

Self-opening topless pocket umbrella frame

The invention relates to a self-opening pocket umbrella frame of the topless type, i.e. in which the cover is not directly supported by the canopy framework immediately around the top of the stick, having a telescopic stick and a collapsible canopy framework extending radially from the stick in the form of scissor-link folding systems which can be spread by means of an opening spring and collapsed manually by a slider which is displaceable along the stick, each scissor-link folding system having a pair of scissor levers, of which an upper one of the scissor levers is pivotally linked to a main crown, while the lower one of the scissor levers is pivotally connected to the slider. Such an umbrella is hereinafter referred to as of the kind described.

Frames of this kind are known, for example, from GB-B-2179855. As a result of the scissor-operated folding kinematics of the canopy framework, they are stable in their design and very user-friendly since they can be opened and closed in one movement by the operation of the slider, involving simultaneous, automatic folding up of the canopy cover. In contrast, it is disadvantageous that the opening spring stressed between the slider and an associated auxiliary slider in the known frames of this type, and their encapsulation take up appreciable space between the telescopic stick and the canopy framework so that the known umbrellas of this type become relatively thick in cross-section in the closed state. Additionally, the opening spring in this design rubs up and down over virtually the entire length of the stick when the umbrella is opened and closed with the result that scratches on the stick cannot be avoided.

Moreover, this arrangement and function of the opening spring, together with the tensioning and sliding mechanism between the auxiliary and main sliders moving the lever scissors, requires a relatively large spring force and

thus also a great manual effort upon closing, making the closing movement difficult.

The underlying object of the invention is to improve a self-opening umbrella frame of the kind described having
5 a scissor folding linkage in such a way that it can be operated with less effort and can be closed in a more user-friendly manner and, additionally, has a more pocket-sized, thinner cross-sectional volume in the closed state.

According to the invention, in an umbrella frame of
10 the kind described, the radially inner arms of the respective scissor levers together with an intermediate strut located between them, forming two triangular linkages, the intermediate strut engaging at its radially
15 inner end an intermediate crown, which is fixed non-displaceably to the upper end of the stick, and engaging at its radially outer end on or adjacent to a scissor lever cross-joint, and wherein the main crown with
20 its joint to the upper scissor lever can move freely away from the intermediate crown when the canopy framework is opened under the effect of the opening spring which acts between the main crown and the stick.

A particularly advantageous embodiment of the invention results if the intermediate strut, in the opened
25 position of the umbrella canopy, extends substantially at right angles to the stick axis with simultaneous formation of a right-angled triangular formation of the two triangular linkages.

An optimally short structure of the folded umbrella can be achieved if, according to a further advantageous
30 development of the invention, the opening spring in the stressed state is completely sunk in the stick and the crown rests on the end of the stick or on the intermediate crown.

According to this design it is also particularly
35 advantageous if, according to a further development of the invention, the opening spring is encapsulated in a slide sleeve guided in the end of the stick.

Another advantageous development of the invention permits a still further shortening of the folded shortened umbrella if the main crown with a ring linking the upper scissor levers is inverted in the manner of a cup over the
5 end of the stick or the intermediate crown.

By these means, a self-opening pocket umbrella of optimum user-friendliness having a scissor-operable folding mechanism is provided. The double lever triangular linkages between the two inner "power" arms of the scissor
10 levers, the lifting mechanism of the upper lever triangular linkage in conjunction with the opener spring engaging on the main crown above the intermediate strut, and the displacing mechanism of the lower lever triangular linkage below the intermediate strut allows a particularly
15 balanced, power-saving spreading out and collapsing of the canopy linkage. The manual pulling forces to be applied according to this design, when closing the umbrella by means of the slider, are considerably reduced compared to the known self-opening pocket umbrellas having scissor
20 lever folding kinematics, because the opener force can be equal to the spring force according to this design. Additionally, the opener spring need no longer rub on the stick so that the latter is saved from unsightly scratches and abrasion marks. Since the opener spring also no longer
25 necessarily winds around the stick, it also no longer enlarges its cross-section or it also no longer requires installation space between the stick and the canopy linkage with the result that the folded umbrella has a thinner, more pocket-sized cross-sectional structure.

30 The invention is explained in greater detail below by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a pocket umbrella according to the invention in two halves in longitudinal section, in closed
35 position according to the left sectional half and in opened position according to the right sectional position; and,

Figure 2 shows an enlargement of the upper partial region of the umbrella halves near to the crown according to Fig. 1.

The umbrella according to the invention is a self-opening pocket umbrella of the so-called topless design having scissor link kinematics and a canopy cover not directly supported in the region of the canopy near to the stick, but stretched in a suspended manner. Such umbrellas have the advantage that the opening and closing of the canopy, including the folding of the canopy cover, takes place in one movement. In the self-opening design, there is also opening at the push of a button. The umbrella has a telescopic stick 1 consisting of at least two parts having a handle 2 attached to the lower end and an intermediate crown C" fixed firmly at the top to the end 1a of the stick. Between the intermediate crown and the handle 2, a slider 3 is displaceable up and down on the telescopic stick 1. The collapsible canopy linkage consists of several folding systems S grouped radially around the telescopic stick 1, of which systems only one to the left and one to the right of the telescopic stick 1 is illustrated in each case for reasons of clarity. Each folding system has in each case a pair of scissor links on the stick side having a two-arm upper scissor lever 4 and a two-arm lower scissor lever 5 and a cross-joint 6 connecting these two levers. The upper scissor lever 4 is connected in a swivelling manner by its "power" arm K' via a joint 7 to the umbrella crown C', while the lower scissor lever 5 engages on the slider 3 with its "power" arm K" via a joint 8.

The scissor lever 4 is connected in a swivelling manner to a control rod 10 by an angled "load" arm L' via a joint 9, while the lower scissor lever 5 engages on an outer canopy rod 12 with its "load" arm L" via a joint 11. The control rod 10 is linked to the outer canopy rod 12 from a joint 13. The two load arms L' and L" of the scissor levers 4 and 5, the control rod 10 and the short

lever arm 12a of the outer canopy rod 12 form a parallelogram linkage P which is operable from the scissors 4, 5, 6 and which, in turn, operates the outer canopy rod 12.

5 Arranged between the two power arms K' and K" of the scissor levers 4 and 5 is an intermediate strut 14 which is linked at one end to an intermediate crown C" via a joint 15 and is mounted in a pivotal manner at the other end on the cross-joint 6 of the scissor levers 4, 5, or
10 adjacent to the cross-joint on one of the two levers. In this manner, the two arms K' and K" in conjunction with the intermediate strut 14, and the linking of these parts at the stick axis X, form double triangular linkages D' and D". In this case, the intermediate strut 14 forms a
15 common central longitudinal side of this double linkage. Since, as a result of the rigid attachment of the intermediate crown C", the intermediate strut 14 is mounted non-displaceably on the intermediate crown, only the two scissor links 4 and 5 are displaced upwards and
20 downwards on both sides of the intermediate crown C" when the canopy is opened and closed. In this case, the umbrella crown C' with the upper scissor levers 4 linked to it carries out a lifting movement on the stick axis X in relation to the end 1a of the stick or to the
25 intermediate crown C", since this crown C' is supported flexibly and freely suspended in relation to the telescopic stick 1 and the intermediate crown C" by the opening spring F serving for automatic canopy opening. Accordingly, the power arm K' of the upper scissor lever
30 4, being spring-supported, and the arm K" of the lower scissor lever 5 each oscillate to one side of the non-displaceable intermediate strut 14 so that the latter also forms a horizontal beam between the two linkages D' and D". Owing to this formation, in particular in a right-
35 angled or virtually right-angled alignment of the intermediate strut 14 relatively to the stick axis X, a particularly advantageous balance results in the lever

proportions in such a way that the opener force is equal to the spring force. By this means, the pulling forces are also correspondingly minimized so that the umbrella can be pulled closed smoothly by means of the slider 3 against the spring force and, additionally, the canopy linkage can assume the maximum stretched opening position shown with the linkage lying close together in the central region. Owing to the maximum stretching, an optimally large canopy parabola results, that is to say an optimum canopy usage surface.

In addition to the balance of the lever forces, the opener and spring force and the minimization of the pulling forces, there is also the further advantage that, as a result of its suspension arrangement at the umbrella tip, the opening spring F no longer requires any accommodation space on the umbrella stick 1. Abrasion marks and scratches on the latter are therefore likewise avoided and, additionally, the umbrella can then also still be folded to form a slimmer, more pocket-sized, small-volume structure.

In its stressed state, the opening spring F is preferably sunk into the telescopic stick 1 in its full length so that the umbrella crown C' can rest on the end 1a of the stick or on the intermediate crown C" against the spring force when the canopy is closed in order in this way to achieve a substantial shortening of the closed umbrella. An even more substantial shortening can be achieved if the umbrella crown C' is inverted with a cup-shaped linking ring 7a and the joints 7 seated on the latter over the intermediate crown C" and the joints 15 when the umbrella is shortened so that the joints 7 and 15 do not come to rest one over the other but adjacently whilst utilizing the corresponding shortening length.

According to this design, the canopy linkage also receives an optimally narrow, slim folding possibility. Firstly, the intermediate struts 14 rest closely on the telescopic stick 1. On them lie the upper scissor levers 4

and the load arms L" of the lower scissor levers 5 fold into their outwardly facing hollow profiles. Directly on them lie the control rods 10, which, in turn, receive the outer canopy rods 12 in a hollow profile. However, the control rods 10 can also be folded in with an inwardly facing hollow profile in a meshing manner over the arms L" and can be immersed together with the latter into the hollow profiles of the scissor levers 4, the outer canopy rods 12 then resting closely on this meshed formation.

The opening spring F can be tensioned between a stopper 16 seated in the telescopic stick 1 and the umbrella crown C', it being possible for the stopper 16 to serve simultaneously as a support stop of a spring 17 automatically pushing out the telescopic stick 1 when the umbrella is opened. To avoid corrosion, the opening spring F can be encapsulated by means of a slide sleeve 18 which is sunk with the opening spring F in the end 1a of the stick and is guided displaceably therein. In this case, the slide sleeve 18 with an insertion opening 18a at the end can form a detachable anchorage for the catch 19a of a top cap 19 fastening the canopy cover d centrally. Besides this, the canopy cover d is also tacked onto the peripheral ends 20 of the outer canopy rods 12 and fixed by means of threads 21 to the upper scissor levers 4. In this manner, the canopy cover d is also folded in in one movement when the canopy is closed. The automatic opening of the canopy by the opening spring F and, if appropriate, the automatic stick telescoping can take place by pressing the triggering button 22 situated on the grip 2 in conjunction with a suitable mechanism. An elastic ring e seated on the telescopic stick 1 below the intermediate crown C" damps the stop of the slider 3 at the end of the canopy opening movement.

Claims

1. A self-opening topless umbrella frame having a telescopic stick and a collapsible canopy framework extending radially from the stick in the form of scissor-link folding systems which can be spread by means of an opening spring and collapsed manually by a slider which is displaceable along the stick, each scissor-link folding system having a pair of scissor levers, of which an upper one of the scissor levers is pivotally linked to a main crown, while the lower one of the scissor levers is pivotally connected to the slider the radially inner arms of the respective scissor levers together with an intermediate strut located between them, forming two triangular linkages, the intermediate strut engaging at its radially inner end an intermediate crown, which is fixed non-displaceably to the upper end of the stick, and engaging at its radially outer end on or adjacent to a scissor lever cross-joint and wherein the main crown with its joint to the upper scissor lever can move freely away from the intermediate crown when the canopy framework is opened under the effect of the opening spring which acts between the main crown and the stick.
2. A frame according to claim 1, wherein, in the opened position of the umbrella canopy framework, the intermediate strut extends substantially at right angles to the stick axis with simultaneous formation of a right-angled triangular formation of the two triangular linkages.
3. A frame according to claim 1 or claim 2, wherein, in the stressed state, the opening spring is substantially completely sunk in the stick and the main crown rests on the end of the stick or on the intermediate crown.



4. A frame according to claim 1 or claim 2, wherein the opening spring is encapsulated in a slide sleeve guided on the end of the stick.
- 5 5. A frame according to claim 1, wherein the main crown with a ring linking the upper scissor levers is formed in the manner of an inverted cup over the upper end of the stick or the intermediate crown.
- 10 6. A self-opening topless pocket umbrella frame substantially as described with reference to the accompanying drawings.
- 15 7. An umbrella incorporating a frame according to any one of the preceding claims, and a cover supported by the canopy framework.
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