Feb. 16, 1954 I. SPITZ 2,669,258

COMPOSITE PACKAGING OR WRAPPING MATERIAL AND MANUFACTURE THEREOF

Filed Sept. 14, 1948 2 Sheets-Sheet 1

Fig. 1

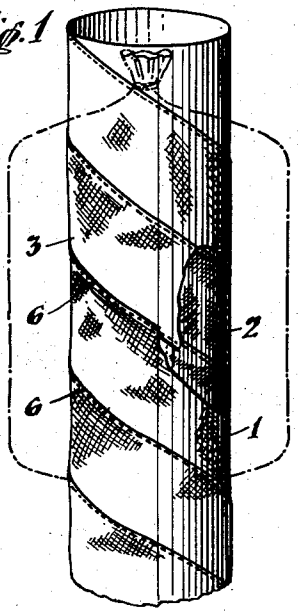


Fig. 2

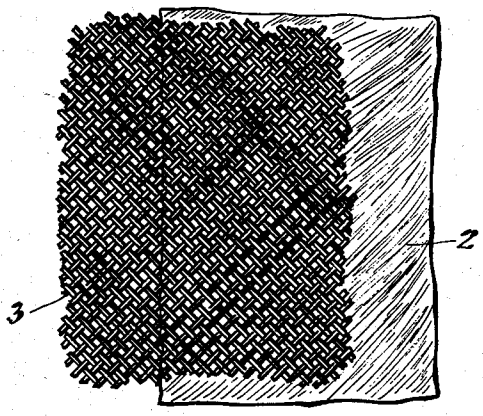


Fig. 3

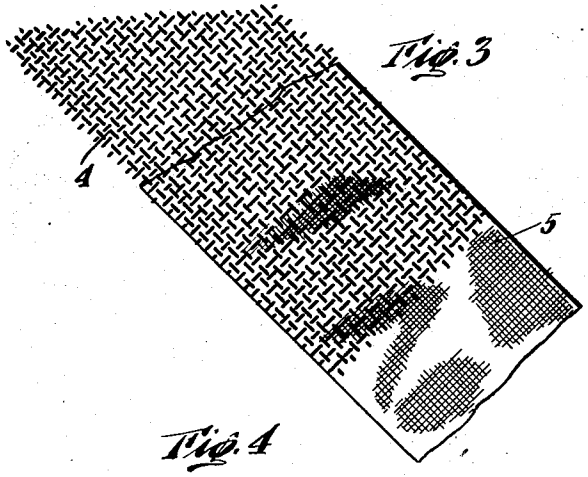


Fig. 5

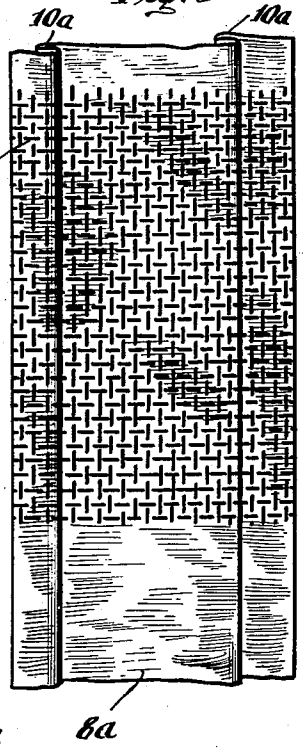
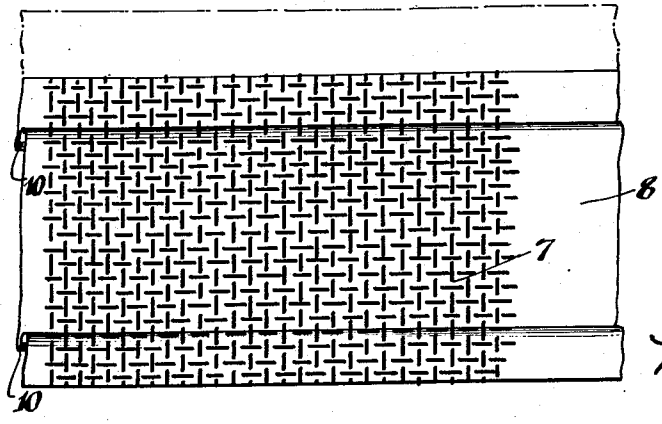


Fig. 4

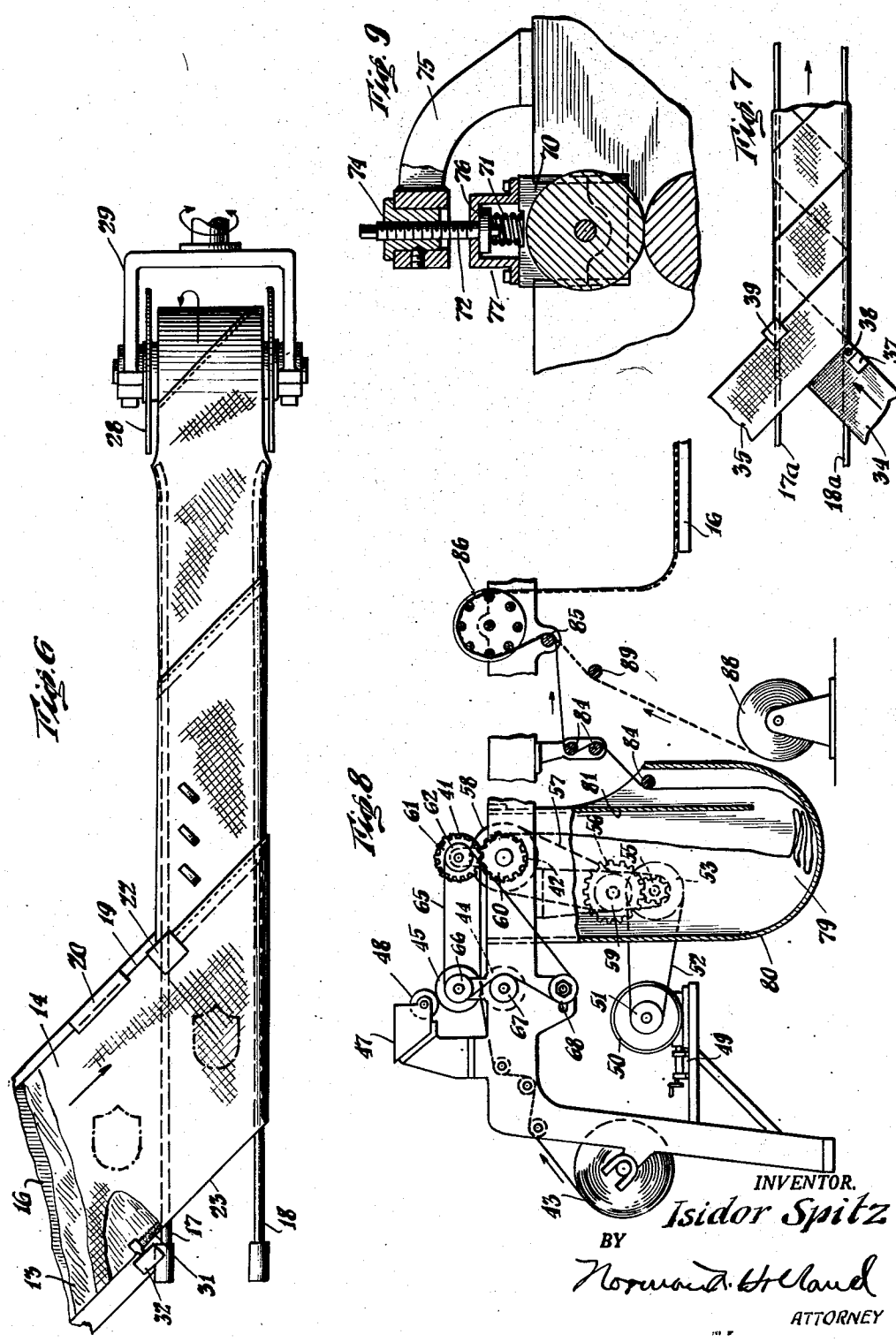


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Feb. 16, 1954 I. SPITZ 2,669,258

COMPOSITE PACKAGING OR WRAPPING MATERIAL AND MANUFACTURE THEREOF

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Patented Feb. 16, 1954 2,669,258

UNITED STATES PATENT OFFICE

2,669,258

COMPOSITE PACKAGING OR WRAPPING MATERIAL AND MANUFACTURE THEREOF

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Application September 14, 1948, Serial No. 49,284

10 Claims. (Cl. 138—55)

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The present invention relates to composite wrapping or packaging materials, and their manufacture, which are extensible or stretchable in length and width.

In shipping of articles or merchandise it is usually desirable and frequently necessary to apply enveloping material thereto. The articles may be round, square, triangular, etc. and the different shapes and sizes have generally necessitated applying individualized wrappings to the articles or the keeping on hand of a number of various sizes of shipping bags in order to cover the articles. Previous methods and wrappings are expensive and are objectionable from the storage and stockkeeping point of view.

The problem is further complicated due to the fact that it is preferable to have a relatively fine, soft or closely woven material immediately next to the article or goods, in order to prevent marring the article or escape of the goods through interstices in the wrapping, and to have a tough exterior material of good wearing qualities. Previous bags or wrapping materials which have attempted to combine an inner merchandise-contacting surface with an outer tougher surface have been relatively expensive to manufacture and sell, as well as being relatively complicated to manufacture.

The present invention aims to overcome the above and other difficulties or disadvantages by providing a new and improved composite packaging or wrapping material which is expandible in length and width, as well as method of making it, which is of relatively simple construction, is less expensive to manufacture and use and is adapted to accommodate a wide variety of products having different sizes, shapes or contours. The invention further contemplates the provision of a new and improved machine and method of imprinting designs such as legends, trade-marks, etc. on the packaging material; the designs may be imprinted on the material during its formation into a preferred shape and appear in orderly arrangement on the exterior surface of the completed wrapping.

An object of the present invention is to provide a new and improved wrapping or packaging material.

Another object of the invention is to provide an improved composite wrapping or packaging material.

Another object of the invention is to provide an improved composite wrapping or covering material of tubelike construction which readily molds itself to and may be quickly applied over products of various sizes and shapes.

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Another object of the invention is to provide an improved composite wrapping or covering material which is relatively simple and inexpensive to manufacture.

Still another object is to provide a novel and relatively simple method of making the present improved packaging material.

A further object is to provide a new and improved machine for imprinting designs on the present packaging material.

A still further object of the invention is to provide new and improved mechanism for forming designs on the outer surfaces of tubelike composite packaging material.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

Fig. 1 is a view showing a preferred embodiment of the present packaging material;

Fig. 2 is an enlarged fragmentary view of a portion of the material shown in Fig. 1;

Fig. 3 is a fragmentary view showing the present packaging material embodying relatively coarse and fine fabric layers;

Fig. 4 is a fragmentary view showing a modified form of the invention embodying a relatively coarse fabric layer and an additional layer having longitudinal gatherings or folds;

Fig. 5 is a fragmentary view similar to Fig. 4 but showing a composite material of fabric and crinkled or creped paper with the crinkles extending transversely of longitudinal gatherings or folds therein;

Fig. 6 is a plan view, largely diagrammatic, illustrating apparatus for spiralling or winding the present composite layers of material into substantially tubular form;

Fig. 7 is a top plan view, largely diagrammatic, showing the formation of a composite substantially tubular packaging material having oppositely spiralled layers;

Fig. 8 is a side elevational view, largely diagrammatic, showing a preferred form of imprinting and handling apparatus for forming de-

signs on moving lengths of the present material; and

Fig. 9 is an enlarged view, partly broken away and partly in section, illustrating a detail of the mechanism shown in Fig. 8.

For purposes of convenience and clarity of description the term "material" is used herein to include paper, cloth, or any other layers of wrapping material. The term "fabric" is used to denote cloth, burlap or the like made from cotton, wool, jute, hemp, etc.

To facilitate ready application of the present composite packaging material to articles or products the wrapping is supplied to users in open-ended tubelike form the tube being stretchable in length and width to accommodate various goods. The tubelike construction is formed by winding the layers of material in spiral or helical fashion around suitable guiding or shaping means and simultaneously stitching or otherwise securing together appropriate portions of the material. First the tubelike composite packaging material will be described and thereafter its fabrication from flat lengths of material.

Referring more particularly to Figs. 1 and 2 there is shown a length of substantially tubular packaging or "wrapping" material 1 comprising an inner layer 2 and an outer contiguous layer 3. Each layer is made from relatively long lengths or webs of material arranged into spiral or helical formation and both the inner and outer layers are attached together, by stitching or otherwise, to form a unitary composite wall. Generally it is desirable to employ an outer layer of some fabric, e. g., burlap or cotton, and to use an inner layer 2 of crinkled or creped paper. The fabric may be of coarse or fine weave and in the usual commercially available form has threads which extend longitudinally along the length of the web and also transversely across the web. The crinkles, crepes or gatherings of the inner layer 2 preferably extend in only a single direction, namely parallel to the transverse threads of the outer fabric layer 3. The crinkles or gatherings of inner layer 2 may extend parallel to the longitudinal dimensions of the outer spiral covering 3 but it is more convenient to form them transversely of the layer 2 so that in the final tubelike form illustrated in Fig. 1 they lie substantially across the width of the outer strips of fabric material 3.

When wound spirally or helically into the tubelike form shown in Fig. 1 the lengthwise and transverse threads of the outer covering 3 are inclined to the length and width of the tubing. The transverse crinkles or gatherings of the inner layer 2 likewise are inclined to the length and width of the tubular wrapping. The construction provides a composite tubular packaging material which is stretchable along both the longitudinal axis of the tubing and also along the transverse axis of the tubing since in neither of these directions is a force applied directly along the lengths of the fibres comprising the inner or outer layers of wrapping material.

The paper or other relatively fine inner lining 2 prevents marring of merchandise and retains granulated material against seepage therethrough; the outermost coarse or fine fabric layer provides a tough wear resistant surface. The composite tubular material readily stretches to give two way stretch or extensibility even though a length of material, such as crinkled paper 2, may, in its ordinary flat web form and prior to spiralling, be normally stretchable or extensible in only a single direction. The crinkles of the inner layer 2 could extend both lengthwise and transversely of the paper. Attaching the inner and outer layers together by stitching or adhesive 6, as will be described, holds the contiguous layers in tubelike shape and causes them to simultaneously stretch and mold to the inserted merchandise; in addition the stronger fabric layer 3 prevents excessive stretching and tearing of the paper layer 2.

When it is desired to apply the composite material to an object or to form a bag for receiving powdery material one end of the tube may be easily closed by a wire or cord tie. Thereafter the resulting open-ended bag or covering may be applied over the article or filled with material, after which the open end may be tied together.

While the tubular wrapping may assume numerous shapes the dot-dash outline indicated in Fig. 1 illustrates in a general way the change in width of the tubing which may occur in connection with the covering of articles wider than the original diameter of the composite tubelike wrapping.

In Fig. 3 there is illustrated a composite length of material comprising a layer or strip of coarse fabric such as burlap 4 and a contiguous layer of finer cloth 5. This composite material is wound into tubelike form such as illustrated in Fig. 1, the adjacent edges being similarly attached together into spiral formation. The transverse and longitudinal threads of the coarse fabric 4 and of the relatively fine cotton, rayon or other cloth 5 are shown substantially parallel with each other so that when the layers are spiralled into a tube the threads of the inner and outer layers will be on a bias or diagonally disposed to the length and width of the tube, to thereby provide a tubelike structure stretchable both longitudinally and transversely.

Fig. 4 shows a composite strip of material, for winding into a tube, comprising an outer layer of fabric 7 and an inner layer of material 8. Preferably the inner layer 8 is of uncreped or uncrinkled paper, having one or more longitudinally extending folds 10. The longitudinal fold or folds 10 may be provided by utilizing a strip of paper of greater width than that of the fabric layer 7, as shown by the dot-dash outline at the upper part of this figure. After the formation of the longitudinal folds the width of the paper is decreased to approximately that of the fabric layer 7. The two layers 7 and 8 may be attached by adhesive along marginal edges thereof or throughout the area thereof, or by suitable stitching.

Instead of a layer of paper 8 there may be utilized a cloth layer similar to that illustrated in Fig. 5, the cloth being provided with a longitudinal fold 10 such as shown in Fig. 4.

The composite material illustrated in Fig. 4 is also preferably formed into tubelike shape as illustrated in Fig. 1, in which shape the one or more folds 10 of the uncreped paper layer 8 are disposed diagonally of the length and width of the tubelike wrapping. This diagonal disposition again affords a tubular construction which is extensible longitudinally and transversely, even though the layer 8 is normally stretchable only in width.

In Fig. 5 there is illustrated a combination strip similar to that disclosed in Fig. 4, the only difference being that Fig. 5 has the inner layer 8a provided with additional transverse crinkles or crepe-like folds. In this instance also the com-

posite strip wrapping material is to be spiralled into tubelike shape such as illustrated in Fig. 1.

A tubular packaging or wrapping material formed from the composite materials illustrated in Figs. 1 through 5 readily stretches or extends in both length and width to accommodate various sizes and shapes of articles and also to retain finely granulated material such as sugar, coffee, flour, grain, etc. While the most generally used embodiment of the invention comprises a composite tube with an outer layer of burlap and an inner layer of "two way stretch" crepe paper it will be clear that the fabric or paper layers may be used in any desired combination to form the tube. For example, the tube may comprise an outer layer of finely woven cloth such as the layer 5 illustrated in Fig. 3 and an inner layer of crepe or plain paper such as illustrated in Figs. 2, 4 or 5. While only two thicknesses or layers are described and generally utilized for the extensible tubular composite wrapping material it will be clear that any suitable number of layers may be used.

In Fig. 6 there is shown diagrammatically a plan view of a mechanism or apparatus which may be used to helically or spirally wind the composite material into tubelike form. A layer of material such as paper or cloth 13 and a layer of fabric such as burlap 14 are shown passing simultaneously over the upper surface of a table 16 which is disposed at an angle to, and terminates adjacent one of, spaced guide rods 17 and 18. The "leading" edges 19 of the contiguous layers of material are preferably maintained in contact with a stationary guide 20 carried by the table 16; the guide 20 insures correct approach of the layers to the guide rods 17 and 18 and insures correct presentation to a stitching or attaching means 22.

The separate lengths of material 13 and 14 pass simultaneously over the table, around the outermost guide rod 18 and thence downwardly beneath the guide rods so as to place the longitudinal "trailing" edges 23 of the contiguous layers beneath the longitudinal leading edge 19. In this relationship the adjacent edges are attached together by the attaching means 22 to form the tubelike construction. Preferably the attaching means 22 is a sewing machine for stitching the layers together since this gives a sturdy attachment. If desired any suitable adhesive applying means may be utilized to secure the layers together, in lieu of a sewing machine.

The flat webs of material pass over the table 16 and around the guide rods 17 and 18 in continuous fashion and the tubelike article provided by stitching the edges of the material together is pulled lengthwise along the guide rods 17 and 18 and rolled about a rotatable spool 28. Rotation of the spool pulls the tubelike wrapper continuously off the ends of the spaced guide rods. Preferably the spool 28 is universally mounted by a bracket 29 to provide smooth reeling of the tube onto the spool. The guide rods 17 and 18 may be adjustably spaceable with respect to each other so as to accommodate varying widths of webs 13, 14 and formation of tubelike wrappers of different "widths" or diameters. Feed rollers, rotated in any suitable manner, may be provided for facilitating movement of the tubelike article along the spaced guide rods. After the spool 28 is filled the resulting roll of material may be removed and stored for future use. The tubelike wrapping material is normally stored in flattened condition but the sides of the flattened tube readily spread apart for fitting over objects or filling with materials.

While it is generally necessary to attach the edges of material together by only the attaching means 22 at the location illustrated it may be desirable to additionally secure together the "trailing" edges of the webs at the location 31; thereafter the secured inner and outer layers 13 and 14 may be further stitched or attached by the attaching means 22. This additional securing together of the layers at the location 31 may be done by a sewing machine similar to that used at the location 22 or the layers may be adhesively secured together by any suitable device 32 adapted to apply adhesive between the simultaneously moving layers. The adhesive may be applied either as a continuous strip or in the form of spaced spots adjacent the marginal portions of the trailing edges. After thus being secured together the trailing edges wind spirally about the spaced guide rods 17 and 18 and pass beneath the sewing machine 22 or other attaching means to form the tube. The provision of the additional attaching means 32 as well a the sewing machine 22 produces a tubular wrapping which is more firmly secured together along the edges of the spiralled material. This may be desirable in some instances since the tubular wrapping is frequently subjected to a great deal of pulling and stretching in order to fit it over an object.

If desired the inner and outer layers of the tube may be wound in opposite hand or sense and in Fig. 7 there is illustrated diagrammatically a method of forming such a tubelike wrapper. As shown an inner layer of cloth or crinkled paper 34 feeds over the spaced guide bars 17*a* and 18*a* from one side thereof and an outer layer of burlap or cloth 35 feeds over the guide bars from an opposite direction. By this construction the transverse threads or crinkles of either one of the lengths of material 34 or 35 extend substantially parallel to the longitudinal threads of the other length of material and thus provide a tubelike wrapping which is universally stretchable.

The layers illustrated in Fig. 7 may be attached together by an adhesive applying device 37 adapted to deposit spaced "spots" of adhesive 38 along a margin of the strip 34 and also by a sewing machine 39 adapted to stitch the lengths 34 and 35 together. The resulting tubelike structure may be pulled endwise off the spaced bars 17*a* and 18*a* in a manner similar to that described in connection with Fig. 6.

In many instances it is desirable that the present final tube be provided with some design, trade-mark or legend and the present apparatus embodies means adapted to continuously imprint such designs on a layer of the material during its manufacture into the tube. The imprinting portion of the apparatus is shown more particularly in Fig. 8 and comprises a pair of horizontal feed rollers 41 and 42 adapted to pull a length of material from a roll 43 and thence between a lower horizontal support roller 44 and an upper "design" roller 45. The design roller 45 has an outer surface of the desired representation which it is desired to print on the surface of the material. Ink may be supplied to the design roller 45 from a reservoir 47 through the intermediation of one or more transferring rollers 48.

Since the axis of the design roller 45 is preferably disposed at right angles across the width of the material which passes beneath it, the actual design carried on the surface of the roll

45 is preferably on a bias; this is due to the fact that the design imprinted on the material should appear in correct relationship on the finished tubular wrapping. Referring to Fig. 6 there is shown a design in the form of a shield and it will be noted that the imprinted shield is inclined with respect to the edges of the length of moving material as it moves over the table 16 but that it is in correctly disposed viewing position on the surface of the final tubular wrapping.

Rotation of the feed rollers is obtained by a motor 50, mounted on a platform 49 at one side of the machine, through pulley 51, belt 52, pulley 53, meshing gears 55 and 56, sprocket 59, chain 57, sprocket 58, and meshing gears 60 and 61 mounted on the roller shafts at the opposite ends thereof from the drive motor 50. Preferably the drive motor 50 is adjustably positioned on the platform 49 and is provided with "Reaves" type pulley to provide for varying the speed of rotation of the various rollers.

While any suitable motor 50 may be utilized a motor of about three-quarter horse power turning it about 1150 revolutions per minute is satisfactory, the motor speed being reduced by the speed adjusting drive and various gears, sprockets and belts to give a speed of about thirty to fifty feet per minute to the web of material advancing through the imprinting portion of the machine.

The inking roller 45 and the lower web supporting roller 44 may be driven by the upper feed roller 41 through sprocket 62, chain 65, and sprockets 66 and 67 keyed respectively to the design roller 45 and web supporting roller 44. An idler sprocket 68 may be provided for adjusting the sprocket chain 65 and preventing excessive slack therein.

Preferably the upper feed roller 41 and the shaft which carries the design roller 45 are yieldably mounted so that in the event the material being fed accidentally twists or doubles-up the upper rollers may spread apart and receive the extra thickness of material without jamming or damaging the machine. In Fig. 9 there is illustrated a device which may be utilized for performing this function; the same type mechanism may be used to support opposite ends of the design roller shaft and the upper feed roller shaft. As shown in Fig. 9 the ends of the upper shafts are carried by a vertically movable bearing block 70; the bearing block may support the shafts in ball, roller or other bearings. Under normal conditions of operation the roller is urged downwardly due to gravity and by a spring 71 which bears against an upper portion of the bearing block 70 and against the head of an adjusting screw 72. The adjustable screw 72 is threaded into an internally threaded bushing 74 carried by an arm 75 bolted or otherwise secured to the framework of the machine and rotation of it in and out of the bushing 74 varies the force of the spring 71. As the screw 72 is threaded into the bushing 74 the force exerted by the spring is increased and vice-versa. In the event an excessive thickness of material enters between the two rollers shown in Fig. 9, the upper roller moves upwardly and lifts its spring housing 77 upwardly away from the enlarged portion 76 of the adjusting screw 72. When the obstruction has passed beyond the feed rollers the spring 72 and the weight of the rollers urge the upper rollers downwardly.

After being imprinted with a desired design the length of material from the roller 43 passes downwardly into a trough-like accumulator 79 provided by a substantially U-shaped sheet metal member 80. This accumulator receives the material and retains it in slack folds so that the ink may have time to at least partially dry and so that it may be subsequently easily pulled out for formation into the composite tubelike wrapping. Preferably a dividing wall 81 extends downwardly into the accumulator 80 and the imprinted material is drawn upwardly between the lower end of this wall and an outer wall of the accumulator 80; this construction facilitates even feeding of the web and minimizes the possibility of tangling during withdrawal from the lower part of the accumulator.

Material passes out of the accumulator over suitable guide rods 84, beneath a guide bar 85, over a feed roller 86, and thence downwardly toward the surface of the supporting and guiding table 16.

A length of material for the inner layer of the tubular wrapping may be supplied from a roll 88, passing from this roll over a guide bar 89, beneath the guide bar 85 and thence over the feed roller 86. In this manner the two lengths of material are simultaneously fed together in contiguous or superposed relationship and thence passed simultaneously downwardly toward and against the upper surface of the supporting and guiding table 16. In instances where the composite tube is to comprise an outer layer of burlap superposed upon a layer of creped or crinkled paper the roll of material 43 will be of burlap and the roll of material 88 of creped paper.

It will be seen that the present invention provides a new and improved tubelike packaging or wrapping material which may be utilized for containing comminuted materials; the comparatively nonporous inner layer retains such materials within the resulting container and the outer relatively coarse covering prevents undue abrasion or tearing of the finer or nonporous inner layer. Where the composite tube is applied to other products the inner layer may provide a relatively smooth non-scratching surface and the outer a wear-resistant covering. In each instance the wrapper is stretchable both longitudinally and transversely to accommodate irregular or varying dimensional articles and also to afford yielding of the inner and outer layers of the wrapping without rupture thereof. The composite wrapping material is inexpensive since ordinary materials such as cloth burlap and commercial varieties of creped or crinkled paper may be utilized to produce the wrapper; the crinkles or folds of the paper or other inner lining material need extend in only a single direction and yet the resulting composite tubelike wrapper embodies "universal" stretchability. The tubing may be manufactured and supplied in any convenient lengths and may be cut to required lengths during packaging operations.

The imprinting portion of the machine forms designs on the outer covering of a web prior to the spiralling thereof into tubelike form and the designs appear in correct alignment or position on the tube.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. A composite covering comprising a flexible fabric layer helically arranged in tubelike manner, a crinkle paper layer helically arranged in tubelike manner, and stitching securing said fabric and crinkle paper layers together only adjacent helically disposed side edge portions thereof, to retain the layers in said helical arrangement, the remaining unstitched portions of the layers being free to move relative to each other.

2. The method of making a stretchable composite wrapping which comprises simultaneously feeding separate lengths of flat material toward support means, simultaneously arranging said separate lengths of material into superposed generally helical relationship around and along said support means to form an endless tube, securing together side edges only of said respective separate lengths of material leaving intermediate superimposed portions between said edges freely movable with respect to each other, and continuously removing said endless tube from the support means.

3. The method of making an endless generally tubular composite wrapping from individual elongate webs of material which comprises simultaneously arranging said individual webs into superposed generally helical relationship about and along a member, with side edge portions of successive turns overlapping side edge portions of preceding turns, and securing together side edge portions of the individual webs and said overlapping side edge portions during said arranging, while leaving the web portions intermediate said side edge portions freely movable with respect to each other.

4. The method of making a generally tubular composite wrapping from individual elongate webs of fabric and creped paper which comprises simultaneously arranging said individual webs of fabric and paper into superposed generally helical relationship about and along a forming member, with side edge portions of successive turns overlapping side edge portions of preceding turns, simultaneously stitching together side edge portions of the individual fabric and paper webs and said overlapping side edge portions during said arranging while leaving the web portions intermediate said side edge portions freely movable with respect to each other, and continuously removing said endless tube from said forming member.

5. The method as claimed in claim 3, wherein said individual webs of material are placed in contact with each other prior to their arranging into helical shape and are so fed during said arranging.

6. In a preformed packaging material, the combination of an outer layer of woven fabric comprising a strip of fabric spirally arranged in tubelike form, an inner layer of stretchable material comprising a strip of such material spirally arranged in tubelike form, said strip of fabric and said strip of stretchable material being superimposed with their edges substantially together and with the edge portions of each spiral turn of both strips overlapping and extending along a preceding turn, and means for securing said spirally overlapping strip edges of both materials together, said portions of the superimposed strips intermediate the edges being free to move with respect to each other.

7. A preformed packaging material as claimed in claim 6, in which the inner strip is creped paper.

8. A packaging material as claimed in claim 6, in which said outer layer is of burlap and said inner layer is of crinkled paper having the lengths of its crinkles disposed substantially perpendicularly to its length.

9. A packaging material as claimed in claim 6, in which said inner layer has an overlapping fold intermediate its edges and extending longitudinally thereof.

10. A composite covering comprising a fabric layer helically arranged in open ended tubelike manner, a crinkle paper layer helically arranged in tubelike manner within said fabric layer, said fabric and crinkle paper layers being secured together only adjacent helically disposed marginal portions thereof, the remaining unsecured portions of said layers being free to move relative to each other.

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