

- [54] **PACKAGING APPARATUS AND METHOD**
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[51] Int. Cl. **B65b 63/04**
[58] Field of Search **53/21 R, 21 FW, 116, 53/117**

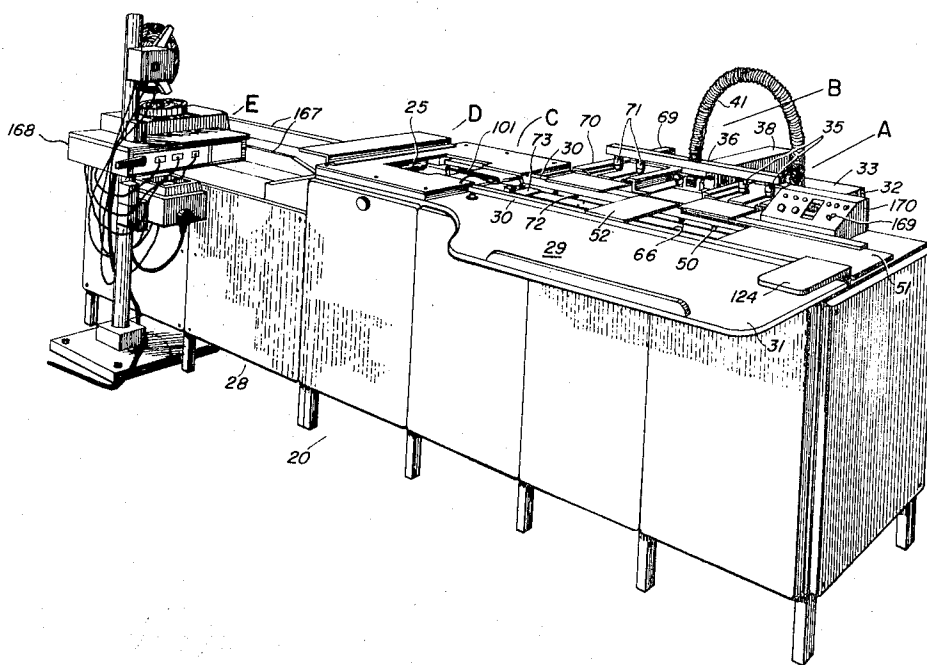
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- [57] **ABSTRACT**
An apparatus and method for packaging hosiery in an

automatic operation that sequentially folds the hosiery about an insert board, places the folded hosiery on an L-board, bags the L-board mounted hosiery, and seals the bags, with the hosiery advancing in a continuous lengthwise direction to and through the various operating stations. Hosiery is initially laid out lengthwise at a folding station at which the hosiery is partially folded automatically, with folding being completed as the hosiery advances lengthwise to a preliminary packaging station at which the folded hosiery advances onto an L-board and against the upstanding end flap thereof. The L-board mounted hosiery is advanced to a bagging station at which it is inserted lengthwise into a bag that is gripped to hold it stationary during hosiery insertion and is then ungripped to allow the bagged hosiery to advance to a bag closing station at which it advances against a stop that causes the hosiery to fully seat in the bag and positions the bag properly for sealing. After the bag is sealed it is turned over lengthwise by oscillation of a turning plate on which the bagged hosiery is received at the bag closing station, from which the bagged hosiery is removed after turning.

30 Claims, 20 Drawing Figures



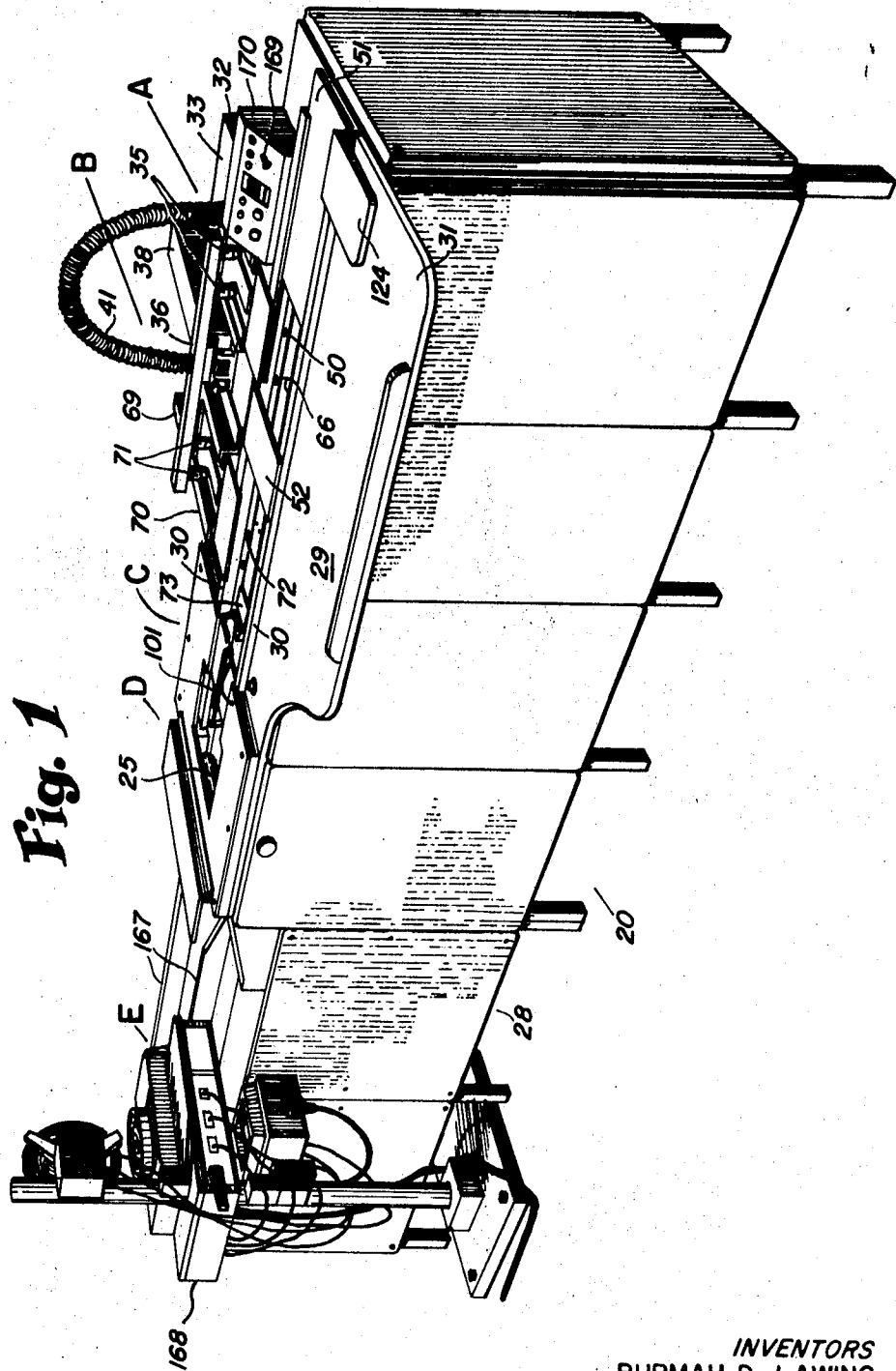


Fig. 1

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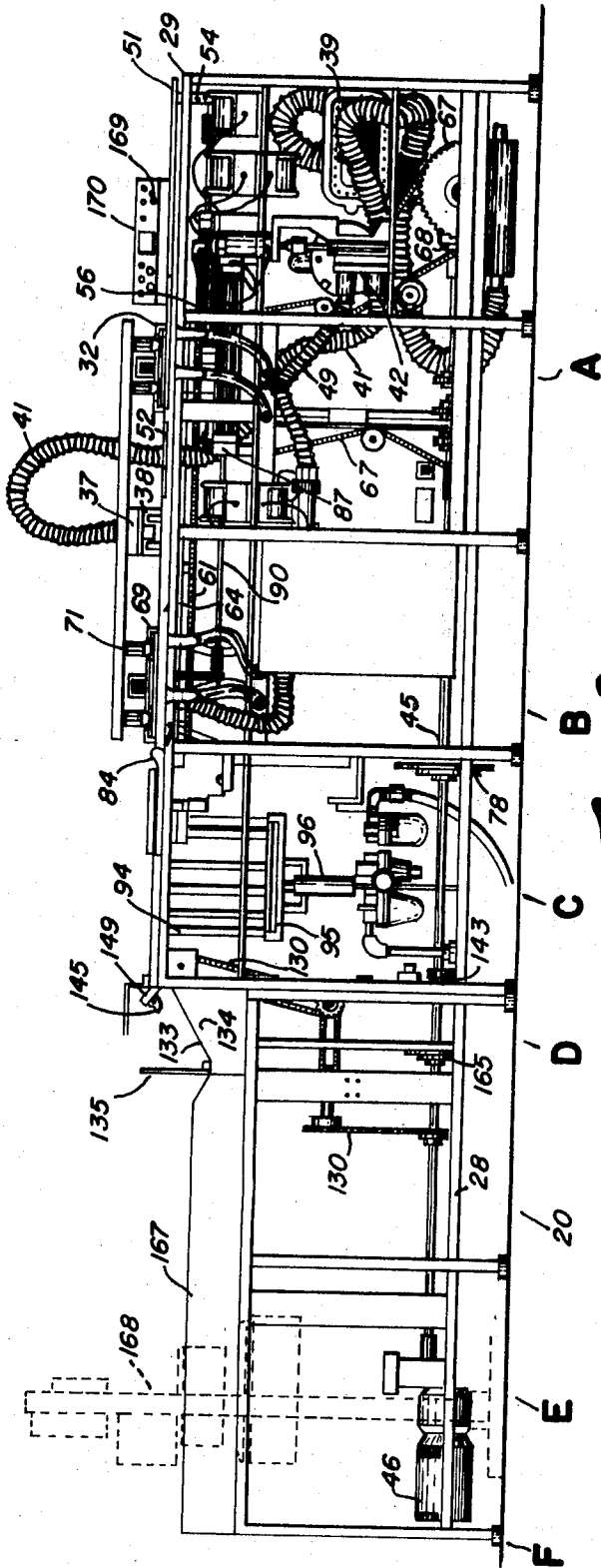


Fig. 2

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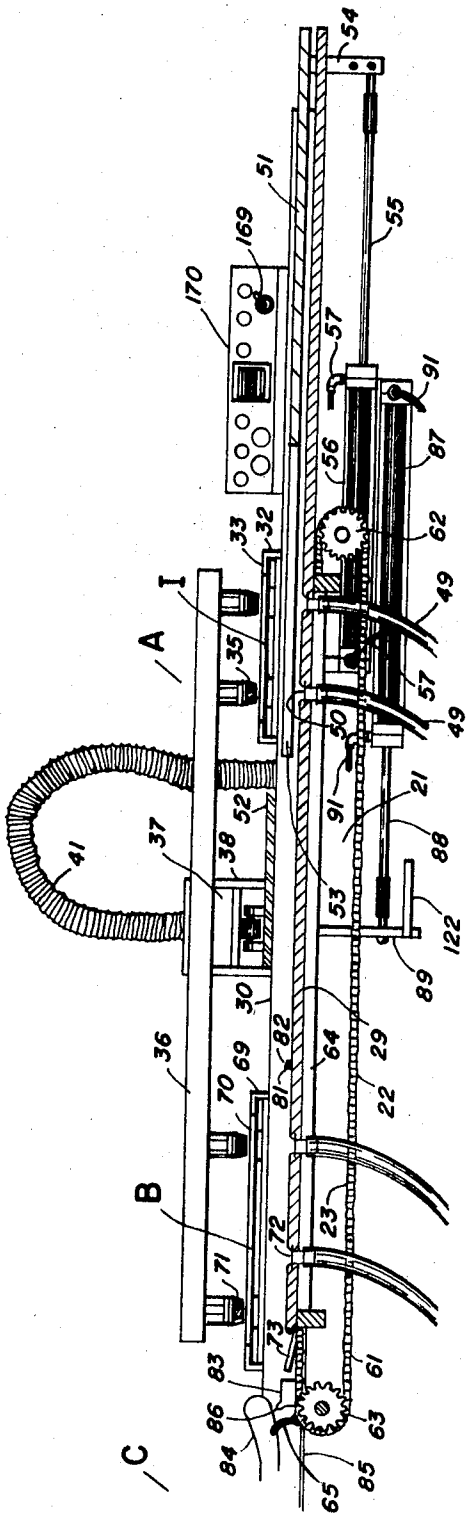


Fig. 3

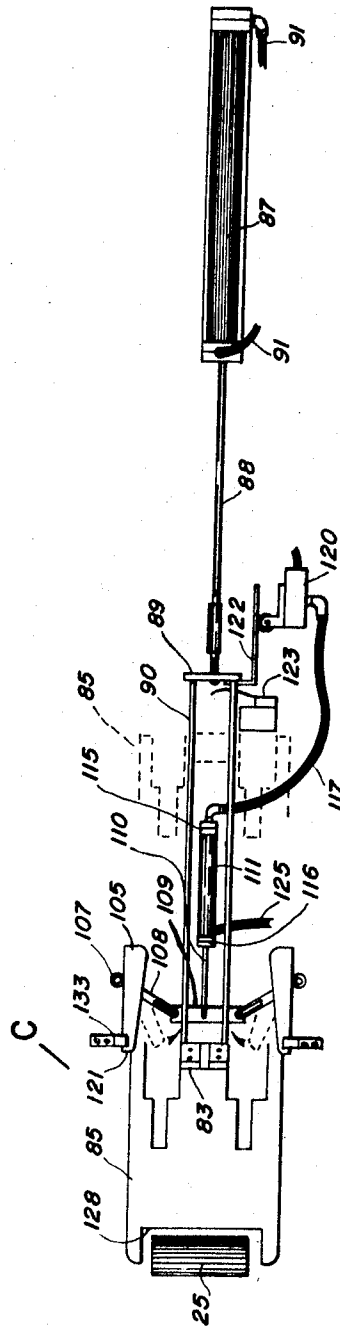


Fig. 6

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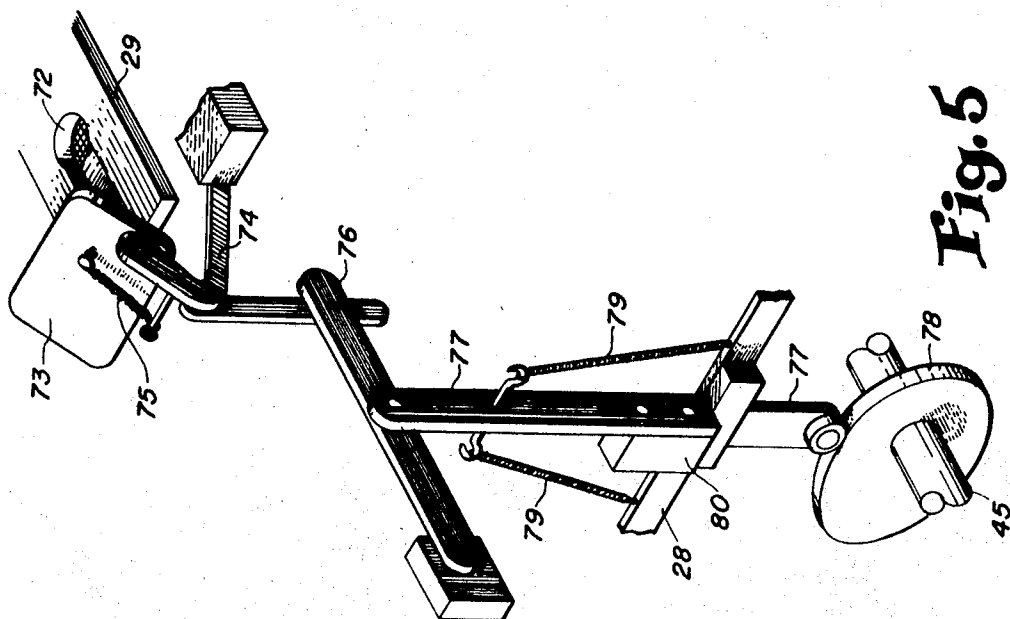


Fig. 5

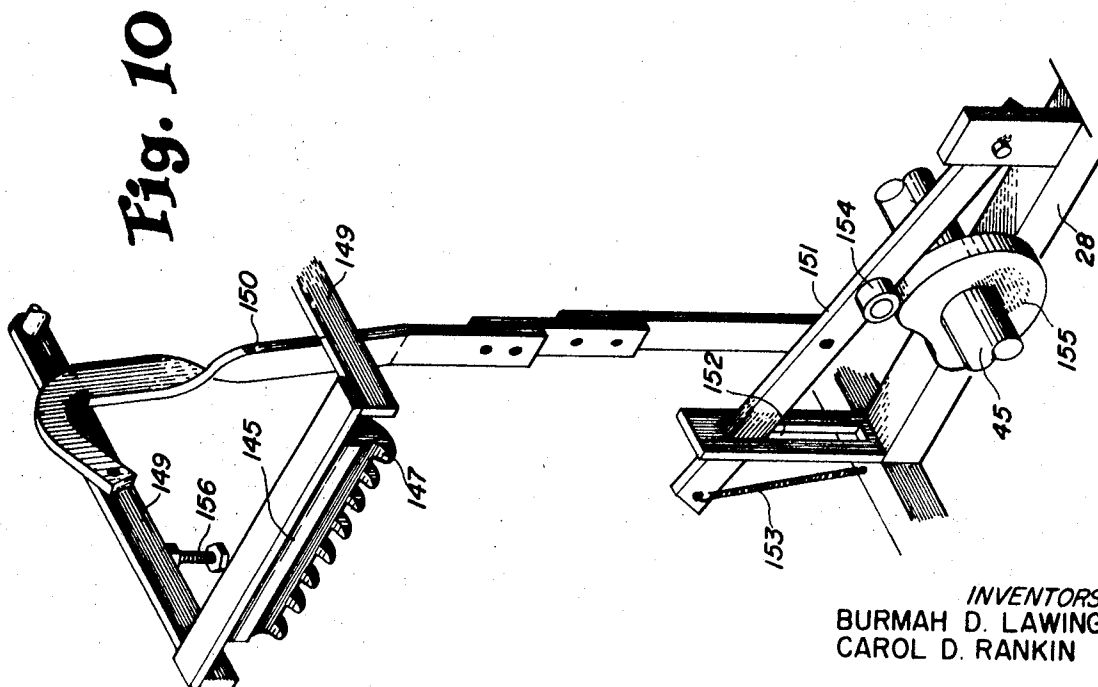


Fig. 10

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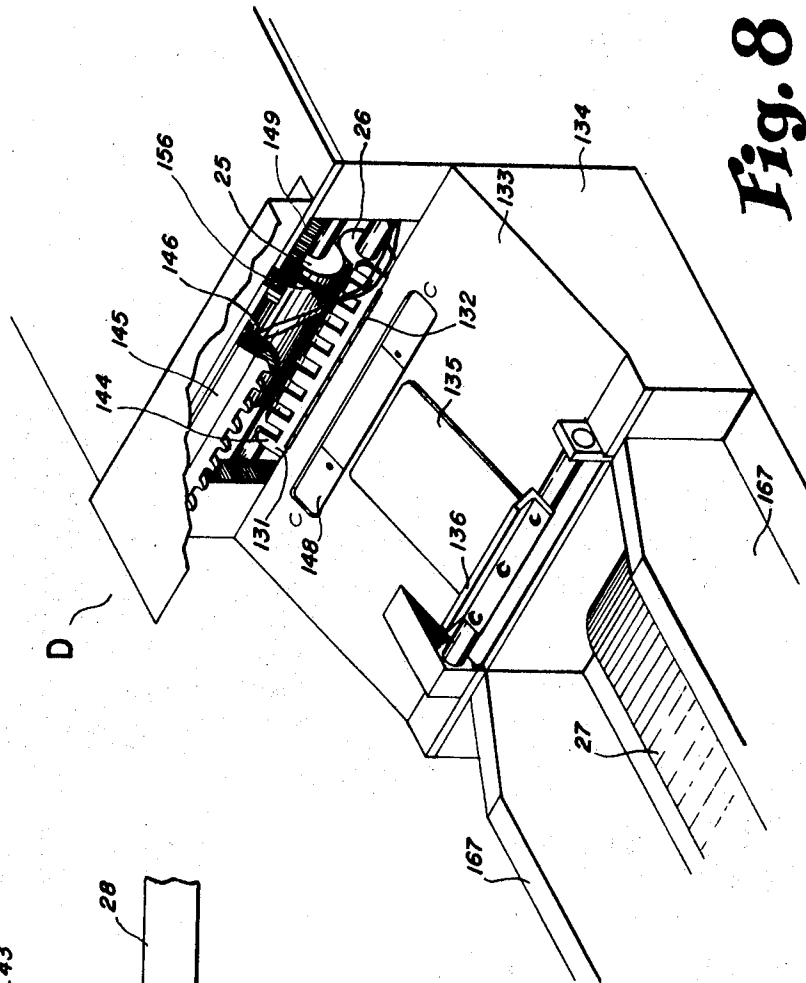


Fig. 8

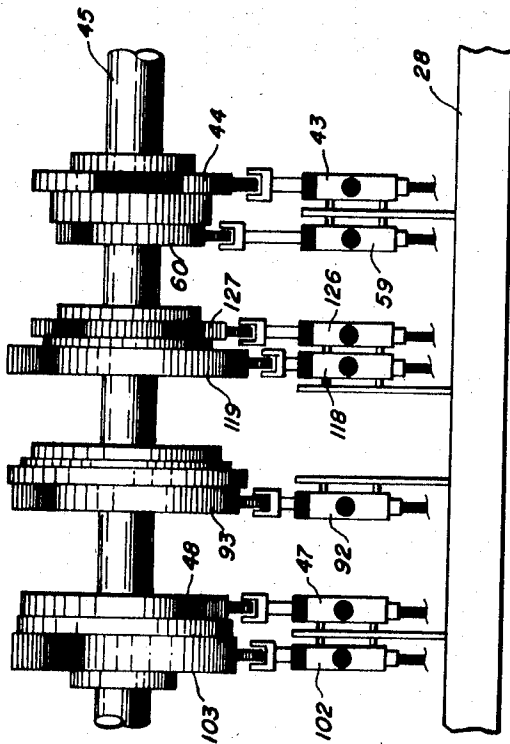


Fig. 12

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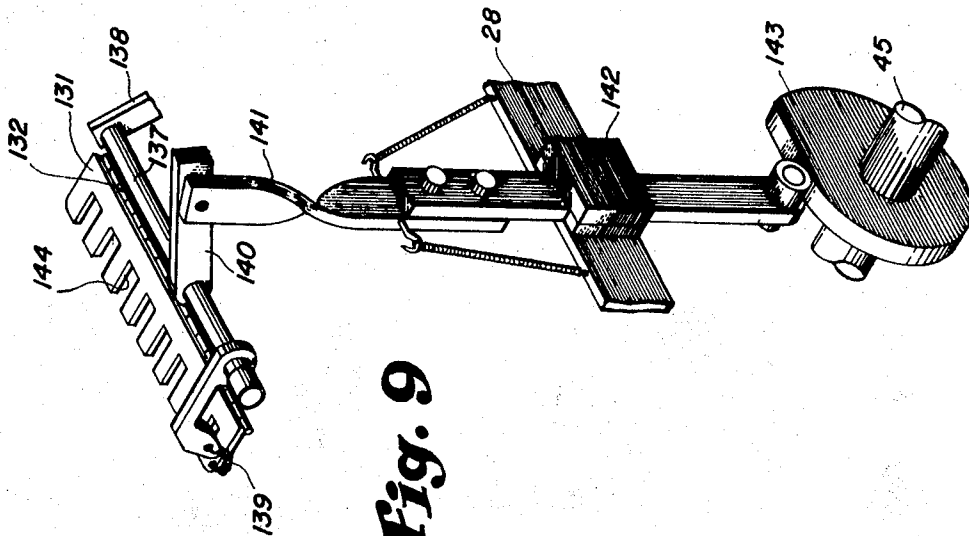


Fig. 9

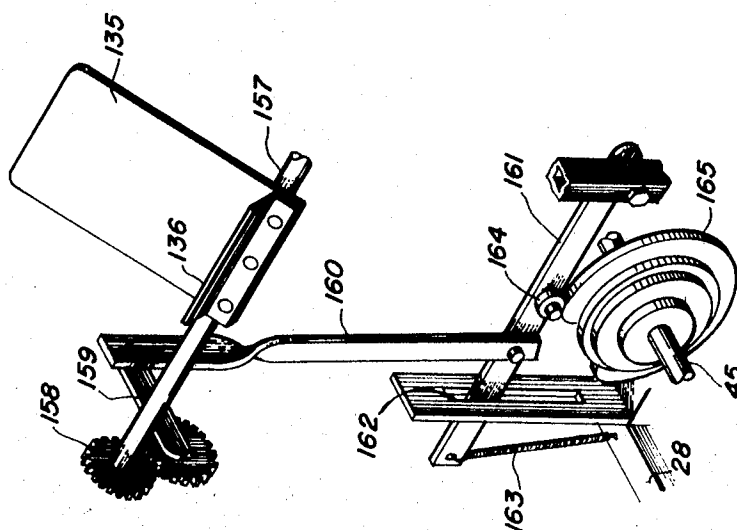
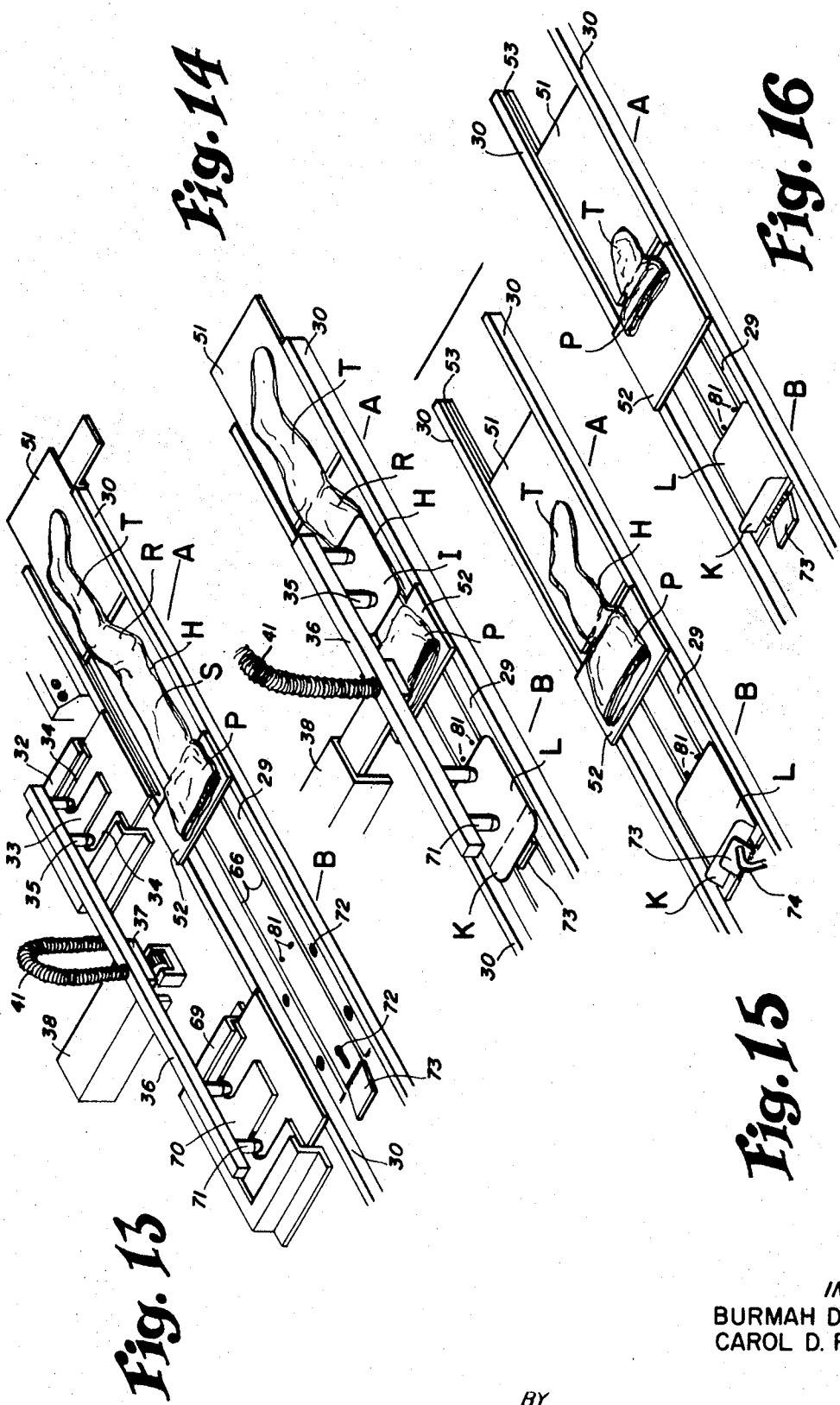


Fig. 11

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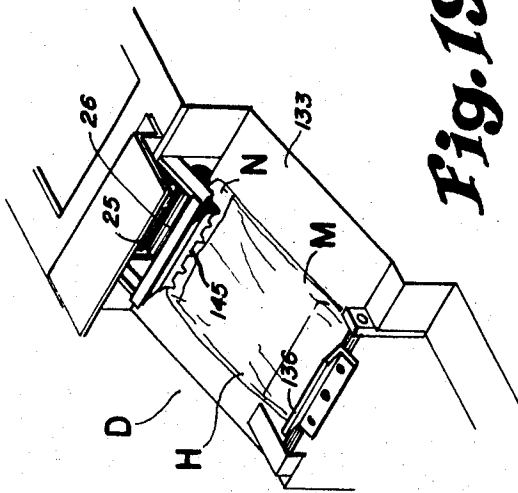


Fig. 19

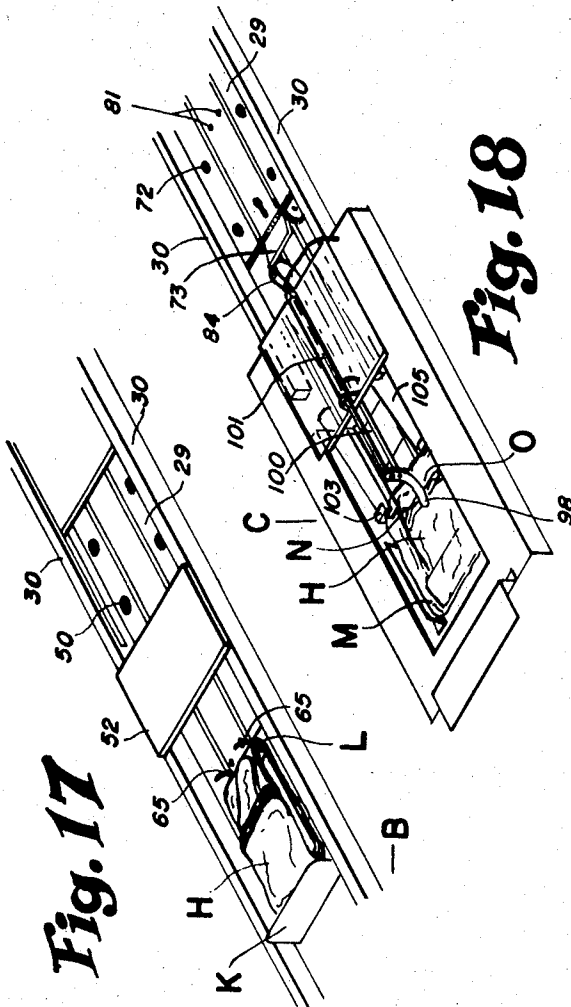


Fig. 17

Fig. 18

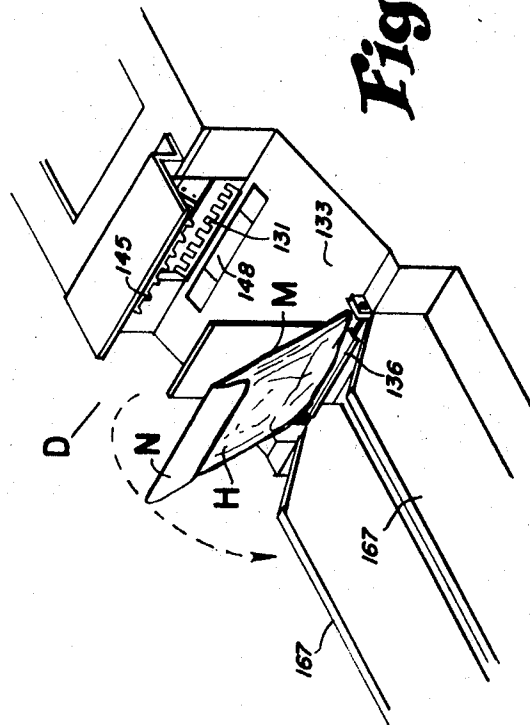


Fig. 20

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PACKAGING APPARATUS AND METHOD

BACKGROUND OF THE INVENTION

The present invention relates to an apparatus and method for packaging elongated flaccid articles, such as hosiery, and more particularly to such an apparatus and method that automatically folds and packages hosiery while the hosiery is advanced in a continuous lengthwise direction through the various folding and packaging operations.

Prior art attempts to develop an apparatus for automatically folding and packaging elongated flaccid articles, such as hosiery, have resulted in complicated and expensive machines that require complicated mechanisms for accomplishing their various operations, especially the folding operation, and require complex handling means to transport the articles from one operation to another and to advance the articles through each operation. Examples of such prior art machines are disclosed in Brinck et al. U. S. Pat. No. 3,290,855, issued Dec. 18, 1966, Korch et al. U. S. Pat. No. 3,310,930, issued Mar. 28, 1967, Glaze et al. U. S. Pat. No. 3,514,019, issued May 26, 1970, and Stossel et al. U. S. Pat. No. 3,516,582, issued June 23, 1970.

In contrast, the present invention provides an apparatus and method that utilizes a relatively simple and less expensive combination of mechanisms, especially in accomplishing folding with a simple arrangement of folding members and a minimum handling of articles. In the preferred embodiment only one movable folding member is required and it operates in a simple one stroke reciprocation. Furthermore, the various mechanisms are arranged in an aligned lengthwise sequence for simple advancement of the articles to and through the various operations in a continuous lengthwise direction with a resulting minimum handling and a simplified performance of the various packaging functions.

In addition to a simplified folding operation, the present invention provides a simple preliminary packaging operation wherein a package component is placed in line with the advancing articles for advancement of the articles thereon, a bagging operation wherein bags are opened for insertion of the lengthwise advancing articles while the bags are gripped to hold them stationary during article insertion and are ungripped to allow the bagged articles to advance, and a bag closing operation wherein the bags advance lengthwise against a stop to seat the articles fully in the bag and are turned over lengthwise after closing.

SUMMARY OF THE INVENTION

Briefly described, the present invention provides an apparatus and method for packaging elongated flaccid articles, such as hosiery, in which articles laid out at a folding station are folded lengthwise thereat and advanced in a continuous lengthwise direction from the folding station through a preliminary packaging station, a bagging station and a bag closing station. At the preliminary packaging station the folded articles are advanced lengthwise onto a package component; at the bagging station the preliminarily packaged articles are inserted lengthwise into bags; and at the bag closing station the bags containing the articles are closed to complete packaging. Finally, the packaged articles are removed from the bag closing station.

The present invention also provides a unique apparatus and method for folding elongated flaccid articles,

such as hosiery, in which articles are laid out on a folding station platform and are partially folded lengthwise, and the partially folded articles are advanced lengthwise while lengthwise folding of the articles is completed. In the preferred embodiment, the articles are laid out with central portions on the folding station platform, with one end of the articles on a movable horizontal folding plate member above the platform and spaced lengthwise from the central article portions with intermediate article portions therebetween, and with the other end of said articles on a stationary horizontal folding plate member above the platform. Means operates to place an insert board on the central article portions, and then folding member moving means operates to move the movable folding plate member horizontally over the insert board, thereby folding the intermediate article portions onto the insert board with the one end of the articles remaining on the movable folding plate member. The partially folded articles are then advanced lengthwise in the direction of movement of the movable folding plate member and under the stationary folding plate member, causing the one end of the articles to slide from the movable folding plate member onto the previously folded intermediate article portions and the other end of the articles to slide from the stationary folding plate member onto the now folded one end, thereby completing folding of the articles during lengthwise advance thereof.

Further, the present invention provides a unique apparatus and method for bagging articles, such as hosiery, in which the bag ends that are facing advancing articles are opened at a bagging station before the articles are advanced thereinto, the opposite edges of the opened bags are gripped to hold the bags stationary while the articles are being inserted and are ungripped to allow the bagged articles to advance. In the preferred embodiment the bags are opened by a bag opening finger engageable with the openable ends of the bags and movable thereinto to open the bags. This bag opening finger is flexible and is inclined in the direction of article advance and toward the bags to allow articles to advance thereunder as they are inserted in the bags. A pusher plate is disposed for advance of articles thereto over the pusher component and is reciprocable to insert articles thereon into the bags, with a lip projecting from the pusher component over the articles to retain the articles in engagement with the pusher component. The gripping and ungripping of the bags is accomplished by a pair of oppositely movable arms adjacent opposite edges of the bags and movable into the bags to press against a pair of upstanding stationary arms for gripping of the bag edges therebetween during article insertion, with the gripping pressure being relieved after insertion of articles in the bags to allow the bagged articles to advance. To facilitate gripping, the stationary arms have resilient gripping pads secured thereto and against which the movable arms are pressed to grip the bag edges therebetween.

The preferred embodiment of the overall packaging apparatus and method of the present invention includes the above-described preferred embodiments of the folding and bagging operations and the following preferred preliminary packaging and bag closing operations. The preferred preliminary packaging includes placing package components in line with the advancing articles, holding the package components in place by suction means during advance of articles thereon, piv-

oting end flap folding elements upwardly from below the package component to fold upwardly end flaps against which the articles advance and returning the folding element to allow package components to pass thereover, and advancing the articles to the package components over the inclined surface of a projecting guide member that raises the articles for conveyance onto the package component, the projecting guide member also preventing movement of the package components during end flap folding thereof. The preferred bag closing operation includes an inclined surface down which bagged articles slide in advancing to a transverse stop that stops the bagged articles to seat the articles fully in the bags and position the bags for folding of trailing closure flaps by pivoting of a flap closing plate in the path of article advance, which flap folding plate holds the flaps folded while sealing means move downwardly onto the flaps to seal the flaps to the bags, after which the closed bags are turned over lengthwise by oscillation of a turning plate disposed on the inclined surface for receipt of bagged articles positioned thereon by the transverse stop prior to closing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an overall perspective view of a machine for automatically packaging panty-hose, stockings, or similar articles, according to the preferred embodiment of the present invention;

FIG. 2 is a right side elevation of the machine with the side panels removed;

FIG. 3 is a lengthwise vertical section through the folding and preliminary packaging stations of the machine;

FIG. 4 is a perspective view of the movable folding plate and operating elements therefor at the folding station;

FIG. 5 is a perspective view of the L-board folding plate and operating elements therefor at the preliminary packaging station;

FIG. 6 is a plan view of the pusher plate, bag gripping arms, and operating elements therefor at the bagging station;

FIG. 7 is a perspective view of the bag opening finger and operating elements therefor, and the gripping arms, at the bagging station;

FIG. 8 is a perspective view of the bag closing station;

FIG. 9 is a perspective view of the bag end flap closing plate and operating elements therefor at the bag closing station;

FIG. 10 is a perspective view of the sealing bar and operating elements thereof at the bag closing station;

FIG. 11 is a perspective view of the bag turning plate and operating elements therefor at the bag closing station;

FIG. 12 is a plan view of the microswitch controls and cams of the machine; and

FIGS. 13-20 are schematic drawings showing in sequence the various operations performed by the machine as a pair of panty-hose progresses through the machine.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the preferred embodiment illustrated in the accompanying drawings, the apparatus of the present invention is shown in the form of a machine for automatically folding and packaging ladies' panty-hose, tights,

or stockings, with the machine operating to practice the method of the present invention. The machine could be adapted to fold and package other types of hosiery as well as other elongated flaccid articles generally.

The illustrated folding and packaging machine 20 comprises generally a folding station A, a preliminary packaging station B, a bagging station C, a bag closing station D, a labelling station E, and a discharge station F, with the stations arranged in an aligned lengthwise sequence for advance of hosiery articles H in a continuous lengthwise direction through the machine.

At the folding station A, hosiery articles, such as ladies' panty-hose H, are laid out lengthwise in pairs, and insert boards I are placed individually on the laid out panty-hose H. The panty-hose are then partially folded onto the insert board I, with folding being completed as the panty-hose H are advanced lengthwise to the preliminary packaging station B.

At the preliminary packaging station B, generally flat package components, such as L-boards L, are placed individually in line with the advancing panty-hose H, with transverse end flaps K at the ends of the L-boards L that are leading with respect to the direction of panty-hose advance being folded upwardly into an upstanding disposition, for advance of the panty-hose H, onto the L-boards L and against the end flaps K.

At the bagging station C, the preliminarily packaged panty-hose H are inserted in their lengthwise direction of advance into bags M that have open ends O facing the advancing panty-hose H. The bags M are gripped to hold them stationary during panty-hose insertion and are ungripped when insertion has been completed to allow the bagged panty-hose H to advance to the bag closing station D.

At the bag closing station D, the bagged panty-hose H are stopped abruptly to cause the panty-hose H to seat fully in the bags M and to position the bags M properly for sealing. The bags M have trailing closure flaps N extending from the open bag ends O, which flaps N are folded over onto the bags M and sealed thereto to close the bag ends O. The bagged panty-hose H are then turned over lengthwise for proper positioning for the application of labels at the labelling station E as the bagged articles advance lengthwise there-through to the discharge station F, at which the packaged panty-hose H are discharged into containers or onto conveyors for whatever further handling is desired.

The panty-hose H are advanced in a continuous lengthwise direction through the aligned lengthwise sequence of stations by means, in the form of a first section 21 of a pin and chain conveyor 22, for conveying folded panty-hose H from the folding station A to the preliminary packaging station B, means, in the form of a second section 23 of the aforementioned pin and chain conveyor 22, for conveying panty-hose H through the preliminary packaging station B and preliminarily packaged panty-hose therefrom to the bagging station C, means, in the form of a pusher plate 85, for inserting the panty-hose H into bags M and thereby advance the panty-hose through the bagging station C, means, in the form of a pair of rollers 25, 26, for conveying the bagged panty-hose H from the bagging station C to the bag closing station D, and means, in the form of a belt conveyor 27, for conveying bagged and turned panty-hose H from the bag closing station D

through the labelling station E and from the machine at the discharge station F. All of these means, as well as all of the other parts of the machine 20, are mounted on a main frame 28 that extends the full length of the machine.

Referring to the folding station A, as shown in FIGS. 1, 2, 3, 4 and 13-16, a horizontal folding platform 29 is mounted on the frame 28 and extends in the lengthwise direction of the machine 20 for laying out of panty-hose H thereon in lengthwise alignment with the sequence of stations. A pair of spaced guide rails 30 are mounted on the platform 29 and extend lengthwise thereon at a spacing generally equivalent to or slightly greater than the width of the panty-hose H to be folded thereat. These guide rails 30 define between them the area in which panty-hose are to be laid out and guide the panty-hose for proper lengthwise advance along the platform 29 from the folding station A to the preliminary packaging station B. The platform 29 is formed with a lateral extension 31 to the left, as viewed in the direction of panty-hose advance, beyond the guide rails 30 for supporting a supply of panty-hose in readiness for an operator to lay out in individual pairs on the folding platform area between the guide rails 30.

Mounted on the main frame 28 and projecting above the level of the folding platform 29 and guide rails 30 at the side of the machine 20 opposite the platform extension 31 is a container 32 in which a vertical stack of insert boards I are disposed in parallel relation to the laying out area of the platform 29. Conventional means (not shown) are provided for biasing the insert board stack upwardly in the container 32 against a top plate 33 thereon to maintain the uppermost insert board of the stack thereagainst in readiness for transfer to the folding area. The container 32 is open at the top edge facing the folding area and the top plate 33 has a pair of spaced recesses 34 extending laterally from the open top edge to expose the uppermost insert board in the container 32 for engagement by a pair of suction cups 35 depending from a lengthwise extending horizontal arm 36 that is connected to a transverse horizontal arm 37 spaced in the direction of panty-hose advance from the insert board container 32 and reciprocated laterally of the machine 20 from a horizontal support housing 38 mounted on the platform 29. A conventional pneumatic piston-cylinder mechanism (not shown) is connected to the transverse arm 37 to reciprocate the transverse arm 37 and thereby reciprocate the suction cups 35 between the top plate recesses 34 and the folding area, with the suction cups 35 disposed closely adjacent the uppermost insert board in the container 32 for engagement thereof upon application of pneumatic suction through the cups 35. Suction is produced by a pneumatic pump 39 mounted on the frame 28 below the platform 29 and driven by an electrical motor 40 mounted on the frame 28 adjacent the pump 39. A suction conduit 41 extends from the suction pump 39 through a double-acting gate valve 42 to the transverse arm 37, which is interiorly bored to provide suction communication between the conduit 41 and the suction cups 35.

The suction cups 35 serve as means for placing insert boards I on panty-hose H in the folding area by suctionally engaging the upper most insert board I in the supply stack and transferring it laterally, upon reciprocation of the transverse arm 37, to a position over a central portion S of a panty-hose H laid out on the folding

area of the platform. Release of suction in the cups 35 allows the transferred insert board I to drop onto the panty-hose central portion S for subsequent folding of the other panty-hose portions thereabout, as described hereinbelow.

The application of suction of the cups 35 during insert board engagement and transfer, and the discontinuance of suction when a board has been positioned over the folding area and during return of the suction cups 35, is controlled by manipulation of the aforesaid gate valve 42, which is controlled by a microswitch 43 (FIG. 12) operated by a rotating timing cam disc 44 mounted on a main drive shaft 45 that is rotatably mounted on and extends substantially the full length of the main frame 28 and is driven by a main electrical drive motor mounted on the frame 28 (FIG. 2). Similarly, reciprocation of the suction cups 35 is controlled by a microswitch 47 (FIG. 12) operated by a rotating timing cam disc 48 mounted on the main drive shaft 45.

The insert boards I are yieldably held in position on the folding platform 29 over the central portions S of laid out panty-hose H by pneumatic suction acting through the panty-hose on the underside of the boards. This suction is drawn by the aforementioned pump 39 through the double acting gate valve 42 from which a suction conduit 49 extends to a plurality of holes 50 in the folding area surface of the folding platform 29 under the laid out panty-hose central portions S and placed insert board I, thereby holding the insert board down in place for folding of the panty-hose H thereabout. This hold-down suction is applied by manipulation of the gate valve 42 as soon as suction is released at the aforementioned suction cups 35 to drop the insert boards I, and is maintained during folding and panty-hose advance until the gate valve 42 again shifts to apply pick-up suction to the cups at the supply stack.

Folding of the panty-hose H about a placed insert board I is accomplished by a movable horizontal folding plate member 51 and a stationary horizontal folding plate member 52, both disposed slightly above the folding platform 29 on and extending between the guide rails 30. The movable folding plate member 51 is spaced lengthwise from the position of the panty-hose central portions S in a direction opposite the direction of panty-hose advance for laying out thereon of one end portion T, such as the toe, foot and ankle portion, of the panty-hose H, with intermediate panty-hose portions R of a length substantially the same as the length of the central portions S between the end portion T and the central portions S.

This movable horizontal folding plate member 51 is mounted for lengthwise horizontal reciprocal movement in parallel horizontal grooves 53 formed in the facing side surfaces of the guide rails 30, and is reciprocated horizontally through a depending connecting arm 54 attached to the end of a lengthwise horizontally extending piston rod 55 that is reciprocated by a pneumatic cylinder 56 mounted on the frame 28 under the folding area of the platform 29. The ends of the cylinder 56 are connected by conduits 57 to a source of compressed air that is reversed in application to the ends of the cylinder 56 through a valve 58 that is controlled by a microswitch 59 (FIG. 12) operated by a timing cam disc 60 on the main drive shaft 45.

The movable horizontal folding plate member 51 is moved in a folding stroke from its initial position spaced from the central panty-hose portions S and

placed insert board I to a position substantially completely over the central portions S and insert board I, which causes the intermediate panty-hose portions R to be folded over onto the insert board I, thereby partially folding the panty-hose H, with the aforementioned one end T of the panty-hose H remaining on the movable folding plate member 51, which remains in this position until the panty-hose H advances from the folding station A, after which the movable folding plate member 51 is moved through a return stroke to its initial position for receipt of the next laid out panty-hose H.

The stationary horizontal folding plate member 52 is disposed at a slight lengthwise spacing from the central panty-hose portions S and placed insert board I in the direction of panty-hose advance for laying out thereon of the other end portion P, such as the panty portion, of panty-hose H when the panty-hose are laid out lengthwise at the folding station A, which other end portion P remains on the stationary folding plate member 52 until the panty-hose H advance from the folding station A.

In advancing from the folding station A to the preliminary folding station B, the panty-hose H are conveyed away from the movable folding plate member 51, causing the one end portion T of the panty-hose H to slide off the movable folding plate member 51 onto the previously folded intermediate panty-hose portions R and under the stationary folding plate member 52, and causing the other end portion P of the panty-hose H to slide off the stationary folding plate member 52 onto the previously folded one end portion T, thereby completing folding during advance of the panty-hose H.

The aforementioned pin and chain conveyor 22, the first section 21 of which conveys the folded panty-hose H from the folding station A to the preliminary packaging station B, comprises a pair of parallel, lengthwise extending, endless chains 61 that are trained around first sprockets 62 rotatably mounted on the frame 28 beyond the central panty-hose portion S location in the direction opposite panty-hose advance and around second sprockets 63 beyond the preliminary packaging station B in the direction of panty-hose advance. The chains 61 have their upper reaches supported on lengthwise extending bars 64 mounted on the frame 28 directly under the folding platform 29. Each of the chains 61 has a pin 65 mounted thereon and projecting outwardly therefrom sufficiently to project into the folding area through and slightly above the level of the folded panty-hose H, but below the level of the folding plate members 51 and 52. To accommodate these pins 65, which are in transverse alignment, the folding platform 29 has a pair of lengthwise slots 66 extending the full length of and vertically above the upper reaches of the chains 61.

The chains 61 are driven through a chain and sprocket connection 67 and a gear reducer 68 from the main drive shaft 45 to move the pins 65 through one complete traverse of the upper and lower reaches of the chains 61 during each revolution of the main shaft 45, with the pins 65 moving from initial positions at the preliminary packaging station end of the upper chain reaches along the lower reaches below the folding platform 29, and then along the upper chain reaches in the direction of panty-hose advance through the first and second conveyor sections 21, 23 to their initial positions at which they stop. As the projecting pins 65 move through the first conveyor section 21 they engage

the trailing edge of the partially folded panty-hose H and push the panty-hose in front of the pins 65 lengthwise along the folding platform 29 and between the guide bars 30, with the panty-hose folding being completed during initial advance as described hereinabove, and the completely folded panty-hose continuing to be advanced along the folding platform 29 and between the guide rails 30, which extend horizontally to and through the preliminary packaging station B for supporting and guiding the panty-hose therethrough and for supporting L-boards L thereat in line with advancing folded panty-hose H.

At the preliminary packaging station B, as seen in FIGS. 1, 2, 3, 5 and 13-17, a vertical stack of generally flat, unfolded, L-boards L is disposed in a container 69 similar to and aligned with the aforementioned insert board container 32, having a recessed top plate 70 similar to that of the top plate 33 of the insert board container 32 against which the L-board stack is similarly biased to position the uppermost of the stacked L-boards for engagement by suction cups 71 mounted on an extension of the aforementioned bored lengthwise extending horizontal arm 36 for operation of the suction cups 71 simultaneously with the insert board transferring suction cups 35 to transfer L-boards L to the platform 29 simultaneously with transfer of insert boards I. Also, the platform 29 is formed with holes 72 similar to the holes 50 at the folding station A and connected to the same suction conduit 49 for similarly applying suction to the underside of the L-boards L to retain them yieldably in place during folding of the transverse end flaps K thereof and to hold them down to assure advancement of folded panty-hose H thereon. As the panty-hose H are at the folding station A when the L-boards L are placed on the platform 29, the L-boards are placed in advance of the panty-hose H thereto.

Before the panty-hose H are advanced by the pins 65 of the pin and chain conveyor 22 through the second section 23 thereof onto the L-boards L, the initially flat end flaps K are folded uprightly at the end of the L-boards L that are leading with respect to the direction of panty-hose advance. This is accomplished by a folding plate element 73 pivoted transversely on the frame 28 for normally flat positioning below the path of the advancing panty-hose H and operated by a pivoted arm 74 against which it is biased by a spring 75. The arm 74 is operated by a connecting linkage 76 that is also pivoted to the frame 28 and includes a vertical cam follower 77 slidable in the frame 28 and riding on a disc cam 78 mounted on the main drive shaft 45. Springs 79 connected to the cam follower 77 and the frame 28 bias the cam follower 77 downwardly in cam following position, and a stop block 80 of the cam follower 77 stops downward movement by abutment against the frame 28.

Operation of the folding plate element linkage 76 by the disc cam 78 causes the folding plate element 73 to pivot upwardly and over in a direction opposite to the direction of panty-hose advance to fold the initially flat end flap K of a placed L-board L upwardly beyond a vertical position and then return the folding element 73 out of the path of advancing panty-hose H, with the L-board end flap K remaining in its folded position for advancement of folded panty-hose H thereagainst as the panty-hose are advanced onto the L-board L by the conveyor pins 65.

To assure advance of the folded panty-hose H onto the L-boards L, a pair of relatively small, laterally spaced, guide members 81 are secured in the platform 29 in advance of the L-board placement. These guide members 81 project upwardly slightly in the path of panty-hose advance and have inclined panty-hose facing surfaces 82 on which the panty-hose H are guided upwardly to raise the panty-hose H slightly to assure conveyance onto the L-boards. The guide members 81 also serve to prevent movement of the L-boards during end flap folding thereof, for which purpose they are located only slightly in advance of the L-board position of the platform 29.

The pin and chain conveyor 22 operates to convey the folded panty-hose H continuously through the preliminary packaging station B, during which the panty-hose are advanced onto the L-board L and against the end flap K thereof, and to convey the combined panty-hose H and L-board L to the bagging station C.

At the bagging station C, as seen in FIGS. 1, 2, 6, 7 and 18, the advancing panty-hose H and L-board L pass over a pusher component or block 83 disposed in the path of advancement and are urged downwardly by a lengthwise extending stationary hold-down bar 84 that causes the panty-hose H and L-board to drop down past the pusher block 83 onto a lengthwise extending horizontal pusher plate 85 within the vertical extent of the pusher block 83, which has a lip 86 projecting slightly upwardly in the direction of panty-hose advance to retain the panty-hose H and L-board L in engagement with the pusher block 83 during subsequent manipulation thereof. The pusher block 83 is initially disposed within the lengthwise extent of travel of the conveyor pins 65 so that the folded panty-hose H and L-board L will be advanced completely past the pusher block 83 and onto the pusher plate 85 at the end of advancement by the conveyor pins 65.

The pusher plate 85 and attached pusher block 83 are reciprocated lengthwise in the horizontal direction of panty-hose advance to insert the folded panty-hose H and L-boards L into the bags M by a pneumatic cylinder 87 mounted on the frame 28 below the folding station A and extending lengthwise of the machine 20 for reciprocation of a horizontal lengthwise extending piston rod 88 that is connected through a connecting plate 89 and a pair of lengthwise extending operating rods 90 to the pusher plate 85. The cylinder 87 is connected at its ends by conduits 91 to a source of air pressure and is controlled to reciprocate the pusher plate 85 in an inserting stroke and a return stroke by a microswitch 92 (FIG. 12) operated by a timing cam disc 93 fixed for rotation on the main drive shaft 45.

The bags M are supported in a vertical stack in a rack 94 below the path of advance of the panty-hose H, with the bottom 95 of the rack 94 being biased upwardly by a pneumatic piston-cylinder mechanism 96 to position the uppermost bag of the stack for panty-hose insertion therein. The bags M have openable ends O facing the advancing panty-hose H, and have end flaps N on their bottom sides extending beyond the open ends O under a cover plate 97 over which the pusher plate 85 slides in moving into the bags M.

The openable ends O of the bags M are opened by a bag opening finger 98 mounted on a bracket 99 at the outer end of a piston rod 100 that is reciprocated by a horizontal lengthwise extending pneumatic cylinder 101 mounted on the frame 28 above and vertically

aligned with the path of panty-hose advance and in advance of the stack of bags M. Operation of the cylinder 101 to reciprocate the bag opening finger 98 is controlled by a microswitch 102 (FIG. 12) that is operated by a timing cam disc 103 fixed on the main drive shaft 45. This operation causes the bag opening finger 98, which is thin and flexible and is biased against the bag end flap N, to advance into the bag end O. Because the bag opening finger 98 extends away from the bags in the supply rack, it engages the top side of the bag M in which it advances and, thereby, raises the top side for opening of the bag M. In the illustrated disposition, the bag opening finger 98 is inclined from the attaching bracket 99 in the direction of panty-hose advance and toward the bags M, and is curved to a flattened outer end 104 to facilitate bag opening engagement, and to allow, in combination with the flexibility of the finger, the pusher plate 85 to advance thereunder.

After the bag opening finger 98 has moved in its bag opening stroke to open initially the bag M, and before panty-hose insertion operation of the pusher plate 85, the bag is engaged by means for gripping opposite edges of the initially opened bag to hold it stationary while panty-hose H on an L-board L are inserted thereto and for ungripping the bag M to allow bagged panty-hose H to advance from the bagging section C. This bag gripping and ungripping means includes a pair of laterally spaced, oppositely movable, gripping arms 105 adjacent opposite edges of the bags M and having facing grooves 106 extending lengthwise thereof for guiding of the side edges of the pusher plate 85 and L-board mounted panty-hose therethrough into the opened bag M. The movable gripping arms 105 are mounted intermediate their ends for limited pivotal movement in a horizontal plane on upstanding pivot posts 107 mounted in lateral alignment on the frame 28 in close proximity to the side edges of the pusher plate 85 in advance of the bag stack. The pivot posts 107 are oppositely pivoted through crank arms 108 that extend oppositely inward from each pivot post 107 and are interconnected by a laterally extending connector bar 109 attached to the end of a lengthwise extending piston rod 110, which is operated by a horizontal, lengthwise extending, pneumatic cylinder mounted on the frame 28 under the preliminary packaging station B. Movement of the piston rod 110 outwardly of the cylinder causes the crank arms 108 to pivot the grooved gripping arms 105 to spread them from an initial position at which they converge toward their bag adjacent ends 112 into a generally parallel disposition. In spreading, the gripping arm ends 112 move in opposite horizontal arcs into the open end O of the bag M, which has been previously opened by the bag opening finger 98, and engage the opposite side edges of the bag M just inwardly of the open bag end O, thereby spreading the bag in open condition for guidance of the pusher plate 85 through the gripping arm grooves 106 into the open bag M. Movement of the movable gripping arms 105 is limited by a pair of upstanding stationary gripping arms 113 mounted on the frame 28 in lateral alignment closely adjacent, exteriorly, the side edges of the bag M adjacent the open bag end O and in the path of movement of the movable gripping arms 105 adjacent the ends 112 thereof. The pneumatic force applied by the cylinder 111 causes the movable gripping arms 105 to be pressed against the stationary gripping arms 113 to grip the bag edges therebetween to hold the bag M

stationary during panty-hose insertion, which gripping is enhanced to assure bag holding by pads 114 of resilient rubber-like material secured to the opposing surfaces of the stationary gripping arms 113 for compression and friction gripping of the bags.

The above-described gripping action is induced by applying air pressure to the end 115 of the cylinder 111 opposite the piston rod end 116 thereof through a conduit 117 from a source of air pressure, with this application of air pressure being controlled by a microswitch 118 (FIG. 12) operated by a timing cam disc 119 mounted on the main drive shaft 45 for rotation therewith. The conduit 117 has a valve 120 connected therein and operated by a cam follower switch 121 to open the conduit 117 to the atmosphere to relieve air pressure in the cylinder 111, thereby relieving the gripping pressure of the movable gripping arms 105 against the stationary gripping arms 113 and allowing slight return of the movable gripping arms 105, thereby ungripping the bag M and allowing it to be advanced upon continued advance of the pusher plate 85 after full insertion into the bag M. The cam follower switch 121 is located near the outward position of the aforementioned connecting plate 89 on the pusher plate operating piston rod 88 for operating engagement by a lengthwise extending finger 112 on the connecting plate 89, which finger 122 engages and operates the cam follower switch 121 to effect ungripping of the bags during the last portion of the insertion stroke of the pusher plate 85 to allow advance of the bagged panty-hose H into the nip of the afore-mentioned rollers 25, 26 at the bag closing station D. At the end of this pusher plate stroke the connecting plate 89 engages a stop switch 123 mounted on the frame 28 that operates to stop the operation of the machine 20 until the machine is recycled by actuation of a manual main starting switch 124 at the folding station A by the operator after the next panty-hose H is laid out for folding. Thus, the bagged panty-hose H remains at the rollers 25, 26 until the machine is recycled, and the bag closing, labelling and discharging operations on the previously bagged panty-hose are carried out while the next panty-hose H is being folded, preliminarily packaged and bagged.

Upon initiation of recycling, the movable gripping arms 105 are returned to their initial position over the end flap N of the next bag M outwardly of the open end O thereof in readiness for a repeat of the bagging cycle by introduction of air pressure into the piston rod end 116 of the cylinder 111 through a conduit 125 under the control of a microswitch 126 (FIG. 12) operated by a timing cam disc 127 mounted on the main drive shaft 45 for rotation therewith.

Referring now to the bag closing station D, as seen in FIGS. 1, 2, 8, 9, 10, 19 and 20, the bagged panty-hose H are conveyed thereto lengthwise by the pusher plate 85, which advances slightly beyond the nip of the two vertically aligned, oppositely rotating, transverse rollers 25, 26 to assure roller nip engagement of the bagged panty-hose H, and is formed with a transverse recess 128 to accommodate the rolls 25, 26, which are shorter in lateral extent than the pusher plate 85. The rollers are mounted on transverse shafts 129 journaled for rotation on the main frame 28 and driven through a chain and sprocket connection 130 by the main drive shaft 45 for continuous bagged panty-hose advancing during each operating cycle of the machine 20. As the machine is stopped at the time the bagged panty-hose

enter the nip of the rollers 25, 26, the rollers will hold the bagged panty-hose H until the machine 20 is recycled and will then advance the bagged panty-hose H into the bag closing station D.

The rollers 25, 26 convey the bagged panty-hose H lengthwise over a transversely extending end flap folding plate 131 located immediately beyond the lower roller 26 and extending at a downward inclination from below the level of the nip of the rollers 25, 26 to a transverse hinge pivot connection 132 at the upper edge of the surface 133 of a bag supporting member or platform 134. This surface 133 is inclined downwardly in the direction of bagged panty-hose advance from the aforementioned hinge pivot connection 132 for sliding thereon of the bagged panty-hose H from the nip of the rollers 25, 26 over a bag turning plate 135 disposed on the inclined surface 133 in advance of a transverse stop 136 located at the downward end of the bag turning plate 135 on the inclined surface 133 and against which the sliding bagged panty-hose H is stopped to assure full seating of the panty-hose H in the bag M and to position the unfolded end flap N of the bag M properly over the end flap folding plate 131 for closing thereof.

Means are provided for pivoting the end flap folding plate 131 in the direction of bagged panty-hose advance to fold the end flap N of the bag M over the open bag end O and against the upper side of the bag M, where the end flap N is held by the end flap folding plate 131 during sealing. This means comprises a transverse shaft 137 oscillatably mounted on the main frame 28 behind the aforementioned hinge pivot connection 132 and having an operating arm 138 fixed thereon and extending for pushing contact during the flap folding stroke against the end flap folding plate 131, to which it is also connected by a spring 139 for pulling the plate back to its initial position during the return stroke. The transverse shaft 137 is oscillated to manipulate the end flap folding plate 131 by a crank arm 140 fixed to the shaft 137 and connected at its extending end to a vertical cam follower 141 that is vertically slidably mounted at 142 on the main frame 28 with its lower end in following engagement with a cam disc 143 mounted on the main drive shaft 45 for rotation therewith. The configuration of the cam disc 143 is such that the end flap folding plate 131 is retained in flap folding position until the bag has been sealed and then is returned to its initial position to allow the next bagged panty-hose to advance thereover. To allow for sealing, the end flap folding plate 131 is formed with a plurality of recesses 144 extending inwardly from its outer edge to expose the end flap N therethrough for operation of sealing means that is movable downwardly onto the folded end flap N, which serves as a closure flap for the sealed bag M.

The sealing means comprises a conventional sealing bar 145 of the heat-sealing type connected through leads 146 to a source of electricity for developing sufficient heat at a series of projecting sealing points 147 to heat-seal the end flaps M to the bags M, for which purpose the bags M are made of thin heat-sealable material, such as polyethylene. The sealing bar 145 is mounted transversely above a sealing bed 148 in the aforementioned inclined surface 133 at the flap folding position of the end flap folding plate 131. A pair of laterally spaced, lengthwise extending arms 149 support the sealing bar 145 at its ends. These support arms 149 are pivoted to the main frame 28 and are operated by

a vertically extending operating arm 150 connected at its upper end to one of the support arms 149 and at its lower end to a cross arm 151 that has one end pivoted to the main frame 28 and its other end guided in a vertical slot 152 on the frame, with a spring 153 connected to the cross arm 151 and to the frame 28 therebelow to bias the cross arm 151 and connected elements downwardly for following engagement of a cam follower 154 on the cross arm 151 with a cam disc 155 that is mounted on the main drive shaft 45 for rotation therewith. As the cam disc 155 rotates, it causes the sealing bar 145 to move downwardly for contact of the folded end flap N of a bag M by the sealing points 147, which are aligned with the flap folding plate recesses 144 for this purpose. The pressure of the sealing points 147 against the bag M is controlled to obtain optimum sealing by adjusting screws 156 that project from the support arms 149 for engagement with the aforementioned inclined surface 133 to limit downward sealing bar movement, with the screws 156 being adjustable toward and away from the support arms 149 to vary the stopped position of the sealing bar 145.

After a bag M is sealed, it is turned over in the direction of panty-hose advance by means comprising the aforementioned turning plate 135, which is fixed at its lower end to a transverse shaft 157 journaled in the main frame 28 and connected to gearing 158 that is oscillated by a crank arm 159. The outer end of the crank arm 159 is connected to the upper end of a vertical operating arm 160 that has its lower end connected to a cross arm 161, which is pivoted at one end to the frame 28 and has its other end extending through a slot 162 in the frame 28. The cross arm 161 and connected elements are biased downwardly by a spring 163 connected between the cross arm 161 and frame 28 to maintain a cam follower 164 on the cross arm 161 in following engagement with a cam disc 165 that is mounted on the main drive shaft 45 for rotation therewith.

With this turning arrangement, the turning plate 135, with bagged panty-hose H supported thereon against the stop 136, is pivoted in the direction of panty-hose advance beyond a vertical disposition sufficient to cause the bagged panty-hose H to fall over and from the turning plate 135 onto the aforementioned belt conveyor 27 and between retaining walls 167 extending upwardly from the frame 28 along the length of the belt conveyor 27. The belt conveyor is driven through a conventional drive connection (not shown) by the main drive shaft 45.

The belt conveyor 27 conveys the bagged panty-hose H in turned-over disposition continuously through the labelling section E, at which a conventional labelling machine 168 applies labels individually to the bags M, and from which the belt conveyor 27 conveys the bagged panty-hose H to the discharge station F, where the panty-hose H fall from the belt conveyor 27 into containers or onto further conveying means.

The various components of the machine 20, which have been described in detail hereinabove, function in combination to package panty-hose, stockings or similar elongated flaccid articles in the following manner.

The machine 20 is prepared for operation by connection to an electrical power source and a pneumatic power source. The main on-off switch 169 at the control panel 170 is then turned on by an operator standing at the folding station A. At this point none of the com-

ponents are operating, except the suction pump 39 and motor 40, but are in condition for sequential operation when the operator subsequently pushes the main starting switch 124.

The operator places a pair of panty-hose H from the supply on the folding platform extension 31 at the folding station A onto the folding area of the platform 29 between the guide rails 30, and in doing so extends the panty-hose H lengthwise with their central portions S on the platform 29 in line with the supply of insert boards I, their panty portions P on the stationary folding plate member 52, their toe, foot and ankle portion T on the retracted movable folding plate member 51, and intermediate portions R extending between the central portions S and the movable folding plate member 52 (FIG. 13).

The operator then presses the main starting switch 124 to start automatic operation of the machine 20 and reaches to the supply to pick-up the next pair of panty-hose H for positioning after the first pair is automatically advanced from the folding station A. Pressing of the starting switch 124 energizes the main drive motor 46 to rotate the main drive shaft 45 through one revolution, causing the various control cams to actuate the various machine operations through one complete cycle.

The first operation performed by the machine 20 is the simultaneous transfer of insert boards I and L-boards L (FIG. 14) from the supply stacks onto the platform 29 by the suction cups 35 and 71, with the insert board I being placed on the laid out panty-hose central portions S and the L-boards L being placed with their unfolded end flaps K over the end flap folding plate 73. As soon as the suction cups 35, 71 release the boards, suction is applied through the holes 50 and 72 to hold the insert board I in place for panty-hose folding thereon and the L-board L for end flap folding. Next, the movable folding plate member 51 is advanced to fold the intermediate panty-hose portion R onto the L-board L and the end flap folding plate element 73 is oscillated to fold the L-board end flap K uprightly and return (FIG. 15). By this time the pin and chain conveyor 22 has advanced the pins 65 to the folding station A behind the panty-hose H with the continuous advance of the pins 65 engaging the panty-hose H and advancing it from the folding station A, which completes folding by causing the toe, foot and ankle portion T and the panty portion P to slide from the folding plate members 51, 52 onto the folded intermediate portion I (FIG. 16). As the pins 65 continue along the platform 29, they advance the now folded panty-hose H to the preliminary packaging station B, at which the pins advance the panty-hose H onto the previously placed L-board L and against the now upright end flap K thereof (FIG. 17), with continuing advance of the pins 65 advancing both the folded panty-hose H and L-board L from the preliminary packaging station B over the pusher block 83 and onto the pusher plate 85. By this time the bag opening finger 98 has extended to open the end O of a bag M and the movable gripping arms 105 have been moved to grip the bag edges against the stationary gripping arms 113. Immediately upon receipt of an L-board L and panty-hose H, the pusher plate 85 advances to insert the L-board L and panty-hose H into the now open bag M (FIG. 18), with the gripping arms 105, 113 holding the bag M stationary during insertion and then releasing the bag M to

allow the pusher plate 85 to advance the now bagged panty-hose H into the nip of the rollers 25, 26. At this point, the main drive shaft 45 has completed one revolution, stopping the operation of the machine 20.

When the operator places the next panty-hose H for folding and again presses the main starting switch 124, the next panty-hose H is processed in the manner just described while the first panty-hose H completes its advance through the machine 20 by first being advanced by the rollers 25, 26 into the bag closing station D at which it slides down the inclined surface 133 against the stop 136, which causes the panty-hose H to seat fully in the bag M and positions the bag M with its end flap K over the end flap folding plate 131, which is then oscillated to fold the end flap K and hold it on the bag M while the sealing bar 145 moves down to heat-seal the end flap K to the bag M (FIG. 19). Upon return of the end flap folding plate 131 and sealing bar 145, the bag turning plate 135 is oscillated to turn the bagged panty-hose H over onto the belt conveyor 27 (FIG. 20), which conveys it continuously through the labelling station E for attachment of a label by the labelling machine 168 (FIG. 1), and then continues to convey it to the discharge station F (FIG. 2) from which the belt conveyor 27 discharges a completely folded, bagged, sealed, and labelled panty-hose package.

The foregoing detailed description has been provided for the purpose of disclosing a preferred embodiment of the present invention by way of an example, but it is not intended that the scope of the present invention be limited to the detailed disclosure or otherwise, except as defined in the appended claims and equivalents thereof. Thus, various modifications, omissions and rearrangements could be made and various features could be incorporated in other machines or practiced separately within the purview of the present invention.

We claim:

1. A method of packaging elongated flaccid articles, such as hosiery, comprising laying out the articles at a folding station, folding the articles lengthwise at said folding station, advancing the folded articles in a continuous lengthwise direction from said folding station through a preliminary packaging station, a bagging station, and a bag closing station, advancing the folded articles lengthwise onto package components as the folded articles advance lengthwise through said preliminary packaging station, inserting the preliminarily packaged articles lengthwise into bags as the articles advance lengthwise through said bagging station, closing the bags containing articles at said bag closing station, and removing the bagged articles from said bag closing station.

2. A method of packaging elongated flaccid articles, such as hosiery, according to claim 1 and characterized further in that said folding comprises partially folding the articles prior to advancing the articles and completing folding during said advancing of the articles from said folding station.

3. A method of packaging elongated flaccid articles, such as hosiery, according to claim 1 and characterized further in that said advancing the folded articles onto package components comprises placing generally flat package components in line with the advancing folded articles before the articles advance to said preliminary packaging station, and advancing the folded articles onto the package components.

4. A method of packaging elongated flaccid articles, such as hosiery, according to claim 3 and characterized further by raising the folded articles as the articles advance to the package components to assure advance of the folded articles onto the package components.

5. A method of packaging elongated flaccid articles, such as hosiery, according to claim 3 and characterized further in that the package components have upstanding transverse end flaps at the ends thereof that are leading with respect to the direction of article advance, and said advancing of the folded articles onto the package components advance the articles against the upstanding end flaps thereof.

6. A method of packaging elongated flaccid articles, such as hosiery, according to claim 5 and characterized further by placing the generally flat package components at said preliminary packaging station with their end flaps flat and folding the end flaps generally upright prior to advance of the folded articles against the flaps.

7. A method of packaging elongated flaccid articles, such as hosiery, according to claim 1 and characterized further by opening the advancing article facing ends of bags at said bagging station before the articles advance thereto, gripping opposite edges of the opened bags to hold the bags stationary while the articles are being inserted thereto, and ungripping the bags to allow bagged articles to advance.

8. A method of packaging elongated flaccid articles, such as hosiery, according to claim 1 and characterized further by advancing the bagged articles against a transverse stop at said bag closing station to seat the articles fully in the bags and to position the bags properly for closing.

9. A method of packaging elongated flaccid articles, such as hosiery, according to claim 8 and characterized further in that the bags are made of heat-sealable material and have trailing open ends with closure flaps extending therefrom, and said bag closing comprises folding the closure flaps over the open ends and heat sealing the folded closure flaps to the bags.

10. A method of packaging elongated flaccid articles, such as hosiery, according to claim 8 and characterized further by sliding the bagged articles down an incline as the bagged articles advance to said stop at said bag closing station prior to said bag closing.

11. A method of packaging elongated flaccid articles, such as hosiery, according to claim 1 and characterized further by turning the bagged articles over in the direction of advance after closing of the bags.

12. A method of packaging elongated flaccid articles, such as hosiery, according to claim 11 and characterized further in that said turning of bagged articles comprises advancing the bagged articles onto a turning plate, and oscillating said turning plate in the direction of the article advance to turn the bagged articles and to return said turning plate to article receiving position.

13. A method of packaging elongated flaccid articles, such as hosiery, according to claim 12 and characterized further by advancing bagged articles onto said turning plate and against a stop to seat the articles fully in the bags and to position the bags properly for closing, said stop positioning the leading end of the bagged articles for bag turning upon oscillation of said turning plate.

14. An apparatus for packaging elongated flaccid articles, such as hosiery, comprising a folding station, a preliminary packaging station, a bagging station, and a

bag closing station, said stations being arranged in an aligned lengthwise sequence, a platform at said folding station for laying out articles thereon in lengthwise alignment with said station sequence and at which the articles are folded lengthwise, means for conveying 5 folded articles in a lengthwise direction from said folding station to said preliminary packaging station, means for disposing folded articles lengthwise on package components at said preliminary packaging station, means for conveying preliminarily packaged articles in 10 said lengthwise direction from said preliminary packaging station to said bagging station, means for inserting the preliminarily packaged articles lengthwise into bags at said bagging station, means for conveying bagged articles in said lengthwise direction from said bagging station to said bag closing station, and means for closing 15 bags containing articles at said bag closing station.

15. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 14 and characterized further by means at said folding station for 20 partially folding articles prior to conveyance of articles from said folding station and for completing folding as the articles are conveyed from said folding station.

16. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 14 and characterized further in that said means for disposing folded 25 articles lengthwise on package components includes means for placing generally flat package components in line with the articles before the articles are conveyed to said preliminary packaging station.

17. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 16 and characterized further in that said means for disposing folded 30 articles lengthwise on package components includes means for raising the articles as they are conveyed to said preliminary packaging station to assure advance of articles onto the package components.

18. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 17 and characterized further in that said article raising means comprises a guide member projecting upwardly in the path 40 of the articles adjacent and in advance of the package components and having an inclined surface on which the articles are guided upwardly into position for conveyance onto the package components.

19. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 16 and characterized further in that said means for disposing folded 45 articles lengthwise on package components includes means for yieldably retaining the package components in position for conveyance thereonto of folded articles, with the generally flat package components being positioned by said package component disposing means with upstanding transverse end flaps at the ends thereof 50 that are leading with respect to the direction of article advance for advance of articles on the package components against the end flaps thereof.

20. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 19 and characterized further in that said yieldably retaining means 60 comprises suction means acting on the underside of disposed package components to resist lengthwise movement thereof and to hold the package components down for movement of folded articles thereonto.

21. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 16 and characterized further by means at said preliminary packag-

ing station for folding transverse end flaps of the package components upwardly at the ends thereof that are leading with respect to the direction of article advance for advance of articles on the package components 5 against the end flaps thereof.

22. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 21 and characterized further in that said end flap folding means comprises a folding element disposed below the package 10 component end flaps for pivoting against the end flaps, and means for pivoting said folding element upwardly to fold the end flaps and for retaining said folding element to allow the package components with articles thereon to pass over said folding element as the 15 preliminarily packaged articles are conveyed from said preliminary packaging station.

23. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 21 and characterized further in that said means for disposing folded 20 articles lengthwise on packaging components includes a guide member projecting upwardly in the path of the articles adjacent and in advance of the package components to prevent movement of the package components during end flap folding thereof and having an inclined 25 surface on which articles are guided upwardly into position for conveyance onto the package components.

24. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 14 and characterized further in that said means for inserting preliminarily packaged articles lengthwise into bags comprises 30 means for opening the advancing article facing ends of bags before the articles are conveyed to said bagging station, means for gripping opposite edges of the open bags to hold the bags stationary while articles are inserted therein as the articles advance and for 35 ungripping the bags to allow bagged articles to advance.

25. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 14 and characterized further by a transverse stop at said bag closing 40 station in the path of advancing bags for stopping the bags and thereby seating the articles fully in the bags and positioning the bags properly for closing.

26. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 25 and characterized further in that said means for closing bags includes a flap folding plate in the path of advancing bags 45 and over which the bags are conveyed into bag closing position, means for pivoting said flap folding plate to fold closure flaps of the bags over the bags, and sealing means movable downwardly onto the folded closure 50 flaps to seal the flaps to the bags while the flaps are held in folded position by said folding plate.

27. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 25 and characterized further by a package supporting member at 55 said bag closing station having a surface inclined downwardly in the direction of article advance for sliding thereon of bagged articles, said transverse stop being located on said inclined surface for stopping bagged 60 articles thereon.

28. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 27 and characterized further by a bag turning plate disposed on 65 said inclined surface in advance of said stop for receipt of bagged articles thereon, and means for oscillating said turning plate in the direction of article advance to

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turn over bagged articles after bag closing and to return said turning plate to article receiving position.

29. An apparatus for packaging elongated flaccid articles, such as hosiery, according to claim 14 and characterized further by means at said bag closing station 5 for turning bagged articles over in the direction of article advance after the bags have been closed.

30. An apparatus for packaging elongated flaccid ar-

ticles, such as hosiery, according to claim 29 and characterized further in that said turning means comprises a turning plate disposed for receipt of bagged articles thereon, and means for oscillating said turning plate in the direction of article advance to turn over bagged articles after bag closing and to return said turning plate to article receiving position.

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