United States Patent

Newman

[15] **3,689,005**

[45] **Sept. 5, 1972**

[54] **PACKAGE OF FLEXIBLE MATERIAL WITH TWISTLESS PAYOUT**

[72] Inventor: **James W. Newman,** Scarsdale, N.Y.

[73] Assignee: **Windings, Inc.,** Yonkers, N.Y.

[22] Filed: **Feb. 8, 1971**

[21] Appl. No.: **113,319**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 819,777, April 28, 1969, abandoned, which is a continuation-in-part of Ser. No. 810,990, March 27, 1969, abandoned.

[52] **U.S. Cl.** **242/163**

[51] **Int. Cl.** **B65h 55/02**

[58] **Field of Search**.....242/163, 170, 171, 172, 159, 242/129

[56] **References Cited**

UNITED STATES PATENTS

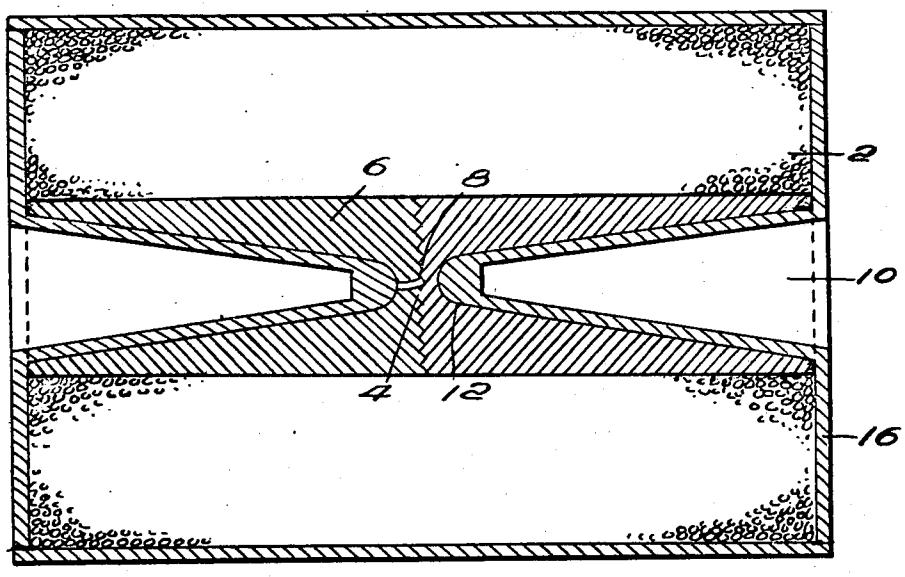
2,634,922	4/1953	Taylor, Jr.	242/163
2,767,938	10/1956	Taylor, Jr.	242/163
2,828,092	3/1958	Taylor, Jr.	242/163

Primary Examiner—Stanley N. Gilreath
Attorney—Jennings Bailey, Jr.

[57] **ABSTRACT**

A package of flexible material formed by a plurality of layers each composed of a series of figure-8's has a radial opening thereinto through which the inner end of the material is led out of the package. Generally conical members with rounded points extend into the axial space within the package from each end, the tips of the conical members being spaced apart by a distance only slightly greater than the greatest cross-sectional dimension of the flexible material, or being movable apart to provide such a space. The conical members are supported so as to be out of contact with the flexible material. A number of such packages are mounted in a container, the conical members being carried by the walls of the container and the flexible material of the packages being successively connected to each other.

15 Claims, 18 Drawing Figures



PATENTED SEP 5 1972 3,689,005

SHEET 1 OF 5

Fig. 1.

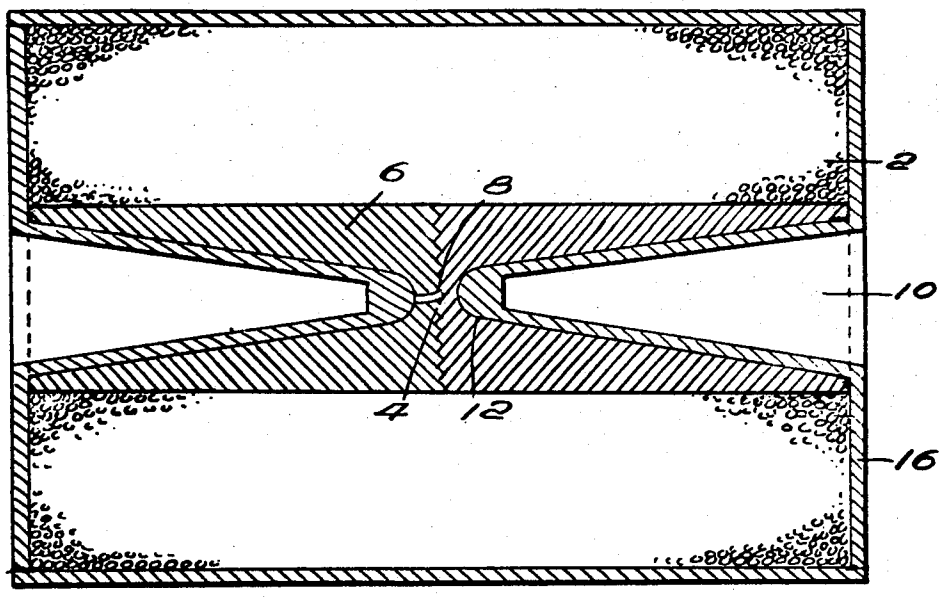
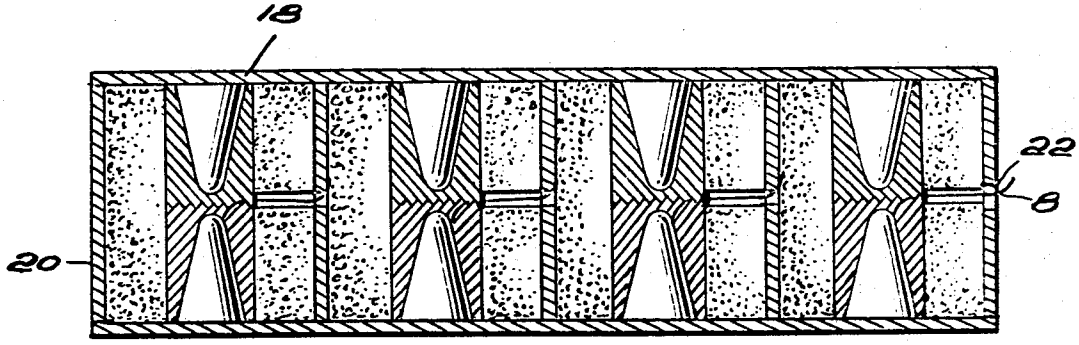


Fig. 2.



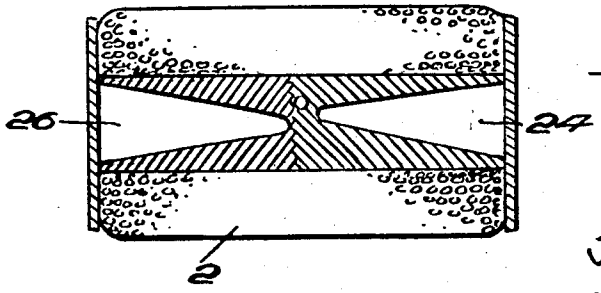


Fig. 3.

INVENTOR

JAMES W NEWMAN

BY Jennings Bailey Jr

ATTORNEY

Fig. 4.

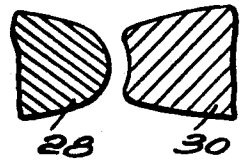


Fig. 7.

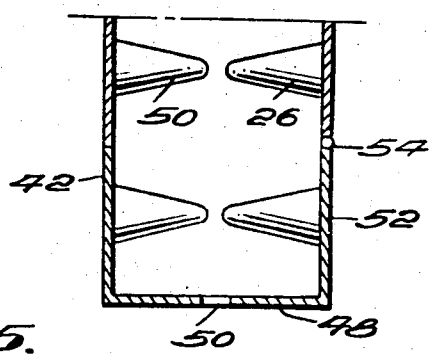


Fig. 5.

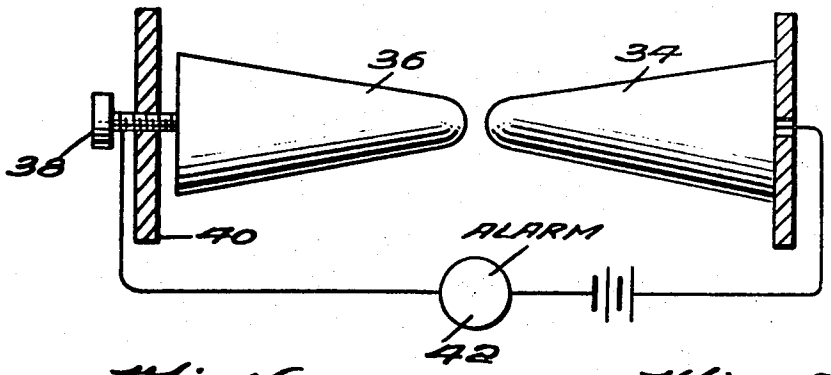


Fig. 6.

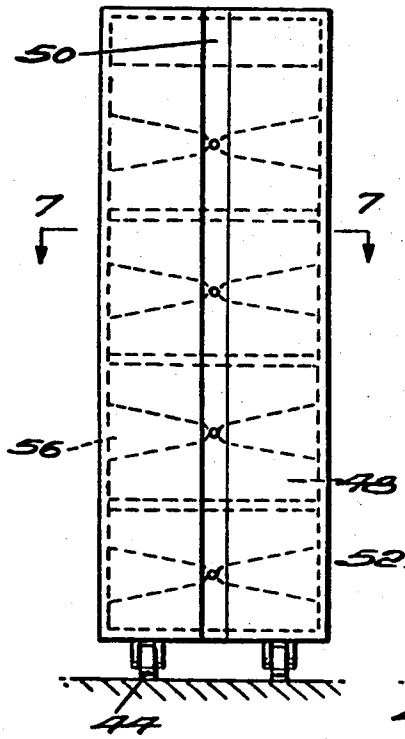
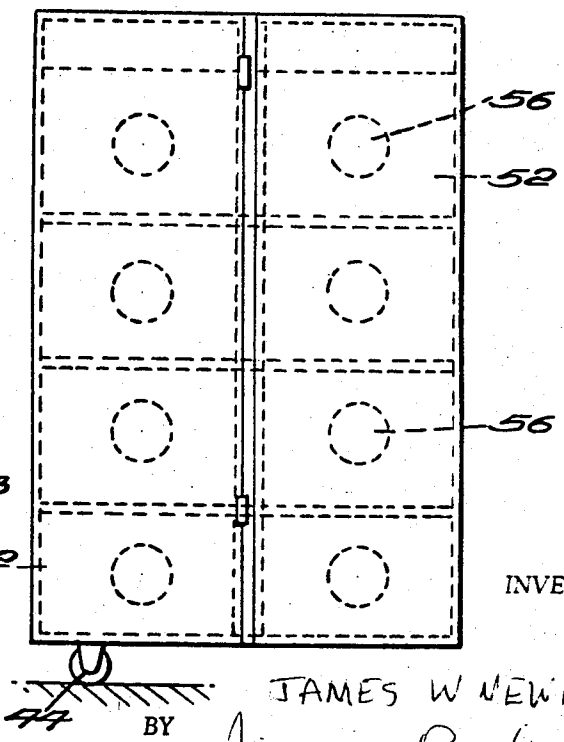


Fig. 8.



INVENTOR

JAMES W NEWMAN

BY

Jennings Bailey, Jr.

ATTORNEY

Fig. 9.

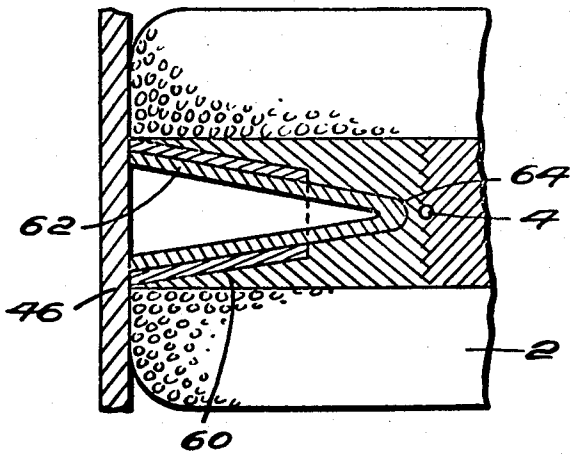


Fig. 10.

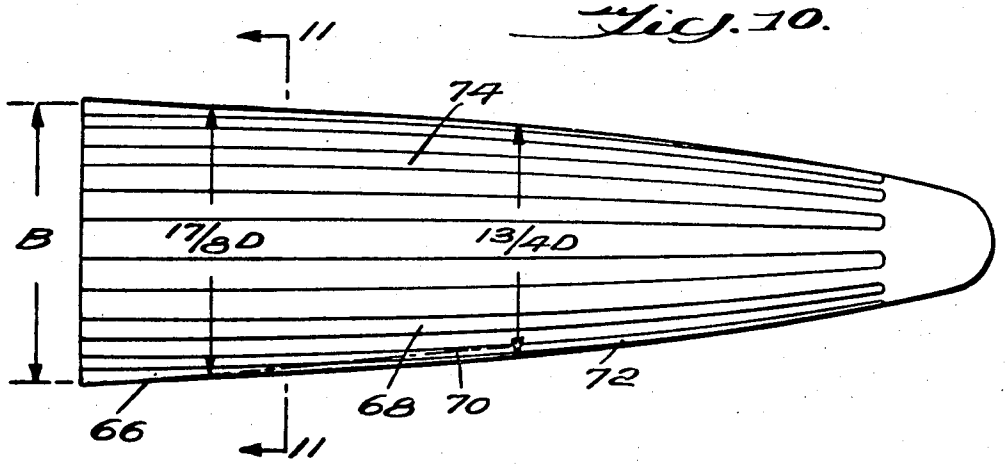
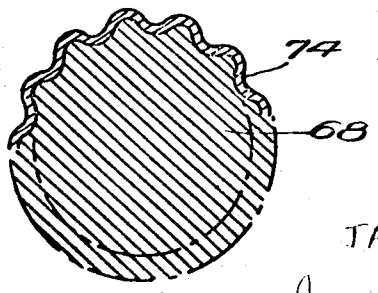


Fig. 11.



INVENTOR

JAMES W NEWMAN

BY

ATTORNEY

Fig. 12.

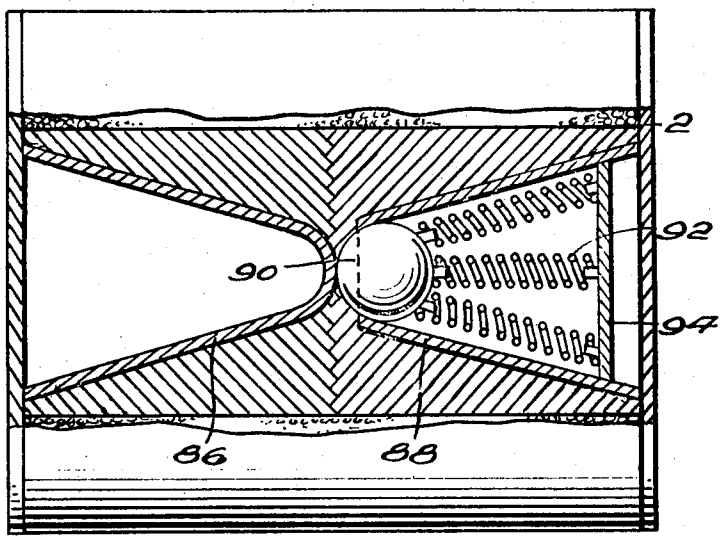


Fig. 13.

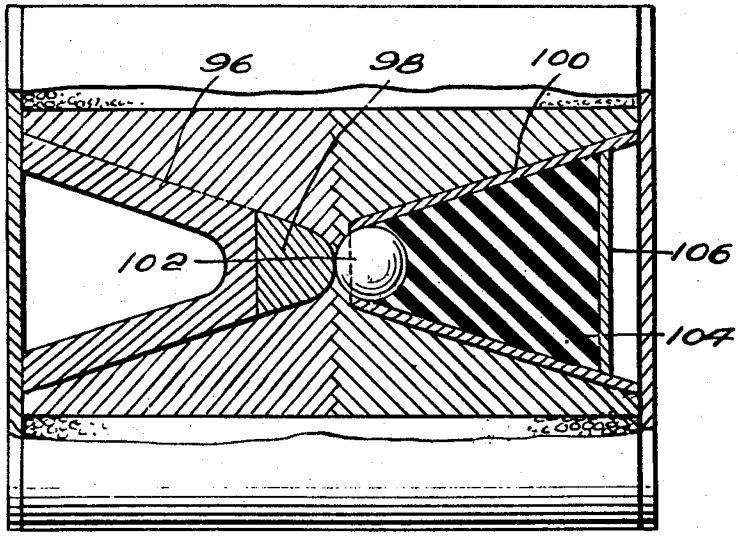
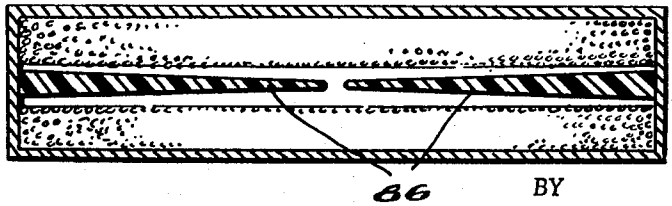


Fig. 18



INVENTOR
JAMES W NEWMAN

BY Jennings Bailey Jr.
ATTORNEY

Fig. 14.

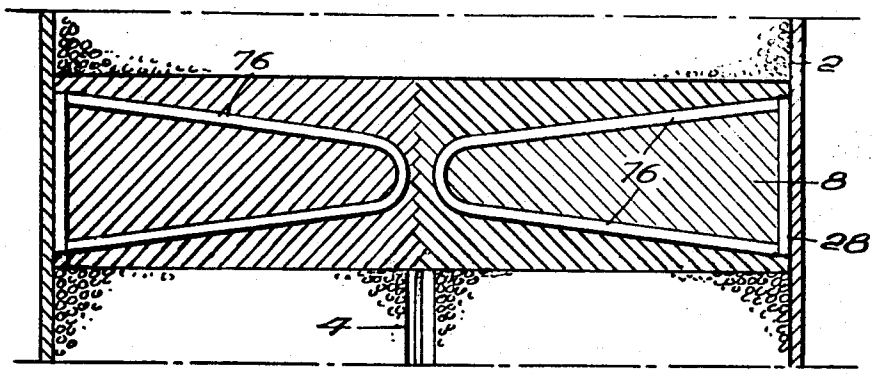


Fig. 15.

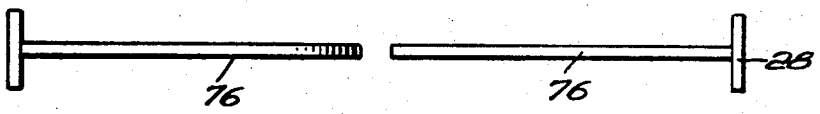


Fig. 16.

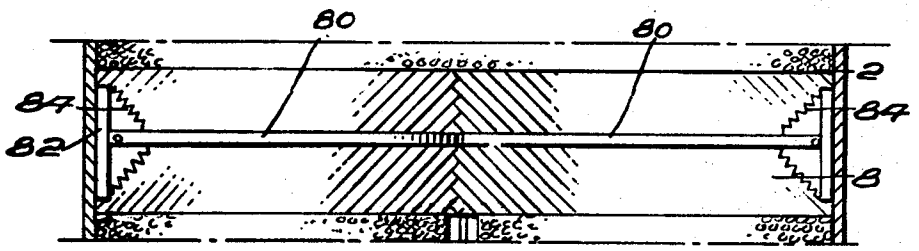
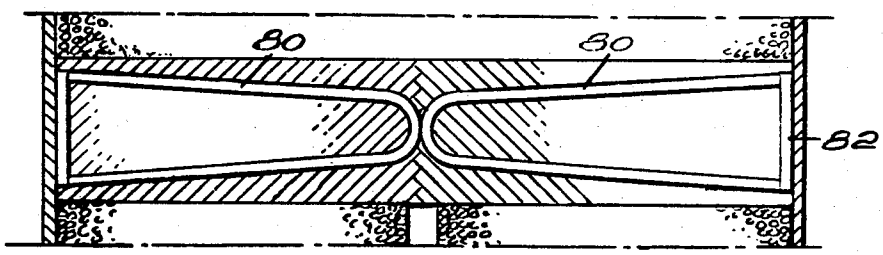


Fig. 17.



INVENTOR

JAMES W NEWMAN

BY Jennings Bailey, Jr.

ATTORNEY

PACKAGE OF FLEXIBLE MATERIAL WITH TWISTLESS PAYOUT

PRIOR APPLICATIONS

This application is a continuation-in-part of application Ser. No. 819,777,filed Apr. 28, 1969, now abandoned, which is in turn a continuation-in-part of application Ser. No. 810,990, filed Mar. 27, 1969, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to packages of flexible material of a universal type having a radial opening through which the inner end of the material is led out for twistless payout.

2. The Prior Art

Taylor U.S. Pat. No. 2,767,938 shows a package of flexible material formed of layers each composed of a plurality of figure-8's, with the free inner end of the material led out through a radial opening.

Taylor U.S. Pat. No. 2,828,092 shows such a package in which the inner surfaces of the end portions of the internal surface of the axial opening are frusto-conical and are supported during handling by short conical members extending partly into the package. These cones are held in place by the material of the package.

SUMMARY OF THE INVENTION

Packages of the type shown in the Taylor patents referred to have proven satisfactory for twistless payouts at low speeds. However, at high speeds there appears to be no way to insure that in the course of a payout of substantial yardage from such packages, a working loop will not half-hitch a loose loop before the payout through the hole is effected. This results in interference with a smooth payout of the material, and may stop it altogether.

It is an object of the present invention to provide an arrangement which greatly improves the payout from packages of this type at high speeds.

Furthermore, since the wind itself pays out from an air core through a radial hole in twistless form, and this type of payout is essential to the package, and since there is a limit to the size of a package in which the last coils paid out will sustain themselves even with the addition of applied chemicals that are not adhesives, there is a premium on being able to cascade packages in a continuous manner. This requires splicing for wires, rope and certain types of yarn, requires knots for certain other types of yarn, and for still other types of yarn requires special joining procedures that are chemical in nature.

It is a further object of the invention, therefore, to provide a system for cascading packages of this type with which rapid payout of long lengths of flexible material is possible.

It has been found that conical inserts into the ends of the air core which almost meet one another or meet one another with separate contact opposite the position of the radial hole and which perform a function which prevents the half-hitch from forming and yet does not provide significant resistance to payout if the surfaces of the cones are smooth at all points.

In order to provide support for cascaded packages, there are provided molded covers of paper board or the like with conical protrusions into the several air cores of cascaded coils, top and bottom and these covers are supported in a way that makes the cones stand apart from one another at least to the extent of the diameter of the material, or even twice the diameter, in order to insure easy exit of the loops as they slide toward the point of the cone and go on their way out.

A package containing two such opposing cones may be protected from pressure that would push the points together. This can be done by having the angle of one cone slightly greater than the angle of the opposing cone, so that the points do not center on one another and therefore actual pressure of the points on one another does not occur. Another way of accomplishing the same thing is to have one cone open ended and the other closed ended with the closed end being smaller so that it can project into the open end of the other cone. Still another solution is to have the tip portion of at least one of the cones mounted for movement away from the tip of the other cone, the tips then being normally in contact with each other.

Such a package provides for a method of holding the cones in place independently of the material itself. The pressure of flat corrugated inserts lining the exterior package holds the cones in place. At the same time, the cones perform the function of securing the material in the package so that each coil does not press on the other during shipment and handling.

There is a slit on the outside package so that the coils do not have to be removed at all but can be paid out completely, leaving an empty carton when the payout is completed. The carton can also be the shipping container.

Since the ultimate objective is to secure packaging that will provide for high-speed, long-length payout in convenient winding sizes and handleable packages that are in effect shipping containers, a pay-off dolly can be arranged that will house one or two rows of coils of six dispensing packages each containing in turn six coils. Each of these would be connected by joining of the ends in the most appropriate manner. To this dolly might be attached permanent cones on hinged doors that could be opened and closed; being opened when the dolly is not being used or when packages are being inserted into the dolly. Cones can also be connected to a source of electrical energy which would reflect when they touch inside the package so that each cone could be adjusted slightly to provide the optimum space between the cone points for payout purposes. Each cone can have a knob or an adjusting attachment that would enable it to be screwed out or in to get to the optimum position. Each coil will be connected to the next coil by joining and each of the series of six will be joined together. The dolly has pulleys top and bottom to transfer the line from package to package. This conical arrangement will replace cones built into the packages themselves.

Another arrangement contemplated is to have the packages contain paper or plastic cones with the points cut off so that, instead of permanent cones being inserted into the packages as they are placed on the dolly, permanent points will protrude through an endwise opening in the cone which is created by cutting off its point. These points could also be given electrical

charges that would assist in placing them in precisely the right position.

In another form of the invention, the cones are arranged to meet at the center of the package, the tip of at least one of the cones being formed by a ball which is movable away from the other cone against a resilient or magnetic force by the entry of the flexible material into the gap between the ball and the other cone. This securely prevents any dropping of a bight of the flexible material through the gap between cones except when tension is applied for the purpose of withdrawing material.

According to a further feature of the invention, the members are not truly conical, but taper only in one direction, either in a plane radial to the hole or a plane transverse to the hole, being otherwise substantially flat. Such parts may if desired be mounted for normal contact with each other, and be angularly movable by the flexible material in order to allow it to slide between them.

It is a further feature of the invention that the cones are supported by the enclosure of the package, and not by the wound material, being out of contact with the flexible material until it is withdrawn from the package. This prevents possible interference with the withdrawal of the material.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** shows in cross-section a package of flexible material embodying the invention;

FIG. **2** shows in cross-section a plurality of such packages in cascaded form enclosed in a container;

FIGS. **3**, **4** and **5** show modified cone arrangements;

FIG. **6** shows an end view of a dolly for holding a plurality of packages;

FIG. **7** is a cross-section on the line **7—7** of FIG. **6**;

FIG. **8** is a side view of the dolly;

FIG. **9** is a cross-section through a portion of modified form of package holding dolly;

FIG. **10** shows in side elevation a modified form of conical member having a shape specifically designed to facilitate the sliding of the bights;

FIG. **11** is a cross-section on a line **11—11** of FIG. **10**;

FIG. **12** shows in cross-section a modification using a movable ball;

FIG. **13** is a cross-section through still a further modification;

FIG. **14** shows in cross-section a package utilizing still another arrangement;

FIG. **15** is a view of the guide members at right angles to FIG. **14**;

FIG. **16** shows in cross-section a part of a package with still a further modification;

FIG. **17** is a view of the members of FIG. **16** at right angles thereto; and

FIG. **18** shows a further modification.

Referring to FIG. **1**, the package **2** is formed of flexible material, such as wire, thread, yarn, tape or other material of any cross-section formed, for example, in the manner shown in one of the Taylor Pat. Nos. 2,634,922 and 2,767,938. Such a package is constituted by a plurality of layers of figure-8 coils, the cross-overs of which progress around the package. By interruption of the cross-overs or in some other suitable way the package is provided with a radial opening **4** into the central axial opening **6**. The free inner end **8** of the material is led out through this radial opening.

According to the present invention, two conical members **10** are inserted one into each end of the package. The inner ends **12** of these conical members are cut or rounded off. The space between the ends **12**, which is opposite the radial opening **4**, is somewhat larger than the diameter (or, in the case of non-round products, the greatest cross-sectional dimension) of the flexible material. However, this space should not be more than about four times as great as said diameter. Also, the conicity of the cones is such that, if their ends were not rounded off, the apexes of the cones would lie at least as far from their bases as the position of the hole.

In order to maintain the spacing between the inner ends of the cones, they are held in position by an enclosing container formed of a cylindrical wall **14**, which has a hole opposite the hole **4**, and end walls **16**. The cones are supported by the walls **16**, out of contact with the wound flexible material. For cheapness of manufacture, the container may be formed of pressed fiber or the like, the cones being formed integral with the end walls.

The cones not only give a certain support to the package during handling and shipment, but also act to guide the loops as they are pulled off from the inner wall of the package and prevent them from entangling with each other and creating a snarl.

FIG. **2** shows a shipping or dispensing container for a plurality of cascaded packages **2**. This is composed of top and bottom walls **18** and **20**, from each of which a plurality of opposed cones **10** project inwardly. The walls **18** are connected by side walls **20**. One end wall has an opening **22** therein opposite the hole **4** of the adjacent package, and the free end **8** of the material is led out through hole **22**. The outer end of the material in the first package is connected to the outwardly extending inner end of the next succeeding package. The whole group of packages may thus be fed out without interruption.

FIG. **3** shows a modified form of package in which at least one of the cones is other than a right cone, that is, the axis of at least one of the cones **24**,**26**, and preferably the axes of both cones, form slight angles with the longitudinal center line of the package, the ends then not being opposite each other. The result is that slight inward movement of one or both cones will not bring their inner ends into contact, and the danger of interference with payout is thus decreased.

FIG. **4** shows two cone ends **28** and **30**, end **28** being rounded and end **30** being somewhat rounded and also provided with a recess **32** in its tip, thus permitting a certain movement of one or both of the cones without causing contact between them.

FIG. **5** shows another arrangement. At least one of the cones **34**,**36** is carried by a threaded member **38** which is threaded in the wall **40** of the container. The cones are of metal or other electrically conducting material and are connected by a circuit including a battery and an alarm **42** such as a bell or light. If the cones are brought too close together, a current will flow and sound the alarm. Also, by bringing the cones to the

point of contact and then backing cone **36** off by turning the threaded member **38** a predetermined number of turns the space between their ends can be adjusted quite accurately.

Referring to FIGS. **6–8**, a dolly construction is shown mounted on wheels **44**. This has a solid back wall **46**, end walls of which the wall **48** has vertical slot **50** running the length thereof, and a front wall formed principally by doors **50** hinged at **52**. The doors **52** and the back wall **46** carry opposed cones **46** and **58**, there being a number of vertical columns of such cones one behind the other.

In using the device, the doors are opened and packages are introduced with their holes pointing toward the slot **50**, the various packages being cascaded from row to row. The door **52** is then closed and the cones properly support the package and guide the material in its withdrawal.

If it is desired to have the package provided with at least some stabilization during shipping, the arrangement of FIG. **9** may be used. In this device, the package itself is provided with frusto-conical members **60** which may be formed of pressed fiber, paper or the like for economy, while the walls of the dolly, such as the back wall **46** carry metal cones **62** with rounded ends **64** adjacent the hole **4**. The cones interfit with each other and the metal cones **62** extend almost to the center of the package, so as to guide the loops during withdrawal.

In the form of FIGS. **10** and **11**, the first part **66** of the guide member has only a slight conicity; the second part **68** is however curved out slightly from the projection of the surface of part **66**, while the remaining portion **72** is curved inward to a rounded tip.

As shown in FIGS. **10** and **11**, this as well as the other forms may, in order to reduce frictional resistance, be provided with grooves **74** running lengthwise and terminating at a short distance from the tip.

In the form of the invention shown in FIG. **12**, there are positioned within the axial opening in the package **2** a pair of cones **86** and **88**. Cone **86** has a round end, while cone **88** has its free end open and in this open end is seated a ball **90** which is at least slightly larger than the opening in the cone **88** so that it is retained therein in a position to engage the end of the cone **86**. The ball **90** is pressed against the end of the cone **86** by springs **92** carried by a supporting member **94**.

In the form of FIG. **13**, the cone **96** has a rounded end portion **98**, while cone **100** has an open end in which is seated a ball **102**. The ball may be pressed against the end portion **98** of cone **96** by a body of rubber **104** held in place by a plate **106**, or the tip portion **98** of cone **96** may be made of permanently magnetized material so that it will attract the ball **102**. Both arrangements may be used if desired.

In forms of FIGS. **12** and **13**, as well as in FIGS. **15** and **16**, to be described below, the ends of the conical members are in contact but are removable from each other by the pulling of a loop against the tips of the conical members.

FIGS. **14** and **15** show a package **2** with an axial opening **8** and a radial opening **4**. The guide members **76** are tapered and are mounted on members **78**. They are spaced apart a slight distance at their inner ends. The members **76** however taper only in one plane, and are substantially flat in the plane through the axis of the radial hole **4**.

In FIGS. **16** and **17**, similar members **80** are mounted by pivots **81** on members **82** at the ends of the package **2**. These are normally held in the intermediate position shown by springs **84**. They taper in one plane but are substantially flat in a plane perpendicular to the radius of the hole **4**. In this form, when the material is withdrawn the loops slip between the ends of the members **80** by moving them slightly towards the hole against the action of the springs.

In FIG. **18** is shown a long, thin package, the axial dimension of which is several times its diameter. The cones **86** are thin and are formed of a flexible material such as rubber.

I claim:

1. A package of flexible material comprising a plurality of layers each formed of a plurality of figure-8 winds with the cross-overs of the winds progressing around the package, said package having a radial opening therein midway of its length, and having an axial opening into which such radial opening extends, and the free inner end of the material being led out through said radial opening, said package including a pair of inwardly tapering members extending into said axial opening from each end terminating adjacent the hole, the points of said tapering members being cut away, the distance between the apices of each of the tapering members and the base thereof being substantially at least as great as the distance between the base and the transverse midplane of the package, whereby to guide loops of material withdrawn from the package to said transverse midplane for payout through said radial opening.

2. In a package as claimed in claim **1**, the distance between the ends of the tapering members being not more than five times the greatest cross-sectional dimension of the flexible material.

3. In combination with a package as claimed in claim **1**, an enclosing member having walls opposite each end of the axial opening, the tapering members being carried by said walls.

4. A package as claimed in claim **1**, in which the axes of the tapering members are noncoincident.

5. A package as claimed in claim **1**, in which means are provided mounting at least one of the tapering members for longitudinal adjustment, said members are of electrically conductive material and an electric circuit including an indicating means is connected to said members.

6. A package as claimed in claim **1**, in which the tapering members are conical and have longitudinal grooves in the outer surface thereof.

7. A package as claimed in claim **1**, in which the tapering members have separable normally contacting surfaces.

8. A package as claimed in claim **1**, in which the tapering members are conical, at least one having an open end and a ball in said end normally engaging the tip of the other conical member, and means urging the ball into contact with such tip.

9. A package as claimed in claim **1**, in which the axial opening is of substantially constant diameter and the larger ends of the tapering members are of substantially the same diameter as the axial opening.

10. A package as claimed in claim 1, in which the ends of the axial opening are of at least as great diameter as the diameter of the axial opening at the transverse midplane of the package.

11. A package of flexible material comprising a plurality of layers each formed of a plurality of figure-8 winds with the cross-overs of the winds progressing around the package, said package having a radial opening therein midway of its length, and having an axial opening into which such radial opening extends, and the free inner end of the material being led out through said radial opening, said package including a pair of inwardly tapering members extending into said axial opening from each end terminating adjacent the hole, the points of said tapering members being cut away, the distance between the apices of each of the tapering members and the base thereof being greater than the distance between the base and the transverse midplane of the package.

12. In combination with a package of flexible material comprising a plurality of layers each formed of a plurality of figure-8 winds with the cross-overs of the winds progressing around the package, said package having a radial opening therein midway of its length, and having an axial opening into which such radial opening extends, and the free inner end of the material being led out through said radial opening, said package including a pair of inwardly tapering members extending into said axial opening from each end terminating adjacent the hole, the points of said tapering members being cut away, means mounting said tapering members with respect to the package out of contact with the flexible material.

13. In a combination as claimed in claim 12, said mounting means comprising an enclosing member having walls opposite each end of the axial opening, the tapering members being carried by said walls.

14. In a combination as claimed in claim 12, said package being of an axial length at least several times its diameter and said tapering members being formed of a resilient material.

15. In a combination as claimed in claim 12, the axes of the tapering members being noncoincident.

* * * * *