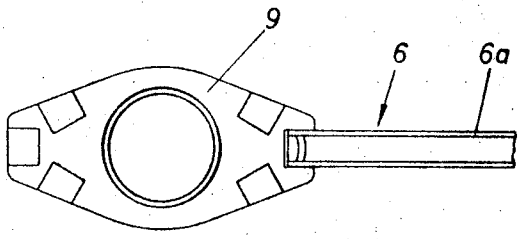


FIG. 11

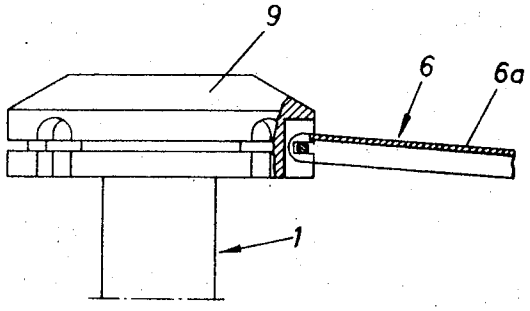


FIG. 2

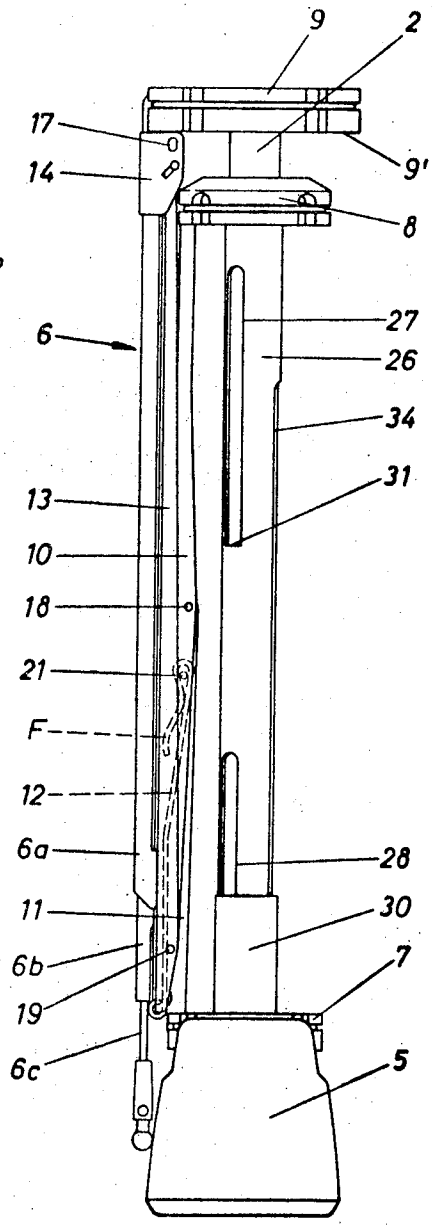
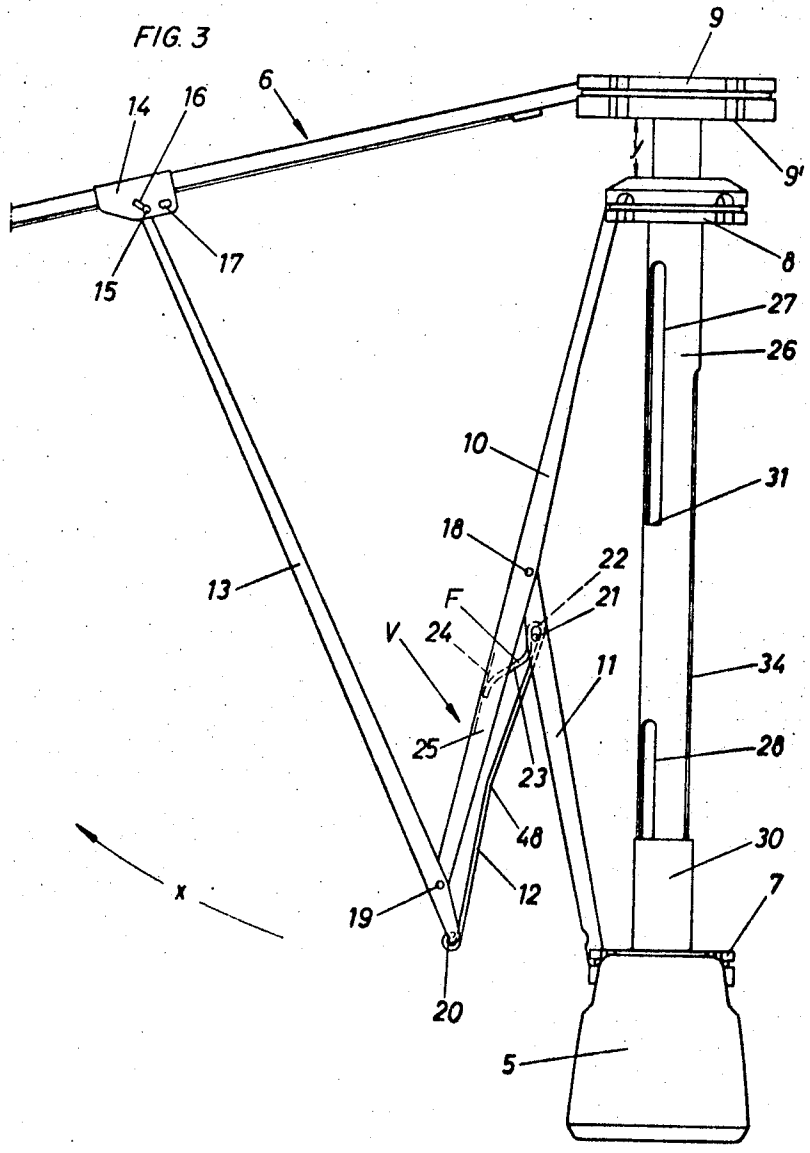


FIG. 3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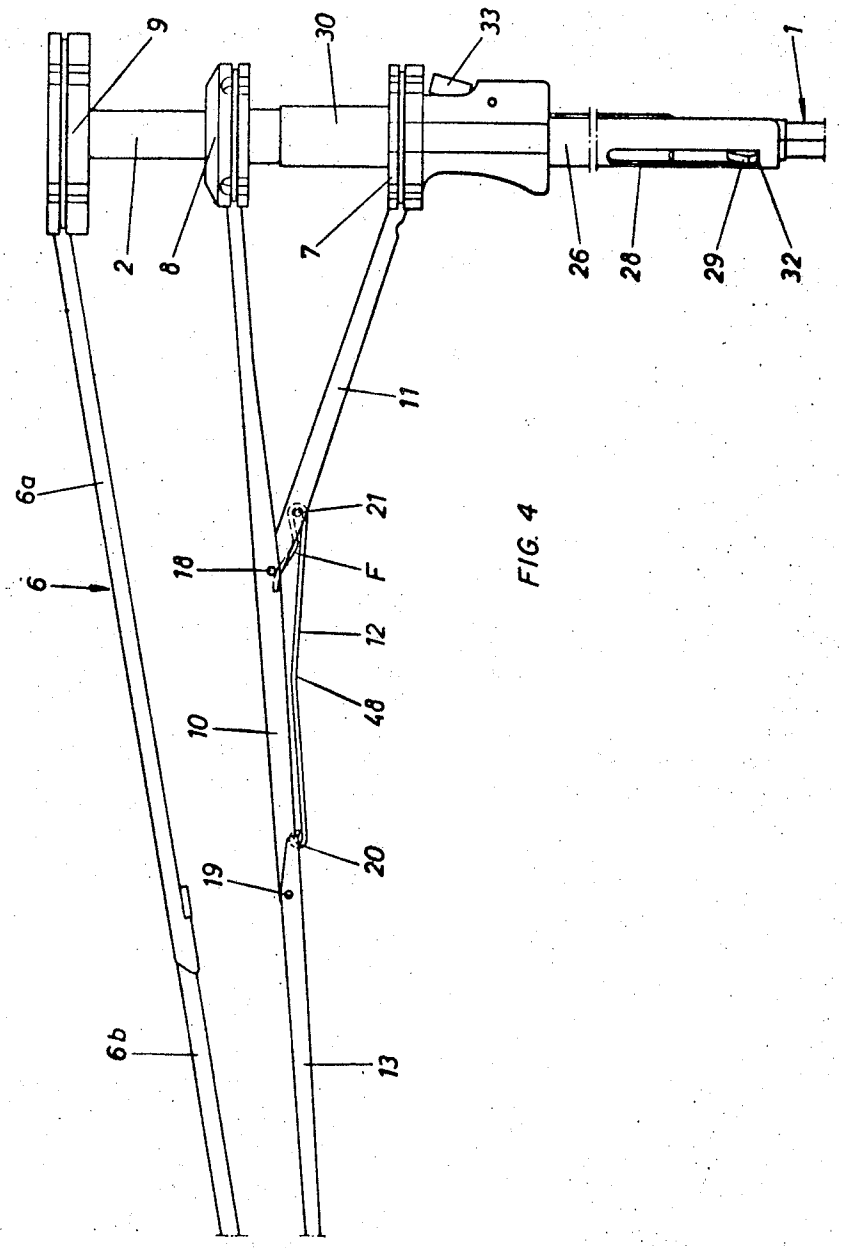


FIG. 4

FIG. 5

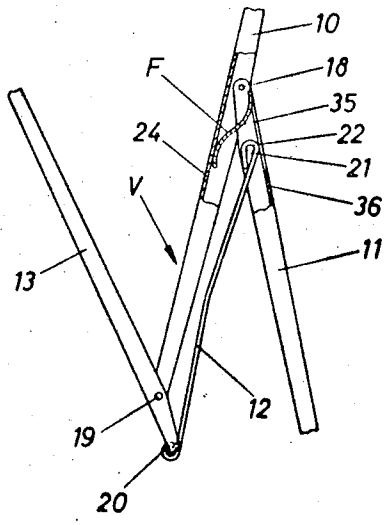


FIG. 6

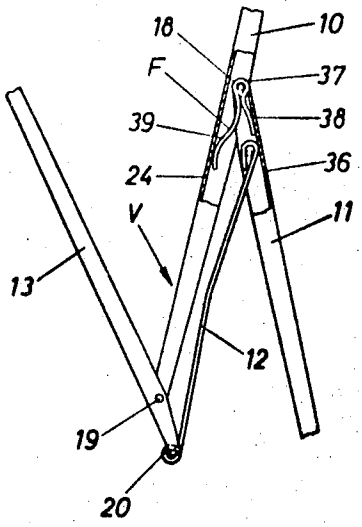


FIG. 7

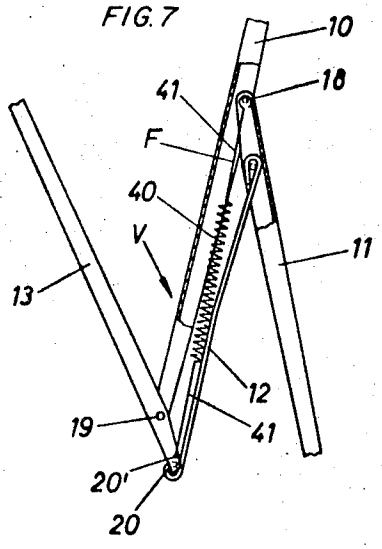


FIG. 8

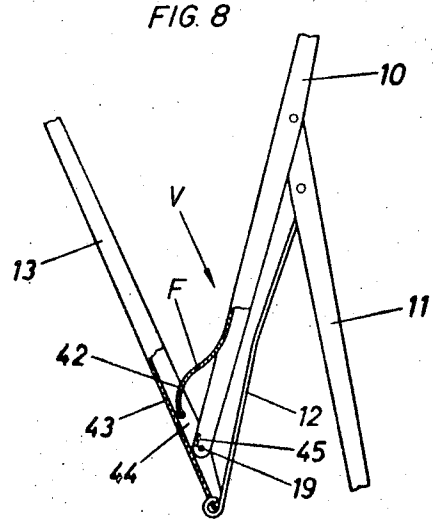
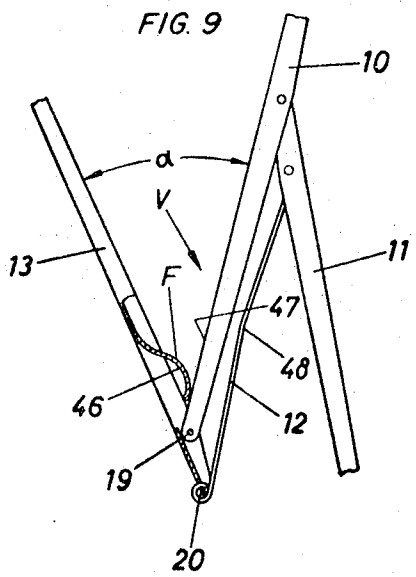


FIG. 9



SHORTENABLE UMBRELLA

BACKGROUND OF INVENTION

1. Field of Invention

The present invention relates to umbrellas and particularly to an umbrella having a telescopic stick and three-section telescopic dome ribs.

2. Description of Prior Art

Reference is made to applicant's copending United States application Ser. No. 035,184, filed May 6, 1970, issued as United States Letters Patent No. 3,699,988 on October 24, 1972. Further, reference is made to U.S. application Ser. No. 112,916, filed Feb. 5, 1971, issued as United States Letters Patent No. 3,705,593 on Dec. 12, 1972.

The present invention is an improvement over structure shown in applicant's earlier applications. Since umbrellas of this type close to a very small package, it is somewhat difficult to open since all of the support structure and dome ribs are parallel to the axis of the stick and adjacent the stick, and especially since the support structure and the dome ribs are nested one within the other.

Furthermore, since the umbrella is now collapsed into such a small package, the covering material makes it difficult to reach the main runner. Even the automatic spreading action which is inherent in the auxiliary link described in the above-mentioned U.S. application Ser. No. 112,916 which is provided mainly for tensioning the supporting structure when the umbrella is in an open position, is not fully satisfactory for sufficiently opening the umbrella at the initial stages of opening.

SUMMARY OF INVENTION

It is an aim of the present invention to provide a supporting structure for a three-stage umbrella wherein the quadrilateral structure has associated therewith spring means which urge the quadrilateral structure to open such that when it is required to open the umbrella, an adequate automatic spreading of the dome ribs and supporting members will be provided.

A construction in accordance with the present invention includes an umbrella having a telescopic stick, a crown at one end of the stick, and dome ribs hinged to the crown. The dome ribs include three parts, each part telescopic in the other. A main runner is provided for sliding movement on the stick and an auxiliary runner slides between the crown and the main runner. The support structure is articulated to the auxiliary runner and the main runner to support the dome ribs in an open position. The support structure includes a stretcher member made up of two articulated parts, with the end of one part hingedly connected to the dome ribs and the end of the other part being hingedly connected to the auxiliary runner. A strut member is hinged to the main runner and a link member is connected to the strut member and to the free end of the stretcher member part hinged to the dome ribs forming a quadrilateral structure with the stretcher member. Each of the parts forming the support structure are of U-shaped construction with the exception of the auxiliary link and one part is adapted to nest within the other when the umbrella is being closed. The quadrilateral structure has associated therewith a spring means normally forcing the quadrilateral structure towards an open position.

In a more specific embodiment of the invention, the link member is provided with a hair-pin shaped extension which forms a bearing opening for the auxiliary link hinge and the free end of the hair-pin shaped auxiliary link bears against the stretcher member part hinged to the auxiliary runner when the umbrella is in a closed position, normally forcing it away from the auxiliary link.

In another form of the present invention, the spring means can be a hair-pin shaped element anchored at the hinge point between the stretcher member part hinged to the auxiliary runner and the strut member, or it can be a cutout portion of the strut curved in such a way so as to form the resilient spring member against the dome rib part hinged to the auxiliary runner.

Further, another embodiment of the present invention would include a cut-out portion of the stretcher member curved to resiliently engage the stretcher member hinged to the auxiliary runner.

Still a further embodiment of the present invention resides in a tension spring extended diagonally of the quadrilateral formed by the support structure between two diametrically-opposed hinge points.

BRIEF DESCRIPTION OF THE DRAWINGS

Having thus generally described the nature of the invention, reference will now be made to the accompanying drawings showing by way of illustration, a preferred embodiment thereof and in which:

FIG. **1** is a schematic side elevational view of an umbrella in an open position;

FIG. **2** is a side elevation of an umbrella according to FIG. **1** in a closed position;

FIG. **3** is a fragmentary side elevation of the umbrella shown in FIG. **2** being open from a closed position;

FIG. **4** is a fragmentary side elevation of the umbrella of FIG. **2** in an open position;

FIGS. **5** through **9** are fragmentary views of different embodiments of a detail of the umbrella;

FIG. **10**, which is on the same sheet as FIG. **1**, is a bottom plan view of the crown of the umbrella; and

FIG. **11**, which is on the same sheet as FIG. **1**, is a side elevation partly in cross section of the crown shown in FIG. **10**.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring now to the drawings, and particularly to FIGS. **1**, **2**, **3** and **4**, the three-stage umbrella is shown having a telescopic stick **1** comprising telescopic sections **2**, **3** and **4**. Stick section **4** has the smallest cross section and the free end thereof mounts a handle **5**. The umbrella shown in the drawings is of the type generally known as a flat umbrella and, therefore, the handle **5** is of flattened cross section.

The three-stage umbrella shown in the present embodiment has six dome ribs **6**, each dome rib comprising three sections, namely an inner section **6***a*, hinged to the crown **9**; the central section **6***b*, telescopic in the section **6***a*; and an outer section **6***c*, telescopic within the central section **6***b*. Dome rib sections **6***a* and **6***b* are of U-shaped cross section, while outer section **6***c* is of steel wire circular cross section.

Main runner **7** slides on the stick **1** and an auxiliary runner **8** slides on the stick **1** between the main runner **7** and the crown **9**. The support structure is similar to that described in U.S. Pat. No. 3,699,988 and includes articulated stretcher members **10** and **13** with the

stretcher section **10** hinged to the auxiliary runner **8**, while it is articulated to the U-shaped stretcher section **13** at hinge point **19**. The stretcher section **13** extends beyond the hinge point **19** to a hinge pin **20**.

A strut **11** is hinged to the main runner **7** at one end and to the stretcher section **10** intermediate thereof at the other end at the hinge point **18**. Finally, an auxiliary link **12** extends between the hinge point **20** on the stretcher section **13** and a hinge point **21** is on the strut **11** spaced a short distance from the hinge point **18**.

The stretcher section **10** between the hinge points **19** and **18** as well as the link **12** and the stretcher section **13** between the hinge points **19** and **20** and the strut **11** between the hinge points **18** and **21** form a structural quadrilateral.

The members **10, 11** and **13** are of U-shaped cross section and are arranged so that they can nest one within the other as shown in FIG. **2** when the umbrella is in a closed position. The auxiliary link **12** having an intermediate bend **48** nests within the U-shaped strut **11** which in turn nests within the U-shaped stretcher section **10** which itself nests within the stretcher section **13**.

For reference in FIG. **3**, the quadrilateral structure or parallelogram is identified by the letter V.

The support structure is attached to the dome ribs **6** by means of the geats **14**. A hinge pin **15** is mounted within the geats **14** and the free end of the stretcher section **13** is hinged to the pin **15**. The outer dome rib section **6***c* is also connected to the hinge pin **15** and, therefore, as the umbrella is being opened, stretcher section **13** pushes the outer section of the dome rib **6***c* outwardly, pulling with it the central section **6***b*.

Still referring to FIG. **3**, the articulated quadrilateral V formed by the above-mentioned hinge points **18, 19, 20** and **21** is spring loaded in accordance with the invention by a spring F in the direction of arrow *x*.

In the first embodiment shown in FIGS. **3** and **4**, the spring F is formed by a hair-pin shaped end **23** of the link **12** which extends over the hinge pin **21** and forms a bearing opening **22** over the pin **21**. The extended end **23** is curved and enters the U-shaped stretcher section **10** resting against the web **24** thereof and is supported laterally by the legs **25** of this stretcher section **10**.

When the support structure and the dome ribs **6** are folded in a closed position as shown in FIG. **2**, the spring F, that is, the extended end **23** of the link **12** engages against the web **24** and is compressed or is loaded such that when the dome ribs are released, for instance, by unfastening a small retainer band which is generally about the cover of the umbrella when it is closed, the force of the spring F tends to open up the quadrilateral V by pushing out the stretcher section **10** thereby pivoting the dome ribs **6** in direction *x*. Since the cover material on the dome ribs **6** spreads out with the dome ribs **6**, the main runner **7** is thus exposed and the person handling the umbrella can easily grip the main runner **7** in order to fully open the umbrella.

The umbrella frame has a locking system for locking the umbrella in an open position. The auxiliary runner **8** has a downwardly extending sleeve **26** concentric with the axis of the stick. This sleeve **26** passes through the opening in the main runner **7** and is provided with two longitudinal slots **27** and **28** which are axially aligned but spaced apart.

A catch **29** is provided on the umbrella stick as shown in FIG. **1** which engages an abutting end of slot **27** of the sleeve **26** as the runner **7** is pushed upwardly. This retards the forward movement of the runner **8** temporarily, thus enabling the stretcher section **10** and the strut **11** to spread the dome ribs **6**. The runner **7** including an upwardly extending sleeve **30** passes over the catch **29** thereby allowing the runner **8** to proceed towards the crown. The catch **29** further engages the slot **28** against the abutting edge **32**, as shown in FIG. **4**, to finally limit the forward movement of the runner **8** towards the crown and leaving a space between the crown and the runner **8**. The main runner **7** is locked in an open position as the catch **33** in the main runner engages through a slot in the sleeve **26** and into a slot provided in the stick as known.

FIGS. **5** through **9** show other embodiments of the structure V.

FIG. **5**, for instance, shows a situation wherein a cut-out portion **35** is cut out of the strut **11** and suitably bent in a curved position. This portion **35** is cut out from the web **36** of the strut **11** and engages the web **24** of the stretcher section **10**. In this case, the link **12** is modified compared to that shown in FIGS. **1** to **4** and is substantially as described in applicant's previous applications and merely acts to form the fourth side of the structural quadrilateral or parallelogram.

In the embodiment shown in FIG. **6**, a hair-pin device **37** is clipped onto the hinge pin **18**, with one leg of the hair-pin spring **37**, that is, leg **38** urging against the web **36** of the strut **11**, while the other curved leg **39** urges against the web **24** of the stretcher section **10**.

In the embodiment shown in FIG. **7**, there is provided a helical tension spring **40** extending diagonally across the quadrilateral and attached at one end to the hinge pin **20** and at the other end to the hinge pin **18**. This is diagonally across the so-called parallelogram and always urges the parallelogram to an open position. When the umbrella is closed, of course, the spring is preloaded and under tension.

In the embodiment shown in FIG. **8**, the spring F is a cut-out portion of the stretcher section **10** and is from the web **24**. This leg **42** urges against the web **43** between the legs **44** of the stretcher section **13** and forces the stretcher sections apart since they are normally nested together in a closed position.

FIG. **9** shows yet another embodiment which is a reverse of that shown in FIG. **8**, that is, the spring F is a cut-out leg **46** of the stretcher section **13** and urges against the back **47** of the stretcher section **10**.

I claim:

1. An umbrella having a telescopic stick, a crown at one end of the stick, and dome ribs hinged to the crown; said dome ribs including three parts, each telescopic one within the other and a main runner provided for sliding movement on the stick with an auxiliary runner slidable on the stick between the main runner and the crown; a support structure articulated to the auxiliary runner and the main runner to support the dome ribs in an open position; the support structure including a stretcher member made up of two articulated parts with the end of one part hingedly connected to the dome ribs and the end of the other part being hingedly connected to tha auxiliary runner; a strut member hinged to the main runner and to the stretcher member and a link member connected to the strut member and to the free end of the stretcher member part hinged to

the dome ribs forming a quadrilateral structure with the stretcher member; the link having an extension beyond the hinge point with the dome rib section hinged to the auxiliary runner, said extension forming a hair-pin shaped spring with the link including a bearing opening for the hinge point and the free end of the extension of the hair-pin shaped extension urging against the stretcher section hinged to the auxiliary runner to normally force the quadrilateral structure towards an open position.

2. An umbrella having a telescopic stick, a crown at one end of the stick, and dome ribs hinged to the crown; said dome ribs including three parts, each telescopic one within the other and a main runner provided for sliding movement on the stick with an auxiliary runner slidable on the stick between the main runner and the crown; a support structure articulated to the auxiliary runner and the main runner to support the dome ribs in an open position; the support structure including a stretcher member made up of two articulated parts with the end of one part hingedly connected to the dome ribs and the end of the other part being hingedly connected to the auxiliary runner; a strut member hinged to the main runner and to the stretcher member and a link member connected to the strut member and to the free end of the stretcher member part hinged to the dome ribs forming a quadrilateral structure with the stretcher member, the quadrilateral structure having associated therewith spring means normally forcing the quadrilateral structure towards an open position; wherein the spring means includes a helical tension spring attached at opposed hinge points of the quadrilateral structure diagonally across thereof.

3. An umbrella having a telescopic stick, a crown at one end of the stick, and dome ribs hinged to the crown; said dome ribs including three parts, each telescopic one within the other and a main runner provided for sliding movement on the stick with an auxiliary runner slidable on the stick between the main runner and the crown; a support structure articulated to the auxiliary runner and the main runner to support the dome ribs in an open position; the support structure including a stretcher member made up of two articulated parts with the end of one part hingedly connected to the dome ribs and the end of the other part being hingedly connected to the auxiliary runner; a strut member hinged to the main runner and to the stretcher member and a link member connected to the strut member and to the free end of the stretcher member part hinged to the dome ribs forming a quadrilateral structure with the stretcher member, the quadrilateral structure having associated therewith spring means normally forcing the quadrilateral structure towards an open position; wherein the spring means includes a hair-pin shaped spring seated on one of the hinge points of the quadrilateral structure and urging against two adjacent members thereof.

4. An umbrella having a telescopic stick, a crown at one end of the stick, and dome ribs hinged to the crown; said dome ribs including three parts, each telescopic one within the other and a main runner provided for sliding movement on the stick with an auxiliary runner slidable on the stick between the main runner and the crown; a support structure articulated to the auxiliary runner and the main runner to support the dome ribs in an open position, the support structure including a stretcher member made up of two articulated parts with the end of one part hingedly connected to the dome ribs and the end of the other part being hingedly connected to the auxiliary runner; a strut member hinged to the main runner and to the stretcher member and a link member connected to the strut member and to the free end of the stretcher member part hinged to the dome ribs forming a quadrilateral structure with the stretcher member, the quadrilateral structure having associated therewith spring means normally forcing the quadrilateral structure towards an open position; wherein the spring means includes a cut-out leg of one of the members forming the quadrilateral structure and curved so as to urge against an adjacent member of the quadrilateral structure.

5. An umbrella frame having a stick; a crown at one end of the stick; dome ribs hinged to the crown; a main runner slidably mounted on the stick; an axuiliary runner slidably mounted on the stick between the main runner and the crown; articulated stretcher means including first and second members and strut members, the strut members being hinged to said main runner, said first stretcher members being hinged to said auxiliary runner, and said second stretcher members being hinged to said dome ribs, the first stretcher members being hinged to said strut members at a point substantially midway of said first stretcher members, the first and second stretcher members being hinged together at a point spaced from an inner end portion of said second stretcher members and defining an extension thereon; and auxiliary link members hinged at one end to the strut members below the hinge point of the stretcher members and the strut members, the other end of said link members being hinged to the extension of said second stretcher members inwardly of the hinge point between said first and second stretcher members, the improvement wherein said stretcher, strut and auxiliary link members combine to form a quadrilateral , parallelogram structure disposed adjacent a lower end portion of the umbrella stick when the umbrella frame is collapsed and folded into a stored condition, and spring means operatively connected to and reacting on the member portions forming the quadrilateral structure and normally urging the quadrilateral structure toward an"open" condition when the umbrella is collapsed and folded for assisting to space the folded structure away from the main runner and to expose the same preparatory to "opening" the umbrella frame.

6. The structure as claimed in claim 5 in which said spring means comprises an integral extension of said link members forming a hair pin portion having a bearing portion about the hinged point between said first stretcher members and said link members and including leaf spring portion engaged with and reacting against a portion of said first stretcher members at a point spaced from the hinge point between said first stretcher members and said strut members.

7. The structure as claimed in claim 5 in which said spring means comprises an integral portion of said strut members forming a leaf spring portion reacting with and engaged against an adjacent portion of said first stretcher members in spaced relation from the hinge point between said strut member and said first stretcher members.

8. The structure as claimed in claim 5 in which said spring means comprises a separate spring element having a bearing portion journaled on the hinge point between said first stretcher members and said strut mem-

bers and including one leg abutting said strut members in spaced relation from said hinge point and another leg abutting said first stretcher members.

9. The structure as claimed in claim **5** in which said spring means comprises a tension spring having one end connected to the hinge point between said strut and first stretcher members, and having another end connected to the hinge point between the extension of said second stretcher members and said link members.

10. The structure as claimed in claim **5** in which said spring means comprises an integral potion of one of said first and second stretcher members and including a leaf spring portion in compressed relation with the other of said fist and second stretcher members.

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