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FOLDABLE BEACH-TYPE UMBRELLA

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My invention relates to umbrellas of large area and diameter of the type used on beaches, and aims to provide certain improvements therein.

Beach umbrellas usually have a canopy diameter of 60 inches or more, and in order to prevent a drooping effect of the canopy the rib braces preferably are of a length equal to or slightly greater than half the rib length and usually engage the ribs at or slightly outwardly of the midpoint of the ribs. Because of this requirement it has not been found practicable to make a bench-type umbrella foldable to a size not much longer than the half length of its ribs, and hence has militated against making such umbrellas conveniently foldable and transportable to and from the beaches.

Among the objects of my invention are to provide (1) a beach-type umbrella that can be easily and quickly collapsed and folded to approximately one-half its rib length so as to provide a compact, small portable parcel; (2) to provide such umbrella with a single brace for each rib, which brace is of a length less than one-half the rib length; (3) to provide such umbrella with a novel rib and brace construction whereby the ribs will have a cantilever action for the support of the cover canopy from approximately the mid-point of the ribs outwardly; (4) to provide such umbrella in which the opening thereof is facilitated by spring action on the braces; (5) to provide such umbrella which will be sturdy, though of relatively simple and lightweight construction.

The foregoing and other objects of my invention not specifically enumerated I accomplish by the novel construction and combination of parts, as will be better comprehended from the detailed description which follows when considered in connection with the accompanying drawings, wherein:

Figure 1 is a view of an umbrella embodying my invention as it would appear in open operative condition as seen from below the cover.

Figure 2 is a view of the umbrella of Fig. 1 in compactly folded condition.

Figure 3 is a substantially diametrical section through the umbrella at an intermediate stage of being folded and compacted, parts being broken away.

Figure 4 is a top plan view of Fig. 3.

Figure 5 is an enlarged view of the central portion of Fig. 4, with the umbrella ribs in folded and stowed relation.

Figure 6 is a vertical section through the umbrella in open condition, showing the relationship of the staff, one rib and rib brace, the cover being omitted.

Figure 7 is a top plan view of Fig. 6 on an enlarged scale.

Figure 8 is an elevational view of an angular connecting member which may be used with the staff where the umbrella canopy is to be disposed at an acute angle to the ground.

Figure 9 is a diagrammatic representation of the relative portions of the ribs and rib braces in the course of opening the umbrella.

Referring to the drawings, the umbrella may be said to consist of the following principal elements, a staff 10, ribs 11, a cover 12, a runner 13 and rib braces 14.

As the umbrella is to be collapsible, the staff 10 is preferably made in a plurality of sections 15, 16 and 17, no one of which is substantially of greater length than a half length of the ribs so that the umbrella, in collapsed, folded and compacted condition, will have an overall length no greater than the longest of the staff sections. Preferably the topmost staff section 15 is of hollow construction and of an internal diameter to house the sections 16 and 17 in a telescoping manner. The adjacent ends of the sections 15 and 16, and 16 and 17 are formed with diametrically disposed openings 18 which are adapted to be brought into registry and held in such position by studs 19 each having at one end an enlarged head 20, and at the opposite end a laterally disposed spring-pressed ball 21. To insure against loss of the studs, for example, by one dropping into the sand, I preferably mount them on a flexible bail chain 22 by having said chain pass through diametrical holes formed in the heads of the studs. To prevent the studs from becoming detached from the chain, the ends of the chain are suitably provided with enlargements 23. To provide for anchoring the staff of the umbrella, when open, in the sand, I provide a stake 24, which has a reduced end (not shown) which likewise may be telescopically received and held within the lowermost staff section 17 in the same manner as the staff sections 15, 16 and 17 are held in assembled relation.

The topmost staff section 15 is provided adjacent its outer end with a peripherally channelled ring 25 formed with radial slots 26 therein, within which the innermost ends of the ribs are pivotally mounted in a conventional manner. Held within the outer end of the staff section 15 in any preferred manner is a plug 27 which carries a spring-pressed lock plunger 28 having a
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hemispherical end 28a which is adapted to extend through an opening 29 in said staff member and constitutes a means for latching the runner in position when the rib braces have been moved to their rib-bracing position. Engaging the projecting portion of the plug 27 is a top cap 30 which may be held in place by a screw 31. The lower end of the staff section 18 is provided with a flange 32 which acts as an abutment stop for the runner 13 when the umbrella is in its collapsed condition.

The ribs 11 are made in two segments, namely, an upper segment 33 and a lower segment 34, preferably of approximately equal length, and formed of metal rod which is adapted to flex when subjected to the tension of the cover 12 when the umbrella is in fully opened condition. The adjacent ends of the segments 33 and 34 are preferably reinforced, as best shown at 33a and 34a in Figs. 6, 7 and 9, to constitute rigid portions and said rigid portions are each pivotally connected through a rigid bracket 35 through the agency of pivot pins 35a and 35b, respectively. Preferably the brackets 35 are each of right angular channelled form and the reinforced rigid portions 33a and 34a of the rib segments are of rectangular cross-section to enable pivot and seat within the channelled bracket 35. It will be noted that, in view of the disposition of the channelled brackets 35 and the pivotal connection between them and the adjacent ends of the rib segments, the latter are adapted to lie substantially parallel to each other when the umbrella is in collapsed condition and to extend substantially in alignment with each other when the umbrella is in opened condition, in which latter conditions the ribs may be said to have an intermediate rigid portion provided by the rigid portions 33a, 33b and 35. The end of the reinforced portion on the rib segment 33a remote from the pivotal connection 35a provides a shoulder or abutment 36, the function for which will presently appear. Mounted on each of the rib segments 33 for slidably movement thereon between the abutment shoulder 36 and the pivotal connection 35a provides a means for sewing or securing the cover 12 to the outer end of the rib, as is conventional.

The cover 12, which may be formed of any suitable strong fabric material such as awning cloth, is secured to the rib caps 34b and to the upper end of the staff section 18 below the top cap 30 in a conventional manner, and is also preferably secured to the reinforced or rigid portions of the rib segments, as shown at 39 in Fig. 3. If desired, the cover may be further secured to the rib segments 34 at a point intermediate the ends thereof as indicated at 40 (Fig. 3). The runner 13 is slidably mounted on the staff section 15 and has secured thereto intermediate its ends a peripherally channelled ring 41 formed with radial slots 42 within which are pivotally connected one end of each of the rib braces 14 in a conventional manner. The upper end of the runner is flared outwardly, as indicated at 43, and below said flared end is formed with an opening 44 which is adapted to receive therethrough the hemispherical end 28a of the locking plunger 28 when the runner is moved close to the top of the staff section 15 in the course of opening the umbrella. The portion of the runner below the channeled ring 41 serves as a hand grip for operating the runner.

The rib braces 14, of which there is one for each rib as previously mentioned, are each pivotally connected at one end in a radial slot 42 in the channeled ring 41 and at its opposite end is pivotally connected to the rib slider 37. The braces 14 are preferably formed of channelled stock, the base of the channel being cut away at the pivotal connecting ends of the braces.

Operation

Let it be assumed that the umbrella is in collapsed, folded and compacted condition, as shown at Fig. 2. In said condition the staff sections 15 and 17 are telescoped within the staff section 18 and the stake 24 and said 19, together with the connecting chain 22, may be assumed to be conveniently accessible. To open the umbrella the telescoping staff sections are first withdrawn, the flange 32 at the lower end of the staff section 15 is held, the device as shown in Fig. 2 is inverted and the folds of the cover or canopy fabric are shaken loose and the folded rib segments 33, 34 are moved manually from their parallel to their extended aligned positions. As the folds are loosed, the compressed rib springs 39 are free to expand and, in so doing will push the rib sliders 37 down along the rib segments 33 as far as position A (Fig. 9), which point is predetermined by the characteristics of the spring and is such as will insure the action in opening the umbrella as hereinafter explained. At the same time the rib engaging ends of the rib braces will have been moved outwardly from the staff 15 and will also be at position A. The runner-engaging ends of the braces will remain at position B.

With the rib segments in alignment, as one proceeds to open the umbrella, the runner 13 is pushed upwardly along the staff section 15. In the course of this movement the angle between the runner ring 41 and the rib braces increases and the angle between the sliders 37 and the spring-carrying portion of the rib segments 33 decreases as the entire rib assembly rotates outwardly about the rib pivot points on the channeled ring 25. The springs 39 hold the rib sliders in substantially fixed relation on the rib segments as the latter are being pivoted upwardly by the rib braces until the rib braces each reach a position normal to a rib segment 33, i.e., to form an angle of 90°, at which stage the cover resists further upward movement of the rib assembly. As the runner is further moved upwardly with the application of additional force to the stage where the angle a between the spring-carrying portion of the rib segments and the rib braces becomes less than 90°, for example, when the runner ring 41 is at position C and the sliders are at position A, the tension of the cover overcomes the lateral component of the upwardly applied force on the rib braces and results in a rapid downward movement of the rib brace 14 and a concomitant outward movement of the sliders along the rib segments, as indicated by the arrow c, and said sliders come to rest against the shoulders 38 on said segments 33 at position D.

As the runner 13 is pushed further upwardly along the staff section, say from the position C to E, the braces 14 again lift the entire rib assembly upwardly from position D to F, rotating said assembly about the rib pivot points on ring
25. The ribs of the entire assembly at this stage being straight and providing, in effect, a flattened cone, any further upward movement will be resisted by the cover 12, consequently the entire rib assembly will start to flex inwardly.

As the runner 13 is pushed close to its extreme upward position as indicated at G, the hemispherical end 26a of the lock plunger 26 will engage in the opening 44 in the runner 13 and the runner-engaging ends of the braces will be at position H. Since during this last stage of the upward movement of the straight rib assembly is resisted by the cover, the only alternative is for the ribs of the rib assembly to flex into substantially arcuate form except for the intermediate rigid portions provided by the bracket 35 and the rigid portions 33a and 34a of the rib segments, as predetermined and constrained to do by the cover 12. The arrow f indicates the final upward movement of the sliders and the slider-engaging ends of the braces, and the position J indicates the uppermost position of the sliders when the umbrella is in its fully opened condition.

The stake 24 and staff sections 16 and 17 are then joined together by means of the studs 19 and said assembly is then connected to the staff section 15 by a stud 16, and the staff may be firmly planted in the sand.

Where it is desired to support the canopy at an angle to the ground, an angular connecting coupling 45 such as shown in Fig. 8 may be employed for connecting two of the staff sections.

To close and compact the umbrella, the staff sections 16, 17 and stake 24 are first disconnected from the staff section 15. The spring-pressed plunger 28 is depressed, thus permitting the runner to be disengaged therefrom and moved downwardly along the staff owing to the tension of the covering on the ribs and braces. The runner is then pulled down until its lower end comes to rest against the flange 32. The runner is then inverted to the position shown in Fig. 3 and the ribs are folded back upon themselves, which makes it possible to put the rib springs in compression by manually moving the braces inwardly against the staff section. As this is being done, the brackets 25 will be brought into closer contact with said staff and are fitted in between the walls of the braces, which are adapted to receive them, as best shown in Figs. 3 and 5. When all of the ribs are thus positioned with the brackets engaged between the walls of the braces, the folds of the canopy fabric are draped or wrapped around the folded ribs and closed braces, thus holding the umbrella in closed, compacted condition. The staff sections 16 and 17 may then be inserted into the hollow section 15 and the stake 24 and connecting chain with its studs 19 may be wrapped up within the folds or placed in a suitable carrying bag which may be provided for the folded umbrella.

From the foregoing detailed description it will be appreciated that I have provided a folding umbrella of a character fulfilling the various objects of the invention as set forth in the opening statement of the specification and, although I have shown and described but a single embodiment of my invention it is to be understood that changes in the constructional details thereof may be made within the range of mechanical skill without departing from the spirit of the invention as defined in the appended claims.

What I claim is:

1. A foldable beach type umbrella comprising a staff section having rib mounting means adjacent its top, ribs pivotally mounted on said means, each of said ribs being formed of two approximately equal length segments of no greater length than the other, and a single bracket to which the adjacent end portions of the rib segments are pivotally connected in a manner to enable the lower rib segment to pivot outwardly to lie substantially parallel to the upper rib segment, a runner slidably mounted on the staff, a rib brace for each rib, said rib brace being pivotally mounted at one end to the runner and slidably connected at its other end to the upper rib segment and being formed with spaced apart walls adjacent its connection with the runner and adapted to accommodate between said spaced walls the bracket which connects the rib segments when said segments are disposed substantially parallel to each other and to the staff section.

2. A foldable beach-type umbrella comprising a staff, ribs pivotally mounted adjacent the top of the staff, each of said ribs being formed of an inner and an outer rib segment of approximately equal length, a rigid bracket for each rib to which bracket the adjacent end portions of the rib segments are pivotally connected in a manner to enable said rib segments to lie substantially parallel to each other or in substantially alignment with each other, a runner slidably mounted on the staff, a single rib brace for each rib, a brace slider mounted on each rib, an abutment stop on each inner rib segment, each said abutment stop being adjacent the connection between each said inner rib segment and its bracket, each said rib brace being pivotally mounted at one end to the runner and pivotally connected at its other end to a brace slider, latch means for locking the runner on the staff in a position to hold the brace sliders against the abutment stops solely by the rib braces in opening the umbrella, whereby in the course of collapsing the umbrella by unlatching the runner latch means, all the brace sliders will be free to move along the rib segments toward the top of the staff and thereby facilitate moving the inner rib segments into substantially parallel relation to the staff section.

3. A foldable beach-type umbrella, comprising a staff made in sections, ribs pivotally mounted adjacent the top of the topmost staff section, each of said ribs being formed of two segments of approximately equal length, a bracket for each rib to which bracket the adjacent ends of a pair of rib segments are pivotally connected in a manner to enable said rib segments to lie substantially parallel to each other or in substantially alignment with each other, a runner slidably mounted on the topmost staff section, a single rib brace for each rib, a brace slider mounted on each rib segment that is pivotally mounted adjacent the top of the staff, each of said rib braces being of less length than said last-mentioned rib segments and being pivotally mounted at one end to the runner and pivotally connected at its other end to a brace slider, and a coil-spring on each said last-mentioned rib segment between a brace slider and the pivotal mounting of said rib segment adjacent the top of the staff, said springs in collapsed condition of the umbrella being held under compression by the brace sliders.

4. A foldable umbrella according to claim 3, wherein the springs, upon release of the compressive force thereon expand and push the brace
sliders along the rib segments to facilitate opening the umbrella.

5. A foldable beach-type umbrella comprising a staff, ribs pivotally mounted adjacent the top of the staff, each of said ribs being formed of two segments of approximately equal length, a rigid bracket for each rib to which bracket the adjacent end portions of the rib segments are pivotally connected in a manner to enable said rib segments to lie substantially parallel to each other or in substantial alignment with each other, a runner slidably mounted on the staff, latch means for holding the runner near the top of the staff, a single rib brace for each rib, a brace slider mounted on each rib, an abutment stop on each rib segment that is pivotally mounted adjacent the top of the staff, each said abutment stop being adjacent the connection between said rib segment and its bracket, each said rib brace being pivotally mounted at one end to the runner and pivotally connected at its other end to a brace slider, a coil-spring on each of said last-mentioned rib segment between its brace slider and the pivotal mounting on said rib segment adjacent the top of the staff, said springs in collapsed condition of the umbrella being held under compression by the brace sliders and being operative, upon release of the compressive force thereon, to expand and push the brace sliders a predetermined distance along said rib segments and hold said rib sliders at substantially said distance from the pivotal mounting adjacent the top of the staff, and as the ribs are pivoted upwardly by the rib braces upon upward movement of the runner on the staff and the rib braces pass beyond the points of normalcy with the rib segments, there results, due to the tension of the cover, a rapid downward movement of the rib braces and an outward movement of the rib sliders until the latter are stopped by engagement with the abutments on said rib segments and further upward movement of the runner on the staff operates to fully open the umbrella, engagement of the latch means with the runner serving to hold the umbrella open.

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