July 11, 1939. H. HAUPT 2,165,967

FOLDING UMBRELLA

Filed Feb. 25, 1937

Fig. 1

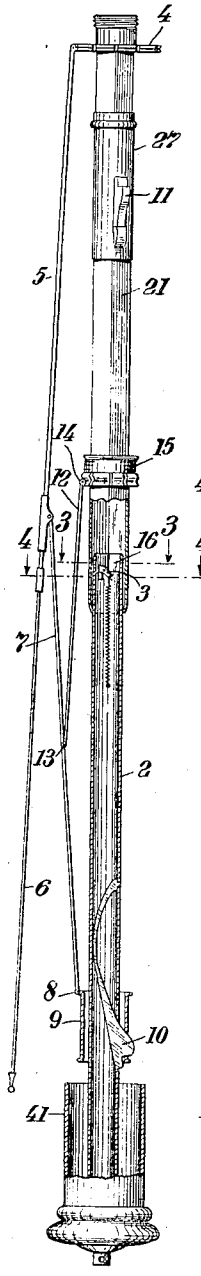



Fig. 2

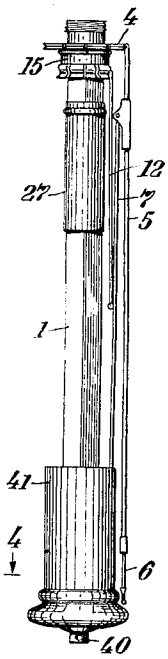



Fig. 3

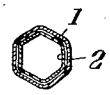



Fig. 4




Fig. 5

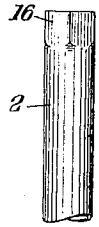



Fig. 6

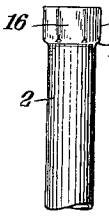



Fig. 7

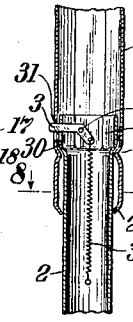



Fig. 8

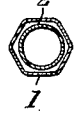



Fig. 9

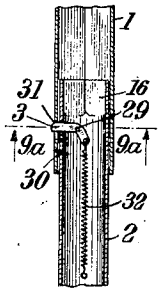



Fig. 10

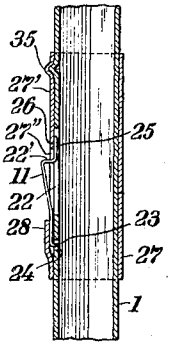



Fig. 11

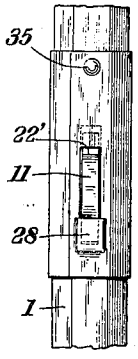



Fig. 9a

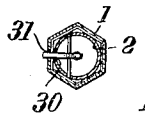



Fig. 12

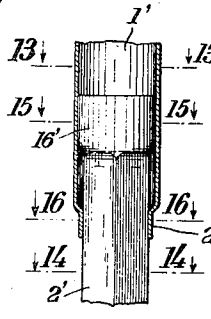



Fig. 13

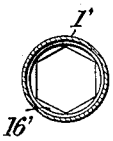



Fig. 14

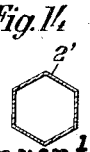



Fig. 15

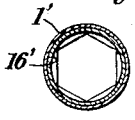
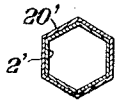



Fig. 16




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# UNITED STATES PATENT OFFICE

2,165,967

## FOLDING UMBRELLA

Hans Haupt, Berlin-Steglitz, Germany

Application February 25, 1937, Serial No. 127,694
In Germany October 17, 1935

10 Claims. (Cl. 135—46)

My invention relates to improvements in folding umbrellas having their ribs and sticks composed of telescoping sections, and having their runners movable over the joint of said stick members, and more particularly in umbrellas of the type in which one of the stick members is polygonal in cross-section, the other member being shaped accordingly, so that the stick members are guided one within the other as against rotary movement. In constructions of this type such as are now in use both stick members are made all over their lengths with polygonal cross-sections, and it has been found that thereby telescoping movement of the members into and out of each other is difficult by reason of the friction and wedging of the parts, the reason being that it is practically impossible to manufacture such sticks without distortion and perfectly straight.

One of the objects of the improvements is to provide an umbrella in which this objection is obviated, and with this object in view the invention consists in constructing one of the stick members all over its length with polygonal cross-section and the other stick member, which may be circular or polygonal in cross-section, at its inner end only with a polygonal cross-section which corresponds to the polygonal cross-section of the first named member, the said first named polygonal member and the said polygonal end of the second member providing a guide for the stick members. By thus constructing the stick members the friction is not increased by the aforesaid distortions or by slight bending of one of the stick members such as may occur in practical use.

By thus constructing the stick with a member having a polygonal cross-section the radial dimension of the said stick and also the radial dimension of the runner are reduced to a minimum, so that also the thickness of the collapsed umbrella is small. In order further to reduce the radial dimension of the stick members and the collapsed umbrella the polygonal stick member and the end portion of the other stick member engaging the same are preferably provided with rounded edges, and in the preferred construction the polygonal end portion of the stick member having an otherwise circular cross-section is made by pressing portions of the circular end outwardly and into polygonal form, so that the side faces of the polygonal end portion are tangential to the circular cross-section of the body of the stick member.

For safely guiding the stick members one within the other while extending or contracting the stick, both stick members are pressed with their inner ends into engagement respectively with the inner and outer faces of their walls, so that two guides are provided at the inner ends of the stick members.

For the purpose of explaining the invention an example embodying the same has been shown in the accompanying drawing in which the same reference characters have been used in all the views to indicate corresponding parts. In said drawing,

Fig. 1 is an elevation partly in section showing the framework of the umbrella in closed and non-collapsed position,

Fig. 2 is similar elevation showing the framework in collapsed position,

Fig. 3 is a sectional plan view taken on the line 3—3 of Fig. 1,

Fig. 4 is a similar sectional plan view taken on the line 4—4 of Fig. 1,

Figs. 5 and 6 are fragmentary elevations showing the top part of the inner stick member,

Fig. 7 is a fragmentary sectional elevation on an enlarged scale showing the bottom and top parts of the outer and inner stick members including the spring catch holding the stick members in extended position,

Fig. 8 is a sectional plan view taken on the line 8—8 of Fig. 7,

Fig. 9 is a sectional elevation similar to the one illustrated in Fig. 7 and showing a modification of the arrangement of the spring catch,

Fig. 9*a* is a sectional bottom view taken on the line 9*a*—9*a* of Fig. 9.

Fig. 10 is a fragmentary sectional elevation showing the upper stick member and the upper spring catch adapted to engage the main runner for holding the umbrella in open position,

Fig. 11 is a side elevation of Fig. 10.

Fig. 12 is a fragmentary sectional elevation showing a modification of the stick members, and

Figs. 13 to 16 are sectional views taken on the lines 13—13, 14—14, 15—15, 16—16 of Fig. 12.

Figs. 1 to 11 show a folding umbrella which comprises subsidiary braces cooperating with the main braces, and in which the upper stick member is polygonal in cross-section, while the main part of the inner stick member is circular in cross-section. But it should be understood that the invention is not limited to this construction, and that the inner stick member may be polygonal in cross-section all over its length, while the body of the outer stick member is circular in cross-section and formed with a polygonal portion at the end engaging the inner stick member. Further, the invention is not limited to constructions in which the upper stick member carrying the ribs is the outer telescoping member, and the lower stick member carrying the handle the inner telescoping member.

As is shown in the said figures the umbrella comprises an upper or outer stick member 1 and an inner or lower stick member 2 which is in

telescoping engagement therewith. The stick members are adapted to be locked in extended position by a spring catch 3 the construction of which will be described hereinafter. To the upper stick member a crown 4 is secured to which ribs are jointed which are made in telescoping sections 5 and 6, the sections 5 being jointed to the crown 4. To the inner ends of the rib sections 6 main braces 7 are jointed which are connected at 8 to a main runner 9. In the closed position of the umbrella the said main runner is locked by means of a spring catch 10, and in the open position of the umbrella it is locked in position by a spring catch 11. For supporting the frame in open position subsidiary braces 12 are provided which are jointed respectively at 13 and 14 to the main braces 7 and to a subsidiary runner 15.

The thickness of the collapsed umbrella largely depends on the diameter of the said subsidiary runner 15, because, when, the umbrella is collapsed, the top parts of the main braces 7 and the rib sections 5 are placed on the outside of the subsidiary braces 12 jointed to the subsidiary runner 15, as is shown in Fig. 2, and the diameter of the subsidiary runner 15 depends on the largest diameter of the stick, and therefore it is essential to reduce the said stick in diameter as far as possible without reducing the strength thereof. For this purpose the upper or outer stick member 1 is made polygonal in cross-section, and the inner or lower stick member 2, which preferably is circular in cross-section, is formed at the end engaging the outer stick member 1 with a polygonal cross-section fitting internally within the polygonal stick member 1, the said polygonal shape of the end of the stick member 2 being produced by pressing the wall at the end of the stick member 2 outwardly. In addition the polygonal shape of the stick member 1 and of the end of the stick member 2 provides simple and effective means for preventing turning of the stick members relatively to each other about their axis. By constructing the outer stick member 1 with a cross-section in the form of a regular polygon the largest diameter is small. Preferably, the said diameter is further reduced by providing a stick member in which the corners of the polygon are rounded, as is shown in Fig. 3, and in a similar way the corners of the expanded top part of the inner member 2 are rounded. Thereby the shape of the polygon to a large extent approaches a circle, and its largest diameter is but slightly larger than that of a stick of circular cross-section, and this is the case also in such constructions in which the number of the sides of the polygon is comparatively small.

The polygonal shape of the top part 16 is obtained by enlarging the stick member 2 at its top. As appears from Fig. 5, the smaller diameter of the polygon is equal to the diameter of the body of circular cross-section, so that the member 2 is enlarged at its end merely by pressing the corners 17 outwardly. Therefore, a comparatively slight enlargement of the end of the member 2 is necessary.

Near its bottom end the outer stick member 1 is pressed inwardly at its corners as is shown at 19 in Fig. 7. Thereby inwardly projecting lugs are provided at the corners of the stick member which provide rigid abutments for the stick members being extended. By thus providing the inwardly projecting portions at the corners of the stick mmeber the said projecting portions are rigid, because they merge at their sides into the side faces of the stick member 1, and therefore the depth of the inwardly pressed portions 19 may be comparatively small, and it is sufficient that the inwardly projecting portions are made merely at the corners of the member 1. Thus the inner diameter of the contracted portions of the stick member 1 need not be smaller than the smallest diameter of the said stick member. This is important, because the smaller the depth of the portions 19 the smaller is the difference between the diameters of the stick members 1 and 2, or in other words the diameter of the stick member 1 need not be much larger than that of the stick member 2. Therefore also the subsidiary runner 15 may be made with a comparatively small diameter.

In the improved stick the friction of the telescoping stick members is small, even if the said stick members are not perfectly straight, or if the polygonal stick member 1 is distorted, because even in case of large distortion only the short edges 17 (Fig. 6) of the stick member 2 are in frictional engagement with the stick member 1. Even if the body of the stick member 2 located below the portion 16 is made polygonal and expanded at its inner end into engagement with the inner surface of the wall of the outer member 1, and the bottom edge 20 of the stick member 1 is pressed inwardly and into engagement with the stick member 2 friction would be produced only at the comparatively short guides 16 and 20 which friction would be produced by the guides counteracting distortion of the stick members.

When the umbrella is opened the subsidiary runner 15 is shifted upwardly to the crown 4, and when the framework is collapsed, as is shown in Fig. 2, the said runner has the same position relatively to the crown. Therefore, when the umbrella is opened or the framework collapsed the runner must pass over the projecting nose of the spring catch 11. However, in constructions now in use this spring exerts considerable resistance to the movement of the runner, because it must be strong, and the diameter of the runner must be reduced as far as possible. Therefore the spring 11 must be constructed so that it does not as far as possible interfere with the movement of the subsidiary runner 15, particularly in view of the fact, that the said subsidiary runner, as distinguished from the main runner 9, is shifted without being engaged by the hand. In connection with this construction of the runner the polygonal shape of the upper stick member 1 is particularly advantageous, because the stick member has plane side-faces. By mounting the spring catch 11 in one of the said plane walls 21, the said spring catch and particularly the devices for securing the same to the stick member are located so that they interfere only in a slight degree with the usual cylindrical runner which by reason of its circular cross-section is spaced from the plane side faces. Therefore it is not necessary to construct the subsidiary runner 15 with increased diameter for permitting the same freely to pass the spring catch 11, and further, it is not necessary to provide large inclined faces either on the runner or on the spring catch, for facilitating the movement of the runner over the spring catch.

As is shown in Figs. 10 and 11, the spring catch 11 is mounted in front of a longitudinal slot 22 made in one of the side walls of the stick

member, and therefore its locking nose 22' is temporarily pressed into the stick member 1 when the runner 9 is passed across the same. But normally the spring catch does not extend into the hollow of the stick member, so that it permits free telescoping movement of the inner stick member 2. This result is attained by the following construction:

The spring catch 11 is provided at its bottom end with an inwardly bent portion or nose 23 which engages in a hole 24 of the wall of the stick member, the spring thus finding a direct support on the stick when the main runner 9 is pressed thereon by the tension of the expanded cover and ribs. The spring is held in position by means of a sleeve 27 formed with an outwardly pressed portion 28. It has a certain initial tension tending to press the same outwardly and at its top end it is provided with an extension 25 which bears on an abutment 26. As shown the said abutment is in the form of a sleeve 27' fixed to the stick member 1. Preferably the sleeves 27 and 27' are made in one piece, in which case they are formed with a slot 27'' for the passage of the spring 11 therethrough.

By thus mounting the spring, the hollow of the stick member 1 is not obstructed, and therefore the stick member 2 may be shifted into the stick member 1 without being interfered with by the said spring, the said spring and its nose 23 being normally located outside the said hollow space. In this respect the construction is preferable as compared to constructions in which the spring is fixed to the stick by means of a rivet. By providing the abutment 26 initial tension may be imparted to the spring which is thereby normally held outside the hollow of the stick member 1, and which has sufficient power for supporting the main runner in position with the cover of the umbrella expanded. The said abutment may be formed from the wall of the stick member by pressing the same outwardly. But the construction shown in Fig. 10 is preferable for convenience in the manufacture of the stick, the said sleeve being readily placed on the stick member from the top or bottom end thereof and into the position shown in Fig. 10. Since the said sleeve is subject only to radial pressure exerted thereon by the spring 11 and any axial pressure is directly transmitted from the spring 11 and through the nose 23 to the wall of the stick member, simple means may be used for fixing the sleeve 27, 27' in position. As shown, the sleeve is fixed merely by punching the wall of the stick member outwardly at one or two points, as is shown in Fig. 10 at 35.

The spring is pressed into the hollow of the stick member only when the runner is passed over the same. In order to prevent injury to the spring which might accidentally project into the hollow of the stick member when the inner stick member is shifted into the same, it is fixed to the stick member 1 by means of the nose 23 at the side from which the inner stick member is moved towards the same, so that the spring is adapted to be pressed outwardly by the said stick member.

It will be understood that when the outer stick member is located at the bottom part of the stick, the construction of the lower spring holding the frame in closed position may be the same as has been described with reference to the upper spring.

The construction of the stick described above in which a stick member which is polygonal all over its length cooperates with a stick member which is polygonal only at its end and which has its main portion smaller in cross-section is particularly important in frames in which the stick members are coupled in extended position by means of a spring operated catch. If in such sticks both stick members are uniform in cross-section over their lengths the inner stick member must be smaller in diameter than the outer member and so as to have a certain play therein, because otherwise the friction would be too great. Therefore the play of the said members at the part where the said catch is in coupling position varies according to the location of the inner stick member within the outer member, and therefore the moment of the pressure of the outer member on the said catch varies in accordance with the distance between the wall of the outer member and the fulcrum of the catch. This, however, is objectionable for the reason that thereby the coupling power is sometimes too small and sometimes too large. In the improved construction in which the enlarged end of one member is in close engagement with the other member, the relative position of the stick members transversely of the axis and therefore the said moment are constant.

As is shown in Fig. 7 the catch 3 by means of which the stick members 1 and 2 are locked in extended position is mounted on a pivot bolt 29 fixed to the inner stick member 2 and adapted to engage in slots 30 and 31 made respectively in the members 1 and 2, a spring 32 tending to hold the said catch in coupling position. In the construction shown in Fig. 7 the catch is located in the enlarged end portion 16 of the inner stick member, and in the modification shown in Fig. 9 it is located slightly below the said enlarged portion. It will be understood that in both constructions the distance between the wall of the outer stick member 1 and the pivot 29 is constant in any position of the stick members, and that therefore the pressure needed for collapsing the stick members is constant. In the construction shown in Fig. 7 the slots 30 and 31 are made in the corners of the polygonal cross-sections of the member 1 and the enlarged end 16 of the member 2. Thus the catch 3 finds a guide in the said corner when the member 2 is moved into or out of the member 1. In the modification shown in Fig. 9 the slot 31 is made in the side face of the polygonal stick member 1, which is preferable because the said side face is in contact with the wall of the member 2, while the corners are spaced from the said wall, as will be understood from an inspection of Fig. 9a.

Figs. 12 to 16 show a modification in which the upper or outer stick member is circular in cross-section, while the lower or inner stick member has hexagonal cross-section. The inner stick member 2' is enlarged at its top end 16' into circular shape in accordance with the inner diameter of the upper stick member 1'. At its bottom end 20' the upper stick member is reduced in diameter into hexagonal shape, corresponding to the cross-section of the stick member 2'. Thus the stick members are guided relatively to each other at 16' and 20'.

I claim:

1. In a frame for a folding umbrella, comprising telescoping stick members, telescoping rib members, and a runner shiftable on the said stick members and across the joint thereof, the said stick members being different in cross-section, the improvement herein described which consists

in forming the outer stick member to polygonal cross-section throughout substantially all its extent and the inner stick member to polygonal cross-section at its outer end, adapting it to make sliding engagement within the outer stick member, and forming the inner stick member elsewhere and throughout the greater portion of its extent to cylindrical cross-section and of a diameter substantially that of a circle inscribed within the polygon of the outer stick member.

2. In a frame for a folding umbrella, comprising telescoping stick members, ribs, braces for said ribs, and a runner on said stick members connected with said braces, one of the stick members being polygonal through substantially all of its extent and the other stick member being polygonal at the end engaging the first-named stick member and adapted thereby to make sliding engagement therewith while secure against rotation relative thereto, the improvement herein described which consists in a spring catch within the inner stick member, and in the provision in the outer stick member of a slit adapted for locking engagement with said spring catch and located in one of the corners of the polygon of the stick member.

3. A frame as claimed in claim 2, in which the telescoping stick members are different in cross-section, and in which the inner stick member is enlarged at its end engaging the outer stick member to correspond to the cross-section of the said outer stick member, and in which the said spring catch is located outside but near the said enlarged end of the inner stick member.

4. A frame as claimed in claim 2, in which the outer stick member is polygonal in cross-section and the inner stick member has its end engaging the outer stick member enlarged into a shape corresponding to the said polygonal cross-section, and in which the said spring catch is located in the said enlarged portion and in position for sliding on one of the corners of said polygonal stick member.

5. A frame as claimed in claim 2, in which the outer stick member is polygonal in cross-section and the inner stick member has its engaging end enlarged in accordance with the said polygonal cross-section, the said spring catch being located outside but near to the said enlarged end and in position for engaging said polygonal stick member.

6. In a frame for folding umbrellas, comprising telescoping stick members, ribs, braces jointed to the said ribs, and a runner movable on said stick members and jointed to said braces, the improvement herein described, in which the outer stick member is formed with a cut-out portion and a hole near the same, and a spring catch is provided adapted to support said runner and comprising a spring located on the outside of the outer stick member and formed with an inwardly bent end engaging in the said hole and located with its free end in front of the said cut-out portion, and a sleeve fixed to the said outer stick member and provided with a cut-out portion corresponding in position to the said cut-out portion made in the outer stick member and partially covering the said cut-out portion made in the said outer stick member, to provide an abutment limiting the outward movement of said spring and also located in position for holding the attached end of said spring in position on the said stick member.

7. In a frame for a folding umbrella, comprising telescoping stick members, telescoping rib members, and a runner shiftable on the said stick members and across the joint thereof, the said stick members being different in cross-section, the improvement herein described which consists in forming one of said stick members to polygonal cross-section with rounded corners and in forming the other stick member at the end engaging the first to shape corresponding to the cross-section of the first stick member, thus providing a guide for the stick members.

8. In a frame for folding unmbrellas comprising telescoping stick members, ribs, braces jointed to the said ribs, and a runner movable on said stick members and jointed to said braces, the improvement herein described in which the outer stick member is formed with a cut-out portion, and a spring catch adapted to support said runner on the stick member is provided, the spring catch having a locking nose and being fixed to the outside of the outer stick member and with its locking nose extending in front of said cut-out portion, the locking nose being adapted to be pushed into the cut-out portion of the outer stick member, and in which the outer stick member carries a sleeve that partly covers the cut-out portion and affords abutment for the end of the spring catch, limiting the outward movement thereof.

9. In a frame for folding umbrellas comprising telescoping stick members, ribs, braces jointed to the said ribs, and a runner movable on said stick members and jointed to said braces, the improvement herein described in which the outer stick member is formed with a cut-out portion, and a spring catch adapted to support said runner on the stick member is provided, the spring catch having a locking nose and being fixed to the outside of the outer stick member and with its locking nose extending in front of said cut-out portion, the locking nose being adapted to be pushed into the cut-out portion of the outer stick member, and in which the outer stick member is formed additionally with a hole near the said cut-out portion, into which hole the end of the said spring catch is bent inwardly, engaging the hole, and a member fixed to the said outer stick member engaging said spring catch and holding it to position with its inwardly bent end in engagement in the said hole.

10. In a frame for folding umbrellas comprising telescoping stick members, ribs, braces jointed to the said ribs, and a runner movable on said stick members and jointed to said braces, the improvement herein described in which the outer stick member is formed with a cut-out portion, and a spring catch adapted to support said runner on the stick member is provided, the spring catch having a locking nose and being fixed to the outside of the outer stick member and with its locking nose extending in front of said cut-out portion, the locking nose being adapted to be pushed into the cut-out portion of the outer stick member, and in which the outer stick member is formed additionally with a hole near the said cut-out portion, into which hole the end of the said spring catch is bent inwardly, engaging the hole, and a sleeve fixed to the said outer stick member engaging said spring catch and holding it to position with its inwardly bend end in engagement in the said hole.

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