

Dec. 2, 1941.

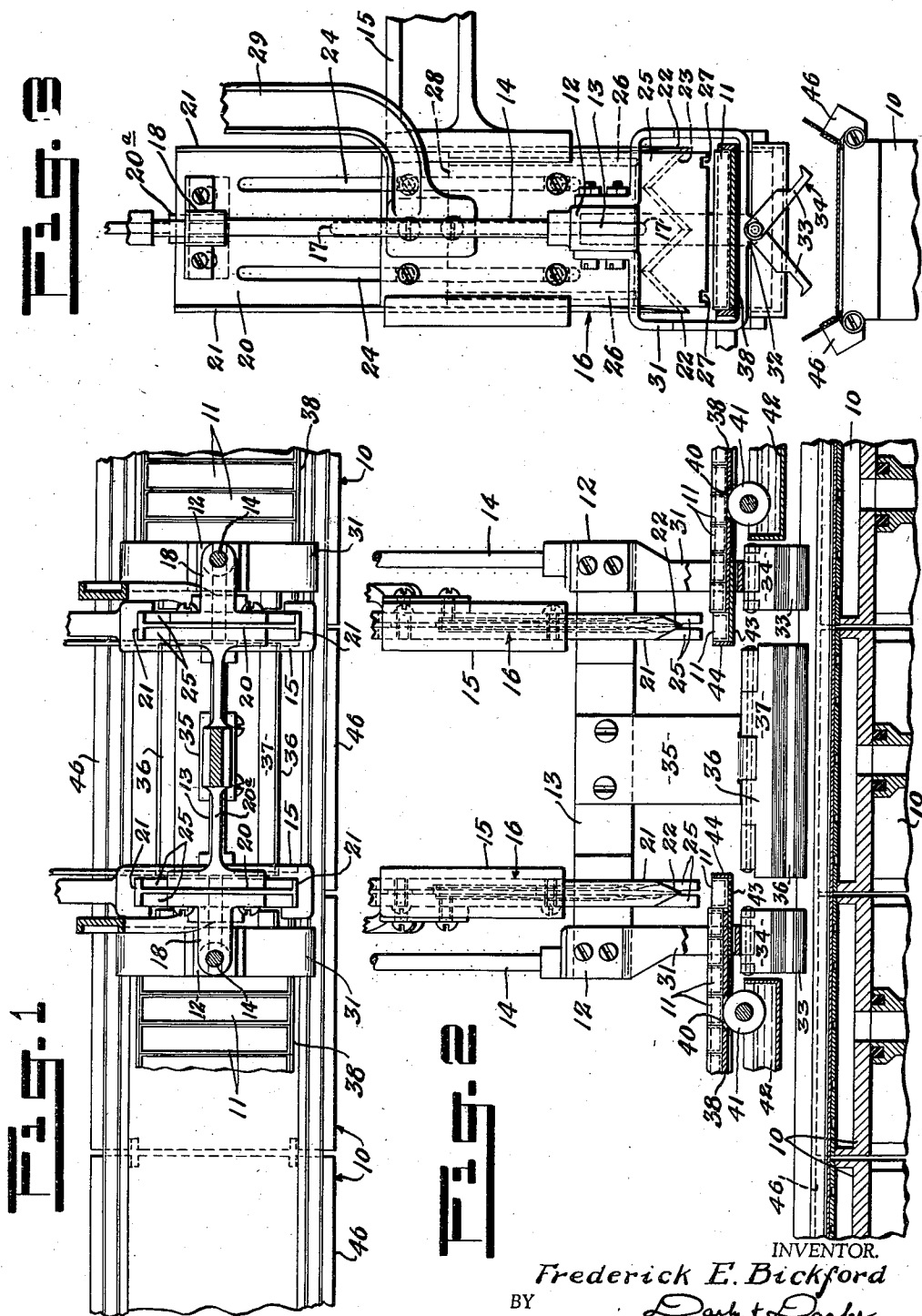
F. E. BICKFORD

2,265,024

PACKAGING MACHINE

Filed Sept. 7, 1940

7 Sheets-Sheet 1



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7 Sheets-Sheet 2

Fig. 4

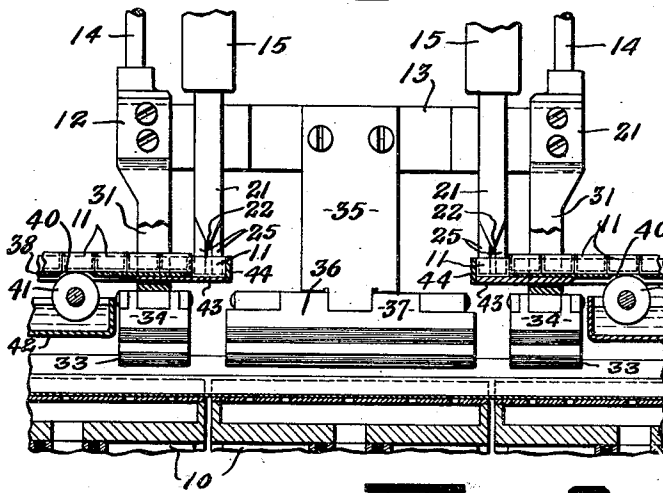


Fig. 5

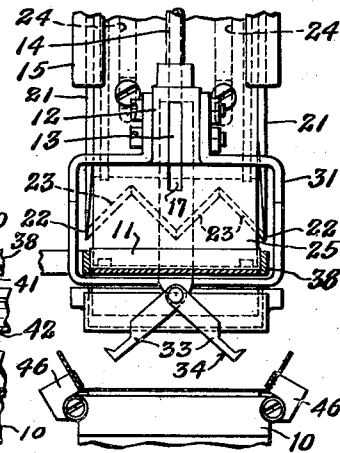


Fig. 6

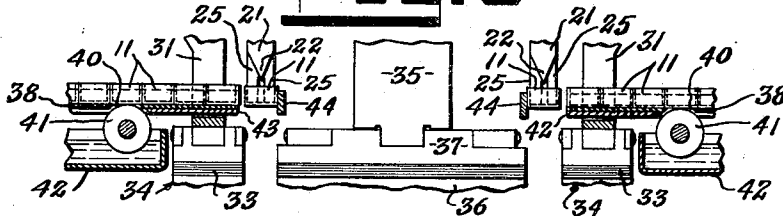


Fig. 7

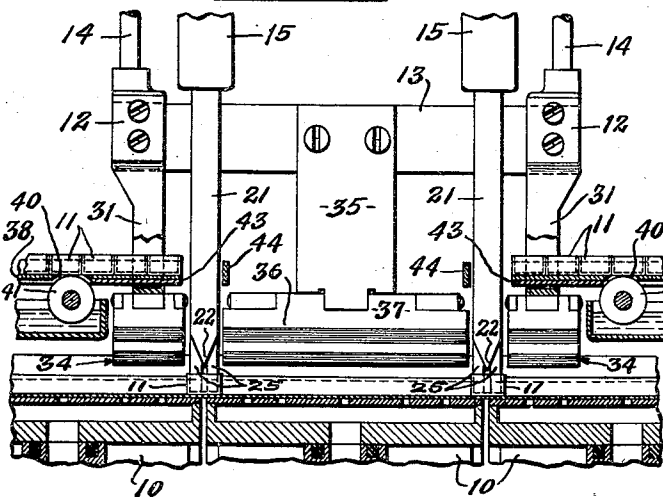
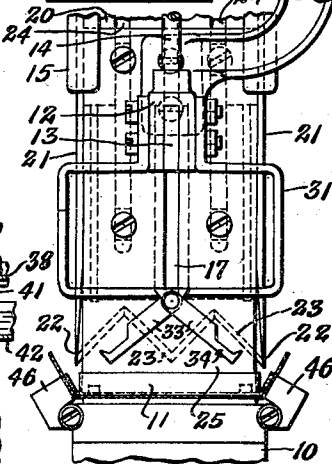


Fig. 8



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7 Sheets-Sheet 3

Fig. 9

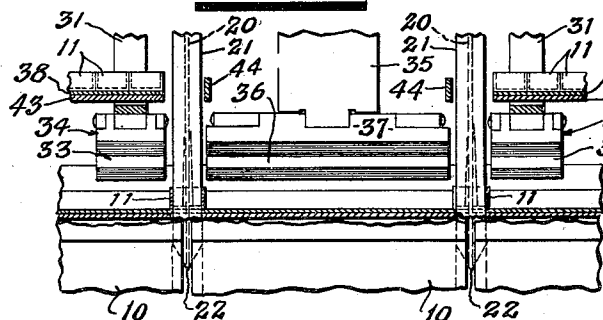


Fig. 10

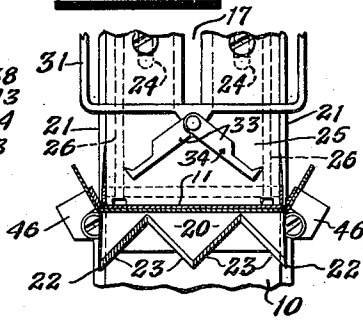


Fig. 11

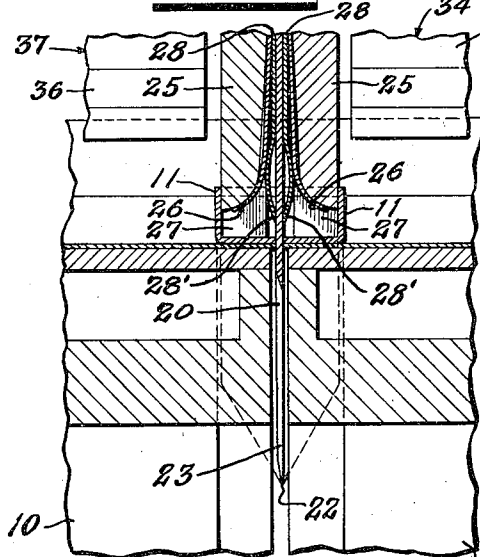


Fig. 13

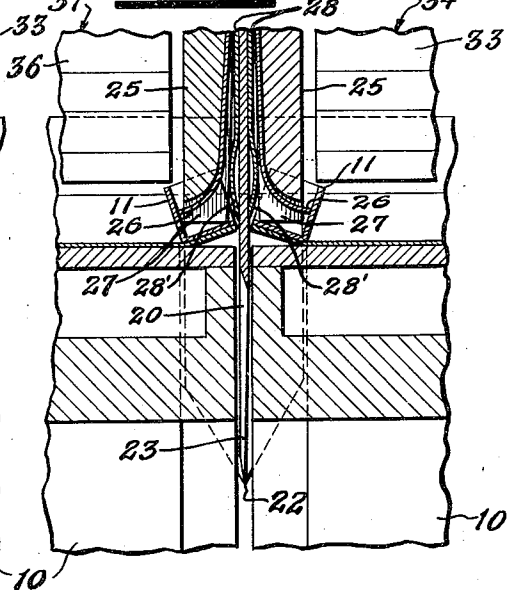
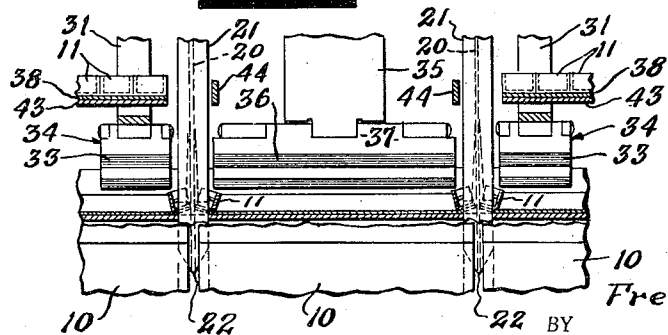


Fig. 12



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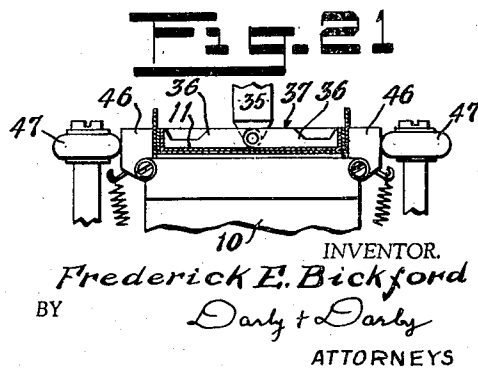
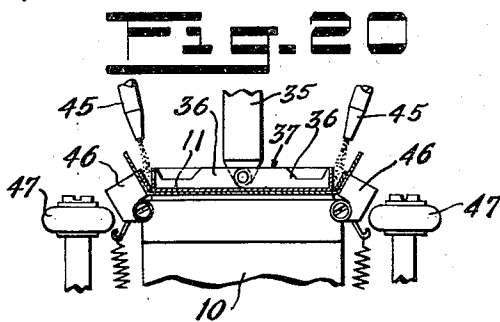
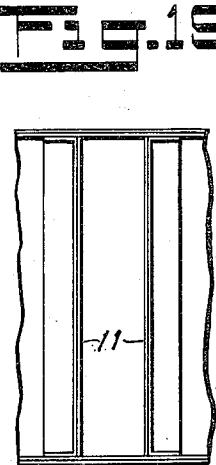
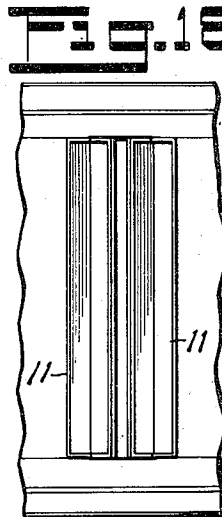
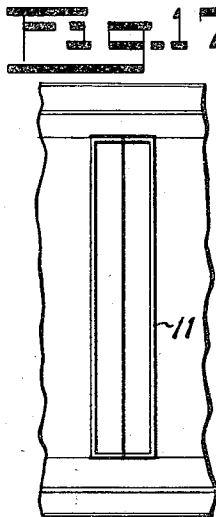
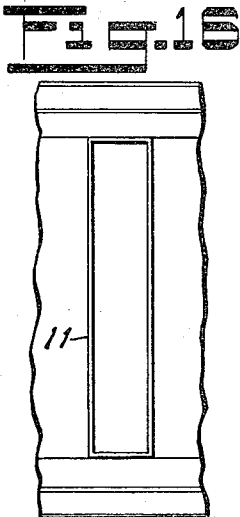
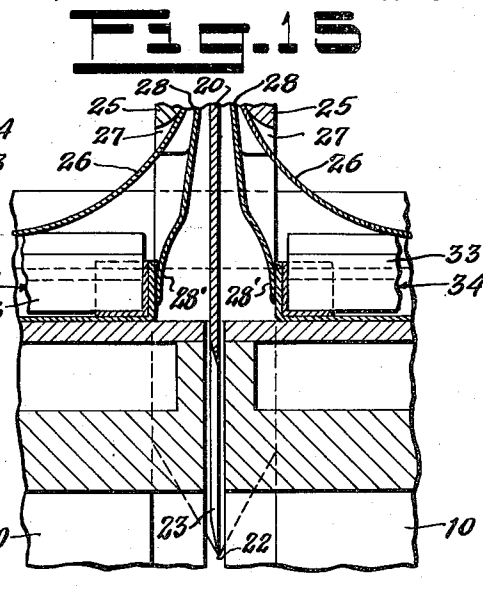
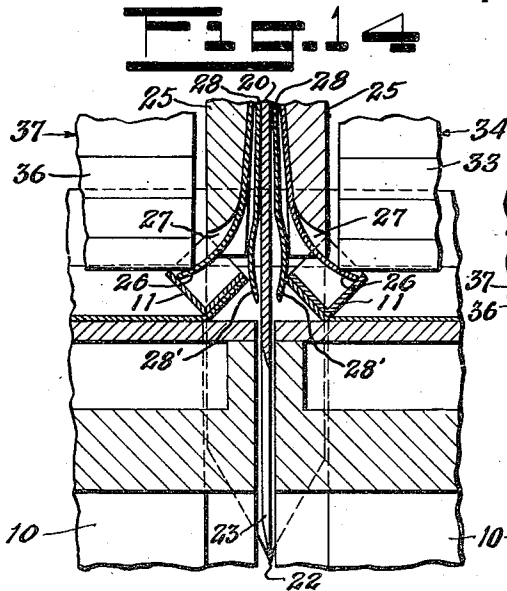
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PACKAGING MACHINE

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7 Sheets-Sheet 4



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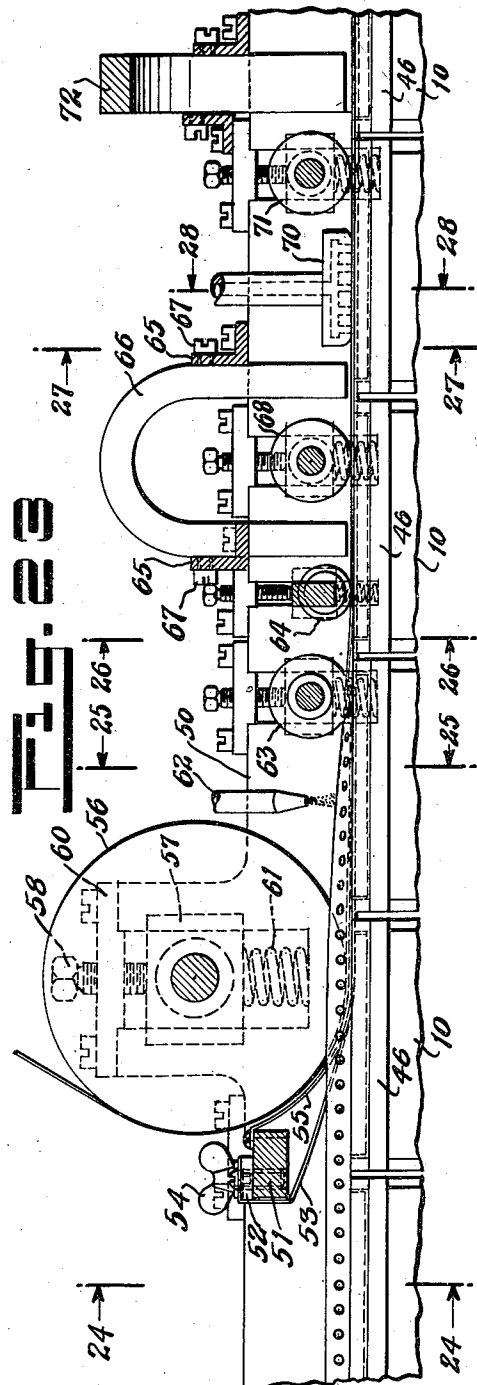
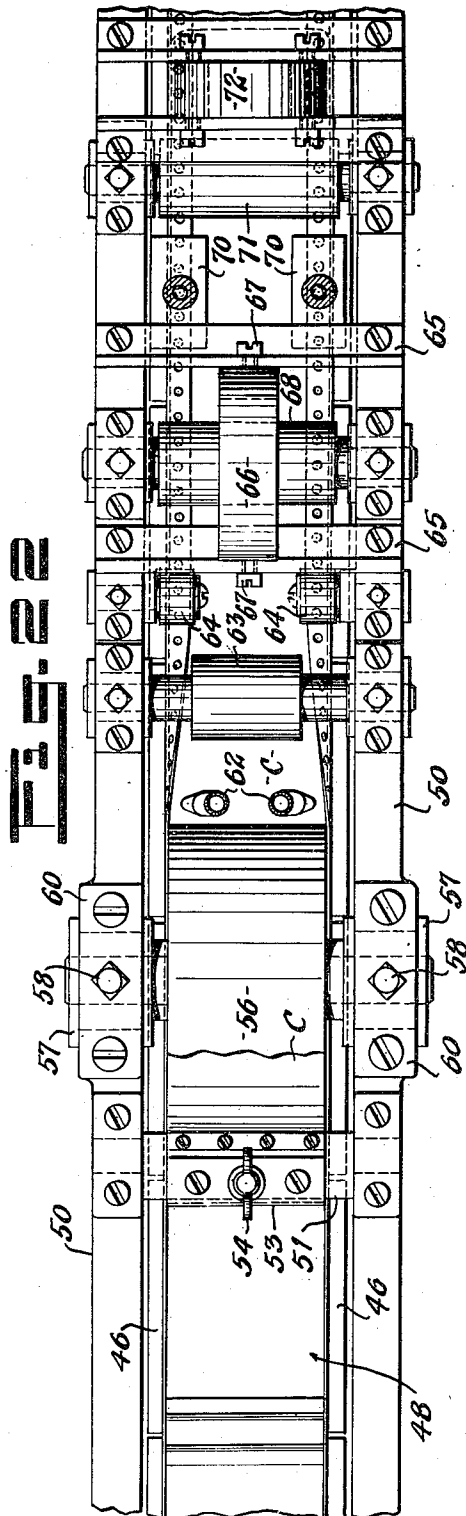
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PACKAGING MACHINE

Filed Sept. 7, 1940

7 Sheets-Sheet 5



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PACKAGING MACHINE

Filed Sept. 7, 1940

7 Sheets-Sheet 6

Fig. 24

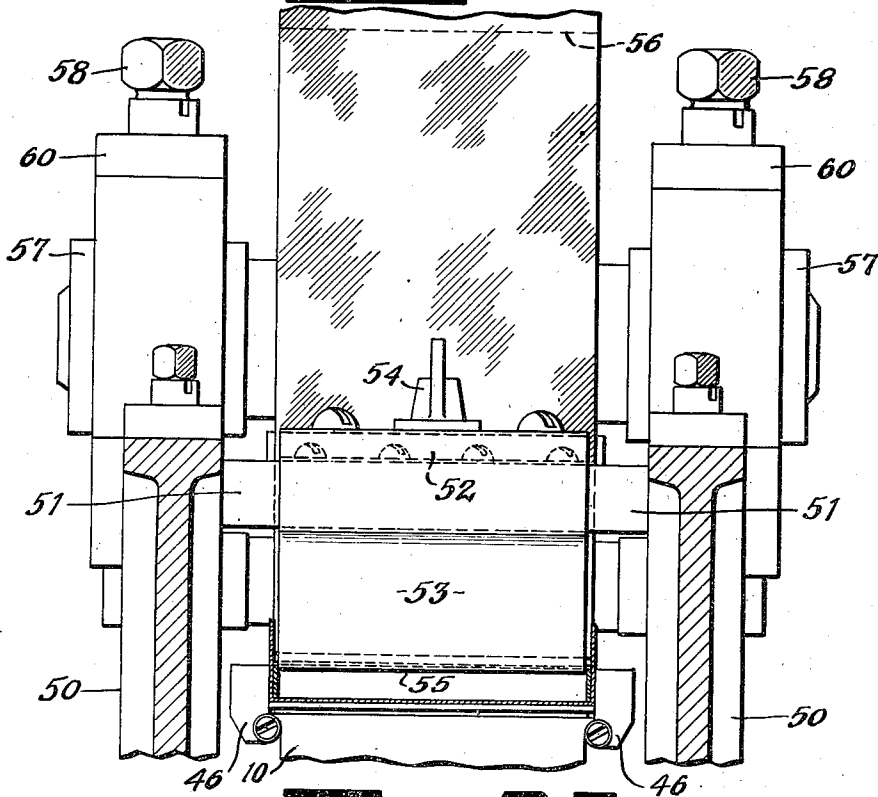
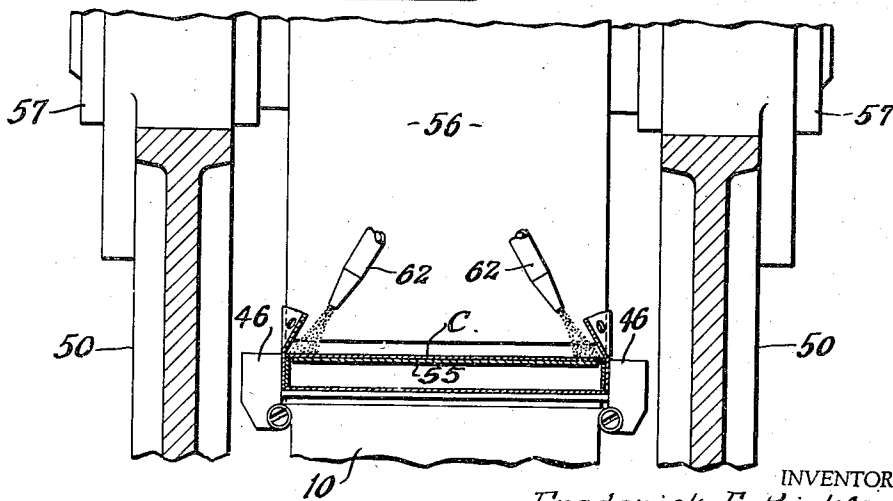


Fig. 25



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PACKAGING MACHINE

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7 Sheets-Sheet 7

Fig. 26

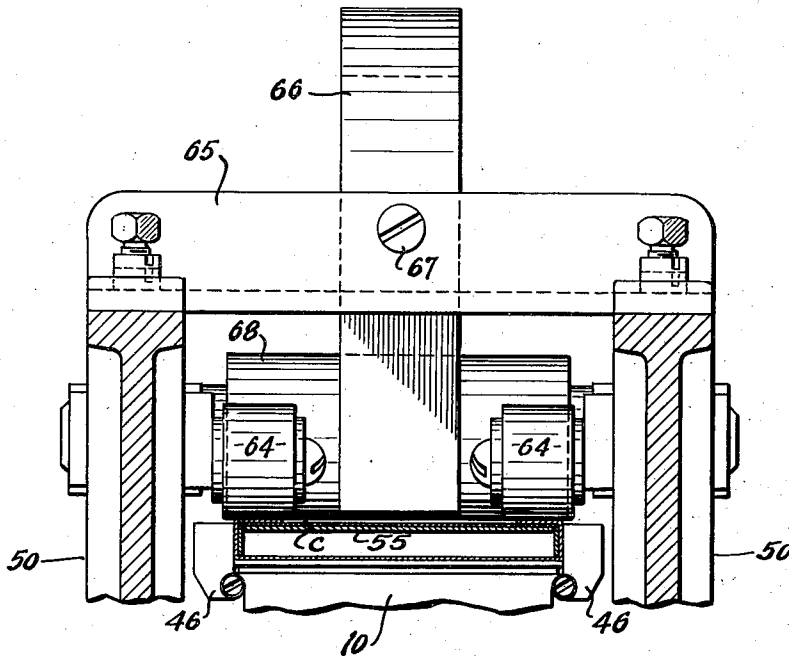
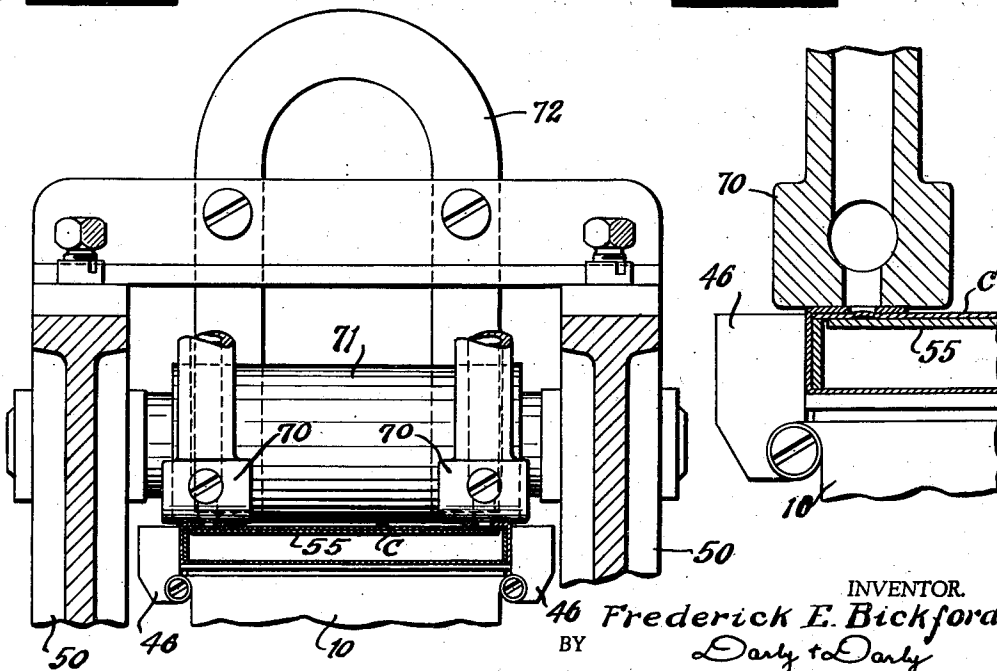


Fig. 27

Fig. 28



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PACKAGING MACHINE

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Application September 7, 1940, Serial No. 355,727

18 Claims. (Cl. 93—3)

The present invention relates to a packaging machine, and particularly to modified mechanisms for use with a machine of the same general type as that of my Patent No. 2,147,632, issued February 21, 1939. The machine as described in that patent formed a package from a sheet of cellulose acetate or other thin flexible material of like character in the following manner.

A sheet of material, the width of which was equal to the width of the base of a package to be formed, plus twice the height of that package, plus a portion to form flaps to which the package top would be fixed, was taken from a reel and passed through a mechanism which caused longitudinal reinforcing strips to be adhered to the original sheet near the margins thereof, specifically at the point where the base and the sides were to join in the final package. Following this, the side portions were turned upwardly at an oblique angle and thereafter transverse reinforcing strips were applied, these strips being applied either before or after the sheet of material was cut intermediate the longitudinal reinforcing strips. Thereafter the reinforced ends of the package were folded up, the longitudinal reinforced sides folded, and corner pieces applied to join the sides and ends to form trays, which trays were joined by the reinforced longitudinal edges.

Following this, the trays were filled and thereafter a cover sheet was placed in register with the succession of trays and the flaps extending from the side pieces were folded over the edges of the covering material and adhered thereto. As a final step the covering material was cut apart intermediate the trays, the flaps thus formed sealed over the tray ends, and the longitudinal strips likewise cut apart and sealed over the tray ends. In some instances the longitudinal strips were cut apart adjacent each tray to form a unit package, whereas in other instances longitudinal strips were merely folded in some instances and cut in others, so that packages of more than unit length were formed.

As stated above, the present invention concerns a machine generally similar to that of the above-mentioned patent, and one which forms a package in a manner generally similar to that mentioned above. The machine and method differ, however, in some respects. The transverse reinforcing strips which are used in the method outlined above are dispensed with and in place thereof small tray-like structures of cellulose acetate or like moulded or stamped ma-

terial are applied to the sheet from which the package is to be formed and caused to adhere thereto. These tray-like structures extend transversely of the sheet, lie between the longitudinal reinforcing strips, and are applied to the sheet at intervals corresponding to the length of a unit package. Immediately after their application these tray-like structures are severed along the center lines thereof and the sheet is incised along the edges of the tray-like structure, or in other words an H-shaped cut is made, the bar of the H being a cut extending through the tray-like structure and the sheet, transversely of the sheet, and the uprights of the H being cuts extending through the sheets alone at the ends of the tray-like structure and adjacent the longitudinal reinforcing strips. Subsequent to this operation the half-trays formed as stated above are rotated about their edges to form ends of the package trays being formed, and thereafter the longitudinal reinforced edges of the sheet are folded upwardly and caused to adhere to the corners formed by the half-trays mentioned. It will be seen that the method of applying this half-tray structure and folding the ends upwardly and adhering them to the sides of the trays replaces the mode previously described of applying transverse reinforcing strips and corners formed therefrom. The mechanism for performing this operation forms a portion of the present invention and will be described in detail hereinafter.

Another difference between the mode of forming a package in the present instance and that described in the above-mentioned patent, lies in the manner of applying the cover sheet to the filled trays. In the former instance this was done by the use of vacuum cups which placed the cover sheet on the filled packages after which the side flaps were bent over and adhered to that cover sheet. In the present instance new mechanism has been devised by means of which the cover sheet is taken from a drum and fed above a spring steel tongue which extends over a number of filled trays. This tongue is held upwardly by magnetic means so that it forms a support against which the side flaps may be folded downwardly and adhered to the edges of the cover sheet. Of course after this adhering of the flaps to the cover sheet has been performed the tongue lies within the package between the articles with which the package is filled and the cover sheet. Thereafter, however, the links of the conveyor chain, similar to those of Patent No. 2,147,632, move the package

(at that time substantially completed and on the tongue) forwardly, sliding the package off the tongue and advancing it to a position at which the cover sheet is severed intermediate the unit packages and the end flaps so formed are folded against the ends of the unit package and adhered thereto. From this point on the operation is the same as that described in the above-mentioned patent.

It is an object of this invention to provide a simple mechanism for applying reinforced ends and corners to a sheet of thin flexible material as a step in the formation of a package.

It is another object of the invention to apply such reinforced ends to two adjacent package units simultaneously in the form of a molded tray and to provide means for cutting this tray to form a reinforced end for each of the two adjacent packages.

It is a still further object of the invention to provide a new mechanism for registering a cover sheet with a filled tray and for adhering the cover sheet to flaps extending upwardly from the sides of the tray.

A still further object of the invention is to provide such a cover sheet registering mechanism in which a flexible spring steel tongue is utilized as a working surface on which the cover sheet and side flaps may be placed together, the tongue being supported solely by magnetic means so that the tongue may lie within the package without interference by any supporting members for the tongue.

It is a still further object of the invention to provide suction means for holding a cover sheet against side flaps extending inwardly over the contents of a tray in order that the cover sheet and the flaps may be smoothly adhered one to the other.

It is a still further object of the invention to provide a link structure on which the package forming sheet is registered and in cooperation with which the various mechanisms operate to form the package, which link structure, while similar to that of the above-mentioned patent, shall be more efficient and less complicated.

Further objects and features of the invention will appear when the following description is considered in connection with the annexed drawings, in which

Figure 1 is a plan view of a mechanism for applying molded plastic tray-shaped reinforcements to a package forming sheet;

Figure 2 is a side elevation of the mechanism of Figure 1, showing the mode of feeding the tray-like reinforcements into position to be lowered onto a package forming sheet and adhered thereto. This figure also shows means for coating the bottom of these tray-like reinforcements with adhesive prior to their being moved into position on the sheet and in addition shows the form of the links of the conveyor chain. In addition, the figure shows templet means for defining and registering the edges of the container or tray to be formed and against which the reinforced sides and ends of the sheet may be folded to form a tray. Further, this drawing shows means for severing the tray-like reinforcements along their center lines and for folding the half-trays thus formed upwardly to become reinforced ends of the package tray being formed;

Figure 3 is an end elevation of the mechanisms of Figures 1 and 2;

Figure 4 is a view similar to Figure 2, showing

the positions of the parts of the mechanisms after operation through the first part of their cycle;

Figure 5 is a view similar to that of Figure 3, showing the mechanisms in the same positions as shown in Figure 4;

Figure 6 is a fragmentary view similar to Figure 4 showing the positions of the parts of the mechanisms after another step of operation subsequent to the position occupied by these parts in Figure 4;

Figure 7 is a side elevation generally similar to Figure 2 showing the positions of the parts after a still further step of operation in which the tray-like reinforcements have been positioned on their sheet of package forming material and caused to adhere thereto;

Figure 8 is an end elevation showing the parts of the mechanisms in the same relation as in Figure 7;

Figure 9 is an additional side elevation, likewise similar to Figure 2, but showing the parts after a further step of operation during which the tray-like reinforcements and the package forming sheet have been cut with an H-shaped incision, as was described hereinabove;

Figure 10 is an end elevation showing the parts in the same position as that which they occupied in Figure 9;

Figure 11 is an enlarged detail view of a part of the mechanism of Figures 2 through 10, showing how the cut reinforcing tray is rotated about its edge and the end portion of the package forming sheet is folded inwardly to become end reinforcements for adjacent ends of two packages;

Figure 12 is a side elevational view of the same mechanism as that described above in connection with Figures 1 through 10, showing, in addition to the folding members of Figure 11, the cooperation of these members with certain templates to cause the reinforcing ends to be correctly positioned against the package forming sheet;

Figure 13 is a view similar to Figure 11 showing the parts in an advanced step of operation from that shown in Figure 11. This view shows to an enlarged scale the same stage of operation as is depicted in Figure 12;

Figure 14 is a view similar to Figure 13 showing the folding of the reinforcing end pieces into position, this view showing the parts at a stage later than that of Figure 13;

Figure 15 is a view similar to Figure 14 showing the final step for folding the reinforcing ends into position and showing the parts of the mechanism in positions which they occupy at this final step;

Figures 16, 17, 18 and 19 show four stages in the application of the reinforcing tray to the package forming sheet and the further operations thereupon;

Figure 16 shows in fragmentary plan view the appearance of a sheet with the longitudinal reinforcing strips applied thereto, and with the reinforcing tray likewise applied thereto. In brief, this view shows the sheet as it would appear immediately after the operation illustrated in Figures 7 and 8;

Figure 17 shows the appearance of the sheet after the next operation or in other words after the performance of the operation indicated in Figures 9 and 10;

Figure 18 is a plan view showing the sheet after the following operation, that is, as it would look after the operation shown in Figure 14;

Figure 19 is a plan view of a sheet showing the ends of two adjacent packages after the half-

tray reinforcements have been folded to their final positions. This showing is illustrative of the condition after the performance of the operation shown in Figure 15;

Figure 20 is a fragmentary view of one of the links of the chain with a partially formed tray thereon, that is, a tray having the end portions folded up into the position shown in Figure 19. This view shows particularly the spraying of adhesive against the longitudinal reinforced side wall portions of the tray and the folding of those side wall portions against a templet inserted in the tray to cause the reinforced ends and the adjacent side walls to be fastened. The view, of course, shows also the mechanism for causing the folding up of the side wall portions;

Figure 21 is a view similar to Figure 20 showing the side wall portions in their final vertical position;

Figure 22 is a plan view of mechanism for placing a cover sheet about a package and supporting it in this position and for folding the cover tabs over the cover portion and adhering the tabs to the cover. This view also shows a position or station, preceding the folding mechanism, at which the tray may be filled;

Figure 23 is a side elevation of the mechanisms of Figure 22;

Figure 24 is an enlarged detail cross-sectional view, the section being taken on the plane of the line 24-24 of Figure 23;

Figure 25 is an enlarged detail cross-sectional view, the section being taken on the plane of the line 25-25 of Figure 23;

Figure 26 is an enlarged detail cross-sectional view, the section being taken on the plane of the line 26-26 of Figure 23;

Figure 27 is an enlarged detail cross-sectional view, the section being taken on the plane of the line 27-27 of Figure 23; and

Figure 28 is an enlarged, fragmentary, cross-sectional view showing a vacuum shoe for causing intimate contact of the cover sheet and cover flaps. This view is taken on the plane of the line 28-28 of Figure 23.

The material from which the bottom of the tray portion of the package is to be formed is supplied with longitudinal reinforcing strips in the same manner as in Patent No. 2,147,632, the sheet, therefore, being creased at the inner margins of the reinforcing strips, likewise in the same manner as shown in the patent mentioned.

After these operations have been performed, the material is fed to the links 10 of a chain which is in general similar to the moving chain of the above-mentioned patent. The links differ somewhat, however, in that whereas in the patent mentioned these links were provided at their ends with mechanism for folding the package ends upwardly and with slidable members acting as anvils for cutting and applying reinforcing cross-strips, in this instance these mechanisms and members are unnecessary and the links are formed with solid ends along the edges of which cutting occurs, only the central portion being equipped with passageways for vacuum registration of material on the links. It should also be mentioned at this time that in utilizing the mechanisms of this invention the chain is given an intermittent motion, whereas in general in the patent mentioned it was contemplated that the chain should have a continuous motion.

After the material has been fed to the chain links, and registered in proper position thereon by the application of vacuum through the pas-

sage of the links, the links are advanced to a position such as that shown in Figures 1 and 2 in which each of three links lying beneath the mechanism for applying reinforcing ends to the tray-shaped bottom of the package has sheet material thereon.

With the links stationary in the position specified, reinforcing tray-like members 11 are applied to the sheet between the first and second, and the second and third links. The mechanism for performing this operation is shown in Figures 1, 2 and 3, and comprises a pair of yokes 12 between which extends a bar 13. Each of the yokes 12 has attached thereto an actuating rod 14, these rods extending upwardly and being guided at their upper ends in a manner to be later described.

Spaced inwardly from the yokes 12 are supporting members 15 which serve as guide-ways for the tray lowering and folding members, generally designated 16. Extending through these tray lowering and folding members 16 are slots 17 through which the bar 13 previously described passes. Fastened to member 16 are guiding members 18 for the rods 14 so that the slots 17 and guides 18 together guide the bar 13 for vertical reciprocation.

Each tray lowering and folding member 16 comprises a plate 20 having narrow flanges 21 at both sides thereof and extending in both directions, forming what amounts to an H-shaped member. The ends of the flanges 21 of plate 20 terminate in points 22 which are sharpened and which serve to cut the sheet at the proper time, as will be later described. Likewise the bottom edge of plate 20 is formed with teeth 23 which are sharpened and which serve to cut the reinforcing member 11, as will also be later described.

Plate 20 is provided with slots 24, through the outer ones of which extend screws which couple two tray inserting plates 25. Fastened to the plate 20 are four flat springs 26, these springs being fixed to the plate 20 at their upper ends only and being located one on either side of each face of plate 20. The tray inserting plates 25 are grooved opposite the springs 26 so that the springs may slide within the grooves in a manner which will be described hereinafter. At the lower end of each groove each plate 25 is notched, as shown at 27, for a purpose which will become apparent when the operation of the mechanism is described.

Fastened to either face of plate 20 is a rectangular piece of resilient material 28 (see Figures 11, 13, 14 and 15) each of which is bowed outwardly at its lower extremity, as indicated at 28'. This rectangular sheet 28 is provided with three slots similar to the slots 24 so that the screws holding two plates 25 together extend likewise through the pieces 28. Fixed to the outer one of each pair of tray inserting plates 25 is an arm 29 which serves to reciprocate the plates 25 and also plate 20 in a manner which will be described hereinafter.

Fastened to each yoke 12 is a pair of U-shaped members 31 which meet at point 32 and form a support for a hinge to which are attached the two halves 33 of a templet 34, each of these templets being relatively short in the direction of the chain of links 10. Fixed to the bar 13 at the center thereof is a supporting bar 35 which extends downwardly and supports a hinged rod 36 on which two halves 36 of a templet 37 are sup-

ported. Templet 37 is generally similar to templets 34 but is of considerably greater length since this templet is to be inserted within and to completely occupy a package forming tray, whereas the short templets merely occupy the ends of package forming trays.

Extending through the space formed by each pair of U-shaped members 31 is a channel member 38 on which the tray-like end reinforcing members, which are molded plastic material, are placed and fed into the position to be operated upon by the mechanism previously described. Each of these channels 38 is slotted at 40 to provide space for a portion of the periphery of a roller 41, which rollers serve to apply adhesive to the bottoms of the tray-like members 11. Lying beneath each roller 41 in position such that the rollers may dip into adhesive contained therein, is an adhesive container 42. At the end of each channel 38 is provided a slide 43 which in its normal position lies against a stop 44 and directly beneath a member 16. These slides may be reciprocated so that they move out of the path of member 16 by any suitable mechanism.

With the above description in mind, the operation of the mechanisms in converting the longitudinal reinforced sheet of thin flexible material into a tray-shaped bottom for a package will be described. As stated above, the sheet lies on three adjacent links 10 of a chain, having been placed in this position by proper operation of the mechanism unnecessary to describe.

With the sheet in this position and with plastic trays 11 in position on the channels 38 and slides 43, as shown in Figure 2, arms 29 are lowered under the control of proper timing mechanism to the position shown in Figure 4, in which each pair of plates 25 lies within a plastic tray 11. Shortly after this, the slides 43 are moved from position under the trays so that each of two trays is supported solely by a pair of plates 25, as indicated in Figure 6.

Immediately after the removal of the slides 43, as described, arms 29 are further lowered to the position shown in Figures 7 and 8, in which a tray 11 is placed upon the sheet of material immediately above the anvil extensions of the first and second, and second and third, of the three links 10 of the chain. Shortly after this, the plates 20 are lowered under control of their actuators 20a (see Figure 1), the sharpened edges thereof cutting through the centers of the tray-like members 11 and perpendicularly to these cuts, also through the sheet. In other words, the trays 11 are cut in half and the sheet is incised in an H-shape, beneath each member 11. The position of the parts subsequent to the performance of this action is shown in Figures 9 and 10.

Immediately after this, actuating arms 29 are raised, thereby sliding plates 25 upwardly with respect to plates 20, the latter plates remaining stationary. As this occurs, the springs 26 which normally lie beneath the plates 25 and pressed against the plates 20 are released as shown in Figure 13, so that their ends press against the upstanding sides of the halves of members 11 to rotate and take the position shown in Figure 13. It will be noted by reference to Figure 13 that when the halves of members 11 have been rotated as described their upper edges lie within the projection of the edges of templets 34 and 37.

At this time, while the plates 25 continue their upward movement, actuating rods 14 are moved downwardly to lower templets 34 and 37. The

templets in their downward movement carry with them the halves of members 11 which rotate about their edges as indicated in Figures 12 and 13 and come to the position shown in Figures 12, 13 and 14, and come to the position shown in Figure 15. Meanwhile, as indicated in Figures 14 and 15, the plates 15 have continued to rise, thus releasing resilient members 28, which members press against the edges of the halves of plastic trays 11, or more exactly against the edges of the sheet adhered thereto, and aid the templets in rotating these halves in the position shown in Figure 15.

At this time a sheet has had applied to it a tray, in the manner shown in Figure 16, which tray and sheet have been cut with an H-shaped cut, as indicated in Figure 17, after which the half-trays have been rotated about their lower edges, as shown in Figure 18, under action of the springs 26, and finally under action of springs 28 and templets 34 and 37 the ends have been folded up as shown in Figure 19.

With the templets still within the partially formed package trays and with the springs 28 holding the half-trays 11 against the templet, thus properly registering the ends for the adherence of the side strips, adhesive material or solvent for the sheet and trays 11 is sprayed between the longitudinal reinforcing strip and the corners of members 11, as shown in Figure 20, this adhesive being discharged from nozzles such as those shown at 45 in Figure 20. Immediately after this, the hinged sides 46 of links 10 are rotated inwardly under control of the actuators 47, thereby causing the longitudinal edges of the packages to be adhered to the corners of members 11.

By reference to Figures 1, 2 and 3, it will be seen that the material on the center link is formed into a complete tray while that on each of the two outside links is formed into a single ended tray. In the next movement of the links they will be advanced through two link lengths so that the tray having its forward edge previously formed will be in a position to have its rear edge formed. This results in the formation of two complete trays at one operation.

After the formation of a tray it is advanced to a position such as that shown at the left in Figure 22, at which the tray is filled either automatically or manually as the case may be. The following mechanism forms no part of this invention and has, therefore, not been shown, the only showing being that of a position or station designated 48 at which filling may occur.

Figures 22 and 23 illustrate the mechanism for applying a cover sheet to the filled package. It is to be understood, however, that the filling station may be omitted and packages formed in the manner about to be described which are filled subsequently. The mode of operation of the mechanism of Figures 22 and 23 is the same whether the package is to be covered after filling or whether the package is to be substantially complete before filling. This mechanism consists generally of side frames 50, one extending longitudinally of the link chain on either side thereof, these side frames serving to support various rollers and other mechanisms which will shortly be described.

Extending between the side frames 50 at the left of that portion of the frame shown in Figures 22 and 23 is a bar 51, on which is pivotally mounted a second bar 52, to which is fixed a spring steel tongue 53, the position of the bar

52 and consequently of the tongue 53 being pivotally adjusted with respect to the longitudinal axis of the side bars 50 by means of the wing nut 54.

Likewise mounted on the bar 51 is a second spring tongue 55, this latter tongue being curved and slightly spaced from the under-surface of a drum 56. This drum 56 is mounted in bearing blocks 57 which are vertically adjustable by means of an adjusting screw 58 threaded through bearing caps 60 extending across upward extensions of the side frames 50. Each bearing block 57 is mounted in grooves in these upward extensions of the side frames 50, and is pressed upwardly by coil spring 61, being, as was previously mentioned, adjusted as to its vertical position by means of the adjusting screw 58.

To the right of the drum 57 as viewed in Figures 22 and 23, there are supplied a pair of nozzles 62 directed toward the marginal portions of the tongue 53 and consequently toward the marginal portions of the cover sheet C, as will be explained. To the right of these nozzles and supported in bearings vertically adjustable in the side frames 50 is a roller 63, the shaft of which extends in each direction and is supported in the bearings as mentioned. Roller 63 is of sufficient width to press against the central portion of the cover sheet only and not against the marginal edges. The bearing structure and mode of vertical adjustment of this roller is exactly similar to that for drum 56, and consequently will not be described in detail.

To the right of the roller 63, two rollers 64 (Figures 23 and 26) are supplied, one mounted in a bearing in each of the side frames 50. These rollers are vertically adjustable in the same manner as is roller 63 but each is mounted on a stub shaft and each roller is of sufficient width to make contact with the marginal portions of the cover sheet only.

Lying to the right of the rollers 64 are two bars 65 which extend from one side frame 50 to the other, and which serve as supports for a horse-shoe magnet 66 which is fixed to the bars 65 near the center thereof by means of the screws 67. This magnet may be a permanent magnet or may be an electromagnet, as is desirable. As has been indicated hereinabove, the magnet serves the purpose of pulling the tongue 53 upwardly thereby exerting pressure against the various rollers, such as 63 and 64, and others to be hereinafter described.

Mounted between the legs of the magnet 66 and supported in the same manner as roller 63 is a roller 68, which roller is the full width of the cover sheet and which serves to press the cover sheet down against the cover flaps of the sides of the package, and to bring about a smoothing of the flaps and cover and perfection of the joint formed between these members.

The arrangement of the magnet and of the roller 68 is shown in Figures 22, 23 and 26. Further to the right there are supplied two vacuum shoes 70. These shoes are supplied with a number of holes through which suction is applied through the holes in the flaps to the cover sheet C; due to this, the cover sheet and cover flaps are caused to come into intimate contact with each other to assure perfect adhesion of the one to the other. Moreover, any excess of adhesive is drawn away through the suction shoes, although it is to be understood that, generally speaking, there will be no such excess since the preferred adhesive is in reality a solvent for the cellulose acetate of

the packaging material and is furthermore a solvent which evaporates without residue.

Still further to the right is an additional roller 71, which is identical with the roller 70, and is mounted in identically the same manner and which serves the purpose of retaining the cover flaps and cover sheet in intimate contact during the time while the adhesive or solvent is setting. To the right of this roller is a magnet 72, similar to the magnet 66 but shown as mounted at right angles to the former magnet, although in a similar manner. The magnet serves the same purpose as magnet 66, that is, serves to hold the spring steel tongue 53 upwardly and press it against the roller 71 to make that roller effective for its purpose as described above.

It will be seen that the mechanism just described serves to lay a cover sheet on the steel tongue 53; to bend the cover flaps of the side of the packages over this cover sheet after applying adhesive or solvent to the cover flaps; and to adhere the cover flaps to the sheet. At this stage, therefore, a package is formed which is filled with the articles desired to be packaged and is complete except that the successive packages are joined to each other by the cover sheet by reinforced side strips. The cover sheet and these side strips are cut apart by any suitable mechanism after the removal of the packages from the links 10 and the cover sheet ends adhered to the package ends, and since the mechanism for accomplishing this may be of any type, and since these operations may be performed manually, no mechanism is shown in connection therewith.

From the above description it will be apparent to those skilled in the art that the various features of novelty comprising this invention are subject to variation without departure from the novel scope of this invention. I do not, therefore, desire to be strictly limited to the disclosure as given for purposes of illustration, but rather to the scope of the claims granted me.

What I claim is:

1. In a device for forming packages of thin flexible material, in combination, means for feeding a continuous sheet of thin flexible material, means for feeding tray-like structures to position adjacent to but out of contact with said sheet, means for applying adhesive to said tray-like structures, and means for moving said tray-like structures into contact with said continuous sheet with the applied adhesive against the sheet.

2. In a device for forming packages of thin flexible material, in combination, means for feeding a sheet of thin flexible material, means for feeding tray-like structures to position adjacent to but out of contact with said sheet, means for applying adhesive to said tray-like structures, means for moving said tray-like structures into contact with and extending transversely of said sheet at spaced intervals therealong, and means for severing the tray-like structures along their center lines.

3. In a device for forming packages of thin flexible material, in combination, means for feeding a sheet of thin flexible material, means for feeding tray-like structures to position adjacent to but out of contact with said sheet, means for applying adhesive to said tray-like structures, means for moving said tray-like structures into contact with and extending transversely of said sheet at spaced intervals therealong, means for severing the tray-like structures along their center lines, and simultaneously incising said sheet in H-shapes, the bars of the H's lying beneath

the cuts in said tray-like structures, the legs thereof being at the ends of said tray-like structures.

4. In a device of the class described, in combination, means for feeding a sheet of cellulose acetate, means for positioning tray-like reinforcing members transversely of said sheet at spaced intervals and causing them to adhere thereto, means for severing said trays to form half-trays and for simultaneously incising said sheet along the center lines of said trays and at the ends thereof, and means to rotate said half-trays about their edges to form ends and corners for packaging trays.

5. In a device of the class described, in combination, means for feeding a sheet of cellulose acetate, means for positioning tray-like reinforcing members transversely of said sheet at spaced intervals and causing them to adhere thereto, means for severing said trays to form half-trays and for simultaneously incising said sheet along the center lines of said trays and at the ends thereof, means to rotate said half-trays about their edges to form ends and corners for packaging trays, and means to fold the sides of said sheet upwardly to form sides for said packaging trays.

6. In a device of the class described, in combination, means for feeding a sheet of cellulose acetate, means for positioning tray-like reinforcing members transversely of said sheet at spaced intervals and causing them to adhere thereto, means for severing said trays to form half-trays and for simultaneously incising said sheet along the center lines of said trays and at the ends thereof, means to rotate said half-trays about their edges to form ends and corners for packaging trays, means to fold the sides of said sheet upwardly to form sides for said packaging trays, and means to cause said sides to be adhered to said corners formed by said reinforcing half-trays.

7. In a device of the class described, in combination, means comprising vacuum supplying links for intermittently feeding a sheet of cellulose acetate or the like having longitudinal reinforcing strips thereon, means for feeding tray-like reinforcing members to position above the space between links, a plunger operable in timed relation to said feeding means to move said tray-like structures into contact with said sheet, and a knife slidable within said plunger and operable to sever said tray-like structures and to incise the sheet with an H-shaped cut following the placing of said structures.

8. In a device of the class described, in combination, means comprising vacuum supplying links for intermittently feeding a sheet of cellulose acetate or the like having longitudinal reinforcing strips thereon, means for feeding tray-like reinforcing members to position above the space between links, a plunger operable in timed relation to said feeding means to move said tray-like structures into contact with said sheet, a knife slidable within said plunger and operable to sever said tray-like structures and to incise the sheet with an H-shaped cut following the placing of said structures, templets mounted adjacent said knife and plunger structures and operable to define the base of a packaging tray, means included in said plunger for causing said tray-like reinforcements to rotate about their edges, and means to lower said templets upon said sheet to aid in said rotation of said rein-

forcements and to form stops for the rotation by said plunger means.

9. In a device of the class described, in combination, means comprising vacuum supplying links for intermittently feeding a sheet of cellulose acetate or the like having longitudinal reinforcing strips thereon, means for feeding tray-like reinforcing members to position above the space between links, a plunger operable in timed relation to said feeding means to move said tray-like structures into contact with said sheet, a knife slidable within said plunger and operable to sever said tray-like structures and to incise the sheet with an H-shaped cut following the placing of said structures, a block mounted within said plunger means and slidable with respect thereto, resilient means mounted on said block, said resilient means being normally within said plunger means but released therefrom by movement of said block with respect to said plunger, and means for causing movement of said block following the movement of said plunger and knife to cause said resilient means to be extended to cause rotation of said half-tray reinforcements about their edges.

10. In a device of the class described, in combination, means comprising vacuum supplying links for intermittently feeding a sheet of cellulose acetate or the like having longitudinal reinforcing strips thereon, means for feeding tray-like reinforcing members to position above the space between links, a plunger operable in timed relation to said feeding means to move said tray-like structures into contact with said sheet, a knife slidable within said plunger and operable to sever said tray-like structures and to incise the sheet with an H-shaped cut following the placing of said structures, a block mounted within said plunger means and slidable with respect thereto, resilient means mounted on said block, said resilient means being normally within said plunger means but released therefrom by movement of said block with respect to said plunger, means for causing movement of said block following the movement of said plunger and knife to cause said resilient means to be extended to cause rotation of said half-tray reinforcements about their edges, hinged templets mounted adjacent said knife and plunger structures, and means to lower said templets upon said sheet to define the ends of packaging trays, said means being timed to lower said templets during the rotation of said reinforcements to thereby aid in such rotation.

11. In a device of the class described, in combination with means for forming packaging trays, means for applying a cover sheet to said trays, said means comprising means for feeding said cover sheet into position above a succession of said trays, means underlying said sheet for supporting said sheet over said succession of trays, means for folding side flaps of said trays over the edges of said cover sheet and said supporting means, and means for pressing said flaps against said cover sheet while supported by said supporting means and for causing said flaps to adhere to said cover sheet.

12. In a device of the class described, in combination with means for forming packaging trays, means for applying a cover sheet to said trays, said means comprising means for feeding said cover sheet into position above a succession of said trays, means underlying said sheet for supporting said sheet over said succession of trays, means for folding side flaps of said trays over the

edges of said cover sheet and said supporting means, means for pressing said flaps against said cover sheet while supported by said supporting means and for causing said flaps to adhere to said cover sheet, and means for removing said covered packaging trays from said supporting means.

13. In a device of the class described, in combination with means for forming packaging trays, means for applying a cover sheet to said trays, said means comprising a drum, means for feeding a cover sheet around said drum and into position above a succession of said trays, a resilient member supported adjacent said drum and extending over a plurality of said trays, pressure applying members for folding side flaps of said trays over said sheet and said supporting member, and magnetic means for holding the portions of said member remote from said support in position with said cover sheet and said side flaps pressed against said pressure applying means.

14. In a device for applying a cover sheet to packaging trays, in combination, a guiding drum, a cover sheet guided by said drum to position above a succession of said packaging trays, a resilient member supported adjacent said drum and extending above a succession of said trays, pressure rollers mounted above said resilient member in position to make contact with the material thereon, means for applying adhesive to cover flaps of said packaging trays, means including certain of said pressure rollers for folding said flaps over the edges of said resilient member and said cover sheet and causing them to adhere to said cover sheet, and magnetic means positioned above the portions of said resilient member remote from said support for holding said member against said pressure rollers.

15. In a device for applying a cover sheet to packaging trays, in combination, a guiding drum, a cover sheet guided by said drum to position above a succession of said packaging trays, a resilient member supported adjacent said drum and extending above a succession of said trays, pressure rollers mounted above said resilient member in position to make contact with the material

thereon, means for applying adhesive to cover flaps of said packaging trays, means including certain of said pressure rollers for folding said flaps over the edges of said resilient member and said cover sheet and causing them to adhere to said cover sheet, magnetic means positioned above the portions of said resilient member remote from said support for holding said member against said pressure rollers, and means for removing said covered packaging trays from said resilient member.

16. In a device of the class described, in combination with means for forming packaging trays, means for applying a cover sheet to said trays, said means comprising means for positioning a cover sheet above a plurality of said trays, means underlying said cover sheet for supporting said cover sheet, means for turning flaps of said trays over the edges of said sheet and said supporting means and causing adhesion of said tray flaps to said cover sheet, and vacuum links carrying said trays, said links being movable beneath said supporting means and beyond the end thereof whereby said covered packaging trays are removed from said supporting means.

17. In a mechanism for applying cover sheets to packaging trays having perforated cover flaps, in combination, means for applying adhesive to said flaps, means for turning said flaps over a cover sheet and adhering them thereto, and vacuum means for cooperating with said perforations to evacuate the space between said flaps and said cover sheet and assure intimate contact and proper adhesion thereof.

18. In a mechanism for applying cover sheets to packaging trays having perforated cover flaps, in combination, means for applying adhesive to said flaps, means for turning said flaps over a cover sheet and adhering them thereto, and vacuum means for cooperating with said perforations to evacuate the space between said flaps and said cover sheet and assure intimate contact and proper adhesion thereof, said vacuum means also serving to remove excess adhesive.

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