Oct. 7, 1969 R. V. O'BERRY ET AL 3,471,350

METHOD OF MAKING A CARRIER FOR FORMING WOUND PACKAGES

Original Filed Feb. 18, 1966 2 Sheets-Sheet 1

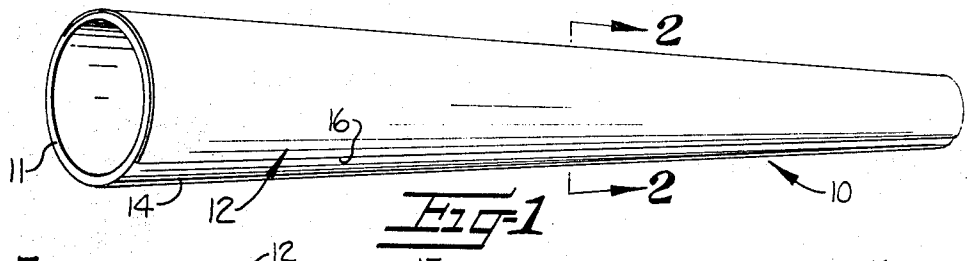

Fig-1

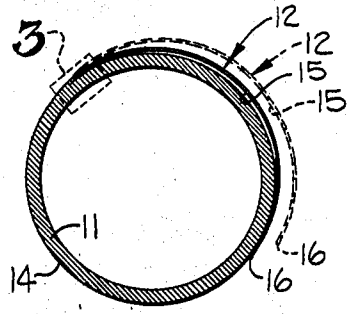

Fig-2

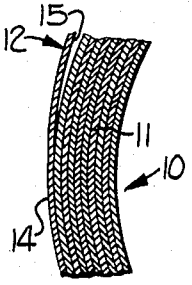

Fig-3

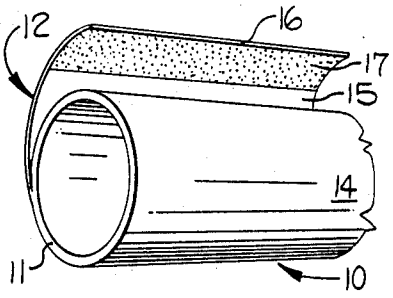

Fig-4

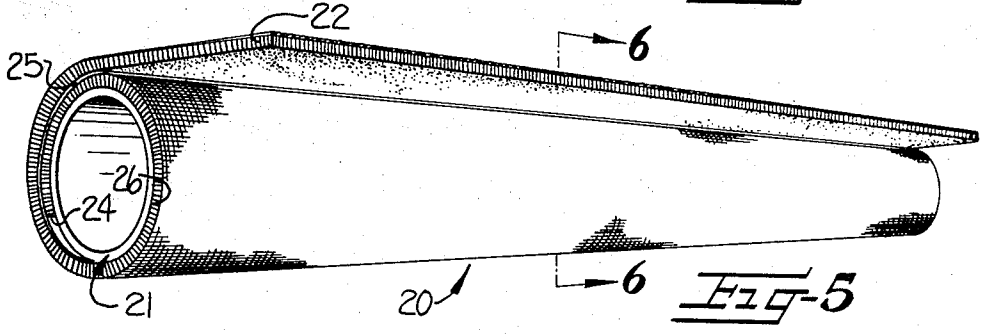

Fig-5

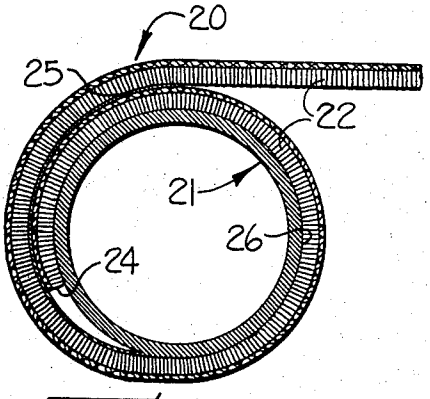

Fig-6

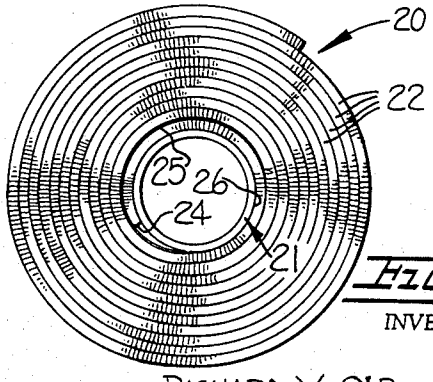

Fig-7

INVENTORS:
RICHARD V. O'BERRY
and WILLIAM R. SHULER
BY Parrott, Bell, Seltzer, Park & Gibson
ATTORNEYS

Oct. 7, 1969 R. V. O'BERRY ET AL 3,471,350

METHOD OF MAKING A CARRIER FOR FORMING WOUND PACKAGES

Original Filed Feb. 18, 1966 2 Sheets-Sheet 2

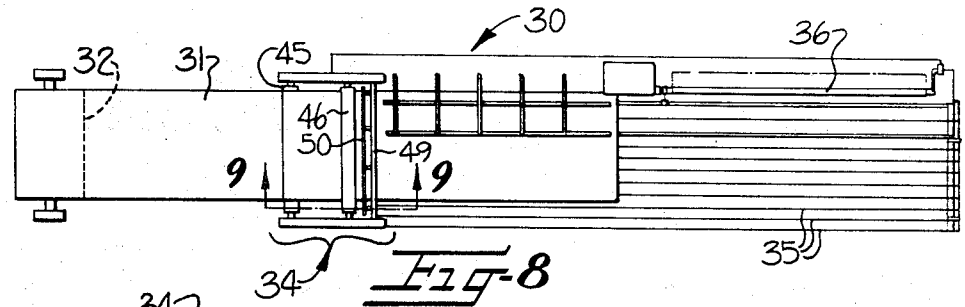

Fig-8

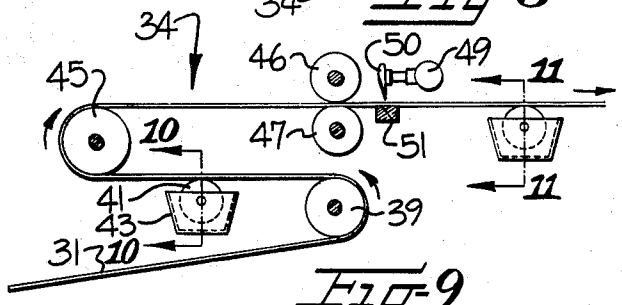

Fig-9

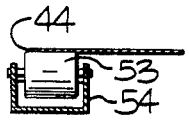

Fig-11

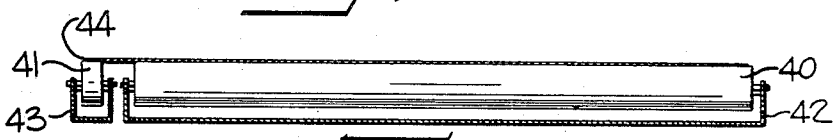

Fig-10

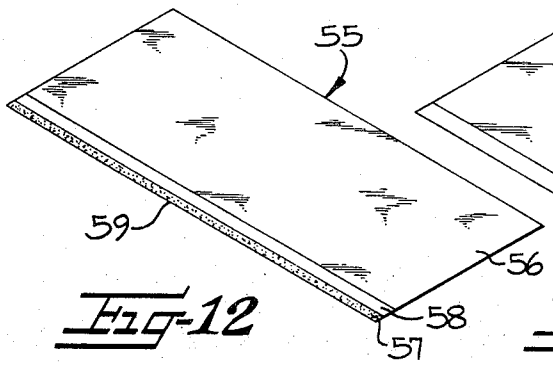

Fig-12

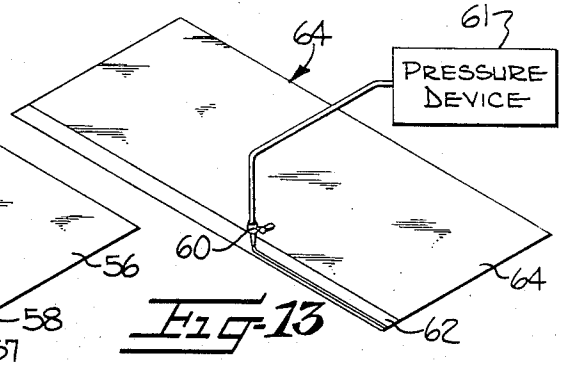

Fig-13

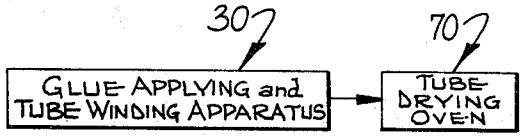

Fig-14

INVENTORS:
RICHARD V. O'BERRY
and WILLIAM R. SHULER
BY Parrott, Bell, Seltzer, Park & Gibson
ATTORNEYS

United States Patent Office 3,471,350 Patented Oct. 7, 1969

3,471,350

METHOD OF MAKING A CARRIER FOR FORMING WOUND PACKAGES

Richard V. O'Berry, St. Petersburg, Fla., and William R. Shuler, Rock Hill, S.C., assignors to Star Paper Tube, Inc., Rock Hill, S.C., a corporation of South Carolina

Original application Feb. 18, 1966, Ser. No. 528,621, now Patent No. 3,395,789, dated Aug. 6, 1968. Divided and this application Apr. 22, 1968, Ser. No. 723,216

Int. Cl. B65h *81/00;* B32b *1/08*

U.S. Cl. 156—184 5 Claims

ABSTRACT OF THE DISCLOSURE

A method of forming a carrier adapted for forming packages of wound material wherein the carrier comprises a convolute tube formed of wound sheet material having a curved arcuate flap formed integral therewith and extending from the periphery of the tube and substantially conforming to the curvature of the tube and being biased toward the tube to define an entrapment zone between the flap and the tube adapted to frictionally engage the innermost end of material wound on the carrier, and wherein the windings of the tube are adhesively secured together, with adhesive, which initially served to bond the flap against the tube to obtain the conforming flap curvature, having been rendered ineffective as by a heat treatment to provide the entrapment zone.

This application is a division of application Ser. No. 528,621, filed Feb. 18, 1966, now Patent No. 3,395,789. This invention relates to a carrier for forming wound packages and more particularly to a method for making such a carrier. The carrier formed in accordance with this invention is so constructed as to entrap or frictionally grip the innermost end of a length of material such as a textile fabric wound thereon for facilitating the forming of a wound package therefrom.

In accordance with this invention, the carrier is formed of a sheet material such as paper wound to form a tube and having a flap secured longitudinally of the tube and extending circumferentially along the tube, and wherein the flap is sufficiently stiff and of an arcuate nature conforming substntially to the circumferential curvature of the tube to be inherently biased inwardly toward the tube to define an entrapping zone between the flap and the exterior surface of the tube for frictionally gripping an end of material positioned therein when winding the material onto the carrier for facilitating the forming of a wound package therefrom.

With the foregoing in mind, it is the primary object of this invention to provide a method of forming such a carrier for facilitating the handling and winding of material on the carrier in making wound packages.

Some of the objects and advantages of this invention having been stated, others will appear as the description proceeds, when taken in connection with the accompanying drawings, in which:

FIGURE 1 is a perspective view of the carrier of this invention;

FIGURE 2 is a sectional view through the carrier of FIGURE 1, taken as indicated by the line 2—2 in FIGURE 1;

FIGURE 3 is an enlarged scale section view of a portion of the carrier of FIGURE 1, taken as indicated by the section lines in FIGURE 2;

FIGURE 4 is a perspective view of the carrier of FIGURE 1, with the flap displaced from the tube;

FIGURE 5 is a perspective view of a partially formed package in accordance with this invention, including a

carrier as illustrated in FIGURE 1 and a length of material being wound thereon;

FIGURE 6 is a section view through the partially formed package of FIGURE 5, taken as indicated by the line 6—6 in FIGURE 5;

FIGURE 7 is a view similar to FIGURE 6 of a completed package in accordance with this invention;

FIGURE 8 is a schematic showing of a portion of an apparatus for practicing the method of this invention for making the carrier of FIGURE 1;

FIGURE 9 is a schematic elevation view of a portion of the apparatus of FIGURE 8, taken as indicated by the line 9—9 in FIGURE 8;

FIGURE 10 is an elevation view, in partial section, of a portion of the apparatus illustrated in FIGURE 9, taken generally as indicated by the line 10—10 in FIGURE 9;

FIGURE 11 is an elevation view, in partial section, of a portion of the apparatus illustrated in FIGURE 9, taken as indicated by the line 11—11 in FIGURE 9;

FIGURE 12 is a perspective view of a sheet of thin flexible material such as paper at an intermediate step in the method of this invention;

FIGURE 13 is a view similar to FIGURE 12, including a schematic showing of an alternate step in the method of this invention; and

FIGURE 14 is a schematic flow diagram illustration of certain steps of the method in accordance with this invention.

Referring now more particularly to the drawings, a package carrier or core in accordance with this invention, generally indicated at **10**, is illustrated in FIGURES 1–4. As there shown, the carrier **10** comprises a tube **11** and an arcuate flap **12** extending in circumferential and longitudinal directions along the tube **11**. The tube **11** is in the form of a cylinder, preferably a right circular cylinder, with a cylindrical exterior surface **14**, and the arcuate flap **12** is secured along a longitudinal portion of the exterior surface **14**.

In order to facilitate the winding of a length of material about the carrier **10** to form a package, as will be described in greater detail hereinafter, the flap **12** is relatively stiff, normally disposed in a circumferentially curved position substantially conforming to the curvature of the exterior surface **14** and adjacent thereto (FIGURE 2), and adapted to overlie the innermost or leading end of a length of material to be wound about the carrier and to cooperate therewith in aligning the first wind of material square with the tube **11** and in retaining the material during subsequent winding and handling. To this end, the proximal opposing surfaces of the tube **11** and the flap **12**, namely the cylindrical exterior surface **14** and an interior surface **15** of the flap, respectively, together define an entrapping zone between the surfaces. The relative stiffness and circumferential curvature of the flap **12**, obtained as a result of the method of this invention as will be described in greater detail hereinafter, contribute to the cooperation of the flap **12** with a length of material to be wound about the carrier **10**, and render the trapping zone effective for facilitating the winding material, by normally biasing the flap **12** radially inwardly toward the tube **11**.

Insertion of a leading or innermost end of material, during formation of a package using the carrier **10** of this invention as hereinafter described, is facilitated by the flap **12** having a substantially linear free edge **16**. As here used with reference to the free edge **16** of the flap **12**, "linear" means that the edge **16** is not sinuous or wavy, but defines a substantially straight line, which preferably is more or less parallel to a longitudinal line on the exterior surface **14** of the tube **11**. Additionally, a minor surface area of at least one of the proximal opposing surfaces **14**, **15** of

the tube **11** and flap **12**, such as the minor surface area **17** of the flap **12** (FIGURE 4), has a residue of adhesive material thereon, which residue is ineffective to bond the opposing proximal surfaces together. The presence of the residue tends to increase the roughness of the minor area portion on which it is present, thereby increasing the coefficient of friction of that surface portion for aiding in holding the innermost end of material and facilitating the winding thereof. Further, if deemed desirable, a friction increasing material may form a component of the adhesive appearing in the residue thereof or may be applied to the interior surface **15** adjacent the minor surface area **17** or to the opposing exterior surface **14** of the tube **11**. Where the residue is on the interior surface **15** of the flap **12**, the minor surface area **17** extends adjacent the free edge **16**.

Preferably, and in accordance with this invention, the carrier **10** is formed of a thin sheet of fibrous material such as paper or paperboard, having a thickness of from about ten points to about sixty points. In the paper industry, the use of "points" to indicate paper thicknesses refers to thousandths of an inch so that, stated differently, the thickness of the sheet from which the carrier **10** is formed is from about 0.010 inch to about 0.060 inch. For the purposes of winding material about the carrier **10**, internal diameters of from about one inch to about six inches have been found preferable. Depending upon the material to be wound about the carrier **10**, the length of the carrier may range from about 36 inches to about 200 inches. Expressed in terms of the ratio of the length of the carrier **10** to the internal diameter of the carrier **10**, those ratios for which the carrier of this invention finds usefulness thus may vary within the range of from 6:1 to 200:1. With carrier dimensions as set forth above, adequate and proper retention of material is obtained when the circumferential extent of the flap **12** is a minimum of about 1½ inches, and the flap preferably has a longitudinal extent substantially the same as the length of the tube.

Preferably, the tube **11** of the carrier **10** is formed by a plurality of overlying convolution windings of the thin sheet material, and the arcuate flap **12** is formed integrally with the tube **11**. The arcuate flap **12** is defined by the trailing end portion of the outermost or last convolution or winding, including the minor surface area **17**, which is free from or not bonded to the remaining convolutions of the tube **11** (FIGURES 2 and 3). The major portion of the convolutions are relatively permanently bonded together.

The package of this invention, including a carrier as described above, and the manner of forming the package may best be discussed with reference to FIGURES 5–7. In FIGURE 6, a package in accordance with this invention, generally indicated at **20**, is being formed. The package includes a carrier **21**, similar to the carrier **10** illustrated in FIGURES 1–4 and described above, and a length of material **22** being wound upon the carrier **21** as a core. As illustrated, the material **22** represents a length of carpet material, positioned with the leading or innermost end **24** of the length of carpet interposed between the flap **25** and the exterior surface **26** of the carrier **21**, so that the flap **25** overlies that end **24** and the end is positioned in the entrapping zone defined therebetween as described above. When slightly more than one revolution of the carrier **21** has been made during winding (FIGURES 5 and 6), the force necessary to proceed with winding of the material **22** onto the carrier **21** reinforces the frictional surface contact occurring in the entrapment zone, thereby assuring adequate retention of the material **22** on the carrier **21**.

Further, as best shown in FIGURE 7 where a completed package including a number of windings of material **22** is shown, the flap **25** provides a substantially continuous and smooth or tapering transition over the innermost end **24** of the material **22**, thereby entirely avoiding the marking which has sometimes appeared in conventional packages formed about convolute tubes as cores.

A preferred method for making the carrier **10** of FIGURES 1–4, in accordance with this invention, may be briefly stated as winding a thin sheet of suitable material such a paper or paperboard into a plurality of successive overlying convolutions, while the thin sheet has adhesive on one surface thereof. The winding of such a thin sheet into a convolute tube is such that the trailing end of the last or outermost convolution includes a minor surface area of the sheet and extends in an arcuate position contiguous with the exterior surface of the last preceding convolution. As wound, the sheet, or at least the portion of the sheet including the minor surface area, contains a predetermined quantity of moisture. Thereafter, the thus wound sheet is treated to adhesively bond together a major portion of the convolutions. Simultaneously, the trailing end of the last convolution, including the minor surface area, is temporarily restrained in the arcuate position contiguous to and in intimate engagement with the last preceding convolution and the moisture content of the sheet is reduced to stiffen the trailing end into the arcuate form, so that the flap **12** provided thereby for the carrier **10** conforms to the curvature of the exterior surface of the tube and maintains the desired circumferentially curved position. In particular, the free edge of the trailing end portion of the last convolution, which is subsequently to be the free edge **16** of the flap **12**, is temporarily restrained in a contiguous relation to the underlying convolution throughout its longitudinal length during the treatment, in order to assure that the free edge **16** of the carrier **10** has the linear characteristics described above.

The detailed steps of the method may best be described with reference to FIGURES 8–14, wherein a glue applying and tube winding apparatus, indicated generally at **30**, suitable for use in practicing the method of this invention has been schematically illustrated. The apparatus **30** preferably may be similar to the apparatus disclosed and claimed in United States Patent No. 3,073,218, issued Jan. 15, 1963 to C. L. Roediger et al. and assigned to the assignee of the present invention, and a detailed description of the apparatus is not here required as reference may be made to that patent. In practicing the method of this invention using such an apparatus, a thin material **31** of indeterminate length, such as paper or paperboard, is fed from a suitable source of supply such as a roll **32** to a glue applying and tube winding apparatus **30**. The material **31** is passed through a glue applying work station, generally indicated at **34**, severed into appropriate lengths or sheets by a cutter means, and the sheets are supported on a work-support surface defined by a number of wires or cables **35** and wound in a plurality of successive convolutions about a suitable mandrel **36**. Upon completion of the winding of a sheet of material **31** about the mandrel **36**, the tube thus formed is removed from the mandrel.

In accordance with the method of the present invention, adhesives are applied to at least portions of one surface of the material **31** at the glue applying station **34** of the apparatus **30**. At that station, the material **31** may be passed over an idler roller **39** to reverse the direction of the sheet (FIGURE 9), and then passed with one surface of the material **31** in contact with first and second glue applying rollers **40**, **41** rotatably supported in glue troughs, or fountains **42**, **43**, respectively. As the surface of the material **31** is passed in contact with the glue applying rollers **40**, **41**, the rollers are caused to revolve, and apply adhesive from the fountains **42**, **43**, to the areas of material **31** in contact therewith. Preferably, the first and second rollers **40**, **41**, respectively, are axially spaced apart (FIGURE 10), so that a void area or zone is provided, between the areas to which glue is applied, which is free of adhesive. The positioning of the second roller **41** should be such that one edge **44** of the material **31** passes thereover.

Upon leaving the glue rollers, the material **31** is passed

over another idler roller **45**, to again reverse the direction of travel of the sheet, and through the nip of a pair of feed rollers **46, 47**, to be fed onto a work table surface as may be provided by a plurality of wires or cables **35**. Suitable cutter means, such as a shaft **49** supported for oscillation and carrying a cutting edge **50** thereon and an anvil **51** positioned on the opposite side of the material **31** from the cutting edge **50** may be provided at this point to sever the material **31** into length or sheets suitable for the longitudinal dimension or length chosen for the carrier being manufactured. As a severed sheet of the material **31** is fed onto the work table surface, it may pass with the surface of the sheet opposite the adhesive carrying surface of the sheet in contact wih a suitable moisture applying roller **53**, rotatably supported in a water trough or fountain **54**, when required and for purposes as described more fully hereinafter.

As severed into sheets suitable for winding by the apparatus **30**, a length of the material **31** will have the appearance illustrated in FIGURE 12. As there shown, the sheet **55**, prepared for convolute winding into a carrier including a tube and a flap, may be seen to have a major surface area **56** of one surface to which adhesive has been applied by the first glue roller **40** from the fountain **42**. Additionally, the sheet **55** has a minor surface area **57** of the one surface, to which an adhesive has been applied by the second glue roller **41** from the fountain **43**. The major and minor surface areas **56, 57** are spaced apart to leave a void surface area **58** therebetween which is free from adhesive.

Preferably, the adhesive applied to the major area **56** is a first type of adhesive, having an initial tack and subsequent bond characteristic. By this characteristic, it is meant that the first type of adhesive is sufficiently tacky to secure the surface to which the adhesive is applied to another surface of the sheet **55** with which it comes in contact, during the winding operation in the apparatus **30**. Further, the first type of adhesive, as applied to the major area portion **56**, will subsequently bond those surfaces in a substantially permanent manner. While a wide variety of adhesives or glues will have a suitable initial tack and subsequent bond characteristic, an inexpensive water soluble cornstarch type of adhesive is preferred in practicing the method of this invention for economic reasons.

The adhesive applied to the minor area **57** is preferably a second type of adhesive having an initial tack and latent release properties or subsequent release characteristic. That is, the adhesive material chosen for use as a second type of adhesive has sufficient tackiness to adhere together the minor area **57** to a surface with which it comes in contact during the winding operation on the apparatus **30**, and to temporarily maintain the adhesive tack. Subsequently, the second type of adhesive material has its bonding effectiveness substantially reduced, or has the same destroyed, to readily permit the release of the minor area from adhesive restraint. A resinous type glue or adhesive which is water soluble and substantially loses bonding effectiveness upon a reduction in moisture content, as by crystallizing, is preferred for the second type. One of many of these types of glues that are effective for this purpose is that commercially available as Swift & Co. 2822 adhesive.

As may be seen in FIGURE 12, the minor surface area **57** to which the second type of adhesive is applied extends immediately adjacent one side edge **58** of the sheet **55**. The winding operation is then carried out in such a manner that the side edge **59** becomes the trailing edge of the sheet as convolute windings are formed, and the portion of the sheet **55** including the minor area **57** subsequently defines the flap **12** of the carrier **10** described above. Adhesively securing the edge of the trailing end portion of the outermost or last convolution and maintaining the adhesive restraint until such time that the moisture content of the sheet material has been reduced to stiffen the flap defined by that portion are particularly important where the sheet material has a thickness of more than 25 points. Material of such thickness normally has sufficient stiffness when wound, even with the necessary moisture content, to create a torque which would entirely unwind the convolute tube before the adhesive was set unless the edge is restrained along its full length longitudinally of the tube. Where a carrier for carpet is being manufactured, the sheet thickness used normally is at least 25 points.

Due to the arrangement of the apparatus of FIGURES 8–10 as described above, the first type of adhesive is placed in the wide trough or fountain **42**, and is applied by the first roller **40** to a portion of the sheet **31** which will become the major surface area **56** of a severed length **55** of the sheet material. Similarly, a supply of the second type of adhesive is provided by the fountain **43**, to be applied by the second roller **41** to a portion of the sheet material **31** adjacent one edge thereof, which will subsequently become the minor surface area **57** of a severed length **55** of the sheet material. With the apparatus as described above, and the adhesive applying rollers **40, 41** being used, the applications of adhesives to the major and minor surface areas are concurrent.

In accordance with a modification of this invention, it is not necessary that the adhesive applications be concurrent. More particularly, as schematically illustrated in FIGURE 13, a suitable injection nozzle **60** receiving an adhesive material suitable for the second type from a pressure device **61** may be employed to deposit a thin strip or ribbon of adhesive material in a minor surface area **62** of a sheet **64**. Such a modification may be adapted to the apparatus **30** of FIGURE 8 by positioning the extrusion nozzle **60** to overlie a severed length of the sheet material **31** as the same is fed forwardly by the feed rolls **46, 47** onto the work table surface provided by the cables or wires **35**.

In order for a sheet being wound onto a convolute tube by the apparatus **30** to be easily formed into convolutions and for the trailing end portion to lie properly contiguous to the exterior surface of the immediately underlying convolution, it is necessary that the sheet material **31** contain at least a predetermined quantity of moisture at the time the windings are formed. The moisture must be sufficient to permit ease in winding the sheet into the tube body and flap and to insure that the arcuate configuration obtained for the flap will be retained upon a reduction of moisture content of the paper. Under certain conditions of ambient humidity, with certain thicknesses of paper and when water soluble adhesives are used, sufficient moisture may be present in the paper or derived from the applications of adhesive to provide the necessary quantity of moisture. However, under conditions of lower ambient humidity, with paper of other characteristics, when a non-water soluble adhesive is used as the second type, or when a high solids content adhesive is used, the addition of moisture to at least the trailing end portion of a length of the sheet **31** may be required in order to obtain that predetermined quantity which will impart the desired characteristics during winding. It is in the latter circumstance that the application of water by the roll **53** is required.

In winding the glued or adhesive carrying sheet into a plurality of successive overlying convolutions, as by placing the side edge of a sheet remote from the side edge adjacent the minor surface area against a mandrel and rotating the mandrel to wind the sheet thereabout, the apparatus **30** illustrated in the drawings positions a sheet with the adhesive carrying surfaces upwardly, and winds the convolutions with the adhesive carrying surfaces directed inwardly. While this winding is preferred, it is contemplated that the carrier of this invention might be wound with the adhesive carrying surfaces of a sheet facing outwardly, by providing appropriate void areas so that the outermost or last convolution, including the

trailing end portion which is to define the arcuate flap, would not be permanently adhesively bonded.

Subsequent to winding of a sheet to form a carrier including a tube and an arcuate flap, the thus wound sheet is appropriately treated to set the first type of adhesive and permanently bond a major portion of the convolutions and to reduce the moisture content of the sheet to set the arcuate configuration of the trailing end portion. The reduction of the moisture content of the sheet, as well known in paper making and paper working, causes the paper sheet to stiffen or set in the position in which it is restrained during the process of reducing the moisture content. Thus, the restraint of the trailing end portion of the last or outermost convolution in contiguous relation to the underlying convolution causes the trailing end portion defining the flap to maintain the desired circumferential curvature thereafter, with the stiffness and the curvature contributing to the desirable result obtained with the carrier as described hereinbefore. As the moisture content of the sheet is being reduced, the trailing end portion, defining the flap, is restrained in the contiguous arcuate position until the moisture content is reduced to such a level to set the curvature in the flap. In particular, the edge of the trailing end is restrained in intimate engagement with the underlying convolution, in order to obtain the linear free edge desired for the flap. Preferably, the restraint of the trailing end portion and the edge is an adhesive restraint, resulting from the application of the second type of adhesive to the minor surface area, and the adhesive tack of that surface area to the underlying convolution.

Subsequent to the setting of the adhesive to permanently bond the major portion of the convolutions and the reduction of moisture content to set the arcuate curvature of the flap, the bonding effectiveness of the second type of adhesive is substantially reduced or destroyed. As the second type of adhesive provides the adhesive restraint holding the trailing end portion in the contiguous position, the trailing end portion or the flap may thereafter be moved free from engagement with the underlying convolution. Where the second type of adhesive is a resinous type of adhesive, as preferred, the crystallization of the adhesive and substantial reduction or destruction of bonding effectiveness thereof results from the reduction in moisture present in the sheet. The bonding effectiveness may be substantially reduced or destroyed in other manners where other adhesives are chosen. Upon the complete destruction of the bonding effectiveness of a resinous type adhesive, a residue of adhesive material remains on one of the proximal opposing surfaces which were temporarily bonded together by the adhesive to provide the adhesive restraint.

Preferably, the treating of the thus wound tube to set the adhesive, reduce the moisture content of the sheet, and thereafter substantially reduce or destroy the bonding effectiveness of the second type of adhesive includes heating the convolute wound sheet. Heating the wound sheet, by passing the sheet from the glue applying and winding apparatus **30** to a tube drying oven **70** (FIGURE 14), will drive off moisture from water soluble adhesives to set the curvature of the convolutions and particularly of the trailing end of the last convolution, and will crystallize the second type of adhesive to thereafter release or permit ready release of the flap. It is apparent, however, that other methods of treatment such as air drying may be appropriate where time considerations and ambient conditions permit.

It is thus seen that a novel method of forming a carrier has been disclosed wherein the stiffness of the carrier flap and the arcuate nature thereof bias the flap toward the tube for defining therebetween a frictionally entrapping zone for engaging an end of material positioned therein and for facilitating starting the first wind of material square with the tube axis and the winding of the remainder of the material on the carrier in forming a wound package.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

We claim:

1. A method of making a carrier adapted to be used as a core for wound material, said carrier comprising a tube and a relatively stiff inwardly biased arcuate flap longitudinally secured thereto and extending circumferentially thereof, said flap being adaptable to overlie and secure the innermost end of a length of material wound onto the carrier for facilitating the winding of the material thereon, said method comprising

winding into a plurality of successive overlying convolutions a relatively thin sheet of fibrous material containing a predetermined quantity of moisture therein, while adhesively bonding together the successive convolutions in the tube-forming portions of the sheet by an adhesive of one characteristic and while adhesively bonding the trailing end arcuate flap forming portion of the sheet to the underlying convolution by an adhesive of another characteristic having latent release properties, and drying the thus wound sheet to reduce the moisture content in the wound sheet to impart stiffness and an inward bias to the flap while setting the adhesive on the tube forming portions and while rendering ineffective the bonding characteristics of the adhesive on the flap whereby the trailing end of the flap will readily separate from the tube.

2. A method of making a carrier adapted to be used as a core for wound material, said carrier comprising a tube and a relatively stiff inwardly biased arcuate flap longitudinally secured thereto and extending circumferentially thereof, said flap being adaptable to overlie and secure the innermost end of a length of material wound onto the carrier for facilitating the winding of the material thereon, said method comprising

applying first and second types of glue to major and minor surface areas, respectively, of one surface of a relatively thin sheet of fibrous material containing a predetermined quantity of moisture therein, with the second type of glue having latent release properties,

winding the glued sheet into a plurality of successive overlying convolutions to form a tube with the trailing end of the last convolution of the sheet including the minor area thereof defining a trailing arcuate flap positioned contiguous to the exterior of the last preceding convolution, and

heating the thus wound sheet to reduce the moisture content to a predetermined level to impart stiffness to the tube and to the arcuate flap while setting the first type of glue for bonding the tube and while rendering ineffective the bonding characteristics of the second type of glue whereby the trailing end of the flap will readily separate from the tube.

3. A method according to claim **2** wherein the glue is applied uniformly over the major and minor areas of the sheet while a void area free of glue is formed separating the major and minor areas and with the glue in the minor area extending along and adjacent the edge of the trailing end of the sheet to serve for restraining the edge in a linear position against the underlying convolution until the heating destroys the bonding effectivness thereof.

4. A method according to **3** wherein the combined circumferential length of the void area and minor area is at least about 1½ inches.

5. A method of making a carrier adapted to be used as a core for wound material, said carrier comprising a tube and a relatively stiff inwardly biased arcuate flap longitudinally secured thereto and extending circumferentially thereof, said flap being adaptable to overlie and secure the innermost end of a length of material wound

onto the carrier for facilitating the winding of the material thereon, said method comprising

feeding a predetermined length of relatively thin web-like fibrous material from a roll in a predetermined path of travel, while applying a first type of glue to a major area of one surface portion of the predetermined length of material and while applying a second type of glue having latent release properties to an adjacent minor area thereof,

while applying a predetermined amount of moisture to at least the minor area portion of the material to raise the moisture content thereof to a predetermined level,

severing the predetermined length of material to form a sheet,

winding the sheet into a plurality of successive overlying convolutions to form a tube with the trailing end of the last convolution of the sheet including the minor area and defining a trailing arcuate flap contiguous to the exterior surface of the last preceding convolution, and

heating the thus wound sheet to reduce the moisture content to a predetermined level to impart stiffness and inward bias to the arcuate flap while setting the

first type of glue for bonding the tube while rendering ineffective the bonding characteristics of the second type of glue whereby the trailing end of the flap will readily separate from the tube.

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EARL M. BERGERT, Primary Examiner

J. C. GIL, Assistant Examiner

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