June 26, 1934. W. A. LIVINGSTON 1,964,292

FOLDING UMBRELLA

Filed Aug. 21, 1933

Fig. 1

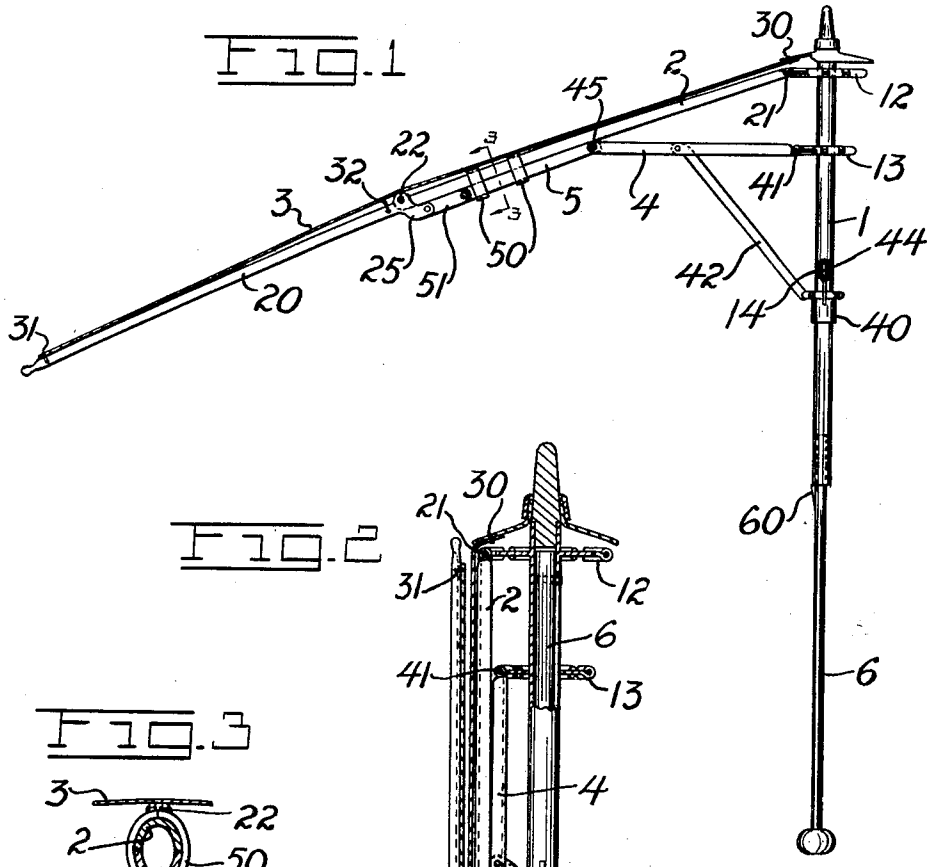


Fig. 2

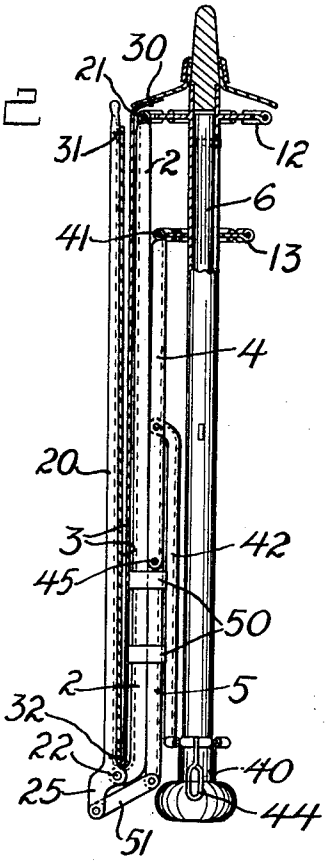


Fig. 3

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FOLDING UMBRELLA

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4 Claim. (Cl. 135—25)

My invention relates to folding umbrellas, that is, umbrellas of the type which can fold into a length shorter than the length of the individual ribs, and which can therefore be packed within a grip, handbag, or the like.

It is an object of the present invention to provide an umbrella having the above characteristics, which will be sufficiently ruggedly built that it will operate satisfactorily for a time commensurate with the average life of an ordinary umbrella, and which will be simple in construction and not likely to get out of order.

It is a further object to provide an umbrella of this type which shall not differ greatly in appearance from an ordinary umbrella when raised, and which in such condition will not have the space beneath the cover obstructed to an appreciable extent by stretchers, braces and the like, to the end that it can be drawn well down over the head of the user.

It is a further object in umbrellas of this type to eliminate springs and like parts which are likely to rust and to cause the umbrella in a short time to fail to function properly.

With these and other objects in view, as will appear hereafter, my invention comprises the novel parts, and the novel combination and arrangement thereof, as shown in the accompanying drawing, described in this specification, and as will be more particularly defined by the claims which terminate the same.

In the accompanying drawing I have shown my invention embodied in a typical form, it being understood that the form and proportion of parts can be altered, and that other devices, such as the extension handle, can be employed or not, as the maker may deem convenient.

Figure 1 is an elevational view of the handle, stem, rib and associated parts of an umbrella, in the expanded condition, the covering being shown in section.

Figure 2 is a similar view of the umbrella in the folded condition.

Figure 3 is a detail section through a rib, taken on the line 3—3 of Figure 1.

Upon the stem 1 are fixed two disks or rings 12 and 13 constituting hinge mountings. The member 12 is or may be similar to the hinge mounting used in ordinary umbrellas for hinging the inner ends of the ribs, and the member 13 may be similar thereto, but preferably is slightly less in diametrical extent. The two hinge mountings 12 and 13 are permanently fixed in spaced relationship on the stem 1.

Each rib is formed of an inner section 2 and an outer section 20. These two sections are hingedly connected at 22. The inner rib section is hinged at its inner end to the hinge mounting 12, as shown at 21. The cover 3 is secured in the usual manner adjacent the inner end of the rib at 30 and to the end of the rib at 31. It is preferably also stitched to the rib at an intermediate point, as indicated at 32.

A stretcher 4 is provided for each rib, the inner end thereof being hinged at 41 to the hinge mounting 13. The outer end of the stretcher 4 is connected to the inner end of the outer rib section 20 in such a way that downward and inward swinging of the stretcher will accomplish outward and upward swinging of the outer rib section 20 with respect to the inner rib section 2 to which it is hinged. Likewise the stretcher is so connected to the inner rib section 2 that downward and inward swinging of the stretcher will accomplish simultaneous inward and downward swinging of the inner rib section 2, to the end that the two rib sections swing eventually into parallelism with each other, and into parallelism with the stem 1, as shown in Figure 2. The cover 3, in such event, folds and lies between the rib sections. This connection will be explained in detail hereafter. It may be pointed out that the swinging of the stretcher may be accomplished in any suitable manner, as for example by a slide 40 slidable lengthwise of the stem 1, connected by braces 42 to the several stretchers 4. Preferably the connection of the brace to each stretcher is between its ends, whereby the amount of movement of the slide to accomplish folding of the umbrella is small, and more clear space is left for the user's head.

The inner end of the outer rib section is formed as a short lever arm 25, and a rod 5 connected to the outer end of the stretcher 4 at 45 is guided by guides 50 mounted upon the outer end of the inner rib section 2 to reciprocate lengthwise of this inner rib section. The outer end of this rod is connected by a link 51 to the short lever arm 25.

Now as the slide 40 is moved downwardly of the stem from the open position of the umbrella it pulls on the stretcher 4, causing it to swing downward. This moves the rod 5 outwardly in the guides 50, and through the link 51 this reacts on the lever arm 25 to swing the outer rib section 20 outwardly and upwardly. The support for the inner rib section 2 being withdrawn, and the inward swinging of the stretcher 4 through the connection accomplished by the rod 5 and the guides 50 tending to swing this inner rib section 2 downwardly, the inner rib section follows the

stretcher, swinging about its pivot 21 in a downward and inward direction. The ultimate result is that the two rib sections 2 and 20 come into parallelism with each other and into parallelism with the stem 1. The umbrella is then collapsed, and since the two rib sections are preferably approximately equal in length, the total length of the umbrella in the folded position is but little in excess of the length of either one of the rib sections.

It is usually desirable to have a handle for carrying the umbrella, which is somewhat greater than this length. Accordingly I have provided an extension handle 6 which is slidable within the stem 1, the latter being made hollow, and which may be held in the extended position by a spring catch 60 of ordinary construction. This is a matter of convenience which may or may not be used, as preferred, but I prefer to employ it since it renders the umbrella, when open, similar in appearance to any ordinary umbrella.

Any means which are found suitable may be employed for holding the slide 40 in its raised position to hold the umbrella open, and as an example of such means I have shown the open loop or eye 44 hinged upon the slide, which is engageable with a lug or hook 14 fixed at the proper position upon the stem 1.

It will be observed that there are no springs in this umbrella other than that employed in conjunction with the usual spring catch at 60, since the hinge mountings 12 and 13 are fixed upon the stem and do not vary in their distance from each other. There are, furthermore, no projecting ends of the ribs which may become damaged in handling or when coming into contact with other objects in a bag. All parts are securely and rigidly held in position by fixed pivots or guides, and therefore are not likely to get out of order by being bent or otherwise damaged, or by becoming rusty.

What I claim as my invention is:

1. A folding umbrella comprising a stem, ribs each of which comprises an inner section hingedly mounted on the stem and an outer section hingedly mounted on the outer end of the inner section, a stretcher for each rib the inner end of which is hingedly mounted on the stem at a point spaced below the rib's hinge mounting, a slide reciprocable along the stem below the stretcher's hinge mounting, a brace hingedly mounted upon the slide and extending to and hingedly connected to each stretcher, between its ends, and means separate from and movable lengthwise of each inner rib section, and operatively connected at one end to the stretcher and at its other end to the outer rib section, whereby upon movement of the slide away from the hinge mountings of the rib and stretcher, the outer rib section swings outwardly and upwardly relative to the inner rib section, as the latter swings downwardly and inwardly, to bring the rib sections parallel to each other and to the stem.

2. A folding umbrella comprising a stem having two hinge mountings fixed thereon a predetermined distance apart adjacent its upper end, ribs each of which comprises an inner section hinged at the upper of said hinge mountings, and an outer section hingedly mounted at the outer end of the inner section, a stretcher for each rib the inner end of which is hinged at the lower of said hinge mountings on the stem, means to swing said stretchers on their hinge mountings aforesaid, and means mounted upon and movable lengthwise of each inner rib section, and operatively connected to the corresponding outer rib section, whereby upon swinging of the stretcher downwardly and inwardly about its hinge mounting the inner rib section will swing inwardly and downwardly, and the outer rib section will swing inwardly and upwardly relative to the inner rib section, to bring the rib sections ultimately into parallelism with each other and with the stem.

3. A folding umbrella as in claim 2, the last-mentioned means comprising a rod guided upon the outer end of the inner rib section for reciprocation, to the inner end of which rod the stretcher is hinged, and a link secured by one end to the outer end of such rod, the inner end of the outer rib section having an inwardly directed lever arm, which in expanded position lies within and inwardly of the outer end of the inner rib section, to which lever arm the other end of said link is secured.

4. In a folding umbrella having a stem; ribs each of which comprises an inner section hingedly mounted on the stem and an outer section hingedly mounted on the outer end of the inner section, a slide reciprocable along the stem below the rib's hinge mounting on the stem, means mounted on, but separate from and movable lengthwise of each inner rib section, and operatively connected at one end to the outer rib section at a point spaced from the latter's hinge mounting, whereby upon movement of said means along the inner rib section, the outer rib section swings outwardly and upwardly relative to the inner rib section, finally to extend parallel thereto, and an operative connection between the slide and said means to translate movement of the slide lengthwise of the stem into the described movement of the outer rib section, and simultaneously to swing the inner rib section downwardly and inwardly, finally to extend parallel to the stem.

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