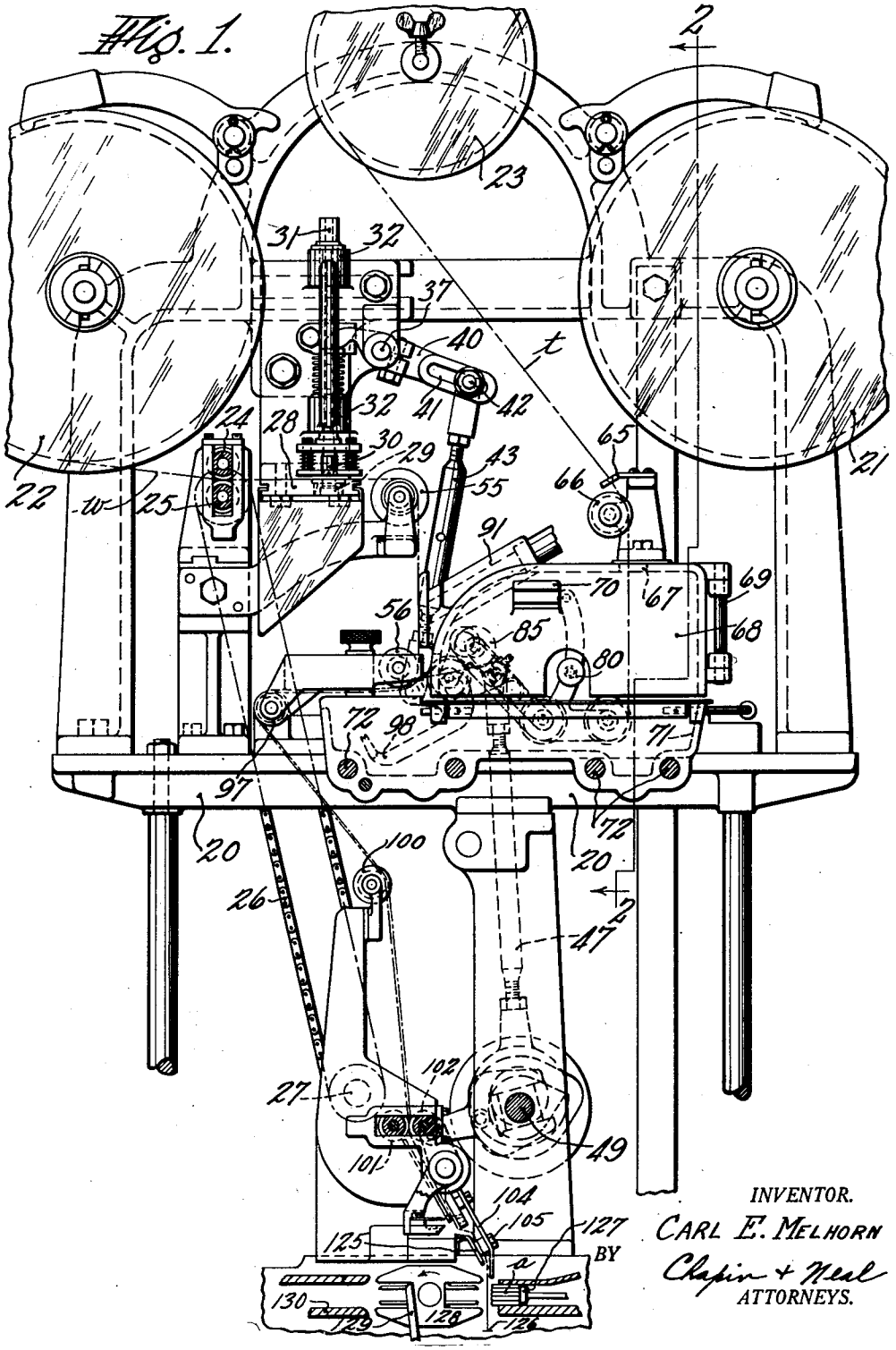
July 3, 1934. C. E. MELHORN 1,965,524

METHOD AND MACHINE FOR MAKING PACKAGES PROVIDED WITH TEARING STRIPS

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Fig. 1.



INVENTOR.
CARL E. MELHORN
BY
Chapin + Neal
ATTORNEYS.

July 3, 1934. C. E. MELHORN 1,965,524

METHOD AND MACHINE FOR MAKING PACKAGES PROVIDED WITH TEARING STRIPS

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Fig. 2.

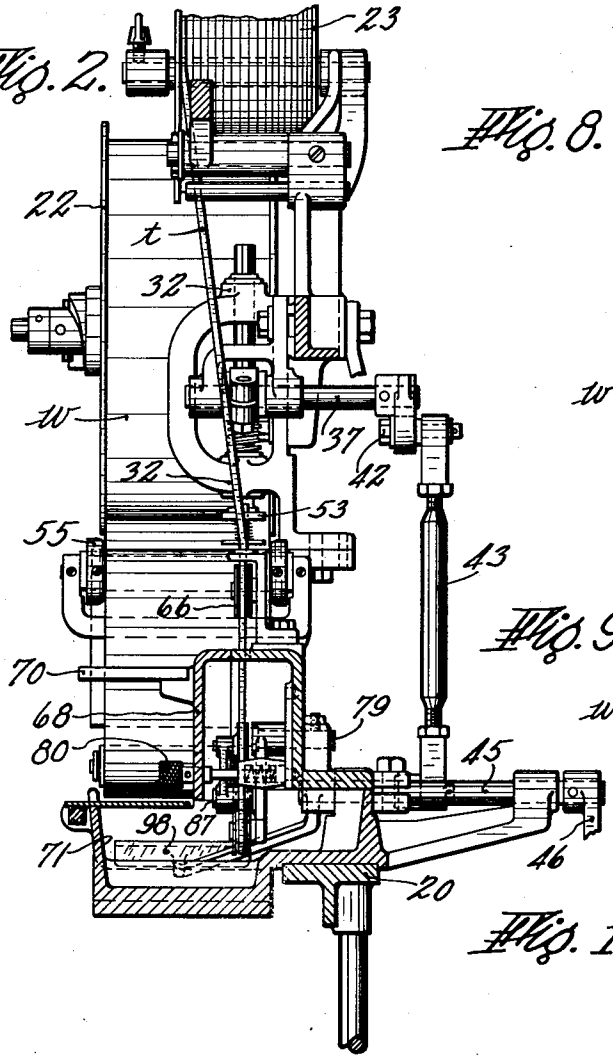


Fig. 8.

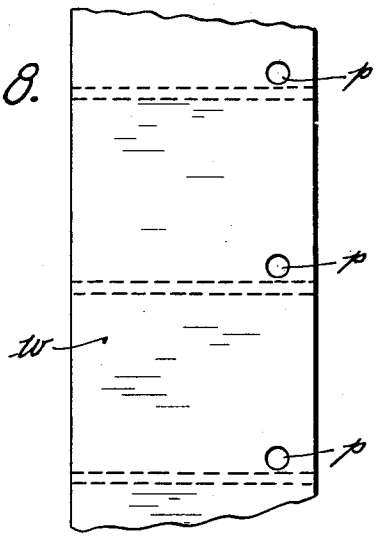


Fig. 9.

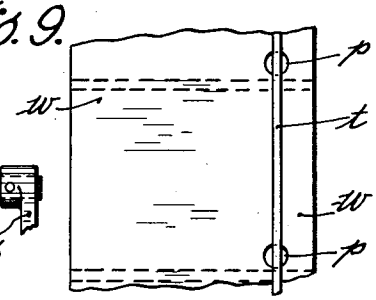


Fig. 10.

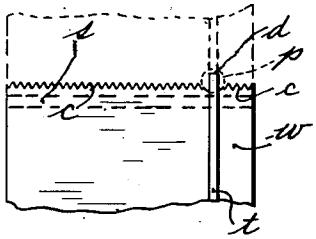


Fig. 3.

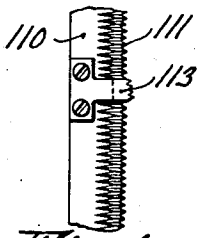


Fig. 5.

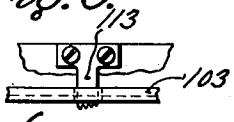


Fig. 6.

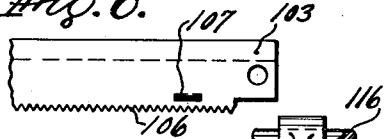
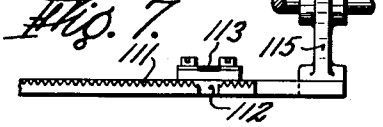


Fig. 4.



Fig. 7.



BY

INVENTOR.
CARL E. MELHORN
Clapin + Neal
ATTORNEYS.

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METHOD AND MACHINE FOR MAKING PACKAGES PROVIDED WITH TEARING STRIPS

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Fig. 12.

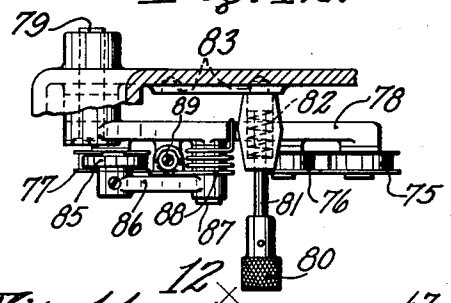


Fig. 11.

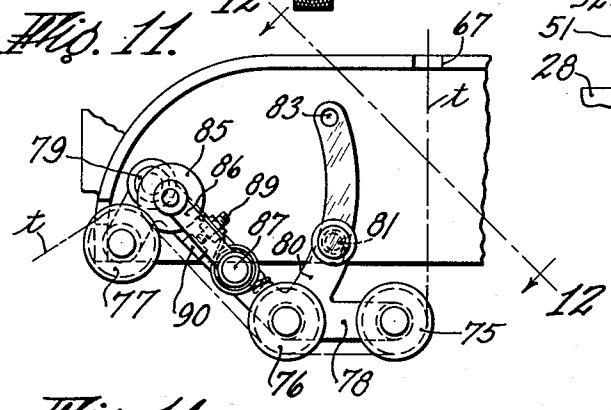


Fig. 13.

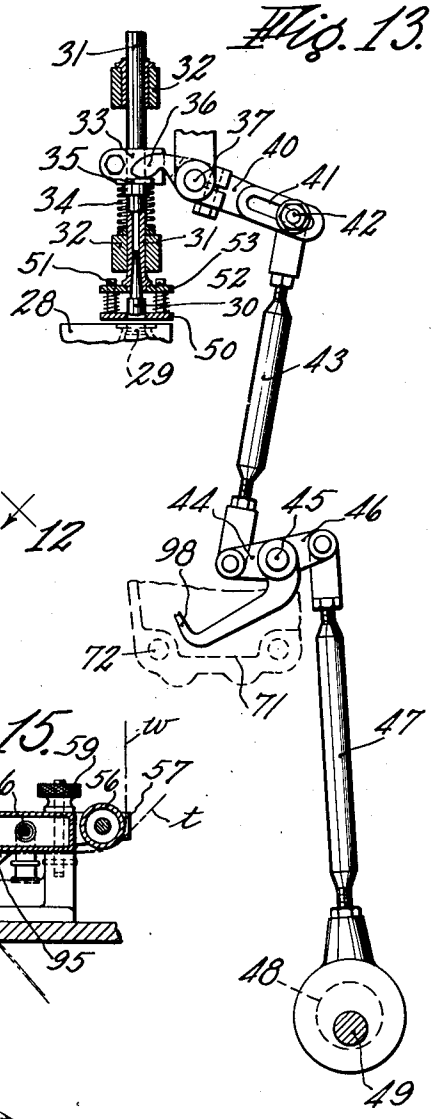


Fig. 14.

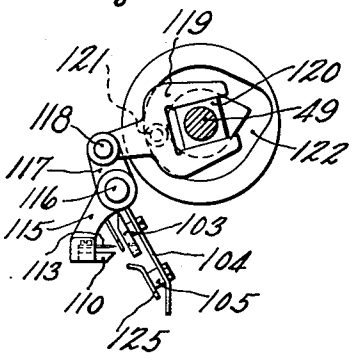
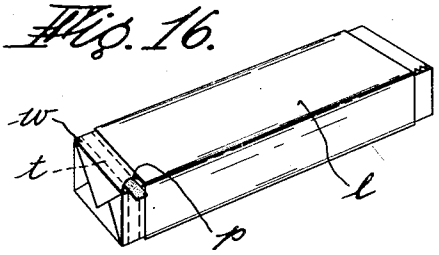


Fig. 15.

Fig. 16.



INVENTOR.
CARL E. MELHORN
BY Clapin & Neal
ATTORNEYS.

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METHOD AND MACHINE FOR MAKING PACKAGES PROVIDED WITH TEARING STRIPS

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Fig. 17.

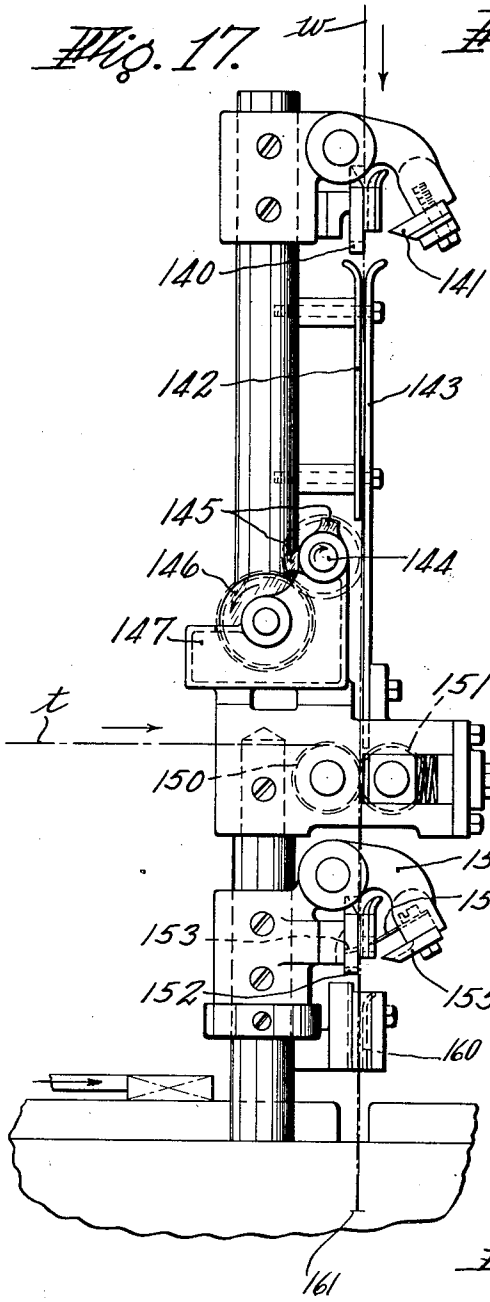


Fig. 18.

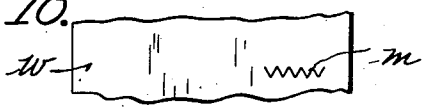


Fig. 19.

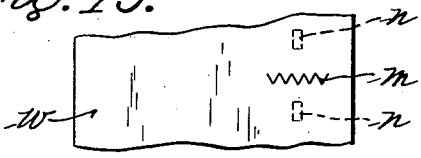


Fig. 20.

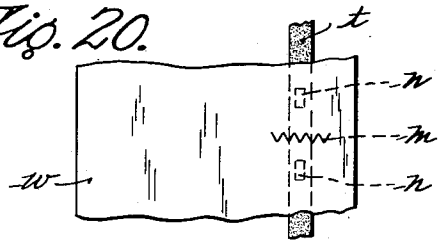


Fig. 21.

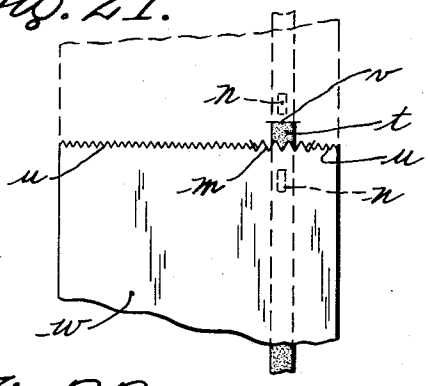


Fig. 22.

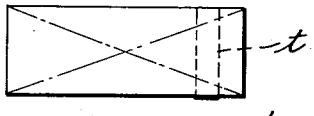
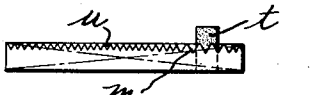


Fig. 23.



INVENTOR.
CARL E. MELHORN
BY Clapin & Neal
ATTORNEYS.

Patented July 3, 1934

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UNITED STATES PATENT OFFICE

1,965,524

METHOD AND MACHINE FOR MAKING PACKAGES PROVIDED WITH TEARING STRIPS

Carl E. Melhorn, Springfield, Mass., assignor to Package Machinery Company, Springfield, Mass., a corporation of Massachusetts

Application February 28, 1933, Serial No. 658,915

16 Claims. (Cl. 93—2)

This invention relates to a method and to a machine for producing wrapped articles having a tearing strip and to a method and a machine for preparing wrapper blanks having integral tearing strips and suitable for use in wrapping articles.

In preparing wrapped articles which are to have a tearing strip incorporated within the wrapper difficulty has been experienced in presenting both the wrapper and the tearing strip to the wrapping mechanism in accurate registration except in cases where the tearing strip did not project beyond the end of the wrapper. It is of course desirable to have the end of the tearing strip projecting free of the wrapper so that if the tearing strip is made of a different material or of a different color from the body of the wrapper attention will be directed to it and its seizure will be facilitated. It is the object of this invention to provide a method and an apparatus by which the wrapper and the tearing strip may be handled as a unit throughout the preparation of the wrapper blank and the presentation of the composite blank to the wrapping mechanism, and in which the composite blank may be so severed by a single cutting operation that the tearing strip will project beyond the severed edge of the wrapper. Additional objects will appear from the following description and claims.

Referring to the drawings:

Fig. 1 is a side elevation of a mechanism constructed in accordance with my invention for associating a tearing strip with a wrapper web, severing the strips into wrapper blanks, and presenting the composite wrapper blank to a suitable wrapping mechanism;

Fig. 2 is a side elevation, partly in section on line 2—2 of Fig. 1, of certain mechanisms shown in that figure;

Fig. 3 is a detail of a movable cutting member;

Fig. 4 is an end view thereof;

Fig. 5 is a detail showing the manner of cooperation of the fixed and movable cutting members;

Fig. 6 is a detail of the fixed cutting member;

Fig. 7 is an end view of the movable cutting member;

Figs. 8, 9, and 10 are detail views showing progressive stages in the preparation of a wrapper blank;

Fig. 11 is a detail of the mechanism for subjecting the tearing strip to a wax bath;

Fig. 12 is a section on line 12—12 of Fig. 11;

Fig. 13 is a detail showing the mechanism for perforating the wrapper web;

Fig. 14 is a detail of the operating mechanism for the cutters;

Fig. 15 is a detail of the device for chilling the associated wrapper web and tearing strip;

Fig. 16 is a perspective view of the completed package;

Fig. 17 is a side elevation of a modified form of mechanism;

Figs. 18, 19, 20, and 21 are successive views showing the method of preparing the wrapper blank performed by the mechanism of Fig. 17; and

Figs. 22 and 23 are respectively a top plan and a side elevation of the package produced by the modified mechanism.

The mechanism shown in Figs. 1 to 15 is mounted upon a frame 20 which may, for convenience, be formed as a part of a suitable wrapping mechanism. Upon this frame are supported a reel 21 which carries wrapping material used, for example, in wrapping individual gum sticks, a reel 22 carrying a web of wrapping material such as tinfoil used in wrapping a group of gum sticks and a reel 23 carrying a tape-like tearing strip. This strip may be made of paper, thin celluloid, or one of the numerous cellulosic products now on the market, and it is preferably colored so as to contrast with the tinfoil wrapper. The course of the tinfoil wrapper web *w* will be traced first.

On leaving the reel 22 the wrapper web *w* passes between rolls 24 and 25 driven intermittently as by a chain 26 from a shaft 27. This shaft is preferably connected to one of the intermittent drive shafts of a wrapping machine so as to rotate in synchronism therewith. Beyond these feed rolls the web *w* passes over a table 28 provided with a perforating die 29. A punch 30 is connected to the lower end of a tube 31 vertically reciprocable in bearings 32. A clamp 33 (Fig. 13) is secured upon the tube and a spring 34 is compressed between the lower bearing 32 and this clamp so as to give the tube a tendency to rise. The clamp is provided with an abutment 35 engageable by a fork 36 secured to a shaft 37. This shaft is also provided with an arm 40 having a slot 41 in which a pivot 42 is adjustably secured. A link 43 connects this pivot with an arm 44 secured to a shaft 45. A second arm 46 on the latter shaft is connected by a link 47 with the strap of an eccentric 48 on a main cam shaft 49 driven continuously by any suitable means. By this mechanism the punch 30 is lowered into cooperation with the die 29 at a time when the web *w* is

stationary. The operation of the punch is to produce in the web a series of longitudinally spaced incisions, in the form of holes or perforations *p*. The perforations are spaced apart a distance equal to the length of the wrapper blank to be produced and are located laterally of the web at the point where the tearing strip is later to be fixed. The punch is preferably provided with the usual stripper plate 50 mounted upon pins 51 and pressed down by springs 52 acting against a plate 53 carried by the lower end of the tube 31. Beyond the punch the perforated web passes over a flanged guide roll 55 and then around a roll 56 (Figs. 1 and 15) carried upon an arm 57 pivoted at 58 to the frame. The arm is generally held in the position of Fig. 15 by a thumb screw 59, but by loosening the latter it may be swung upwardly upon its pivot to facilitate threading of the web when the machine is being started.

Considering now the progress of the tearing strip *t*, it passes from the reel 23 through a guide 65, over a flanged guide roll 66, and through a hole 67 in the top of a casing having a cover 68 swinging on a vertical pivot 69 and provided with a handle 70. The lower portion of this casing is formed as a wax tank 71 provided with electric heaters 72 and the usual thermostatic form of control. Within the casing are a series of flanged guide rolls 75, 76, and 77 (Figs. 11 and 12) all mounted upon an arm 78 carried upon a stationary pivot 79. The arm has an extension 80 upon which a pin 81 is pressed laterally by a spring 82 so as to be maintained in one or another of two spaced holes 83 in the casing. Normally the arm is in the position of Fig. 11, but by withdrawing the pin and shifting the arm so that the pin registers with the upper hole, the rolls may be held in a position facilitating threading of the tearing strip. A roll 85, preferably having a flat surface fitting within the flanges of the roll 77, is carried upon a short arm 86 pivoted to the arm 86 at 87 and pressed toward the roll 77 by a spring 88. A stop 89 coacting with an abutment 90 on the arm 78 limits the approach of the rolls 85 and 77, these rolls serving as a doctor to remove excess wax picked up by the tape in its progress through the tank. The upper portion of the tank casing is preferably provided with an electric heater 91 (Fig. 1) which serves to keep both the atmosphere within the casing and the various rolls warm in order to avoid premature congealing of the wax.

On passing beyond the roll 77 the tearing strip *t* meets the now perforated web *w* approximately at the guide roll 56. Immediately thereafter the composite strip shown in Fig. 9 passes underneath a cooling tank 95 provided with inlet and outlet openings 96 for the circulation of water. During the passage of the composite strip across this tank the wax carried by the tearing strip cools sufficiently to unite this strip with the web *w*, the two forming thereafter a single unit. For convenience in later sealing the longitudinal seam of the package a strip *s* of wax may be applied across the compound web by a dauber 98.

It will be observed that no separate feeding mechanism has been provided for the tearing strip, reliance being placed upon its union by the congealed wax with the web *w*. This web was given a preliminary intermittent feed by the rolls 24 and 25. Its final feeding movement is also intermittent and is secured after the composite web passes a flanged guide roll 100 by feed rolls 101 and 102 driven in any suitable manner from the shaft 27. These rolls are preferably of slightly larger diameter than the rolls 24 and 25 so that the composite strip is maintained under a slight tension. Below these latter rolls the composite web passes a stationary knife bar 103 carried by a guide 104 which is in turn supported on a bracket 105 arising from the frame. This knife bar has a serrated cutting edge 106 and is provided with a hole 107 into which one part of the movable cutting member is adapted to enter. The movable cutting member comprises a main knife 110 having a serrated cutting edge 111. This edge is adapted to coact with the edge 106 and has a gap 112 in line with the perforations *p*. The movable knife is also provided with an offset cutter 113 adapted to enter the hole 107 and also is in registration with the line of perforations. The movable cutting members are supported on an arm 115 (Fig. 14) secured to a shaft 116. A second arm 117 on this shaft is joined by a pivot 118 with a yoke 119 embracing a block 120 free upon the shaft 49. A roll 121 on the yoke enters a groove in a cam 122 on the shaft 49 to cause the movable knife to pass across the edge of the stationary knife during the rest period of the web.

Beyond the knife the severed wrapper blank passes between the guide 104 and a second guide 125 and drops upon a stop plate 126 which positions it for the wrapping operation. The article *a* which, in the case shown, consists of a group of five individually wrapped gum sticks, is pushed by a plunger 127 against the wrapper blank and carries the latter into a tumble box 128 which may be of any desired design. After the tumble box is rotated a half revolution the package is forced therefrom by an ejector 129 into a folding channel 130 in which the end folds of the package may be turned down by any desired folding mechanism.

The method by which the tearing strip and the web are associated and the operation of the mechanism will now be considered. As described above, the web *w* is originally provided with a series of longitudinally spaced incisions or perforations *p*. After this is done the tearing strip *t* is adhesively secured to the web in a position so it is stretched across the perforated portions of the web. The composite web is then severed on a broken line, as indicated in Fig. 10, the web *w* being severed upon a line *c* extending into but interrupted at the perforation *p* so that the tearing strip is not cut at this point. The tearing strip itself is cut at a point within the boundary of the perforation but longitudinally spaced from the cut *c* along a line *d*, this being accomplished by the cutter blade 113. It will be seen that by this means the end of the tearing strip is left free and projecting from the body of the wrapper blank. In the subsequent wrapping operation the blank is folded circumferentially around the article so that the projecting portion of the tearing strip will be on the outside, the tearing strip itself lying within the wrapper. Preferably, in order to afford easy access to the end of the tearing strip, the cut edge *c* is located at one edge of the package, as indicated in Fig. 16. The projecting portion of the tearing strip is by this means allowed to extend free of the package beyond one side, as clearly indicated in that figure.

If desired, the package may be encircled by a label *l* having a width insufficient to cause it to overlie the tearing strip. Upon pulling the tearing strip around the package the end of the wrapper will be torn off, exposing the ends of the

gum sticks, which will meanwhile be held in assembled relation by the label *l* and the remaining portion of the wrapper.

As indicated in the modification shown in Figs. 17 to 23 it is not necessary to remove material from the web in forming the initial incisions or partial severances in the web. In this modified method the incisions in the web are made in the form of slits *m* which are narrower than the web so as to leave an uncut margin on each side. Preferably these slits are made with a cutter having comparatively large serrations, so that the serrated slit takes up a substantial space lengthwise of the web. The tape *t* is secured to the web *w* by spots *n* of adhesive preferably applied to the web on either side of the slit or perforation *m*. The composite strip shown in Fig. 20 is now severed (Fig. 21) on a double line *u*, *v*. The line of cut *u* is interrupted at the slit *m*, running into that slit from opposite margins of the web. The large size of the serrations forming the original slit *m* is of use in assuring complete severance of the web, even with slightly imperfect registration of the lines *m* and *u*. Of course the large serrations could be placed in the cut *u* instead of in the slit *m* with this same result, or either the slit *m* or the cut *u* could be provided with a terminal portion extending longitudinally of the web. The cut *v* extends through both the tape and the web, completely severing the former at a point spaced from the line *u*, and leaving a blind slit in what is to be the inner and therefore concealed end of the wrapper blank. In this modification the severed wrapper blank has straight edges without any notch, as would be the case with a perforation of the type first discussed, and may sometimes be desirable for that reason. The amount of projection of the tearing strip may be made as great as is desired, since it is not limited by the diameter of the punched hole as in the first modification. The tape being secured to the web only by spots of adhesive which are outside the area bounded by the cuts *u* and *v*, the tape when severed on the latter line comes away from the underlying web. When the wrapper blank is removed from the end of the composite web there will be left on the latter a portion of web uncovered by tape from the blind slit *v* to the transverse cut made up of the slit *m* and the two-part slit *u*. This end of the web, however, forms the inner end of the wrapper, so that the absence of this small length of tape is of no consequence.

The mechanism for producing this modified form of wrapper blank has not been shown in detail, as certain operating mechanisms may be the same as those previously described. In this case the web *w* passes a knife mechanism composed of a fixed member 140 and a movable member 141. The operating mechanism is the same as that shown in Fig. 14 and is not illustrated again. These members 140, 141 are short in relation to the total width of the web, and are formed with serrations of comparatively large pitch for the reasons previously given, so as to form the slit *m* in the manner described above. Below this cutting mechanism the web passes between guide members 142, 143, the former being broken off to permit the application of adhesive in the form of spots *n*. A convenient form of adhesive applying mechanism is a rotating shaft 144 bearing circumferentially spaced adhesive applying pads 145. These pads receive adhesive from a supply roll 146 running in an adhesive containing tank 147.

The web, bearing the slits *m* and adhesive spots *n*, passes between intermittently driven feed rolls 150, 151 around the former of which the tape *t* is led. Below these rolls is a second cutting mechanism substantially identical with that shown in Fig. 14, having a stationary blade 152 provided with a slot 153. The movable knife arm 154 carries a blade 155 adapted to contact with the blade 152 and also a short knife 156. Blades 152 and 154 have their cutting edges interrupted so as to form the slit *u*, and knife 156 enters the slot 153 to form the blind slit *v*. The severed sheet falls through guides 160 onto a stop 161, where it is picked up by the wrapping mechanism as before.

While in the above discussion the feed rolls have been described as intermittently driven, it is obvious that where the invention is to be used on wrapping machines employing a continuous wrapper feed the same method could be followed by conventional changes in the individual mechanisms. Other changes, within the scope of the invention as set forth in the accompanying claims, may be made in response to the requirements of different wrapping machines to which the invention is to be applied.

What I claim is:

1. A method of forming wrapper blanks provided with attached tearing strips which comprises forming longitudinally spaced incisions in a web of wrapping material, securing a tearing strip to the web along the line of the incisions leaving a portion of the strip unattached to the web at each incision, cutting the web from each margin thereof into each incision without cutting the strip, and severing the strip at a point spaced from the line upon which the web was cut and within said unattached portion of the strip.

2. A method of wrapping packages provided with tearing strips which comprises forming a series of longitudinally spaced incisions in a web of wrapping material at a distance from one edge thereof in excess of the marginal requirements for forming the end folds, securing a tearing strip to the web along the line of the incisions leaving a portion of the strip unattached to the web at each incision, cutting the web from each margin thereof into each incision without cutting the strip, severing the strip at a point spaced from the line upon which the web was cut and within said unattached portion of the strip, wrapping the blank thus produced around an article with the projecting end of the tearing strip produced by the last-named severance exposed, and closing in the marginal portions of the wrapper blank upon the ends of the article.

3. A method of forming wrapper blanks provided with attached tearing strips which comprises forming in a web of wrapping material a series of longitudinally spaced incisions each of which is spaced from the margins of the web and has a substantial longitudinal as well as a lateral extent, securing a tearing strip to the web along the line of the incisions leaving a portion of the strip unattached to the web at each incision, cutting the web from each margin thereof up to the lateral edges of the incisions and within the longitudinal extent thereof, and without cutting the tearing strip, and severing the tearing strip at a point spaced from the line upon which the web was cut and within said unattached portion of the strip.

4. A method of forming wrapper blanks provided with attached tearing strips which comprises punching longitudinally spaced holes in a

web of wrapping material, adhesively securing a tearing strip to the web along the line of the holes and severing wrapper blanks from the composite web upon broken transverse lines running from the edges of the web to the holes and then longitudinally offset so that the tearing strip is severed within the boundary of the holes but on a line spaced from the adjacent transverse severed edge of the wrapper blank.

5. A method of wrapping packages provided with tearing strips which comprises forming longitudinally spaced holes in a web of wrapping material, adhesively securing a tearing strip to the wrapping material along the line of the holes, severing the wrapping material web transversely along lines intersecting each of said holes adjacent one longitudinal edge thereof without severing the tearing strip, severing the tearing strip upon lines adjacent the other longitudinal edge of each hole so as to leave a projecting length of the tearing strip, and wrapping the compound strip thus produced about an article with the tearing strip inside and with the projecting end of the tearing strip exposed.

6. A method of wrapping packages provided with tearing strips which comprises forming longitudinally spaced holes in a web of wrapping material, positioning a tearing strip along the line of the holes, severing the wrapping material web transversely along lines intersecting each of said holes adjacent one longitudinal edge thereof without severing the tearing strip, severing the tearing strip upon lines adjacent the other longitudinal edge of each hole so as to leave a projecting length of tearing strip, and wrapping the compound strip thus produced about an article with the tearing strip inside and with the projecting end of the tearing strip exposed.

7. A method of forming wrapper blanks provided with attached tearing strips which comprises forming in a web of wrapping material a series of longitudinally spaced slits each of which is spaced from the margins of the web, securing a tearing strip to the web leaving an unattached portion adjacent each slit, cutting the web from each margin thereof into each slit without severing the strip and cutting through the strip and web at points spaced from the former cut and within the unattached portion of the strip so that a composite wrapper blank having a projecting tearing strip will be severed from the web.

8. A method of forming wrapper blanks provided with attached tearing strips which comprises forming in a web of wrapping material a series of longitudinally spaced slits each of which is spaced from the margins of the web, securing a tearing strip to the web leaving an unattached portion adjacent each slit, cutting the web from each margin thereof into each slit without severing the strip, one of the partial severances of the web comprising the slit and the last named cut being formed on a line having substantial longitudinal as well as lateral extent so that the combined partial severances will completely sever the web irrespective of slight variations in register, and cutting through the slit and web without completely severing the web at points spaced from the former cut and within the unattached portion of the strip so that a composite wrapper blank having a projecting tearing strip will be produced.

9. A method of forming wrapper blanks provided with attached tearing strips which comprises forming in a web of wrapping material a series of longitudinally spaced broadly serrated slits each of which is spaced from the margin of the web, securing a tearing strip to the web leaving an unattached portion adjacent each slit, cutting the web from each margin thereof into the broad serrations of each slit without severing the strip, and cutting through the slit and web with a line of cut substantially equal to the width of the strip at points spaced from the former cut and within the unattached portion of the strip so that a composite wrapper blank having a projecting tearing strip will be produced.

10. Mechanism for forming wrapper blanks provided with attached tearing strips which comprises means for advancing a web of wrapping material, means for forming in the web a series of longitudinally spaced incisions, means for advancing a tearing strip into contact with the web along the lines of the incisions, means for securing the strip and web together leaving an unattached portion of the strip at each incision, means for cutting the web from each margin thereof into each incision without cutting the strip, and a cutter operable to sever the strip at points spaced from the lines upon which the web was cut and within said unattached portions of the strip.

11. Mechanism for forming wrapper blanks provided with attached tearing strips which comprises means for forming perforations longitudinally spaced along a web of wrapping material, means for attaching a tearing strip to the web along the line of perforations, and cutting means for severing the composite web upon broken transverse lines running from the edges of the web to the perforations and then longitudinally offset to sever the tearing strip within the boundary of the perforations.

12. Mechanism for forming wrapper blanks provided with attached tearing strips which comprises means for forming perforations longitudinally spaced along a web of wrapping material, means for attaching a tearing strip to the web along the line of perforations, and cutting means for severing the composite strip comprising cooperating cutting members having cutting edges extending from the edges of the web into the perforations and additional cutting edges offset from the first in a direction longitudinally of the web and positioned to sever the tearing strip within the boundary of the perforations.

13. Mechanism for producing packages provided with tearing strips comprising means for forwarding a web of wrapping material, perforating mechanism for forming longitudinally spaced perforations in the web, means for locating a tearing strip in adjacency to the web and in line with the perforations, cutting devices operable to sever the web transversely upon lines extending from each edge of the web into each perforation adjacent one longitudinal side thereof, and to sever the tearing strip upon lines adjacent the other longitudinal side of each perforation so that the tearing strip projects beyond the severed edge of the wrapper, and means for wrapping each severed wrapper and tearing strip around an article with the tearing strip inside and with the projecting end of the tearing strip exposed.

14. Mechanism for producing packages provided with tearing strips comprising means for forwarding a web of wrapping material, perforating mechanism for forming longitudinally spaced perforations in the web, means for securing a tearing strip adhesively to the web in line with the perforations, cutting devices operable

to sever the compound web so formed transversely upon lines extending from each edge of the web into each perforation adjacent one longitudinal side thereof and across the tearing strip adjacent the other longitudinal side of each perforation so that the tearing strip projects beyond the severed edge of the wrapper, and means for wrapping each severed compound wrapper around an article with the tearing strip inside and with the projecting end of the tearing strip exposed.

15. Mechanism for forming wrapper blanks provided with attached tearing strips which comprises means for forming perforations longitudinally spaced along a web of wrapping material, a supply for a tearing strip, means for applying molten wax to the strip, means for guiding the strip into contact with the web along the line of the perforations, means for chilling the web and strip while in contact, and cutting means for severing wrapper blanks from the composite web upon broken transverse lines running from the edges of the web to the perforations and then longitudinally offset so that the tearing strip is severed within the boundary of the perforations but on a line spaced from the adjacent transverse severed edge of the wrapper blank.

16. Mechanism for forming wrapper blanks provided with attached tearing strips which comprises means for advancing a web of wrapping material, a cutter operable periodically on the web to form therein a series of longitudinally spaced broadly serrated slits each of which is spaced from the margin of the web, means for advancing a tearing strip into contact with the web along the line of the slits, devices for securing the web and strip together leaving an unattached portion of the strip adjacent each slit, and cutting devices operable upon the composite strip thus formed to cut the web from each margin thereof into the broad serrations of each slit without severing the strip, and to cut the strip and web on lines of cut substantially equal to the width of the strip and located at points spaced from the said marginal cuts but within the unattached portion of the strip.

CARL E. MELHORN.