(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 350 752 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
08.10.2003 Bulletin 2003/41

(51) Int Cl.[7]: **B65H 75/22**

(21) Application number: **03252082.7**

(22) Date of filing: **02.04.2003**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

(30) Priority: **05.04.2002 US 370491 P**

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(54) Reel and method of assembly

(57) A reel and a method of assembling and disassembling the reel are described. The reel includes a pair of flanges (10), each flange engaged with the circular or polygonal end of a flexed stave pane formed from appropriately sized staves (20) connected to one another by one or more flexible bands (30). To make the reel, the staves (20) are aligned side by side and connected to one another by way of the flexible bands (30). Once connected, the staves (20) form the flexible stave pane having joints in between each stave. Assembly of the reel involves flexing the stave pane into a tubular barrel with circular or polygonal ends adapted to correspond with a stave-engaging portion (12) on each flange (10). Once one end is engaged with the stave-engaging portion of one flange, the opposing end of the flexed stave pane is engaged with a second stave-engaging portion on the second flange and the flanges are connected.

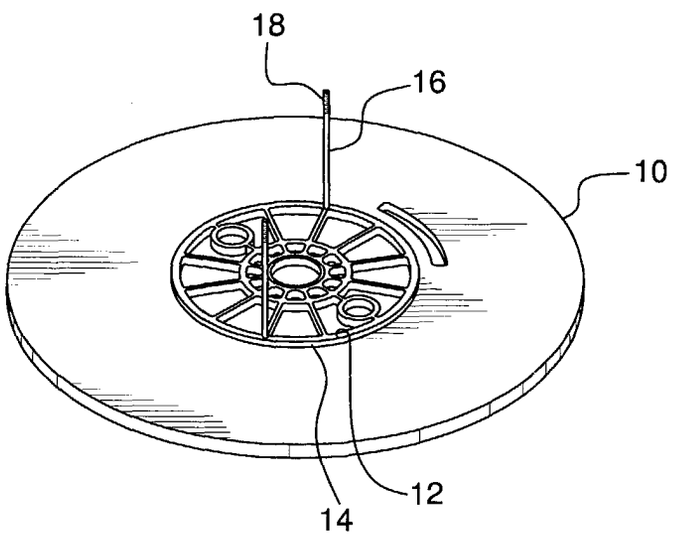

FIG. 1

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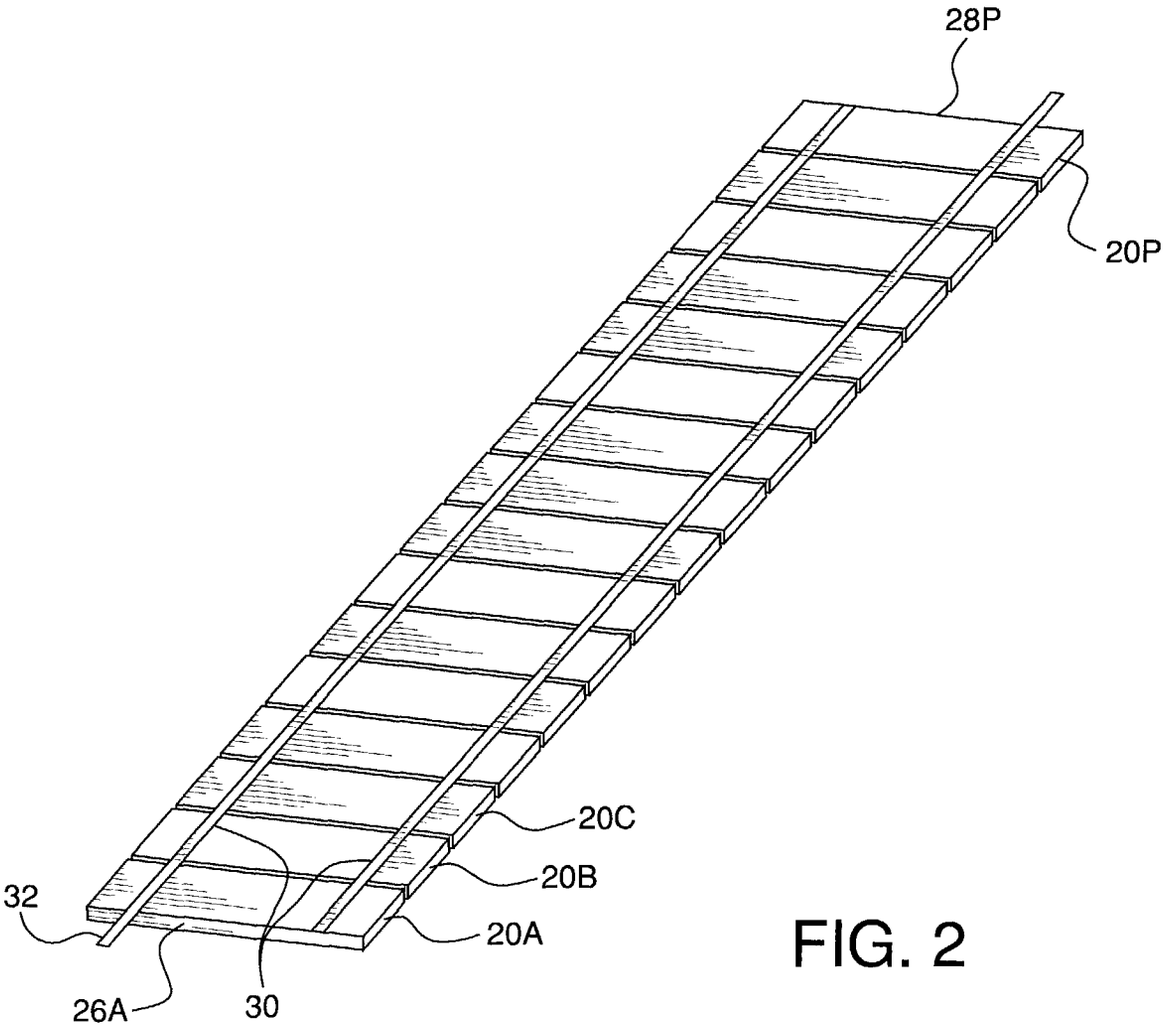

FIG. 2

Description

Cross-Reference to Related Application

[0001] The present application claims priority from U. S. Provisional Application No. 60/370,491, which was filed April 5, 2002.

Field of the Invention

[0002] The invention relates to a new reel for use in packaging, storage and shipment of cable, wire and other coiled products. The invention also relates to a method of assembling and disassembling such a reel.

Background of the Invention

[0003] Conventional reels used in the cable and wire industry are constructed of wooden staves supported by a pair of flanges or hubs. The flanges have circular grooves that engage the ends of each stave, thereby sandwiching the length of the staves between the flanges to maintain the staves in a barrel configuration. The two flanges are connected by a pair of bolts extending parallel to the axis of the barrel. Being otherwise unsupported, the arrangement of the staves becomes unstable if one of the flanges is removed. Thus, the barrel configuration tends to collapse if the supporting flanges are separated.

[0004] Generally two or more assemblers must cooperate to assemble the conventional reel. Each flange must be held perpendicular to the ground, against its tendency to fall flat due to gravity, and the flanges must be spaced apart by the approximate length of the staves. While holding up the flanges, the assemblers must carefully insert each stave, one by one, into the grooves of the flanges, all the while taking care so as not to displace the previously placed staves. Only after all of the staves have been individually placed can the flanges be bolted together to provide stability to the assembly.

[0005] Although relatively simple in theory, the conventional assembly of a reel is slow and methodical. Indeed, large amounts of time, patience and skill are required, much more of the first when one of the later are lacking. For these reasons, those in the cable and wire industry are reluctant to purchase a reel in need of assembly and more so to disassemble a reel once put together. Often then, reels are shipped and stored in their fully assembled state, even when empty of cargo, in order to save labor costs in assembly. Unfortunately, the practice of handling fully assembled empty reels adds significantly to the cost of shipping and storing the reels.

[0006] In order to avoid the cost of handling empty assembled reels, a need exists for a reel that can be assembled and disassembled efficiently, along with a method for doing so. Such a reel would not only cut the costs of initial assembly, but also encourage those in the field to disassemble empty reels to save on costs of shipping and storage.

Summary of the Invention

[0007] The invention solves these long felt needs by providing a new reel and method of assembling and disassembling the reel. To make the new reel, appropriate sized staves are aligned side by side and connected to one another by way of one or more flexible bands. Once connected, the staves form a flexible stave pane having joints in between each stave. In use, the reel is assembled by flexing the stave pane into a tubular barrel with ends fitted to correspond with a stave-engaging portion on each of a pair of flanges. Each end is engaged with the stave-engaging portion of one of the flanges and the two flanges are connected.

[0008] Thus, the assembled reel includes a pair of flanges, each flange engaged with the open end of a tubular barrel formed of a flexed stave pane produced from appropriately sized staves connected to one another by one or more flexible bands.

Brief Description of the Drawings

[0009] Figure 1 is a view of a first flange useable with the present invention.

[0010] Figure 2 is an isometric view of an unflexed stave pane according to the present invention.

[0011] Figure 3 is an isometric view of three staves from the front and above.

[0012] Figure 4 is a view of the stave pane of Figure 2, flexed and engaged with the first flange of Figure 1.

[0013] Figure 5 is a view of a second flange engaged with the assembly of Figure 4.

[0014] Figure 6 is a side view of an assembled reel according to the present invention.

Detailed Description of the Drawings

[0015] For the purpose of illustrating the invention, there is shown in the Figures a form which is presently preferred; it being understood that this invention is not limited to the precise arrangements and instrumentalities shown.

[0016] In Figure 1 there is shown a flange 10 having a stave-engaging portion 12 in the form of a groove 14. The groove 14 forms a circle around the center of the flange and is concentric with the outer edge of the flange 10. In some applications it is preferable to use a rim, a series of ribs or a skirt (not shown), rather than a groove, as the stave-engaging portion 12. A pair of bolts 16 extends perpendicular to the plane of the flange 10. Each of the bolts 16 includes a connection at its end 18 distal to the flange 10. The connection may be threads for receiving a nut, bores adapted to receive a locking pin, a flattened region capable of receiving a gripping device, etc. For reasons that will become clear below, it is pre-

ferred that the bolts 16 be closer to the center of the flange 10 than is the groove 14. Depending on the size and intended use of the reel, the flange may be formed from a variety of rigid materials, such as plastic, wood, metal, polyfiber, wood/plastic composites, rigid elastomers, etc., as well as combinations of these.

[0017] An arrangement of staves 20 is shown in Figure 2, the three staves closest to the observer being labeled 20a, 20b and 20c and the stave farthest from the observer being labeled 20p. Although sixteen staves are shown (20a through 20p), more or less may be used. It will become clear from the following description that the actual number of staves to be used depends on the width of each stave and the desired diameter of the reel barrel to be formed. Staves 20 are preferably wooden, but may alternatively be formed of many rigid materials, such as plastic, paperboard, cardboard, metal and the like, as well as composites and combinations thereof.

[0018] Referring briefly to both Figures 2 and 3, each stave 20 has an inside face 22, which faces upwardly in Figures 2 and 3, and an outside face, which is oriented downwardly and is not visible in Figures 2 and 3. In practice, the inside face 22 is normally facing away from the ground or assembly fixture while the stave pane is assembled. Each stave 20 also has a pair of minor sides 24 and a pair of major sides. The first major side of each stave, which is oriented in the direction of stave 20a in Figure 2 (i.e., the major side that is closest to stave 20a, except, of course, for that of stave 20a itself), is shown as element 26. The second major side of each stave, which is oriented in the direction of stave 20p, is labeled as element 28.

[0019] In order to make a reel according to the present invention, the staves 20 are aligned side by side, as shown in Figure 2. The first major side 26 of each stave is arranged adjacent the second major side 28 of the next, leaving only first major side 26a and second major side 28p unmatched. With the staves 20a through 20p properly aligned, one or more flexible bands 30 are attached to the staves 20 transversely to the length of each stave, two bands being shown in the Figures. The flexible bands 30 may be attached to the staves using mechanical fasteners, such as staples, screws, tacks, etc., or by an adhesive. The bands 30 may be formed from any material having adequate flexibility and adequate strength to hold the stave pane together under expected stress caused by movement or flexing. Such materials include flexible plastics, such as polyethylene or nylon; rubber; thin metal, fabric, cloth and the like. The flexible band could also be a rigid material with folding points in between the staves. It is preferred that at least one band 30 include an extension portion 32, which projects past the exposed major side 26a or 28p.

[0020] With the staves 20 connected to one another by one or more flexible bands 30, a reel can be easily assembled and disassembled. The stave pane is flexed and major sides 26a and 28p are juxtaposed to form a tubular barrel 34 having an approximately circular cross section as shown in Figure 4. The staves may be curved so as to have a concave inside face 22 and a convex outside face. When appropriately curved staves are used, the transverse cross section and ends of the barrel will be a circle or very closely approximate a circle. Where flat staves are utilized, the cross section is polygonal. By increasing the number of flat staves, a circular cross section is more closely approximated.

[0021] The direction of flex should be that which results in the connecting bands 30 and inside faces 22 of each stave on the inside of the barrel 34. As shown in Figure 4, the barrel 34 may be held closed by attaching the extension portion 32 of one or more bands 30 to the stave into which it comes in contact. The flexed stave pane, in the form of barrel 34, is engaged with the stave-engaging portion 12 of flange 10, by, in the preferred embodiment, inserting one of the minor sides 24 (Figure 3) of each stave into the groove 14 (Figure 1). If the stave-engaging portion 12 is a skirt or ribs instead of a groove, the inside face 22 of each stave is positioned against the skirt or ribs.

[0022] During assembly, each stave 20 is provided with lateral support by the staves to which it is connected. Thus, the flexed stave pane can be engaged with the stave-engaging portion while the flange 10 is safely lying on the ground or on an assembly fixture. Unlike the assembly of a conventional reel, there is no absolute need to support the flange in an unstable upright position while the staves are engaged. Bolts 16 are located on the inside of barrel 34 for holding the reel together once assembled and preserving the polygonal or circular cross section of the outside of the barrel 34.

[0023] A second flange 36 is similar to flange 10. As shown in Figure 5, the second flange 36 has apertures 38 for receiving the distal ends 18 of bolts 16. The flexed stave pane engages a stave-engaging portion (not shown) on second flange 36 in a fashion similar to that of first flange 10. Nuts or other connecting devices are then affixed to distal ends 18 in order to secure the assembly together.

[0024] Thus, a reel as shown in Figure 6 is produced. The reel includes a first flange 10 connected to a second flange 36, and a barrel 34, which is formed from staves attached to one another by a flexible band, sandwiched between the flanges.

[0025] Certain possible modifications to the embodiment shown in the drawings should be apparent to those skilled in the art. For example, the staves need not all be of equal width and length. If a reel barrel with a non-regular polygonal cross section is desired, one or more staves may be incorporated that have greater or lesser widths than the others. If it is desired that the barrel have a fixed orientation relative to the flanges, one or more of the staves may have a longer or shorter length than the others. The lengthened or shortened stave may then correspond with an indentation or tab provided on the stave-engaging surface to act as a key.

[0026] After loading the reel with cable, wire or other

coiled product and subsequently unloading the cargo, the reel can be easily disassembled for efficient shipment and storage thereof. To do so, the connecting devices are removed from the distal ends 18 of the bolts 16 and the second flange 36 is removed. The barrel 34 is then easily disengaged from its engagement with flange 10 and the stave pane unflexed to once again take the shape shown in Figure 2. In this disassembled state, the reel can be handled more efficiently than an assembled reel. When the reel is required to again take up a coiled product, it is easily transformed back to its assembled state by the method described above.

[0027] As noted above, a variety of modifications to the embodiments described will be apparent to those skilled in the art from the disclosure provided herein. Thus, the present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification, as indicating the scope of the invention.

Claims

1. A method of assembling a reel comprising:

aligning a plurality of staves side by side;
connecting the staves with one or more flexible bands to form a stave pane;
flexing the stave pane to form a tubular barrel;
engaging each end of the barrel with a stave-engaging portion of a flange; and
securing the flanges engaged with each end of the barrel to one another.

2. The method of claim 1 wherein the barrel has a substantially circular cross section.

3. The method of claim 1 wherein the connecting step comprises the steps of positioning the flexible band adjacent each stave and mechanically fastening the band to each stave.

4. The method of claim 3 wherein the step of mechanically fastening comprises stapling the band to each stave.

5. The method of claim 1 wherein at least one flexible band comprises an extension portion extending past an end of the stave pane.

6. The method of claim 5 further comprising the steps of attaching the extension portion to the end of the stave pane opposite the end from which it extends.

7. The method of claim 1 wherein the flexible band is polyethylene.

8. The method of claim 1 wherein the securing step comprises the step of attaching the two flanges with a bolt.

9. A reel comprising:

a stave pane formed from a plurality of staves connected to one another by one or more flexible bands, the stave pane being flexed into an open-ended tubular barrel;
first and second flanges connected to one another, each flange having a stave-engaging portion engaged with one of the ends of the barrel.

10. The reel of claim 9 wherein the one or more flexible bands are attached to the inside surface of the barrel.

11. The reel of claim 9 wherein the stave-engaging portion is a circular groove.

12. The reel of claim 9 wherein the stave-engaging portion comprises ribs.

13. The reel of claim 9 wherein the stave-engaging portion is a skirt.

14. The reel of claim 9 wherein the flanges are connected by a pair of bolts extending parallel with the axis of the barrel.

15. The reel of claim 9 wherein the flexible bands are plastic.

16. The reel of claim 9 wherein the flexible bands are strips of cloth.

17. The reel of claim 9 wherein the flexible bands are connected to each stave by staples.

18. The reel of claim 9 wherein each stave has a concave inside face and a convex outside face.

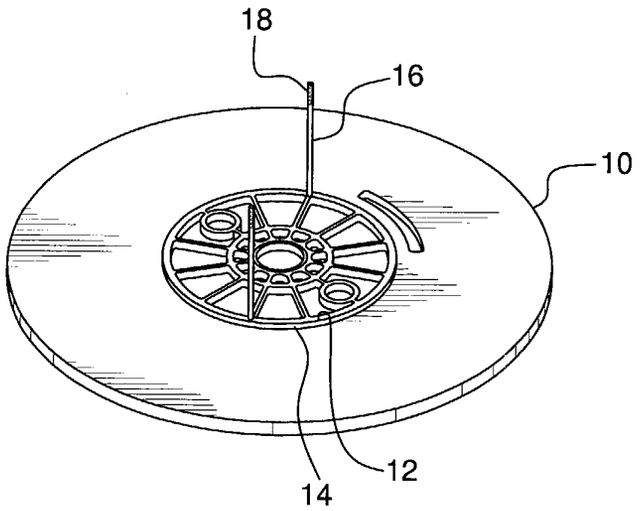

FIG. 1

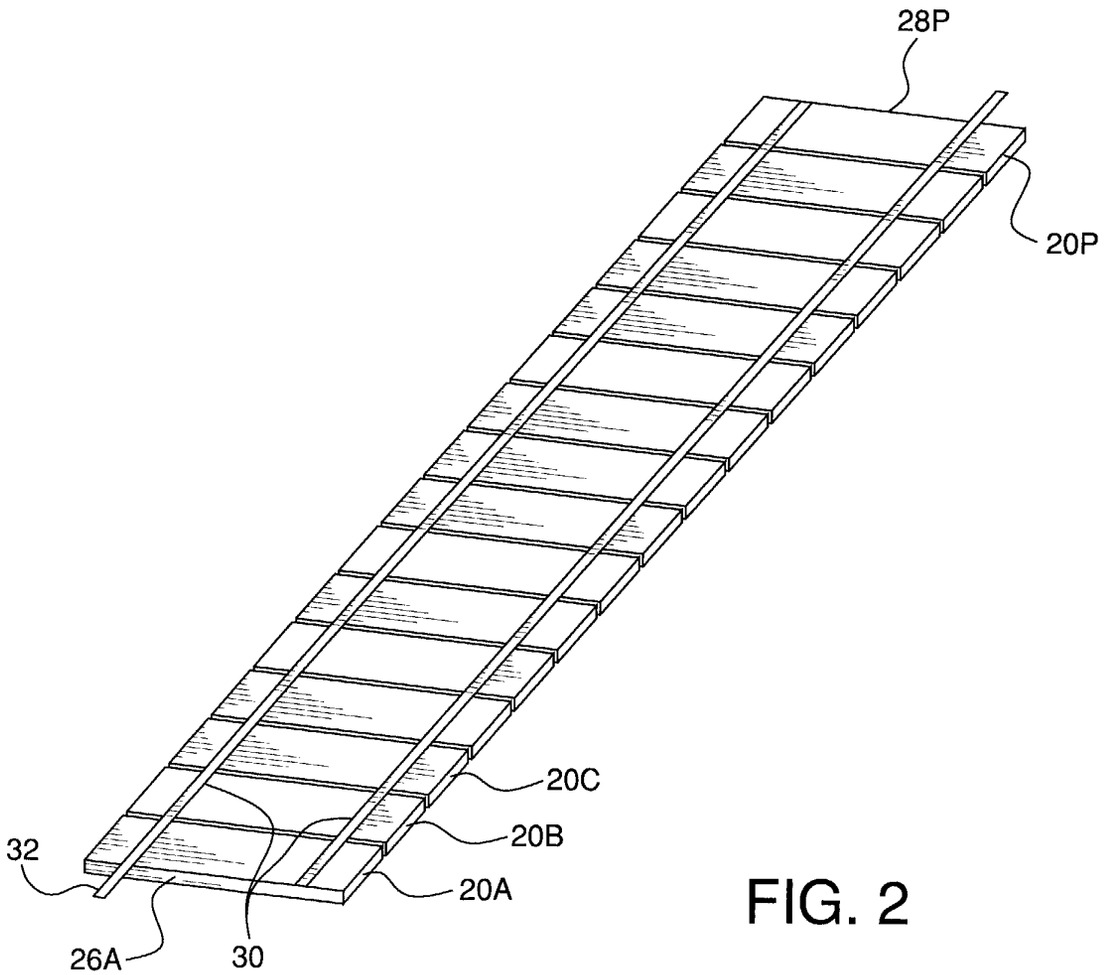

FIG. 2

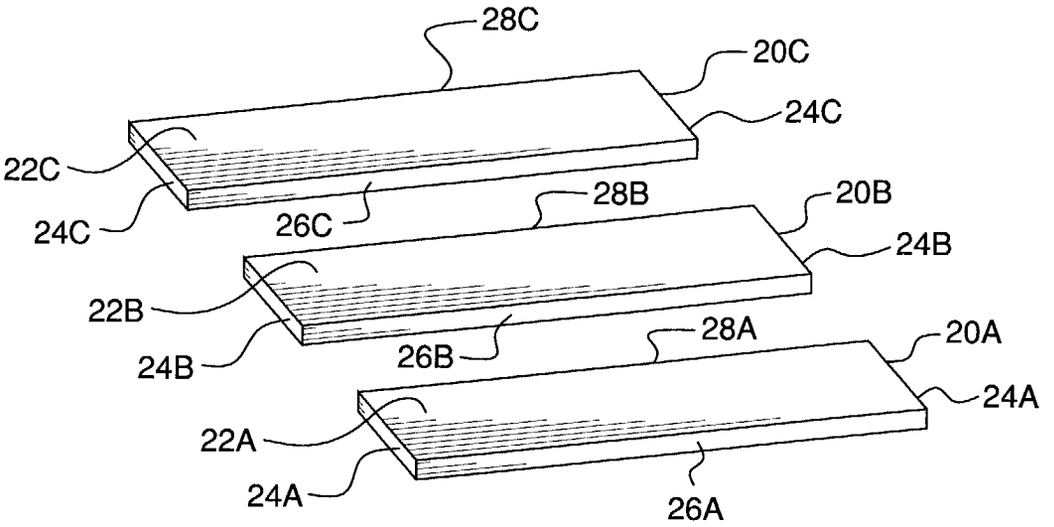
28C
20C
24C
22C
24C
26C
28B
20B
24B
22B
24B
26B
28A
20A
24A
22A
24A
26A

FIG. 3

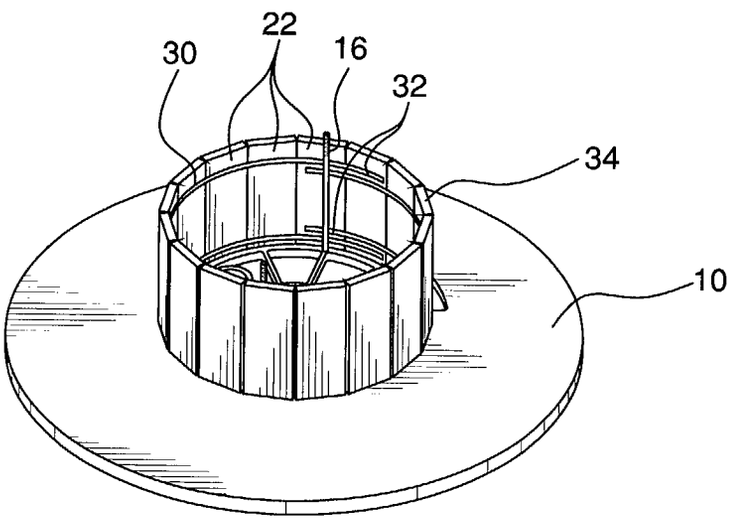
22
30
16
32
34
10

FIG. 4

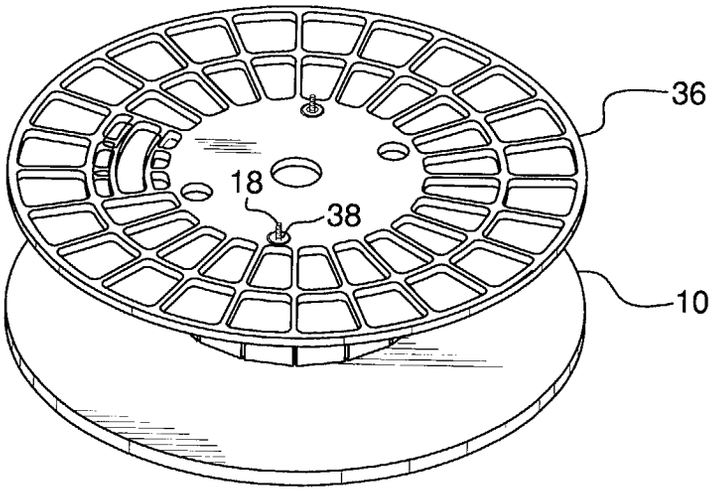

FIG. 5

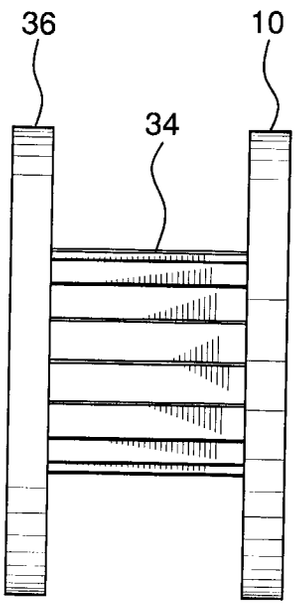

FIG. 6