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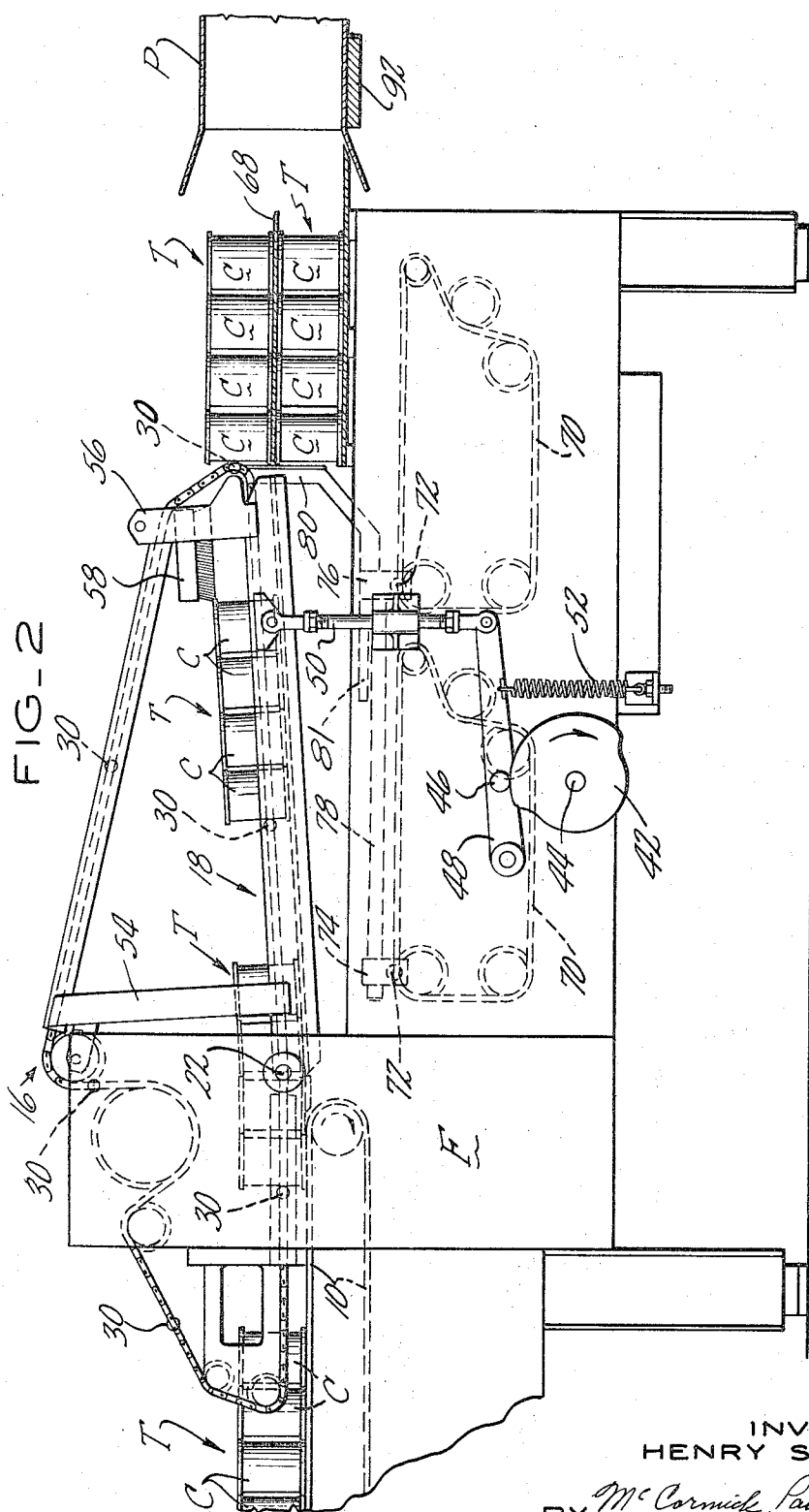
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3,340,672

CASE PACKING MACHINE FOR TIERED ARTICLES

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4 Sheets-Sheet 2



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FIG. 4

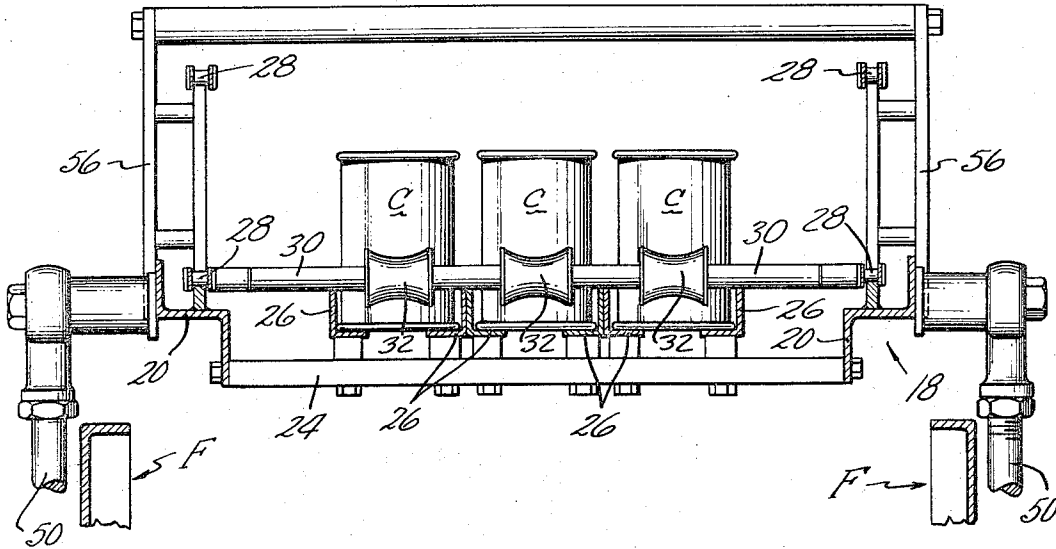
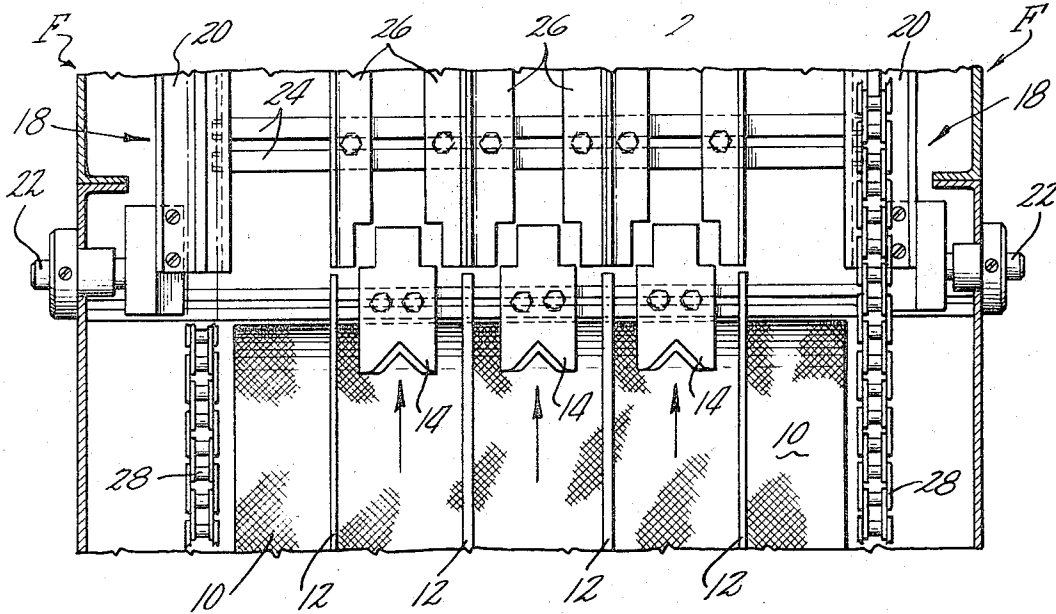


FIG. 3



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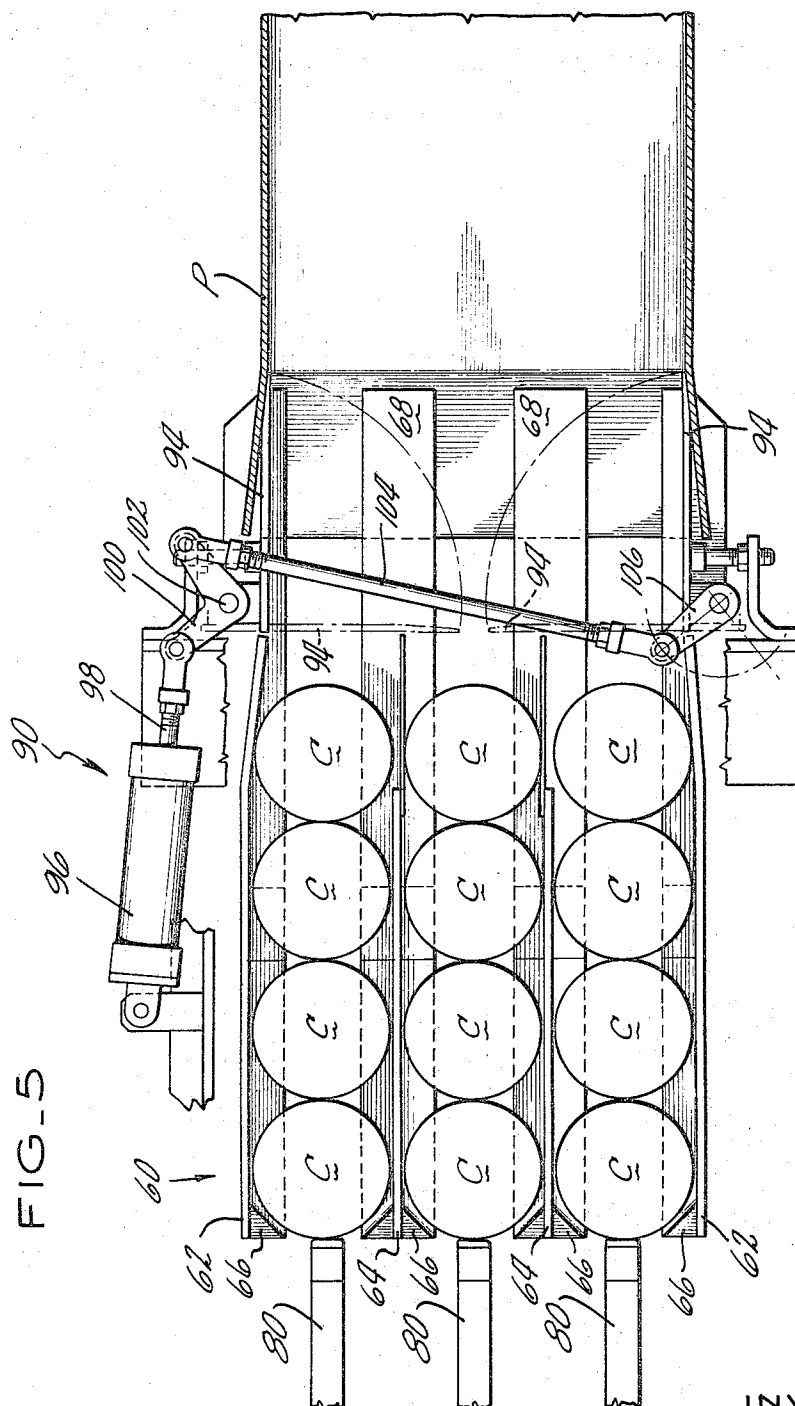
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4 Sheets-Sheet 4



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CASE PACKING MACHINE FOR TIERED ARTICLES

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4 Claims. (Cl. 53—153)

This invention relates to a case packing machine, and more particularly, to improvements in such a machine for the purpose of stacking articles which have been segregated into groups.

It is the general object of the invention to provide in a case packing machine apparatus which will stack group articles in tiers prior to the time that the tiers of articles are thrust into an open case resting on its side or into a case having a side opening. It is also a part of this general object of the invention to provide a mechanism co-operating with the stacking mechanism to thrust the tiered articles into an open case in timed relationship with operation of the stacking mechanism.

The drawings show a preferred embodiment of the invention and such embodiment will be described, but it will be understood that various changes may be made from the construction disclosed, and that the drawings and description are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings:

FIG. 1 is an elevational view of that portion of the case packing machine which incorporates the stacking apparatus and the mechanism for moving the stacked articles into an open case;

FIG. 2 is a view similar to FIG. 1, although more schematic, showing the stacking mechanism in an elevated position;

FIG. 3 is a detailed horizontal sectional view taken through the machine shown in FIGS. 1 and 2 to provide a top plan view of the downstream end portion of the infeed conveyor and of the upstream end portion of the stacking mechanism;

FIG. 4 is a vertical sectional view taken generally as indicated by the line 4—4 of FIG. 1; and

FIG. 5 is a top plan view partly in section of the machine of FIGS. 1 and 2 taken at the downstream end thereof wherein the multi-tiered pack is loaded into the case.

As shown in FIGS. 1, 2 and 3, the complete case packing machine includes an infeed conveyor 10 which can be of the endless belt type and which is driven to advance articles from left to right as viewed in FIGS. 1 and 2. Means (not shown) are operatively associated with the infeed conveyor 10 to segregate articles to be packed into groups. Each segregated group of articles, as will be more fully understood hereinafter, will ultimately constitute a tier of the articles to be packed, and therefore, each such group of articles is designated generally by the reference character T. It will be understood that the machine can be used in connection with a wide variety of articles, but for purposes of illustration, the articles in each group or tier T are shown to comprise a series of metal containers C, C. Preferably, the tier of articles is advanced on the conveyor 10 with the containers C, C thereof arranged in rows by lane-defining fences 12, 12 (FIG. 3), and preferably, each tier includes four containers in each row so that the entire tier constitutes twelve containers.

As each row of containers C, C in a group or tier reaches the end of the infeed conveyor 10, the containers in the row are thrust by the conveyor onto a deadplate 14,

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there being one such deadplate (FIG. 3) provided for each row. The line pressure of the advancing containers on the conveyor 10 thrusts the containers in order or sequence and in engaged relationship off the infeed conveyor 10 and into the tier stacking mechanism which will now be described.

The tier stacking mechanism comprises an overhead flight bar conveyor indicated generally at 16 and a pivoted longitudinally slotted chute 18 over which the tiers of containers C, C are advanced by the said flight bar conveyor. More specifically, the pivoted chute 18, as best shown in FIG. 3 comprises a pair of longitudinally extending angle iron members 20, 20 which are pivotally supported at their upstream ends and at the respective longitudinal sides of the machine on stub shafts 22, 22 which are journaled in suitable frame structure F at the respective sides of the machine. Transversely extending bars or straps 24, 24 (FIG. 3) extend between the side members 20, 20 to interconnect them, and these bars provide supporting means for angle iron members 26, 26 six of which are shown, and which are utilized to define chute lanes aligned with the deadplates 14, 14 and the three rows of containers advancing thereover. The angle iron members 26, 26 in pairs support the advancing rows of containers C, C for longitudinal movement along the chute 18.

The containers C, C are moved along the three thus defined lanes by the overhead flight bar mechanism 16 which comprises an endless chain 28 at each longitudinal side of the machine. The flight bar mechanism also includes a series of flight bars 30, 30 which are connected at their respective ends to the chains 28, 28 and which are spaced therealong. These flight bars 30, 30 extend transversely of the machine and engage the rearmost containers C, C in the three rows of containers comprising each tier to move the associated tiers along the chute 18. When handling big containers, for example, one gallon containers, it is desirable to provide rollers such as the rollers 32, 32 on each flight bar 30 to engage the containers.

The overhead flight bar mechanism 16 is driven by a drive motor 34 to which it is connected by chain and sprocket units 36, 38 and 40. The same drive motor 34 is utilized to raise and lower the pivoted chute 18 about the axis of the pivot shafts 22, 22. The raising and lowering of the chute 18 is accomplished by a cam 42 mounted on a cam shaft 44 which is driven by the chain and sprocket unit 40. As the cam 42 rotates, it engages a cam follower roller 46 on a pivotally supported arm 48 which at its free end is connected to a vertically movable rod 50. The upper end of the rod 50 is connected to the side of the pivoted chute 18. Preferably, there are two cams such as the cam 42 respectively located at the sides of the machine to move an arm 48 and 50 at each side of the machine. A spring 52 biases each arm 48 and rod 50 downwardly, thus biasing the pivoted chute 18 downwardly.

It is important to observe that the downstream end portion of the overhead flight bar conveyor mechanism 16 is supported on the pivoted slotted chute 18 as on frame members 54 and 56 so that the overhead flight bar mechanism maintains its same position relative to the pivoted chute in all positions thereof. It is also important to observe that the frame member 56 (there being one such member at each side of the pivoted chute 18) supports a transversely extending brush 58. This brush is used to steady the containers in the group or tier T as they are moved off the pivoted chute 18 by the overhead flight bar mechanism.

The overhead flight bar mechanism 16 thrusts each tier T of containers C, C off the pivoted chute 18 into a funnel which is indicated generally by the reference numeral 60. The said funnel is a box-like structure having side

walls 62, 62 and a longitudinally slotted bottom. The said slotted bottom is defined by members 64, 64 which are of inverted T shape in cross section and which have raised portions or curbs 66, 66 at their upstream end. The containers C, C are thrust in rows in a tier over the slots in the bottom of the funnel 60 as best shown in FIG. 5. The lower tier of containers rests upon the flanges of the inverted T-shaped members 64, 64 and on the flanges of the side walls 62, 62. An upper tier can be placed over said lower tier and they will rest upon thin spring steel strips 68, 68 which provide separators between the tiers to permit the easy movement of the top tier over the bottom tier.

The lowermost tier is thrust into the funnel on the aforedescribed support means when the pivoted chute 18 is in its lowermost position shown in FIG. 1. Thus, when the pivoted chute is elevated to its upper position shown in FIG. 2, the next tier is thrust into the funnel over the spring strips 68, 68 to assume the position shown therein. Thus, the funnel is loaded, first with a bottom tier and with the top tier. That is, the pivoted chute 18 is moved upwardly and downwardly to alternate between its lower and upper positions with each tier of containers C, C being advanced therealong.

The two tier stack of containers is moved from the funnel 60 into a packing case T by a "walking beam" mechanism which is operated in timed relationship with the operation of the overhead flight bar mechanism 16 and the pivoted chute 18. The said walking beam mechanism comprises two similar pair of endless chains 70, 70 which are shown in FIGS. 1 and 2 as being located beneath the pivoted chute 18 and beneath the funnel 60. The two pairs of endless chains are located in longitudinally spaced apart relationship and each carries a flight bar 72 extending transversely between its respective chains. The flight bar 72 on the rearmost or upstream set of chains carries a series of brackets 74, 74 and the flight bar 72 on the forward or downstream set of chains carries a series of brackets 76, 76. Each bracket 74 is aligned with a companion bracket 76 so that they cooperate to support at least one longitudinally extending rod 78. A plurality of pusher arms 80, 80, one for each row of containers, C, C in a tier, are secured to a transverse plate 81 on the forward or downstream end of the rod 78. As best shown in FIG. 5, the pusher arm 80 is arranged to engage the rearmost containers in each of the rows of both the lower and upper tiers in the stacked containers in the funnel 60.

As will be seen by comparing FIGS. 1 and 2, the chains 70, 70 in each pair move generally in a clockwise direction so that the series of pusher arms 80, 80 carried thereby will move from left to right to thrust the containers out of the funnel 60 and into an associated case P. Then, the pusher arms 80, 80 will drop below the elevation of the funnel 60 and return from right to left to the left-hand end or upstream end of the funnel before they are again elevated into active position.

The pairs of chains 70, 70 are driven in timed relationship with the other driven mechanism by means of chain and sprocket unit 82 and by chain and sprocket unit 84, the unit 82 being connected by a chain and sprocket unit 86 with the drive motor 34. The unit 84 is connected between the chain pairs 70, 70 to assure their timed equal speed relationship.

In further keeping with the present invention, a mechanism 90 is included at the discharge end of the funnel 60 to spread the flaps of the open case P located therein. Each case P can be moved into position at the end of the funnel on a conveyor 92, or it can merely be placed at the end of a funnel manually. When an empty case is placed at the end of the funnel with its flaps facing toward the funnel, a pair of gates or doors 94, 94 are swung outwardly from the broken line position shown in FIG. 5 to the full line position shown therein to spread the flaps as the containers are moved into the case. The mechanism

90 spreading the flaps comprises a fluid motor 96 including a piston 98 which is connected to a bell crank 100 pivoted on an axis 102. As the piston rod 98 is thrust outwardly, the bell crank 100 is rotated in a clockwise direction and this rotates the upper gate (FIG. 5) from an open position to a closed position. At the same time, a connecting rod 104 on the bell crank 100 operates a crank arm 106 on the lower gate 94 in a counterclockwise position to close that gate also. Obviously, when the piston rod 98 is retracted, the gates pivot in the opposite direction to an open position wherein they spread the flaps as shown in FIG. 5. Although not shown, it will be apparent that one or more limit switches could be provided at the discharge end of the funnel 60 to control the operation of the fluid motor 96. By proper placement of such switches on the funnel 60, and by operating the conveyor 92 intermittently in timed relationship with the stacking mechanism, an automated case packing machine can be provided.

A fluid motor 108 (FIG. 1) having a piston 110 which carries a roller 112 on its lower end is utilized to hold a packing case down as it is being loaded. This fluid motor 108 is supported at the end of an arm 114 extending outwardly from and supported on the funnel 60. The roller 112 is so arranged that it permits the packing case P to be moved away from the funnel in a lateral direction when it has been filled and when the gates 94, 94 have been closed. The fluid motor 108 can also be operated in response to the limit switches discussed above and in this connection it should be noted that the roller 112 will allow the packing case P to move laterally even when the roller is in its lowered position. The roller 112 has been found very desirable in the automated mode of operation outlined above.

The invention claimed is:

1. In a case packing machine of a type having an infeed conveyor for advancing segregated multi-row tier-forming groups of articles and also having a packing funnel provided with a slotted bottom for supporting the articles before they are thrust into a case, the improvement comprising a chute disposed between the conveyor and funnel and pivotally supported at its end adjacent the conveyor, continuous drive means for alternately raising and lowering the other end of the chute adjacent the funnel, an overhead flight bar conveyor supported in part over the downstream end portion of the infeed conveyor and supported in part over the chute for movement therewith, the said flight bar conveyor being operated by said drive means in timed relationship with the raising and lowering of said chute to sweep a first tier of articles onto the funnel bottom when the chute is lowered and then to sweep a second tier of articles onto the top of the first tier when the chute is raised, and a mechanism for moving the stacked tiers out of the funnel, said mechanism including a plurality of pushers extensible through the slots in the bottom of the funnel to engage the rearmost articles in the rows of the stacked tiers, and support means for said pushers operated by said drive means to elevate the pushers into engagement with the stacked tiers and to thrust the tiers out of the funnel and to then lower the pushers while said chute is being lowered and prior to movement of a subsequent tier into the funnel.

2. The improvement in a case packing machine as set forth in claim 1 wherein the drive means for raising and lowering the chute includes a driven rotating cam, linkages connected with said chute and operated by the cam to raise the chute, and wherein spring means is included for lowering the chute.

3. The improvement in a case packing machine as set forth in claim 1 wherein the support means for the said pushers comprises two pairs of endless chains supporting a beam in a generally horizontal longitudinal position, the beam being adapted to support the pushers and the pairs of chains being operated by said drive means to

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elevate the beam and then move it longitudinally in one direction and to then lower the beam and move it longitudinally in the opposite direction.

4. In a case packing machine of the type having an in-feed conveyor for advancing segregated multi-row tier-forming groups of articles and also having a packing funnel provided with a slotted bottom for supporting the articles before they are thrust into a case, the improvement comprising a chute disposed between the conveyor and funnel and pivotally supported at its end adjacent the conveyor, a driven rotating cam, linkage means connecting said chute with said cam for alternately raising and lowering the free end of the chute adjacent the funnel, an overhead flight bar conveyor supported in part by the downstream end portion of the infeed conveyor and supported in part over the chute for movement therewith, said flight bar conveyor being driven in timed relationship with said cam so that a first tier of articles is swept into the funnel when the chute is lowered and a second tier of articles is swept onto the top of the first tier in said funnel when the chute is raised, and a mechanism for moving the

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stacked tiers out of the funnel, said mechanism including a plurality of pushers extensible through the slots in the bottom of the funnel to engage the rearmost articles in the rows of the stacked tiers, a generally horizontal beam longitudinally arranged below said pushers for supporting the same, two pairs of endless chains driven in timed relationship with said cam and with said flight bar conveyor for supporting said pushers and successively elevating the pushers into engagement with the stacked tiers, thrusting the tiers out of the funnel, and lowering the pushers while said chute is being lowered and prior to movement of a subsequent tier into the funnel.

References Cited

UNITED STATES PATENTS

2,047,272	7/1936	Kimball et al.	53—153 X
2,814,922	12/1957	Pechy	53—153
3,201,912	8/1965	Wozniak	53—153 X

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