Jan. 16, 1962 LA VERN H. BARRETT 3,016,665

PACKAGING MACHINE

Filed July 22, 1957 8 Sheets-Sheet 1

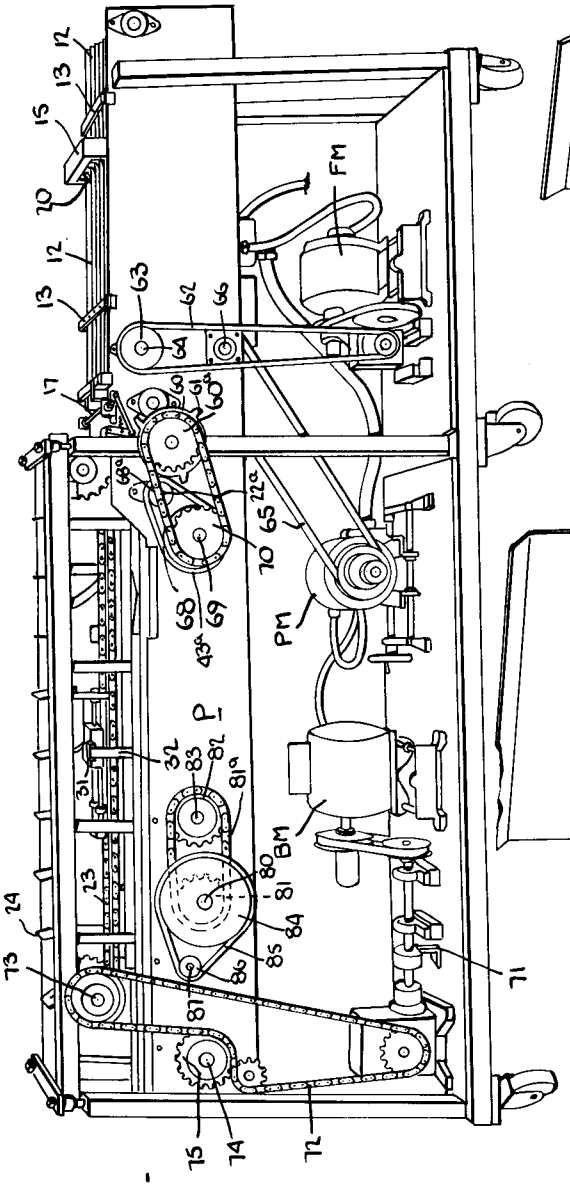


Fig. 1.

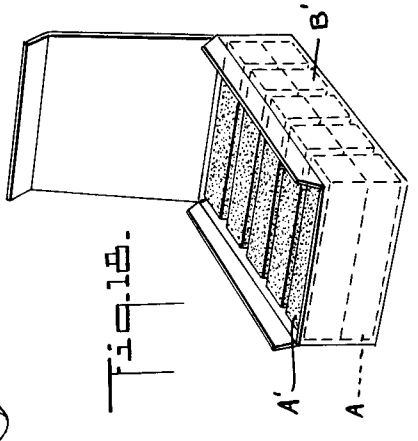


Fig. 1B.

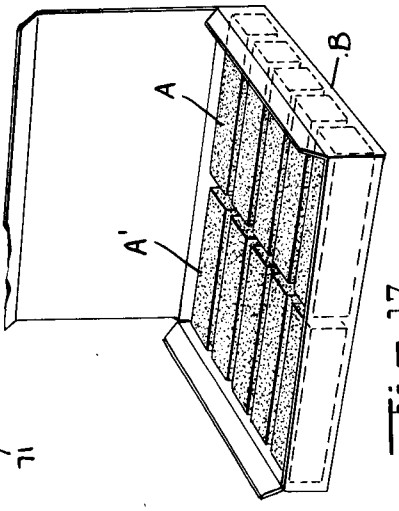


Fig. 17.

INVENTOR.
LA VERN H. BARRETT

BY

J. F. Bassecches
his ATTORNEY

Jan. 16, 1962 LA VERN H. BARRETT 3,016,665

PACKAGING MACHINE

Filed July 22, 1957 8 Sheets-Sheet 2

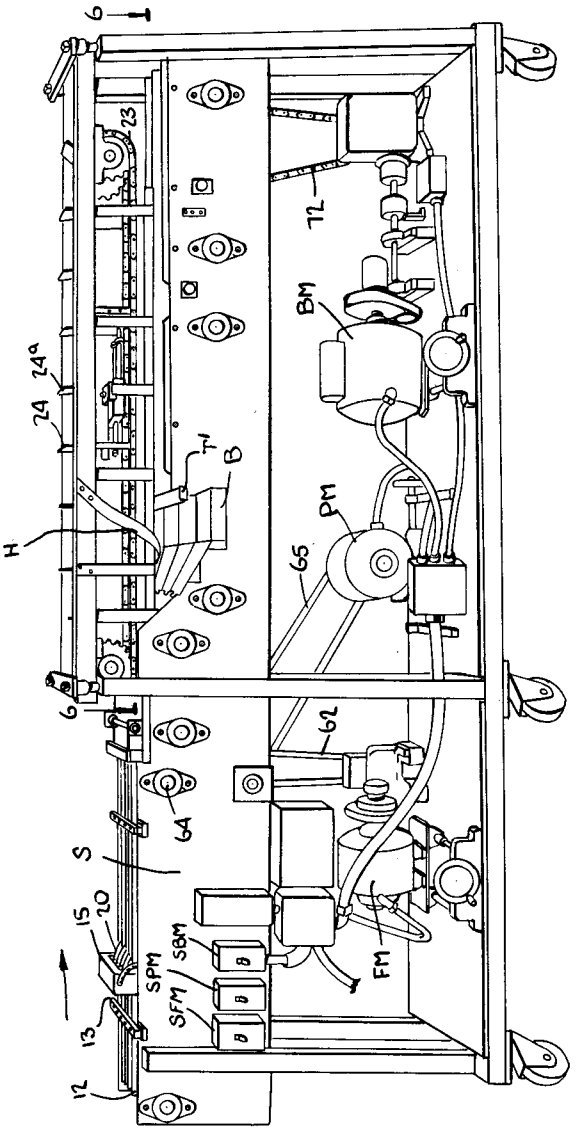


Fig. 2.

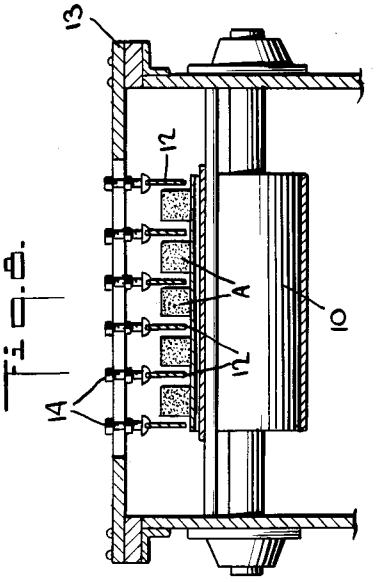


Fig. 6.

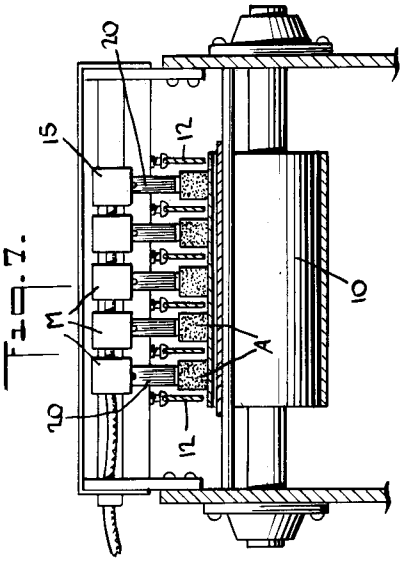


Fig. 7.

INVENTOR.
LA VERN H. BARRETT

BY

his ATTORNEY

Jan. 16, 1962 LA VERN H. BARRETT 3,016,665

PACKAGING MACHINE

Filed July 22, 1957 8 Sheets-Sheet 3

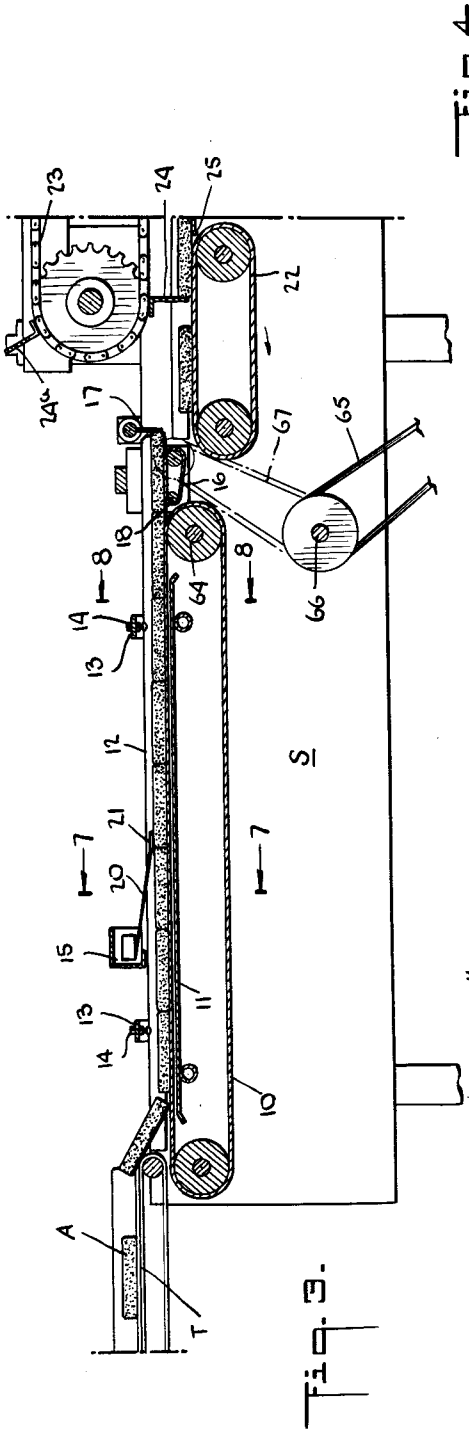


Fig. 3.

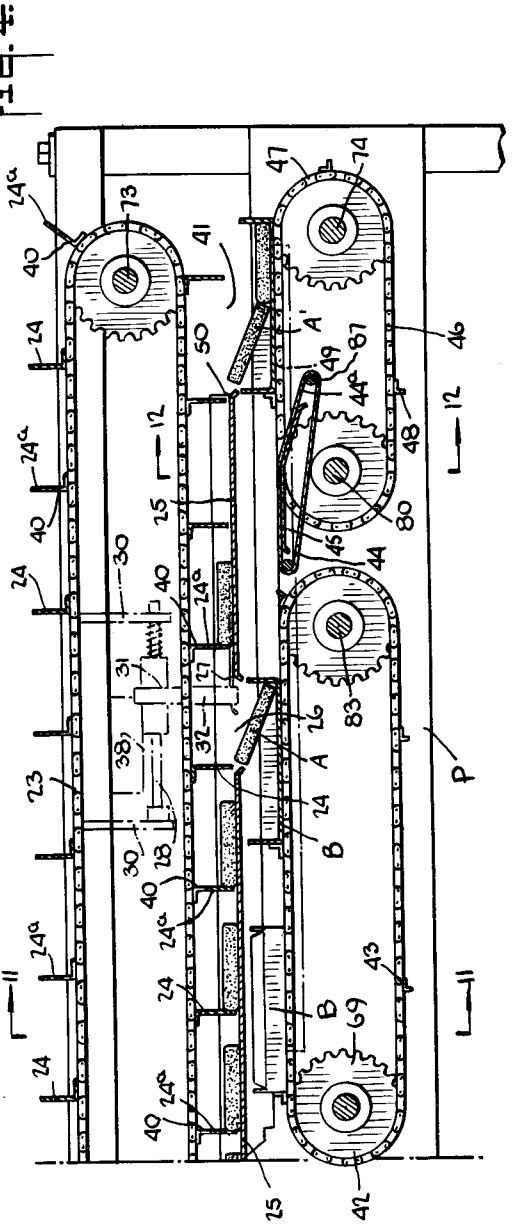


Fig. 4.

INVENTOR.
LA VERN H. BARRETT
BY
J. V. Bassuchess
his ATTORNEY

Jan. 16, 1962 LA VERN H. BARRETT 3,016,665

PACKAGING MACHINE

Filed July 22, 1957 8 Sheets-Sheet 4

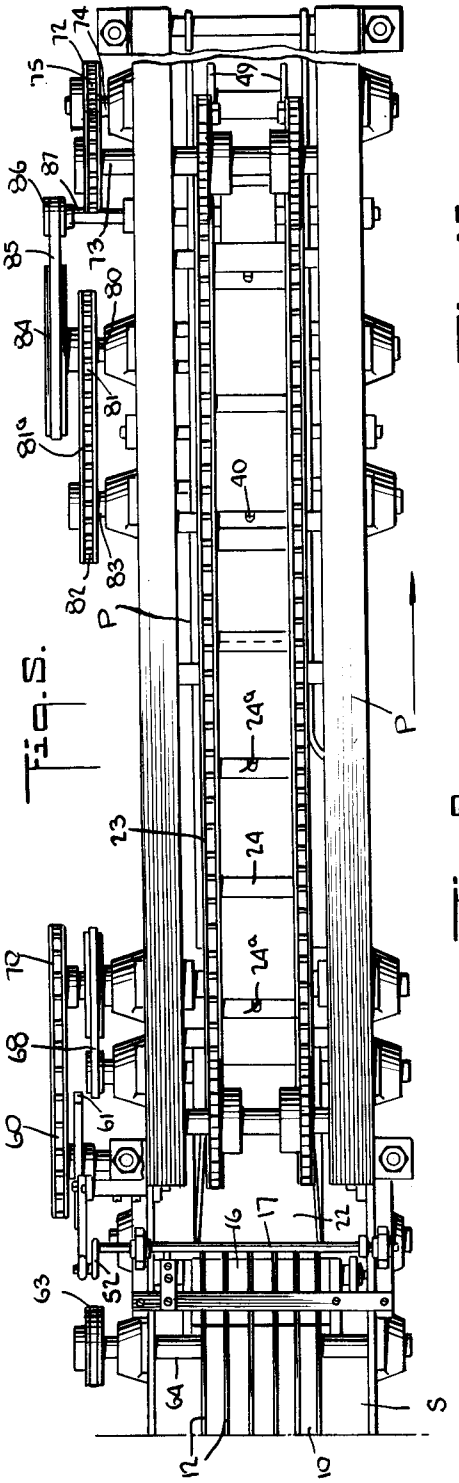


Fig. 5.

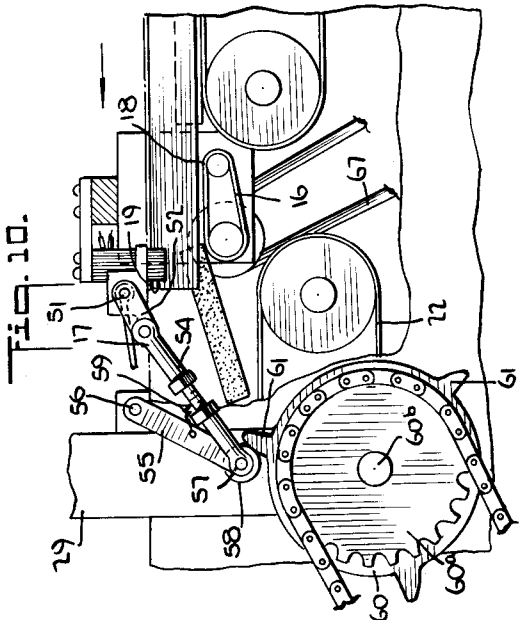


Fig. 10.

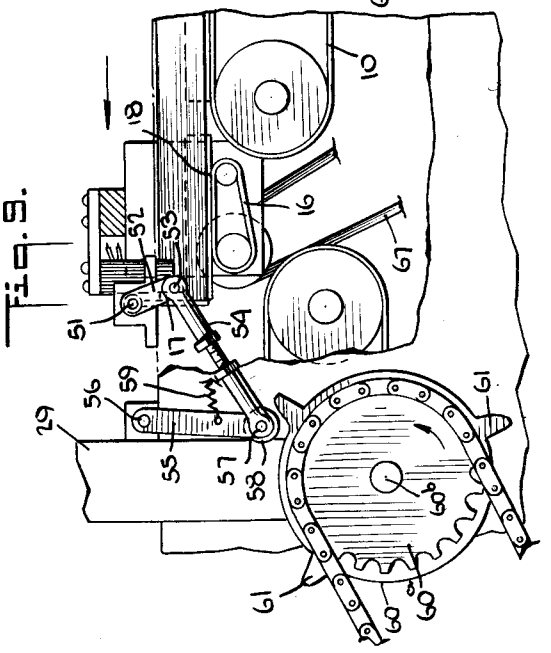


Fig. 9.

INVENTOR.
LA VERN H. BARRETT
BY
J. F. Bassiches
his ATTORNEY

Jan. 16, 1962 LA VERN H. BARRETT 3,016,665

PACKAGING MACHINE

Filed July 22, 1957 8 Sheets-Sheet 5

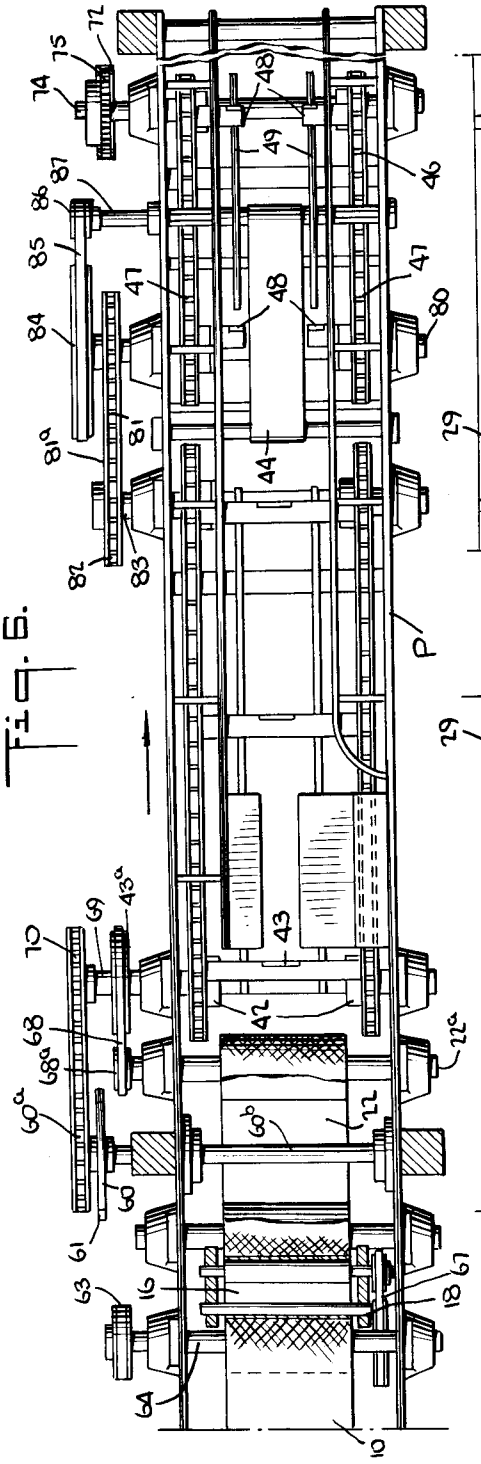


Fig. 6.

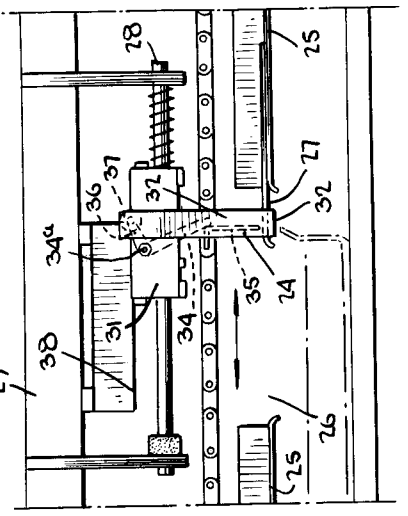


Fig. 14.

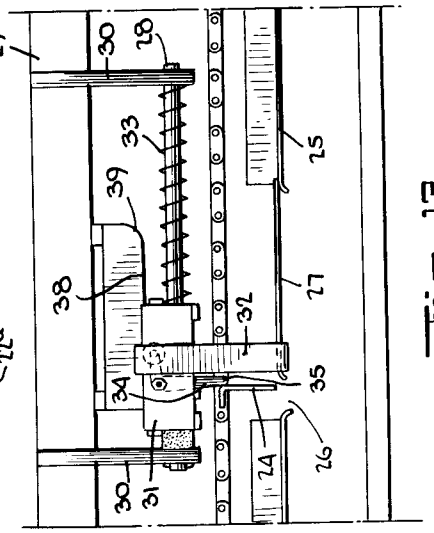


Fig. 13.

INVENTOR.
LA VERN H. BARRETT

BY

J. F. Bassuches
his ATTORNEY

Jan. 16, 1962 LA VERN H. BARRETT 3,016,665

PACKAGING MACHINE

Filed July 22, 1957 8 Sheets-Sheet 6

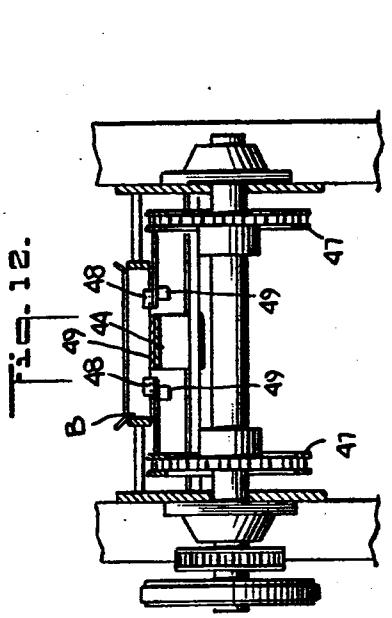


Fig. 12.

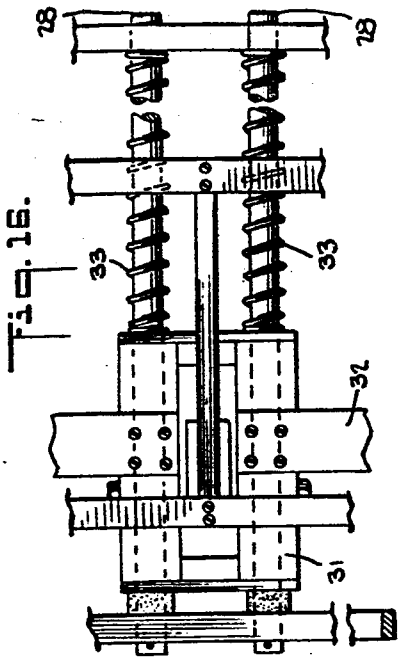


Fig. 16.

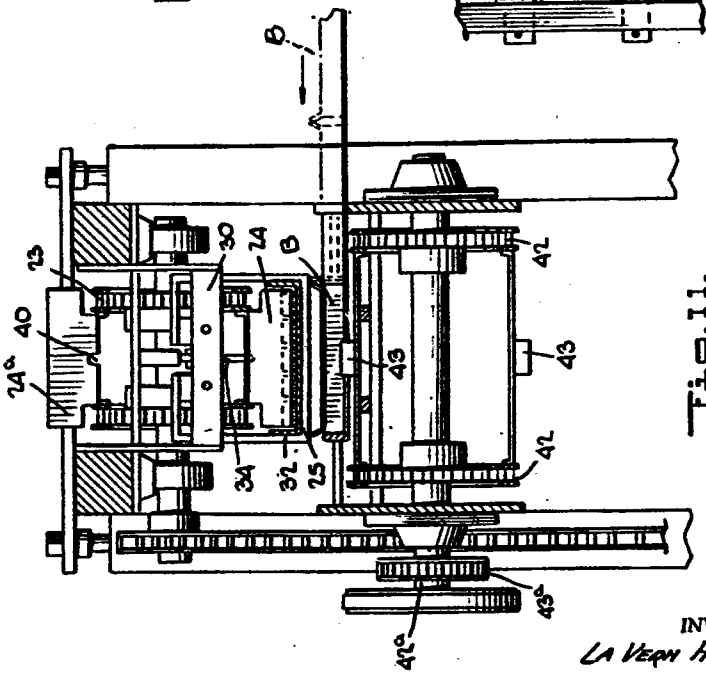


Fig. 11.

INVENTOR.
LA VERN H. BARRETT
BY
J. Barnes
his ATTORNEY

Jan. 16, 1962 LA VERN H. BARRETT 3,016,665

PACKAGING MACHINE

Filed July 22, 1957 8 Sheets-Sheet 7

Fig. 15.

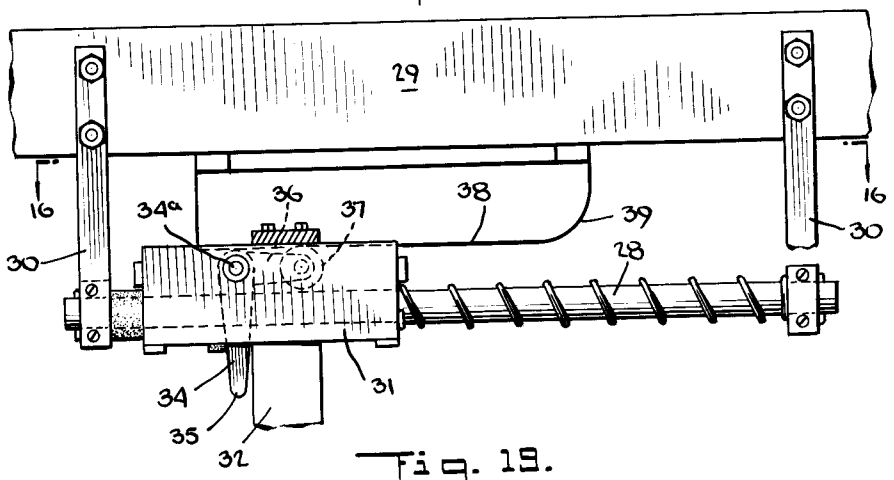
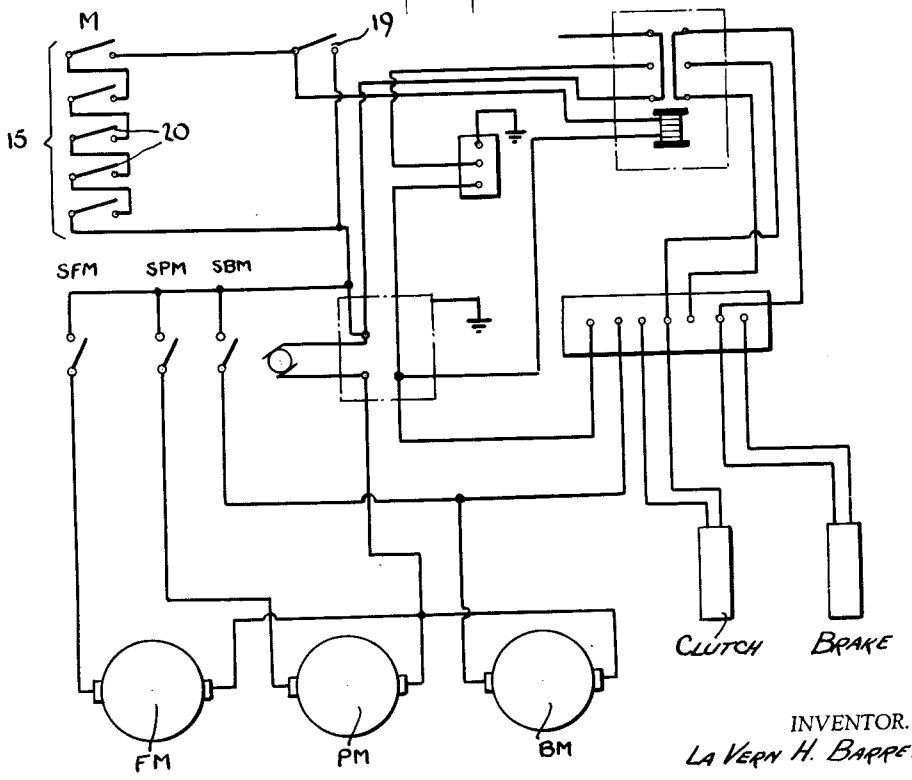


Fig. 19.



INVENTOR.
LA VERN H. BARRETT

BY

J. J. Bassecches
his ATTORNEY

Jan. 16, 1962 LA VERN H. BARRETT 3,016,665

PACKAGING MACHINE

Filed July 22, 1957 8 Sheets-Sheet 8

Fig. 21.

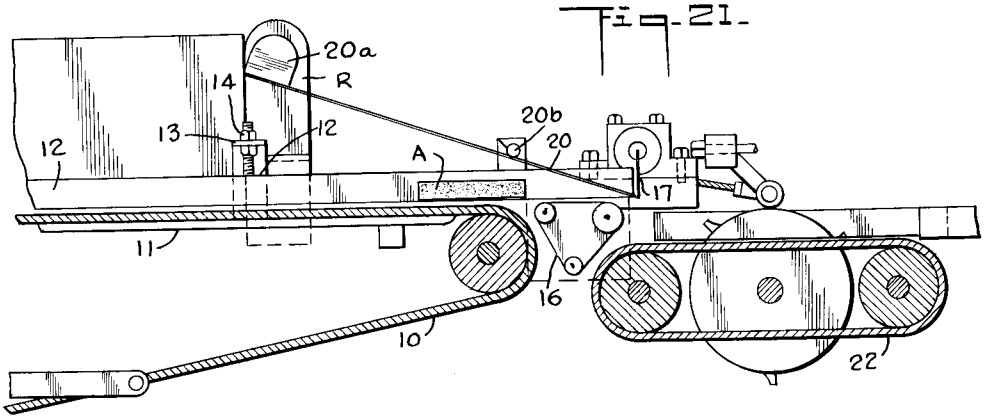
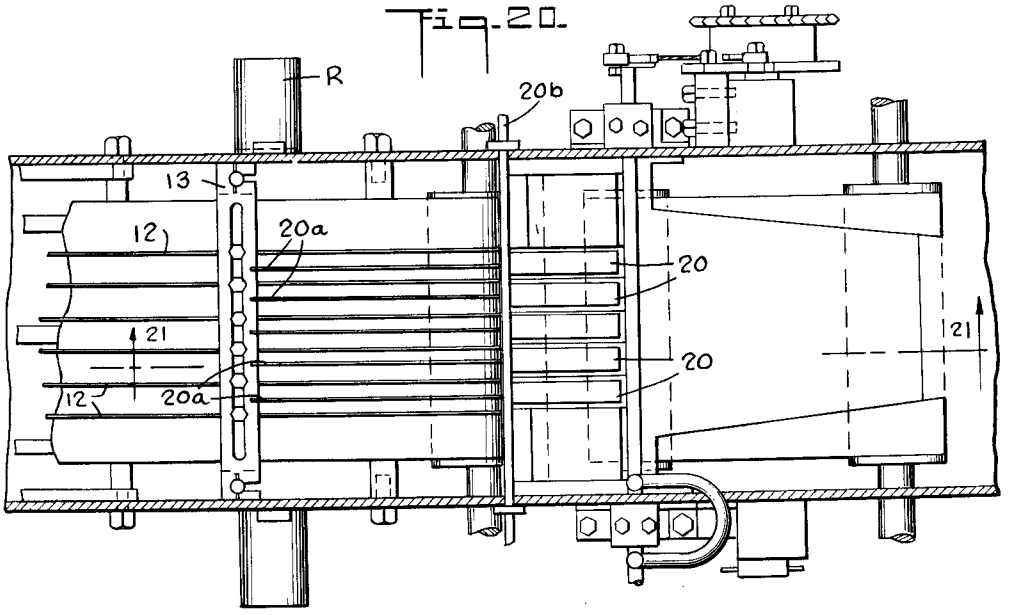


Fig. 20.



INVENTOR

LA VERN H. BARRETT

BY J. J. Bassecches

his ATTORNEY

United States Patent Office 3,016,665
Patented Jan. 16, 1962

3,016,665

PACKAGING MACHINE

La Vern H. Barrett, Lyons, N.Y., assignor to Manett Enterprises, Inc., New York, N.Y., a corporation of New York

Filed July 22, 1957, Ser. No. 673,291
22 Claims. (Cl. 53—73)

This invention relates to an automatic packaging machine, and more particularly to an assembly for handling products and packaging the same, of the character as outlined in my pending application entitled Feeder for Packaging Machines, Serial No. 651,373, (now U.S. Patent No. 2,890,784) filed April 8, 1957.

In my aforesaid application I have, inter alia, described and illustrated a feeder having particular value in providing a preliminary arrangement or orientation of elongated objects, specifically fish sticks, and I have indicated that it may form part of the means of feeding the said products alternatively to packaging machinery or to a station where this operation is manually performed, should it be found desirable.

Given a feeder in accordance with my said prior invention, or other feeding means for orienting the elongated objects, it is an objective of the present invention to utilize products thus preliminarily organized for automatically feeding the same in manually or automatically related means for feeding containers, whereby packages of said elongated objects may be furnished without manual operations in the handling of said products.

Still more particularly, it is an object of my invention to provide a packaging assembly for handling fish sticks, among other products, to feed the same in columnar arrangement, in rows arranged substantially in "dead heat," from which position they are moved in timed relationship to container feeding means whereby one or more layers of said rows of elongated objects may be filled into containers automatically, characterized by features assuring accuracy of filling, avoiding errors in the contents of the containers, arrangement of layers of said elongated products in overlying position or in edge-to-edge relationship, synchronization of the feed of boxes or containers with rows of said elongated objects or sticks, accurately to fill the containers or boxes, with minimum clearance to maintain the objects against unnecessary abrasion in shipping, all carried out under conditions avoiding errors in filling with a predetermined quantity of such objects, thereby minimizing the need for inspection.

Still more particularly, it is an object of my invention to provide feeder means for packaging machines whereby high speed filling of containers may be achieved, with assurance that the containers are filled with a predetermined quantity of elongated objects or fish sticks, with automatic detection and control of errors in the quantity fed, and minimum abrasion, whereby human errors normally encountered in the packaging of food stuffs of the kind herein exemplified are overcome.

Still more particularly, it is an object of my invention to provide automatic means for packaging the frail and readily frangible food stuffs to maintain the maximum desirable appearance, and to assure hygienic conditions by eliminating human handling of such products.

Still more particularly, it is an object of my invention to provide a packaging assembly for the handling of relatively delicate food products, in which losses due to mishandling are reduced to the minimum.

Still more particularly, it is an object of my invention to provide packaging machinery whereby high economies are effected by automatically handling relatively delicate food products which heretofore were considered too frangible for automatic packaging machines, and thereby

eliminating the need for manual coordination of packaging with feeder means, resulting in economies in labor costs.

Still further objects of my invention reside in novel means for aligning elongated objects in close end-to-end relationship, whereby close fitting into packaging containers may be effected, and a full quantity of the fish stick contents in a package assured.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, I make reference to the accompanying drawing forming a part hereof, in which—

FIGURE 1 is a perspective view of the left hand side of an assembly in accordance with my invention;

FIGURE 2 is a view similar to FIGURE 1 from the right hand side of the assembly;

FIGURE 3 is a fragmentary sectional view showing a detail of the aligning feeder;

FIGURE 4 is a sectional view of the boxing assembly;

FIGURE 5 is a plan view of portions of the assemblies shown in FIGURES 3 and 4;

FIGURE 6 is a plan view, partly in section, taken along the line **6—6** of FIGURE 2;

FIGURE 7 is a fragmentary section taken on the line **7—7** of FIGURE 3;

FIGURE 8 is a fragmentary section taken on the line **8—8** of FIGURE 3;

FIGURE 9 is a detail in magnified form of the gate controlling assembly, with the gate in the closed position;

FIGURE 10 is a view similar to FIGURE 9, with the gate in the open position;

FIGURE 11 is a fragmentary section taken on the line **11—11** of FIGURE 4;

FIGURE 12 is a fragmentary section taken on the line **12—12** of FIGURE 4;

FIGURES 13 and 14 are side elevational views of details of the trap door mechanism in two different positions;

FIGURE 15 is a magnified detail of the assembly shown in FIGURES 13 and 14;

FIGURE 16 is a section taken on the line **16—16** of FIGURE 15;

FIGURE 17 is a perspective view showing the fish sticks packaged in a single layer;

FIGURE 18 is a perspective view showing the fish sticks packaged in a double layer;

FIGURE 19 is a diagrammatic view of the wiring system for my installation;

FIGURE 20 is a plan view of another embodiment of my invention;

FIGURE 21 is a section taken on the line **21—21** of FIGURE 20.

In accordance with my invention, it is intended in the preferred embodiment thereof to provide a packaging assembly which may usefully employ the preliminary feeding assembly in accordance with the invention of my application aforesaid as filed, wherein elongated food products, more specifically fish sticks in pre-conditioned form or in raw frozen form, are provided oriented in columnar arrangement, five columns being illustrated. Such initially oriented elongated objects may be first distributed over a timing conveyor of extended length, to assure a large average distribution in columnar arrangement of such fish sticks. While the orienting means may time the oriented fish sticks exemplified in my prior application sufficient for manual packaging, it is intended by the assembly to be described to assure accuracy of timing and filing of packages, and for this purpose the products which may be supplied from a timing conveyor are thereupon distributed upon a packaging machine feeding conveyor, including means initially to align the leading ends of the sticks in each of the columns in "dead

heat" position, the conveyor assuring an uninterrupted flow of columns of such sticks before the sticks are fed to a station at which rows of such sticks are deposited within a container.

Further phases of the assembly described include novel mechanism for timing in synchronism the positioning of a container to the positioning of a row of fish sticks, and the movement of the container with the movement of rows of fish sticks, whereby the rows may be deposited in the containers in one or more layers, superimposed upon each other or in end-to-end contact, as market requirements may dictate as desirable.

Describing my invention generally, I refer to the drawings, and particularly to FIGURES 3 and 4.

Elongated objects A, A', exemplified as fish sticks, axially aligned to lie in a plurality of columns, are fed to a sensing and edgewise aligning station S by the timer belt T, and thence to a packer and container synchronized station P.

The objects A are advanced by another belt, which other belt is provided with a detecting device adapted to insure filling of all of the columns. The objects are then deposited on a relatively short accelerating belt, and are thrust by said belt against a releasable, endwise aligning gate, or a temporary stop, thereby "dead heat" aligning the objects into a row.

With the objects thus aligned, the stop is displaced, thereby permitting the accelerated belt to project the row of objects onto still another belt. The stop is arranged to return to its former position in a time sequence calculated to prevent the projecting of more than one row during a single cyclic opening and closing of the stop means or gate.

The projected rows of objects are advanced by the belt to an elongated skid or dead plate, where they are simultaneously engaged by pusher plates extending from an endless chain. The plates are arranged to operate in synchronism with the stop, to bar possible damage to the objects.

The rows are advanced along the skid by the plates in timed relationship to the feeding of boxes which are advanced by a box conveyor lying beneath the skid. The skid is provided with a covered passage or trap, the cover for said passage being removable by the movement thereover of predetermined pushers.

When the cover is removed, a single row of objects is dropped into an opened box positioned beneath the passage by the box conveyor. The trap cover returns to the trap sealing position after a discharge, thereby preventing the row of objects advanced by the following pusher from falling through the trap.

A partially filled box is retimed by a second box conveyor, to be positioned to receive a second row of objects as they fall through a second drop or passage located at an advanced position along the skid. By varying the timing, it is possible to arrange the rows in a box to lie in end-to-end or stacked relationship. Any number of rows may be positioned in a given box by providing additional traps or passages.

Describing in detail the "dead heat" orienting operation of my invention, elongated objects, manually or otherwise arranged in parallel columns by an extended timing conveyor, are deposited in endwise, haphazard relation on a first belt **10**. Sagging of the upper flight portion of the belt **10** is prevented by the supporting action of forming a guide plate **11** arranged to underlie the object advancing surfaces of the belt **10**.

The objects are maintained in parallelism by the partition or guide plates **12** (see FIGURE 8), which extend downwardly from the overhanging guide plate cross bar supports **13**, to lie adjacent without contacting the belt **10**. The plates **12** are arranged to be variably spaced on the supports **13** by the locking bolts **14** slidably mounted in slots, thereby adapting the assembly for use with objects of a variety of thicknesses.

Along the length of the belt **10** is provide a columnar detector assembly **15** (see FIGURES 3 and 7), adapted to scan or sense the plural columns and note any unfilled column or columns. The method of detection and effects of noting a deficiency will be described later.

The objects A are deposited by the belt **10** onto an independently actuated, accelerating feed belt **16** (see FIGURE 3), proceeding in the same direction as belt **10**, but at a greater rate of speed.

A stop or gate **17** is swingably positioned to form, in the closed or down position (see FIGURES 3, 9 and 10), an end abutment against which the objects are momentarily stopped to form a "dead heat" aligned row adjacent the stop means or gate **17**, traversing the full row of objects between the plates **12**. It should be noted that the entering portion **18** of the accelerating belt **16** is preferably spaced from the gate **17** a distance of less than the length of one object A, thereby to permit only one row of the objects at a time to lie on said accelerating belt **16** in the closed or blocking position of said stop **17**.

The stop or gate **17** is arranged to be cyclically moved open and shut under power supplied from and in synchronism with the packing assembly, and the stop actuating means will therefore be described in connection with the packer. The stop **17** is likewise provided with a power controlling switch **19** (see FIGURES 9 and 10), which switch is arranged to be closed when the stop is in any position other than the "down" or blocking position, and open only when the stop is in said down or blocking position.

Details of the effects on the pushing assembly of the various positions of the switch **19** will be discussed in the description of the packing portion, it being sufficient to note in connection with the aligning and feeding portions of my invention that the switch **19** functions to prevent a stoppage of that portion with the stop **17** in other than the down position.

The deficiency detector **15** comprisies, in one embodiment (see FIGURES 3 and 7 and the wiring diagram), a plurality of levers or sensing fingers **20** corresponding in number to the number of channels outlined by the plates **12**. The fingers **20** normally extend downwardly to lie adjacent the upper flight of the belt **10** at a point **21** along its length. In the aforementioned embodiment, each finger **20** is arranged to control a power circuit by the operation of a microswitch M (not shown) in the assembly **15**. Each said finger **20** operates to keep its corresponding microswitch M in the open position when there is no object A beneath said finger at the point **21**. When an object A is advanced to fill the gap at the point **21**, the finger **20** rides upwardly over the object A, thus closing the individual microswitch controlled by that finger **20**.

The microswitches included in this embodiment of the detector **15** are series-connected and thus the detector **15** is actuated by the absence at the point **21** of an object A in any of the channels.

The detector **15** and the stop switch **19** are connected in parallel, and together control the power supply to the stop **17**, thereby enabling the stop actuating mechanism to continue cyclic operation when either the detector **15** is closed (by reason of a full complement of objects A at the point **21**) or the stop switch **19** is closed (by reason of the stop **17** occupying a position other than closed). It should be noted that the belts **10** and **16** are controlled independently of the detector **15** and stop switch **19**, the said belts continuing despite the open or closed postion of the said detector and/or switch.

In operation, the columns of axially aligned, endwise, haphazard objects A are fed from a supply conveyor T to the belt **10**, the guide plates **12** having been adjusted, as previously described, to provide the desired columnar clearance. The objects A advance from the belt **10** to the belt **16** and are thrust by the last-named belt against the downwardly positioned stop **17**, thereby

momentarily aligning the stop adjacent objects A in dead heat, as well as in columnar relation. Upon cyclically raising the stop **17**, the thus-formed row of objects is projected by the accelerated belt **16** onto a conveyor **22**, forming the first stage of the packing assembly.

It is important to note that only the stop-adjacent objects A are permitted to contact the accelerated belt **16**, the differential speeds of the belts **10** and **16** providing a time lag to allow the stop to come to the down position in time to block passage to the packing assembly of more than one row of objects during any single cyclic opening and closing of the stop **17**.

The detector **15** and the stop switch **19** are provided to assure the supplying of full rows only to the packing assembly. If at the point **21**, a columnar deficiency is detected by the fingers **20**, the detector **15** comes to the open switch position. As previously noted, the stop **17** being under control of a separate actuating means will continue its cyclic operation despite the open position of detector **15**, current being supplied to the stop actuating means through the parallel connected stop **19**. When the stop **17** reaches the down position (see FIGURE 9), however, the stop switch **19** automatically opens, and the operation of the stop **17** will be suspended, the stop remaining in the down or blocking position. If, in the time interval between the detection of a deficiency at the point **21** by any of the sensing fingers and the closing of the stop **17**, an object or objects are advanced by the belt **10** to close the detector assembly **15**, stop **17** will continue to operate without interruption, current being supplied to the stop actuating means through the closed detector. It is only when the detector **15** and the stop switch **19** are coincidentally open that the stop **17** is deactivated. Since the stop **17** can be deactivated only in the closed position, there is no chance for accidental feeding of less than a full row of objects, despite the fact that the belts **10** and **16** continue to operate when the stop is deactivated.

The stop **17**, thus deactivated in the closed position, forms an end barrier, causing a jamming or backing-up of objects in their respective channels. As the belt **10** continues to feed additional objects A, there will eventually occur a back-filling until the columnar deficiency at point **21** has been corrected, thereby closing the detector and automatically causing the stop **17** to resume its cyclic operation.

The packer

An aligned row of objects A is projected from the belt **16** to the conveyor **22** on its upper flight upon each cyclic opening and closing of the stop **17**. An endless chain **23**, having a series of extending pusher plates **24**, is powerized to advance each pusher plate **24** in synchronized relation to the operation of the gate **17**, to descend behind the row of objects A, thereby to prevent possible cutting, fracturing or abrading of the objects A. The rows of objects A thus engaged from behind by pusher plates **24** are advanced by said plates from the conveyor **22** onto and along a skid or dead plate **25**.

A trap or passage **26**, comprising an opening of approximately rectangular outline, is formed through an advanced portion of the skid plate **25** (see FIGURES 13 and 14). A trap cover or door **27** is arranged to be horizontally, slidably mounted to cover the trap **26**. A pair of rods **28** (see FIGURES 13, 14, 15, 16) are horizontally suspended from the frame **29** of the packer by the vertical bars **30**. A carriage **31**, having a pair of vertically descending straps **32**, is slidably mounted on the rods **28**, the said carriage being normally biased to the closed position shown in FIGURE 13 by a pair of rod-encircling springs **33**. The cover **27** is horizontally supported between the straps **32**, it being noted that the cover **27** is movable with the carriage **31** and is, therefore, normally biased by the springs **33** to cover the passage **26**.

Downwardly depending from the carriage **31** and centrally positioned thereon is a pawl **34**, mounted on a pivot **34***a*, having an extending trigger branch **35** and a follower branch **36**, the said follower branch being additionally provided with a friction reducing roller **37** (see FIGURE 15).

Beneath the frame **29** of the packer is affixed an extended horizontal guide track **38**, with a terminal roll-off or cam face **39**.

In the illustrated embodiment, alternate pusher plates **24***a* are formed with a recess **40** centrally of the chain adjacent an inner surface thereof (see FIGURE 11). The dimensions of the recess **40** are calculated to permit the recessed pushers **24** to span without contacting the trigger branch **35** of the pawl **34**. When a non-recessed pusher **24** passes the trap **26** of the skid **25**, the trigger **35** is engaged by the chain adjacent the face of the said pusher, causing the carriage **31** and consequently the cover **27** to be withdrawn against the biasing action of the springs **33** in the direction of movement of the pushers **34**. The trigger **35** is maintained in approximately vertical position by the contact of the roller **37** of the follower branch **36** against the track **38**. As the carriage **31** and cover **27** reach the fully retracted position (see FIGURE 14), the roller **37** and follower branch **36** are guided over the contour of the cam face **39**, thereby permitting the pawl **34** to swing about the pivot **34***a* and removing the trigger **35** from contact with the pusher **24**. With the trigger thus disengaged, the carriage **31** is returned by the springs **33** to the closed position of the cover **27** (see FIGURE 13), at the same time passing a pusher **24***a* by the clearance slot **40**.

It will be readily recognized that by the above arrangement, the row of objects advanced by each recessed pusher **24***a* will be permitted to fall as it reaches the trap **26**, (the cover having been drawn by the preceding non-recessed pusher **24**), while the row carried by each non-recessed pusher **24** will pass over the cover **27**, bypassing the trap **26**, and continue down the skid or dead plate **25**.

A second end drop **41**, spaced apart from the trap **26**, is formed through the skid **25**, the drop **41** being adapted to receive the alternate rows not previously deposited (i.e. the rows advanced by the non-recessed pushers **24**).

Boxes B are advanced in filling position beneath the first trap **26** by a box conveyor **42**, having box feed shoulders or lugs **43**. The conveyor **42** is timed to be synchronized with the movement of the pushers **24**, thereby to enable accurate deposition of the rows of objects A at a predetermined position within the boxes B.

The boxes B, partially filled at the trap **26** (see FIGURE 4), are deposited by the conveyor **42** on a centrally positioned dwell or idler belt **44**, which belt is adapted to assume a generally downwardly receding flight **44***a* by the belt conforming supporting dead plate **45**, thus giving the box a dwell as the belt recedes and leaves the boxes on skid bars herebelow described.

The boxes are removed from the belt **44** by a box retiming conveyor **46** comprising a pair of spaced endless chains **47** (see FIGURES 4 and 12), to each side of the idler belt **44**, carrying a plurality of spaced-apart, paired box grippers **48**. The grippers **48** advance the boxes B from the idler belt **44** to and along the skid bars **49**, arranging the partially filled boxes B beneath the point **50**, to receive the rows of objects A' not deposited through the first trap **26**.

By varying the feeding timing of the conveyor **46**, as will be described, it is possible to vary the stacked arrangement of the box, as is illustrated by FIGURES 17 and 18 showing, respectively, end-to-end (B), and superimposed (B') stacking arrangements.

It is important to note the timed inter-relation and operational control of the feeding and packing portions of my invention.

The stop or gate **17** (see FIGURES 9 and 10) is pivot-

ally mounted at **51** and is operatively connected to a crank arm **52** which is, in turn, pivotally connected to an extended arm **54** by the knuckle **53**. A downwardly depending link **55** is pivotally connected at one end **56** to the frame **29** of the packer and at the other end **57** to the arm **54**. The end **57** of the link **55** is provided with a roller **58**, for purposes which will appear hereafter. A spring **59** is tensioned between the link **55** and the frame **29**, thereby causing the gate **17** to assume the closed or down position (see FIGURE 9).

A cam wheel **60**, having a plurality of camming teeth **61** spaced about its periphery, is operatively connected to the source of power supplying the packing assembly, and is thus activated at all times when the packing assembly is in operation (i.e. when either the switch **19** or the detector **15**, or both, are in the closed position). As the wheel **60** rotates, each of the teeth **61** successively contacts the follower roller **48** of the link **55**, thereby causing the arms **52** and **54** to pivot the gate **17** to the open or feeding position (see FIGURE 10). As the roller **58** passes the dead center position of the teeth **61**, the link **55** will be raised and the arms **52** and **54** will permit the gate **17** to snap back to the down or closed position under the biasing influence of the spring **59**.

Adjacent the leading point of the packer station P, a box B feeding throat T' is provided in the form of a slide and cover hold H, manually or automatically to introduce boxes in timed relation to the movement of the belt **23** and synchronized with the pushers **24** to provide one box B for each pusher blade **24**.

Motorization of the assembly is preferably effected by providing the frame F with a platform having portability, so that the packaging assembly may be moved to a point adjacent a processing station to which sticks B are fed to the timer belt T first described.

In one form of assembly, a feeder motor FM is mounted adjacent the station S and a pusher and a speed-up belt motor PM and box and conveyor motor BM are mounted on the platform adjacent the packer frame P. The motor FM, through the chain drive or belt **62** and intermediate transmission and speed reducer, as required, drives the pulley **63** for the shaft **64** of the conveyor **10**.

The motor PM, through the belt **65**, drives the shaft **66** and then, through the belt **67** and coordinate pulley, drives the speed-up conveyor **16**. The shaft **69** of the box conveyor **42** is provided with a sprocket **70** and a pulley **43***a*. A belt **68** links the pulley **43***a* to a pulley **68***a*, thereby rotating the shaft **22***a* and thus operating the conveyor **22**. The sprocket **70** of the shaft **69** is connected with a sprocket **60***a* mounted on the shaft **60***b*, thereby coordinating rotation of the sprocket **60***a* with the wheel **60** carrying gate operating cam teeth **61**.

Motor BM, through suitable transmission coupling **71** and speed reducer, which may include brake and clutch control expedients, operates the chain belt **72**, rotating the shaft **73** to which conveyor belt **23** is coupled, as well as driving the shaft **75** through the medium of the selectively operated slip-clutch controlled sprocket **75** to time the box conveyor **46** in accordance with the stacking or endwise arrangement of the sticks which is desired.

Positive drive for the shaft **74** is derived through the chain **72**. Transmission is given to the shaft **80** through the carrier belt **47**. The shaft **80** includes a sprocket **81** connected by the chain **81***a* to the sprocket **82** on the shaft **83**. The shaft **80** has a pulley **84** driving the pulley **86** on the shaft **87** through the belt **85**. Shaft **87** drives the dwell or idler belt **44** to locate a partially filled box on the skid bars **49** previously described.

Switches SFM, SPM, SBM manually may be used for controlling the power circuits for the motors FM, PM, BM, respectively, but otherwise during operation the motors are under the control of the sensing switch assembly **15** and the gate switch **19**.

It will be observed from the wiring diagram (FIGURE 19) that absence of a fish stick adjacent the sensing detector station **15** will control the packer and the box conveyor motor BM but will not affect the power of the circuits controlling the feeder motors FM or PM so that it will continue its operation to satisfy the full complement or columnar supply in rows, to assure a full package.

It will also be understood that while I have shown and described a sensing detector assembly **15** which operates upon depression of any finger **20**, it will be observed that each finger **20** may have a light beam interrupting member or obscuring means comprising a flag **20***a* to deactivate a photo-electric relay means R instead of depending on the mechanical contact of the fingers **20**.

A plurality of light flags **20***a* (see FIGURES 20 and 21), each arranged to be maintained in non-light beam interrupting position when tilted in the direction of the arrow about pivot **20***b* by the presence of an object or stick A along the conveyor thereby may be used to minimize the slightest abrasion caused by touching contact of the spring fingers **20**.

It will thus be shown that I have described a feeder and packaging machine with automatic control, eliminating human errors in packaging and assuring a continuous operation of the feed of the fish sticks and the boxes, with minimum abrasion.

Thus, the most fragile and delicate components of food may be packaged, with assurance of maintaining a highly desirable appearance and hygienic conditions.

It will be further understood that the choice of materials entering into the construction, such as the use of highly polished stainless steel, need not here be described, as it will be understood that a selection of materials may be made to assure conditions of cleanliness, and continuous operation of the assembly.

Having thus described my invention and illustrated its use, what I claim is new and desire to secure by Letters Patent is:

1. An assembly for orderly positioning in a box a plurality of similarly sized elongated objects, such as fish sticks, previously oriented in a plurality of columns to be in mutually parallel, leading edge haphazard relation, comprising a first conveyor means arranged to advance said parallel objects in the direction of their longitudinal axes, a second conveyor means arranged to proceed at a speed in excess of said first conveyor means and adapted to receive said objects from said first conveyor means, and to accelerate the movement of the objects to remove the same from the influence of said first means, transversely extended stop means variably positionable to release and stop position forming, in the closed position, an abutment extending across all said columns for dead heat aligning said objects of each of the columns in relation to each other thereagainst, and timing means arranged cyclically to move said stop means to the open position, thereby to permit a single row across all of said columns of said endwisely aligned objects to be fed by said second conveyor to a packing assembly arranged to receive and box said aligned objects.

2. An assembly in accordance with claim 1 and including primary sensing means arranged to detect columnar deficiencies at a predetermined point along the length of said first conveyor means, and actuating means for said stop means operatively controlled by said primary sensing means, said primary sensing means and said actuating means cooperating to maintain said stop means in the closed position in the event of a columnar deficiency.

3. An assembly in accordance with claim 1 and including primary sensing means arranged to detect columnar deficiencies at a predetermined point along the length of said first conveyor, and has stop means-actuating means operatively controlling the position of said stop means to move the same from closing position to a lowered pass-

ing position, and secondary sensing means arranged to detect the position of said stop means, said primary and secondary sensing means cooperating to interrupt operation of said conveyors upon detection of a columnar deficiency only when said stop means is cyclically depressed to the closed position.

4. An assembly in accordance with claim 3 wherein a packing assembly is positioned operatively to receive said objects from said conveyor and said primary and secondary sensing means cooperate to suspend operation of said packing assembly when said stop means is maintained in the closed position by reason of detection of a columnar deficiency by said primary sensing means.

5. An assembly in accordance with claim 3 wherein the object contacting surface of said second conveyor is of a length less than the length of said objects, to overlap the contacting surface of said second conveyor in the direction of feed of said second conveyor.

6. An assembly in accordance with claim 3 wherein the said stop means in the closed position is spaced from the entering portion of said second conveyor a distance less than the length of one of said objects.

7. An assembly in accordance with claim 3 wherein said first and second conveyors have operating means independently arranged to continue in operation, notwithstanding the closed position of said stop means caused by detection of a columnar deficiency.

8. An assembly in accordance with claim 7 wherein said lowered stop means has means connected therewith to provide upon detection of a columnar deficiency, provides an end wall, thereby causing a columnar jam of said objects, the rear of each said object forming an abutment for the leading edge of the following objects, thereby causing a lost motion of said objects relative to said conveyors, and thus effecting a filling of said columnar deficiency as other objects are supplied by said first conveyor.

9. An assembly in accordance with claim 8 wherein said primary and secondary sensing means are coupled to control means arranged to permit resumption of the cyclic operation of said stop means upon the filling of said columnar deficiency.

10. An assembly in accordance with claim 3 wherein said stop means comprises a vertically swingable gate.

11. A packing assembly for arranging in a box a plurality of rows of elongated objects, such as fish sticks, arranged on an extended skid, comprising endless conveyor means having a plurality of outwardly extending pusher plates, at least two box loading drop passages formed through said skid, at least one drop passage cover means on each but one of said apertures biased normally to cover said other apertures, cover retractor means in repeated sequence on certain of said pusher plates, and arranged to withdraw said cover means to permit a row of objects to be loaded into an open box arranged to lie beneath said withdrawn cover, and box conveyor means timed to advance a partially filled box to filling position beneath at least one other said passage.

12. An assembly in accordance with claim 11 wherein said cover means includes an extending trigger, and said cover retractor means comprises a conveyor adjacent portions of said pushers.

13. An assembly in accordance with claim 12 wherein said plates not equipped with cover retractor means are provided with trigger clearance means.

14. An assembly in accordance with claim 11 wherein said cover retractor means are dimensionally differentiated whereby certain of said detractor means are adapted to withdraw certain of said cover means and to by-pass, without withdrawing, other of said cover means.

15. An assembly in accordance with claim 11 wherein said cover means includes a pivotally mounted trigger having a retractor actuated branch and a follower branch adapted to ride on a stationary cam means, said follower branch and cam means cooperating to maintain said retractor actuated branch in the retractor engaging position of said trigger until said cover means reaches the withdrawn position thereof.

16. An assembly in accordance with claim 15 wherein said cover means is arranged to be automatically returned to the closed position thereof under said biasing pressure when said cover means reaches the withdrawn position thereof.

17. An assembly in accordance with claim 15 wherein said follower branch and cam means cooperate to pivot said retractor actuated branch to retractor disengaging position when said cover means reaches the fully open position thereof, thereby permitting said last named means to return to the closed position under said biasing influence.

18. In an assembly for orderly positioning in a box a plurality of rows of similarly sized elongated objects, such as fish sticks, previously oriented in a plurality of columns to lie in mutually parallel, leading edge haphazard relation, including end-to-end aligning means including a stop cyclically movable to form, in the closed position, an end abutment for said objects, feeding means along the length of said aligning means, and packing means arranged to receive objects from said aligning means, sensing means including means for detecting columnar deficiency of said objects and independent stop position detecting means, and control means including electrical switching means for each of said detecting means, said control means being arranged to suspend operation of said packing means when each said switching means is in the open position.

19. A device in accordance with claim 18 wherein said electrical switching means are connected in parallel.

20. A device in accordance with claim 18 wherein said top position detecting means is connected to means arranged to open one said switching means each time said stop means is cyclically moved to the closed position.

21. A device in accordance with claim 18 wherein said columnar deficiency detector means comprises a plurality of series-connected microswitch means corresponding in number to the number of objects in a row, each said microswitch means being maintained in closed position by the presence of an object at a predetermined point along the length of said aligning means.

22. A device in accordance with claim 18 wherein said columnar deficiency detector means comprises a light-beam activated photo-electric relay means and a plurality of light-beam interrupting means, each arranged to be maintained in non-light-beam interrupting position by the presence of said objects at a predetermined point along the length of said first conveyor.

References Cited in the file of this patent

UNITED STATES PATENTS

1,938,104	Jennings	Dec. 5, 1933
1,952,042	Ahnger	Mar. 27, 1934
1,954,842	Ranney et al.	Apr. 17, 1934
1,995,085	Wild	Mar. 19, 1935
2,158,069	Grover	May 16, 1939
2,210,378	Parry	Aug. 6, 1940
2,608,038	Knowlton et al.	Aug. 26, 1952
2,687,208	Cox	Aug. 24, 1954
2,805,755	Jones	Sept. 10, 1957
2,816,647	Ruth	Dec. 17, 1957
2,834,165	Bonebrake	May 13, 1958