

Jan. 20, 1953

B. J. TAMARIN ET AL

2,625,775

ART OF PACKAGING WITH PULL STRIP

Filed Aug. 16, 1946

8 Sheets-Sheet 1

Fig. 2

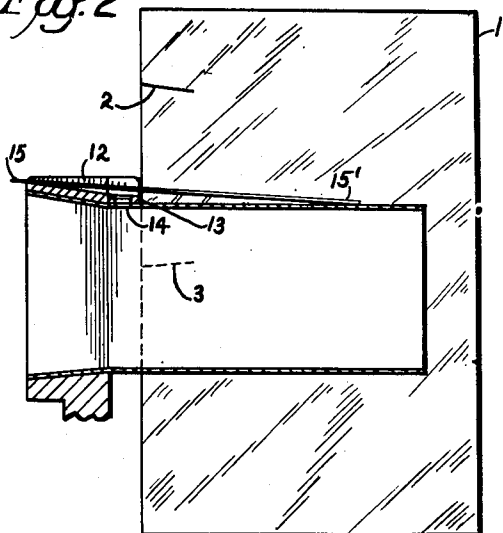


Fig. 5

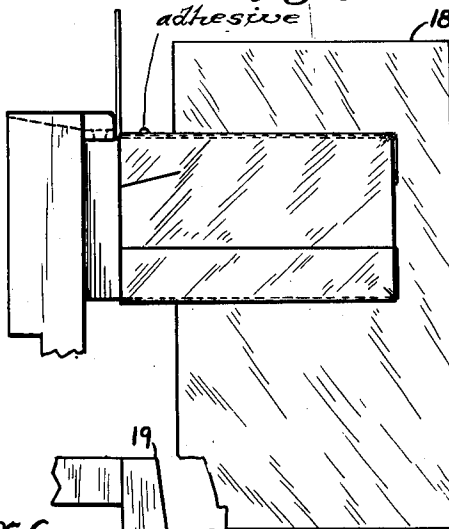


Fig. 3

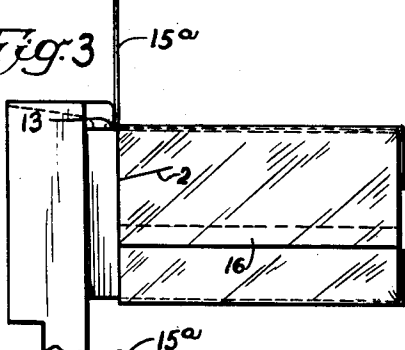


Fig. 6

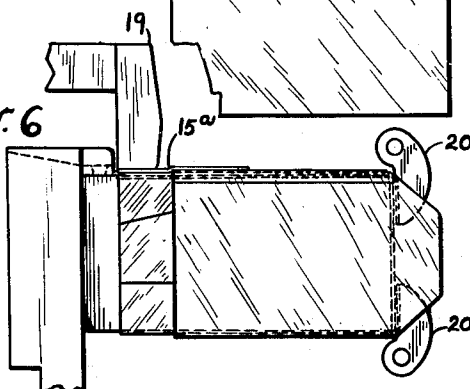


Fig. 4

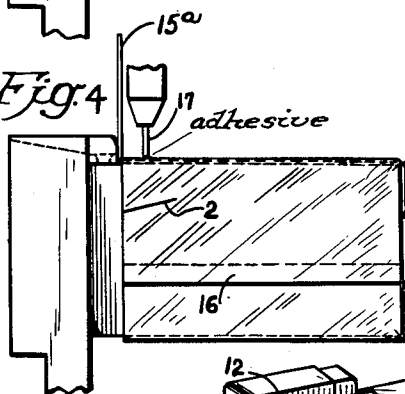


Fig. 7

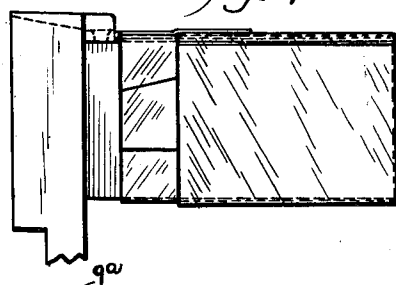
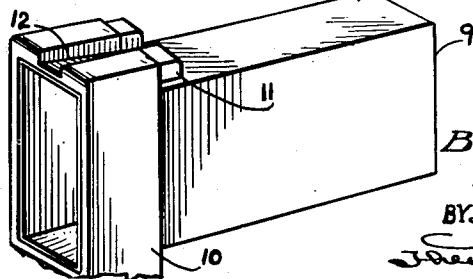


Fig. 1



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Fig. 8

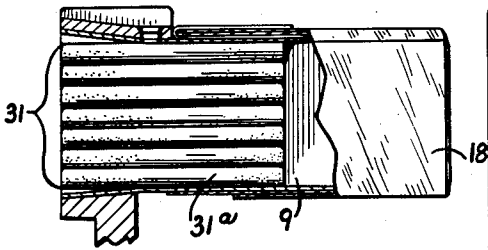


Fig. 11

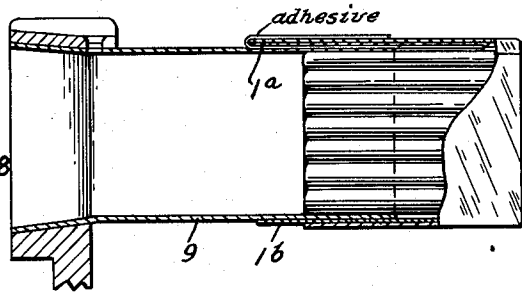


Fig. 9

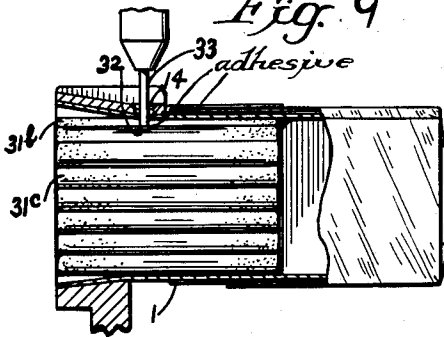


Fig. 10

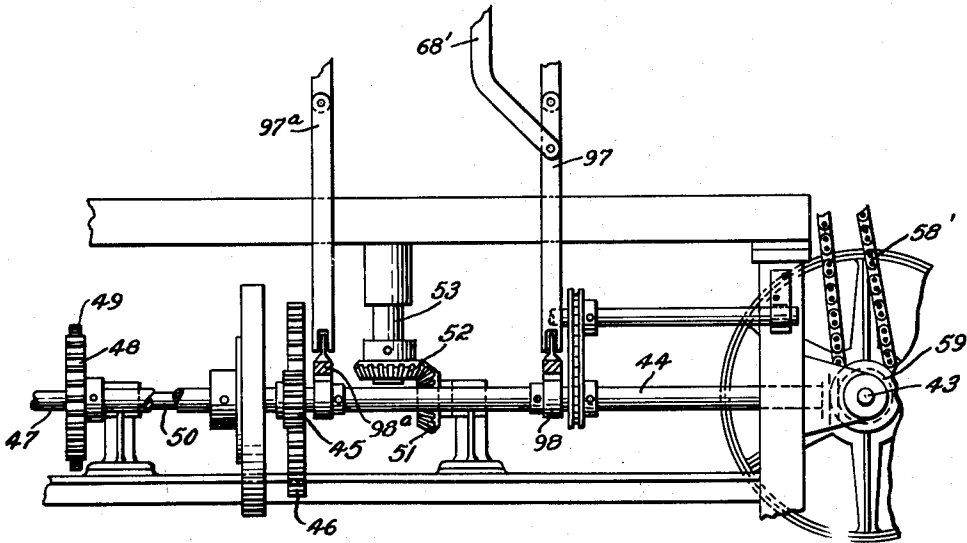
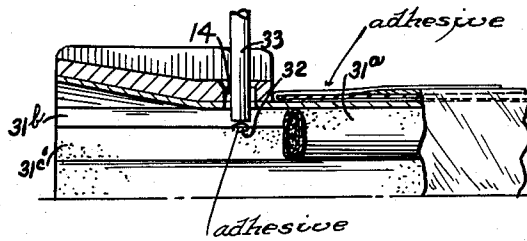


Fig. 20

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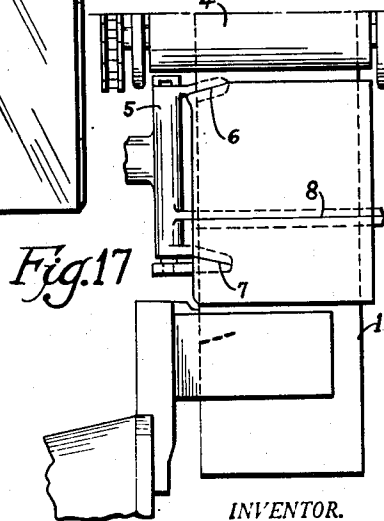
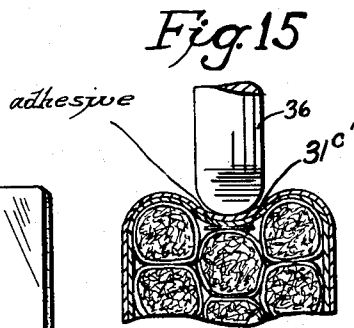
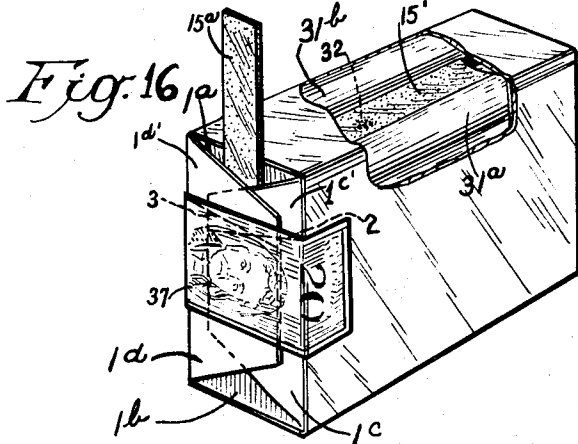
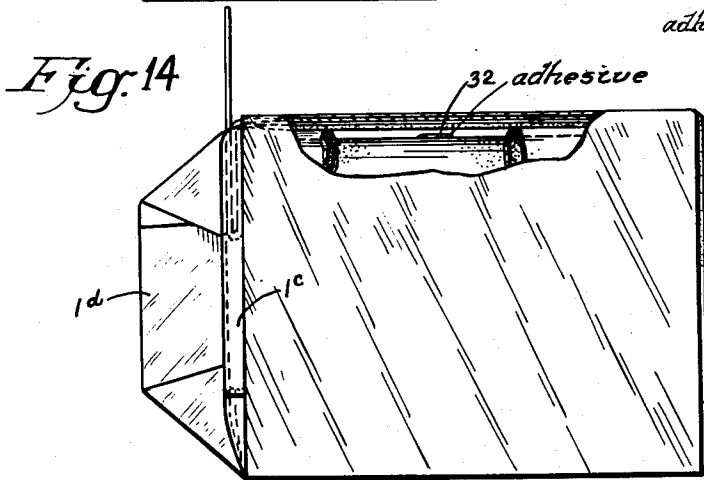
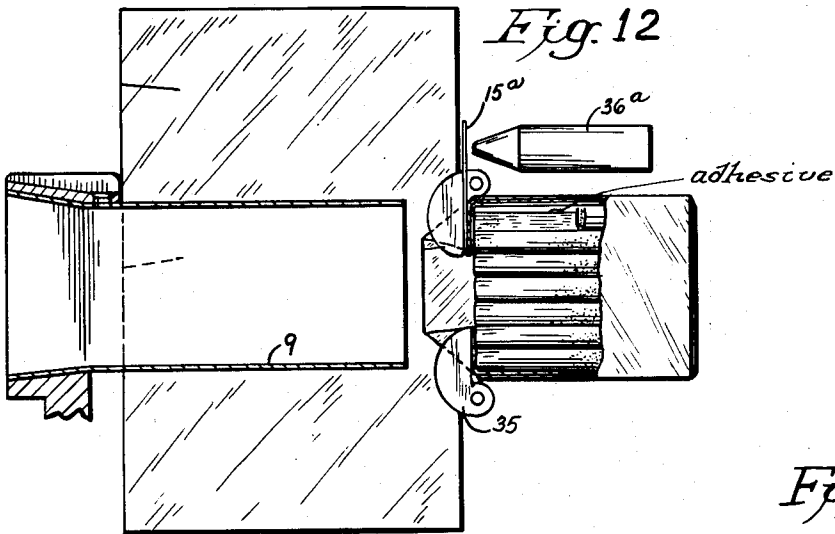
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8 Sheets-Sheet 3



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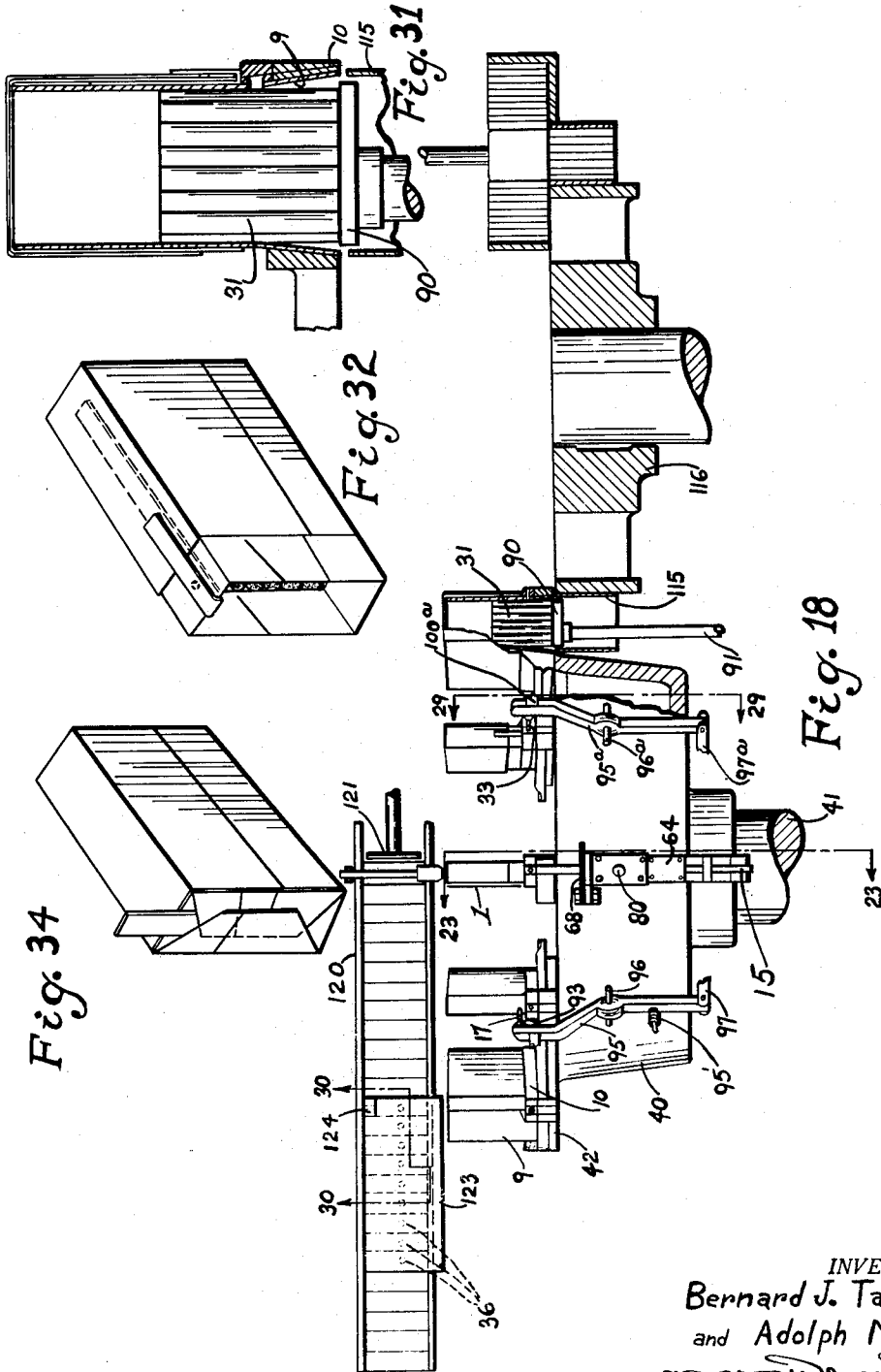
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ART OF PACKAGING WITH PULL STRIP

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8 Sheets-Sheet 4



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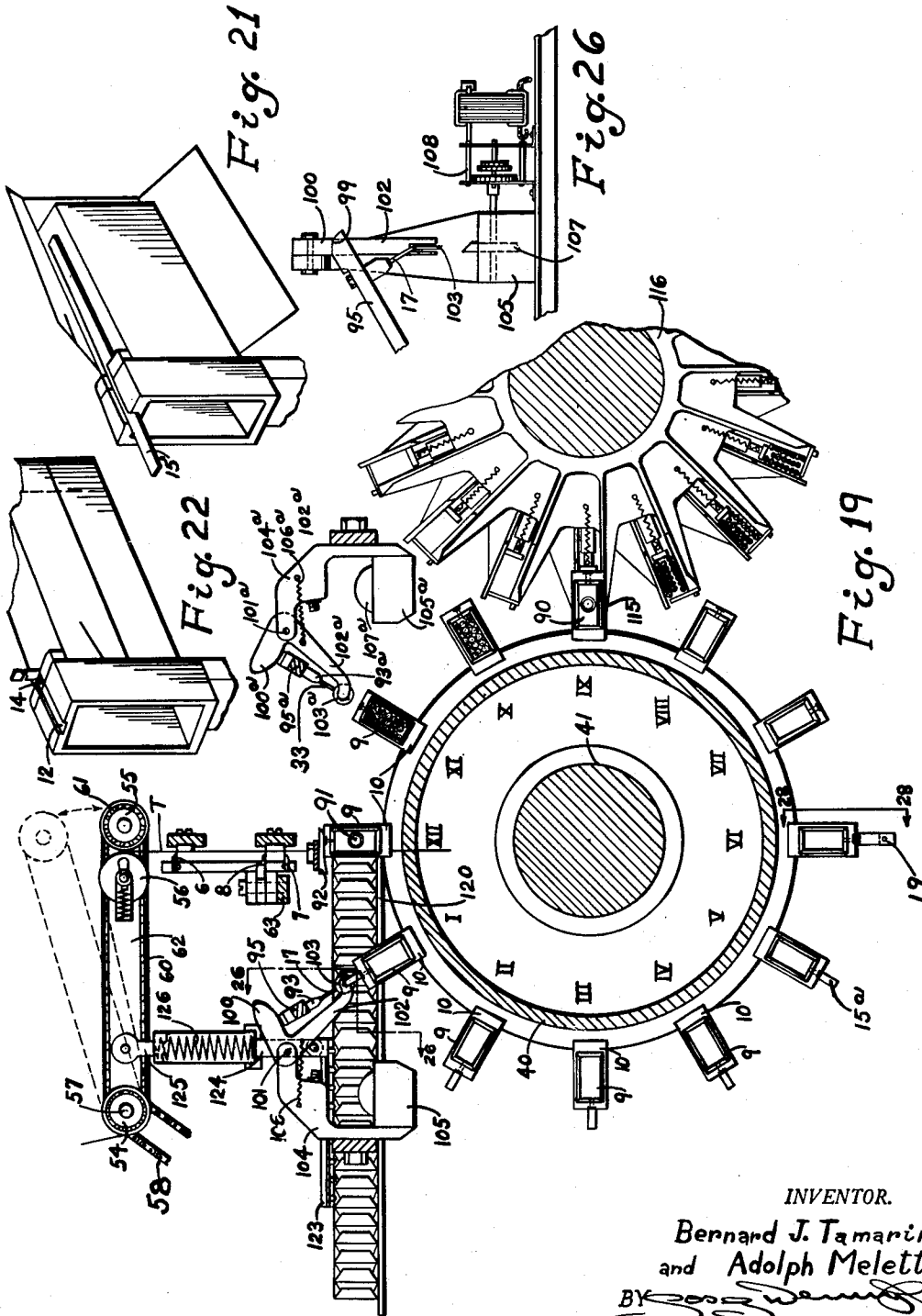
B. J. TAMARIN ET AL

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ART OF PACKAGING WITH PULL STRIP

Filed Aug. 16, 1946

8 Sheets-Sheet 5



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B. J. TAMARIN ET AL

2,625,775

ART OF PACKAGING WITH PULL STRIP

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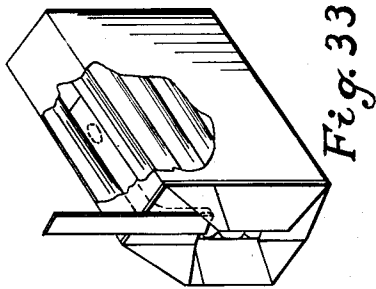


Fig. 33

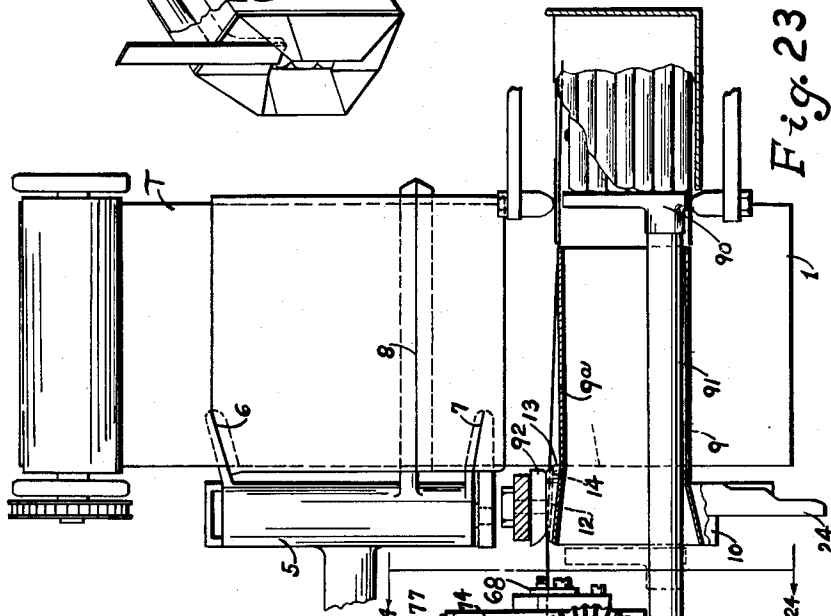


Fig. 23

Fig. 24

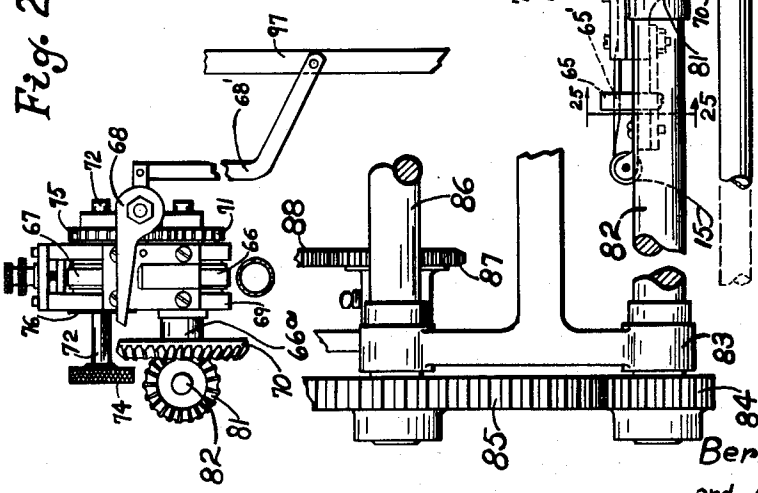
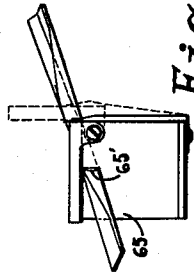


Fig. 25



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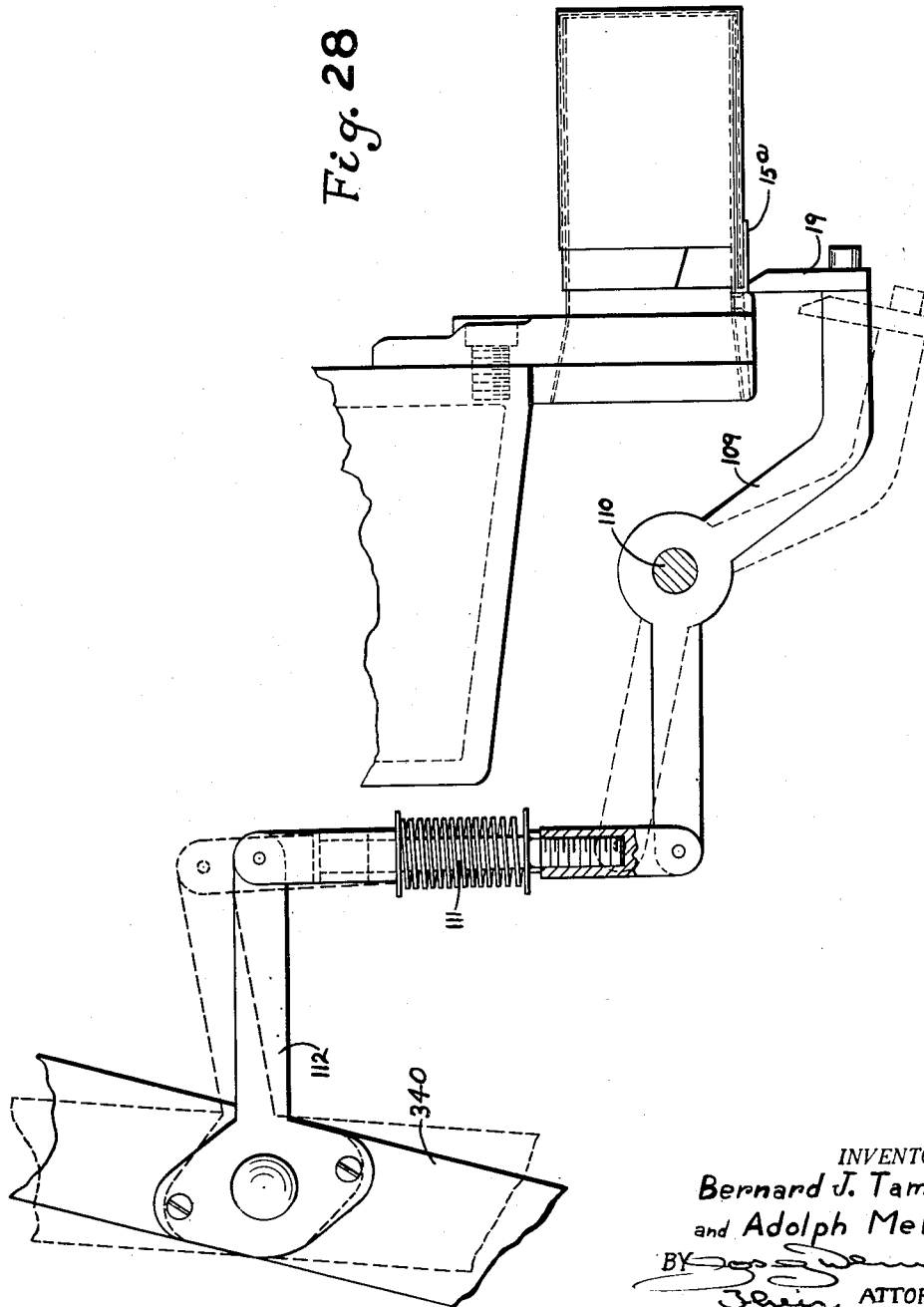
B. J. TAMARIN ET AL

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ART OF PACKAGING WITH PULL STRIP

Filed Aug. 16, 1946

8 Sheets-Sheet 7



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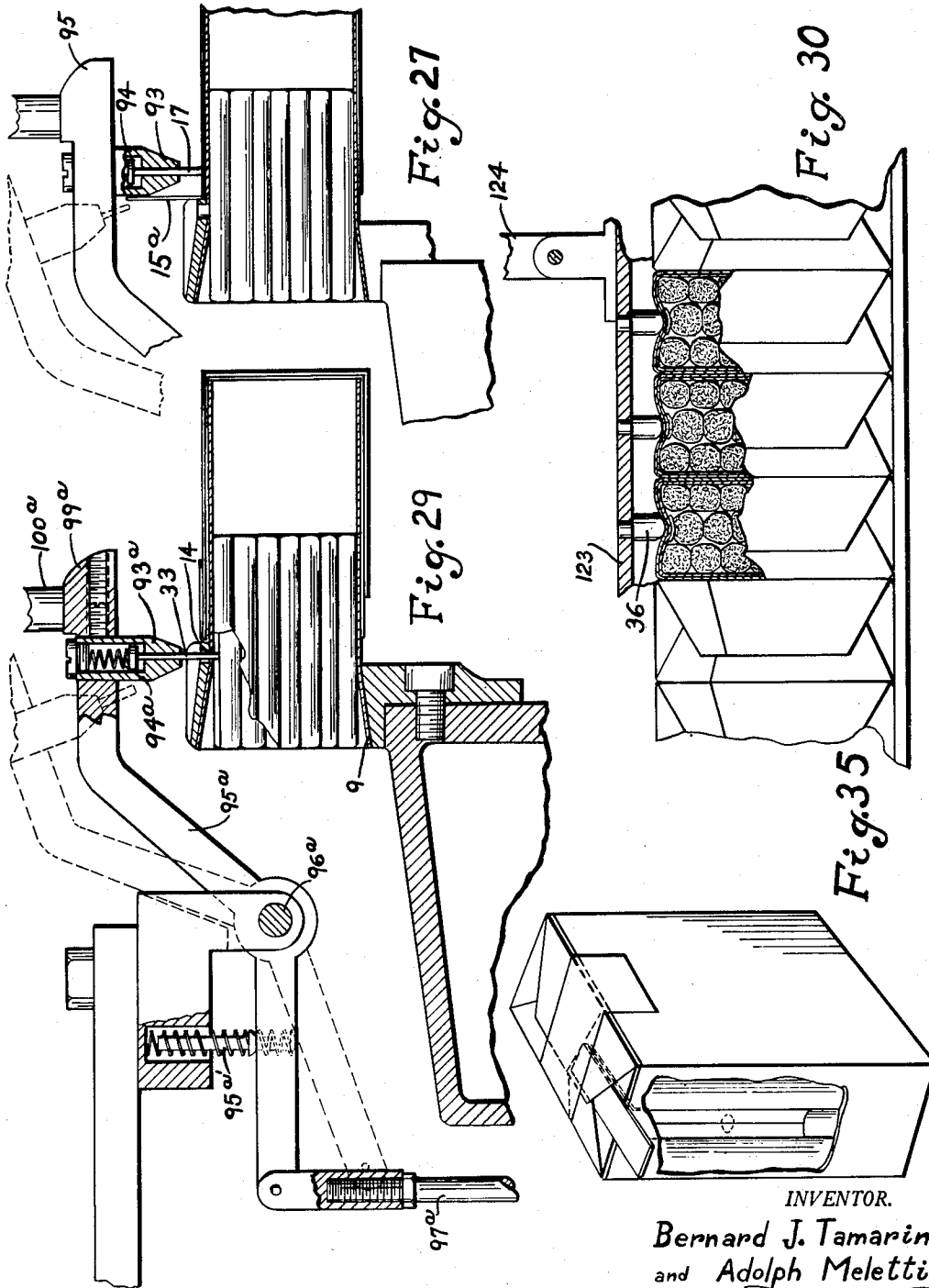
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ART OF PACKAGING WITH PULL STRIP

Filed Aug. 16, 1946

8 Sheets-Sheet 8



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# UNITED STATES PATENT OFFICE

2,625,775

## ART OF PACKAGING WITH PULL STRIP

Bernard J. Tamarin, Whitemarsh, and Adolph Meletti, Philadelphia, Pa.; said Meletti assignor to said Tamarin

Application August 16, 1946, Serial No. 691,130

18 Claims. (Cl. 53—5)

1

Our invention is a method of and apparatus for incorporating a pull in a package for facilitating the opening thereof and preferably for initiating the ejection of an article enclosed therein, and our invention is particularly adapted for the production of a cigarette package invented by Bernard J. Tamarin and of the type illustrated in his application Serial No. 467,676.

In accordance with our invention, a pull, such as a strip of tape, is overlaid by a wrapper and the wrapper is formed into a container for a group of articles, such as rows of cigarettes. The pull is preferably attached to one or more articles of the group or to the wrapper or to both wrapper and article, and portions of the wrapper may be bent to form an end closure having a member around which a pull section is so looped that a pull thereon unfolds such member to expose an end of one or more of the enclosed articles.

Preferably the pull is anchored to at least one of the exposed articles so that a continued pull on the pull after the opening of the closure member causes the attached article to rise until the point of attachment of the pull to the article clears the wrapper, whereupon the pull is stripped from the article and the latter is left projecting from but positioned by the remaining articles of the group encased in the wrapper.

The wrapper and pull are preferably fed to a suitable support for positioning them relatively to one another during the overlaying of the pull by the wrapper and the formation of a container from the wrapper around the pull and during the insertion of a group of articles into such container.

Preferably each pull is cut from a strip of multi-ply cellophane tape which is longitudinally creased to impart thereto a tendency to assume a channeled cross section which stiffens the tape longitudinally to facilitate its rectilinear movement transversely to the path of a strip of sheet material from which a wrapper may be cut substantially concurrently with the severance of a pull from the tape strip. The creased and channeled cross section of the pull further facilitates the attachment thereof to one of the articles enclosed in the container; such attachment preferably being effected after the ejection of the container and its contents from the support on which the container is formed.

Each wrapper is preferably pre-slit along converging lines diagonal to one edge. The portion of the wrapper containing diagonal slits forms a container margin providing tuck and fold extensions projecting beyond the ends of the articles housed in the container, and such marginal portion is tucked and folded down trans-

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versely to the body of the container to form an end closure including a member about which an outer portion of the pull is looped; to which the pull is preferably attached, and from which the terminus of the pull projects laterally. Preferably the end closure member about which the pull is looped consists of a tuck, which is partly overlaid by minor sections of folds which are severed from the major sections of such folds by the diagonal slits in the marginal portion to facilitate the subsequent unfolding of the minor fold sections by rise of the tuck covered thereby when it is lifted by a pull on the pull looped thereon. The major sections of the folds are secured by a stamp or the like adhesively attached to the front and back walls having an edge slightly overlapping the diagonal edges of the minor fold sections to yieldingly hold such minor fold sections in closed positions.

At any stage in the proceedings, and preferably at an early stage, the end of the container remote from the pull terminus may be closed in any desired manner, and the container formed by the wrapper may be sheathed in a label jacket. After both ends of the container are closed, it may be enveloped in a cellophane covering or the like to provide a package similar in general appearance to standard cigarette packages.

When our invention is utilized in connection with the packaging of cigarettes or analogous articles, the pull is preferably attached at a point along the middle portion of a cigarette which is spaced from the wrapper by adjoining cigarettes so that the inner portion of the pull lies in a channel between the cigarette to which the pull is attached and the wrapper; such channel preferably being bounded laterally by end cigarettes of rows on opposite sides of the cigarette to which the pull is attached when the cigarettes are arranged in rows 7-6-7. However, the pull may be attached to an end cigarette of a side row and lie in a channel between such cigarette and a corner of the package when the cigarettes are arranged in rows 7-7-6.

The pull is preferably attached to the cigarette by means of an adhesive applied thereto before the group has been fully housed within the wrapper. We have found it advantageous to apply the adhesive to an end cigarette after the group has been assembled and preferably after it has been partly inserted within the container formed by the wrapper, and to then complete the insertion of the cigarette group into the container while the pull strip is out of contact with the adhesively coated cigarette and thereafter to press the pull strip into contact with the adhesively coated section of the cigarette.

While our method is capable of practice manually, it is particularly applicable to providing pulls for packages during their manufacture on standard types of cigarette packaging machines having a turret for forming sequential containers and mechanism for grouping and compacting cigarettes and filling the respective containers therewith immediately after completion of the containers. Our invention embraces apparatus hereinafter described whereby the steps of our method may be rapidly carried out during the formation and loading of a container to produce a sealed package having a pull for opening it and initiating the ejection of its contents.

The principles and characteristic features of our invention, and the manner of practicing our method and of making, constructing and using our apparatus will further appear from the accompanying drawings and the following description explaining the best modes in which we have contemplated applying such principles.

In the drawings, Fig. 1 is a perspective view of a hollow support or former forming a part of our invention and adapted to facilitate the assembly of the package elements, viz., container constituents and contents, in the preferred practice of our method and in the preferred embodiment of our apparatus; Fig. 2 illustrates diagrammatically the initial positioning of a pull and wrapper relatively to one another, and preferably relatively to the former shown in Fig. 1, in the practice of our method after the pull and wrapper have been severed from the respective strips of which they initially form parts; Fig. 3 illustrates diagrammatically a later step in our method by which the wrapper is wrapped on the former and the pull is bent thereby; the remote end of the wrapper being tucked and folded to form a closure; Fig. 4 illustrates diagrammatically the application of adhesive to a side of the soft shell formed from the wrapper, the point of application being adjacent to the bent end of the pull; Fig. 5 illustrates diagrammatically the positioning of a label blank relative to the shell, pull and former; Fig. 6 illustrates diagrammatically the further bending of the pull strip and the tacking thereof to an end tuck extension of the shell after the label blank has been wrapped around the shell to provide a double walled pouch; the free end of the pull overlying the jacket formed from the label; Fig. 7 illustrates the position of the former, shell, pull and jacket just before the introduction of the bundle or load to be housed in the package; Fig. 8 is a diagrammatic part sectional view illustrating the insertion of a bundle of cigarettes into the hollow former with the pouch thereon; the cigarettes projecting outward partway beyond the open end of the shell; Fig. 9 is a view similar to Fig. 8 and illustrating diagrammatically the application of an adhesive to a cigarette of the bundle intermediate the length of such cigarette; Fig. 10 is an enlarged fragmentary view further illustrating the application of the adhesive to the cigarette so that such adhesive is spaced from the inner wall of the former; Fig. 11 is a longitudinal sectional view illustrating the completion of the insertion of a bundle of cigarettes through the former and into the pouch and the partial removal of the bundle and pouch from the former; Fig. 12 is a diagrammatic fragmentary sectional view illustrating the tucking and folding of the open end of the shell after the bundle of cigarettes has been pushed home and the positioning of a new wrapper with respect to the former; Fig. 14 is a side ele-

vation, partly broken away, illustrating the pouch after one fold has been bent over the end tucks and pull; Fig. 15 is a diagrammatic transverse sectional view illustrating the tacking of the pull to the adhesive spot previously applied to a cigarette; Fig. 16 is a perspective view of a completed package with parts broken away to show the adhesion of the pull to a cigarette; Fig. 17 is a diagrammatic view illustrating the cutting of a strip of sheet material to form a wrapper suitable for use in our method; Fig. 18 is a diagrammatic top plan view, with parts broken away, of a standard type of cigarette packaging machine having applied thereto our novel apparatus for the practice of our method; Fig. 19 is a diagrammatic rear elevation, partly in section, of the principal parts of the apparatus shown in Fig. 18; Fig. 20 is a front elevation of driving apparatus through which certain of the parts of the standard packaging machine and certain parts of our apparatus may be operated in timed relation; Fig. 21 is a detached perspective view showing the folding of a wrapper around a former and a pull thereon; Fig. 22 is a detached perspective view showing the end of the pull bent at right angles to the wrapper; Fig. 23 is a part sectional elevation of pull and wrapper feeding mechanism and taken approximately on the line 23—23 of Fig. 18; Fig. 24 is an elevation of a pull strip feeder taken on the line 24—24 of Fig. 23; Fig. 25 is a fragmentary perspective view of a pull strip creasing device looking in the general direction of the line 25—25 of Fig. 23; Fig. 26 is an elevation of an adhesive applicator and taken approximately on the line 26—26 of Fig. 19; Fig. 27 is an enlarged fragmentary view showing parts of the adhesive applicator of Fig. 26 in their relation to the former and a shell thereon; Fig. 28 is an elevation of mechanism for bending the pull against an adhesive spot on the shell and looking in the general direction indicated by the line 28—28 of Fig. 19; Fig. 29 is an enlarged fragmentary sectional view of a second adhesive applicator looking in the general direction indicated by the line 29—29 of Fig. 18; Fig. 30 is an enlarged fragmentary view, partly in section, taken approximately on the line 30—30 of Fig. 18, showing the mechanism for maintaining contact between the pull and a cigarette in a package until the tacking of the pull to the cigarette is completed; Fig. 31 is a detached longitudinal sectional view illustrating the ejection of a cigarette bundle from a compressor into a former; Fig. 32 is a perspective view of a detached package before the folding of the end extension thereof; Fig. 33 is a perspective view of a filled pouch with its end tucked and partly folded; Fig. 34 is a perspective view of a completed package, minus a stamp; and Fig. 35 is a perspective view of a completed and stamped package with parts broken away to show the tacking of the pull to a cigarette.

In packaging cigarettes, for example, in accordance with our invention, we preferably form an inner shell of the package from a rectangular wrapper 1 having spaced slits 2 and 3 extending diagonally inward from an edge of the wrapper and converging toward one another. Such wrappers may consist of any desired type of sheet material but are preferably made from strips of laminated paper and metal foil.

In making a wrapper, a laminated strip is preferably cut to form the slit 3 before the severance of the wrapper from the strip, and the strip is then cut to simultaneously form the slit 2 and sever the wrapper from the strip.

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The slitting and severance of a wrapper may be performed in any desired manner but is conveniently effected, as shown in Fig. 17, by feeding a laminated strip 4 in the path of a cutter 5 having short diagonal end blades 6 and 7 and an intermediate long blade 8. When the laminated strip and cutter are brought into cutting relationship, the blade 6 cuts a diagonal slit 3 in an unsevered section of the strip 4; the blade 8 severs a section from the strip 4 to form a wrapper 1, and simultaneously with such severance the blade 7 cuts a slit 2 in the wrapper 1 being severed; such wrapper 1 already containing a slit 3 cut during the severance of a preceding wrapper.

In the practice of our method, we preferably utilize a hollow support or former 9, one end of which is seated in a hollow block or bracket 10 forming a peripheral rim about one end of the former 9. The rim 10 has a beveled nose 11 which extends over one of the narrower faces 9a of the former 9 and contains a slot 12 extending longitudinally of the former and having a bottom inclined downwardly toward the surface of the face 9a. The inner end of the inclined bottom of the slot 12 is separated from the surface of the face 9 by a short step 13. The rim 10 and former 9 contain a through aperture 14 having its mouth in the bottom of the groove 12 adjacent to the step 13.

In the preferred practice of our invention, a strip of longitudinally creased pull tape 15 is projected through the slot 12 and over the surface 9a at or about the time a wrapper 1 is positioned in the path of movement of the front or leading surface of the former 9, as shown in Fig. 2. The free end of the projected tape rests on the surface 9a near the end thereof opposite to the step 13 and the section of tape adjacent to the top of the step 13 is spaced from the surface 9a a distance substantially equal to the height of the step 13. The tape is then severed adjacent to the mouth of the former to leave a pull 15' resting in the channel 12 and on the surface 9a.

The wrapper 1, with the slit 2 above the level of the surface 9a, is bent circumferentially around the former 9, as shown in Fig. 3, so that the slits 2 and 3 are in substantial alignment on opposite sides of the former 9. One edge of the wrapper 1 is adjacent to the bottom of the step 13, and when the wrapper 1 is drawn tightly against the surface 9a, the projecting end 15a of the pull 15' is bent by the step 13 at right angles to the surface 9a and to the tape section resting thereon, thereby uncovering the mouth of the aperture 14.

The juxtaposed transverse edges of the wrapper 1 may be adhesively connected to form a seam 16 and the portion of the wrapper 1 projecting beyond the end of the former 9 may be tucked and folded in any usual manner to form a bottom closure for the soft shell thus formed from the wrapper 1.

A tacky adhesive is applied by any suitable means, such as an applicator 17, as shown in Fig. 4, to the side surface of the soft shell in alignment with the bent end 15a of the pull 15' and preferably on the end extension of the shell from which the top closure will be formed.

If it is desired that the shell be sheathed in a printed jacket, a second wrapper or label 18, of somewhat less width than the wrapper 1, is applied to the shell on the former 9, as shown in Fig. 5, so that the inner edge of the label 18 leaves exposed the adhesive drop applied by the applicator 17. When the label or wrapper 18 has been bent circumferentially around the shell to form a

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jacket, the projecting pull strip section 15a is folded down against the end extension of the shell and against the jacket by any suitable means, such as a folder 19, and the folded end 15a of the pull is lightly tacked in place by the spot of adhesive previously applied by the applicator 17.

The outer end of the label or wrapper 18 may be tucked in any usual manner, as for instance by tuckers 20, and the flaps between the tucks then folded and secured together. By combining the shell and jacket there is provided a double walled pouch having a pull extending along the inner surface of the shell and overlying and tacked to the outer surface of the shell, as shown in Fig. 7.

A bundle of cigarettes 31 is inserted in the open, flared mouth of the former 9 with the pouch thereon; the bundle preferably being preformed and composed of two outer rows 31a and 31b, each containing an odd number of cigarettes, and an intermediate row 31c containing an even number of cigarettes. The end cigarette 31c' of the intermediate row 31c forms the bottom of a shallow channel lying between the end cigarettes of the outer rows 31a and 31b.

A spot 32 of adhesive is applied intermediate the ends of the end cigarette 31c' before the bundle of cigarettes is fully seated in the soft shell or pouch formed by the wrapper 1, but preferably after a group of cigarettes have been assembled in a bundle.

This adhesive spot 32 is preferably applied to the cigarette at a point along its length such that when the cigarette is shifted lengthwise to bring its spot adjacent to the fold line between the pouch and its tuck, one end of the cigarette will project from the pouch sufficiently to be easily grasped, whereas the other end of the cigarette will be so far down within the pouch as to firmly position the cigarette. On a cigarette of ordinary length, the spot is preferably on the intermediate half of the length of the cigarette, that is at a point not less than one-fourth its length from either end, and an advantageous position is a point spaced from its outer end approximately two-fifths the length of the cigarette.

The spot of adhesive 32 may be conveniently applied to the cigarette 31c' at the desired point by inserting the adhesively coated end of an applicator 33 (Figs. 9 and 10) through the aperture 14 in the former 9 when the outer end of the cigarette bundle is aligned with the outer edge of the mouth of the former.

The cigarette 31c' is positioned by engagement in the grooves between the two upper cigarettes of the respective rows 31a and 31b (Figs. 10 and 15) and its peripheral surface is thereby held in spaced relation from the inner face of the former member 9a (Fig. 10). Hence the bundled cigarettes may be pushed as a group through the former 9 without contact of the adhesive spot 32 with the inner face of the former or with the inner face of the pouch when the latter is detached from the former.

The application of pressure to the outer end of the cigarette bundle will force the cigarettes through the former 9 so as to first seat the inner ends of the cigarettes against the bottom of the pouch and then discharge the pouch, with the cigarettes therein, from the former 9, as shown in Figs. 11 and 12.

This longitudinal movement of the pouch slides the pull 15' along the former member 9a without longitudinally crumpling the pull. The portion

of the pull lying within the ejected pouch tends to resume its channel-like cross section and drop into the channel formed by the cigarettes 31a' and the end cigarettes of the rows 31a and 31b on either side thereof.

After the filled pouch has been ejected from the former 9, the projecting end sections 1a and 1b thereof (Fig. 11) are tucked manually or by conventional tuckers 35, as shown in Fig. 12. The tucking of the section 1a, to which is attached the exterior section 15a of the pull, preferably brings this section 15a into the effective zone of an electric eye 35a in a circuit preventing the subsequent operation of a conventional throw-out mechanism or alarm, and which are actuated in the absence or displacement of the pull section 15a.

When the extensions 1a and 1b have been tucked, the side extensions 1c and 1d (Fig. 14) are folded over the tucks and over a portion of the pull section overlying the tuck section 1a and secured by a stamp 37.

It is preferable that the sections 1a and 1b be tucked before the sections 1c and 1d are folded, as shown in Figs. 12 to 16, but it will be understood that the top extensions may be first folded and then tucked in the same manner as the bottom extensions, as shown in Figs. 3 and 4, or the top may be closed by first tucking one extension, then forming one fold, then tucking another section, and then forming a second fold, or by other combinations of tucks and folds, but none of such closures are as effective as having the tuck section 1a overlaid by a pair of folds.

To insure adhesion of the pull to the cigarette 1c' by the adhesive spot 32, the edge of the pouch may be bulged inward, as for instance by a presser finger 36, so as to press the pull 15' firmly into contact with the adhesive spot and hold it there until such spot has solidified, as shown in Figs. 15 and 16. The package is then further sealed by pasting a stamp 37 over the fold sections 1c and 1d so as to overlie the now intersecting cuts 2 and 3 therein.

To open the package and eject a cigarette, it is only necessary to pull on the pull section 15a laterally of the package. The pull on the pull draws the tucked section 1a upward and outward and crumples it, thereby displacing the fold sections 1c' and 1d' from beneath the stamp 37, and drawing the cigarette 31c' upward. As soon as the rise of the cigarette 31c' moves the spot 32 above the crumpled tuck section 1a', the lateral stress on the pull 15' strips it from the cigarette 31c' by a splitting action without defacing the cigarette, which is left projecting part way from the package but with its remainder held by its engagement between the cigarettes of the end rows and prevented thereby from dropping.

The steps of our method may be manually performed but may be more rapidly and efficiently performed by our improved apparatus, which is adapted for cooperation with standard types of high speed cigarette packaging machinery.

The drawings show an embodiment of our apparatus invention, which we have illustrated by way of example, in cooperative relation with the well-known American Machine and Foundry Company cigarette packer of the type illustrated generally in United States Patent No. 1,926,192 of September 12, 1933.

For the sake of simplicity, we have shown only enough of a conventional packer per se to facilitate an understanding of the positioning and co-

action of our apparatus relative thereto, but it will be understood that in the formation of a complete package various conventional steps and operations are involved that are not illustrated in detail herein because they are well known and constitute no part of our invention.

In the drawings, and particularly in Figs. 18 and 19, there is illustrated a conventional intermittently rotatable turret or rotor 40 carried by a shaft 41 mounted in a usual frame. The turret is provided with a disk shaped section 42 on which are mounted a series of our improved, equidistantly spaced brackets 10, such as shown in Fig. 1, which provide seats for the flaring mouths of the hollow formers or supports 9, which are of substantially the same shape and cross section as the package to be formed. These formers 9 may be made of thin sheet metal and are preferably twelve in number.

The turret 40 is turned intermittently in the usual manner to bring the respective formers 9 step by step into cooperative relation to various mechanisms at or between a series of stops or stations corresponding in position to the numerals on the dial of a clock when the turret is viewed from the front, and for convenience these stations may be designated by the I to XII o'clock positions to which they correspond.

The proper timing of the step by step or intermittent movement of the turret 40 may be accomplished by any suitable indexing device (not shown), forming no part of our invention. The indexing device may be operated by power applied in the usual manner from a drive shaft 43 (Fig. 20) connected by beveled gears with a main shaft 44 which has fixed thereto a spur gear 45 meshing with a gear 46 on the shaft 47. The shaft 47 has fixed thereto a gear 48 meshing with a gear 49 on the shaft 50. A beveled gear 51 on the shaft 50 meshes with a beveled gear 52 on the shaft 53 connected with the indexing mechanism (not shown) for rotating the turret.

Sheet material, such as paper, tinfoil or laminated paper and tinfoil T is fed from a supply roll (not shown) over the roller 54 (Fig. 19) and between the guide rollers 55 and 56. The roller 54 is loosely journaled on a shaft 57 journaled in a bracket of the packer frame in the usual manner. The shaft 57 has fixed thereto a pair of sprocket wheels, one of which is driven, through the chain 58 and suitable intermediate mechanism, from the chain 58' (Figs. 19, 20) meshing with a sprocket 59 on the drive shaft 43. The other sprocket wheel is connected through a sprocket chain 60 with a sprocket wheel 61 fixed on the shaft of the feed roller 55 in the usual manner.

The rollers 55 and 56 are mounted in a pair of frames 62 vertically oscillatable about the axis of the shaft 57 as a center. The oscillation of the frames 62 and the rotation of the rollers 55, 56 and 54 feeds the strip T step by step past the triple bladed cutter mechanism 5 (Figs. 17 and 23), which, in accordance with our invention, is mounted on the bracket 63 (Fig. 19) in place of the usual single bladed cutter mechanism of conventional packers. This triple bladed cutter mechanism is operable in timed relation to the feed of the wrapper strip T and to the rotation of the turret 40 by the actuating mechanism customarily used to operate the conventional single bladed cutter mechanism.

In accordance with our invention, a tape layer 64 (Figs. 18, 23) is mounted in alignment with station XII on the housing (not shown) which

normally overlies the rearwardly extending portion of the turret 40.

The tape feeder 64 (Figs. 23, 24, 25) preferably comprises a folder 65; a pair of peripherally contacting feed rollers 66 and 67 for intermittently advancing the pull tape 15; and a cutter 68 for cutting from the tape 15 a length sufficient for a pull 15' after delivery to a support or former 9 at position XII.

The folder 65 consists of a plate containing a narrow slot 65' through which the tape 15 is led to crease it longitudinally and impart thereto a tendency to assume a channel shape or V-cross section imparting greater longitudinal rigidity to the tape.

The feed wheel 66 is fixed to a shaft 65a which is journaled in the frame 69 and has a bevel gear 70 and a gear 71 fixed to the ends thereof. The feed wheel 67 is fixed on a shaft 72 provided with a knurled knob 74 and a gear wheel 75; this shaft being journaled in a slide 76 which is vertically movable on slideways 77 of the frame 69. The slide 76 is normally biased downwardly by springs 78 and a follower 79 which is adjustable by a screw having a knurled knob 80 to regulate the traction between the peripheries of the feed wheels 66 and 67.

The gears 71 and 75 mesh with one another to effect their simultaneous rotation, and may be manually positioned by the knurled knob 74 to regulate their initial position relative to the tape 15 when the knurled knob 80 has been unscrewed to diminish the traction between the wheels 66 and 67. The length of the tape fed per revolution of the wheels 66 and 67 may be varied by the use of feed wheels of different diameters.

The feed wheels 66 and 67 are mechanically driven through the beveled gear 70 by means of a beveled gear 81 fixed on a shaft 82 (Figs. 23, 24) journaled in bearings 83 of a frame bracket. The shaft 82 has fixed thereon a spur gear 84 meshing with a gear 85 fixed on the shaft 86. The shaft 86 is rotated step by step in timed relation with the wrapper feeder and turret 40 through any suitable step by step mechanism, such as a Geneva movement or mutilated gear (not shown) so as to rotate the feed wheels 66 and 67 in desired timed relation to the movements of the turret 40, so that a tape strip 15' is laid on each former 9 in position XII during or immediately following the ejection of a filled package from the former and before the folding of a new wrapper 1 on the former.

The Geneva movement, mutilated gear or other suitable step by step mechanism may be driven through any suitable means, such as gearing 87, 88, from a source of continuous rotary power, such as the shaft 57 actuated from the main shaft 43.

As soon as a suitable section of the tape 15 has been laid upon the former 9, the cutter 68 is rocked by power applied through the link 68' from any suitable source, such for instance as the link 97 hereinafter described.

In conventional cigarette packaging machines there may be provided a transfer plunger carried by the turret in complementary relation to each former 9, or a series of plungers may be mounted on the turret housing and reciprocated in the various formers 9 as they are moved into alignment with the several plungers. Our improvements are adapted for use without change with either plunger arrangement, and, as an example only, we have illustrated our improvements in conjunction with the former type of plunger ar-

angement wherein each plunger is reciprocable in a complementary former 9 to a limited degree during a major portion of the turret's rotation by a cam mounted on the turret housing and is reciprocable to a greater degree at position XII by a supplementary plunger carried by the housing and reciprocable by an oscillating lever having a timed relation to the turret's rotation.

In accordance with our invention (Figs. 18, 19, 23), there is substituted for each usual transfer plunger complementary to a former 9, a pusher or head 90 having a cam operated shaft 91 offset from the center thereof so as to lie below the feeder 64 so that the modified plunger 90-91 may be reciprocated by the usual cam and lever mechanisms without interference by or with the tape feeder 64.

As above noted, the rim or bracket 10 of each former 9 is provided with a groove or channel 12 for positioning the pull 15' cut from the tape, with a step 13 for bending the pull at right angles when a wrapper 1 is folded on the former 9, and with an aperture 14 adjacent to the step 13 for the insertion of an adhesive applicator. To assist the walls of the groove 12 in positioning the pull 15', a spring guard 92 may be mounted on the packer frame in position for engagement by the upper surface of the rim 10 during the initial movement thereof from XII o'clock position toward I o'clock position (Figs. 19, 23).

The wrapper 1 cut from the strip T by the cutter 3, and provided with edge slots 2 and 3, as previously described, is held against the leading face or front side of a former 9 at XII position in the usual manner and is wrapped circumferentially about such former by the usual wrapping means as the former moves from station XII to station I.

In accordance with our invention, this wrapping of the wrapper 1 around the former 9 (Figs. 21 and 22) bends the pull strip 15' against the step 13 and at right angles to the face 9a of the former, thereby clearing the channel 12 and uncovering the aperture 14.

When the extremity 15a of the pull has been thus bent at right angles, the adhesive tipped applicator 17 may be brought into action at any suitable location, as for instance at the station I. The applicator rod 17 may be mounted in a housing 93 (Fig. 27) and yieldingly spring biased by an adjustable spring 94 therein. The housing 93 is mounted in an arm 95 which is pivoted on bearings 96 (Fig. 18) in the frame of the packer and biased by a spring 95'. The arm 95 is oscillated, through a pivoted flexible link 97, by a cam 98 fixed on the main shaft 44 (Figs. 18, 19, 20, 26 and 27).

The lever 95 has a cam nose 99 (Figs. 19, 26) for engaging an arm 100 of a bell crank fulcrumed on a bearing 101; the bell crank including an arm 102, in which is journaled a wheel 103 having a beveled edge. The bearing 101 is supported by a bracket 104 of an adhesive fountain 105, and the bell crank arm 102 is biased against the action of the cam 98 by a spring 106 anchored on the bracket 104.

The fountain 105 contains a beveled edge wheel 107 which rotates in and projects above an adhesive pool in the fountain. If desired, the wheel 107 may be continuously rotated by a motor 108.

The cam 98 is so shaped that during the portion of the rotation of the shaft 44, which effects a step movement of the turret 40, the spring 95' is permitted to bias downward the rear end of the lever 95 and elevate the forward end of this lever so as to lift the applicator stem 17 out of

the path of any moving former 9. In this position, the bell crank 100-102 is turned on its axis 101 so as to bring the beveled edge of the adhesively coated wheel 103 into contact with the end of the applicator stem 17 and coat it with adhesive.

When a former 9, with a wrapper 1 folded thereon, comes to rest at the station I, the cam 33 elevates the link 97 to rock the lever 95 so as to move the stem 17 downwardly to deposit a spot of adhesive on the outer face of the wrapper section adjacent to the upturned pull section 15a. The downward movement of the nose 99 of the lever 95 permits the spring 106 to retract the wheel 103 from the path of the stem 17 and bring the periphery of the wheel 103 into contact with the adhesively coated periphery of the rotating wheel 107.

During the progress of a former 9 from station I to station V, the wrapper 1 thereon is tucked and folded and sheathed in a label jacket in the usual manner. By the time the former 9 arrives at station VI, the wrapping, tucking and folding of the inner wrapper or shell and of the jacket have been completed, and consequently the pull extension 15a may now be further bent so as to overlie the edge of the label jacket and be secured in position by the adhesive spot previously applied to the shell by the applicator 17.

This bending or folding of the pull extension 15a at the station VI may be effected by mounting the folding finger 19 on the end of a bent lever 109 fulcrumed on a frame bearing 110 and connected through an adjustable, yielding link 111 with an arm 112 fixed to the conventional oscillating lever 340 for reciprocating the supplementary plunger for operating each transfer plunger 90 at station XII above referred to, viz., the part 340 of Patent No. 1,926,192. The arm 112 is fixed to the lever 340 adjacent to the axis of oscillation thereof. The link 111 comprises telescoped members having limited longitudinal movement relative to one another and normally biased to their outward positions by a coiled spring. Hence when the lever 340 is rocked to the full line position shown in Fig. 28 to advance a plunger 90 at station XII to the position shown in Fig. 23, it rocks the member 112 and thrust is transmitted through the spring of the link 111 to the lever 109 to move the folder 19 yieldingly against and fold a pull extension 15a of a pouch on a former 9 at station VI. During transit of a pouch from station I to station VI the adhesive applied by the applicator 17 becomes more tacky so that when the pull extension 15a is folded at station VI, it immediately adheres to the adhesive spot on the shell.

In passing from station VI toward station IX, the pouch is subjected to the action of a heater (not shown) to dry the adhesive sealing its seams and ends and attaching the end 15a of the pull to the shell.

Upon the arrival of each former 9 at station IX, there is brought into registration therewith one of a series of pockets 115 (Figs. 18, 19, 31) each containing a compacted bundle of cigarettes 31 arranged in three rows, preferably containing respectively 7-6-7 cigarettes. The pockets 115 are carried on the arms of a conventional rotary compacting mechanism 116.

When a pocket 115 is brought into registration with the mouth of a former 9, the transfer plunger 90 complementary to the latter is operated in the usual manner by cam on the turret housing (not shown) to push the bundle of cigarettes 31 out of the compactor pocket 115 into the former 9 so

that the outer ends of the cigarettes are flush with the edge of the mouth of the former 9 and rim 10 (see Figs. 18, 19 and 31). The plunger 90 is then retracted by the cam (not shown) to permit relative movements of the turret 40 and compactor 116.

After the bundle of cigarettes 31 has been inserted in a pouch, an adhesive applicator 33 is inserted in the aperture 14 through the rim 10 and former 9 to apply a spot of adhesive 32 to an end cigarette of the middle row of the bundle. Preferably the insertion in the applicator takes place when the former 9 stops at station XI.

The applicator 33, and the mounting and operation thereof, are similar to the applicator 17 and the mounting and operation thereof, that is to say, the headed stem 33 (Fig. 29) is reciprocably mounted in a housing 93a and yieldingly spring biased by an adjustable spring 94a therein. The housing 93a is mounted in an arm 95a, which is pivoted on bearings 95a in the frame of the packer and biased by a spring 95a' mounted on the packer frame. The arm 95a is rocked through a pivoted, flexible, link 97a by a cam 98a fixed to the main shaft 44 (Figs. 19, 20 and 29). The lever 95a has a cam nose 99a for engaging the arm 100a of a bell crank lever fulcrumed on the bearing 101a and having an arm 102a in which is journaled a wheel 103a having a beveled edge. The bearing 101a is supported by a bracket 104a of an adhesive fountain 105a, and the bell crank arm 102a is biased by a spring 106a anchored on the bracket 104a. The fountain 105a contains a beveled wheel 107a which rotates in and projects above an adhesive pool in the fountain. If desired, the wheel 107a may be continuously rotated by a motor similar to the motor 108.

The cam 98a is so shaped that during the portion of the rotation of the shaft 44 which effects a step movement of the turret, the spring 95a' is permitted to bias downward the rear end of the lever 95a (Fig. 29), thereby elevating the forward end of the lever 95a so as to lift the applicator stem 33 out of the path of any moving former 9. In this position of the lever 95a (Fig. 19) the bell crank 100a, 102a is turned on its axis 101a so as to bring the beveled edge of the adhesively coated wheel 103a into contact with the end of the applicator stem 33 and coat it with adhesive. When a former 9 containing a bundle of cigarettes 31 comes to rest at, for instance, the station XI, the cam 98a acts through the link 97a to rock the rear end of the lever 95a upward so as to move the spring biased stem 33 downwardly through the aperture 14 in the rim 10 and former 9 to deposit a spot of adhesive 32 on the end cigarette 31c' of the middle row 31c of the bundle (Figs. 9, 10, 29).

The aperture 14 is preferably positioned at a distance of about 1½ inches from the mouth of the former 9 so that the spot of adhesive 32 is applied to the middle half of the length of the cigarette.

The downward movement of the nose 99a of the lever 95a, toward the position shown in full lines in Fig. 29, permits the spring 106a to retract the wheel 103a from the path of the stem 33 and bring the periphery of the wheel into contact with the adhesively coated periphery of the wheel 107a to renew the supply of adhesive on the wheel 103a. When the pin 33 is again rocked away from the former 9, to the dotted line position shown in Fig. 29, the nose 99a of the lever 95a engages and rocks the bell crank arm 100a

so as to move the periphery of the wheel 103a into engagement with the end of the stem 33 and renew the supply of adhesive thereon.

When a filled former 9 has been moved from position XI to position XII, its plunger 90 is given an extreme forward movement through the lever 340 to complete the insertion of the bundled cigarettes into the former and against the bottom of the pouch and to eject the cigarettes and pouch from the former 9, as shown in Fig. 23. This movement transfers the filled pouch into the entrance of the delivery guideway 120 and into position for the usual tucking and folding of its sections 1a, 1b, 1c and 1d. The stripped former 9 is thus prepared for the laying of a new pull strip 15' and the positioning and cutting of a new wrapper 1 for a new cycle of operations.

The ejected package in the guideway 120 is moved along the guideway by the pressure of a follower 121. Such lateral pressure on the face of the packages tends to bulge upward the narrow upper side of the package. To reverse this outward bulging of the upper side of the package and to press the pull 15' running along the inner face of such side against the adhesive spot 32 applied by the applicator 33, we mount a series of fingers 36 on a plate 123 which is connected, through pivoted links 124 and 125 and spring 126, with an oscillating arm 62 of the paper feed mechanism. Consequently each paper feeding movement of the arm 62 imparts a yielding pressure to a group of the finished packages on the guideway 120 without interfering with the movement of the packages to provide room for the ejection of a new package. Such repeated yielding pressures insures the adhesion of the pull 15' to the spot 32 whose tackiness increases during its transit from the applicator 33 to the fingers 36.

From the foregoing it will be understood that during or immediately upon the completion of the ejection of a filled pouch from a given former 9 at position XII (Fig. 23), the shaft 82 is rotated to impart rotation to the feed wheels 66 and 67 which feed a predetermined length of laminated tape, which has been creased by the folder 65', through the slot 12 and onto the top 9a of the former 9, which has just been emptied.

As soon as a length of tape sufficient to form a pull 15' has been laid, it is severed by the operation of the cutter 68 by the cam 98 and intermediate linkage. Substantially simultaneously with the laying of the tape, the arms 62 and the rollers 55 and 56 advance a strip of sheet material T from which a new wrapper 1 is severed and slit by the knives 6, 7 and 8 while in position for engagement by the leading face of the former 9. The wrapper is bent around the former 9 and over the pull (Fig. 21) upon the movement of the turret 40 in a clockwise direction when looked at from the front (anti-clockwise as it appears in Figs. 19 and 31). The bending of the wrapper 1 over the pull 15' bends the end 15a of the latter at right angles thereto against the step 13 (Fig. 22) and, while the pull end 15a is so bent, a spot of adhesive is applied by the applicator 17 and on a part 1a of the wrapper which will subsequently form an end tuck of the package; the spot being near the base of the pull end 15a. After the bottom of the wrapper has been tucked and folded and

the wrapper has been sheathed in a pouch in the usual manner during the progress of the former from station XII to station VI, the projecting end of the pull 15a is bent back (Figs. 28, 32) against the adhesive spot applied by the applicator 17.

Thereafter a bundle of cigarettes, preferably arranged in rows of 7-6-7 are inserted in the former and part-way within the length of the pouch formed by the wrapper 1 and label 18 and a further spot of adhesive 32 is applied by the applicator 33 to a cigarette aligned with the pull 15' at a point on the cigarette just beyond the outer edge of the wrapper.

The bundled cigarettes are then pushed completely into the pouch (Figs. 23, 34) and the open end of the wrapper 1 is tucked and folded (Figs. 33 and 34) so that the extremity 15a of the pull projects laterally from the completed package. An intermediate section of the pull strip forms a loop (Fig. 14) around the end tuck 1a and the inner section of the pull strip is adhesively connected to an end cigarette of the middle row, which cigarette is spaced from the package wall and slides freely in grooves formed by adjacent cigarettes of the two outer rows 31a and 31b. The end tuck 1a and the outer section of the pull loop thereon are partly covered by the severed end sections 1c' and 1d' of said flaps bent down from the front and back walls of the wrapper 1 and such flaps are secured in folded position by a stamp 37 or the like; the stamp being pasted to the front and back walls and main portions of the flaps 1c and 1d and projecting slightly over the edges of the severed portions 1c' and 1d' of the flaps.

When the projecting end 15a of the pull strip is pulled laterally, it raises the tuck 1a to which it is adhesively connected and thereby draws the severed fold sections 1c' and 1d' from beneath the edge of the stamp 37 and turns them upwardly. A continued lateral pull on the pull splits it from its adhesive connection to the outer face of the tuck 1a and thereupon imparts an endwise stress on the cigarette 31c, which is thereby drawn upward until the adhesive spot 32 rises above the top of the package. Whereupon the pull 15' splits or strips off the cigarette 31c' and leaves it partially projecting from the package but free from the pull strip.

Having described our invention, we claim:

1. In the art of packaging, the steps which include wrapping a wrapper around a substantially straight pull, thereafter moving a group of articles into said wrapper in the direction of the length of said pull, and connecting said pull to an article aforesaid within said wrapper.
2. In the art of packaging, the steps which include laying a pull member along a hollow former, wrapping a wrapper around said former and pull member, inserting in said wrapper a group of articles including a member to be pulled, one of said members having an adhesive section, and connecting said last named member at said adhesive section with the pull member.
3. In the art of packaging, the steps which include housing a pull within a wrapper, moving a group of articles rectilinearly within said wrapper while spaced from said pull, and connecting together said pull and an article aforesaid while housed in said wrapper.
4. In the art of packaging, the steps which include wrapping a wrapper around a section of a

pull and bending a projecting section of said pull, attaching the projecting section of said pull to said wrapper, inserting in said wrapper a group of articles, one of said articles being aligned with the wrapped section of said pull and connecting the wrapped section of the pull with said aligned article.

5. In the art of packaging, the steps which include wrapping a wrapper around a pull section, bending an outer section of said pull and attaching it to said wrapper, inserting a group of articles within said wrapper, applying an adhesive to one of said articles before completing the insertion thereof within said wrapper, and attaching said pull to said adhesive article within said wrapper.

6. In the art of packaging, the steps which include moving a group of articles rectilinearly within a wrapper containing a pull, said group including a plurality of unequal rows of said articles forming a channel at one end of the group, applying an adhesive to an end article of a row containing fewer articles than the adjacent row and while said group is partially inserted within said wrapper, said end article forming a recessed wall of said channel and attaching said pull to said adhesive article within said wrapper.

7. In the art of packaging, the steps which include enclosing within a wrapper a pull member and a group of articles including a member to be pulled, one of said members having an adhesive section, and bulging said wrapper inward to form a channel extending longitudinally of said members to press said members together.

8. In the art of packaging, the steps which include feeding a tape and a wrapper strip transversely to one another, slitting a marginal section of said wrapper strip and severing a wrapper therefrom, severing a pull from said tape, wrapping said wrapper around a section of said pull, and bending a projecting portion of said pull, applying an adhesive to said wrapper adjacent to the bent portion of said pull, forming a sheath around said wrapper, bending the projecting portion of said pull against said adhesive and over said sheath, inserting a group of rod-like articles partially within said wrapper, applying an adhesive to a projecting portion of one of said articles aligned with the wrapped pull strip and spaced from said wrapper, inserting said group fully within said wrapper with said adhesive coated articles spaced from said wrapper and bending sections of said wrapper to form an end closure having a member looped by said pull, and pressing a wrapped portion of said pull and said adhesively coated articles together.

9. Packaging apparatus comprising a former, a guide for positioning a pull strip on an exterior surface of said former, and means for wrapping a wrapper about said surface and pull strip while it is positioned by said guide.

10. Packaging apparatus comprising a former having a rim containing a slot extending longitudinally of said former, said rim and former containing an adhesive aperture intersecting said slot, and said rim forming a step for bending a tape laid on said former and rim.

11. Packaging apparatus comprising a former having an end mouth, a plunger reciprocable into and out of said former, said former being movable only when said plunger is withdrawn therefrom, an operating rod for reciprocating said plunger and offset with the center thereof,

and a tape feeder adjacent to the mouth of said former and intersecting the path of a portion of said plunger, said tape feeder ejecting a free end of tape substantially parallel with the line of movement of said plunger.

12. Packaging apparatus comprising a movable former, means for laying a tape on said former, means for wrapping a wrapper on said former and bending said tape, an applicator for applying an adhesive to a wrapper on said former, means for bending said tape against said adhesive, a loader for inserting articles in said former, a second applicator for applying an adhesive to an article in said former, and means for pressing together said tape and adhesively coated article.

13. Packaging apparatus comprising a movable former, feeding mechanisms for feeding a wrapper and a pull tape transversely to said former, a loader for inserting articles in said former, an applicator for applying adhesive to an article aforesaid while in said former, and means for pressing said tape and adhesive-coated article together.

14. Packaging apparatus comprising a container-forming mechanism and an article-group-forming mechanism, and means for transferring an article-group from said last named mechanism to a container formed independently of said article group by said first named mechanism, and means for applying an adhesive to an article of said group after the group is formed and before it is fully seated in said container.

15. Packaging apparatus comprising mechanism for assembling adjacent unequal rows of similar rod-like articles and means for covering said articles and for attaching a pull strip to an end article of a row containing a lesser number of articles than an adjacent row.

16. Packaging apparatus comprising a series of formers, means operably associated with said formers for intermittently feeding a free end of tape rectilinearly along each of said formers, one after another, and means operably associated with said formers for feeding wrappers to said formers, one after another, and wrapping them thereon to form packages each enclosing a part of said tape.

17. In the art of packaging, the steps which comprise forming a compacted group of articles and forming therefor a container containing a pull strip, applying an adhesive to an article of a group aforesaid, moving said group and container rectilinearly and relatively to one another until said group is within said container and said adhesive registers with said pull strip and adhering together by said adhesive said pull strip and the article to which said adhesive is applied.

18. Packaging apparatus comprising an article-group-forming mechanism, means for applying an adhesive to an article of a group formed by said mechanism, a holder for a container and pull strip, means for moving a group and container holder aforesaid relatively longitudinally to one another and bringing said adhesive and pull strip into registration, and means for pressing said pull strip against adhesive on said article of said group within said container and adhering such pull strip and article together.

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## 17

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