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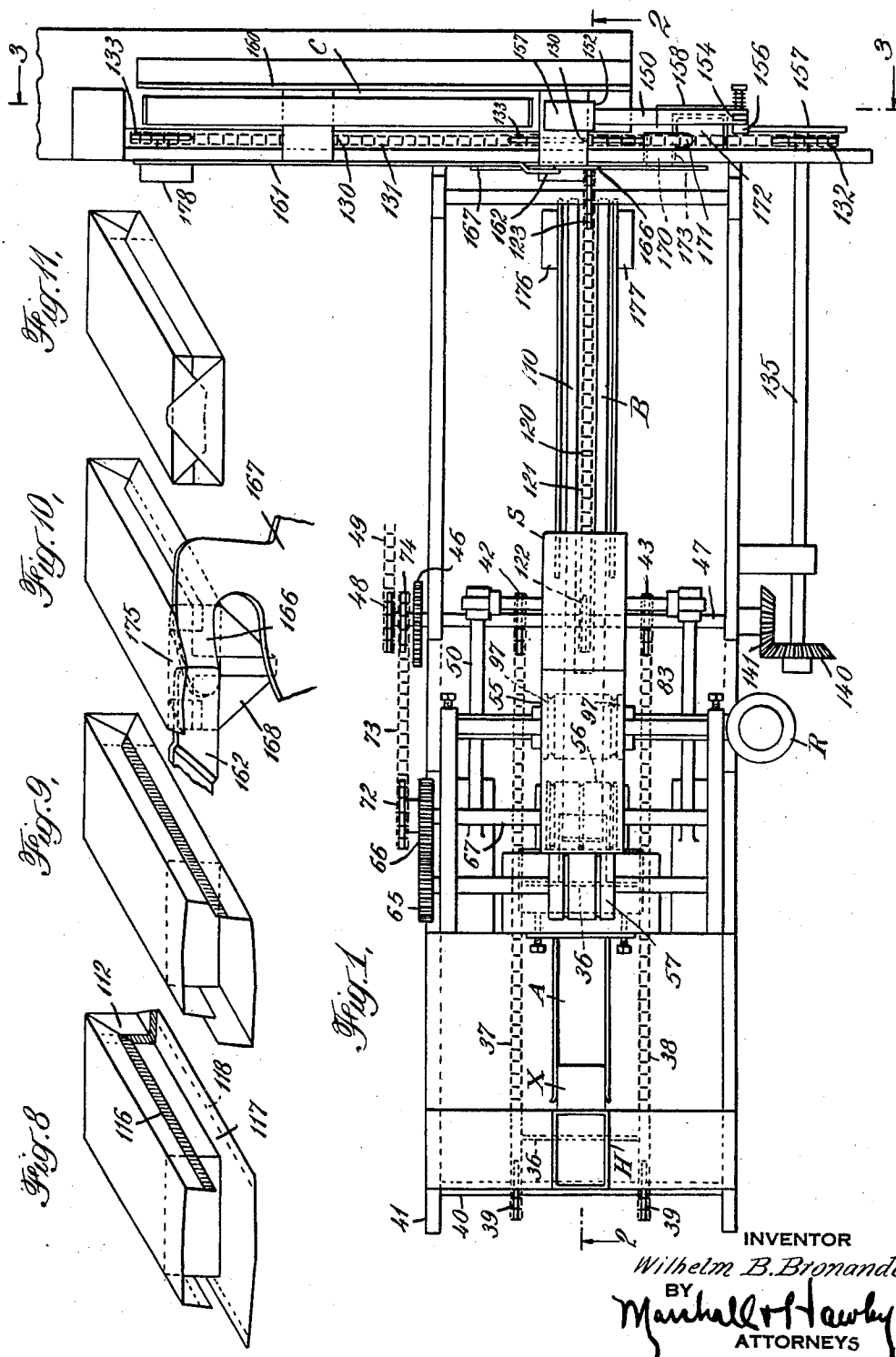
W. B. BRONANDER

2,182,113

METHOD OF WRAPPING ARTICLES

Filed Dec. 12, 1938

4 Sheets-Sheet 1



**Dec. 5, 1939.**

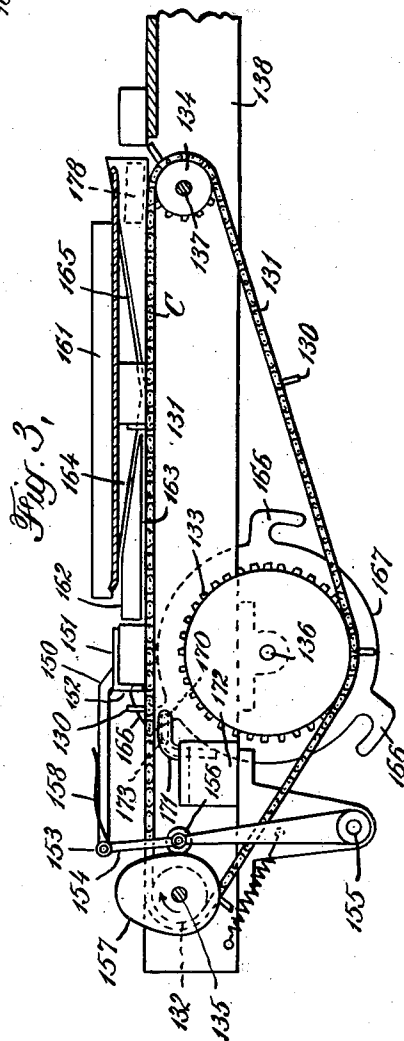
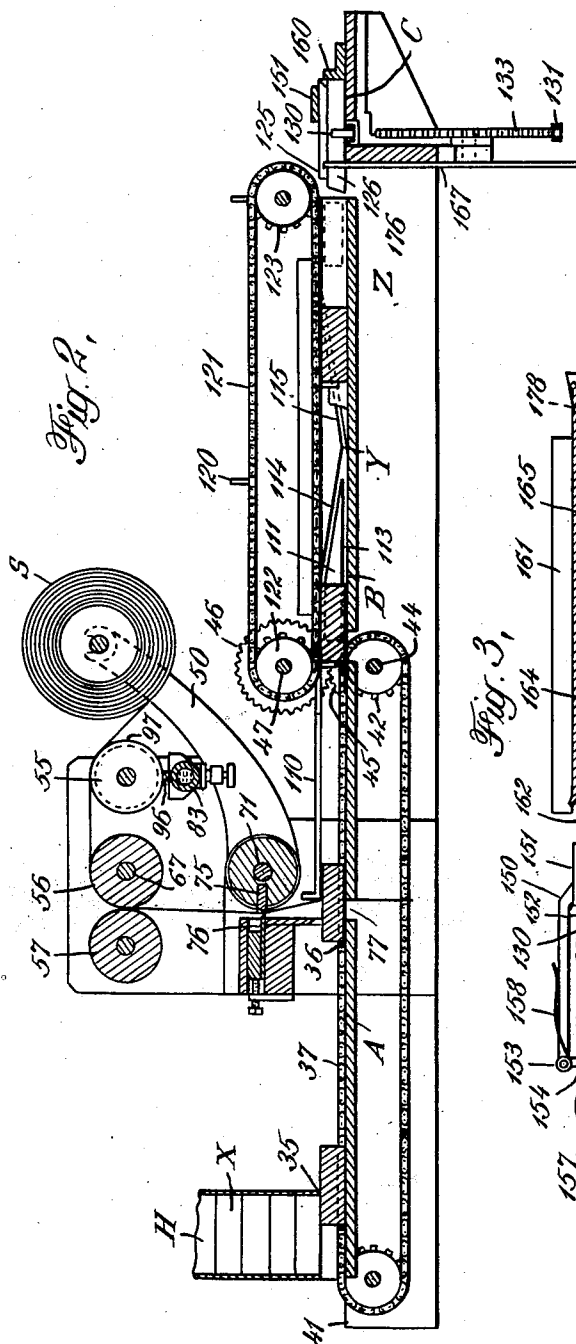
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**2,182,113**

## METHOD OF WRAPPING ARTICLES

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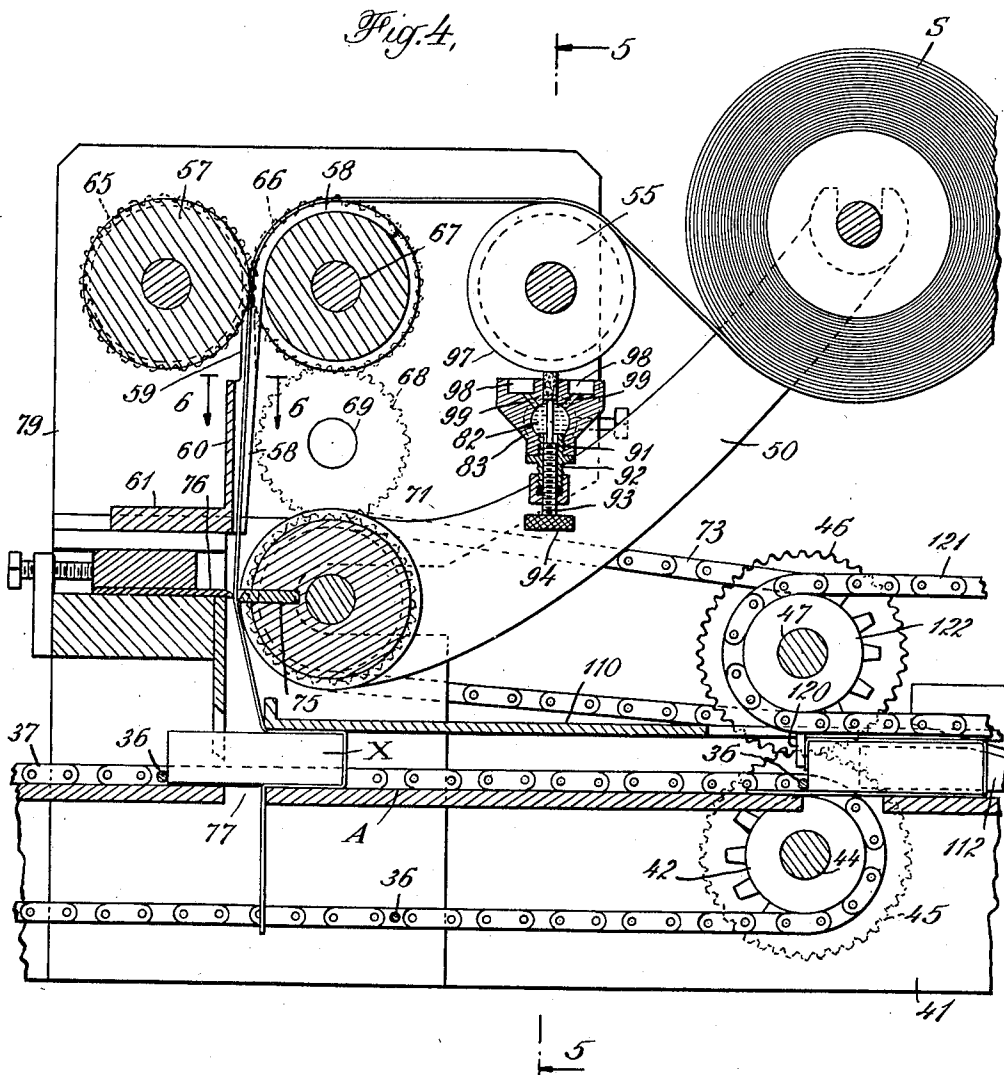
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METHOD OF WRAPPING ARTICLES

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4 Sheets-Sheet 3



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Fig. 5,

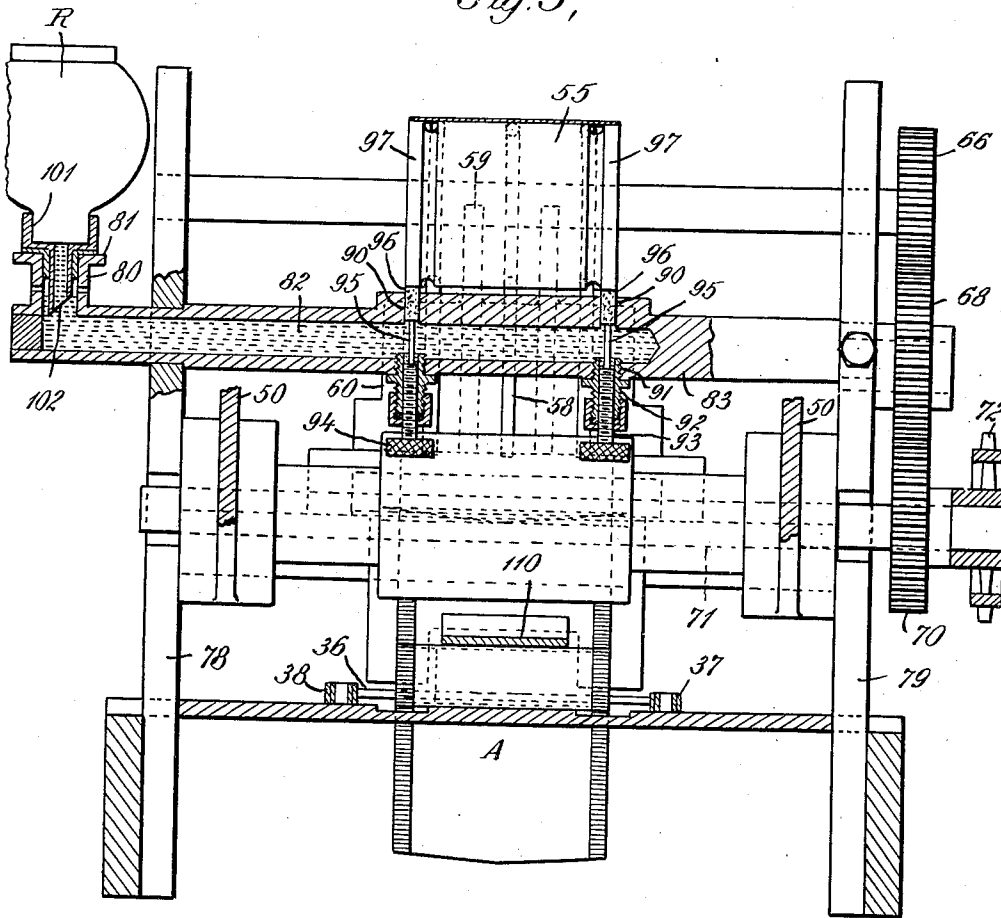


Fig. 6,

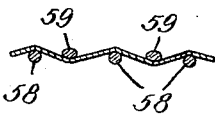
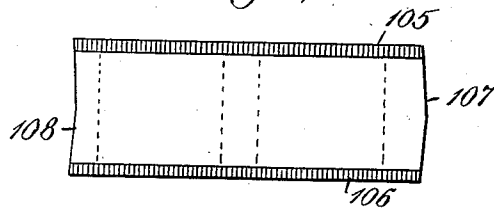


Fig. 7,



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## UNITED STATES PATENT OFFICE

2,182,113

## METHOD OF WRAPPING ARTICLES

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Application December 12, 1938, Serial No. 245,067

5 Claims. (Cl. 93—2)

This invention relates to a method of wrapping articles.

More particularly stated, the invention relates to methods of and machines for wrapping packages in material such as a coated regenerated cellulose film commercially known as moisture proof "Cellophane."

Ordinary adhesives or glues are ineffective and not satisfactory when used with such material since they do not adhere sufficiently to the coating.

However, such wrappers can be effectively sealed by moistening the coated surfaces with a solvent for the coating and holding the folded parts in firm contact under pressure until the solvent has taken effect. One suitable solvent for this purpose is ethylene glycol mono-methyl ether, which is a fluid having substantially the consistency of water.

The "Cellophane" coating when moistened with the solvent becomes tacky or sticky and the interengaging parts are securely held and sealed. It is essential, however, that the folding parts be maintained clean and smooth and free from the adhesive formed by the application of the solvent to the paper coating.

One object of the invention is to provide a machine of the character described, so constructed and arranged that the solvent can be applied continuously throughout the entire length of the wrapper.

Another object of the invention is to provide a machine of the character described with the solvent applying means so constructed and arranged that the folding or wrapper engaging parts will be kept clean and smooth by the solvent and will not be "gummed up" by the coating which has been rendered adhesive by the solvent.

Another object of the invention is to provide a method of wrapping articles in "Cellophane", so carried out that the folding elements will be kept clean and smooth and will not become sticky or "gummed up".

Another object of the invention is to provide a method of wrapping articles in "Cellophane" in which "Cellophane" solvent is used to keep the folding elements clean and smooth and prevent gumming or sticking of these parts.

Further objects of the invention will appear from the following specification taken in connection with the drawings which form a part of this application, and in which

Fig. 1 is a top plan view somewhat diagram-

matic of a machine constructed in accordance with the invention;

Fig. 2 is a longitudinal sectional elevation taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a sectional elevation taken substantially on line 3—3 of Fig. 1, showing the means for completing the folding and sealing of the package;

Fig. 4 is an enlarged sectional elevation showing the moistening means, wrapper feeding means and a portion of the wrapper and article feeding mechanism;

Fig. 5 is a sectional elevation taken at right angles to Fig. 4 and substantially on line 5—5 of Fig. 4;

Fig. 6 is a transverse sectional elevation taken substantially on line 6—6 of Fig. 4, showing the wrapper guiding means;

Fig. 7 is a plan view of the wrapper after it has been severed from the wrapper strip or sheet;

Fig. 8 is a perspective view showing the wrapper moistened by the mechanism shown in Fig. 5 after it has been partially folded around the article;

Fig. 9 is a view similar to Fig. 8 but showing the sides of the wrapper folded upwardly against the sides of the article leaving a tubular extension beyond the end of the article;

Fig. 10 is a view similar to Figs. 8 and 9 but showing the wrapped article after the projecting ends of the tubular extension have been tucked or folded inwardly against the ends of the article, the end flaps being shown prior to the final folding operation; and

Fig. 11 is a perspective view showing the wrapped article after it has been completely wrapped.

The invention briefly described consists of a wrapping machine comprising means for feeding an article to be wrapped, means for feeding the wrapper strip across the path of movement of the article and for severing the strip into wrappers, means for moistening the entire lengths of the longitudinal margins or edge portions of the wrapper strip with a solvent adapted to render the coating on the wrapper adhesive, means for folding the wrapper around the advance end of the article, for folding the sides of the wrapper against the sides of the article leaving a tubular extension projecting beyond the end of the article, and subsequently acting means for tucking the ends of the projecting portion or extension and folding the end flaps against the ends of the article.

The solvent applied to the longitudinal por-

tions of the wrapper renders the sides of the wrapper adhesive and as they are folded against the sides of the article they will be effectively secured and sealed, heaters preferably being provided to evaporate the solvent.

Means is also provided for applying solvent to the end tucks and to the outer end flap. This last named means consists of tuckers which are continuously operated in wiping contact with solvent conducting means and which transfer the solvent to the end tucks and to the outer end flap.

The solvent applying means for applying the solvent to the longitudinal marginal portions of the wrapper operate to continuously apply this solvent to the longitudinal marginal portions of the wrapper.

The invention, further described, consists of a method of wrapping articles in wrappers having a surface adapted to be rendered adhesive by the application of a solvent, comprising the following steps: The solvent is first applied to the marginal longitudinal portions of the wrapper throughout the entire length of the wrapper and the wrapper is then folded around the bottom, end and top of the article and the marginal portions are folded against the sides of the article by engaging the surfaces having solvent thereon, thereby maintaining the folding means clean and preventing gumming during the folding operation.

Further details of the invention will appear from the following description.

In the form of the invention illustrated in the drawings, there are three sets of operating mechanisms which engage and operate successively on the article and wrapper. Furthermore, there are three supports or tables along which the article and wrapper are fed. The first supporting table is shown at A, the second at B and the third at C. From the showing in Fig. 1 it will be noted that the support C is disposed at right angles to the supports A and B.

The articles X are fed from a hopper H along the support A by a plurality of successively acting transverse spaced feeding members or cross rods 36 carried by a pair of endless feeding members or chains 37 and 38.

As illustrated in Fig. 2, the rods or feeding members 36 engage the rear edges of articles X and feed the articles through an opening 35 in the hopper H and along the support A.

The chains or endless feeding members 37 and 38 are supported at one end on sprockets 39 carried by a shaft 40 mounted in the frame 41. At their other ends the chains are mounted on sprockets 42 and 43 carried by a shaft 44 which is also mounted in the frame 41. The shaft 44 has secured thereto a gear 45 which meshes with a gear 46 mounted on a shaft 47 on the outer end of which is mounted a sprocket 48 driven by a chain 49 which is connected to a motor drive shaft or any other suitable source of power.

#### *Paper feeding and moistening mechanism*

The paper for the wrappers, which in this instance is preferably coated waterproof "Cellophane" paper, is carried by a supply roll S mounted in brackets 50 secured to the frame of the machine. The strip of paper is led from the supply roll over a roll 55 which carries the solvent, and from the roll 55 passes downwardly between a pair of feeding rolls 56 and 57 which are grooved to receive the upper ends of spaced guide rods 58 and spaced guiding members 59 which are relatively located in the manner shown in Fig. 6. The

guide members 58 are curved at their upper ends and extend over the upper periphery of the roller 56 and guide the strips downwardly between the guiding members 58 and 59. The members 59 are carried by and extend upwardly from a plate 60 mounted on a supporting base or plate 61. The members 58 are also mounted on and supported by the roller 56 and, as stated, are disposed in spaced relation to the members 59. It will be noted from Fig. 6 that the strip as it passes downwardly is longitudinally grooved which prevents any transverse wrinkles and maintains a continuous uninterrupted feed of the strip.

The feed rolls 56 and 57 are geared together, as shown at 65 and 66, the gear 66 being mounted on a shaft 67. The shaft 67 is driven in the following manner: Gear 66 meshes with an idler gear 68 mounted on a spindle 69 and the gear 68 meshes with a gear 70 mounted on a shaft 71. This shaft has also secured thereto a sprocket wheel 72 which is driven by a chain 73 from a sprocket 74 mounted on the shaft 47.

The shaft 71 has mounted thereon a rotary cutting knife 75 which coacts with a stationary blade or knife 76 and severs the strip at predetermined intervals to form the wrappers.

Before being severed the strip is fed downwardly through an opening or slot 77 formed in the table or support A and the downwardly extending portion is engaged by the article X which is being fed along the table by one of the transverse feeding members or rods 36. As the article engages the downwardly extending wrapper strip the wrapper will be folded around the advance end of the article and over the upper and lower surfaces thereof in the manner illustrated in Fig. 4. After the strip has been so folded it is severed and the rear end of the wrapper projects rearwardly from the rear edge of the article.

The feed rolls, cutting mechanism and paper guiding means and also the moistening means hereinafter described are all mounted and carried by vertically extending frame members 78 and 79.

The moistening means will now be described. The liquid solvent for the "Cellophane" coating is carried by a receptacle R which is closed at the top and is mounted, in inverted position, in a vertically extending support 80 in the form of a conduit having a flange 81 at the upper end thereof and communicating at its lower end with a transverse conduit 82, these parts being formed in and carried by a block 83. The block 83 is provided with vertically extending bores 90 which extend upwardly from the conduit 82. The block is also provided with downwardly extending threaded bores 91 disposed in alignment with the bores 90 and into which are threaded sleeves 92 which are internally threaded to receive screws 93 having knurled heads 94 on the lower ends thereof. The upper end of the screws 93 have formed thereon upwardly projecting pins 95 which engage the lower ends of wicks 96. By adjusting the screws 93 the wicks can be raised to the desired level.

It will be noted that the bores 90 and wicks 96 are disposed in position to engage the marginal or end portions 97 of the roll 55.

In order to remove and permit the return of excess solvent liquid the block has formed therein in front of and in the rear of each bore 90 a groove 98 and a return conduit 99. The bores 90 at their lower ends communicate with the conduit 82. The receptacle R has secured to the lower end thereof a cap 101 having extending downwardly therefrom a conduit 102 which ex-

tends into a central bore formed in the support 80 and communicating with the conduit 82.

As illustrated in Fig. 5, the vertically extending support 80 for the receptacle R is provided near the lower end thereof with apertures through which air can enter. The lower end of conduit 102 which is disposed within the support 80 is beveled. When the liquid in bores 90 is lowered to a predetermined extent the level in the bore formed in the support 80 is lowered sufficiently to expose the openings or apertures above described, and air enters the conduit 102 and passes upwardly into the receptacle R, permitting the release of liquid therein. The vacuum above the liquid in the receptacle normally prevents the release of the liquid therein.

Fig. 7 illustrated the undersurface of a blank cut from the strip of wrapping material and from this figure it will be noted that the margins of the strip are moistened, as shown at 105 and 106. It will also be noted that the end 107 of the strip is convex or V-shaped and the end 108 is concave.

After the wrapper and article are fed past the slot 77 they pass between a top plate 110 and the support A of the wrapper and the wrapper is fed across the upper and lower surfaces of the article. From the support A the article and wrapper pass to the support B. At the entrance of the support B along the two sides thereof are formed tuckers 111 which engage the two laterally projecting advance ends of the wrappers and form tucks 112 therein. Side plates are disposed at the sides of the support B and have formed therein slots 113, 114 and 115 which operate in the usual manner to fold the laterally projecting upper and lower portions of the wrapper against the sides of the article. The upper projecting portions are first folded downwardly by the slots 114, the lower projecting ends being guided during this period of the operation through the slots 113. These portions are then folded upwardly by means of the slots 115. This folding mechanism is old and common and therefore has not been shown in detail.

Fig. 8 shows the article and wrapper at the stage in which the folding slots 114 have operated to fold the upper ends of the wrapper downwardly and inwardly against the sides of the article. The article and wrapper shown in Fig. 8 represent the period in the cycle of operation at the point Y in Fig. 2. The moistened marginal portions of the wrapper, as shown in Fig. 8, are disposed along the outer lower edge of the downwardly folded portion 116 of the wrapper and the moistened marginal portion of the bottom 117 of the wrapper is disposed on the bottom surface thereof, shown in dotted lines at 118.

Fig. 9 illustrates the article and wrapper in the form assumed after the lower projecting portions have been folded upwardly by the slots 115. The article and wrapper have reached the stage shown in Fig. 9 at the point Z in Fig. 2 or when they are about to be discharged from the support B and fed to the support C.

The article and wrapper are fed along the support B and through the folding mechanism described by means of a plurality of spaced lugs 120 carried by a chain or endless feeding member 121 mounted on sprockets 122 and 123. The sprocket 122 is carried by the shaft 47 and is driven thereby.

From the showing particularly in Fig. 2, it will be noted that the feeding lugs 120 engage the article and wrapper as the feeding members or

rods 36 move out of operation. From the support B the articles and wrappers in the shape shown in Fig. 9 are fed to the support C, the open ends of the wrapper extending rearwardly, as shown at 125 and 126 in Fig. 2. The wrapped articles are fed along the support C by means of spaced lugs or feeding members 130 carried by an endless belt or chain 131 which extends around and is supported on sprockets 132 and 133 and 134 carried respectively by shafts 135, 136 and 137. The shafts are mounted on a frame 138. The shaft 135 is driven by a bevel gear connection 140 and 141 from the shaft 44, the gear 141 being mounted on the shaft 44.

It has been found that the operation of the endless feeding member 131 and lugs 130 at high speed, causing the lugs to engage against the sides of the article, tends to dent in the article and damage the package and for this reason the lugs 130 do not engage and feed the article and wrapper immediately after it has been deposited on the support 31. They are, however, fed by a reciprocating feeding mechanism illustrated particularly in Fig. 3. In this figure there is shown an arm 150 having an angular head on the front end thereof consisting of an upper plate 151 adapted to engage over the top of the article and a rear plate 152 adapted to engage along the rear side of the article. The arm 150 is reciprocated back and forth on the support C and is so timed as to engage and feed the articles after they have been deposited on the support by the feeding members or lugs 120. At its rear end the arm 150 is pivoted at 153 to the upper end of a lever 154 which is mounted on a fixed pivot 155 and is provided intermediate its ends with a roller 156 disposed in engagement with a cam 157 mounted on the shaft 135. A spring 158 engages the upper surface of the arm 150 and holds the front end of the arm or head in engagement with the table or support C.

From the showing in Fig. 3 it will be seen that as the shaft 135 and cam 157 rotate the lever 154 will be oscillated about its pivot 155 and will reciprocate the arm 150 and the feeding head formed on the front end thereof. A suitable spring, as shown, is provided to press the arm 150 to the left viewing Fig. 3 in order to maintain the roller 156 in engagement with the cam 157. The cam 157 is so designed that the initial movement of the article and wrapper along the support C will be relatively slow, but this movement becomes more rapid as the article is fed and at the limit of the feeding movement 150 the article and wrapper are moving at approximately the speed of movement of the lugs 130.

The support C is provided along one edge thereof with a wall 160 which engages the closed end of the package and is provided along the other edge thereof with a wall 161 having a stationary tucker 162 at the entrance end thereof and having slots 163, 164 and 165 which operate in a manner similar to the slots 113, 114 and 115 shown in Fig. 2, to fold the projecting ends of the wrapper across the end of the article.

As above stated, the tucker 162 forms a tuck in one edge of the tubular extension or projecting portion of the wrapper and the tuck in the other end is formed by a rotary tucker 166, a plurality of these rotary tuckers being carried by a disk 167 mounted on the shaft 136.

The tuckers 162 and 166 are so relatively constructed and arranged that the tuckers 166 can pass inside the tuckers 162 in the manner shown in Fig. 1.

In order to supply solvent or moistening liquid to the lower end flap 168 shown in Fig. 10, and to insure the moistening of the end tucks, a moistening wick 170 is mounted on the support 138 in a conduit 171 which communicates with a receptacle 172. The outlet end of the wick shown at 173 is so disposed as to engage and wipe one surface of the rotary tucker 166 before the tucker performs its tucking operation. The solvent is therefore carried upwardly on the tucker 166 and deposited on the end flap 168 and to a lesser extent on the end tucks.

The tuckers 166 also perform an added function in insuring the proper alinement of the upper end flaps 175. These flaps, due to their engagement by the lugs 120, are bent downwardly to a slight extent and the rotation of the tuckers 166 bends them upwardly again so that they will enter the folding slots in the proper relation thereto.

In order to insure the proper sealing of the packages and the evaporation of the solvent material after the contacting surfaces have been sealed, heaters are provided at suitable positions, as at 176 and 177, at the discharge end of the support B and at 178 at the discharge end of the support C.

From the foregoing specification it will be seen that simple, practical and effective means have been provided for wrapping articles in material having a surface adapted to be rendered adhesive by the application of a solvent. By means of this machine the solvent is applied easily and quickly to the longitudinal portions of the strip before it is severed and wrapped around the article and in order to insure the final sealing of the wrapper solvent is applied to the outer end flap.

Furthermore, the article and wrapper feeding means have been so constructed and arranged as to render the machine capable of operation at high speeds and to prevent any tendency of the feeding means to dent or injure the packages being wrapped.

Moreover, the method of applying solvent to the wrapper and folding the wrapper effectively insures clean folding elements and surfaces and prevents gumming of the parts.

This application is a continuation in part of application Ser. No. 76,158, filed April 24, 1936.

Although certain specific embodiments of the invention have been particularly shown and described, it will be understood that the invention is capable of modification and that changes in the construction and in the arrangement of the various cooperating parts may be made without departing from the spirit or scope of the invention, as expressed in the following claims.

What I claim is:

1. A method of wrapping articles in wrappers having a surface adapted to be rendered adhesive by the application of a solvent, which consists of applying a solvent to the marginal longitudinal portions of the wrapper throughout the

entire length of the wrapper, folding the wrapper around the article, folding the marginal portions against the sides of the article by folding means engaging the surfaces having solvent thereon, the solvent preventing gumming of the folding means during the folding operation, and tucking and closing the ends of the wrapper.

2. A method of wrapping articles in wrappers having a surface adapted to be rendered adhesive by the application of a solvent, which consists of applying a solvent to the under marginal longitudinal portions of the wrapper throughout the entire length of the wrapper, folding the wrapper around the article, folding the marginal portions upwardly and downwardly against the side of the article by folding means engaging the surfaces having solvent thereon, leaving solvent on the outer surfaces of the sides of the wrapper, the solvent preventing gumming of the folding means during the folding operation, and tucking and closing the ends of the wrapper.

3. A method of wrapping articles in wrappers having a surface adapted to be rendered adhesive by the application of a solvent, which consists of applying a solvent to the under marginal longitudinal portions of the wrapper throughout the entire length of the wrapper, folding the wrapper around the bottom, end and top of the article, folding the marginal portions against the sides of the article by folding means engaging the surfaces having solvent thereon, the solvent preventing gumming of the folding means during the folding operation, and tucking and closing the ends of the wrapper.

4. A method of wrapping articles in wrappers having a surface adapted to be rendered adhesive by the application of a solvent, which consists of applying a solvent to the under marginal longitudinal portions of the wrapper throughout the entire length of the wrapper, folding the wrapper around the bottom, end and top of the article, folding the marginal portions upwardly and downwardly against the side of the article by folding means engaging the surfaces having solvent thereon, leaving solvent on the outer surfaces of the sides of the wrapper, the solvent preventing gumming of the folding means during the folding operation, and tucking and closing the ends of the wrapper.

5. A method of wrapping articles in wrappers having a surface adapted to be rendered adhesive by the application of a solvent, which consists of applying a solvent to the under marginal longitudinal portions of the wrapper throughout the entire length of the wrapper, folding the wrapper around the bottom, end and top of the article, folding the marginal portions against the sides of the article by folding means engaging the surfaces having solvent thereon, the solvent preventing gumming of the folding means during the folding operation, tucking and closing the ends of the wrapper and evaporating the excess solvent.

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