This invention relates to parasol, beach umbrella, and also portable shade or overhead covering.

Usually, when the umbrella is increased in size to an extent to become a beach umbrella or other large overhead covering, it is necessary to increase the cross sectional area of the ribs and parts or support for the covering as well as that of the curvature of the cover at the outer portion thereof, and also duplicate vertical supports. The umbrella or the like becomes unnecessarily heavy and clumsy, and so, an ever existing waste in the materials of the frame structure, and also in the fabric of the cover is evident. And it is one of the principal objects of this invention to provide a new and novel rib or support structure for the covering fabric, which will: 1st, retain against any extreme side play; 2nd, withstand any predetermined tension pressure at their entire length; 3rd, eliminate the usual concave underside of the cover from the extreme outer portion to a portion or distance inward thereof, leave no damaging effect to the umbrella or the like; 4th, change, when the umbrella or the like is raised, the normal outer downward curvature of the cover to an appreciable extent the otherwise normal covering area over the person or persons and thus sheds the fallen water from, or spreads to an increased distance the shade over the user or users and provides also a higher forward vision.

A further object of this invention is to provide, in conjunction with the ribs as set forth, a new and novel spring or stabilizer which will: 1st, absorb the sudden gust of wind against the underside of the cover; 2nd, radially equalize said cover, and thus prevent jerking of the stick in the hand of the user; 3rd, eliminate flexible joints now used in the upper portion of the stick, as said destructive wind force will not be transferred on the stick but rather upon the spring; 4th, shortening the usual longitudinal traveling of the runner on the stick, and thus eliminate the marring of the polished surface of the stick, so frequently encountered, as well as afford less effort in the opening and closing of the umbrella; 5th, retain the umbrella open and also shorten the movement for the closing thereof; 6th, withstand the force of wind longitudinally and transversely in respect of the stick.

A still further object of the invention is to provide a new and novel supporting means in the form of grooves in the stick to receive slidably the spring or stabilizer, as set forth, to further absorb longitudinally and transversely radially deflections of the cover and thus protect same for longer wear, and also further equalize the stick in the user's grip.

A still further object of the invention is to provide, in conjunction with the ribs and spring as set forth, a new and novel sliding supporting means: 1st, to receive the vertex of the cover, and 2nd, to afford that the deflection of any side portion of the cover will be rapidly and directly transmitted to opposite side thereof, so that the cover shall stay intact and the twiddling of the stick in the hand of the user will be prevented or minimized.

A still further object of this invention is to provide means for the cover, whereby the umbrella may be made to any size for practical purposes and not necessarily increase the thickness of the members constituting the rib structure and also will stabilize the covering fabric between and at the outer end of the ribs without undue strain to said fabric. Thus no need for increased thickness in the fabric of the cover is necessary for large overhead covering such as beach umbrella, or the like sun shades.

A still further object of this invention is to provide a frame structure upon which the tension of the fabric, which may be light and transparent or rubber composition or the like, is reduced so that the cover will not shear or become damaged, by frequent uses, at the portions necessary to produce tension on the fabric.

A still further object of this invention is to provide an umbrella or the like of the character described, which is adapted to any polygonal shape circumferentially at the outer border thereof, and which is also of few parts easily assembled and replaced, and is convenient and practical for long use.

Other and further objects and advantages of this invention will be apparent as the description proceeds.

The accompanying drawings show, for purposes of illustrating the present invention, one embodiment in which the invention may take form, together with modification of certain parts, it being understood that the drawings are illustrative of the invention rather than limiting the same.

In the drawings:
Fig. 1 is a fragmental top view of the umbrella in open condition.
Fig. 2, a fragmental elevational view of the umbrella in open condition, a portion of which is...
shown sectional along the line 2—2 in Fig. 1 to show the parts thereof. Fig. 2 is an elevational view of the umbrella in closed condition, a portion of which is shown sectionally along the same line 2—2 in Fig. 1, and also the cover being substantially removed. Fig. 4 is a sectional view along the line 4—4 in Fig. 2. Fig. 5 is an elevational view of the spring element embodied in the umbrella. Fig. 6 is a sectional view along the line 6—6 in Fig. 5. Fig. 7 is a top plan view of the spring element shown in Fig. 5. Fig. 8 is a top plan view of the outer part of the top pivot member of the umbrella. Fig. 9 is a top plan view of another inner part of the said top pivot member, fitting in the first said outer part and adapted to receive the cover thereat. Fig. 10 is a top plan view of another inner part of the said pivot member, shown in Fig. 8, to protect the cover from frictional deflections thereof. Fig. 11 is a side elevational view of Fig. 8. Fig. 12 is a longitudinal section along the longitudinal axis of the ribs shown in Fig. 2. Fig. 13 is a transverse section along the line 13—13 in Fig. 2, and includes one brace member. Fig. 14 is a modification of the ribs, when the umbrella is closed, and is according to the invention. Fig. 15 is the same as Fig. 14 but the rib is in expanded condition as when the umbrella is open. One form of the invention shown includes a central support 1, provided with one or more grooves 2, longitudinally thereof. A spring element 3 about the central support is provided with interior projections 4, which are adapted to slidably move in the respective grooves 2 and thereby prevent rotary movements of the spring element. In Fig. 7 is shown one form of the upper end of said spring element that may be secured in any convenient manner to the central support 1 and affords flexibility radially and transversely thereat. This spring element may be constructed of one piece, or in two pieces, 3a (cylindrical) and 3b (conical), joined together in any convenient manner. It is obvious that the portion 3b facilitates flexibility transversely and also radially in addition to longitudinally; while portion 3a is to produce an increased tension upon the spiral portion 3b. 5 is the usual runner on the central support 1 and may be secured to the lower end of the spring element. This runner is provided, in addition to the usual pivoted portion 5a, with a recess or tubular portion 5b to receive the lower portion 3a of the spring element. 6 is an upper pivot member which may be secured at the outer circumference of the upper end of the spring element and leaving the central portion and the spring free from the central support 1, for the necessary flexibility of the upper portion of the portion 3d of the spring element. Pivot portion 5a of the runner and upper pivot member 6, being in the usual alignment, are adapted to receive ribs 7, pivoted in the usual manner, or in two parts. These ribs 1 may be termed forked or "split ribs" as each comprises two inner pivot ends 6a, 6b being on a continuous longitudinal separating distance to about a point 9, which is adjacent the outer end marked 10. Said inner ends are adapted to spread to the normal length of the spring element 3 and so produce tension sufficiently upon the lower and upper separated lengths of each said ribs. Interposed between the upper and lower separated lengths is a spreader 12, pivoted at or adjacent each end in channels 13, formed in said upper and lower separated lengths for same (see Figs. 12 and 13). The spreader is arranged that it braces the entire rib, and also shapes the curvature for the proper tension desired upon the cover 14, and further reinforces the outer radial portion of the structure in the case of a severe and sudden gust of wind, as indicated in dotted lines in Fig. 2. The cover 14 is secured in the usual manner at the ribs except at the crown or top, where the fabric of the cover is tightly secured between an inner ring 15 and outer ring 16 (see Fig. 9). The outer ring 16 fits tightly in an aperture 17 provided in the upper pivot member 5 shown in Fig. 8; while the inner ring 15 by its inner diameter is adapted to receive tightly the outer circumference of a collar 18, of an escutcheon 19 illustrated in Fig. 10. In Figs. 2 and 3, it will be noted that the collar 10 is a distance away from the central support 1, and at its underside free from the spring element 3. Obviously, any deflection of the cover 14 is absorbed by friction on the spring element and not transmitted to the central support. The normal length of the spring element 3, for the proper functioning of the frame structure, is sustained between two stationary elements, disposed at one end of the central support. One being the upper element 20, secured by pin or screw 21 and cooperates at its under surfaces with the upper surfaces of the escutcheon 19 to facilitate allowable movements thereat; the other being the lower element 22 that stops or checks the longitudinal movement of the spring when normal. 23 is the usual catch means at the upper end of the central support, and 24 the usual aperture in the runner in which the catch means 23 operates when the umbrella is open (see Fig. 2). This catch means is provided with a cut 24 in the form of a hook and fitted to the lower end of the aperture 24 to prevent upward movements of the runner in the case of a severe gust of wind against the underside of the cover 14. Obviously, to close the umbrella, the catch means is pressed in, and the runner 5 showed upward or toward the upper pivot member 6 and thereby places the catch means in position shown in Fig. 3, whereby the frame structure will remain closed. And to open the umbrella, the catch means is pushed inside, whereby the spring element, instantly, comes into normal and the catch means in place in the aperture, as well as the ribs in proper shape and tension as previously described. 25 is the usual means for retaining the ribs when the frame structure is closed as well as to release said ribs when the frame work is opened. The preferred form 26 shown, for beach umbrella or the like proportion, is a metal sleeve provided with impressions 27 in threaded form, adapted to operate in grooves 28 provided in the annular block 29, secured to or forming part of the central support. A modified form of rib construction is shown in Figs. 14 and 15. Here the ribs are provided with a plurality of braces or spreaders 30 between the upper separated length 31 and lower 31a, and functioning the same as previously described. This type of ribs may be termed "truss type" as they afford a frame structure for extra.
large overhead coverings and also, eliminate extra heavy fabric for the cover as no excess tension on said cover is required.

It is believed, that the foregoing conveys a clear understanding of the objects prefixed above.

It is obvious that the invention may be embodied in many forms and combinations within the scope of the claims and I wish it to be understood that the particular form is but one of many forms. Various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

1. The combination, in an umbrella frame structure, a stick or central support, a runner having a spiral spring element slidably mounted on the stick, forked to the free end of the ribs pivotally connected to the runner and also spiral spring element, brace members pivotally connected on the ribs, said brace members being independent of the stick or central support and also of the runner whereby, when the spring is expanded to its full length, the ribs including the said central support and runner have no tendency to expand or move away from the position assumed to support an open state of the cover of the structure, means securing the cover to the frame structure including a crown plate, the crown plate being detachably connected to the spiral spring element whereby the cover at the upper end of the stick or central support is held free from the stick or central support.

2. The combination, in an umbrella or the like frame structure, a central support having grooves longitudinally therein, a spring element about said central support, interior projections intermediate both ends of the spring element adapted to slidably move in said longitudinal grooves and prevent therefrom rotary movements of the spring element, a runner on the central support for regulating the movements of the spring element, and catch means on the central support combined with the runner to prevent accidental movements of the spring element, a pivot member at the upper end of the spring element, an aperture centrally of the pivot member, ribs each comprising a pair of stretcher rods with inner ends pivotally connected to the pivot member and runner respectively and their outer ends secured together, and spreaders with ends pivotally connected to each of said stretcher rods respectively, whereby when the runner moves away from the pivot member, tension upon the stretcher rods is exercised substantially for the use of the cover of the structure, a double ring member detachably secured within the aperture of the said pivot member, said double ring member adapted to receive the vertex of the cover and is free from said central support whereby deflections of the cover are absorbed by reaction on the spring element.

3. In a frame structure as described, in combination, a central support, a runner and associated pivot member on the central support, ribs each comprising a plurality of split longitudinal portions secured relative to one another to form the desired length of each of said ribs and with two inner pivoted ends, one pivotally secured to the associated pivot member and the other inner end to the runner, whereby upon the runner being slidably moved away from the pivot member, a rib consisting of upper and lower members respectively connected and intermediately braced is extended with sufficient force to stretch and support a cover.

4. In a frame structure of the character described, a central support, a pair of pivot members on the central support, ribs pivotally connected at each said pivot members, said ribs each comprising an upper and lower longitudinal member joined adjacent the outer end to support the cover of the structure, brace means associated with the upper and lower longitudinal members to radially exercise tension, substantial tension being on the entire cover when used, means operatively and also with the upper and lower longitudinal members of the ribs whereby when normal the umbrella is retained open.

5. In a frame structure of the character described, a central support, split ribs each having two inner pivoted ends adapted to operate on the central support, pivot means to receive pivotally the inner pivoted ends separately on the central support, a spring element connected with the pivot means normally separating the pivot means so that the split ribs expand transversely the length of their split sections, and brace means disposed between and pivotally connected with the split sections of the ribs so that the longitudinally split sections are separated and extended with sufficient force to support a cover when the spring element is normal.

6. In an umbrella or the like structure, the combination of a stick, an upper pivot member movably substantially transversely of the stick and another or lower pivot member movably longitudinally, a spring about the stick and connecting the upper and lower pivot members and adapted to the movements of each said pivot members respectively, ribs each having a split section with two inner pivoted ends, one pivotally connected to the upper pivot member and the other or second inner end pivotally connected to the lower pivot member, said inner ends adapted to spread to the normal length of said spring whereby the umbrella is opened and sustained, associated spreader elements disposed between the parts of the split section and pivotally connected thereto to distribute bending stresses through the whole length of the rib, catch means on the stick whereby the lower pivot member and also the spring is prevented from accidental longitudinal movement in respect of the stick.

7. In an umbrella or the like structure, the combination of a stick, an upper and lower pivot member on the stick, an associated spring element normally separating the upper and lower pivot members, longitudinal split ribs, each rib having a double inner end adapted to diverge or spread in respect to the longitudinal axis of same and being pivotally connected to said upper and lower pivot member respectively, whereby when said pivot members are adjacent to one another the double inner ends of each rib are substantially longitudinally together and the ribs are forced against the stick and so the structure is collapsed when not used.

8. An umbrella or the like structure comprising a stick, a spiral spring combined with upper and lower pivot members on the stick, ribs, each rib being split longitudinally and having a pair of inner pivoted ends pivotally connected to the upper and lower pivot members respectively and being spread thereat correspondingly to the normal length of the spiral spring, a brace member pivotally attached by its ends to the two parts of each rib and free from the intermediate brace and lower pivot members, whereby when the spiral spring is normally extended, the ribs are extended with sufficient force to sustain the cover for use, said ribs having recesses adapted to receive the spiral spring element.
receive said brace members whereby when the structure is collapsed the brace members are within the longitudinal sections.

9. The combination in an umbrella of a central support having a pair of pivot members, and check means to restrict the movement of the said pivot members to a predetermined distance apart adjacent the upper end of the central support, longitudinally split ribs with the free ends of the split portion pivotally connected to the pair of pivot members whereby when the pair of pivot members are drawn close together the ribs ultimately are forced into parallelism with the central support, said ribs each being of a plurality of longitudinally split portions attached relative to one another to form an upper and lower longitudinal rib portion with brace elements between the upper and lower longitudinal rib portions so that when the pivot members are at the said predetermined distance apart the free ends are separated from each other and the brace elements produce bending stresses along the entire length of the upper and lower longitudinal rib portions for the necessary extension and desired curvature for a cover of an open umbrella.

10. In an umbrella frame as in claim 9, a spring about the central support, said spring abuts the pair of pivot members and adapted to stabilize said pivot members at the predetermined distance and also the frame structure when the umbrella is open, clamping means co-operative with one of the said pair of pivot members and its associated check means and adapted to receive detachably the vertex of the cover free from the central support so that, deflections of the cover are absorbed by friction on the spring, said clamping means comprising an aperture in the associated pivot member, a pair of ring elements to clamp the fabric of the cover between and fitted tightly in the aperture, and a friction plate between the said ring elements and said associated check means.

11. In a frame structure as described, the combination of a pole, ribs around the pole, said ribs being split longitudinally from the inner end at the pole to adjacent the outer end and having spreaders movable with the split sections, operative means at the open end of the split section including a spring element on the pole and arranged so that when said spring element is pressed upon or drawn shorter the split sections and also spreaders, longitudinally, come together and are forced into alignment with the pole, and also, when the spring element is released to normal condition, the split sections diverge substantially in respect to their longitudinal axis and are extended, the spreaders controlling the spacing of the split sections to distribute bending stresses along the length of the rib and produce the desired curvature of the rib.

12. The combination in an umbrella of a pole having grooves longitudinally thereof, a combined runner and spring having interior projections, said projections adapted to slidably move in said grooves to prevent rotary movements of the runner and spring, ribs pivotally connected to the pole and runner, said ribs comprising an upper and lower longitudinal member united at the outer extreme end and diverging therefrom in respect to the longitudinal axis of the ribs when the umbrella is open, associated brace members between and pivotally connected to the upper and lower longitudinal members and being independent of the pole, runner and spring, means operative with the catch for restricting movements of said runner whereby the umbrella is retained open or closed.

13. In a sun shade frame structure, the combination of a centre pole, a combined cylindrical and conical spring element at one end of the centre pole, cooperative means between the said spring element and centre pole to prevent accidental rotary movements of said spring element, a pair of sleeve elements at said end of the pole coating with and regulating the positions of said spring element, pivot means at each of said sleeve elements to receive ribs, each of said ribs being fork shaped substantially when the said sleeve elements are moved away from one another or when the frame structure is open, and a plurality of cooperative spreaders pivotally connected with each said ribs, said spreaders being disposed between the forked shaped portions so that upon normal position of the spring element, the fork shaped portions being in extension, said spreaders control the spacing of the fork shaped portions to distribute bending stresses along the length of the ribs and produce the desired curvature for a cover free from the centre pole, means to secure one of said sleeve elements to the pole, and catch means cooperative with the other or second sleeve element whereby to check the movements of the spring element when the frame structure is open or closed, and means to secure the vertex of the cover at the stationary or fixed sleeve element free from the centre pole and capable of some lateral sliding movement with respect thereto.

ALFRED E. BRANDON.
CERTIFICATE OF CORRECTION.


ALFRED E. BRANDON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 45, for "cut 2\frac{1}{2}" read cut 25; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of May, A. D. 1939.

Henry Van Arsdale
(Seal) Acting Commissioner of Patents.