March 17, 1959 R. ZIMMERMANN 2,877,782

SELF-OPENING UMBRELLA

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FIG. 1

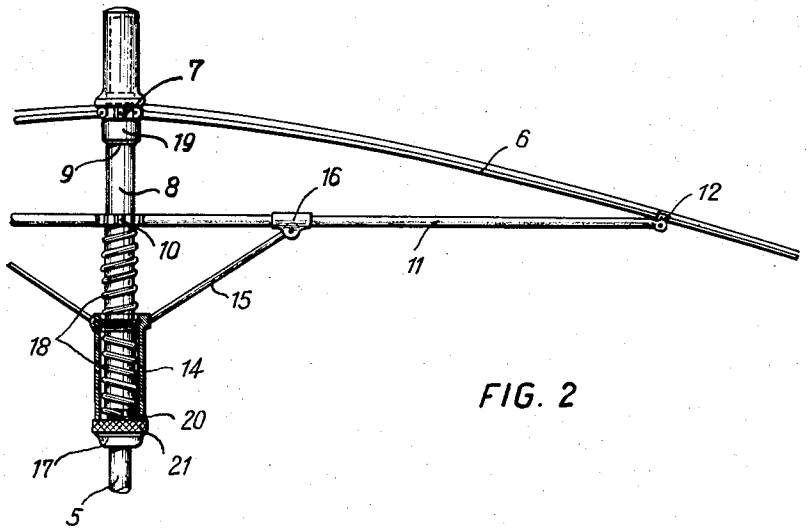


FIG. 2

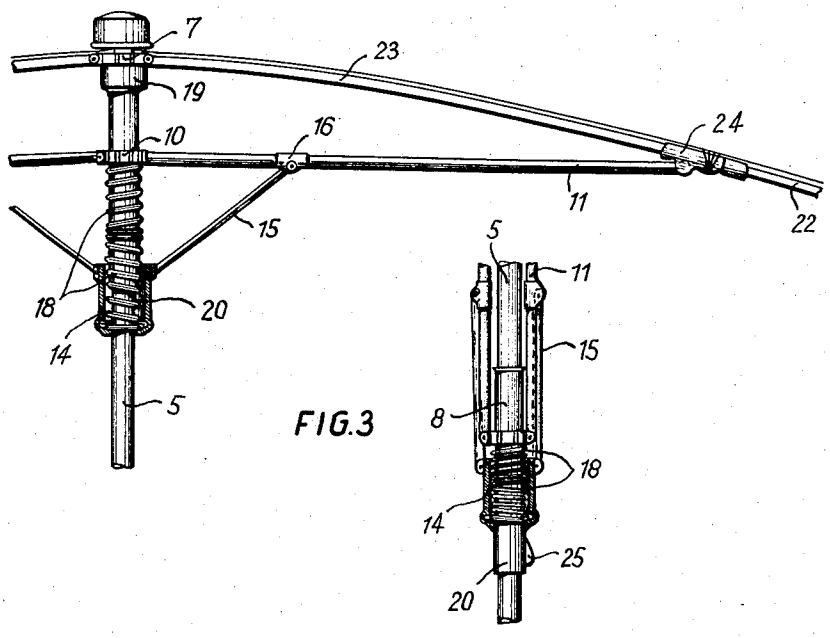


FIG. 3

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SELF-OPENING UMBRELLA

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The invention relates to umbrellas, and more particularly to an opening device which can be used either for non-collapsible or for collapsible pocket umbrella frames. It is known in connection with such umbrella frames to hinge main and auxiliary struts on main and auxiliary slides and to arrange an opening or spreading spring between the slides, which spring, when the umbrella is being opened, spreads the umbrella frame and automatically opens the umbrella roof.

Frames are known wherein the main struts are hinged to an auxiliary slide which runs on a main slide. This construction is open to the objection that, owing to the cloth of the umbrella being subjected to lateral stretching which is not always uniform and consequently pressure being exerted on the main struts and the auxiliary slide, the running of this auxiliary slide on the main slide is impeded and reliable automatic opening of the umbrella is not always ensured.

With a view to overcoming this objection it is likewise known to hinge the main struts to a crown ring rigidly connected with the main slide. In this case a bell-shaped auxiliary slide is not rigidly connected to the main slide but slidably guided on the elongated main slide. The auxiliary struts are hinged on the bell-shaped auxiliary slide. In this arrangement no lateral pressure is exerted on the bell-shaped auxiliary slide so that the umbrella roof can open reliably. In these known forms of construction the sliding movement of the bell-shaped auxiliary slide was limited by a bead or abutment at the end of the elongated main slide. This is open to the objection that the spring pressure which should open the umbrella roof was relieved prematurely and the umbrella could not be completely opened. It was necessary to assist the opening movement by hand in order to bring the umbrella into its fully open position and an arresting spring was provided on the umbrella stick to maintain the slide in its raised position.

According to the present invention no bead or abutment is provided at that end of the elongated main slide which is directed towards the umbrella handle, so that the sliding movement of the bell-shaped auxiliary slide is not prematurely limited. Consequently the umbrella opens automatically right up to the raised position because the force of the opening spring remains operative until the elongated main slide strikes against the roof crown. An arresting spring for maintaining the main slide in its raised position is no longer necessary on the umbrella stick because the surplus spring force of the opening spring maintains the umbrella roof in open position. The main struts of the umbrella roof are brought into an angle position of slightly less than 90° relatively to the lower portion of the umbrella stick axis when the umbrella is in its open position, with the result that unintentional closing of the umbrella roof under wind pressure is avoided.

The auxiliary struts hinged to the bell-shaped auxiliary slide are kept very short as compared with the known

forms of construction and thus facilitate the closing of the umbrella and, in addition, enable the elongated main slide to be moved as little as possible out of the bell-shaped auxiliary slide during the closing of the umbrella and to be made only of sufficient length to catch the stick spring near the handle end of the umbrella stick and thereby lock the umbrella in closed condition. This is particularly advantageous in the case of collapsible umbrellas in order to produce a short length umbrella in closed telescoped state. When the umbrella roof is raised, the lower end of the elongated main slide facing the umbrella handle disappears entirely in the bell-shaped auxiliary slide. The other end of the elongated main slide strikes against the crown or a rubber ring arranged in front of the crown to cushion the blow. The main slide is at its upper edge beaded over so as to prevent damage to the rubber ring.

Several preferred embodiments of the invention are illustrated by way of example in the accompanying drawing, in which:

Fig. 1 shows the upper part of a self-opening non-collapsible umbrella in open position, partly in sectional view, only a few struts and roof ribs being illustrated;

Fig. 2 is a similar view of the upper part of a collapsible pocket umbrella, and

Fig. 3 shows the slide arrangement of the umbrella illustrated in Fig. 2, in closed position.

The umbrella illustrated in Fig. 1 comprises a stick 5 and roof ribs 6 which are articulated with the aid of a crown 7 mounted near the upper end of the stick 5. A sleeve-shaped main slide 8 is shiftable on the stick 5 and carries, hinged in pairs of radial slots of a ring member 10 located below its upper edge formed by a bead 9, the bifurcated ends of main struts 11 which act on the roof ribs 6 through the intermediary of joints 12. A bell-shaped auxiliary slide 14 is slidable over the sleeve-shaped main slide 8 and guides, in the region of its upper edge, articulated auxiliary struts 15 which are connected to the struts 11 by joints 16. The joints 16 are located about in the region of the first third of the length of the main struts 11 towards the stick. Between a bottom internal flange 17 of the bell-shaped auxiliary slide 14 and the ring member 10 of the main slide 8 a spring member 18 serving for opening the umbrella and preferably composed of two oppositely wound compression springs is accommodated and pretensioned. The main slide 8 is of such length that, when in open position, which is determined by its upper edge 9 bearing against an elastic rubber ring 19 engaging the crown 7, a lower edge 20 of the slide 8 is located within the bell-shaped auxiliary slide 14. The auxiliary slide 14 serves as manipulating device for shifting the slide arrangement for folding or closing the umbrella, the slide being provided with a knurled annular bead 21 for this purpose. During the return movement of the slide arrangement, the main slide 8 travels a greater distance than the auxiliary slide 14, so that, in the last portion of the movement, the lower part of the main slide 8 can protrude from the auxiliary slide 14 and co-operate with a catch, not shown in the drawing, mounted on the stick for locking the umbrella in closed position.

The slide arrangement illustrated in Figs. 2 and 3 in connection with a pocket umbrella is similar to that shown in Fig. 1. In this type of umbrella the crown 7 on the upper end of the stick 5 carries a plurality of roof ribs 22 hingedly connected thereto and each having an inner portion 23. The main struts 11 are each hingedly connected to a slide 24 slidably guided on the portion 23 of its respective rib, which sleeve straddles the ends of a rivet or pin serving as pivot between strut 11 and slide 24. In the case of such collapsible or telescopable umbrellas the slide arrangement according to the invention is particularly advantageous because, as compared with the

known constructions, it enables the umbrella in collapsed condition to be shorter in length, which is due to the fact that in open position the rearward end of the main slide **8** enters the bell-shaped auxiliary slide **14**.

Fig. 3 shows the umbrella in closed state. It will be seen that the spring member **18** is tensioned and the rearward end **20** of the main slide **8** projects so far out of the auxiliary slide **14** that it can be engaged by a catch **25** on the stick **5** which locks the umbrella in folded or closed position. The stick **5** of the umbrella illustrated in Figs. 2 and 3 is composed in known manner of sections which are telescoping one within the other for the purpose of shortening or collapsing.

From Figs. 1 and 2 it can be seen that the main struts **11**, when the umbrella is open, stand at an angle of less than 90° relatively to the axis of the handle end of the stick **5**. Thus, independently of the pre-tension of the springs **18**, the umbrella is automatically locked in a reliable manner when in open position.

The forms of construction illustrated are, as has already been mentioned, only examples of possible applications of the invention which is not restricted thereto. Many other forms of construction can be envisaged. Thus, for example, the length of the main slide **8** can be shortened to such an extent that it does not project beyond the bell-shaped auxiliary slide **14** on the handle side even when the umbrella is in closed or folded position. For locking the umbrella in folded position a catch may be provided to which a suitable releasing device is coordinated. The shape of the parts forming the slide arrangement can be modified in many ways from the construction illustrated:

I claim:

1. An umbrella comprising, in combination, an umbrella stick having an upper end portion; a plurality of ribs, each hinged at one end to said upper end portion of said umbrella stick; abutment means on said umbrella stick at the upper end portion thereof; a tubular inner main slide shiftable on said stick; a plurality of main struts each hinged at one end to said main slide and at the other end to one of said ribs; a plurality of auxiliary struts, each of said struts hinged at one end to one of said main struts; a tubular outer auxiliary slide coaxially shiftable relative to said main slide and hingedly attached at its upper end to the other ends of said auxiliary struts, said tubular auxiliary slide having such a length that in open umbrella position the lower end of said main slide is located within said auxiliary slide and in closed umbrella position the lower end portion of said main slide projects downwardly beyond said auxiliary slide; releasable locking means on said umbrella stick adapted to engage said lower end portion of said main slide in closed umbrella position so as to releasably hold it in such position; and compression spring means surrounding said main slide and extending into said auxiliary slide confined between the hinged ends of said main struts and the lower end of said auxiliary slide, said spring means being in compressed condition when the slides are in their closed umbrella position and being in an expanded condition when the slides are in their open umbrella position, the arrangement being such that the spring means when expanded will urge the hinged ends of the main struts at least into dead center position with respect to each other for thereby locking the umbrella in its open position.

2. An umbrella comprising, in combination, an umbrella stick having an upper end portion; a plurality of ribs, each hinged at one end to said upper end portion of said umbrella stick; abutment means on said umbrella stick at the upper end portion thereof; a tubular inner main slide shiftable on said stick; a plurality of main struts each hinged at one end to said main slide and at the other end to one of said ribs; a plurality of auxiliary struts, each of said struts hinged at one end to one of said main struts; a tubular outer auxiliary slide coaxially shiftable relative to said main slide and hingedly attached at its upper end to the other ends of said auxiliary struts, said tubular auxiliary slide having such a length that in open umbrella position the lower end of said main slide is located within said auxiliary slide spaced a distance from the lower end of the auxiliary slide and in closed umbrella position the lower end portion of said main slide projects a substantially similar distance downwardly beyond said auxiliary slide; releasable locking means on said umbrella stick adapted to engage said lower end portion of said main slide in closed umbrella position so as to releasably hold it in such position; and compression spring means surrounding said main slide and extending into said auxiliary slide confined between the hinged ends of said main struts and the lower end of said auxiliary slide, said spring means being in compressed condition when the slides are in their closed umbrella position and being in an expanded condition when the slides are in their open umbrella position, the arrangement being such that the spring means when expanded will urge the hinged ends of the main struts at least into dead center position with respect to each other for thereby locking the umbrella in its open position.

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