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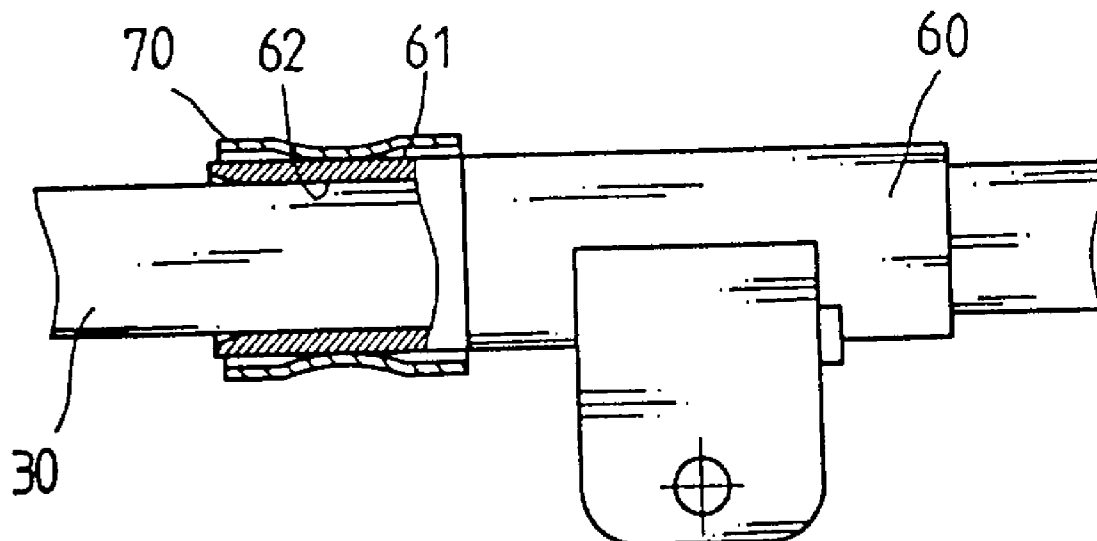
(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2004/0123889 A1**
Liang (43) **Pub. Date: Jul. 1, 2004**(54) **CONNECTION OF STRETCHERS OR RIBS
AND JOINTS OF UMBRELLAS****Publication Classification**(76) **Inventor: Kung-Tai Liang, Changhua City (TW)**(51) **Int. Cl.⁷ A45B 25/00**(52) **U.S. Cl. 135/29**

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ROSENBERG, KLEIN & LEE**3458 ELLICOTT CENTER DRIVE-SUITE 101****ELLICOTT CITY, MD 21043 (US)**(57) **ABSTRACT**(21) **Appl. No.: 10/426,805**(22) **Filed: May 1, 2003**(30) **Foreign Application Priority Data**

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A stretcher or rib of an umbrella is made of compound material and a cap has a tube in which an end of the stretcher or rib is inserted. A metal collar is mounted to the tube and rolled to deform inward to clamp the tube and the stretcher or rib together. A joint has a tube and the stretcher or rib extends through the joint and the tube. A metal collar is mounted to the tube and rolled to deform inward to clamp the tube of the joint and the stretcher or rib together.



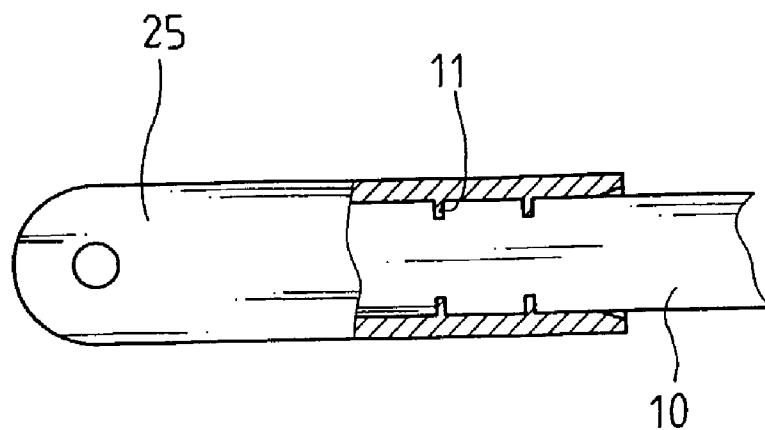


FIG. 1
PRIOR ART

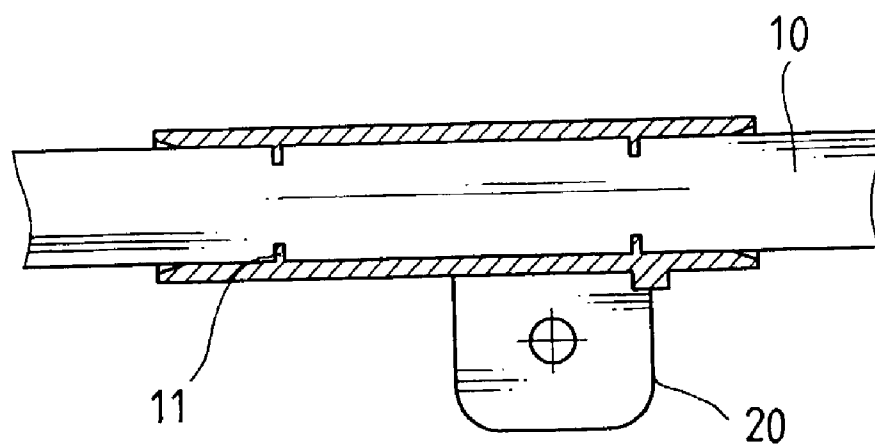


FIG. 2
PRIOR ART

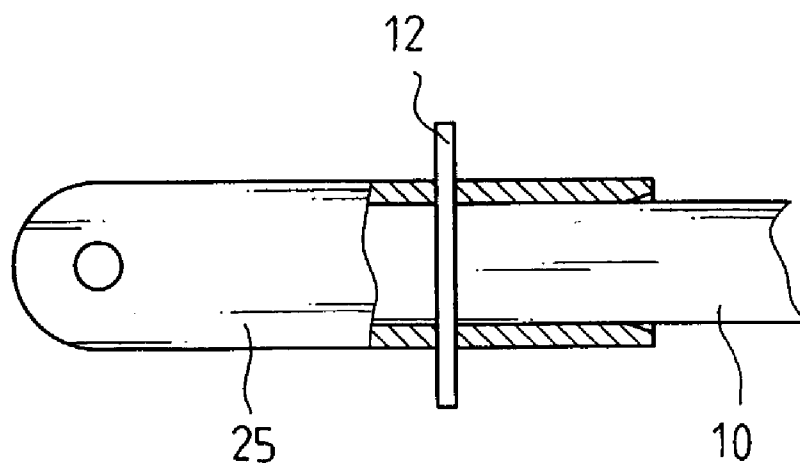


FIG. 3
PRIOR ART

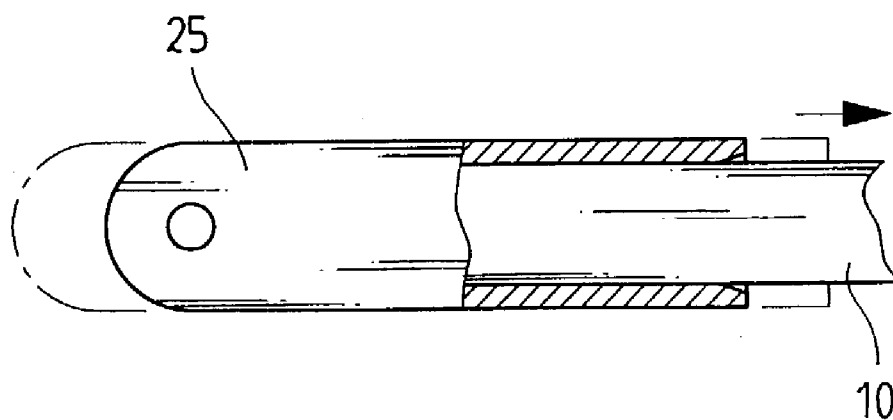


FIG. 4
PRIOR ART

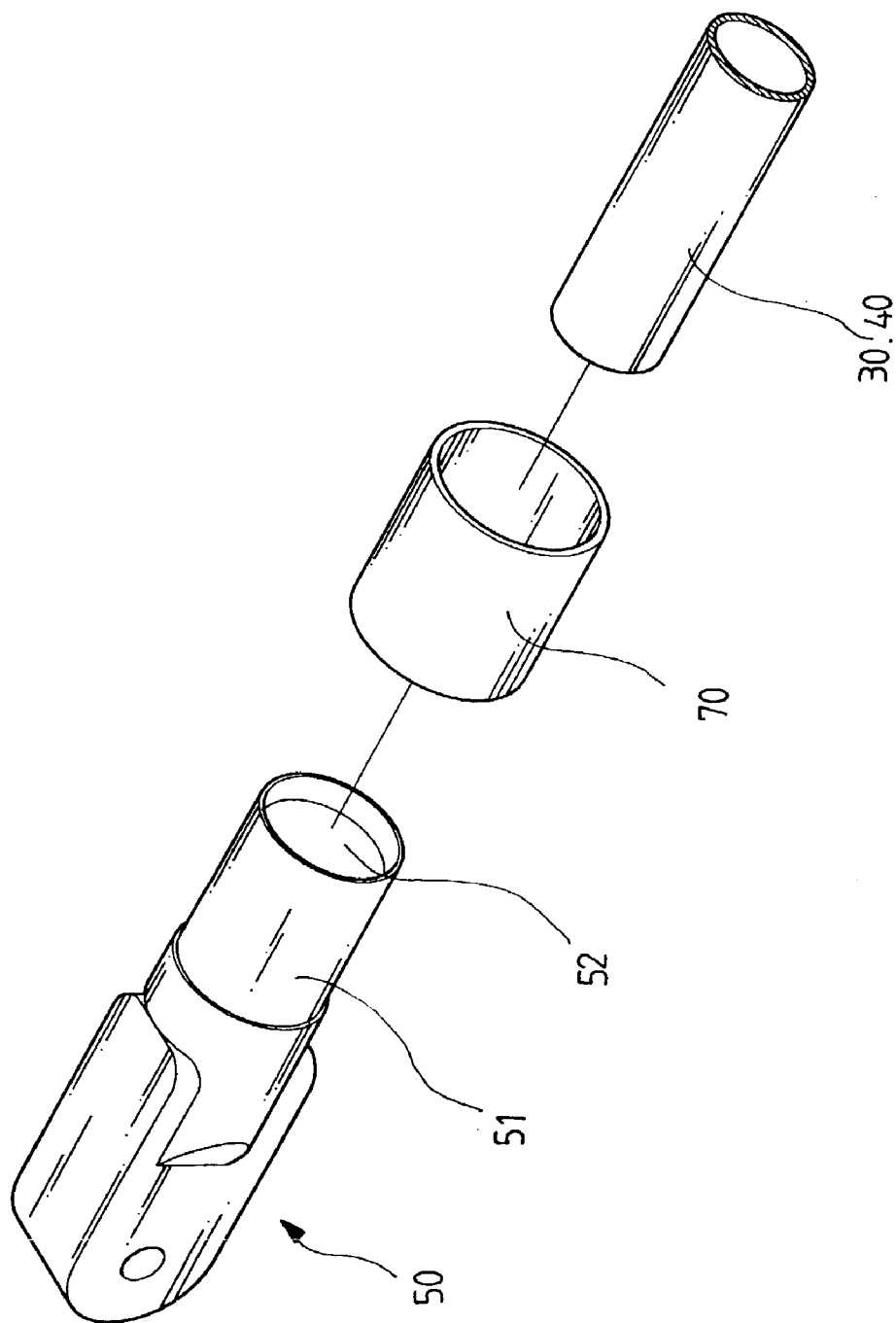


FIG. 5

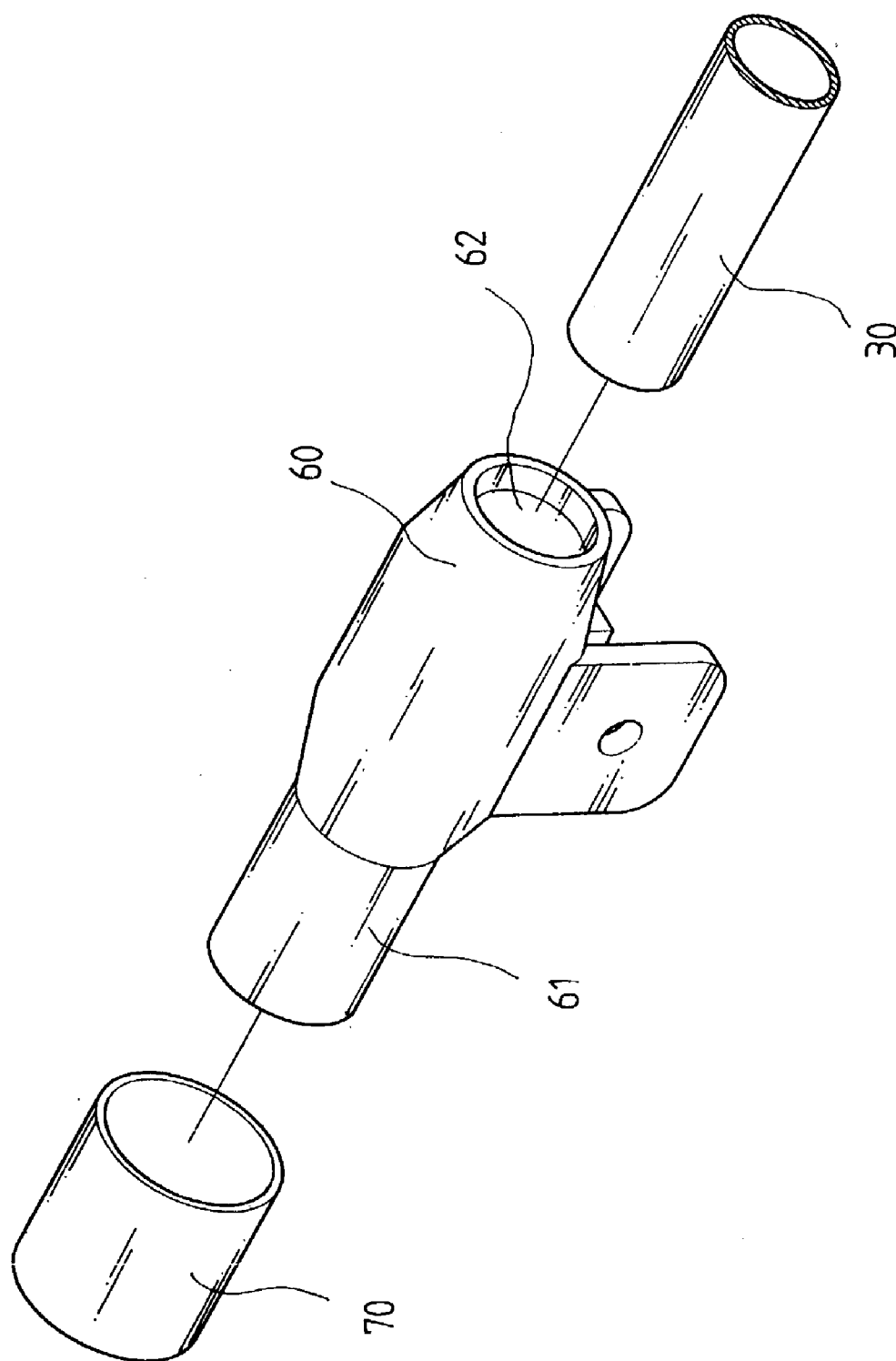


FIG.6

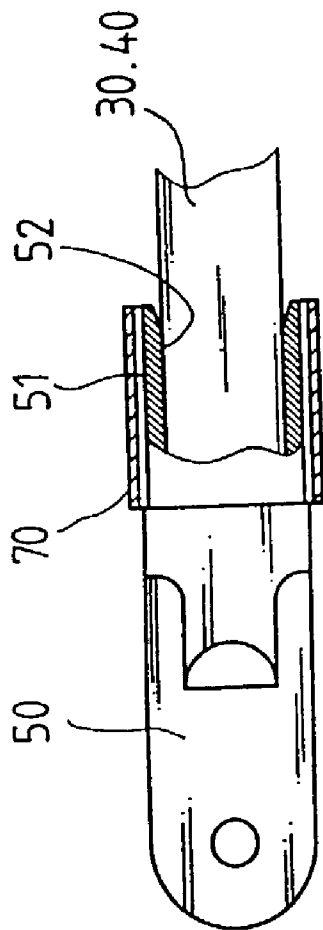


FIG. 7A

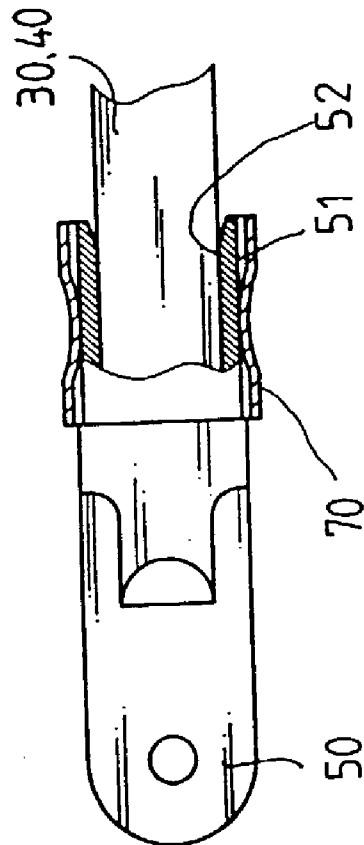
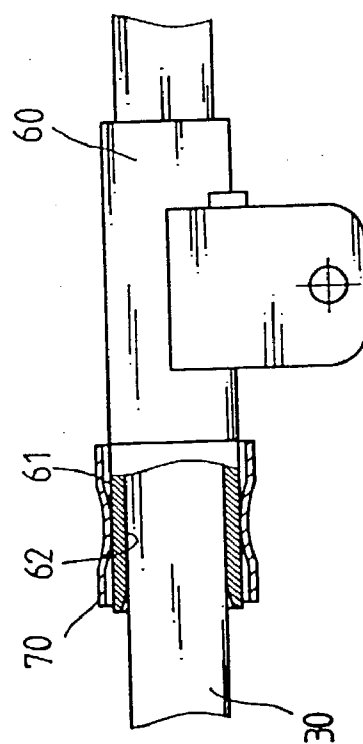
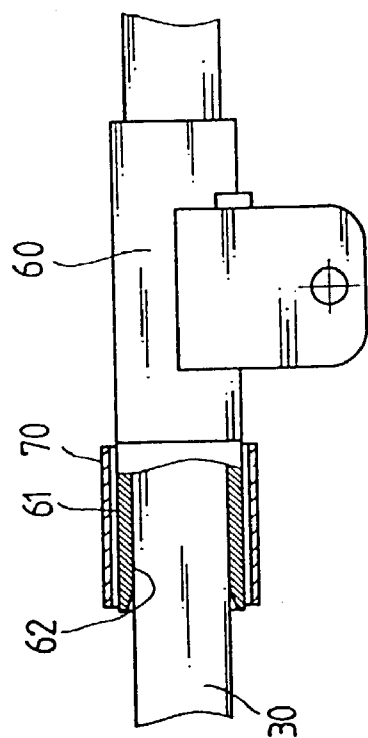


FIG. 7B



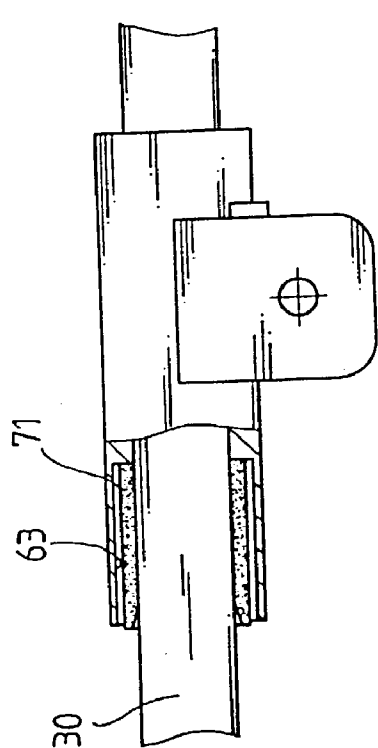


FIG. 9A

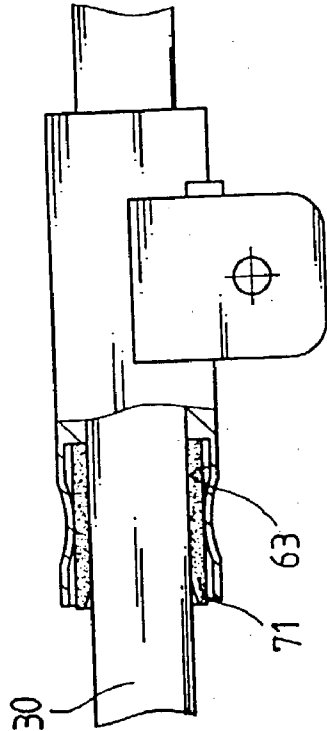


FIG. 9B

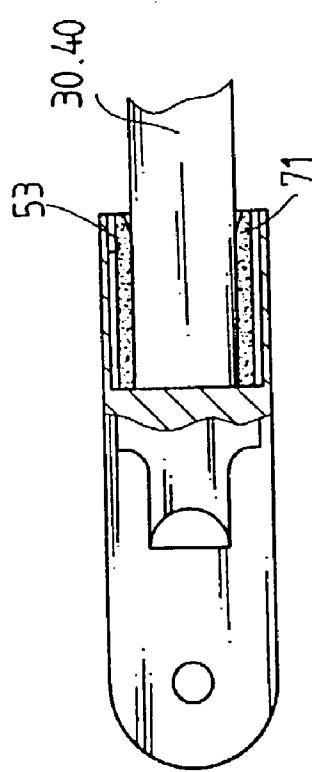


FIG. 10A

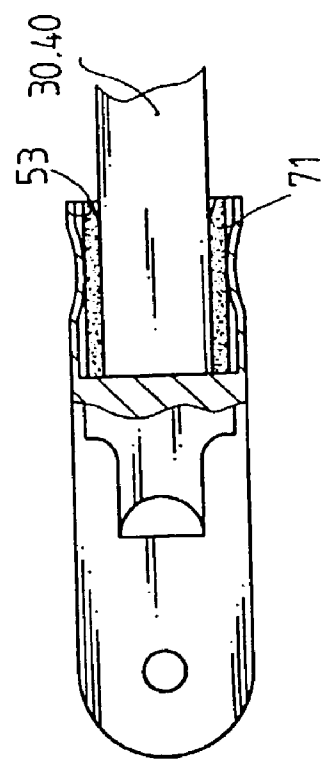


FIG. 10B

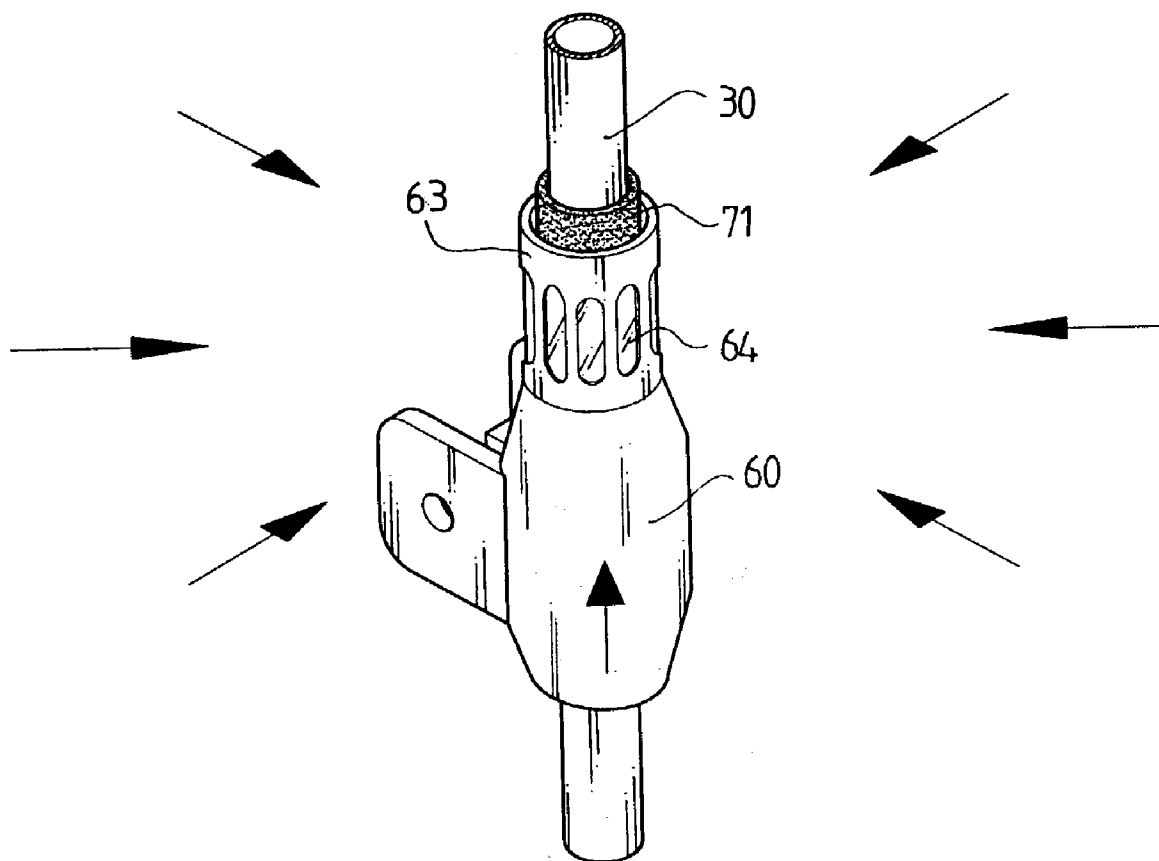


FIG. 11

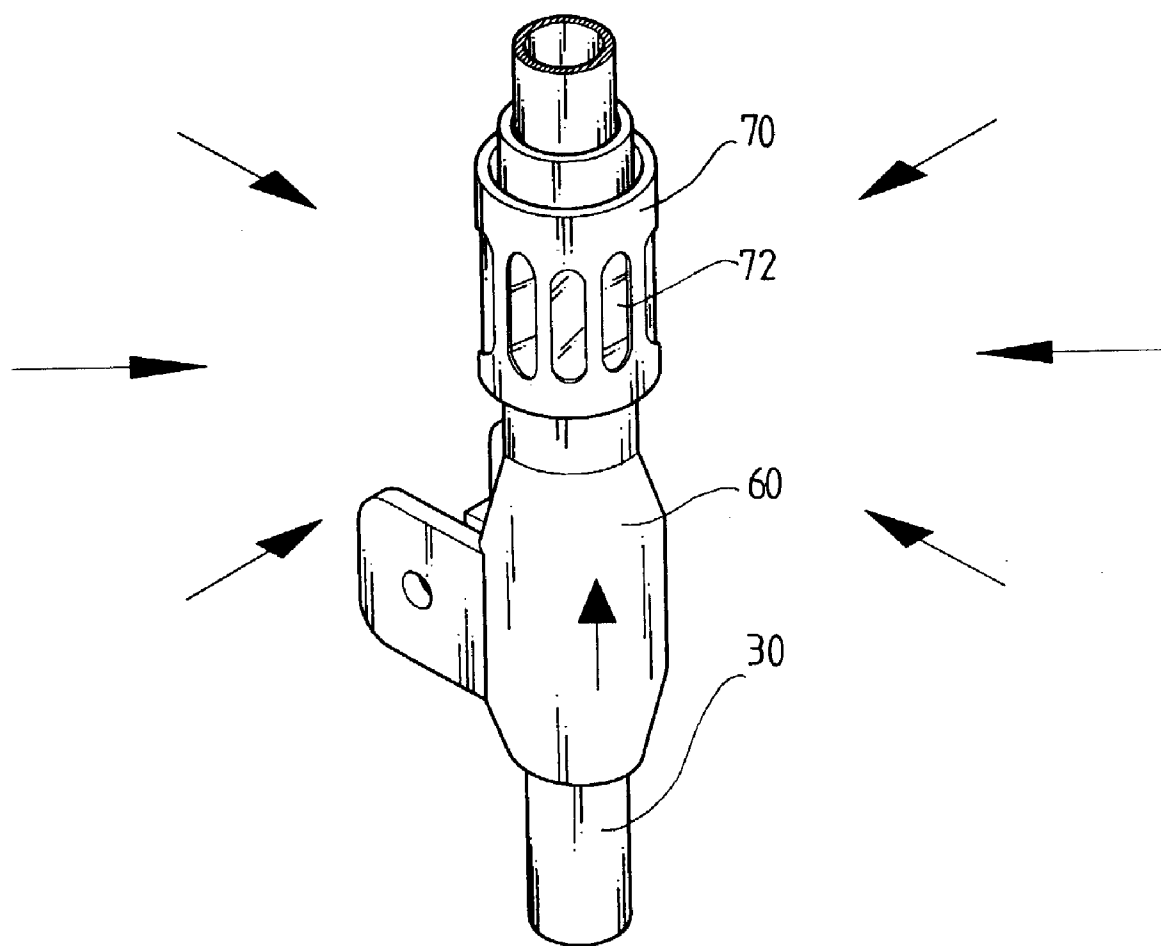


FIG. 12

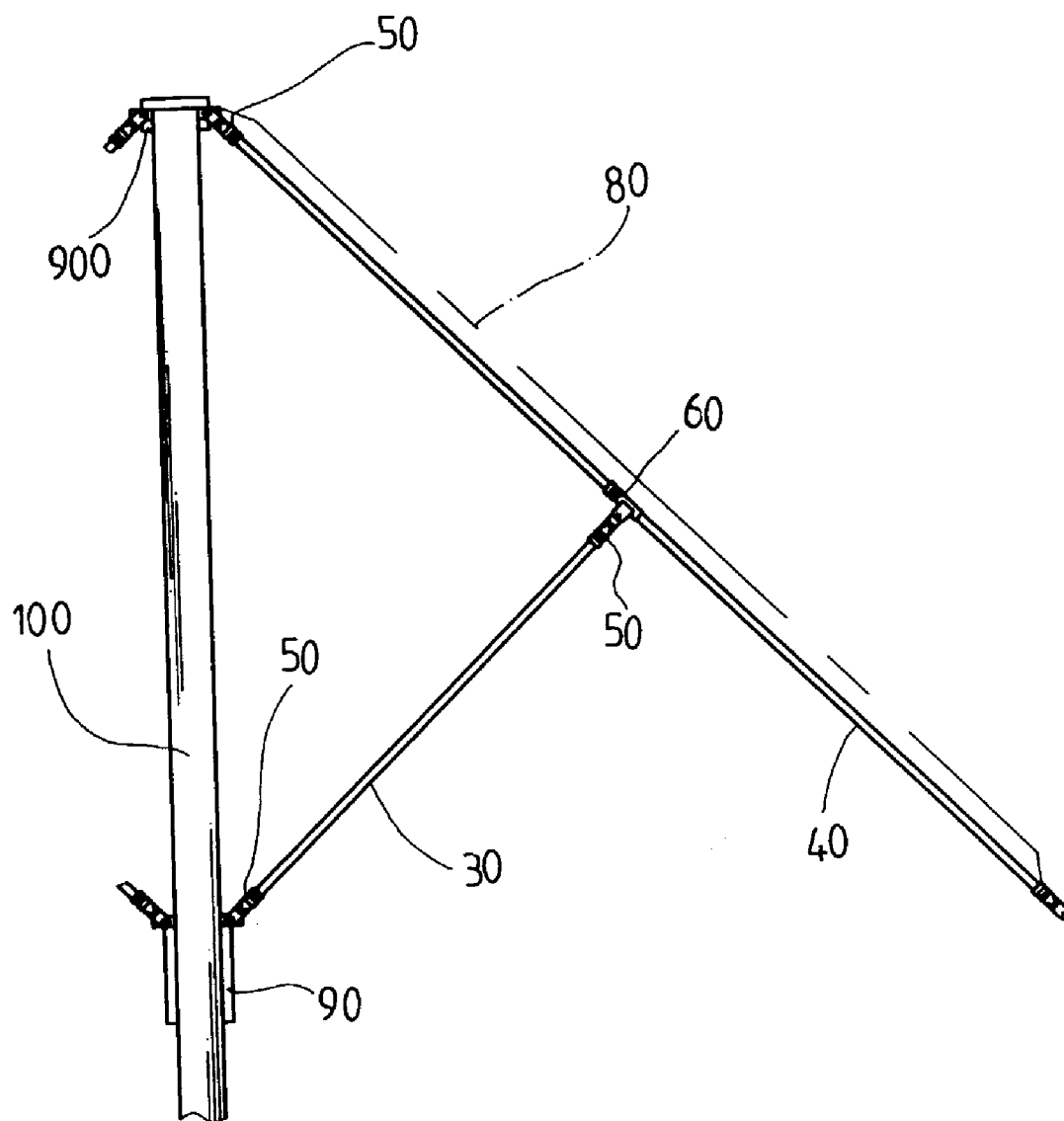


FIG. 13

CONNECTION OF STRETCHERS OR RIBS AND JOINTS OF UMBRELLAS

FIELD OF THE INVENTION

[0001] The present invention relates to connection of stretchers or ribs made of compound material and joints of umbrellas.

BACKGROUND OF THE INVENTION

[0002] A conventional connection between stretchers or ribs **10** of umbrellas and joints or caps are disclosed in **FIGS. 1 and 2**. The stretchers or ribs **10** of modern umbrellas are made of compound material such as carbon fibers or glass fibers which are light in weight and durable in strength, the caps **25** for connecting to an end of the stretchers or ribs **10** and the joints **20** for connecting to an intermediate portion of the stretchers or ribs **10** are made of plastic or rubber which is secured to the stretchers or ribs **10** by way of plastic injection. In order to allow the rubber or plastic secured to the stretchers or ribs **10**, grooves **11** are defined in an outer periphery of the stretchers or ribs **10** so that the plastic or rubber may be filled in the grooves **11**. **FIG. 3** shows a pin **12** is used to penetrate through the stretchers or ribs **10** and the cap **25** instead of using the plastic injection. Nevertheless, once the carbon fibers or glass fibers made the stretchers or ribs **10** is broken into grooves in the outer periphery thereof, the structural strength is reduced and stress concentration is happened at the area where grooves **11** are defined. **FIG. 4** shows the cap **25** is force-fitted to the stretchers or ribs **10**. The cap **25** could be deformed due to the temperature change and could be disengaged from the stretchers or rib **10**.

[0003] The present invention intends to provide a connection structure for securely connect the joints or caps to the stretchers or ribs.

SUMMARY OF THE INVENTION

[0004] In accordance with one aspect of the present invention, there is provided a stretcher or rib which is made of compound material and a cap which has a tube. An end of the stretcher or rib is inserted into the tube and a metal collar is mounted to the tube and rolled to deform inward to clamp the tube and the stretcher or rib together.

[0005] The main object of the present invention is that the compound material made stretchers or ribs are not damaged or deformed when being connected with the caps or joints.

[0006] The present invention will become more obvious from the following description when taken in connection with the accompanying drawings which show, for purposes of illustration only, a preferred embodiment in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] **FIGS. 1 and 2** show a conventional way to connect the cap and the joint to the stretcher or rib;

[0008] **FIGS. 3 and 4** respectively show two different conventional ways to connect the cap and the joint to the stretcher or rib;

[0009] **FIG. 5** is an exploded view to show the cap, the collar and the stretcher or rib of the present invention;

[0010] **FIG. 6** is an exploded view to show the joint, the collar and the stretcher or rib of the present invention;

[0011] **FIGS. 7A and 7B** show the metal collar is deformed to secure the cap and the stretcher or rib of the present invention;

[0012] **FIGS. 8A and 8B** show the metal collar is deformed to secure the joint and the stretcher or rib of the present invention;

[0013] **FIGS. 9A and 9B** show the metal tube on the joint is deformed to secure the collar and the stretcher or rib of the present invention;

[0014] **FIGS. 10A and 10B** show the metal tube on the cap is deformed to secure the collar and the stretcher or rib of the present invention;

[0015] **FIG. 11** shows the metal tube of the joint is pressed to form a plurality of recesses;

[0016] **FIG. 12** shows the metal collar is pressed to form a plurality of recesses, and

[0017] **FIG. 13** shows a part of the stretcher and rib of an umbrella.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0018] Referring to **FIGS. 5, 7A, 7B and 13**, an umbrella includes a shaft **100** with a runner **90** movably mounted to the shaft **100**. A finishing cap **900** is connected to a top of the shaft **100** and a plurality of ribs **40** are pivotably connected to the finishing cap **900** and a plurality of stretchers **30** are pivotably connected between the ribs **40** and the runner **90**. The caps **50** are mounted to distal ends of the stretcher and rib **30** and **40**, and the joints **60** are used to connect the stretchers **30** to the ribs **40**. A fabric **80** is connected to the ribs **40** and can be expanded out when moving the runner **90** toward the finishing cap **900**.

[0019] The stretcher or rib **30** or **40** of the present invention is made of compound material and the cap **50** has a tube **51** which is made of plastic or rubber. An end of the stretcher or rib **30** or **40** is inserted into the tube **51** via an opening **52** of the tube **51**. A metal collar **70** is mounted to the tube **51** and rolled to deform inward to clamp the tube **51** and the stretcher or rib **30** or **40** together.

[0020] Referring to **FIGS. 8A and 8B**, the joint **60** has a tube **61** which is made of plastic or rubber and the stretcher or rib **30** or **40** extends through the joint **60** and the tube **61**. A metal collar **70** is mounted to the tube **61** and rolled to deform inward to clamp the tube **61** and the stretcher or rib **30** or **40** together.

[0021] By this way, the stretcher or rib **30** or **40** is not damaged in shape and structure so as to improve the shortcoming of the conventional connection structure.

[0022] As shown in **FIG. 12**, the metal collar **70** can be pressed to form a plurality of recesses **72** to fix the tube **61** and the stretcher or rib **30** or **40** together.

[0023] Referring to **FIGS. 9A and 9B**, the stretcher or rib **30** or **40** is made of compound material and the joint **60** has a metal tube **63**. The stretchers or ribs **30** or **40** are extended through the joint **60** and the metal tube **63**, and a collar **71** made of plastic or rubber is mounted to the stretcher or rib

30 or **40** and received in the metal tube **63** which is rolled to deform inward to clamp the collar **71** and the stretchers or ribs **30** or **40** together. The metal tube **63** can be pressed to form a plurality of recesses **64** to fix the collar **71** and the stretcher or rib **30** or **40** together as shown in **FIG. 11**.

[0024] Referring to **FIGS. 10A and 10B**, the stretcher or rib **30** or **40** is made of compound material and the cap **50** has a metal tube **53**. An end of the stretcher or rib **30** or **40** is inserted into the metal tube **53**, and a collar **71** made of plastic or rubber is mounted to the stretcher or rib **30** or **40** and received in the metal tube **53** which is rolled to deform inward to clamp the collar **71** and the stretcher or rib **30** or **40** together.

[0025] While we have shown and described the embodiment in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

What is claimed is:

1. A connection between stretchers or ribs and caps, wherein the stretcher or rib is made of compound material and the cap has a tube, an end of the stretcher or rib is inserted into the tube, and a metal collar is mounted to the tube and rolled to deform inward to clamp the tube and the stretcher or rib together.

2. The connection as claimed in claim 1, wherein the cap is made of rubber or plastic.

3. A connection between stretchers or ribs and caps, wherein the stretcher or rib is made of compound material and the cap has a metal tube, an end of the stretcher or rib is inserted into the metal tube, and a collar is mounted to the stretcher or rib and received in the metal tube which is rolled to deform inward to clamp the collar and the stretcher or rib together.

4. The connection as claimed in claim 1, wherein the cap is made of rubber or plastic.

5. A connection between stretchers or ribs and joints, wherein the stretcher or rib is made of compound material and the joint has a tube, the stretcher or rib extends through the joint and the tube, and a metal collar is mounted to the tube and rolled to deform inward to clamp the tube and the stretcher or rib together.

6. The connection as claimed in claim 1, wherein the joint is made of rubber or plastic.

7. A connection between stretchers or ribs and joints, wherein the stretcher or rib is made of compound material and the joint has a metal tube, the stretchers or ribs are extended through the joint and the metal tube, and a collar is mounted to the stretcher or rib and received in the metal tube which is rolled to deform inward to clamp the collar and the stretcher or rib together.

8. The connection as claimed in claim 1, wherein the joint is made of rubber or plastic.

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