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# United States Patent [19]

**Schmidt, Sr. et al.**

[11] **3,760,553**

[45] **Sept. 25, 1973**


[54] **PRODUCT HANDLING EQUIPMENT**


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[73] Assignee: **Alto Corporation**, York, Pa.



[22] Filed: **Feb. 3, 1972**

[21] Appl. No.: **223,225**

**Related U.S. Application Data**

[63] Continuation of Ser. No. 124,143, March 15, 1971, abandoned.

[52] **U.S. Cl.** ..... **53/26,** 53/61, 53/74, 53/147

[51] **Int. Cl.** ..... **B65b 5/06,** B65b 57/10, B65b 57/12

[58] **Field of Search** ..... 53/26, 28, 33, 133, 53/182, 228, 229, 147, 74, 59, 159, 152, 61



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*Assistant Examiner*—E. F. Desmond
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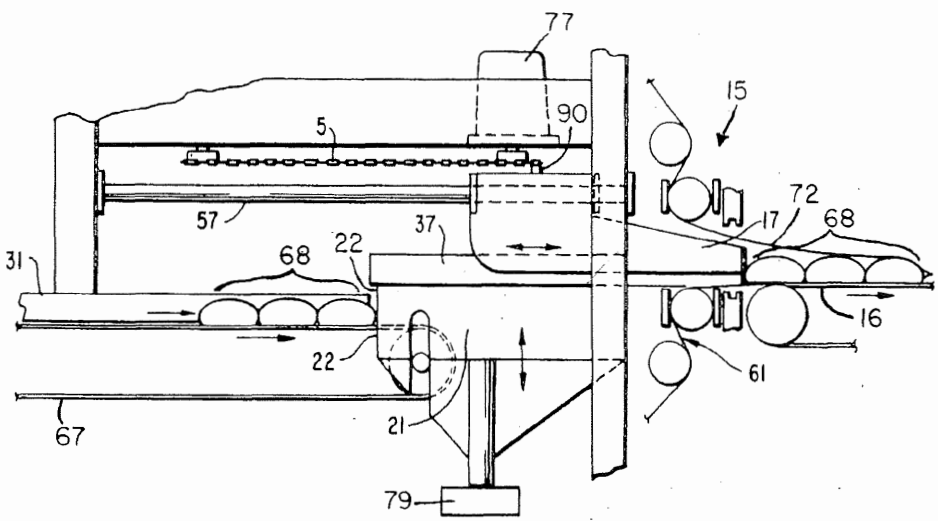
[57] **ABSTRACT**

Apparatus for presenting a marshalled product group (bakery rolls, meat patties, auto mirrors, records and the like) to a film packaging system which maintains the predetermined marshalling or corrects problems therein and which involves an elevator which accepts and established the final marshalling and elevates the group to a pusher, and a reciprocating pusher which moves the marshalled group into the film packaging system and the method therefor. A single pusher control chain with sensor and timing systems responsive thereto is also provided.


**5 Claims, 12 Drawing Figures**



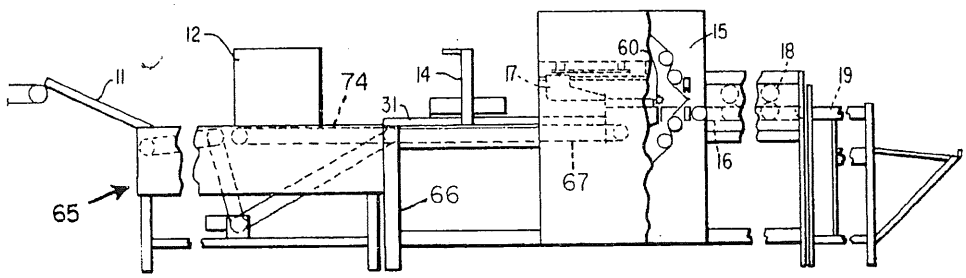



FIG. 1

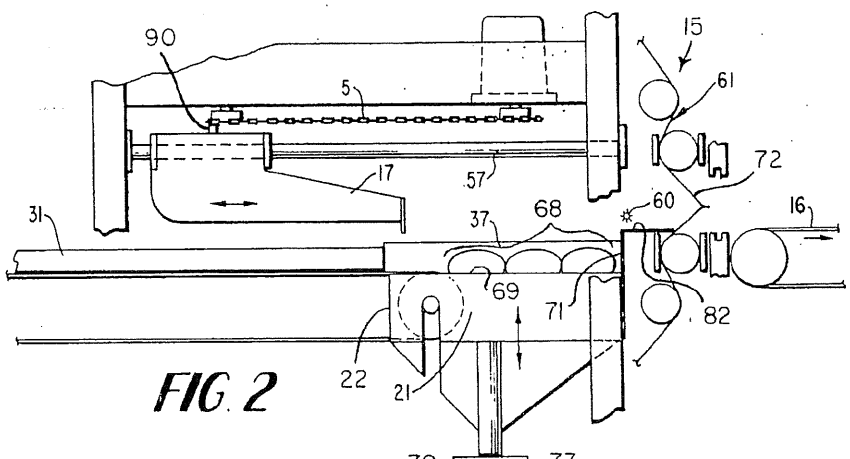



FIG. 2

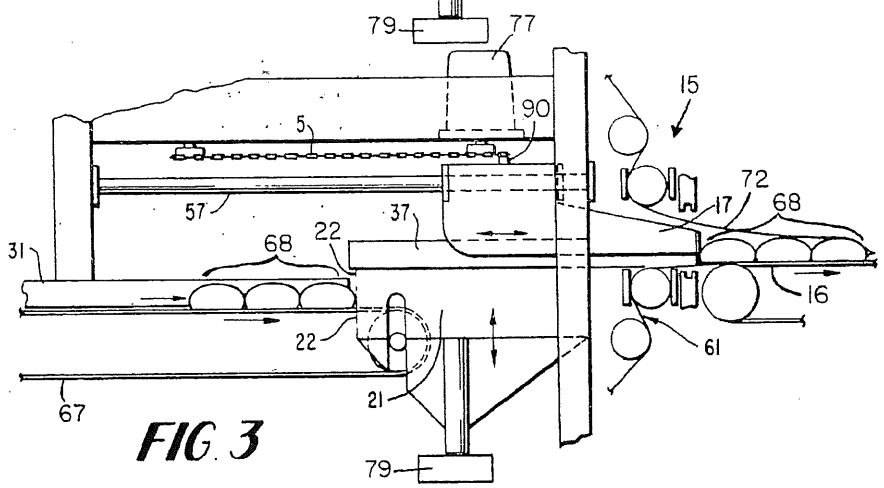



FIG. 3

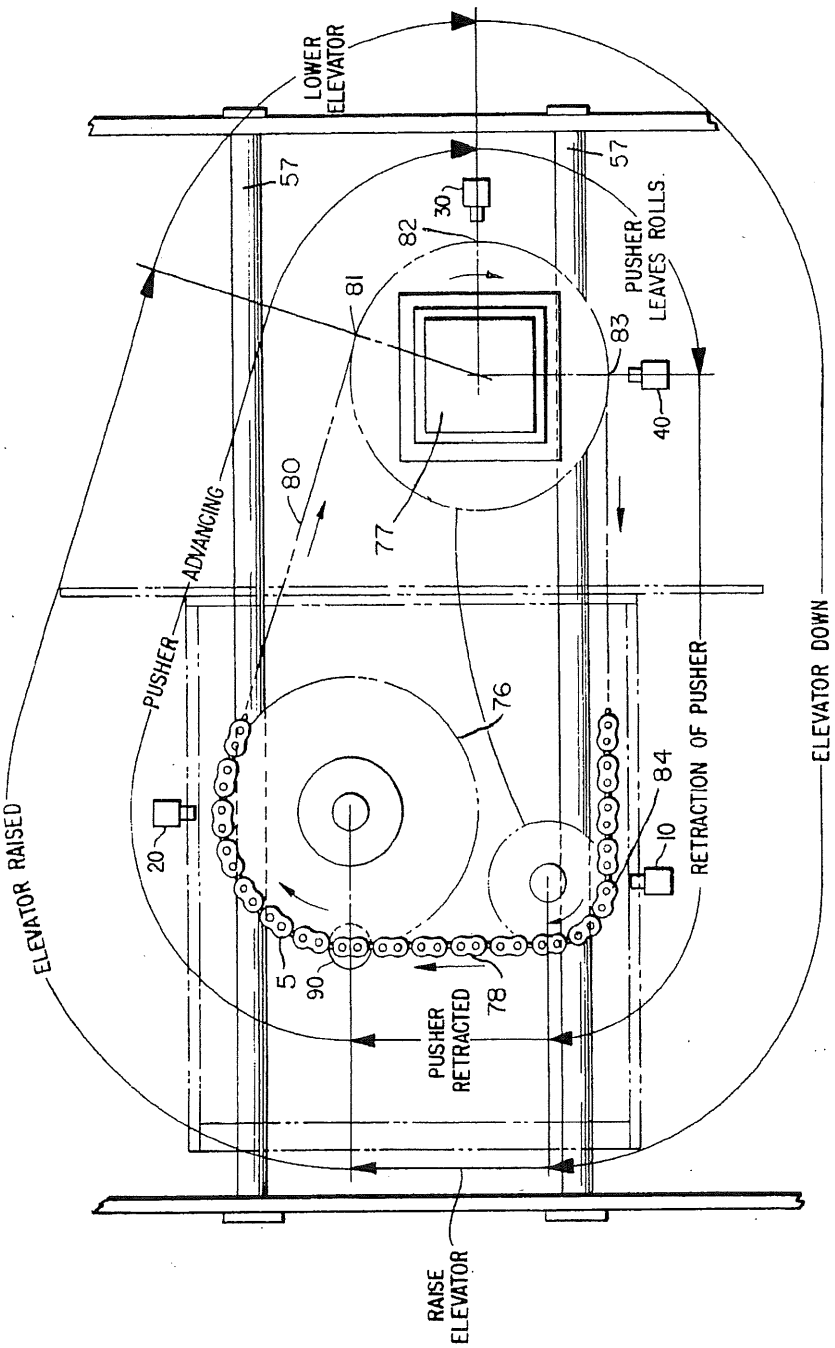



FIG. 4

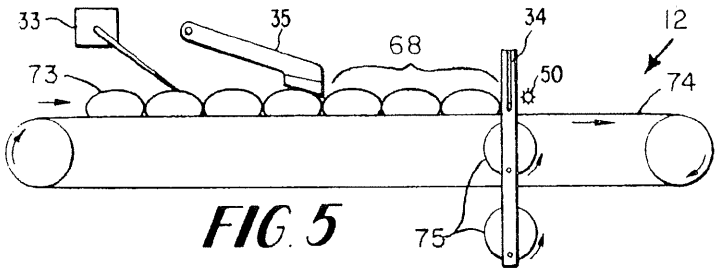
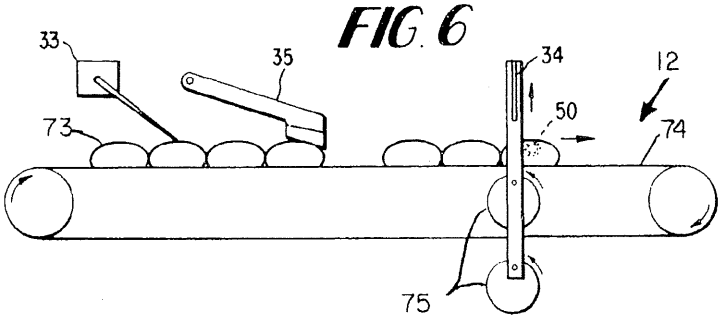



FIG. 5

FIG. 6



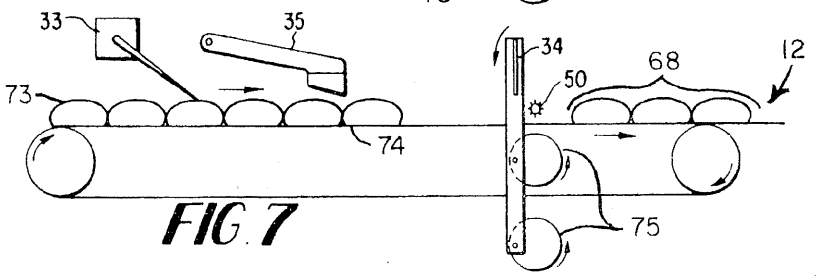
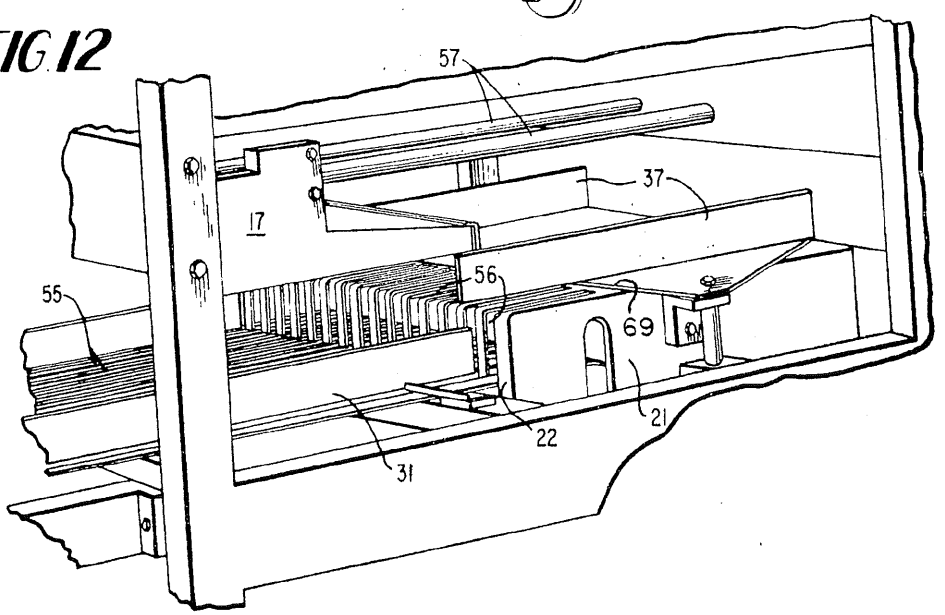




FIG. 7

FIG. 12



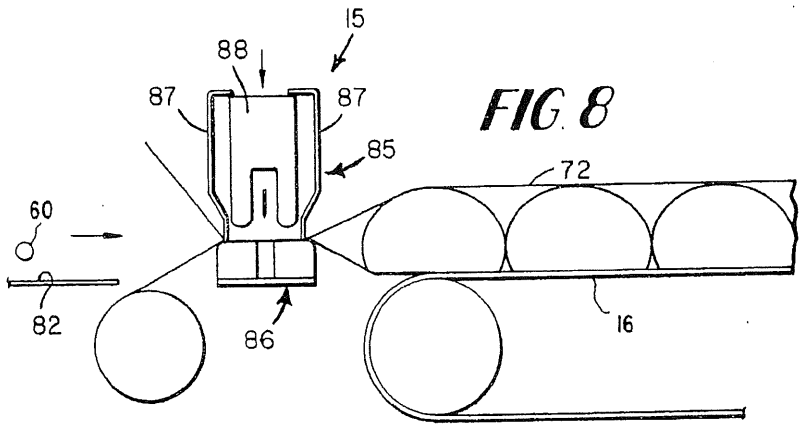



FIG. 8

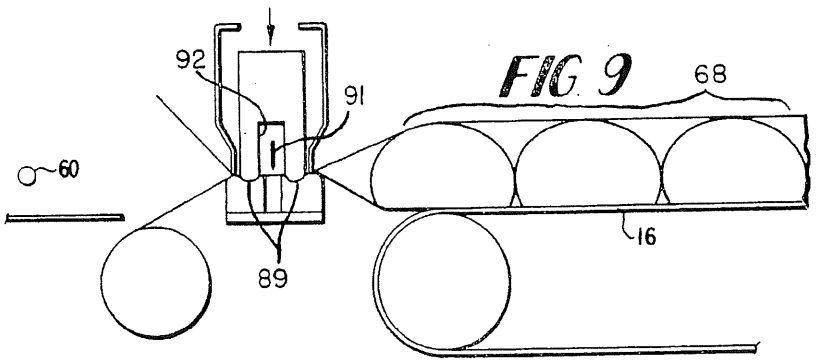



FIG. 9

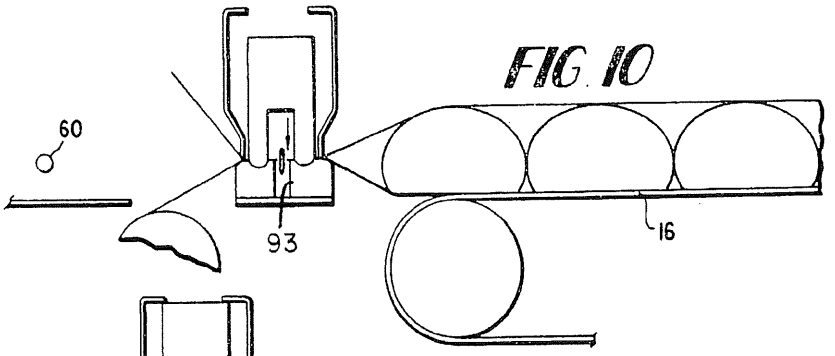



FIG. 10

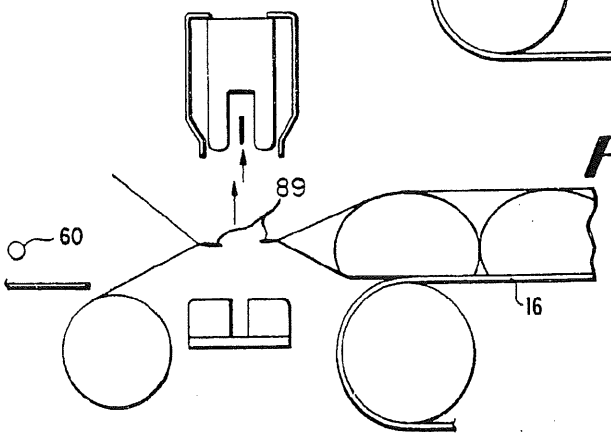



FIG. 11

# PRODUCT HANDLING EQUIPMENT

## CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation of applicants' application Ser. No. 124,143, filed Mar. 15, 1971, now abandoned.

## BACKGROUND OF THE INVENTION

In the bakery field, particularly, equipment must be sanitary. Overhead conveyors for moving a perfectly marshalled group to a packaging station have involved complicated conveyors. Sequential mechanisms for coordinating the steps of the system have been ponderous. Normal upkeep of equipment has been sacrificed to the desired high sanitary standards required. The handling of cooled (discrete) rolls for packaging systems has required, for example, a transverse row of five across and a grouping of three transverse rows. Meeting this need has involved many approaches. The sanitary problem has been severe due to required maintenance.

Products, such as hamburger and hot dog buns have been marshalled into various groups. The rolls or products are first marshalled, that is they are aligned into three transverse rows with each row having five rolls across the length thereof making a group of 15 rolls. The system takes this group of 15 rolls and elevates it 3 or 4 inches to a location where a pusher moves the group forwardly into a film packaging system. A key to the system lies in a switch and drive chain unit which controls the entire system through the operation of sensors responsive to the position of the chain. Additional sensors are provided which sense the position of rolls moving to the elevator and the position of rolls at the forward end of the elevated elevator. The sensors may be electric eyes. One electric eye operates to activate the film feed when rolls are present.

The roll grouper includes a gate and a hold down which cooperate to permit movement of a single group of rolls to the elevator. The gate moves outwardly and upwardly as it releases a group and then vertically downwardly and backwardly upon return to the closed position.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, of which there are four sheets.

In the drawings:

FIG. 1 is a partially broken away side view of a marshalling and packaging system according to the invention;

FIG. 2 is an enlarged and also partially broken away side view of the marshalling and sealing portions of the apparatus showing the elevator in the down position and the pusher in the retracted dwell position;

FIG. 3 is like FIG. 2 showing the elevator in the up position and the pusher extended beyond the sealing zone with the film being fed by a system of feed rollers and being pulled by the sealing conveyor;

FIG. 4 is a top view of the drive chain showing the drive motor and electric eyes which coordinate the operation of the apparatus;

FIGS. 5, 6 and 7 illustrate the grouper respectively at rest, with the gate open and the restrainer holding the rolls, and with the restrainer up and the gate on the way down during refilling;



FIGS. 8 thru 11 illustrate the steps during the sealing operation; and

FIG. 12 is a perspective view showing the slotted elevator for receipt of the thin delivery belts and two sets of side guides for transverse alignment of the group to be sealed.

Apparatus 65 illustrated in FIG. 1, includes a support structure 66 along which the rolls are moved from left to right. The rolls are supplied to a roll divider chute 11 which aligns rolls in a number of longitudinal extending rows. A conveyor moves the rows of rolls from the chute to grouper 12, the operation of which is illustrated at FIGS. 5 thru 7. Groups of rolls are periodically released from grouper 12 and are carried downstream by conveyors 74 and 67, until they engage the slotted rear aligner plate 22 of raise elevator conveyor 21. Side conveyor guides 31 are provided to either side of the conveyor 67 to confine the groups of rolls upon the conveyor.

Upon lowering of elevator conveyor 21, conveyor 67 moves a group of rolls 68 on to the top surface 69 thereof. Fixed stop plate 71 prevents further downstream movement of the group. The elevator may then be raised to the position of FIG. 3 so that movement of pusher 17 from the retracted position of FIG. 2 to the extended position of FIG. 3, pushes the group into end sealer system 15. At the same time film feed 61 is acutated to advance the transversely sealed web 72 as indicated in FIG. 3. Upon retraction of the pusher 17, operation of the end sealing system 15 as illustrated in FIGS. 8 thru 11 provides an end seal for the packaged group of rolls. The end sealing operation reseals the ends of the plastic films or sheets to reform the transversely sealed web 72. Sealing conveyor 16 moves the partially sealed group of rolls past side sealer 18 to boxing station 19.

The operation of grouper 12 is illustrated in FIGS. 5 through 7 which show one of a number of rows of rolls as it is moved through the grouper. Rows of rolls 73 are moved to the grouper by conveyor 74. A sensing switch 33 is provided for each row to sense whether or not there is a supply of rolls in the row. Switches 33 are connected together in series to provide an indication if rolls are missing from any of the rows. The presence of rolls is sensed by a probe as illustrated.

Pivotal restrainer 35 engages the front or downstream roll in each row of rolls upstream from the group 68 held by gate 34 as shown in FIG. 5. The restrainer extends laterally to engage each lead roll. A gate 34 extends across the rows immediately above the conveyor to prevent downstream movement of the rolls by continuously moving conveyor 74. The ends of the gate are connected to rotatable cranks 75 whereby upon actuation of the crank drive to permit a one half revolution of the cranks in the direction indicated, the gate is raised to permit the downstream or lead group of rolls to pass thereunder. As the gate is raised it is moved downstream somewhat to prevent binding between the lower edge of the gate and the upper surface of the lead rolls. Gate sensor 50 is located immediately downstream of the gate and operates to sense passing of the group 68 through the gate. Upon passing of the group the sensor actuates the crank drive to rotate cranks 75 through another half revolution to relower the gate to the closed position. After the gate is closed, restrainer 35 is raised thereby permitting the next group of rolls to be moved up against the gate 34 by a

conveyor 74. The restrainer is then lowered to hold the upstream rolls.

The released group 68 is carried through a slicer 14, if provided, and to the rear aligner plate 22 of the raised elevator conveyor 21. The group of rolls is moved to the aligner plate by thin conveyor belts 55, as illustrated in FIG. 12, which extend into slots 56 in the aligner plate 22 and elevator top plate 69. In this way the elevator may be freely raised and lowered without interfering with the belts. As shown in FIG. 2 belts 55 extend above the slotted upstream part of the plate 69 when the plate is in the down position. Side conveyor guides 31 confine the rolls on the conveyor 57.

Pusher 17 is mounted on fixed horizontal slide bars 57 by means of suitable bearings to permit movement thereof along the bars between the retracted position of FIG. 2 and the extended position of FIG. 3. Control chain 5 extends around three sprocket gears 76 located on support 66 above the bars 57. A drive motor 77 rotates one of the sprocket gears to drive the chain clockwise as shown in FIG. 4. Link 90 on the drive chain 5 is connected to the top of the pusher 17 by means of a suitable connection whereby upstream and downstream movement of the link is transmitted to the pusher. FIG. 4 is a partially broken away generalized top view showing the chain 5, sprockets 76 and bars 57 with indications of the positions of the pusher and elevator with regard to the location of the link 90.

At the start of the cycle of operation link 90 is located at 84 opposite cycle reset switch 10 which is triggered thereby to set up the suitable electrical circuits and timing apparatus. In this position the pusher is nearly retracted and, as indicated, the elevator 21 is down or lowered. The elevator is filled with a group of rolls. This start position is illustrated in FIG. 2.

Upon actuation of switch 10 motor 77 drives the chain 5 to move link 90 along chain run 78 during which time the pusher is retracted and the elevator is raised to the position of FIG. 3 by suitable raising and lowering means 79. Further movement on the link 90 around the large sprocket gear and along run 80 advances the pusher to the position of FIG. 3 thereby moving the group of rolls from the elevator into the end sealing system 15, between the sides of the transversely sealed web 72 and on to the moving sealing conveyor 16. Movement of the link 90 past the sensor 20 actuates the grouper 12, provided that the series oriented sensor switches 33 indicate that a supply of rolls is provided in each row. The grouper releases the next group of rolls 68 whereby the thin conveyor belts 55 move the same downstream so that it rests against the rear aligner plate 22 of the raised elevator conveyor 21 as illustrated in FIG. 3. Movement of the rolls into the end sealer system 15 triggers sensor 60 to actuate the film feed 61 thereby allowing the center of the sealed web 72 to move downstream with the rolls between the two sheets of the web.

When the link 90 is moved to position 81 the pusher has moved the group of rolls completely from the elevator so that the elevator may be lowered to receive the next group on upper support plate 69. Overfeeding of the group on the support plate by the conveyor belts 55 is prevented by fixed backing plate 71. Conveyor side guides 37 retain the rolls on plate 69.

Movement of the link past film feed switch 30 trips the same to deactivate the film feed. The film feed is deactivated at the end of the forward or feed stroke of the pusher thereby allowing the film web 72 to be drawn taut by the sealing conveyor as the pusher is withdrawn from the rolls. Movement of the link 90 past point 82 begins the retraction of the pusher back from the fed rolls. When the link reaches point 83 it actuates switch 40 to initate the end sealer system 15 as illustrated in FIGS. 8 thru 11. Continued movement of the chain retracts the pusher and brings the link back to the position 84 opposite switch 10. When the pusher is retracted link 90 trips sealer switch 40 to initiate the sealing and cutting operation as illustrated in FIGS. 8 thru 11. This sealing and cutting operation can be in accordance with the disclosure of Fehre et al., U.S. Pat. No. 3,508,378 of Apr. 28, 1970, wherein the two layer film is first gripped, two longitudinally spaced and transversely extending end seals are made between the gripping portions, following which the portions of the film between the seals is severed. This operation is more clearly illustrated in the figures. Other sealing and cutting operations may be used.

The sealing and cutting operation is initiated with the web 72 in the position of FIG. 3 and with the pusher 17 retracted from the end sealer system 15. The upper sealing tooling 85 is lowered toward the lower sealing tooling 86 so that the spaced and laterally extending clamp members 87 hold the sheets together against the lower tooling. Further movement of the upper tooling toward the lower tooling seats sealing bar 88 against the lower tooling to form a pair of laterally extending spaced seals 89. Following formation of seals 89 cutter 91 confined in a recess 92 between the sealing members of sealing bar 88, is moved into a recess 93 in the lower tooling so as to sever the unsealed portions of the two strips between seals 89.

After sealing and severing the upper tooling is raised as in FIG. 11 thereby permitting the sealing conveyor 16 to move the partially sealed group of rolls past side sealer 18 which seals together the sheets at the sides of the group. The conveyor then deposits the completely sealed group of rolls at boxing station 19. Upon return of the link 90 to position 84, the apparatus 65 is returned to the position of FIG. 2 whereby the cycle of operation may be repeated.

While we have illustrated and described the preferred embodiment of our invention, it is understood that this is capable of modification, and we therefore do not wish to be limited to the precise details set forth, but desire to avail ourselves of such changes and alterations as fall within the purview of the following claims.

We claim:

1. The method of handling articles comprising longitudinally moving a pre-established packaging unit on to an elevator; raising the elevator to place said unit at a predetermined level; pushing said elevated unit longitudinally forwardly into a packaging system; moving a second packaging unit toward said elevator while said elevator is raised; lowering said elevator when the pushing step is at its forward position; and establishing a packaging unit for delivery to the elevator including accepting and stopping a pair of packaging units at a grouper zone, in response to the elevator rising causing the forward packaging unit to move longitudinally forwardly toward the elevator while detaining the immediately rearward packaging unit, identifying the complete passage of the forward packaging unit past a predetermined point and then in response thereto causing the detained rearward packaging unit to move forward to

the forward part of the grouper zone for residence until said elevator is again raised.

2. A method of handling packaging units comprising longitudinally moving a pre-established packaging unit on to an elevator; raising the elevator to place said unit at a predetermined level; pushing said elevated unit longitudinally forwardly into a system for packaging; and moving a second packaging unit toward said elevator while said elevator is raised; stopping an immediately trailing second packaging unit at the upstream end of the elevator for delivery to the elevator upon its return to its down position; sensing the presence of a packaging unit being pushed downstream of the elevator when in elevated positon and actuating the system in response to said sensing to thereby package said first packaging unit; lowering said elevator when the pushing step is at its forward position and extablishing a packaging unit for delivery to the elevator including accepting and stopping a pair of packaging units at a grouper zone; in response to the elevator raising causing the forward packaging unit to move longitudinally forwardly toward the elevator while detaining the immediately rearward packaging unit; identifying the completed passage of the forward packaging unit past a pre-determined point and then in response thereto causing the detained rearward packaging unit to move forward to the forward part of the grouper zone for residence until said elevator is again raised.

3. A packaging apparatus comprising an elevator having a top plate for holding a packaging unit, belt delivery means for moving a packaging unit forwardly on to said top plate when the elevator is in the down position, a pusher positioned above said elevator, first means for moving said elevator upwardly to an elevated position to place said packaging unit in front of the pusher, means for horizontally reciprocating said pusher forwardly and rearwardly, removal means in horizontal alignment with the elevated position of said top plate for receiving said unit upon forward discharge by the pusher from the elevated top plate, a depending slotted plate extending downwardly from the upstream edge of said top plate for arresting movement of a packaging unit at the upstream edge of said elevator when the elevator is not in full down position, said top plate including an upstream slotted portion forming an extension of the slots in said slotted plate and a downstream lift support portion for receiving the product unit from the belt delivery means, and said belt delivery means including a transverse set of thin belts fitted within the slots in said plates and extending above the surface of said upstream portion of said top plate when the elevator is in the down position to ensure full delivery of the packaging unit to the downstream portion of the top plate while permitting elevation of the plate relative to the belt delivery means.

4. A packaging apparatus comprising an elevator having a top plate for supporting a packaging unit, belt delivery means for moving a packaging unit forwardly on to said top plate when the elevator is in the down position, a pusher positioned above the elevator, first means for moving said elevator upwardly to an elevated position to place said packaging unit in front of the pusher, means for horizontally reciprocating said pusher forwardly and rearwardly including a triangular horizontally disposed drive chain extending around three sprocket gears, means for driving the chain around said gears, a link between the chain and the pusher, movement of a link along two legs of said chain path operating to move the pusher forwardly and to retract said pusher and movement of the link along the remaining leg of said chain operating to dwell the retracted pusher, removal means in horizontal alignment with the elevated positon of said top plate for receiving said product unit upon forward discharge by the pusher from the elevated top plate, and sensor responsive actuating means for controlling the operation of the apparatus.

5. A packaging apparatus as in claim 4 wherein said chain is disposed in a right triangle and a short dwell leg extends perpendicular to the direction of movement of said pusher.

* * * * *