

July 3, 1962

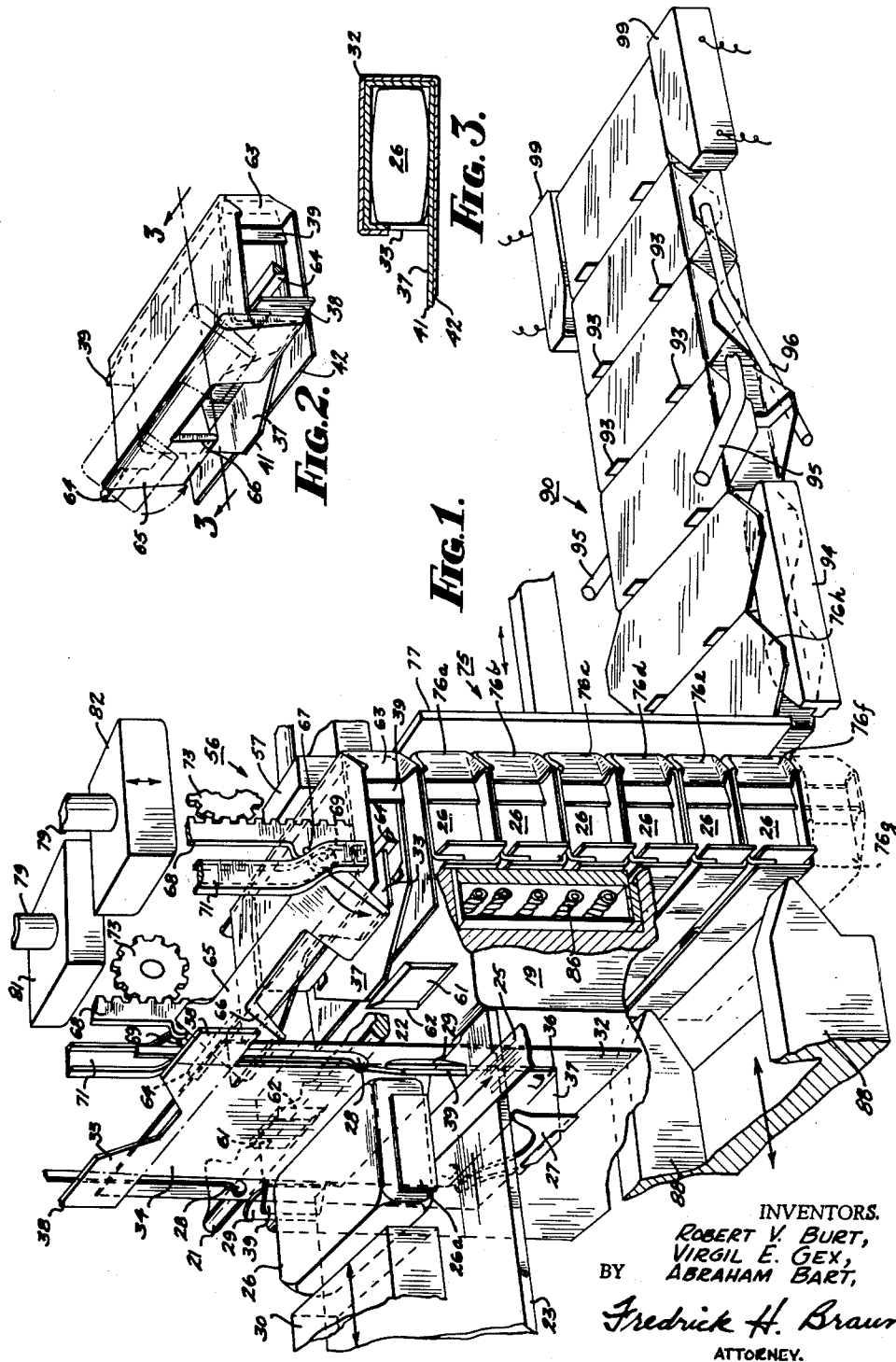
R. V. BURT ET AL

3,041,806

MACHINE FOR FORMING LINED PACKAGES

Filed April 28, 1960

5 Sheets-Sheet 1



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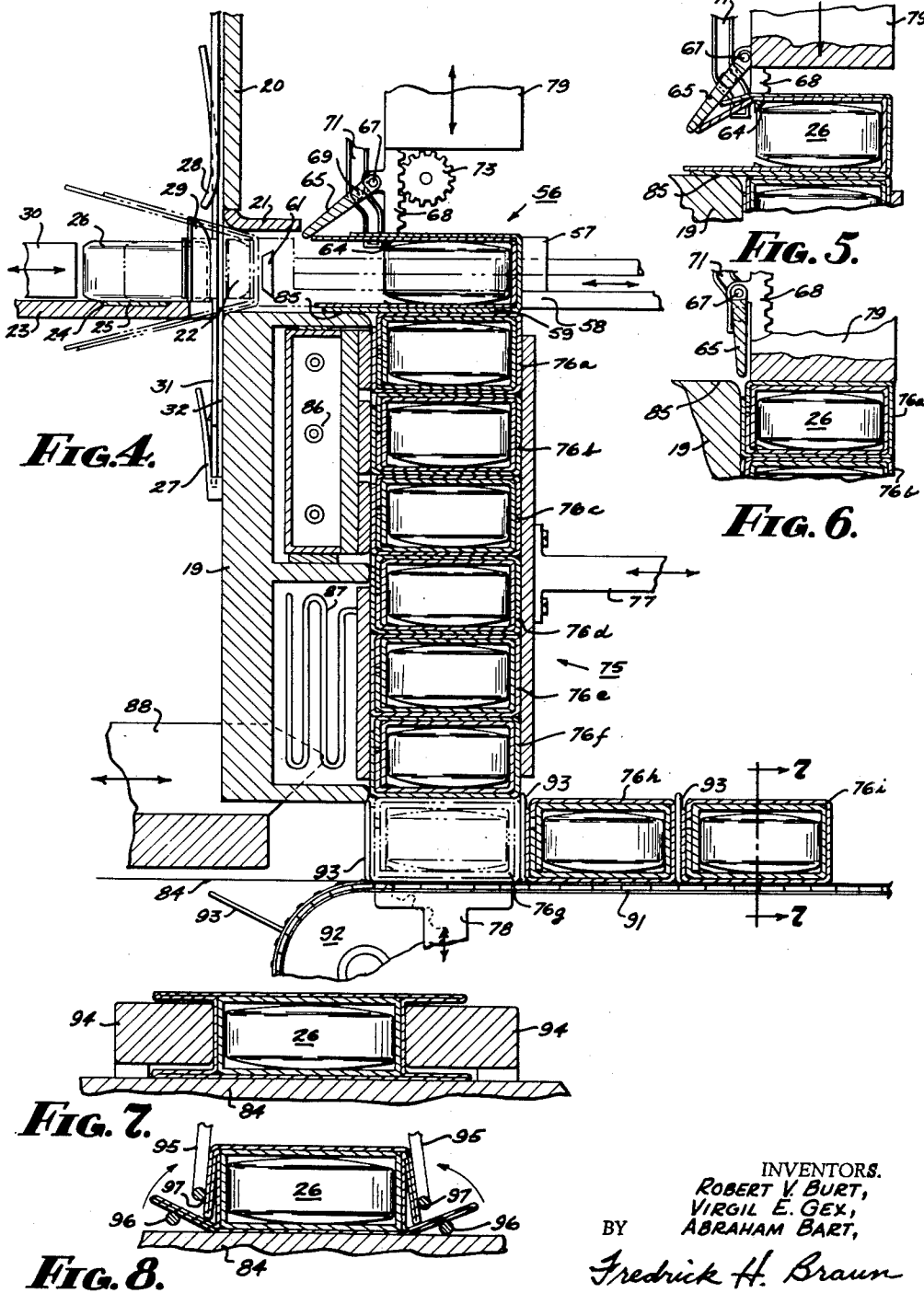
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MACHINE FOR FORMING LINED PACKAGES

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5 Sheets-Sheet 2



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MACHINE FOR FORMING LINED PACKAGES

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5 Sheets-Sheet 3

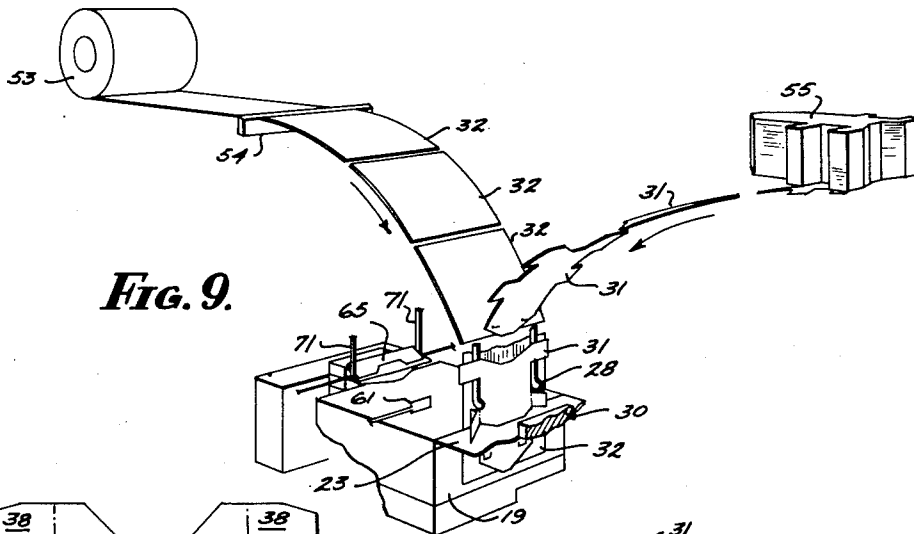


FIG. 9.

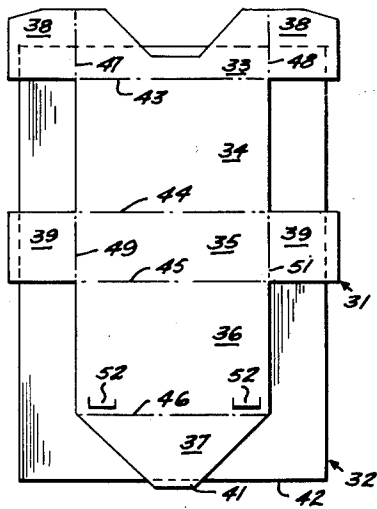


FIG. 10.

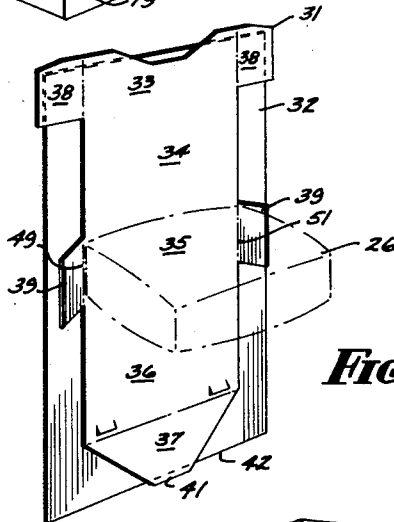


FIG. 11.

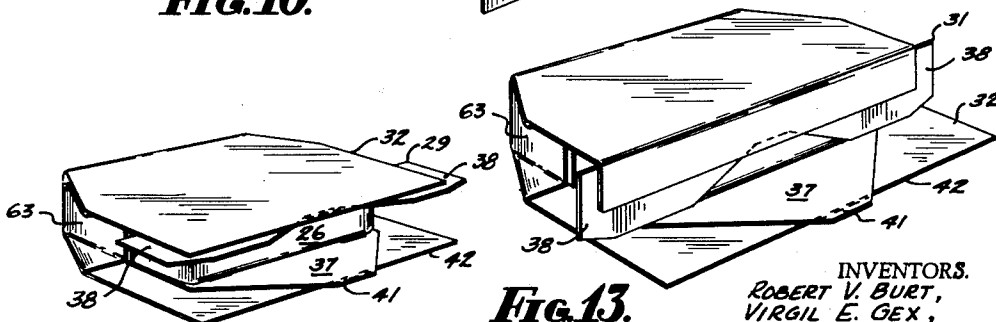


FIG. 12.

FIG. 13.

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5 Sheets-Sheet 4

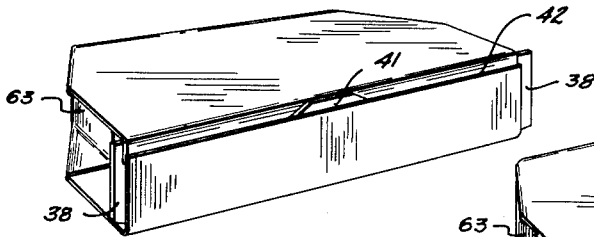


FIG. 14.

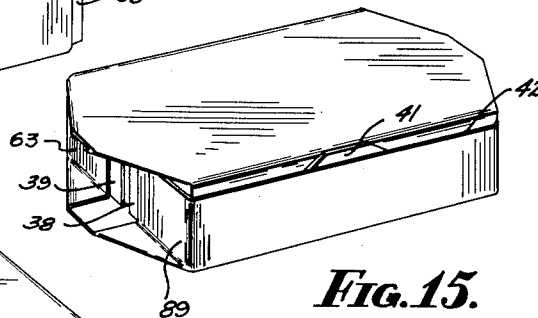


FIG. 15.

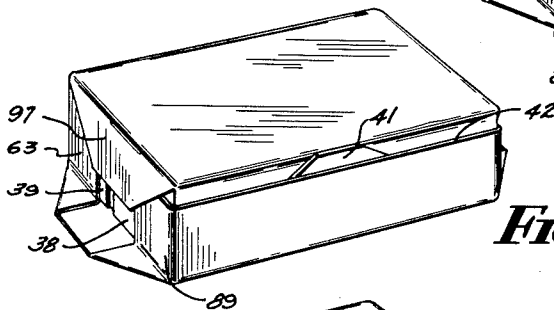


FIG. 16.

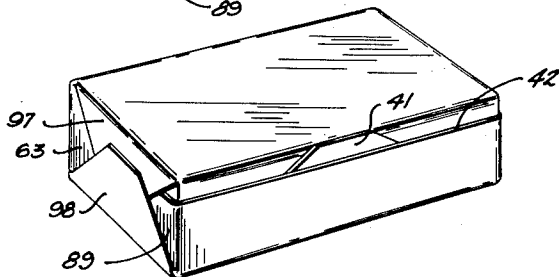


FIG. 17.

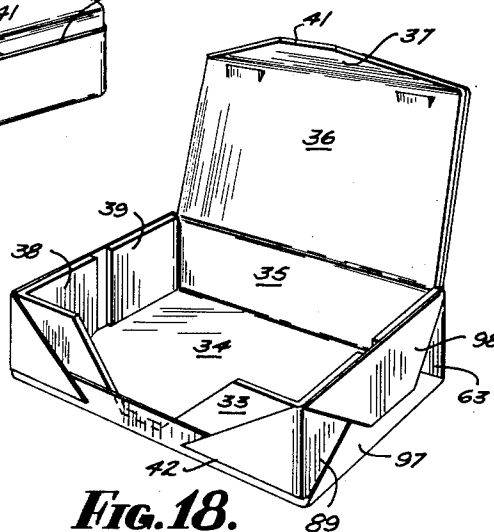


FIG. 18.

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5 Sheets-Sheet 5

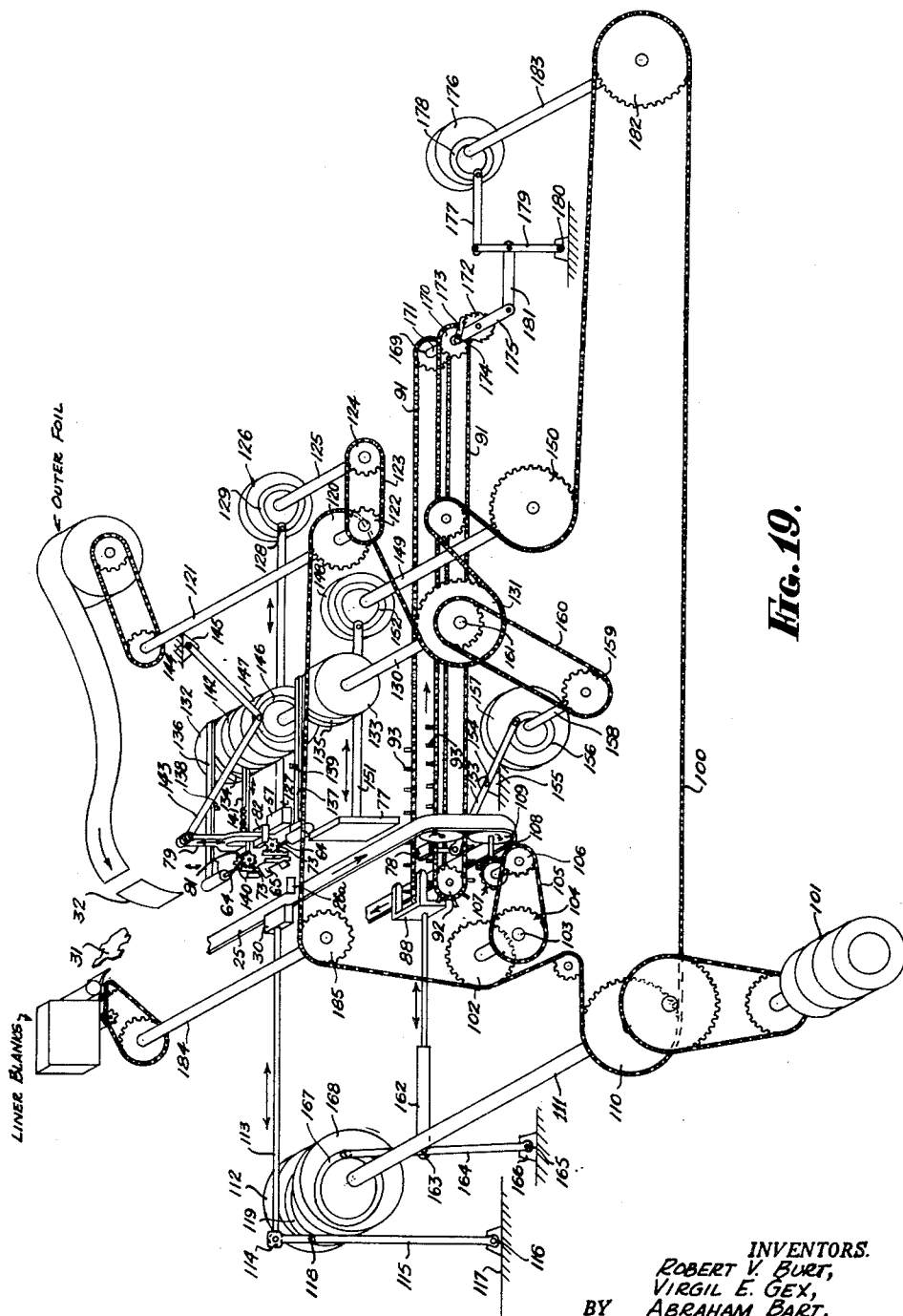


Fig. 19.

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3,041,806

MACHINE FOR FORMING LINED PACKAGES
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poration of Ohio

Filed Apr. 28, 1960, Ser. No. 25,395
13 Claims. (Cl. 53-172)

This invention relates to an apparatus for packaging articles and, more particularly, to a machine for forming a package having a paperboard liner and an outer wrapper wherein the liner and outer wrapper are simultaneously wrapped around the article.

With the development and improvement of highly attractive and decorative wrapping films has come a simultaneous trend to use these materials for overwrapping conventional cardboard and paperboard containers. Typically, an article is packaged in a plain paperboard carton which then is overwrapped and sealed with a decorative wrapping film, such as a printed foil or the like. This procedure has at least one major drawback in that it necessitates the use of two machines; one for packaging the article in the carton and a second for overwrapping the carton. Attempts have been made to devise machines which will simultaneously wrap articles with a cardboard or paperboard liner and an outer wrapper. Heretofore, however, such machines have been deficient from the standpoint of operating at prohibitively low rates for production purposes.

In general, therefore, it is a principal object of this invention to provide a wrapping machine which will simultaneously wrap a superposed paperboard liner and an overwrap material around an article.

Another object of this invention is a machine of this character capable of continuous operation which can produce in excess of 150 finished packages per minute.

A further object of this invention is the provision of a machine capable of forming various styles of packages. By way of example, packages of the character described in the applications of Robert V. Burt, Serial Number 798,736, filed March 11, 1959, now abandoned in favor of continuation-in-part application Serial No. 54,563, filed August 31, 1960, and Raymond W. Carlin et al., Serial No. 779,490, filed December 10, 1958, now U.S. Patent No. 2,973,893, may be formed. The said applications are also assigned to the assignee of this invention. The invention is not limited to the types of packages described in those applications, however, these being merely exemplary of two types of packages that can be formed.

Still another object of this invention is the provision of a machine in which initial association of the article with the liner and wrapper is effected by inserting the components into a forming pocket which serves to effect initial folding of the parts, the pocket also defining the upper end or mouth of a vertical chute into which the partially wrapped assemblies are introduced for additional folding operations.

A still further object of this invention is the provision of a mechanism for improving the resistance to bending of one surface of the paperboard liner blank prior to its undergoing additional steps in the wrapping cycle.

Yet another object of this invention is the provision of a machine of the character described which is capable of using a wide range of paperboard liner blanks from the standpoint of quality and score depths without appreciably affecting the performance of the machine.

Yet a further object of this invention is the provision of a machine of this character which is capable of form-

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ing a rectangular package around an article having a relatively narrow edge.

Briefly stated, in accordance with one aspect of this invention, a package is formed around an article by pushing the article laterally against a pre-cut and scored liner blank which is superposed upon a pre-cut outer wrapper blank. The article is pushed laterally past a stationary tucker which forms a first end tuck on the side opposite the pusher while being held in square alignment by a reciprocating support until the partially wrapped article enters a forming pocket composed of a stationary stop and the reciprocating support on one side, and a lower support formed by the uppermost of a plurality of partially wrapped packages disposed in a vertical chute. The wrapper surrounds the article on three sides after being pushed into the forming pocket.

Thereafter, the outwardly extending upper liner panel and superposed portion of the wrapper are tucked downwardly whereupon the entire stack of partially wrapped articles in the vertically disposed chute is moved downwardly. This action simultaneously folds the outwardly extending lower liner panel and wrapper of the uppermost partially wrapped article upwardly into superposed relation to the upper panel and superposed outer wrapper.

The downward movement in the vertically disposed chute lowers the bottom package into position at the entrance to a folding channel. A reciprocating member with integral tucking arms forms the second end tuck on each successive package when it is in position just above the entrance to the folding channel. A conveyor with moving fingers pushes the partially formed packages past a pair of folding members to complete the end folds on the package.

The invention further resides in the methods and in the features of construction and arrangement of parts hereinafter described and claimed. For an understanding of the invention, and for illustration of the various details and embodiments thereof, reference is now made to the accompanying drawings wherein:

FIGURE 1 is a perspective view, partially in cross-section, of the apparatus showing the principal elements in their operative relationship; and

FIGURE 2 is a perspective view of a partially formed package showing two positions of the rotary and reciprocating folder both before (broken lines) and after having made its fold; and

FIGURE 3 is a cross-section taken along the lines 3-3 of FIGURE 2 showing the condition of the partially completed package in the forming pocket; and

FIGURE 4 is a fragmentary elevational view illustrating the forming pocket and vertical chute; and

FIGURE 5 is a fragmentary vertical sectional view of the package in the forming pocket as the rotary and reciprocating folder has gone partially through its movement; and

FIGURE 6 is a fragmentary vertical sectional view of the package after having been moved from the forming pocket into the vertically disposed chute; and

FIGURE 7 is a cross-section taken along the lines 7-7 of FIGURE 4 showing the nesting tuckers; and

FIGURE 8 is a cross-section showing the folding members making the final folds on the package; and

FIGURE 9 is a schematic view of the means for feeding liner blanks and overwrap blanks to the wrapping apparatus of this invention; and

FIGURE 10 is a plan view of a superposed liner blank and outer wrapper blank; and

FIGURE 11 is a perspective view of the superposed liner blank and outer wrapper blank as they are held in position prior to being wrapped around an article; and

FIGURE 12 is a perspective view of a partially com-

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plete package in the form it takes when moved into the forming pocket; and

FIGURE 13 is a perspective view of the partially complete package in the form it takes in the forming pocket after the upper panel of the liner and outer wrapper are folded downwardly; and

FIGURE 14 is a perspective view of the partially complete package in the form it takes in the vertically disposed chute of the wrapping apparatus; and

FIGURE 15 is a perspective view of the partially complete package with completed end tucks; and

FIGURE 16 is a perspective view of the partially complete package with the upper end fold in place; and

FIGURE 17 is a perspective view of the finished package made by the apparatus of this invention; and

FIGURE 18 is a perspective view of the package shown in FIGURE 17 after being opened and with its contents removed; and

FIGURE 19 is a diagrammatic perspective view illustrating drive mechanism for the apparatus.

Referring now to the drawings; and particularly FIGURES 1 and 4, there is shown the machine and its several elements that cooperate to form a finished package. The machine structure includes a frame 19, an upper plate 20 and a folding member 21. The plate 20 is spaced from the main frame 19 to provide an opening 22 for initiation of the folding cycle. A support table 23 is recessed at 24 to accommodate the supply belt 25 which moves the articles 26 into position against a stop 26a prior to the initiation of the wrapping cycle. An overlap blank support 27 is mounted on the frame 19 and a pair of end flap folders 28 are mounted on the upper plate 21. End flap holders 29 are mounted on opposite sides of the table 23 and below the folders 28. A reciprocating feed pusher 30 is mounted for movement over the table 23.

In order to appreciate the manifold advantages of the invention, its operation will be described in the formation of a new type of package as disclosed in the aforementioned copending application of Robert V. Burt, Serial No. 798,736, filed March 11, 1959. It will be understood, of course, that a great variety of packages can be formed with the machine of the present invention and that the particular package described as being formed herein is for exemplary purposes only.

Referring to FIGURE 10, the package components consist of a liner blank 31 and an outer wrapper blank 32. The liner blank 31 is divided into a front panel 33, a bottom panel 34, a back panel 35, a top panel 36, and a tear tab panel 37. Front end flaps 38 extend laterally from the front panel 33 and back end flaps 39 extend laterally from the back panel 35. An opening tab 41 extends beyond the edge 42 of the outer wrapper blank 32. The liner blank 31 is scored at the lines 43, 44, 45 and 46 to divide the respective panels. Score lines 47, 48 and 49, 51 are provided to permit infolding of the end flaps 38 and 39. A pair of holding tabs 52 are struck from the top panel 36.

The device for supplying outer wrapper blanks 32 and liner blanks 31 is shown schematically in FIGURE 9. This portion of the machine is similar to the supply mechanism that is disclosed in U.S. Patent 2,911,774 issued to A. R. Frank and W. H. Giles. The outer wrapper blanks 32 are supplied from a web 53 and are severed by the cutting knife 54 and fed to the wrapping machine so that the finished blank 32 is held by the support 27 (FIGURES 1 and 4). The liner blanks 31 are supplied in pre-cut form from a stack 55 and are fed to the wrapping machine so that they are in superposed relationship to the outer wrapper blank 32 when they come to rest prior to initiation of the wrapping sequence. It will be noted that the liner blanks 31 are fed to the wrapping machine in flat form. However, as they are moved into position for initiation of the wrapping sequence, the end tab folders 28 are interposed between the back end flaps and the outer wrapper blank 32 (see FIGURE 1). This folds the end

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flaps 39 inwardly and they are held in that position by the holders 29 as the lower edges of the end flaps 39 are supported on the table 23. It has been found that preforming the back end flaps 39 materially increases the resistance to bending of the back panel 35 when pushed into the wrapping machine and this permits the use of thinner material for the liner blanks than is possible if the end flaps 39 remain in the same plane as the back panel 35 during the initial stages of folding.

The liner blank 31 and outer wrapper blank 32 are held in the position shown in FIGURE 11 at the inlet to the wrapping machine. The infolded back end flaps 39 rest on the table 23 and the lower edge 42 of the outer wrapper blank 32 is held up by the support 27. The article 26 to be wrapped is fed in and supported by the belt 25 so that one of its lateral surfaces abuts the back panel 35 of the liner blank 31. While the invention has been found to be useful in wrapping articles of soap and the like, it will be understood, of course, that it can be practiced in the wrapping of any commodity having reasonably good resistance to deformation. For convenience, therefore, the article 26 is shown in the shape of a typical bar of soap.

The article 26 together with the liner blank 31 and outer wrapper blank 32 are simultaneously moved through the opening 22 by the reciprocating feed pusher 30 until they come to rest in the forming pocket 56 as shown in FIGURE 4. The forming pocket 56 is composed of a reciprocating support 57 and a stationary stop 58 at one end, and the upper surface 59 of a previously formed package as a bottom support. The reciprocating support 57 is moved to its left hand position (as viewed in broken lines FIGURE 4) just before movement of the feed pusher 30 is initiated. The front face of the reciprocating support 57 is spaced from the front face of the feed pusher 30 a distance which is about equal to the width of the article 26 and the thickness of the liner blank 31 and outer wrapper blank 32. Thus, in effect, the reciprocating support 57 and feed pusher 30 act to clamp the article 26 against the liner blank 31 and outer wrapper 32 and move the three components firmly and simultaneously into the forming pocket 56. The purpose of the reciprocating support 57 is to maintain the package in square alignment until it reaches the forming pocket 56. As the article 26 moves through the opening 22, the liner 31 and superposed portions of the outer wrapper 32 will be folded over on score lines 44 and 45 so that the bottom panel 34 and top panel 36 are substantially parallel.

Means are provided for forming end tucks in the wrapper as the article, liner and overwrap are moved into the forming pocket 56. A pair of stationary tucking blades 61 are positioned on opposite sides of the path of the article 26, liner 31 and overwrap blank 32, just beyond the opening 22. The tucking blades 61 are mounted so that their edges 62 are spaced apart at a distance about equal to the length of the article 26 plus some allowance for the thickness of the liner and overwrap. Thus as the article 26, liner 31 and overwrap 32 are moved to the forming pocket 56, the tucking blades 61 form the end tucks 63 shown in FIGURE 12. When initially moved into the forming pocket 56, the partially completed package is in the form shown in FIGURE 12.

Means are provided for folding down the front panel 33 and the overlying portion of the outer wrapper blank 32 on the score line 43 while the partially wrapped article is in the forming pocket 56. As shown in FIGURE 2, a pair of substantially triangular supports 64 are first moved inwardly from opposite sides to support the edge portion of the bottom panel 34 alongside the score 43. The supports 64 are preferably narrow and thin so that they will not disturb the article within the partially completed package. Where the article 26 is oval shaped as in the case of a typical bar of soap, a support 64 having a triangular cross-section has been found satisfactory. The front panel 33 is folded downwardly at the score

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43 by a rotary and reciprocating folder 65. The folder 65 is cut-out at 66 in order to provide clearance for the reciprocating support 57 which can move to the opening 22 while the folder 65 is in its down position. The folder 65 is pivoted at 67 to a vertically movable rack 68. The folder 65 has a roller follower 69 at each end. The followers 69 ride in the stationary cam tracks 71. A pinion 73 engages the rack 68.

On initial rotation of the pinion 73, the rack 68 is moved downwardly. This causes the folder 65 to pivot at 67 due to the shape of the cam tracks 71 so that it is initially moved to the position shown in FIGURE 5 and in broken lines in FIGURE 2. This movement initiates bending of the panel 33 at the score line 43. As the rack 68 continues to move downwardly, the folder 65 completes the fold along the score lines 43 of the liner 31. It simultaneously folds the superposed portion of the outer wrapper 32. After completing the fold, the folder 65 is moved downwardly a small additional distance due to the shape of the cam tracks 71 in order to smooth the completed fold until the position shown in solid lines in FIGURE 2 is reached. FIGURE 3 shows the cross-section of the package in this condition. The supports 64 are then withdrawn and the partially formed package in the forming pocket 56 is ready for the next step in the folding cycle.

A vertically disposed chute 75 holding a plurality of partially formed vertically stacked packages 76a . . . 76f is located immediately below the forming pocket 56. The partially formed packages 76a . . . 76f are held against the frame 19 by means of a clamp 77. A vertically movable bottom support 78 is provided for moving the packages downwardly in the chute 75. A vertical plunger member 79 having a pair of spaced pads 81 and 82 is mounted for vertical movement above the forming pocket 56. The pads 81 and 82 are spaced apart so that the reciprocating support 57 can move to the left when the vertical plunger member 79 is in the down position.

To initiate downward movement in the chute 75, the bottom support 78 is first moved upwardly until it engages the bottom package 76f in the vertically disposed chute 75. Then, the vertical plunger member 79 is moved downwardly until the pads 81 and 82 touch the top surface of the partially formed package in the forming pocket 56. The clamp 77 is then moved to the right (as viewed in FIGURE 4) and the support 78 and member 79 are then moved downwardly in unison to lower the entire vertical stack until the bottom package rests on the table 84. The clamp 77 is then moved to the left to hold the partially formed packages 76a . . . 76f against the frame 19.

In the course of moving the stack downwardly, the uppermost package in the forming pocket 56 has its tear tab panel 37 folded upwardly along the score line 46 due to the abutment of the surface 85 against the panel 37 and the superposed portion of the outer wrapper. When the downward movement of the vertical stack is completed, the uppermost package 76a is in the condition shown in FIGURES 6 and 14.

While the vertical plunger member 79 is in the down position, the reciprocating support 57 moves to the left between the pads 81 and 82 and through the cut-out 66 in folder 65 to initiate folding of the next package with the feed pusher 30. The use of spaced pads 81 and 82 and the notched folder 65 allows the initiation of the next folding sequence before the folder 65 and vertical plunger 79 are returned to the position shown in FIGURE 4. This is very important from the standpoint of speeding up the wrapping machine so that it will wrap at rates in excess of 150 packages per minute.

As the partially formed packages 76a . . . 76f are clamped in the vertically disposed chute 75 by the clamp 77, the heater element 86 forms a heat seal on the overlapped outer wrapper portions forming the front surface of the package due to the heat sealing characteristics of

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the outer wrapper material. A cooling element 87 is provided to chill these seals and cause them to take on a permanent set thus preventing distortion of the partially finished package as successive operations are performed.

When the partially formed package is in the position of the package shown at 76f, a reciprocating tucker 88 forms the second tuck 89 at both ends of the package. Thus, when the partially finished package is lowered to the table 84, it is in the condition shown in FIGURE 15 and is at the entrance to the folding channel 90.

A pair of spaced chains 91 (see FIGURES 4 and 19) are supported at one end by a pair of sprockets 92 (one shown) to move the packages through the folding channel 90 by means of the spaced fingers 93 attached to each chain 91. The fingers 93 move successive packages out from under the lowermost package 76f in the vertically disposed chute 75 and past the stationary nesting tuckers 94 shown in FIGURES 1 and 7. As soon as the package 76g is moved to position 76h, the stack of partially formed packages in the chute 75 can be lowered again. Upper and lower folding members 95 and 96 (FIGURES 1 and 8) in the folding channel 90 act to form the upper end fold 97 as shown in FIGURE 16 and the lower end fold 98 as shown in FIGURE 17. Making the end folds 97 and 98 completes the folding operations on the package. As the packages continue to advance in the folding channel 90, they are moved between a pair of opposite heater elements 99 which form a heat seal on the overlapped portions of wrapper material 32 to complete the package. Cooling elements similar to the cooling element 87 may be employed beyond the heater elements 99 to chill the end seals and cause them to quickly take a permanent set.

FIGURE 18 shows the package, described as being formed in the foregoing paragraphs, after being opened by pulling on the opening tab 41. The contents of the package have been removed. This particular style of package is formed in inverted fashion by the machine, since the panel 37 having the opening tab 41 is folded last. This is not critical to the successful operation of the machine as some types of packages would be formed in right side up fashion. Or, alternatively, the vertically disposed chute could be designed so that the partially wrapped articles move upwardly from the forming pocket rather than downwardly as heretofore described.

The specific means for operating the several moving elements of the machine may take numerous forms and, in general, will comprise conventional components which are well known to those skilled in this art. However, FIGURE 19 illustrates an embodiment of the invention wherein the operating components are all driven in timed relation by means of an endless chain 100 driven from a prime mover 101.

Referring to FIGURE 19, the chain 100 causes the supply belt 25 to move continuously through a drive mechanism which is composed of sprocket 102, the shaft 103, the sprocket 104, the chain 105, the sprocket 106, the bevel gear combination 107, the shaft 108 and the drive pulley 109.

The reciprocating feed pusher 30 is also driven by the chain 100 which rotates the sprocket 110 and shaft 111 as well as the face cam 112. The pusher 30 is attached to a member 113 which is pivoted at 114 to the member 115 which is in turn pivoted at 116 to a stationary support 117. A cam follower 118 (not shown) rides in the cam track 119 and causes reciprocating motion of the pusher 30 as the cam 112 rotates.

Likewise, the reciprocating support 57 is also driven from the chain 100 through the sprocket 120, the shaft 121, the sprocket 122, the chain 123, the sprocket 124, the shaft 125 and the face cam 126. The support 57 is attached to a member 127 which has a cam follower 128 (not shown) which rides in the cam track 129.

The triangular supports 64, the rotary and reciprocating

ing folder 65 and the vertical plunger member 79 are all actuated by a series of cams keyed to the shaft 130 and driven by the sprocket 131 which is in turn rotated by the chain 100.

The supports 64 are moved by the barrel cams 132 and 133 which are provided with cam tracks 134 and 135. The members 136 and 137 have a fixed pivot at 138 and 139 and roller followers (not shown) which ride in the cam tracks 134 and 135. The triangular supports 64 are connected to the members 136 and 137 and are thus moved laterally in and out in timed sequence as the cams 132 and 133 rotate.

The detailed operation of the rotary and reciprocating tucker and its mechanism has been described in greater detail heretofore. The means for actuating the mechanism in timed sequence is composed of a pinion 140 which is keyed on a common shaft with the pinions 73. The pinion 140 is engaged by a rack member 141 having a roller follower (not shown) which engages a cam track (not shown) in the face cam 142. Rotation of the cam 142 causes reciprocating movement of the member 141 which in turn actuates the rotary and reciprocating folder 65 through the pinions 73.

The vertical plunger member 79 is moved by an angular arm member 143 which has one end pivoted at 144 to a fixed support 145. The arm 143 has a cam follower (not shown) which rides in the cam track 146 of the face cam 147. Thus rotation of the cam 147 causes vertical reciprocation of the plunger member 79.

The clamp 77 is actuated by the face cam 148 which is driven through the shaft 149 by the sprocket 150 which is driven by the chain 100. Clamp 77 has a member 151 with a cam follower (not shown) at its other end which engages the cam track 152 in the cam 148. Rotation of the cam 148 results in reciprocating movement of the clamp 77.

The bottom support 78 is positioned between the chains 91 and is actuated for vertical movement by the lever 153 pivoted at 154 to the fixed support 155. The other end of the lever 153 has a cam follower (not shown) which engages the track 156 of the face cam 157. The cam 157 is rotated by the shaft 158, sprocket 159, chain 160, sprocket 161 and shaft 130. Rotation of the cam 157 will cause vertical reciprocating movement of the support 78.

The reciprocating tucker 88 is actuated by a mechanism composed of a member 162 pivoted at 163 to a lever 164 which has a fixed pivot 165 at one end which is attached to the stationary support 166. The other end of the lever 164 has a cam follower (not shown) which engages the cam track 167 of the face cam 168 which is rotated by the shaft 111.

The finger members 93 are moved intermittently by the chains 91 which are driven by the sprockets 169 and 170 keyed to the shaft 171. A conventional ratchet drive mechanism is used for moving the fingers 93 intermittently and in timed relation to the movement of the support 78. The ratchet drive is composed of the ratchet 172 which is keyed to the shaft 171 and is driven by the pawl 173 pivoted at 174 to a member 175 capable of oscillating movement on the shaft 171. The oscillating movement of the member 175 is imparted by the face cam 176 through the member 177 which has a cam follower (not shown) riding in the cam track 178. The motion of the member 177 is transmitted to the member 175 through the member 179 which has a stationary pivot at 180 and the member 181. The face cam 176 is rotated continuously by the sprocket 182 through the shaft 183.

The shafts 184 and 121 which are also driven by the chain 100 through the sprockets 185 and 120, respectively, drive the mechanism for feeding liner blanks and foil to the machine. This latter mechanism is shown schematically in the drawing. A more detailed show-

ing can be found by referring to U.S. Patent 2,911,774 issued to A. R. Frank and W. H. Giles.

While particular embodiments of the invention have been illustrated and described, it will be obvious to those skilled in the art that various changes and modifications can be made without departing from the spirit and scope of the invention and it is intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

What is claimed as new is:

1. Apparatus for forming a lined package around an article comprising means for holding a paperboard liner and an outer wrapper in superposed relation, means for moving an article against said liner and wrapper and into a forming pocket disposed over a chute for holding a plurality of partially wrapped articles in a vertical stack, a vertical plunger member for moving the partially wrapped article downwardly in said chute thereby folding the upper and lower trailing sides of the wrapper into superposed relation so that the article is enclosed on four sides, means for heat sealing the overlapped portions of the wrapper as it moves downwardly, a pair of reciprocating tucking arms near the bottom of said vertical chute for forming one end tuck, means for advancing the partially wrapped article into a folding channel, a pair of folding members in said channel for forming the top and bottom end folds and means beyond said folding members for heat sealing said end folds to complete the package around said article.

2. Apparatus for forming a lined package around an article comprising means for holding a paperboard liner and an outer wrapper in superposed relation, means for moving an article against said liner and wrapper and into a forming pocket, means for folding downwardly the upper trailing panel of said liner, means for folding the free ends of the liner and wrapper around the article to enclose the article on four sides while simultaneously moving the partially wrapped article downwardly in a vertically disposed chute, means for heat sealing the overlapped portions of the wrapper as it is moved downwardly in the chute, a pair of reciprocating tucking arms near the bottom of said vertical chute for forming an end tuck at opposite ends of the partially finished package, means for advancing the partially wrapped article into a folding channel, a pair of folding members in said channel for forming the top and bottom end folds and means beyond said folding members for heat sealing said end folds to complete the package around said article.

3. Apparatus for forming a lined package around an article comprising a reciprocating feed pusher for moving articles in a horizontal path, means for feeding a superposed liner and wrapper into the path of said feed pusher so that the article is moved against the superposed liner and wrapper past a stationary tucking blade and into a forming pocket disposed at the top of a vertical chute thereby folding the liner and wrapper around three sides of the article and forming one end tuck, a rotary and reciprocating folder for folding the upper trailing panel of the liner and the superposed portion of the wrapper downwardly, a vertical plunger member for moving the partially wrapped article downwardly in said chute thereby folding upwardly the lower extending portions of the wrapper and liner so that the article is enclosed on four sides, means for heat-sealing the overlapped portions of the wrapper as it moves downwardly in the chute toward the entrance to a folding channel, a pair of reciprocating tucking arms near the bottom of said vertical chute for forming the other end tuck, means for intermittently advancing the partially wrapped articles into said folding channel, a nesting tucker in said folding channel for securing the end tucks on said wrapper as it is moved through said folding channel, a pair of folding members in said channel for forming the top and bottom end folds and means beyond said folding members for

heat-sealing said end folds to complete the package around said article.

4. In an apparatus for forming a package from a liner blank and an overwrap blank, said liner blank having a plurality of end flaps each of which are foldable on a score line with respect to the main body of the liner blank, supporting means for said liner blank and overwrap blank comprising an overwrap blank support mounted on the frame of said apparatus, a support table spaced from said frame so that said liner blank and overwrap blank can be interposed between the support table and the frame, said liner blank having a pair of its end flaps folded on their score lines so that the end flaps rest on said support table, the support table and the overwrap blank support being spaced apart to properly position said liner blank with respect to said overwrap blank.

5. A device as claimed in claim 4 including a pair of end flap folders mounted on said frame above said support table for bending a pair of opposite end flaps on their score lines as said liner blank is being fed into position so that the said end flap pair rests on said support table.

6. In an apparatus for forming a package from a liner blank and an overwrap blank, said liner blank having a plurality of adjoining panels including a top panel and a side panel separated by a score line, mechanism for folding over the side panel of said liner blank and the superposed portion of the overwrap blank, said mechanism comprising a movable folder member, means for pivoting said folder member to initiate folding of the extending side panel of said liner blank at the score line between the side panel and the top panel and means for thereafter moving said folder member downwardly to complete the fold of said side panel with respect to said top panel and simultaneously smooth the overwrap portion over said folded side panel.

7. A device as claimed in claim 6 including means for supporting the portion of the top panel of the liner blank adjoining the score line in order to achieve a sharp, well defined corner for the package between the side panel and the top panel.

8. In an apparatus for forming a package from a liner blank and an overwrap blank, said liner blank having a pair of adjoining panels separated by a score line, mechanism for folding the adjoining panels of said liner blank and the superposed portion of the overwrap blank at the score line of said liner blank, said mechanism comprising a pair of oppositely disposed supports for moving inwardly to support the liner blank in the area adjoining the score line, a folder member, said folder member pivoted on a rack and having a roller follower spaced from said pivot and engaging a cam, a pinion for reciprocating said rack whereby said folder member is simultaneously pivoted and moved lineally to fold said liner at the said score line and to smooth the overwrap over said folded portion.

9. In an apparatus for forming a package from a liner blank and an overwrap blank, forming pocket means for holding the partially formed package in squared condition, said forming pocket means comprising a stationary stop at the side of the partially formed package, the bottom support for said forming pocket being composed of the upper surface of the top package of a vertical stack of partially formed packages substantially at right angles to said stationary stop.

10. Apparatus for forming a lined package around an article comprising means for holding a paperboard liner and an outer wrapper in superposed relation, means for placing the article in contiguous relationship with respect to the liner, means for clamping the article, liner and wrapper and moving same laterally through an opening thereby folding the liner and wrapper to form three surfaces around the article, said last named means bringing the partially wrapped article to a stationary position in a forming pocket located over a vertically disposed chute containing a plurality of partially formed packages, the

bottom surface of the partially formed package in the forming pocket resting on the top surface of the previously formed package in the vertically disposed chute means for clamping the partially formed packages in the vertically disposed chute, means for folding over the upper end portions of the liner and wrapper in the forming pocket to partially form the fourth surface of the package, a vertical plunger member for moving the partially wrapped article downwardly in the vertically disposed chute so that one edge of the chute folds the lower end portions of the liner and wrapper upwardly into overlapping relationship with the previously folded upper end portions thereby enclosing the article on four sides, means for heat sealing the overlapped portions of the wrapper as it is moved downwardly in the vertically disposed chute, means for forming end tucks and end folds to enclose the article on all sides and means for heat sealing the end folds to complete the package.

11. Apparatus for forming a lined package around an article comprising means for holding a paperboard liner and an outer wrapper in superposed relation, means for moving an article against said liner and wrapper and into a forming pocket disposed over a chute for holding a plurality of partially wrapped articles in a vertical stack, means including a vertical plunger member for concurrently folding the upper and lower trailing sides of the wrapper into superposed relation while moving the partially wrapped article downwardly into said chute so that the article is enclosed on four sides, means for heat sealing the overlapped portions of the wrapper as it moves downwardly, means for forming end tucks at opposite ends of the package, said means including a pair of reciprocating tucking arms near the bottom of said vertical chute for forming one end tuck at each end of the partially wrapped article, means for advancing the partially wrapped article into a folding channel, a pair of folding members in said channel for forming the top and bottom end folds and means beyond said folding members for heat sealing said end folds to complete the package around said article.

12. Apparatus for forming a lined package around an article comprising a frame, a reciprocating feed pusher for moving articles in a horizontal path, means for feeding a superposed liner and wrapper into the path of said feed pusher, a reciprocating support movable in cooperation with said feed pusher when the faces of said feed pusher and said reciprocating support are contiguous to opposite sides of an article and the superposed liner and wrapper blank, means for simultaneously moving said feed pusher and reciprocating support so that the article, liner and wrapper are pushed through an opening in said frame and into a forming pocket thereby folding the liner and wrapper around three sides of the article, said forming pocket being located over a vertically disposed chute containing a plurality of partially completed packages, the bottom surface of said forming pocket being formed by the top surface of the previously formed partially complete package in said vertically disposed chute, a clamp member forming one side of said chute for holding the partially completed packages therein, means including a vertical plunger member for concurrently folding the free ends of the liner and wrapper around the article to enclose the article on four sides while moving the partially wrapped article from the forming pocket downwardly into the vertically disposed chute, means for forming end tucks at opposite ends of the package, said means including a pair of reciprocating tucking arms near the bottom of said vertical chute for forming one end tuck at each end of the partially wrapped article, means for advancing the partially wrapped article into a folding channel, a pair of folding members in said channel for forming the top and bottom end folds thereby completing the package around the article.

13. Apparatus for forming a lined package around an article comprising a reciprocating feed pusher for mov-

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ing articles in a horizontal path, means for feeding a superposed liner and wrapper into the path of said feed pusher so that the article is moved against the superposed liner and wrapper past a stationary tucking blade and into a forming pocket disposed at the top of a vertical chute thereby folding the liner and wrapper around three sides of the article and forming one end tuck at each end of the partially wrapped article, the bottom surface of said forming pocket being formed by the top surface of the previously formed partially complete package clamped in said vertically disposed chute containing a plurality of partially formed packages, a rotary and reciprocating folder for folding the upper trailing panel of the liner and the superposed portion of the wrapper downwardly, means for moving the partially wrapped article down-

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wardly into the upper portion of the vertically disposed chute while simultaneously folding the remaining free ends of the liner and wrapper to enclose the article on four sides and means for tucking and folding the free ends of the wrapper thereby completing the package around the article.

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