

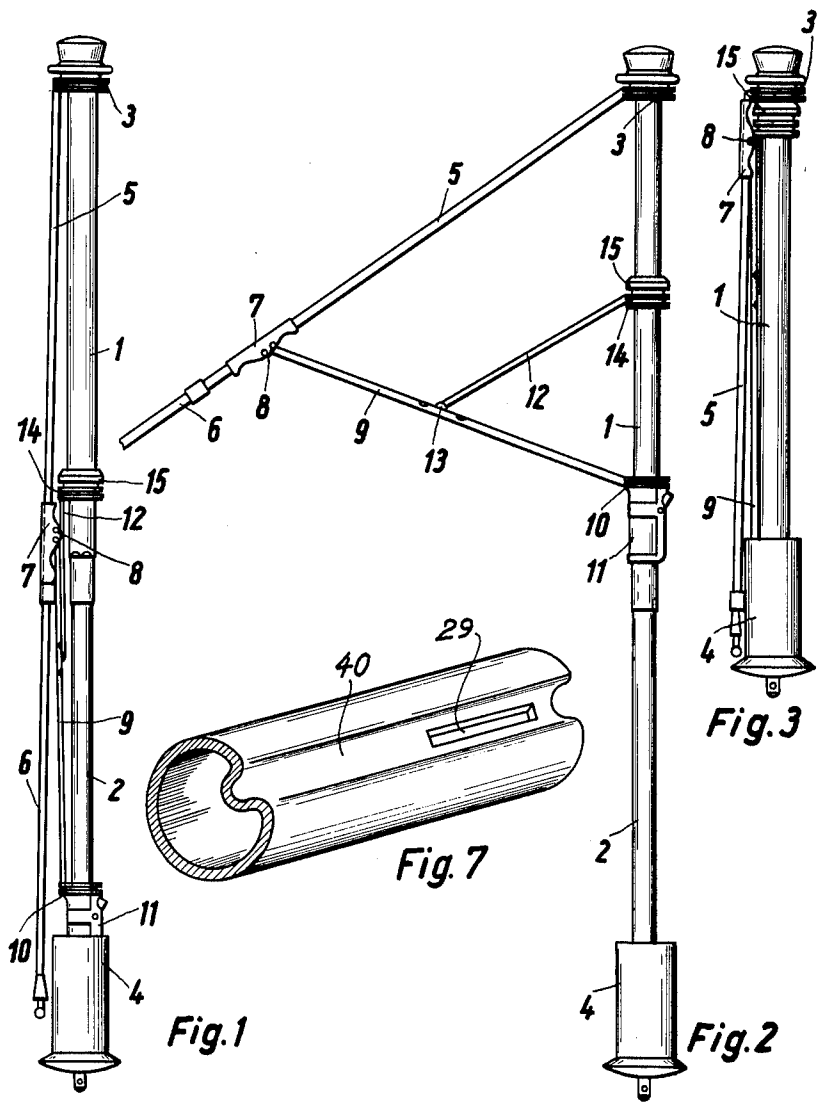
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COLLAPSIBLE UMBRELLA

3,234,954

Filed Dec. 17, 1963

2 Sheets-Sheet 1



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Heinz Weber

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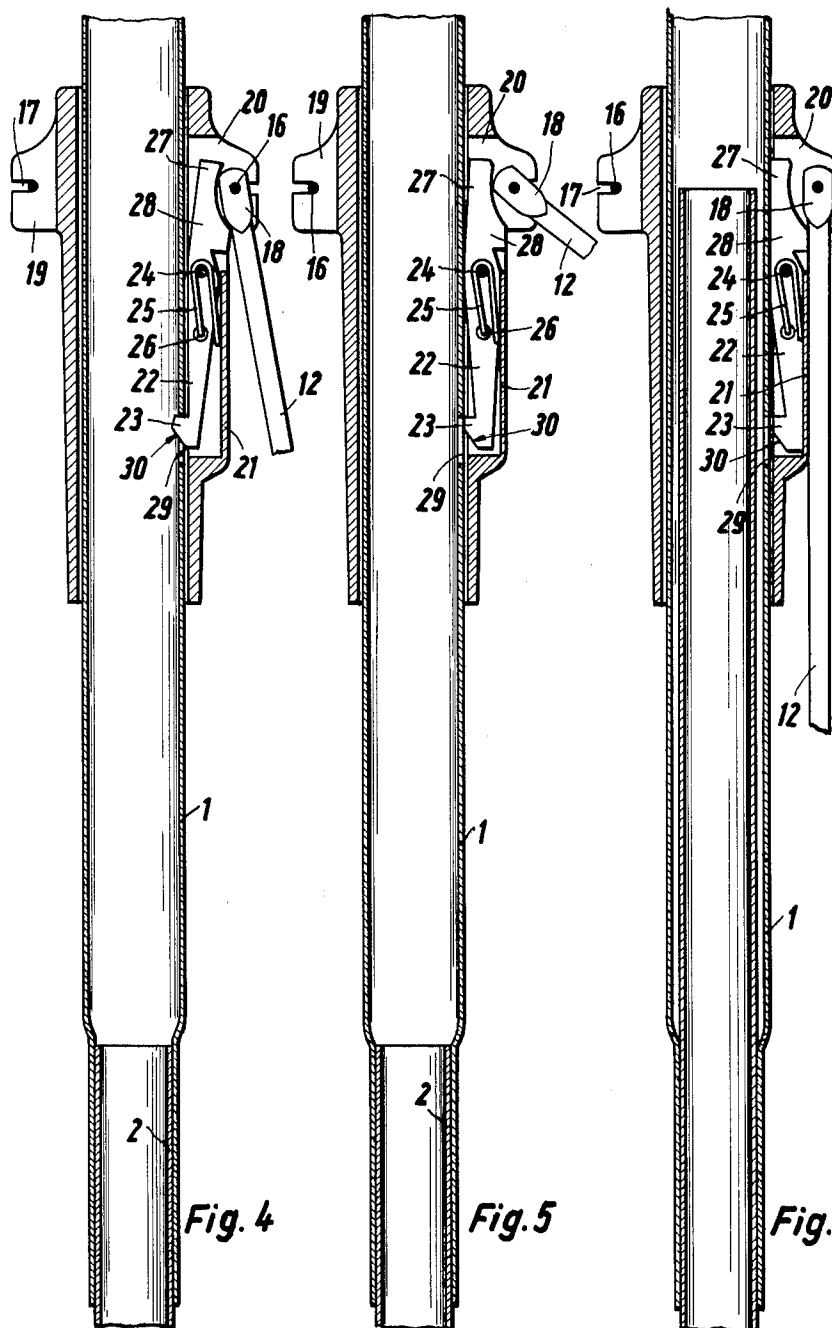
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## COLLAPSIBLE UMBRELLA

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3 Claims. (Cl. 135—26)

My invention relates to a collapsible umbrella whose frame can be shortened by telescoping so that, when the umbrella, when completely collapsed, is small enough to be carried in a brief bag or a lady's pocketbook, for example.

More specifically, my invention relates to a collapsible umbrella frame composed of a stick which is formed of telescoping portions, a main runner or slider displaceable along the stick and latchable thereto in frame-unfolding position, telescoping ribs each having a radially inner member linked to the stick and an outer member which is linked by a main strut to the main runner, and an auxiliary runner which is slidable along the stick and is linked to the main struts by means of auxiliary struts. Such umbrella frames are described, for example, in U.S. Patents 2,165,967 and 3,003,510.

This type of umbrella, although generally satisfactory, may occasionally cause trouble because the rib members, instead of turning outwardly away from the stick in order to open the umbrella, sometimes telescope into each other so that the umbrella cannot open at the first try. To remedy such trouble, a spring-biased pawl has been pivoted to the auxiliary runner for catching, during opening of the umbrella, into a recess in the stick wall, thus temporarily stopping the auxiliary runner, the pawl being thereafter lifted out of the recess by the turning movement of the auxiliary braces away from the stick during further opening of the umbrella. The pawl, therefore, is active only in the particular interval of the umbrella opening movements in which the pawl action is needed to prevent undesired telescoping of the ribs.

In the known umbrella frame according to Patent 3,003,510, the withdrawal of the pawl from the catch recess is brought about by coupling the pawl with a pair of auxiliary struts through a spring bracket. Such a bracket complicates the frame structure and involves the danger that portions of the roof material may be caught by the bracket and become damaged when the umbrella roof is being unfolded.

It is an object of my invention to avoid such shortcomings and to not only afford a simplification in design but also eliminate the danger of damaging the web material of the umbrella roof.

Furthermore, some hindrance may be encountered when the known umbrella is being telescoped to shorter length. This is because, during such telescoping, the latch pawl will then also tend to enter into the catch recess. Although during shortening movement the catch recess is covered by the inner tubular stick portion so that the pawl cannot entirely drop into the recess, the pawl still encounters the edge of the recess in the wall of the outer stick portion and thus may impede the shortening movement by a force disagreeably felt by the person handling the umbrella.

It is, therefore, another object of my invention to avoid

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the occurrence of such impeding forces between latch and catch recess when shortening the umbrella by telescoping.

According to a feature of my invention, a coupling of the latch pawl with two auxiliary struts by a spring bracket is eliminated and, in lieu thereof, a control cam or dog is provided either on the pawl or a coacting auxiliary strut, and the resulting cam engagement is used for constrainedly lifting the pawl out of the recess by the pivotal movement of the auxiliary strut away from the stick, the pawl being normally biased by a spring in the direction toward engagement with the catch recess, and the strut acting against the force of the spring when moving the pawl out of the recess. As a result, no separate coupling member between the auxiliary strut and the pawl is needed, the pawl can be made very small, and the frame structure does not possess any structural element that can catch or tear the web material of the umbrella roof.

According to another feature of my invention, another control cam or dog is provided on the pawl or the coacting auxiliary strut for lifting the pawl out of the catch recess when the auxiliary strut is being moved to a position substantially parallel to the stick axis. Since such a parallel position obtains whenever the folded umbrella is being telescoped to shortened length, the shortening is always kept free of any hindrance by undesired engagement of the pawl with the catch recess.

The above-mentioned and more specific objects, advantages and features of my invention, said features being set forth with particularity in the claims annexed hereto, will be apparent from, and will be described in, the following with reference to a preferred embodiment of an umbrella frame according to the invention illustrated by way of example on the accompanying drawings in which:

FIG. 1 is a front view of part of a collapsible umbrella according to the invention in extended but unfolded condition.

FIG. 2 shows the same frame during unfolding.

FIG. 3 shows the same frame in collapsed condition.

FIG. 4 is a longitudinal section through the stick and auxiliary runner of the umbrella at a stage where the unfolding of the umbrella roof may commence.

FIG. 5 is a longitudinal sectional view corresponding to FIG. 4 but showing a subsequent stage of unfolding operation.

FIG. 6 is a longitudinal section corresponding to FIGS. 4 and 5 but relating to a condition during telescoping of the stick; and

FIG. 7 is a perspective view of part of the upper stick portion.

The umbrella frame illustrated in FIGS. 1 to 3 comprises a stick composed of two telescoping tubular portions 1 and 2. Stick portion 1 carries a crown 3 at its top, and portion 2 carries a handle 4 at its lower end. The means for mutually latching the two stick portions in the extended position shown in FIGS. 1 and 2, being generally known and conventional, are not illustrated.

The ribs linked to the crown 3 are likewise composed of two telescoping members, namely a hollow tubular inner member 5 and an outer member 6, the latter consisting usually of a massive rod. A sleeve 7 is displaceable on the hollow rib member 5 near the outer end thereof and is joined by a linking pin 8 with the upper end of the massive outer rib member 6. The pin 8 also serves for articulately joining the outer rib member 6 with a main strut 9. All main struts are pivotally joined at 10

with a sleeve-shaped main runner 11 which surrounds the stick and is displaceable along the stick. When the umbrella is folded, as shown in FIG. 1, the main runner 4 is located near the handle 4. When the umbrella roof is fully unfolded the main runner 10 is latchable on stick portion 1 near the crown 3, the latching means being conventional and not illustrated. Connected with each main strut 9 by a link pin 13 is an auxiliary strut 12. All auxiliary struts 12 are pivoted at 14 to an auxiliary runner 15 which forms a sleeve about the stick and is longitudinally displaceable.

For unfolding an umbrella of this type, the main runner 11 is released from its lowermost position shown in FIG. 1, and the handle 4 is manually moved upwardly toward the crown 3. As mentioned, it may happen in the known umbrellas that the roof will not open because the rib members 5 and 6 become telescoped together under the pushing force exerted by the main struts 9 through the sleeves 7 upon the rib members 6. In an umbrella according to the invention, however, such trouble is prevented by the means described presently.

As shown in FIGS. 4 to 6, the pivoting of all auxiliary struts 12 to the auxiliary runner 15 is effected by means of a ring-shaped wire 16 tied into a ring-shaped groove 17 of the auxiliary runner 15. The heads 18 of the individual auxiliary runners are in engagement with respective radially extending recesses 19 of the runner 15.

The wall of the auxiliary runner 15 is provided with a radial slot 20 which is elongated in the axial direction and partially covered at 21 toward the outside. Mounted in the slot 20 is a latch pawl 22 with a latch nose 23. The pawl is rotatable about a pivot pin 24 and is biased by a two-legged wire spring 25 which extends about the pivot pin 24 and has one leg abutting against the cover wall 21. The other leg engages a hole 26 in pawl 22. The spring 25 tends to turn the pawl 22 clockwise about the pin 24.

One of the auxiliary struts 12 is substantially located in the same vertical plane as the stick axis and the pawl 22. The head 18 of the auxiliary strut and the pawl 22 form interengageable cam means which, in the illustrated embodiment, consist essentially of a dog member integral with the auxiliary strut near the pivot thereof, and two cam contours 27 and 28 formed by an extension of the pawl. The wall of the tubular stick portion 1 is provided with a recess 29 in form of an axially elongated slot which is likewise located in the above-mentioned plane and engageable by the latch nose 23 of lever 22. By engagement of the dog member formed by the head 18 of auxiliary strut 12 either with the cam portion 27 according to FIG. 5 or with the cam portion 28 according to FIG. 6, the pawl 22 can be lifted out of the catch recess 29 in opposition to the force of spring 25, or can be prevented from dropping into the catch recess, respectively. When the umbrella frame is folded according to FIG. 1, the nose 23 is downwardly spaced from the catch recess 29 and its distance from the handle 4 is then shorter than the distance of the handle from the recess 29.

When the umbrella is to be unfolded and in the event the web portions 5 and 6, instead of turning away from the stick, have the tendency to telescope into each other, the nose 23 glides upwardly along the outside of the stick wall until it catches into the recess 29. This temporarily interrupts the upward travel of the auxiliary runner 15, and the auxiliary struts 12 are now also prevented from further upward travel. As a result, the ribs are constrainedly pressed to move outwardly due to the force transmitted thereto through the main struts 9 from the handle 4. Simultaneously, the auxiliary struts are turned outwardly about the now temporarily fixed pivot at 16, and the auxiliary strut 12 shown in FIGS. 4 to 6 presses at its head 18 radially against the cam portion 27 of the pawl 22, thus forcing the pawl out of the latching position. The nose 23 now leaves the recess 29 according to FIG. 5, and the auxiliary runner can continue its up-

ward travel toward the crown until the roof is completely unfolded.

When the umbrella is being folded together and the auxiliary strut 12 again passes downwardly back to the position according to FIG. 4, the pawl 22, on its downward travel, passes by the recess 29, and the nose 23 glides at its inclined cam edge 30 over the lower end of the recess so that the auxiliary runner 15 is not retained.

When the umbrella is being telescoped from the extended condition of FIG. 1 to the shortened condition of FIG. 3, the nose 23 travels from below toward the catch recess 29 in a manner similar to the travel occurring during umbrella unfolding operation. Now, however, the nose 23 cannot fully drop into the catch recess because the lower stick portion 2 participates in the travel of the auxiliary runner 15 and covers the recess 29 according to FIG. 6 before this recess is reached by the nose 23. Nevertheless, some hindrance could be encountered, particularly if the inner diameter of the stick portion 1 appreciably departs from the outer diameter of the stick portion 2, this being shown in FIG. 6. Such hindrance is eliminated by virtue of the fact that the auxiliary strut 12, as it is being placed fully or nearly parallel to the stick axis during shortening of the umbrella, causes its head 18 to act upon the cam portion 28 of pawl 22 and thereby forces the pawl in opposition to the force of spring 25 to a position in which the pawl nose cannot drop into the recess 29.

To minimize weakening of the stick wall, the recess 29 as is preferably made as narrow as feasible in the tangential direction. For nevertheless securing a reliable engagement of nose 23 with the narrow recess, it is advisable to provide for suitable guidance. This may be done by giving the stick portion 1 a longitudinal groove in whose bottom the elongated catch recess 29 is located and in which the nose 23 glides along the stick and into the recess. Such a groove is shown at 40 in FIG. 7. For the same purpose, the tubular stick portion 1 may be given a polygonal, for example hexagonal, cross section, so that the nose 23 glides along one of the lateral faces of the prismatic stick. In the latter case, a guiding groove, as a rule, is not necessary.

To those skilled in the art, it will be obvious upon a study of this disclosure that umbrella frames according to my invention may be modified in various other respects and hence can be given embodiments different from those particularly illustrated and described herein, without departing from the essential features of my invention and within the scope of the claims annexed hereto.

I claim:

1. A collapsible umbrella frame, comprising a stick formed of telescoping portions, a main runner displaceable along said stick between frame-folding and unfolding positions, telescoping ribs each having a radially inner member linked to said stick and an outer member, main struts linking said respective outer rib members to said main runner, an auxiliary runner glidable on said stick along a given path during unfolding of the frame caused by displacement of said main runner, auxiliary struts linking said respective main struts to said auxiliary runner and being pivotally movable relative to said auxiliary runner due to movement of said main struts to frame-folding and unfolding positions, said stick having a catch recess in said path, a pawl pivotally mounted on said auxiliary runner, a biasing spring engaging said pawl on said auxiliary runner and having a biasing force directed toward said recess whereby said pawl engages into said recess to temporarily retain said auxiliary runner at the beginning of the unfolding movement of said main runner, and mutually engageable cam means on said pawl and one of said auxiliary struts respectively for constrainedly moving said pawl out of said recess in opposition to the force of said spring by outward pivotal travel of said auxiliary strut.

2. In a collapsible umbrella frame according to claim 1, said cam means comprising a dog member integral with

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said auxiliary strut near the pivot thereof so as to rotate about said pivot as said strut performs said outward pivotal travel, and a cam contour on said pawl kept in follower engagement with said dog member by the force of said spring.

3. In a collapsible umbrella frame according to claim 2, said pawl having another cam contour engageable with said auxiliary strut when the latter lies parallel to the stick axis, for then lifting said pawl out of said recess.

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