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FOLDING UMBRELLA RIB

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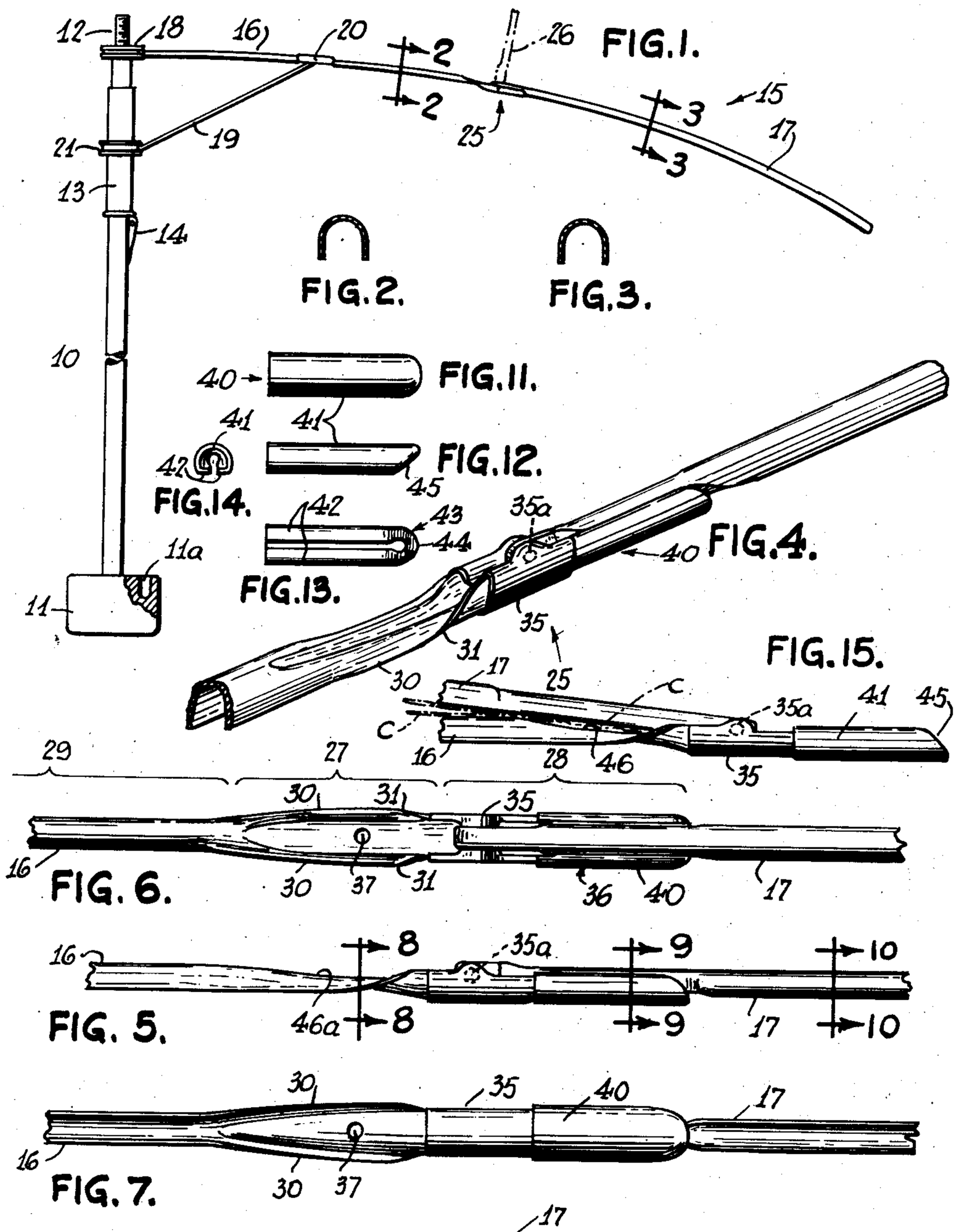

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 11.

FIG. 12.

FIG. 14.

FIG. 13.

FIG. 4.

FIG. 15.

FIG. 6.

FIG. 5.

FIG. 7.

FIG. 8.

FIG. 9.

FIG. 10.

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FOLDING UMBRELLA RIB

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4 Claims. (Cl. 135—31)

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The present invention relates to improvements in folding umbrellas and specifically to an improved jointed rib construction therefor.

It is the purpose of the invention to simplify construction of jointed ribs for use in folding umbrellas whereby the production costs are lowered and, at the same time, the rib, from a functional standpoint, is improved whereby wear and tear on the associated covering fabric is reduced to a minimum. The invention provides in addition to the above a rib joint having maximum resistance to lateral bending.

The invention resides generally in reversing the channel of one section of a rib adjacent the end whereby the rib sections can be jointed to present a smooth bearing surface to the fabric covering.

Further details of the invention, as well as further objects and advantages, will appear from reading the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a partial side elevation of the umbrella frame in open adjustment.

Fig. 2 is a cross-section on the line **2—2** in Fig. 1.

Fig. 3 is a cross-section on the line **3—3** in Fig. 1.

Fig. 4 is a detailed perspective view of the joint interconnecting two rib sections.

Fig. 5 is a side elevational view of the rib joint shown in Fig. 4.

Fig. 6 is a top plan view thereof.

Fig. 7 is a bottom plan view thereof.

Fig. 8 is a cross-section on line **8—8** in Fig. 5.

Fig. 9 is a cross-section on line **9—9** in Fig. 5.

Fig. 10 is a cross-section on line **10—10** in Fig. 5.

Fig. 11 is a top plan view of a rib section cap.

Fig. 12 is a side elevation thereof.

Fig. 13 is a bottom plan view thereof.

Fig. 14 is an end elevational view thereof.

Fig. 15 is a fragmentary view showing a detail of the joint in folded position.

Referring now to the drawings, Fig. 1 shows a partial view of a folding umbrella in open position. It comprises a stick **10** having a handle **11** at its lower end and a reduced threaded portion **12** at its upper end. A runner **13** is slidably mounted upon the body of said stick and is retained in opened position by spring catch **14**. The rib **15** comprising rib sections **16** and **17** is pivotally mounted on ring **18** which engages the threaded portion **12** of the stick. A brace **19** is pivoted to the rib section **16** at **20** and is pivoted to ring

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21 provided on runner **13**. This is conventional in umbrella construction and naturally similar ribs and braces are connected to the rings **18** and **21** in angularly spaced relationship around the entire periphery thereof.

Each of the rib sections **16** and **17** are channel or U-shaped as seen in Figs. 2 and 3. It is important to note that the base or rounded portion of both channels is uppermost as seen in Fig. 1 and, therefore, a smooth curvilinear surface is presented to the fabric cover (not shown in the drawing). As seen in Fig. 1, rib section **17** is pivotally connected to section **16** by means of joint **25** whereby it may be articulated as shown by the dotted lines **26**. As will appear below, the section **17** is capable of being folded back upon section **16** until it is substantially parallel thereto. The handle **11** is provided with an annular channel **11***a* which engages the outer tip of rib section **16** when the section is folded parallel to the stick **10**. The stick is generally made telescoping to permit the handle to be moved into and out of engagement with the rib tips.

The invention herein resides in the details of joint **25** considered alone and in combination with the rib sections. For a better understanding thereof, some of the problems encountered in the construction of folding umbrellas of the instant character will now be discussed. As inferred above, it is important that the upper surface of the rib be as smooth as possible in order not to rub or abrade the cloth covering. Throughout the years, the only rib structure which has consistently proven satisfactory because of its simplicity, inexpensiveness, and structural attributes is the conventional U-shaped rib of carbon steel used in most umbrellas today. Therefore, it is desirable, in folding umbrellas, to employ a rib structure which, when in operative position, has all the attributes of the conventional channel rib and which, for the inoperative position, can be satisfactorily folded or collapsed, taking into account the problem encountered inf olding the cover. The present invention, although not completely attaining the ideal, substantially approximates same.

In order to take care of the covering, it is necessary to fasten it to the inner rib section near the inter-sectional joint whereby it will fold readily when the outer rib sections are folded back. It is necessary to provide sufficient clearance between the two rib sections adjacent the joint when the sections are in folded position in order not to pinch the bight in the covering fabric and cause excessive wear thereupon.

Referring now to Figs. 4 through 10, the details of joint **25** and how the above is achieved will now be described. For simplicity, the joint end of the inner rib section **16** will be divided into three basic portions, the transition portion **27**, the reversed channel portion **28**, and the normal channel portion **29**. The latter is the same as the remainder of the section **16** as described before in connection with Fig. 2.

As we proceed along portion **29** and enter the portion **27**, the outer edges or side walls **30** of the channel commence to turn upward until they are substantially horizontal in a common plane at points **31**. This, as seen in the drawing, is a shallow sweeping curve. Beyond points **31** the edges **30** bend sharply to the vertical forming the side walls for the reversed channel portion **28**. At the same point that the edges **30** commence their bending the central portion of the base of the channel commences to curve inwardly or downwardly, this inward curve increases as points **31** are approached. This concurrent curvature of the channel base and side walls produces a corrugated or ribbed cross-section, as seen in Fig. 8. When the side walls make their abrupt rise to the vertical, the reversal of the channel is complete. It will be obvious that the portion **27** as a result of the corrugation, is substantially as strong as portions **28** and **29**, both as regards bending and twisting.

A conventional hinge strap **35** is attached to the reversed channel portion **28** adjacent the transition portion **27** to which the rib section **17** is pivoted at **35***a*. As seen in Figs. 6 and 7, the hinged end of section **17** is reduced slightly in order to fit properly within the reinforced rib extension **36**. The rib extension serves the dual function of a stop to prevent backward bending of the jointed sections and a finger to coact with the umbrella handle in the collapsed condition. The rib extension is reinforced with a cap **40**, the details of which will be described hereafter. The cooperation of the rib tip, the cap **40** and the hinged end of rib **17** is best seen from the cross-sectional view in Fig. 9. As seen in Fig. 10, the body of rib **17** is U-shaped with the base uppermost.

Referring now to Fig. 15, the reason for the gradual curving portion of the transitional curve will become apparent. As seen therein, a space or clearance **46** is formed between the rib sections **16** and **17**, when the latter is folded back upon the former. When the cover is attached to the frame, it may be fastened to rib section **16** by stitching around the rib and through the hole **37** located in the center of the transitional portion. The hole prevents the stitching from riding up the rib when the umbrella is folded. The clearance **46** will permit the cover to be folded and gather at the bight without pinching it between the rib sections.

With a portion of rib section **17** cradled in the reversed channel portion **28** of rib section **16**, as seen in Figs. 5–7, the two sections are locked against lateral bending about the joint and thus, in operative position, the sections respond as an integral unit.

The rib cap **40** previously mentioned is shown in detail in Figs. 11–14. It comprises a body portion **41** rounded to conform to the curvature of the reversed channel portion of rib **16**. The edges **42** are bent inwardly to form a pair of flanges while the end **43** is bent inwardly to form a rounded nose **44** having a taper **45**.

When assembled, flanges **42** including the portion bounding the nose **43** are crimped over the edges of the rib structure, as seen in Figs. 5–7 and 9. This produces a strong tip free of all sharp edges and alleviates the need for sanding the tip of the rib to produce a similar result.

It is obvious that with the above jointed rib construction it has not been necessary to employ any special hinge adapter elements or the like. Instead, a conventional hinge strap similar to the one used to connect the brace **19** to the rib section **16** is employed, affording a convenient standardization of parts. Many other advantages of the above construction will be apparent to those skilled in the art to which this invention appertains.

Having described the invention in clear and concise terms, I desire to secure by United States Letters Patent and, therefore, claim:

1. A rib for a folding umbrella comprising pivotally connected cross-sectionally U-shaped inner and outer rib members wherein the sides of the inner member are turned outwardly and reentrantly at the outer end thereof to form an inverted cross-sectionally U-shaped portion at the end of a normal portion, and said outer rib member is pivotally joined to said inverted portion, and wherein a hinge strap including means to secure it thereto is arranged over said inverted U-shaped portion and said outer rib member is provided with a pintle which engages said strap for maintaining said outer member in pivotal engagement with said inner rib member.

2. A rib for a folding umbrella as set forth in claim 1 wherein said outer rib member is joined to said inner rib member with its cross section oriented in the same direction as that of said normal portion of the inner rib member when the two members are in extended position.

3. A rib for a folding umbrella as set forth in claim 2 wherein said hinge strap is located axially inward from the free end of said inverted U-shaped portion whereby said end extending beyond said strap limits the pivotal movement of said outer rib member relative to said inner rib member.

4. A rib for a folding umbrella as set forth in claim 3 wherein a rib cap is mounted on said free end of the inverted rib portion to reinforce same, said cap comprising a body element rounded transverse to its longitudinal axis and conforming to the outer surface of said rib and having the edges of said body element bent inwardly on three sides over and against the inside surfaces of said rib portion.

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