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PACKAGING MACHINE

Filed Sept. 22, 1949

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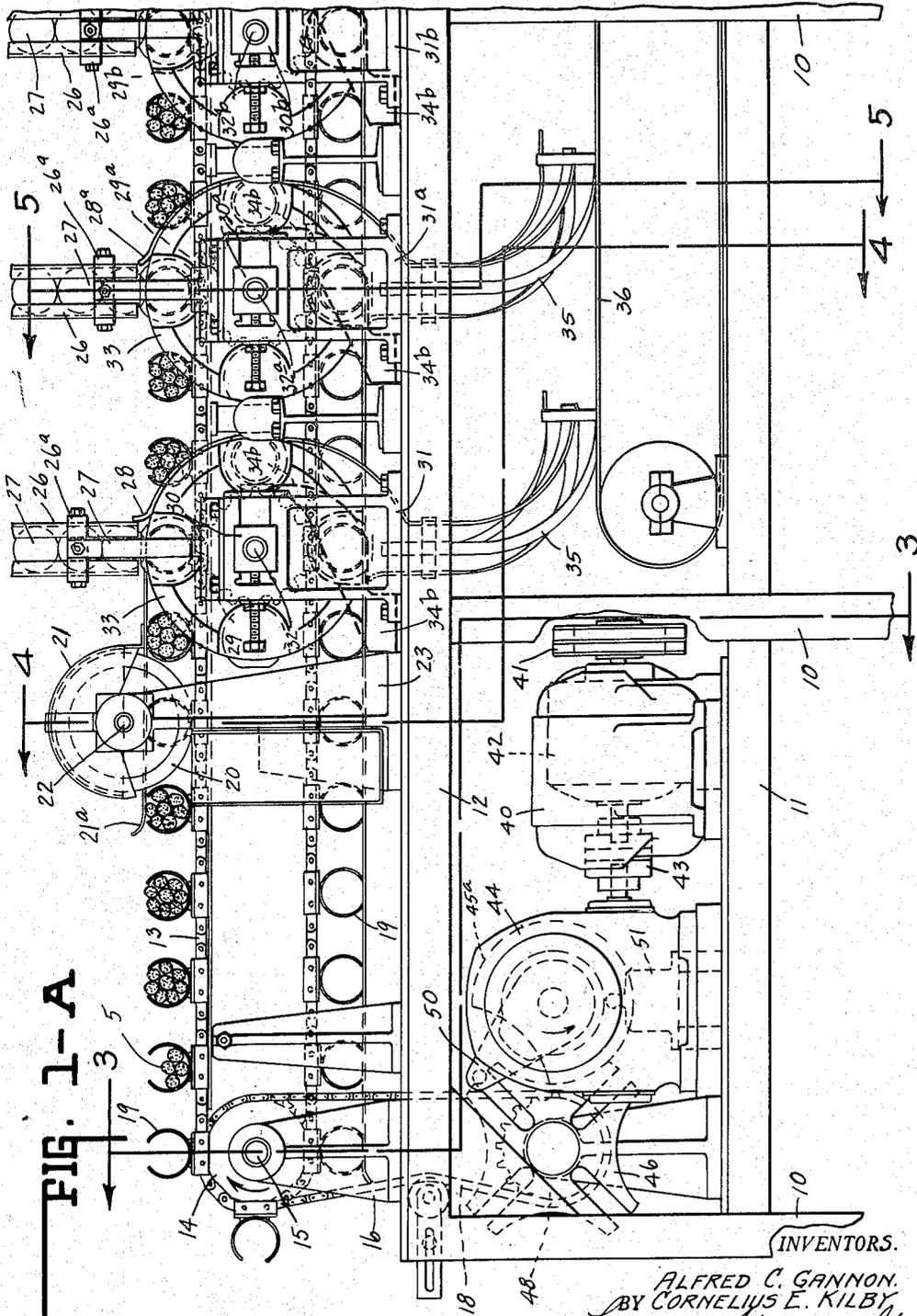


FIG. 1-A

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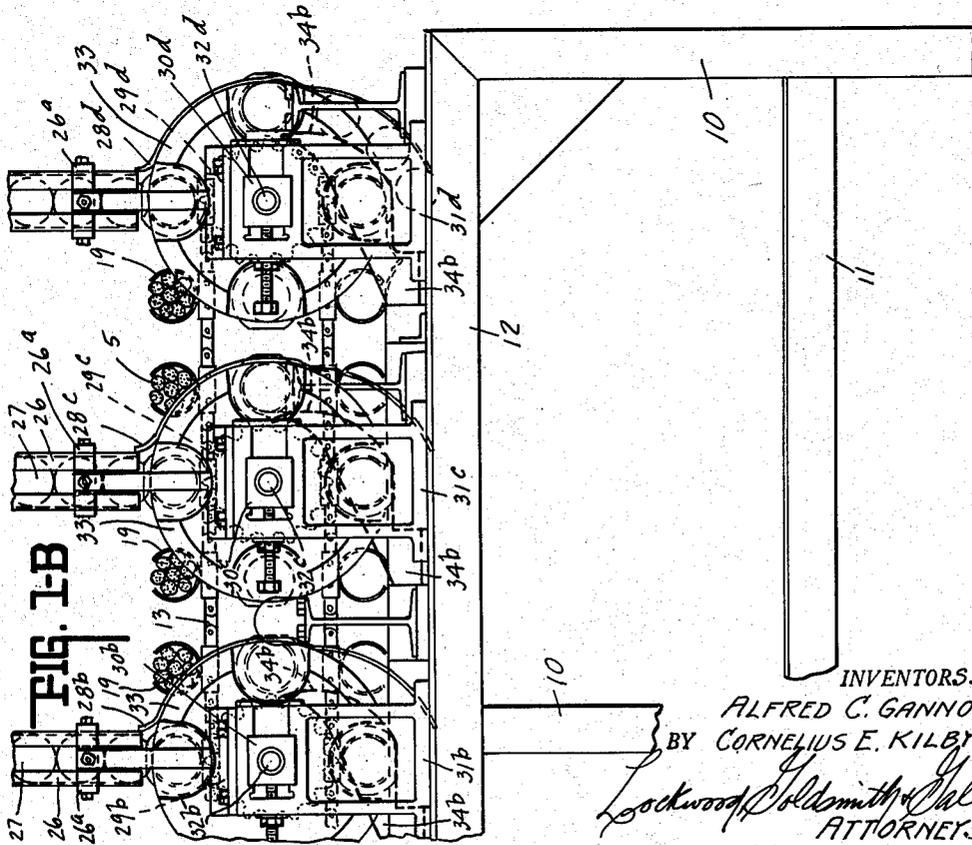
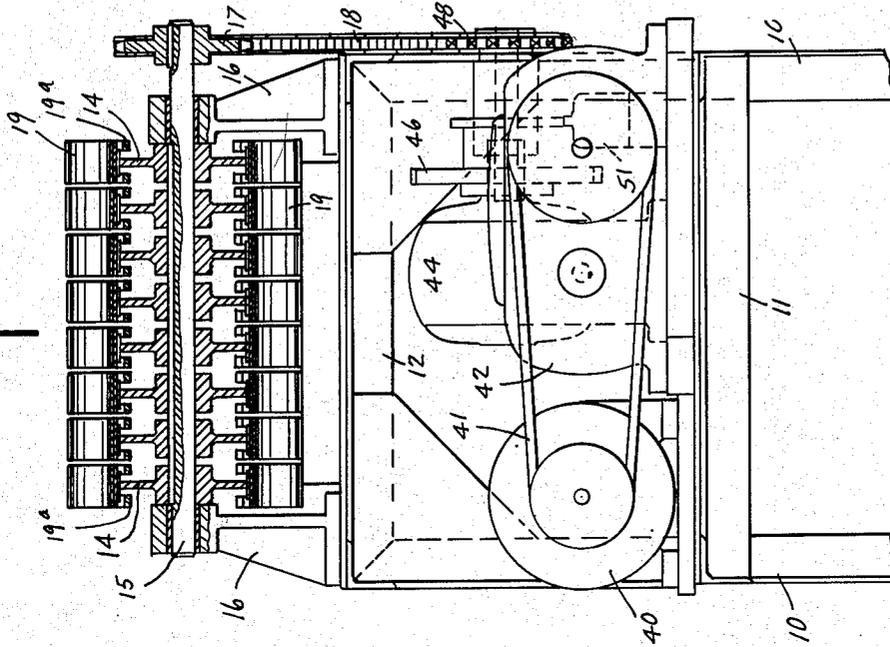
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FIG. 3



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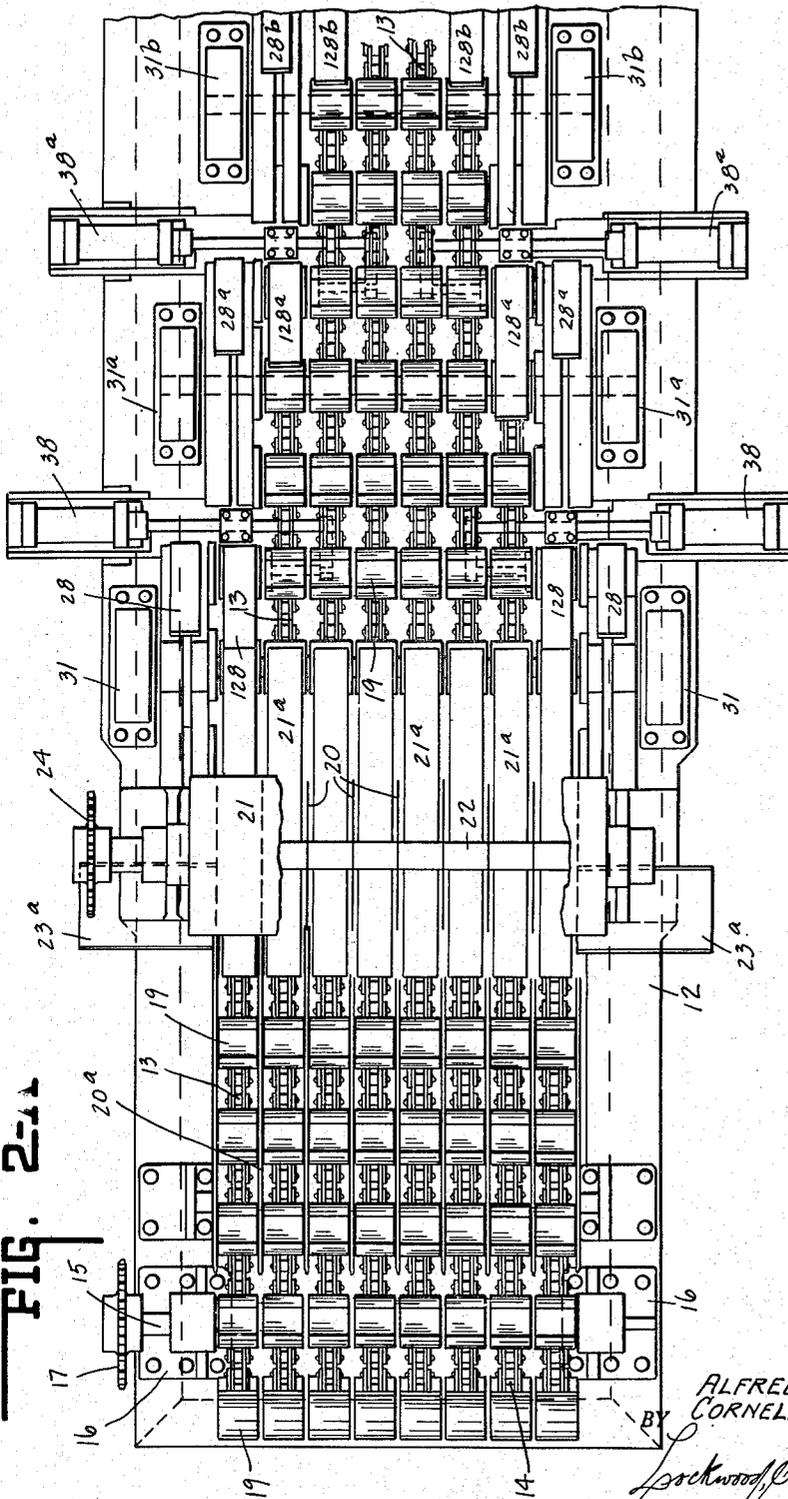
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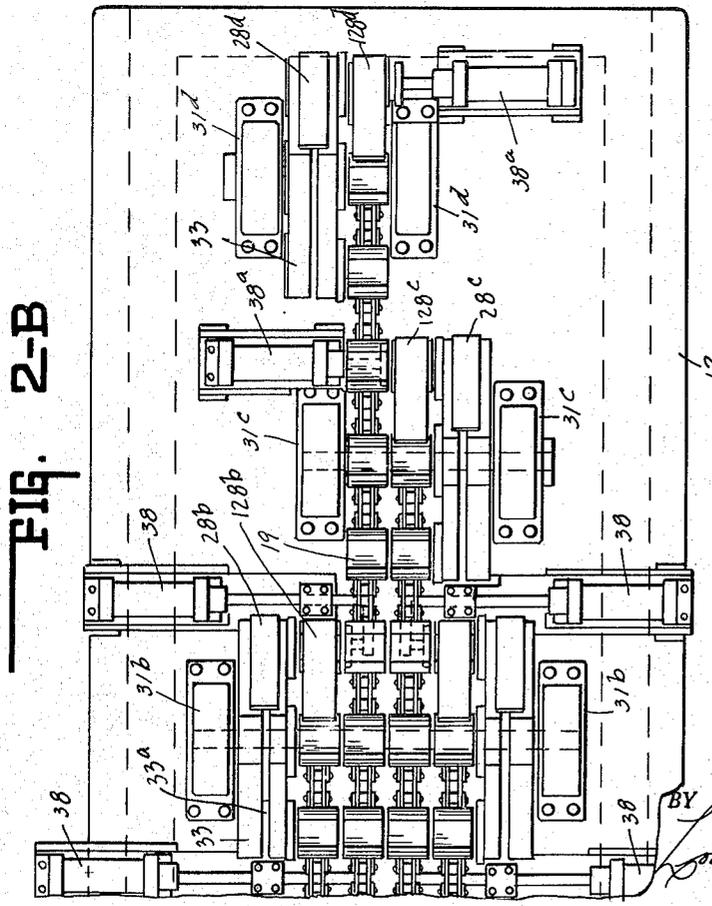
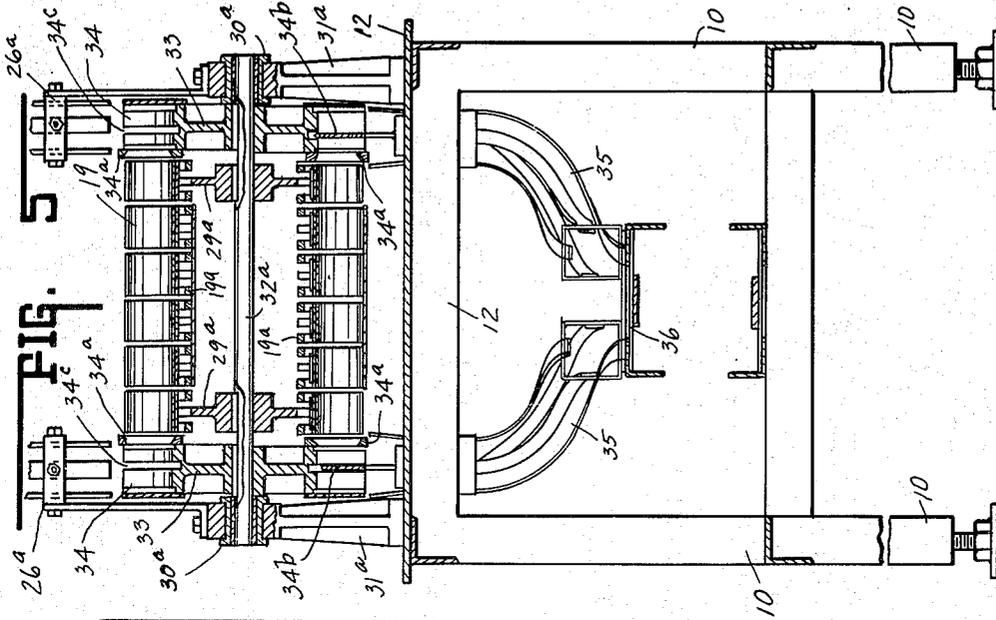
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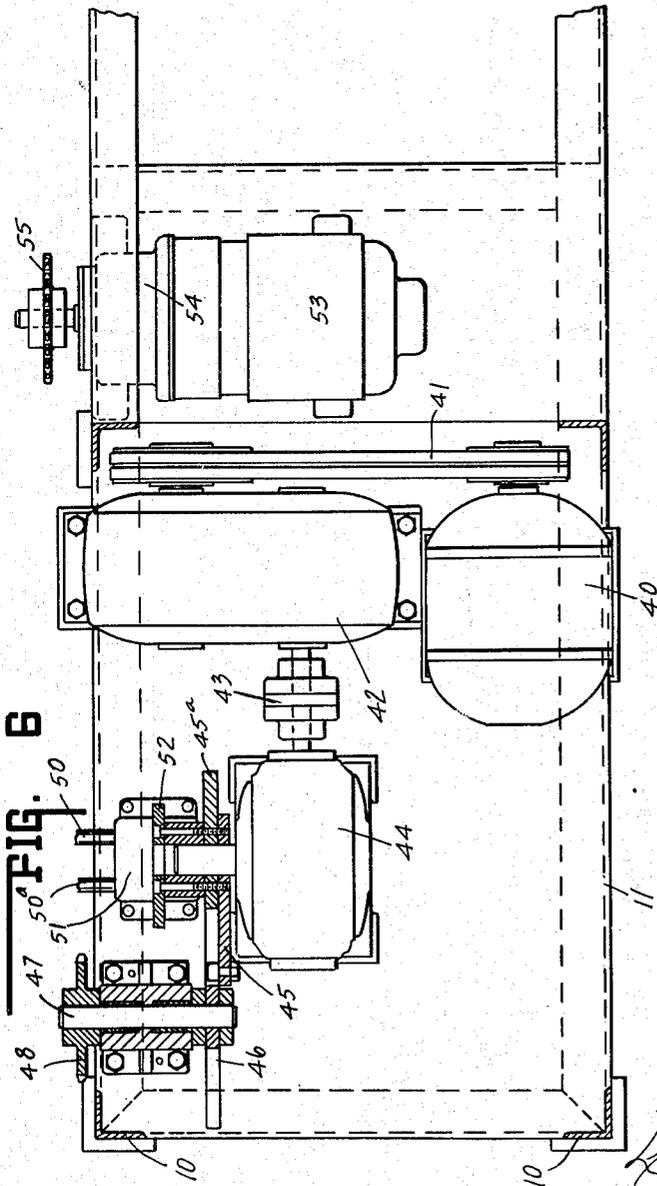
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PACKAGING MACHINE

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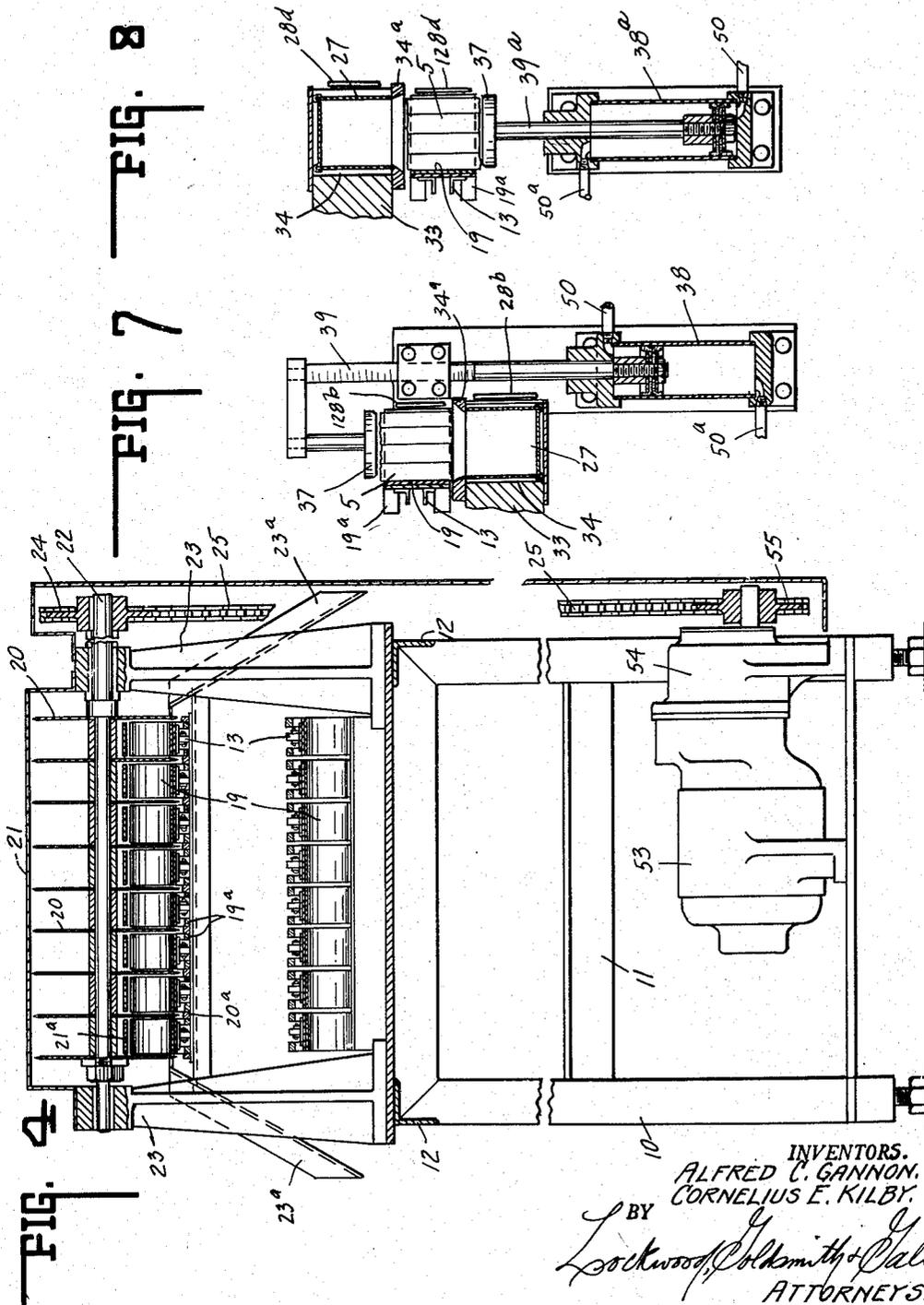
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UNITED STATES PATENT OFFICE

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PACKAGING MACHINE

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15 Claims. (Cl. 226—96)

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This invention relates to a packaging machine, and particularly as may be applied to the canning of Vienna sausages or like mass of material wherein the sausages or the like are bunched, cut to packaging length, and introduced lengthwise into a can or similar packaging container.

It is the object of this invention to produce an automatic packaging machine having a series of aligned holders for the uncut bunched sausage or like mass of material, each holder conforming substantially in size and contour to the container to be filled.

As applied to the packaging of such material, said holders are mounted for intermittent travel upon a series of individual endless conveyors, one for each series of holders. At the loading station the holders extend in axial alignment to receive the material, which may be of several cans length to extend throughout the aligned holders and slightly beyond the ends thereof. The aligned holders carrying the material then pass as a unit to a cutting station where the massed material is cut to substantially the length of each individual holder. The holders then progress to a series of offset packing stations, where the cans to be packed are brought into axial alignment with the end holders and a packing plunger caused to operate to slide the charge of material from the end holders into their respective aligned cans.

The end holders are then returned to the loading station while the intermediate holders continue to the next following packing station. Again the charges of material in the end holders are introduced into their respective aligned cans, their holders returning to the loading station while the intermediate holders progress to the next following packing station until the last holder is unloaded and caused to return to the loading station.

One feature of the invention resides in the carrier transmission for intermittently conveying the individual holders to their respective packaging stations and returning them to the loading station.

Another feature of the invention resides in the mechanism for introducing containers to be packed into axial alignment with the end holders as they reach their respective packing stations, and discharging the containers after packing onto a suitable conveyor.

Another feature of the invention resides in the packing plungers and means for actuating said plungers in association with the aligned holders and containers at their respective packing stations for discharging the charge of cut and

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bunched material endwise from the holder into the aligned container in timed relation with the travel of the holders and containers to be packed therefrom.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1-A is a side elevation showing the forward portion of the packaging machine carrying sausages to be packed.

Fig. 1-B is a continuation of Fig. 1-A showing the rear portion thereof.

Fig. 2-A is a plan view showing the forward portion of the machine with the sausages removed.

Fig. 2-B is a continuation of Fig. 2-A showing the rear portion thereof.

Fig. 3 is a section taken on the line 3—3 of Fig. 1-A with the sausages removed.

Fig. 4 is a section taken on the line 4—4 of Fig. 1-A with the sausages removed.

Fig. 5 is a section taken on the line 5—5 of Fig. 1-A with the sausages removed.

Fig. 6 is a plan view of the driving mechanism.

Fig. 7 is a sectional view of one of the charging plungers.

Fig. 8 is a sectional view of another one of the charging plungers.

In the drawings there is shown as one modification of the invention a supporting frame for the machine including the legs 10, a lower horizontal frame support 11 for the driving mechanism and an upper frame support 12 for the packaging mechanism.

Mounted on the upper support 12 for intermittent travel longitudinally of the frame there are a series of endless conveyor chains 13 of varying length, there being illustrated herein eight such chains. Said chains are carried and driven at the loading end of the machine by a series of sprocket wheels 14 mounted in axial alignment and each secured to a shaft 15 rotatably supported in suitable bearings provided by the upstanding bearing supports 16. Said shaft is driven by the sprocket wheel 17 keyed or otherwise secured to one end thereof which in turn is intermittently driven by the sprocket chain 18 from the power plant which will be hereinafter described.

Each of the sprocket chains carries a series of holders 19 secured thereto at equally spaced intervals. Each holder is herein shown for purposes of illustration as cup shaped and open at the top to receive a charge of material which may comprise a bunch of sausages 5, being circular endwise thereof and of a transverse size

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or diameter substantially that of the container to be packed. The axial length of each holder is substantially the axial length of such container or can. At the loading end of the machine the holders are aligned axially as shown in Fig. 3, and spaced from each other sufficiently to permit passage of a cutting knife therebetween.

The several conveyor chains 13 with their respective holders in alignment move in the direction of the arrow past the cutting station with respective holders passing between the rotary knives 20 protected by the housing 21 extending over the upper periphery of said knives. As the holders approach and pass between the knives they travel under a series of aprons 21^a having the effect of closing their open tops to prevent any displacement of the sausages. Said knives are arranged in a gang for rotation by the shaft 22 (Fig. 4), the shaft being supported by opposed bearing mountings 23 carried on the frame 12. In order that the holders 19 may be guided between the knives 20 they are each provided with depending lugs 19^a adjacent each end thereof. In alignment with each knife 20 there is an elongated guide rod or spacer 20^a with which the adjacent lugs slidably engage. Secured to the end of the shaft 22 there is a sprocket 24 driven by the chains 25 as hereinafter described.

As the holders progress past the cutting station the knives 20 will cut the bunched sausages to substantially the length of the holder and, therefore, approximately the length of the can to be packed. The butt ends of the sausages will be discharged down the waste chute 23^a. Upon the holders, still in axial alignment, passing through the cutting station they progress to the first packing station. At this station there is provided a can feeding rack 26 adjacent the outer side of each of the outer holders. Stacked in each rack there are a plurality of empty cans 27 adapted to be fed by gravity into axial alignment with the end holders into can recesses 34 within an arcuate can retaining cage 28. At the first such station, and within the retaining cage 28, the outer conveyor chains 13 carrying the end holders pass about the idler sprockets 29.

The intermediate conveyor chains with their holders continue on to the next packing station at which station the then outer chain conveyors and their respective holders pass about the idler sprocket 29^a within the cage 28^a. The remaining conveyors and holders pass onto the third packing station where again the outer conveyor chains with their holders pass about the idler sprocket 29^b within the cage 28^b. The remaining intermediate conveyor chains with their holders continue on with one of them passing about the idler sprocket 29^c in the cage 28^c, while the other passes about the idler sprocket 29^d within the cage 28^d.

Each of the idler sprockets 29 to 29^d, inclusive, are secured to the shafts 32—32^d, respectively, rotatably supported in adjustable bearings 30—30^d, and to which shafts are secured the respective can receiving wheels 33 as shown in Fig. 5. Said bearings 30—30^d are respectively mounted on upright standards 31 to 31^d inclusive, and each can feeding rack is carried by a bracket 26^a extending upwardly from the respective bearing standards.

Said wheels are provided with four equally spaced can receiving recesses 34 arranged to be brought into axial alignment with the holders 19 and moved therewith about the idler sprocket. As the outer holders 19 move about the idler

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sprockets 90 degrees, they are separated from the intermediate holders, and extend in axial alignment with the empty cans within the can recesses 34. At this point the cans are ready for packing. The packing operation then consists in forcing the charge of sausages, severed to length, longitudinally and axially from the holder through a cone shaped guide 34^a mounted on the wheel, and into its aligned can 27 as shown in Figs. 7 and 8.

Following the packing of the cans at their respective packing stations they are ejected from their recesses 34 by fixed ejector blades 34^b into the discharge chutes 35. This occurs as the filled recess progresses from its packing position toward its lowermost ejecting position. Each ejecting blade 34^b is secured to the frame 12, extending upwardly therefrom an alignment with the transverse slots 34^c extending about the wheel through and centrally of the respective recesses 34. The ejecting edge of each blade is curved in concentric spaced relation to the lower portion of the cage 28, being spaced therefrom substantially the diameter of a can. Thus the ejecting action is progressive from just past the packing position to its lowermost position. From the chutes 35 the packed cans drop onto a suitable conveyor indicated at 36 which carries them from the machine.

For transferring the charge of sausages from one of the holders to the can, there is provided a plunger 37 adapted to reciprocate axially of the aligned holder 19 and the can 27. The plunger is actuated by a pneumatic piston and cylinder assembly 38, 38^a to cause the plunger to eject the charge of sausages from the holder to the can during the dwell period in timed relation with its intermittent movement. Since the open end of the can is directed inwardly toward the holder on the outer side thereof, the packing plungers are necessarily positioned intermediate the two outer holders to force the sausages outwardly therefrom at the first three packing stations as in Fig. 2. For this purpose, as shown in Fig. 7, the plunger 37 is provided with a gooseneck or reversely directed piston rod connection 39. At the last two stations said plunger may be connected with the piston and cylinder assembly 38^a by a short straight piston rod connection 39^a.

The power plant for the machine, shown in Figs. 1-A and 6, comprises a motor 40 which drives the belt and pulley transmission 41 to a variable speed transmission within the housing 42, the transmission driving the coupler shaft 43 leading to a speed reducing gearing within the housing 44 from which a Geneva rotator 45 is driven for intermittently rotating the Geneva wheel 43. A position retaining wheel 45^a prevents backlash or movement of the wheel during the dwell period. The wheel of course drives the shaft 47 to which the sprocket wheel 42 is keyed. Said sprocket wheel drives the sprocket 17 through the chain 18. Air lines 50 and 50^a connect an air control valve 51 with the several piston and cylinder assemblies 38 and 38^a, respectively. The air valve 51 is actuated and controlled by a timing cam 52 driven with the Geneva rotator shaft from the housing 44. A suitable source of compressed air is connected with the valve 51. Thus, the air lines and the Geneva drive are synchronized. Through such timed relation, the plungers 37 are actuated to eject the charge of sausage from the holder into the can during the pause in the movement of the

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holder upon reaching its position of alignment between the can and the plunger.

The cutting knives 20 are driven by the motor 53 which, through suitable gearing indicated at 54, drives the sprocket 55 which drives the chain 25.

From the foregoing, it will be observed that the joint loading of the aligned holders, the cutting operation, and the packing operation may be performed in rapid succession without the delay and time consuming operation of effecting changes in the position of the aligned group of holders at the several operating stations. Thus, the holders at all times move in planes parallel to each other which permits each succeeding group of aligned holders to be closely spaced for rapid loading and packaging.

Whereas the machine has been herein shown and described in connection with the canning of Vienna sausages, it is equally applicable to any other material to be packaged, the holders and the knives serving to form the individual charges from a bunch or mass of material to be packed or canned. Wherein the material is of such character that it may be distorted when the butts are trimmed off by the knives, the first series of outer or end holders may be utilized to support or clamp the end butts, discharging them as waste at the first station instead of packaging them. When this is practiced, the number of holders may be accordingly increased.

The invention claimed is:

1. A packaging machine comprising a series of endless conveyors mounted to travel in adjacent parallel relation, each conveyor carrying material holders normally in axial alignment for jointly receiving material to be packed, means for intermittently driving said conveyors in unison past a cutting station to successively positioned packing stations, a series of cutting knives at said cutting station disposed to cut said material into individual charges substantially the length of the respective holders, idler wheels at each successive packing station for carrying and returning each outer conveyor and its holders to material receiving position while permitting intermediate conveyors and holders to progress to the next following station, said wheels carrying said outer holders into packing position out of alignment with the intermediate holders, carriers for receiving and presenting a container to be packed in axial alignment with said opposed outer holders at their respective packing positions, and a plunger for each said outer holder positioned intermediate thereof at their respective packing positions operable to transfer a charge therefrom into an adjacent aligned container.

2. A packaging machine comprising a plurality of series of material holders, means for intermittently moving each series of holders through parallel paths and with adjacent holders in axial alignment for jointly receiving material to be packed, cutters past which said holders are moved for cutting the material into individual charges substantially the length of the respective holders, mechanism operable to reverse the movement of one series of holders relative to an adjacent series for moving them out of axial alignment after passing said cutters, carriers for receiving and presenting containers to be packed into axial alignment with holders moved out of alignment with their respective adjacent holders, and plungers positioned on the opposite side of said holders from their aligned containers when so positioned operable to transfer charges of ma-

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terial from said holders to their aligned containers.

3. A packaging machine having a filling station, a cutting station and a series of successive offset packing stations, a plurality of material holders, means for intermittently moving said holders in parallel paths of movement and in timed relation for causing said holders to be grouped in axial alignment at the filling station for jointly receiving material to be packed, a series of cutting knives at said cutting station disposed to cut said material into individual charges substantially the length of the respective holders upon said aligned group of holders moving past said cutting station, mechanism at each succeeding offset packing station for moving one of said holders out of alignment with the remaining holders and into alignment with a container to be packed, and a plunger operable to transfer a charge of material from said container aligned holder into said aligned container.

4. A packaging machine comprising a plurality of endless conveyors mounted to travel in parallel paths of varying distances, a series of material holders mounted in equally spaced relation on said conveyors normally travelling in axial alignment for jointly receiving material to be packed, means for intermittently driving said conveyors in unison past a cutting station for severing the material to substantially the axial length of the respective holders, mechanism operable at a station following the cutting station to move adjacent holders out of alignment with each other and into alignment with and between a container to be packed and a plunger for transferring a charge of material from the holder into the container, and means for actuating said plunger to transfer said material during a pause in the intermittent movement of the holder.

5. The invention machine comprising a plurality of endless conveyors mounted to travel in parallel paths of varying distances, a series of material holders mounted in equally spaced relation on said conveyors normally travelling in axial alignment for jointly receiving material to be packed, means for intermittently driving said conveyors in unison past a cutting station for severing the material to substantially the axial length of the respective holders, idler wheels for each conveyor for reversing the conveyor movement beyond the cutting station, the idler wheel for one conveyor being positioned beyond that of the other conveyor to thereby move the adjacent holders of the respective conveyors out of alignment with each other and into alignment with a container to be packed, a packing plunger on the opposite side thereof, and a power drive for reciprocating said plunger to transfer the charge of material within said holder into said container during a pause in the intermittent movement of its conveyor.

6. A packaging machine comprising a plurality of endless conveyors mounted to travel in parallel paths of varying distances, a series of material holders mounted in equally spaced relation on said conveyors normally travelling in axial alignment for jointly receiving material to be packed, means for intermittently driving said conveyors in unison past a cutting station for severing the material to substantially the axial length of the respective holders, means progressively arranged at packing stations beyond the cutting station for reversing the travel of the conveyors one beyond the other and thereby moving said holders out of their normal alignment and into pack-

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ing position during a dwell in the intermittent movement of their respective conveyors, a power actuated reciprocating packing plunger at said packing position, mechanism for feeding a container to be packed into axial alignment with said holder and plunger, and power mechanism for actuating said plunger to discharge a charge of material from the holder into the container during said dwell in the intermittent movement of said holder at its packing position.

7. A packaging machine comprising a plurality of endless conveyors of different lengths mounted to travel in adjacent parallel planes from a material receiving station to a series of progressively spaced packing stations, a series of equally spaced holders carried by the respective conveyors normally in axial alignment for jointly receiving material to be packed at the receiving station, a series of cutters past which said holders are carried for cutting the material therein into individual charges, means for intermittently driving said conveyors in timed relation, means at each progressive packing station for moving one series of said holders out of alignment with the holders of the adjacent series and progressively into packing position, a carrier at each packing station for receiving and presenting a container to be packed in axial alignment with each of said holders as it is moved to its packing position, a plunger aligned with each packing position, and means for actuating said respective plungers to remove the charge of material from the holder into the aligned container during the pause in the intermittent movement of the holders in their respective packing positions.

8. A packaging machine of the character described having a series of progressively disposed and offset packing stations, a container to be packed and a plunger for packing said container at each of said packing stations, intermittently driven holders movable from alignment at a material receiving station past a series of cutters to said packing stations, adjacent holders being positioned out of alignment at each successive packing station and into alignment between a container and a plunger, and means for actuating the respective plungers to transfer charges of material from their respective holders to their containers when positioned in alignment therewith and during a pause in the intermittent movement thereof.

9. A packaging machine of the character described having a series of progressively disposed and offset packing stations, a container to be packed and a plunger for packing said container at each of said packing stations, intermittently movable holders carried from alignment at a material receiving station past a series of cutters to their respective packing stations, said holders travelling in parallel planes, mechanism for changing the direction of travel of each series of holders at their respective packing stations to move the holders of one series out of alignment with the adjacent holders of another series and into packing position, a plunger aligned with each packing position, mechanism for moving a container to be packed into alignment with the respective holders and plungers, and means for actuating said plungers to transfer a charge of material from a positioned holder into its adjacent container during the pause in the intermittent movement thereof.

10. A packaging machine of the character described having a series of progressively disposed and offset packing stations, a container to be

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packed and a plunger for packing said container at each of said packing stations, intermittently movable holders carried from alignment at a material receiving station past a series of cutters to their respective packing stations, said holders travelling in parallel planes, mechanism for changing the direction of travel of each series of holders at their respective packing stations to move the holders of one series out of alignment with the adjacent holders of another series and into packing position, a plunger aligned with each packing position, mechanism for moving a container to be packed into alignment with the respective holders and plungers, means for actuating said plungers to transfer a charge of material from a positioned holder into its adjacent container during the pause in the intermittent movement thereof, and a discharge track at each packing station for receiving and discharging the packed container upon the next following movement of its aligned holder.

11. A packaging machine of the character described comprising an endless conveyor, a series of material holders mounted in spaced relation on said conveyor, means for intermittently driving said conveyor so as to bring said material holders to a packaging station, a peripherally recessed wheel, a container rack mounted to drop a container to be packed into a peripheral recess of said wheel, a carrier for jointly moving said wheel and conveyor with one of said holders adjacent and in end to end alignment with a container in one of said recesses, a plunger for transferring a charge of material from the holder into the container, a chute below said carrier, a cage including a portion extending downwardly from said wheel to said chute, and a fixed member opposite to said cage portion and engageable with the charged container for ejecting said container from its recess in said wheel into said chute during its progressive movement.

12. A packaging machine of the character described comprising an endless conveyor, a series of material holders mounted in spaced relation on said conveyor, means for intermittently driving said conveyor about an arcuate path to bring said holders to a packaging station, a container receiving wheel rotated by said driving means in timed relation with said holder, said wheel having a series of peripherally spaced container receiving recesses movable in end to end alignment with said holders during a portion of their respective arcuate travel, a cage extending about said arcuate travel for retaining the material in said holders and containers in said recesses respectively, a plunger for transferring a charge of material from a holder into a container while in axial alignment therewith, said cage including a divergent portion, and a fixed member having a portion conforming to the curvature of said divergent portion and engageable with the charged container for progressively ejecting said container from its recess during the movement thereof into engagement with said divergent portion.

13. A packaging machine of the character described comprising an endless conveyor, a series of material holders mounted in spaced relation on said conveyor, a carrier wheel for said conveyor about which it is directed at a packaging station, a container receiving wheel mounted to rotate with said carrier wheel, said container wheel having a series of peripherally disposed recesses adapted to receive a container in end to end alignment with one of said material

holders, each recess having a transfer slot intermediate its ends, a cone shaped guide ring mounted adjacent the receiving end of each recess, a plunger for transferring a charge of material from a holder into its aligned container through said ring to be directed inwardly thereby into said container, a cage fixedly mounted to extend about and adjacent the periphery of said wheel between its container receiving position and its charging position to retain the containers in their respective recesses, said cage diverging from said wheel between said charging position and its container discharging position, and a fixed ejector blade extending from the discharge position of the wheel to the charging position adapted to project through said transfer slot, said blade having a container engaging edge of the same curvature as the diverging portion of said cage spaced therefrom the diameter of a container to progressively eject each container from its recess while in engagement with said cage as said wheel moves the container from its charging to its discharging position.

14. The method of packaging material which comprises the steps of placing the material in a plurality of axially aligned holders, moving the aligned holders past a series of cutters for cutting the material therebetween into charges, moving said holders through parallel planes to progressively spaced packing stations, offsetting

adjacent holders from each other and forcing the contents of the several holders into an equal number of containers while in their offset relation.

15. The method of packaging material which comprises the steps of placing the material of a length exceeding the combined height of a plurality of containers to be packed simultaneously into a plurality of axially aligned holders, cutting the material between the holders, moving the axially aligned holders through parallel planes of movement to a series of progressively offset packing stations, moving each holder from alignment with its adjacent holder at its packing station, and forcing its charge of material into a container.

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