

PATENT SPECIFICATION

(11) 1 296 634

1 296 634

DRAWINGS ATTACHED

- (21) Application No. 32397/71 (22) Filed 9 July 1971
- (31) Convention Application No. P 20 36 255.4
- (32) Filed 22 July 1970
- (31) Convention Application No. P 20 36 701.5
- (32) Filed 24 July 1970
- (31) Convention Application No. P 21 29 559.0
- (32) Filed 15 June 1971 in
- (33) Germany (DT)
- (45) Complete Specification published 15 Nov. 1972
- (51) International Classification A45B 19/04//25/06 25/10
- (52) Index at acceptance

A4P 10 11A 11B 11C 12A 12B 12C 12F 15 5B 6A 7A2 9



(54) SHORTENABLE UMBRELLA FRAME

(71) We, BREMSHEY A.G., a German company of Ahrstrasse 5—7, 565 Solingen Ohligs, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a shortenable umbrella frame, particularly but not exclusively a flat umbrella, that is to say an umbrella which has a substantially rectangular cross section transverse to the stick axis when closed, with a stick, a crown and a handle which has a recess into which, when the umbrella is closed and shortened, enters a guide sleeve of a slider which slides on the stick.

The purpose of introducing the guide sleeve of the slider into a recess in the handle is to produce the shortest possible arrangement, that is to say the most compact arrangement possible, when the umbrella frame is shortened and closed. In a known shortenable umbrella frame of this kind the outer telescopic stick tube is arranged almost entirely to form the umbrella handle. The outer stick tube forms a guide bush for a guide piece which is secured to the lower end of the telescopic inner stick tube. The outer tube terminates at the handle end in a plate which contains an annular chamber for accommodating the rib ends. The guide piece has snap catch balls which engage, when the umbrella frame is fully extended, in catch recesses in the interior of the outer tube. A mechanical stop which limits the extension of the stick of the umbrella frame forms a projection on the upper end of the inner tube. The two pieces of tube have circular cross section. To prevent them from rotating relative to each other the telescopic outer tube has diametrically opposite guide

ribs which engage in corresponding recesses in the guide piece of the telescopic inner part. However this arrangement is comparatively costly and is not entirely reliable. A further disadvantage is that due to the interposition of the guide piece, which is constructed like a piston ring, the outer tube of the umbrella stick has the width of an ordinary umbrella handle. This is a disadvantage in umbrellas which are intended to be as compact as possible when shortened and closed, particularly in regard to cross-section, that is to say flat umbrellas.

The object of the present invention is to provide an umbrella constructed in such a way that when the umbrella is fully extended it has a length which is greater than what corresponds to the individual telescopic stick parts, but which is capable of having a cross-section of very compact dimensions, as desired in flat umbrellas.

In accordance with the present invention, a shortenable umbrella frame comprises a stick having a number of telescopic parts, a crown at one end and a handle at the other end, the handle having a recess which, when the umbrella is closed and shortened, receives a guide sleeve of a slider that slides on the stick, the recess containing a stick support plate which is fixed to the lower end of the stick and which can slide up and down in the recess and which is guided in its sliding movement by a guide pin which projects upwards from the bottom of the handle, coaxially with the stick towards the upper end of the handle, the stick support plate being retained, at its upper limiting position, when the umbrella frame is fully extended, or at both its upper and lower limiting positions by a catch, and the support plate having an upwardly extending bush which, when the umbrella is closed and

shortened, penetrates into the guide sleeve of the slider.

Advantageously the guide pin extends upwards to above the upper limiting position of the stick support plate, the upper end of the guide pin penetrating into the interior of the lower part of the umbrella stick.

The stick support plate may have around its periphery, preferably housed in a generally annular groove, a resilient wire ring which cooperates with catch projections projecting inwards from the wall of the handle recess, to give a snap catch action for retaining the stick support plate in its upper and lower limiting positions.

Alternatively a snap catch may be interposed between the guide pin and the stick support plate, the snap catch taking the form of a ball which is spring loaded radially relative to the stick axis and which retains the stick support plate in its uppermost position.

The hollow bush of the stick support plate may have an elongate slot which cooperates with a hook of a locking catch of the sleeve of the slider and ensures that the slider is securely locked in position when the umbrella is collapsed.

By this construction an umbrella is obtained which has the shortest possible length when completely shortened and folded up, the umbrella nevertheless extending to give a fully extended length which is greater than what corresponds to the individual telescopic stick parts. The extra length is obtained by utilising the height of the handle. The construction is surprisingly rigid when the umbrella is extended. The central guide pin penetrates a certain distance into the lower part of the umbrella stick, which is hollow at least at its lower end, nearer to the umbrella handle. The stick is guided reliably in its movement by the guide pin projecting upwards in the handle. Preferably the umbrella stick is further stabilised by the stick support plate which also serves for locking the lower part of the stick in its upper, or upper and lower limiting positions. The stick support plate also has an upwardly extending bush, formed for example integrally with the stick support plate. The hollow bush does not increase the length of the fully folded umbrella because the hollow bush, projecting upwards from the stick support plate, penetrates into the guide sleeve of the slider. The stick support plate is retained, at least in its upper limiting position, by a snap catch. This ensures that when the umbrella frame is fully extended the parts of the entire stick system, including the stick support plate, are retained reliably in their fully extended positions. The stick support plate is preferably also retained in its lowest limiting position by a snap action catch. The construction of the snap action catch, using a catch spring, is simple and reliable. The same spring loaded catch mechanism can be used

for retaining the stick support plate in both its upper and its lower limiting positions. The snap action catch can if desired take the form, particularly if the umbrella handle is large, of a catch mechanism acting between the stick support plate and the guide pin. When the umbrella is being extended by the operator, in the first movement the handle is pulled away from the slider. This exposes the slider guide sleeve, giving access to a locking catch in the slider sleeve. When the umbrella is being shortened and folded the locking catch in the slider sleeve first engages in the elongate slot in the hollow bush of the stick support plate.

In one example stick support plate catch projections projecting inwards from the inner wall of the handle recess cooperate directly with the peripheral edge of the stick support plate, the catch projections acting by virtue of the elastic resiliency of the walls of the handle. Preferably the peripheral edge of the stick support plate then has a chamfered surface.

Further advantages are obtained if mechanical stops limiting the upward movement of the stick support plate are in the form of projections projecting inwards from the walls of the recess in the umbrella handle, the catch projections being situated between these projections when seen in plan view.

The umbrella can with advantage be arranged in such a way that the guide pin for guiding the stick support plate is enclosed in a guide tube which slides in contact with the inner wall of the lower part of the umbrella stick, the guide tube extending over almost the entire length of the guide pin.

These arrangements provide a particularly accurate, central guiding for the umbrella stick in its sliding movement in and out of the umbrella handle, to give the umbrella a greater extended length, the stick support plate being retained by simple means in its two limiting positions. In one form the snap action catch operates by virtue of an elastic resiliency of the handle walls from which catch noses project inwards. The catch noses cooperate directly with the peripheral edge of the stick support plate, which can also be made of an elastically resilient material. The peripheral edge of the stick support plate can have chamfered surfaces to facilitate the resilient movements of the catch noses, reducing the shearing stresses and increasing the life of the catch parts. The upper limiting stops, for limiting the upward movement of the stick support plate, are also projections projecting inwards from the wall of the handle. These projections can be formed integrally with the walls of the handle. When the stick support plate is in its upper limiting position its rim is securely locked in place between the projections and the catch noses previously mentioned. When the operator wishes to

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retract the lower end of the umbrella stick and the slider sleeve into the interior of the handle, he thrusts the slider towards the handle with sufficient force to cause the peripheral edge of the stick support plate to override the catch noses. The stick support plate can be retained in its lowest position in various ways, for example by means of appropriately contrived friction between the edge of the stick support plate and the inner wall of the handle. Alternatively catch noses can be provided, similar to those described above, projecting inwards from the wall of the recess in the handle. The lower and upper noses are situated between the projections when seen in plan view and project inwards from the walls of the recess in the handle. The guide pin has a highly abrasion resistant surface providing an accurate central guiding for the stick support plate and favouring the reliable functioning of the snap catches, the snap action deriving from the elastic resiliency of the material of the umbrella handle, the precise central guiding of the stick support plate preventing the latter from tilting relative to the guide pin. To ensure a particularly abrasion resistant guiding of the stick support plate, the guide pin projecting upwards from the handle bottom may be enclosed in a metal tube, whose outer surface slides in contact with the inner surface of the lower part of the umbrella stick.

In an umbrella with a handle of substantially rectangular cross-section it is desirable to ensure that U-sectioned ribs and/or struts of the umbrella are pivoted securely to an umbrella crown and/or sliders which are themselves shaped to agree with the shape of the handle. This is obtained if each rib or strut is pivoted respectively to the crown or associated slider by means of a respective pair of slots in the said crown or slider, the two slots of each such pair being joined together by a respective connecting slot traverse to the stick axis and situated above a plane containing a pivot axle which pivotally fixes the rib or strut concerned to the crown or associated slider, the connecting slot accommodating the inner end of the central joining piece of the U-sectioned rib or strut concerned, which joining piece extends inwards over the pivot axle.

Preferably the transverse connecting slots are open towards a peripheral groove which accommodates a wire pivot axle of the known kind.

There is thus obtained a simple, compact and yet stable arrangement for pivoting the ribs and/or the struts. At each pivoting location there are two individual slots in which work the side webs of the U-sectioned ribs and/or struts, giving a good guiding effect. It should be observed that very little space is available at the pivot locations and the inner ends of the ribs and/or struts penetrate only

a little way. The wide pivot bearings provided by the U-shaped arrangement prevent the parts from tilting. The arrangement makes it unnecessary to flatten the inner ends of the ribs and it is unnecessary to use a filler piece. Each pivot axle, which preferably consists of part of a conventional axle wire, takes comparatively little load. It should be observed that the middle web of each U-sectioned rib and/or strut extends inwards almost as far as the inner end of the rib and/or strut. The transverse connecting slot connecting together the two individual slots at each pivot location allows the middle web to extend inwards to a location above the pivot axle.

Some examples of umbrella frames constructed in accordance with the invention are illustrated in the accompanying drawings, in which:—

Figure 1 is a longitudinal section through the handle of one frame, showing also the lower end of the stick and the slider, which is shown partly sectioned;

Figure 2 is a cross section taken on the line II—II in Figure 1;

Figure 3 is a different version of the catch which retains the stick support plate in its upper and lower positions;

Figure 4 is a largely diagrammatic side view of a frame in the fully extended position, the frame being for use with any of the handles illustrated in these drawings;

Figure 5 is a side view of a different version of the umbrella handle;

Figure 6 is a corresponding plan view;

Figure 7 is a longitudinal section taken on the line VII—VII in Figure 5;

Figure 8 is a vertical section taken on the line VIII—VIII in Figure 6 and drawn to a larger scale;

Figure 9 is a perspective view of part of a fully extended frame system, as seen from underneath;

Figure 10 is a partly sectioned side view of a crown of the frame of Figure 9;

Figure 11 shows the umbrella crown of Figure 10 from underneath;

Figure 12 shows a detail of the edge of the umbrella crown of Figures 10 and 11, drawn to a larger scale;

Figure 13 is a partly sectioned side view of an auxiliary slider such as that shown in Figures 4 and 9; and,

Figure 14 shows the auxiliary slider of Figure 13 as seen from underneath.

Any of the handles illustrated in these drawings may be used on the frame shown in Figures 4 and 9 to 14.

The illustrated flat umbrellas each have a stick 1, which is telescopic and consists of a plurality of parts, and a handle 2 connected to the lower end of the lower and inner telescopic stick part 1'.

The telescopic inner stick part 1', which is tubular at least at its lower end, is sup-

ported at its lower end in a stick support plate 45, which is arranged so that it can slide up and down in a substantially parallel-sided internal recess 46 in the umbrella handle 2, the stick support plate having a cross section which corresponds with the internal cross section of the recess 46 transverse to the stick axis. In its sliding movement the stick support plate 45 is guided on a guide pin 47 which projects upwards from the bottom 2' of the handle. The guide pin 47 is formed integrally with the bottom 2'.

Projecting upwards from the stick support plate 45 there is a hollow bush 48 containing the lower end of the stick part 1'. The bush 48 and the stick part 1' are firmly bonded together, for example by injection moulding the bush around the stick part.

When the umbrella is in the closed state the hollow bush 48 is accommodated in a hollow interior 49 of a guide sleeve 41' of a main slider 41. The sleeve 41' of the main slider is equipped with a locking catch 50 actuated by an actuating button 51. The operative end of the locking catch 50 works in a longitudinal slot 52 in the hollow bush 48.

When the stick support plate 45 is in its upper position it is retained by a snap catch. In the version shown in Figures 1 and 2 a generally annular groove 53 running around the rim of the stick support plate 45 contains a resilient wire ring 54 which has at least one outwardly curved part 54' which projects out beyond the peripheral edge 45' of the stick support plate 45. When the catch is engaged the outwardly curved ring part 54' is engaged over a catch projection 55 projecting inwards from the wall of the recess 46 in the umbrella handle. The catch projection 55 is contained in a groove 46' and has sloping surfaces 56 and 57. When the stick support plate is in its lowest limiting position, represented by the chain lines in Figure 1, the curved ring part 54' is engaged under a lower catch projection 58, which has sloping surfaces 59 and 60. The resilient wire ring 54 is oval in shape and has enough room in the generally annular groove 53 to deform resiliently so that the curved ring part 54' engages by a snap action above the projection 55 or below the projection 58.

An alternative snap catch arrangement is represented in Figure 3. In this case the catch acts between the stick support plate 45 and the guide pin 47. The guide pin 47 contains a ball 61 urged radially outwards by a compression spring 62. When the catch is engaged, the stick support plate 45 being in its highest position, the ball 61 engages under the lower edge 63 of the central opening 64 in the stick support plate 45, or engages under the lower edge of the metal stick part 1'.

The two wider sides of the handle 2 extend upwards forming extension cheeks 67 between

which, when the umbrella is fully shortened, the two wings 68 and 69 of the main slider 41 are embraced, so that the two extension cheeks 67 between them form a recess containing the upper part of the main slider 41.

In the examples shown in Figures 4 to 8, the stick support plates 45 are guided somewhat differently in their sliding movement, and the snap catches are arranged differently. In the first two examples the same reference numbers are used for corresponding parts.

In the third example, Figures 5 to 8, the guide pin 47 projects upwards from a handle bottom 21, which is manufactured separately and subsequently joined to the main part of the umbrella handle. The bottom 2' is precisely positioned on the handle body by projections 71 which engage in recesses 72 in the handle body. The guide pin 47 is encased in a metal tube 74 extending over almost the entire length of the guide pin 47 to ensure precise guiding of the stick support plate 45. The metal tube 74 is fixed to the bottom 2' by means of a terminal flange 75 which is embedded in the material of the bottom 2'. Figure 8 shows the flange 75 embedded near the surface of the bottom 2', but if desired the flange 75 can be embedded deeper in the material of the bottom 2'. At the top end of the metal tube 74 the material of the guide pin 47 can if desired extend radially outwards over the upper annular surface 74' of the metal tube 74, securely anchoring the metal tube 74 on the guide pin 47. The outer surface of the metal tube 74 slides along in contact with the inner wall 1'' of the telescopic inner stick part 1'. It should be observed that the two metal tubes 74 and 1' can be manufactured accurately enough to give the umbrella stick wobble-free support.

The resulting precise, almost wobble-free guiding of the stick support plate 45 in the handle 2 allows the snap catch mechanism to be made from the material of the moving parts. The inner wall 2'' of the handle, near its upper end, has two catch projections 55 projecting inwards in opposite directions, at the same height in the recess 46 in the handle. The two inward projections 55 are formed integrally with the handle and have sloping surfaces 56 and 57, the surface 56 being steeper, relative to the inner surface 2'' of the handle body.

The two projections 55 cooperate directly with the edge 54' of the stick support plate 45. These parts of the handle wall are sufficiently resilient to allow the snap catch action. The lower edge of the stick support plate 45 has corresponding sloping surfaces 76, to facilitate the downward movement of the stick support plate towards the bottom of the handle. When the stick support plate 45 is in its highest, limiting position, its edges are locked in place between the catch projections 55 and upper mechanical stops which are arranged as fol-

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lows. As shown particularly in Figure 7, projecting inwards from the narrow side walls of the recess 46 in the handle there are corner projections 77, with sloping upper surfaces 77'. When the stick support plate 45 is being inserted into the handle during assembly of the umbrella the corners of the stick support plate 45 force the corner projections 77 outwards, the material of the handle being sufficiently resilient to allow this, the stick support plate 45 engaging with its upper edge under the corner projections 77.

Figure 8 indicates by chain lines the lower limiting position of the stick support plate 45. In this position the stick support plate can if desired be retained by further snap catch projections 58 which have sloping surfaces 59 and 60. Alternatively however if desired the stick support plate can be secured in its lowest position merely by frictional grip between the edge of the stick support plate and the inner surface 2'' of the handle, this arrangement also giving a largely wobble-free anchoring for the stick support plate.

If desired, depending on the construction of the umbrella handle, the catch projections 55, and if necessary also the catch projections 58, can project inwards from the wide sides of the handle 2, as indicated by chain lines in Figures 6 and 7. In any case the catch projections 55, 58 are situated between the corner projections 77 as seen in plan view.

Figures 4 and 9 to 14 show umbrella crowns and sliders suitable for use with a flat handle, showing in particular the arrangements for the pivoting of the umbrella ribs and struts. To obtain a particularly flat shape the umbrella crown 3 has two oppositely situated wings 4 and 5, as shown in Figure 9. Pivoted in the wings 4, 5 are the inner parts 6 of the umbrella ribs. Middle rib parts 7 slide along inside the inner rib parts 6. Sliding along inside the middle rib parts 7 there are terminal, outer rib parts 8 made of wire. Each outer rib part 8 is connected by means of a pivot pin in a canopy stitch buckle 9, to a rib brace 10, which is itself pivoted to an auxiliary strut 11. When the umbrella is in the extended state each auxiliary strut 11 is supported from underneath by a main strut 12. Each main strut 12 is connected to the corresponding rib brace 10 by a tension link 13 which, when the umbrella is being opened, pulls the rib brace into its extended position.

Each auxiliary strut 11 is pivoted at its inner end to an auxiliary slider 14. All the parts 6, 7 and 11 are U-shaped in cross section at least where they join the sliders or crown and in these particular examples the parts are U-shaped over their whole length. The mouths of the "U's" face downwards towards the umbrella handle, when the umbrella is open.

The main struts 12 are also U-shaped in cross section.

Each inner rib part 6 is pivoted to the umbrella crown 3 on a pivot which is arranged as follows. The pivot axle A is in the form of a wire which extends around the umbrella crown, passing through drillings L near the inner ends of the inner rib parts 6. Each inner rib part 6 pivots, at its inner end, in a pair of parallel slots in the umbrella crown. In Figure 11 these pairs of parallel slots are shown at 15, 16; 17, 18; 19, 20; 21, 22; 23, 24; and 25, 26.

The two side webs 27 and 28 of each inner rib part 6 work in the two parallel slots of the corresponding pair of slots, for example in the two parallel slots 15 and 16.

The middle web 29 of each inner rib part 6 extends inwards over the pivot axle A, the middle web extending inwards almost as far as the extreme inner end of the inner rib part 6.

The pivot axle wire A is housed in a peripheral groove 30 running around the umbrella crown, as shown in Figure 12, which also shows a pair of parallel slots 15, 16. Each pair of slots such as 15, 16 are joined together at their upper ends by a respective connecting slot 31 which accommodates the inner end of the middle web of the inner rib part. This gives the umbrella crown an unbroken upper surface, that is to say an upper surface which is not interrupted by slots. Each wing of the umbrella crown has a group of three pairs of slots, for example the wing 4 has the group of slots 15, 16 and 17, 18 and 19, 20. The other wing 5 of the crown 3 has the other group of three pairs of slots. In Figure 11 the straight line x—x is the middle axis of the crown 3, as seen in plan view. The middle axis x—x extends midway between the two slots 15 and 16, parallel to these two slots, and extends midway between the two slots 21 and 22, parallel to these two slots. Figure 11 also shows a middle line M—M extending midway between and parallel to the slots 19 and 20, and a further middle line M1—M1 extending midway between and parallel to the slots 17 and 18. These two middle lines intersect at the point 21 near the middle of the wing 4, intersecting preferably on the middle axis x—x of the crown 3.

In the other wing 5 of the crown the pairs of slots are arranged similarly, that is to say they have middle lines x—x and M—M and M1—M1 which intersect at the point Z2. The two intersecting points Z2 for the wing 5 and Z1 for the wing 4 being on the middle axis x—x of the umbrella crown.

The umbrella canopy B is secured to the upper surface of the umbrella crown by a cap piece 37 which has downwardly projecting dowels 35, 36 which engage in holes 33, 34, respectively situated approximately in the middle of the wings 4 and 5 respectively.

The auxiliary slider 14 has corresponding pairs of slots, for example the two parallel

slots 39, 40 (in Figure 14). The auxiliary slider 14 has a lower bush 42 (in Figure 9) which penetrates downwards through the interior of the main slider 41. The bush 42 has a longitudinal slot 43 which cooperates with a locking catch 44 on the umbrella stick 1. The locking catch 44 ensures that when the umbrella is open the auxiliary slider 14 is held at a certain distance away from the crown 3.

10 WHAT WE CLAIM IS:—

1. A shortenable umbrella comprising a stick having a number of telescopic parts, a crown at one end and a handle at the other end, the handle having a recess which, when the umbrella is closed and shortened, receives a guide sleeve of a slider that slides on the stick, the recess containing a stick support plate which is fixed to the lower end of the stick and which can slide up and down in the recess and which is guided in its sliding movement by a guide pin which projects upwards from the bottom of the handle, coaxially with the stick towards the upper end of the handle, the stick support plate being retained, at its upper limiting position, when the umbrella frame is fully extended, or at both its upper and lower limiting positions by a catch, and the support plate having an upwardly extending bush which, when the umbrella is closed and shortened, penetrates into the guide sleeve of the slider.

2. A frame according to claim 1, in which the guide pin extends upwards to above the upper limiting position of the stick support plate, the upper end of the guide pin penetrating into the interior of the lower part of the umbrella stick.

3. A frame according to claim 2, in which the bush is integral with the stick support plate and the lower part of the umbrella stick is secured in the hollow bush.

4. A frame according to claim 3, in which the outer face of the bush of the stick support plate has an elongate slot which co-operates with a hook of a locking catch of the guide sleeve of the slider to ensure that the slider is securely locked in position when the umbrella is collapsed.

5. A frame according to any one of the preceding claims, in which the stick support plate has around its periphery a resilient wire ring which cooperates with catch projections projecting inwards from the wall of the handle recess to give a snap catch action for retaining the stick support plate in its upper limiting position or in its upper and lower positions.

6. A frame according to any one of claims 1 to 4, in which a snap catch is interposed between the guide pin and the stick support plate, the snap catch taking the form of a

ball which is spring loaded radially, relative to the stick axis, and which retains the stick support plate in its uppermost position or in its upper and lower positions.

7. A frame according to claim 1, in which catch projections projecting inwards from an inner wall of the handle recess cooperate directly with a peripheral edge of the stick support plate to retain the stick support plate in its upper position or its upper and lower positions, the catch projections acting by virtue of a resiliency of the walls of the handle.

8. A frame according to claim 7, in which the stick support plate has a chamfered peripheral edge.

9. A frame according to claim 7 or claim 8, in which there are mechanical stops limiting the upward movement of the stick support plate, these stops being in the form of projections projecting inwards from the wall of the handle recess, the catch projections being situated between these projections when seen in plan view.

10. A frame according to any one of claims 7 to 9, in which the guide pin for guiding the stick support plate is enclosed in a guide tube which slides in contact with an inner wall of the lower part of the umbrella stick, the guide tube extending over almost the entire length of the guide pin.

11. A frame according to claim 1, with ribs which are U-shaped in cross section at least near the crown, the ribs being pivoted on axles in the crown, and the axles being contained in slots in the crown which are open towards the periphery of the crown, there being in the crown, for pivoting each rib, a respective pair of parallel slots in each of which works a respective side web of the rib, characterised in that the two slots of each pair are joined together above the corresponding axle part by a connecting slot which accommodates a middle web of the rib.

12. A frame according to claim 1, with struts which are U-shaped in cross section at least near the slider, the struts being pivoted on axles in the slider, and the axles being contained in slots in the slider which are open towards the periphery of the slider, there being in the slider, for pivoting each strut, a respective pair of parallel slots in each of which works a respective side web of the strut, characterised in that the two slots of each pair are joined together above the corresponding axle part by a connecting slot which accommodates a middle web of the strut.

13. A frame according to claim 11 or claim 12, in which respectively each connecting slot is open towards a peripheral groove in the crown or slider which groove accommodates an axle wire.

14. A frame according to claim 1, substantially as described with reference to any

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slots 39, 40 (in Figure 14). The auxiliary slider 14 has a lower bush 42 (in Figure 9) which penetrates downwards through the interior of the main slider 41. The bush 42 has a longitudinal slot 43 which cooperates with a locking catch 44 on the umbrella stick 1. The locking catch 44 ensures that when the umbrella is open the auxiliary slider 14 is held at a certain distance away from the crown 3.

10 WHAT WE CLAIM IS:—

1. A shortenable umbrella comprising a stick having a number of telescopic parts, a crown at one end and a handle at the other end, the handle having a recess which, when the umbrella is closed and shortened, receives a guide sleeve of a slider that slides on the stick, the recess containing a stick support plate which is fixed to the lower end of the stick and which can slide up and down in the recess and which is guided in its sliding movement by a guide pin which projects upwards from the bottom of the handle, coaxially with the stick towards the upper end of the handle, the stick support plate being retained, at its upper limiting position, when the umbrella frame is fully extended, or at both its upper and lower limiting positions by a catch, and the support plate having an upwardly extending bush which, when the umbrella is closed and shortened, penetrates into the guide sleeve of the slider.

2. A frame according to claim 1, in which the guide pin extends upwards to above the upper limiting position of the stick support plate, the upper end of the guide pin penetrating into the interior of the lower part of the umbrella stick.

3. A frame according to claim 2, in which the bush is integral with the stick support plate and the lower part of the umbrella stick is secured in the hollow bush.

4. A frame according to claim 3, in which the outer face of the bush of the stick support plate has an elongate slot which co-operates with a hook of a locking catch of the guide sleeve of the slider to ensure that the slider is securely locked in position when the umbrella is collapsed.

5. A frame according to any one of the preceding claims, in which the stick support plate has around its periphery a resilient wire ring which cooperates with catch projections projecting inwards from the wall of the handle recess to give a snap catch action for retaining the stick support plate in its upper limiting position or in its upper and lower positions.

6. A frame according to any one of claims 1 to 4, in which a snap catch is interposed between the guide pin and the stick support plate, the snap catch taking the form of a

ball which is spring loaded radially, relative to the stick axis, and which retains the stick support plate in its uppermost position or in its upper and lower positions.

7. A frame according to claim 1, in which catch projections projecting inwards from an inner wall of the handle recess cooperate directly with a peripheral edge of the stick support plate to retain the stick support plate in its upper position or its upper and lower positions, the catch projections acting by virtue of a resiliency of the walls of the handle.

8. A frame according to claim 7, in which the stick support plate has a chamfered peripheral edge.

9. A frame according to claim 7 or claim 8, in which there are mechanical stops limiting the upward movement of the stick support plate, these stops being in the form of projections projecting inwards from the wall of the handle recess, the catch projections being situated between these projections when seen in plan view.

10. A frame according to any one of claims 7 to 9, in which the guide pin for guiding the stick support plate is enclosed in a guide tube which slides in contact with an inner wall of the lower part of the umbrella stick, the guide tube extending over almost the entire length of the guide pin.

11. A frame according to claim 1, with ribs which are U-shaped in cross section at least near the crown, the ribs being pivoted on axles in the crown, and the axles being contained in slots in the crown which are open towards the periphery of the crown, there being in the crown, for pivoting each rib, a respective pair of parallel slots in each of which works a respective side web of the rib, characterised in that the two slots of each pair are joined together above the corresponding axle part by a connecting slot which accommodates a middle web of the rib.

12. A frame according to claim 1, with struts which are U-shaped in cross section at least near the slider, the struts being pivoted on axles in the slider, and the axles being contained in slots in the slider which are open towards the periphery of the slider, there being in the slider, for pivoting each strut, a respective pair of parallel slots in each of which works a respective side web of the strut, characterised in that the two slots of each pair are joined together above the corresponding axle part by a connecting slot which accommodates a middle web of the strut.

13. A frame according to claim 11 or claim 12, in which respectively each connecting slot is open towards a peripheral groove in the crown or slider which groove accommodates an axle wire.

14. A frame according to claim 1, substantially as described with reference to any



— one of the examples illustrated in the accompanying drawings.

15. An umbrella incorporating a frame according to any one of the preceding claims.

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Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1972.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from
which copies may be obtained.

