United States Patent

Bosworth et al.

[15] **3,677,439**

[45] **July 18, 1972**

[54] CARTON DISPENSERS HAVING PLURAL CAM DENESTERS

[72] Inventors: **Delbert B. Bosworth; Ernest E. Goodridge,** both of Portland, Maine

[73] Assignee: **United Industrial Syndicate, Inc.,** Portland, Maine

[22] Filed: **July 30, 1970**

[21] Appl. No.: **59,424**

[52] **U.S. Cl.** **221/251**

[51] **Int. Cl.** **B65g 59/10**

[58] **Field of Search** 221/238, 251, 297, 221, 223

[56] **References Cited**

UNITED STATES PATENTS

3,341,072	9/1967	Schoot	221/251 X
3,468,455	9/1969	Voorhis	221/251 X

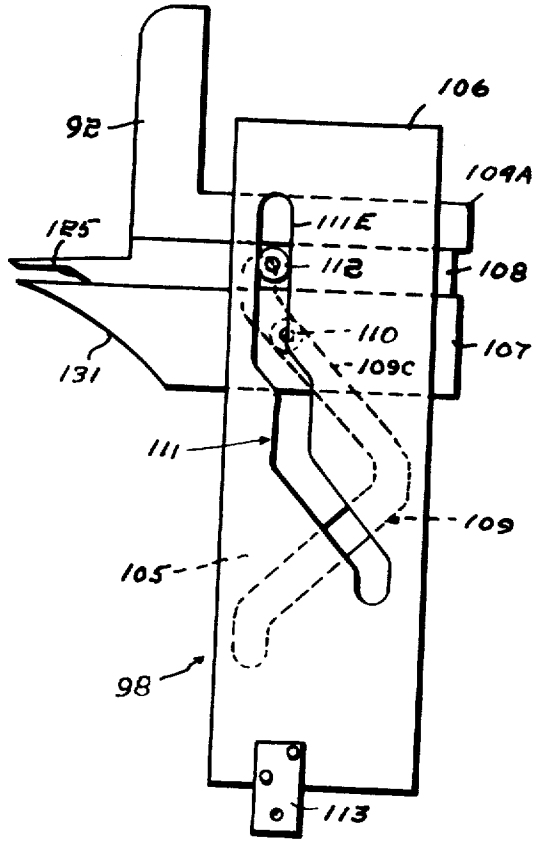
Primary Examiner—Stanley H. Tollberg

Attorney—Abbott Spear

[57] **ABSTRACT**

Dispensers are disclosed for a stack of nested articles of a type having marginal portions by which they may be supported and which are spaced so that the ends of supported members having cam surfaces may be inserted between them to force them apart. The dispensers are discussed with particular reference to open egg cartons with the marginal portions being the ends of the hinge connection between their covers and bottoms. The dispensers have first and second members at both of its sides and means, in preferred embodiments vertically reciprocable cam plates, operable to actuate the members so that the ends of the first and second members alternately support the stack of articles. The ends of the second members are spaced from the ends of the first members by a distance such that the ends of the second members may be entered between the marginal portions of two articles when the stack is supported by the ends of the first members. The second member ends have cam surfaces operable, in one embodiment, to free the lowermost article, as they move into article supporting positions, if the lowermost article adheres to the bottom of the stack when the first member ends are retracted. In a preferred embodiment, the first member ends include cam surfaces and the second member ends are operative at least to increase the distance between the articles between which they are entered so that the first member ends may also be entered therebetween as the first member ends approach their stack supporting positions so that both members cooperate in ejecting articles. The member operating means provide for the operative position of the first member ends following the movement of the second member ends into their operative positions thereby to cooperate therewith in article ejection. Desirably, the dispenser has resiliently yieldable fingers arranged to receive and support articles whether freed by the second members or by the combined effort of the two sets of members and then be forced therefrom by the cam surfaces of the first members after predetermined travel.

23 Claims, 23 Drawing Figures



Patented July 18, 1972 3,677,439

9 Sheets-Sheet 1

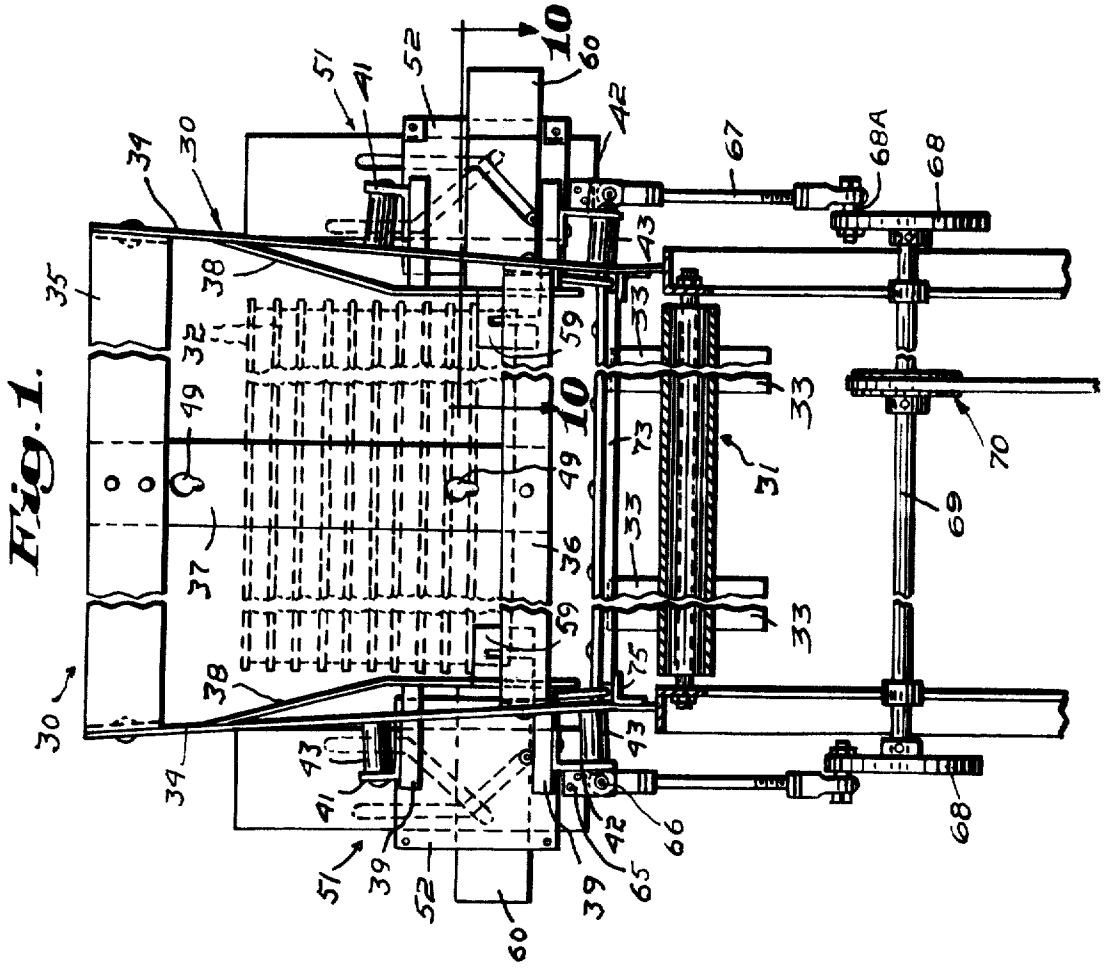


Fig. 1.

Inventors:
Delbert B. Bosworth,
Ernest E. Goodridge,
by
Attorney

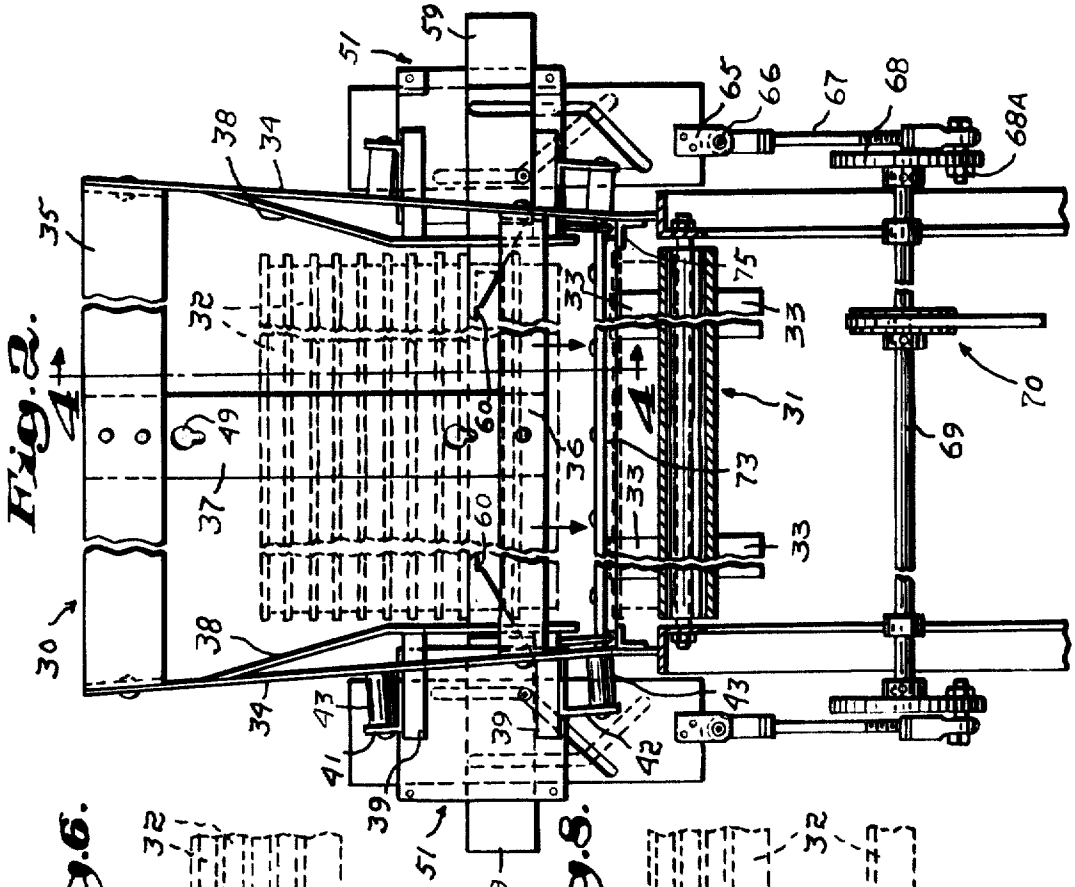


Fig. 2.

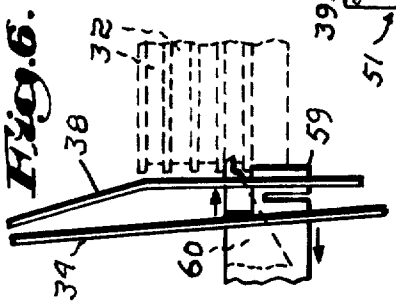


Fig. 6.

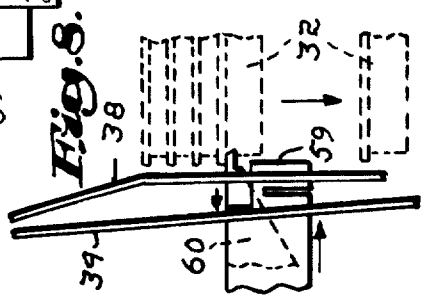


Fig. 8.

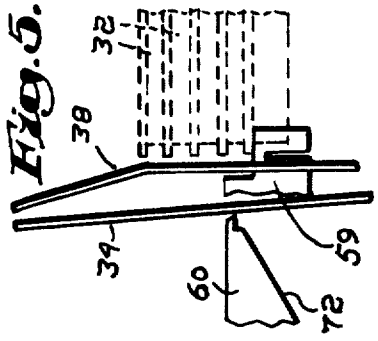


Fig. 5.

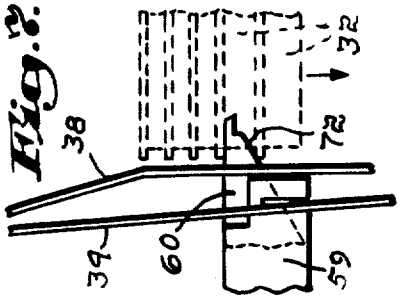


Fig. 7.

Inventors:
Delbert B. Bosworth,
Ernest E. Goodridge,
by Attorneys

Fig. 4.

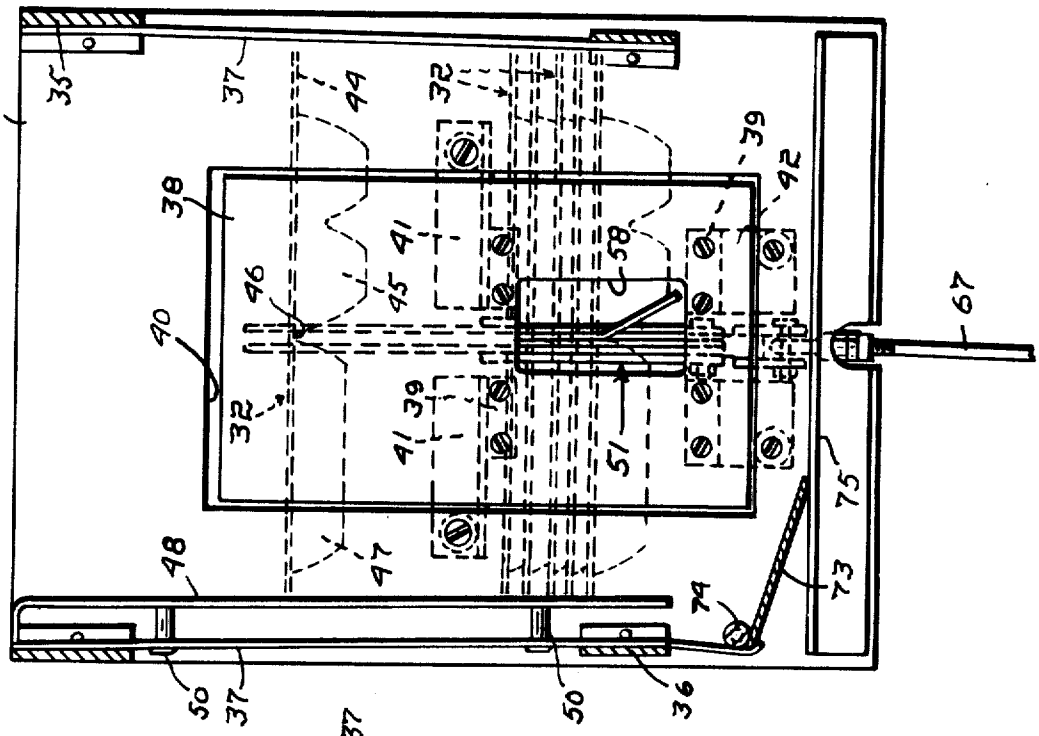
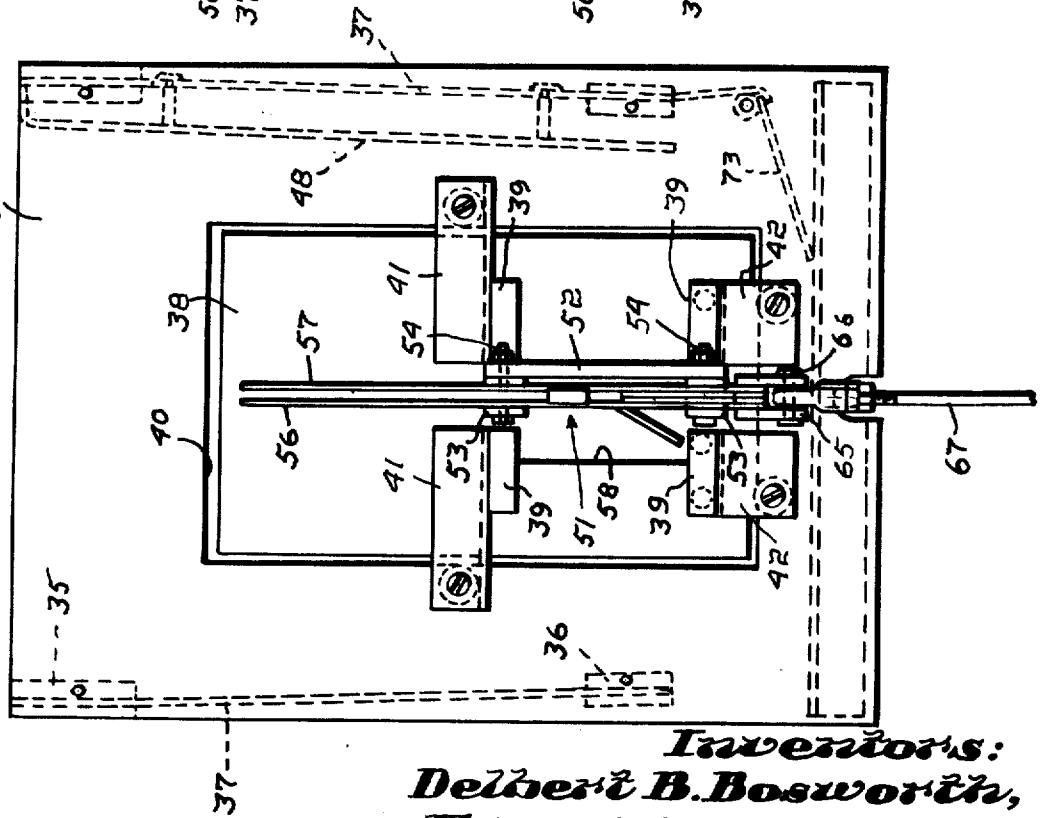


Fig. 3.



Inventors:
Delbert B. Bosworth,
Ernest E. Goodridge,
by Attorney

Fig. 9.

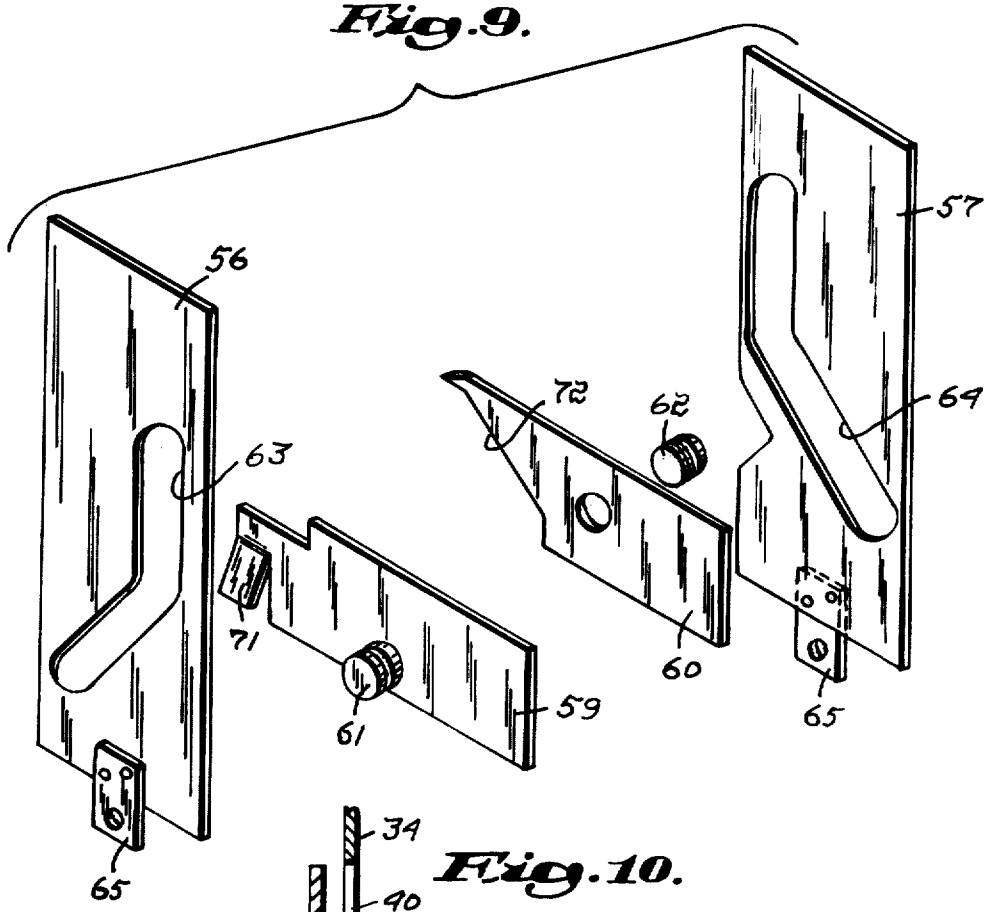
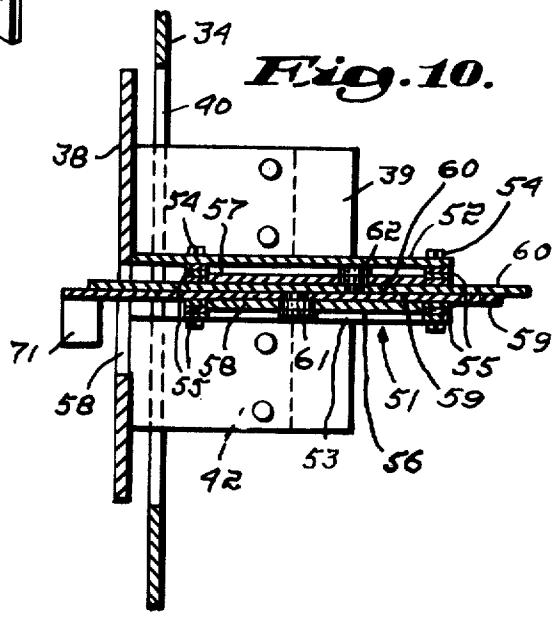


Fig. 10.



Inventors:
Delbert B. Bosworth,
Ernest E. Goodridge,
by Albert Spencer,
Attorney

Fig. 12.

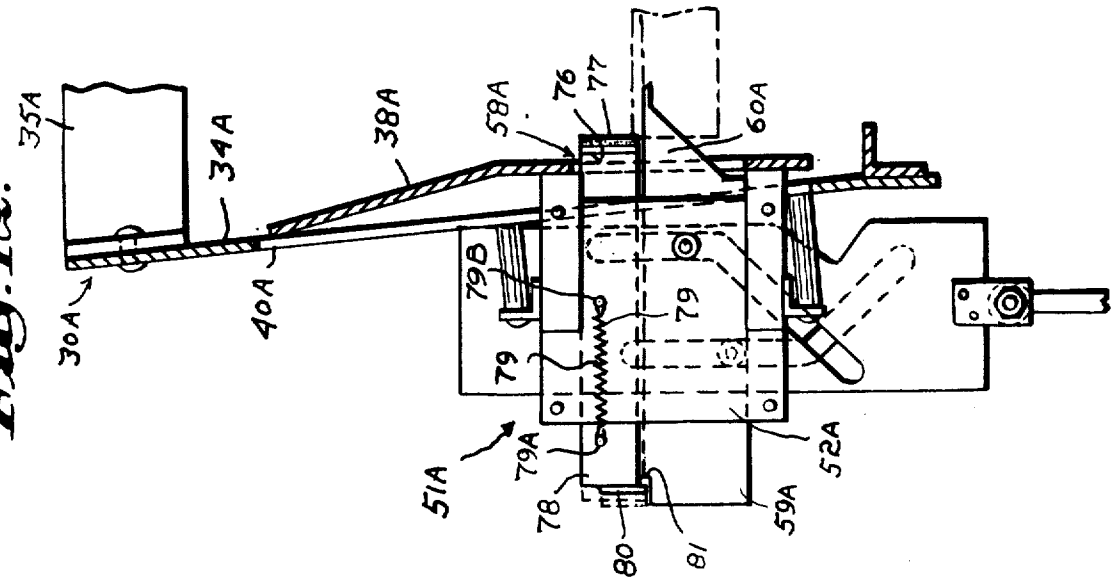
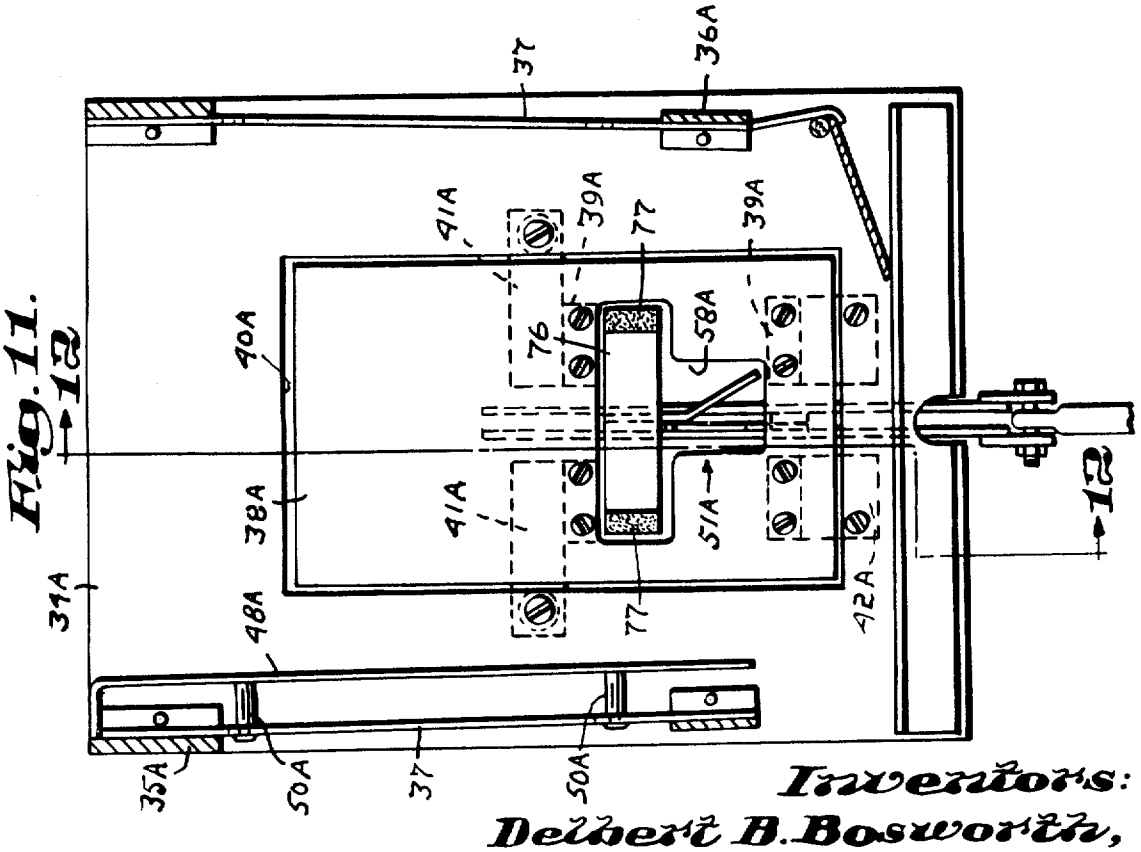


Fig. 11.



Inventors:
Delbert B. Bosworth,
Ernest E. Goodridge,
by Albert Hopson,
Attorney

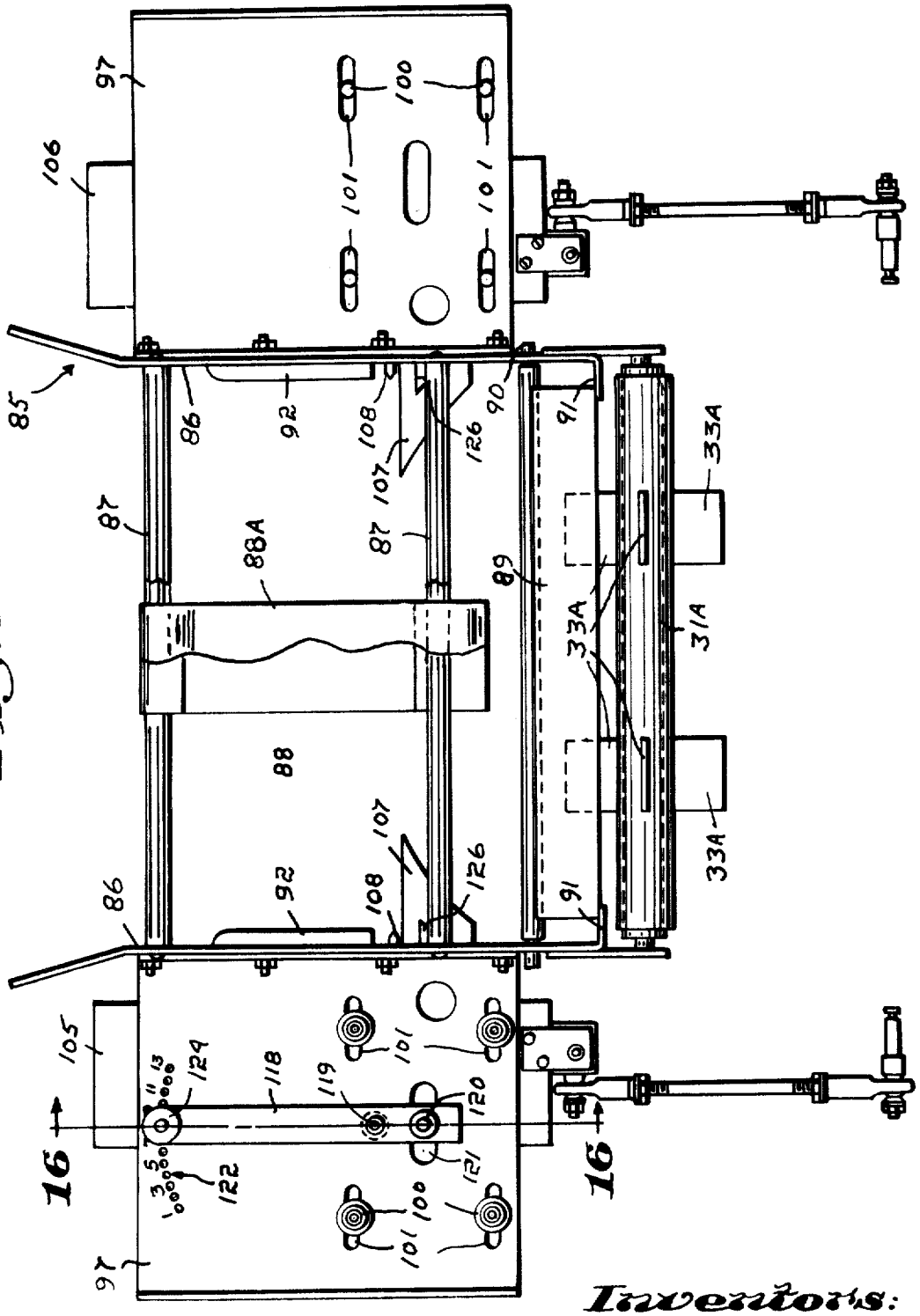


Fig. 13.

Inventors:
Delbert B. Bosworth,
Ernest E. Goodridge,
By Attorney

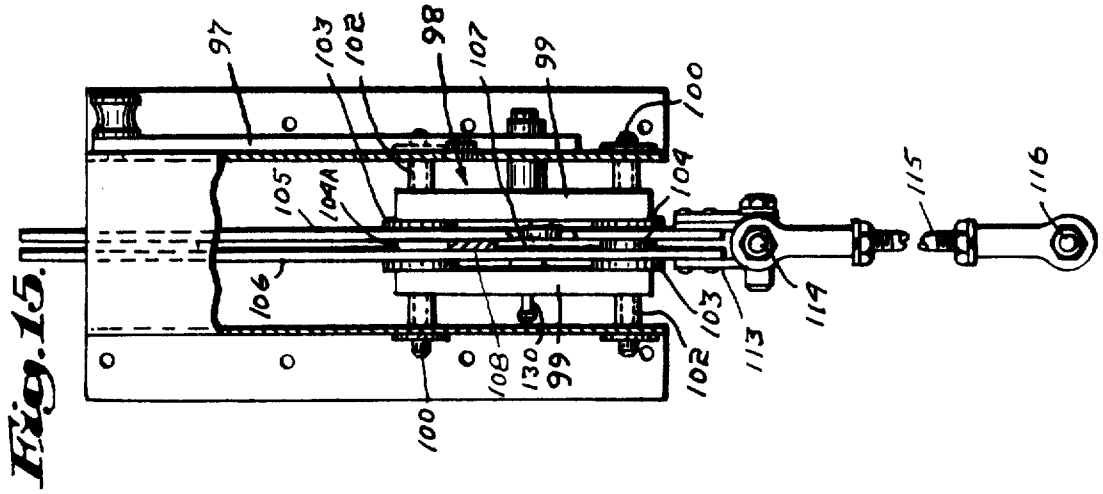


Fig. 15.

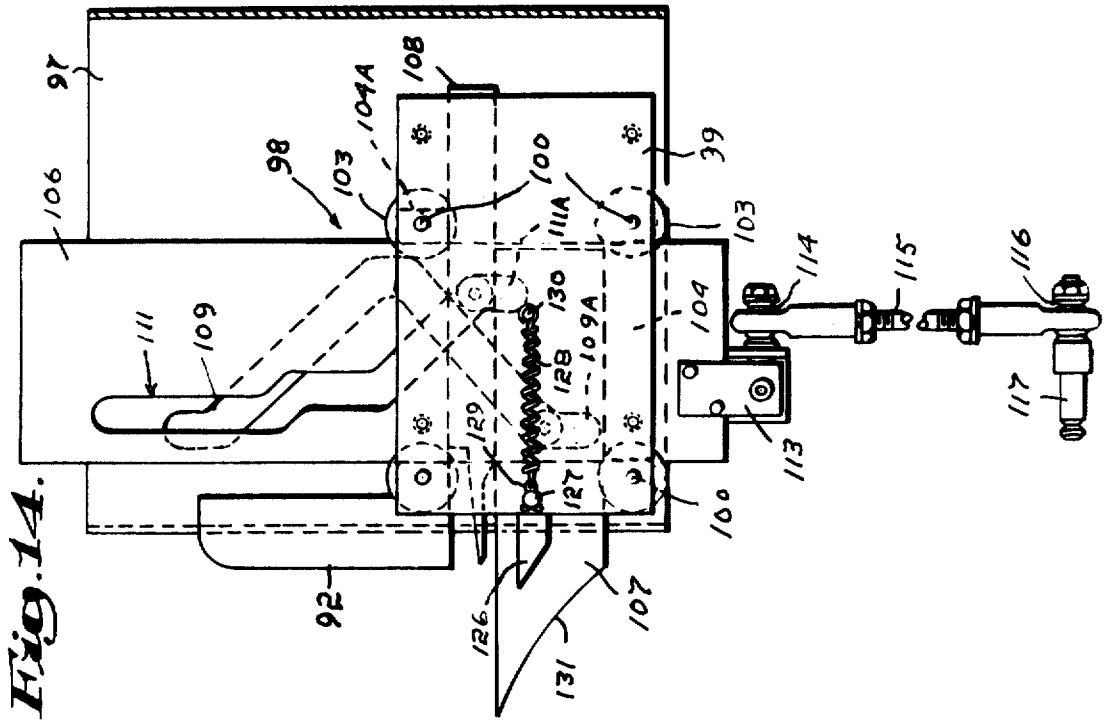


Fig. 14.

Inventors:
Delbert B. Bosworth,
Ernest E. Goodridge,
by Albert Spencer,
Attorney

Fig. 18.

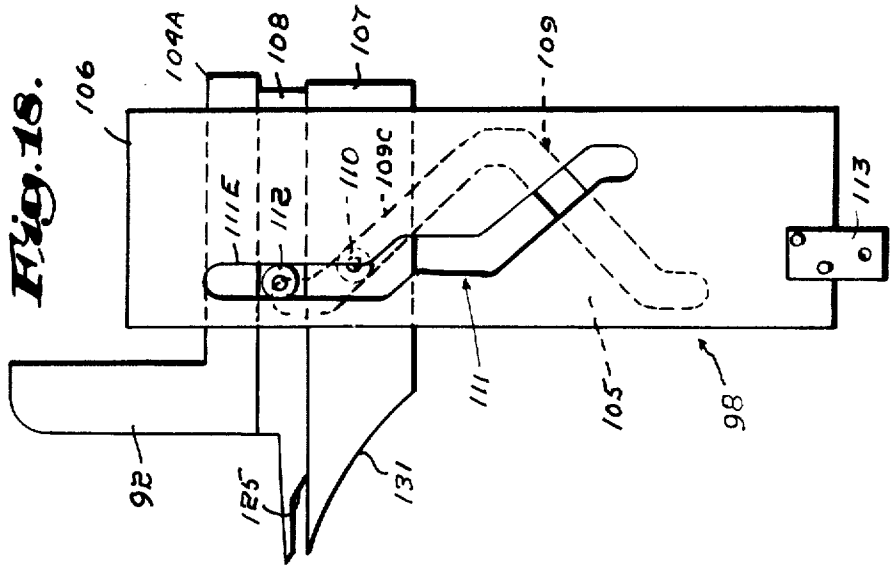


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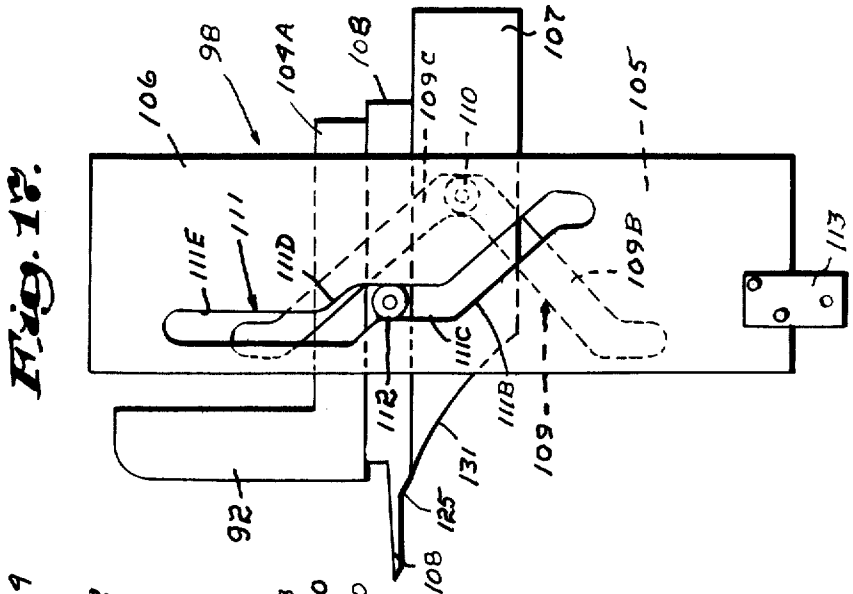
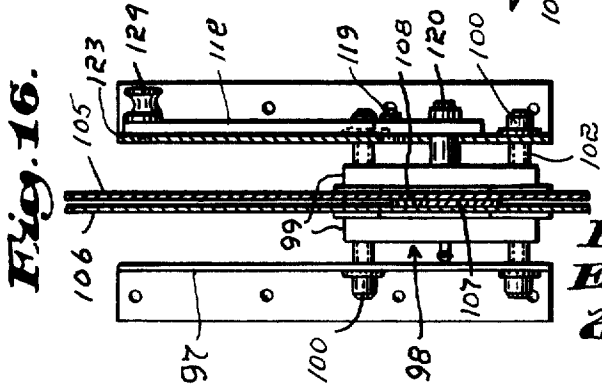


Fig. 16.



Inventors:
Delbert B. Bosworth,
Ernest E. Goodridge,
By Abbott Spear,
Attorney

Fig. 19.

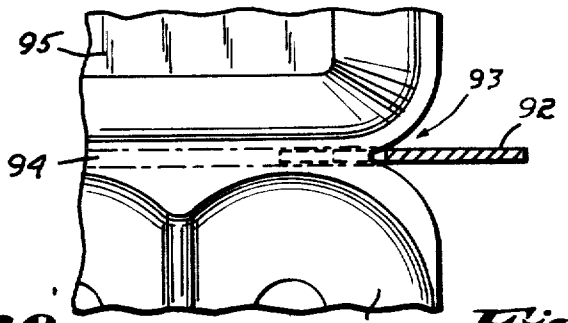
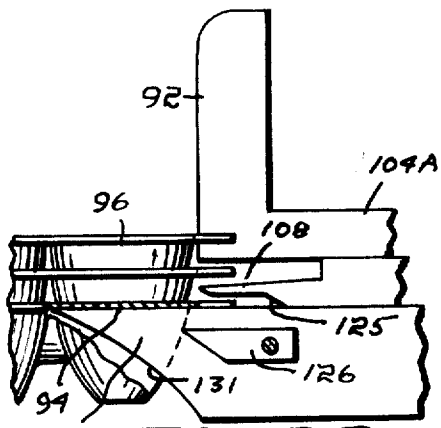


Fig. 20.

Fig. 21.



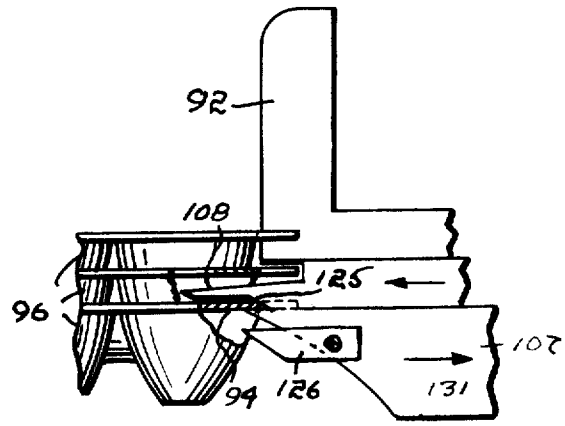
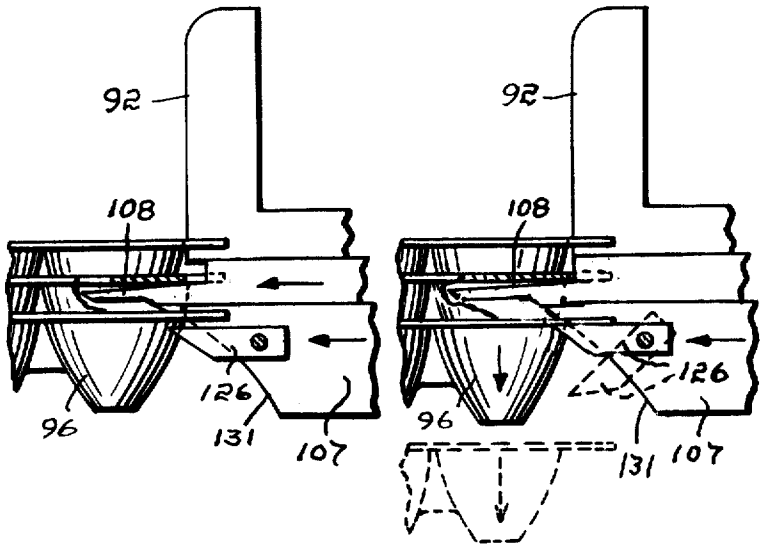


Fig. 22.

Fig. 23.



Inventors:
Delbert B. Bosworth,
Ernest E. Goodridge,
by Attorney
Attorney

CARTON DISPENSERS HAVING PLURAL CAM DENESTERS

The present invention relates to dispensers operable to dispense nested articles of the type having marginal portions by which they may be supported and which are spaced so that the ends of supporting members may be entered therebetween and function then to force them at least partly apart. The disclosed embodiments of the invention are for use where the marginal portions of the containers are transversely aligned and of substantial length and the invention is herein discussed with particular reference to egg cartons where the marginal portions are the ends of their hinges interconnecting their covers and bottoms.

In loading egg cartons, a stack of open cartons is placed in a dispenser above a conveyor that is operable to carry the open cartons under a loader which deposits eggs therein. Such a conveyor is advanced step-by-step with the dispensing of the cartons and the depositing of the eggs therein being synchronized with the operation of the conveyor to ensure than an open carton is in a position to receive its quota of eggs at the time the loader is operated. Failure of such systems occur with objectionable frequency and such failures are commonly due to the carton dispensers.

One cause of failure is the tendency of the nested cartons to adhere so that when the lowermost carton of the stack is free to fall, it may not drop, making some means necessary to wedge the bottom carton free from the stack. Failures also occur if the cartons do not drop in correct relation to the stepping of the conveyor. Such conveyors typically have flights which engage the cartons and positively advance them. In practice, the egg cartons are deposited with their bottoms leading and the flights are to engage the trailing edges thereof. In addition, some egg cartons have channels in their covers and if the flights engage the trailing edges of the carton covers or catch in such channels, the cartons will be delivered to the loader in an incorrect position.

The problems of dispensing articles, including egg cartons, from stacks, have long been recognized including the necessity of wedging the lowermost article from the bottom of the stack. See, for example, the patent to Burkholder U.S. Pat. No. 2,589,600 of Mar. 18, 1952, and the U.S. Pat. No. to Wetzler 2,668,627 of Feb. 9, 1954.

The general objective of the present invention is to provide article dispensers, particularly but not necessarily for egg cartons, that will be so reliable in their operation as to eliminate the above generally indicated causes of failure.

In accordance with one embodiment of the invention, this objective is attained with a dispenser having a hopper to receive a stack of open egg cartons with the hinges between their covers and bottoms transversely thereof and vertically aligned. Each side of the hopper has a slideway assembly having horizontal slideways provided with two slidable members and means for reciprocating them into and out of positions within the hopper in which their ends can support the stack, the ends of one corresponding pair of members being spaced above the other pair of corresponding members by a distance such that portions, desirably the ends of the cover hinge, of the lowermost carton can be received between them. During the reciprocation of the slidable members, first the lowermost ends and then the uppermost ends are in support of the stack with the lowermost ends withdrawn during such reciprocation to release the lowermost carton while the uppermost member ends are in their stack-supporting position. The uppermost ends include downwardly and outwardly inclined cam shoulders operable as wedges to dislodge the lowermost carton if it then adheres to the next above carton.

One objective of the invention is to provide reciprocating means that are adapted to ensure that the assemblies meet a side range of requirements, an objective attained by providing the assemblies with vertical slideways for the reciprocating means with the reciprocating means having a cam tract for each slidable member and each slidable member having a cam follower in engagement with the appropriate one of the tracks.

Another objective of the invention is to enable the dispenser to be adjusted for use with cartons of different manufacture, an objective attained by providing adjustable connections between the hopper and its assemblies.

Another objective of the invention is to provide each dispenser with a hinged plate disposed to support the cover of the dispensed carton above the conveyor in a position such that a conveyor flight will engage and raise it and come into carton-moving contact with the trailing edge of the carton bottom.

Another objective of the invention is to provide a dispenser in which first dispensing members and second dispensing members cooperate in the separation and ejection of nested cartons. This objective is attained with a dispenser having the ends of the second members spaced from the ends of the first members by a distance such that the second member ends will enter between two cartons and so separate their marginal portions that the ends of the first members may also be entered therebetween. The ends of the first members include cam portions and the operating means provide that after the ends of the first members have been retracted from their stack-supporting position and the ends of the second members have been positioned in support of the stack to the appropriate extent, the first members are again advanced to an extent so that their end portions are positioned to cooperate with those of the second members in the ejection of the subjacent carton or cartons. The operating means provide for the lowermost member ends being again positioned to support the stack at the completion of a dispensing cycle at which time the ends of the second members are inoperatively positioned.

Yet another objective of the invention is to provide dispensers in which cartons are deposited at the same part of the dispensing cycle whether the lowermost carton drops free once the ends of the lowermost slidable members are retracted or is forcibly dislodged by the cam shoulders of the uppermost member ends. This objective is attained by providing each dispenser with a pair of resiliently yieldable fingers below the lowermost member ends, the fingers being arranged and disposed to receive and support a carton whether it drops free or is forcibly dislodged. The member ends have cam surfaces operable to engage the finger-supported carton and force it downwardly with the fingers yielding to free and eject that carton.

In the accompanying drawings there are shown embodiments of the invention illustrative of these and other of its objectives, novel features, and advantages.

In the drawings:

FIG. 1 is a front view of a carton dispenser in accordance with one embodiment of the invention;

FIG. 2 is a like view but illustrating the dispensing of a carton;

FIG. 3 is a side view of the dispenser on an increase in scale;

FIG. 4 is a section, on the scale of FIG. 3 and taken approximately along the indicated line 4—4 of FIG. 2;

FIG. 5 is a fragmentary view illustrating the relationship between the ends of the slides in the operation of the dispenser as shown in FIG. 1;

FIG. 6 is a like view illustrating the retraction of the lowermost dispensing member ends and the advance of the uppermost dispenser member ends into their stack-supporting positions;

FIG. 7, in a like view, illustrates the functioning of the shoulders of the uppermost member ends in dislodging a carton adhering to the bottom of the stack when the lowermost member ends have been retracted;

FIG. 8 is another like view but illustrating the retraction of the uppermost member ends and the advance of the lowermost member ends towards their carton-supporting position shown in FIG. 1;

FIG. 9 is an exploded view of one of the cam plate and slide assemblies;

FIG. 10 is a section taken approximately along the indicated lines 10—10 of FIG. 1;

FIG. 11 is a view similar to FIG. 4 but illustrating another embodiment of the invention;

FIG. 12 is a section taken approximately along the indicated line 12—12 of FIG. 11;

FIG. 13 is a front view of a dispenser in accordance with another embodiment of the invention;

FIG. 14 is a somewhat schematic view, on an increase in scale, of the right hand assembly of the dispenser of FIG. 13 with its supporting structure broken away with the member reciprocating means at one limit of travel;

FIG. 15 is an end view of that assembly;

FIG. 16 is a section taken approximately along the indicated line 16—16 of FIG. 13;

FIG. 17 is a view of the assembly of FIG. 14 but with the reciprocating means being intermediate its travel limits;

FIG. 18 is a like view but with the reciprocating means nearing its other limit of travel;

FIG. 19 is a fragmentary top plan view of a carton;

FIG. 20 is a somewhat schematic side view showing the lowermost member ends operatively positioned;

FIG. 21 is a like view but showing the advance of the uppermost member ends into a stack-supporting position with the lowermost member ends retracted to an extent freeing the lowermost carton:

FIG. 22 is a like view showing the release of a freed carton by the shoulders of the uppermost member ends and advance of the lowermost member ends; and

FIG. 23 is another like view but showing the release of a finger-supported carton by the cam surfaces of the lowermost member ends.

In the embodiment of the invention illustrated by FIGS. 1 – 10, the dispenser consists of a hopper generally indicated at 30 and shown as supported above a general indicated conveyor 31 which may be of the type in carton loading apparatus in which open egg cartons, generally indicated at 32, are dispensed one-by-one from a stack at intervals and advanced step-by-step to be loaded with eggs and then closed. The conveyor 31 has spaced flights 33.

The hopper 30 is shown as having side walls 34 joined by top and bottom members 35 and 36 adjacent their end edges and interconnected by end guides 37. Side guide plates 38 have vertically spaced pairs of arms 39 extending outwardly through openings 40 in the hopper side walls 34. The upper arms 39 have a laterally extending member 41 of nearly right angular section fixed thereon and the lower arms have similar members 42 secured thereto, the members 41 and 42 being connected to the proximate side wall 34 through spacers 43. The egg cartons 32 may be of the type shown in U.S. Pat. No. 3,458,108 having a locking flap 44 hinged to its bottom 45, see FIG. 4, or of the type shown in the co-pending application of Harold A. Doughty, Ser. No. 868,279, owned by applicant's assignee and differing in that its locking flap is connected to the front wall of the cover of the carton. In accordance with the illustrated embodiments of the invention, it is necessary to support each stack of cartons 32 with the hinges 46 between their covers 47 and bottom sections 45 in a predetermined vertical, transverse path and with the cartons 32 so positioned that they will be deposited on the conveyor with the bottoms 45 leading. In order to accommodate the two types of cartons to which reference has been made, a spacing guide 48 is provided that may be detachably attached to either end of the hopper 30, see FIGS. 3 and 4. To this end each end guide 37 has vertically spaced keyholes 49 to slidably receive supports 50 with which the spacing guide 48 is provided.

At each side of the hopper 30, there is a generally indicated slide assembly 51. As both sides of the hopper 30 and their attached assemblies are identical, opposite faces of the assemblies are shown in both FIGS. 1 and 2. Each assembly has a plate 52 vertically supported by one pair of vertically aligned arms 39 of each side guide plate 38 at approximately right angles to the side walls 34. See FIGS. 1, 3, and 10. Top and bottom side members 53 are secured to each plate 52, each by a pair of bolts 54 extending through spacers 55 to provide a vertical slideway for cam plates 56 and 57 and a transverse slideway opening into the interior of the hopper through an opening 58 with which each side guide plate 38 is provided. As best indicated in FIG. 9, the transverse slideways receive slidable members 59 and 60 shown as disposed in a side-by-side relationship between the cam plates 56 and 57 and having followers 61 and 62 respectively. The cam follower 61 is entrant of the cam tract 63 of the cam plate 56 and the cam follower 62 is entrant of the cam track 64 of the cam plate 57. The cam plates 56 and 57 are interconnected in spaced relationship at their lower ends through members 65 having a pivot connection 66 with a rod 67. Each rod 67 is eccentrically attached as at 68A to a disc 68 rotated by a shaft 69 having a drive generally indicated at 70 of a type effecting a single rotation thereof. As the disc 68 and the drive 70 form no part of the present invention, it is not herein detailed.

On each complete rotation of the discs 68, the cam plates 56 and 57 at both sides of the hopper 30 are reciprocated through a predetermined stroke, compare FIGS. 1 and 2. It will be seen from FIG. 9 that the cam tracks 63 and 64 are similar in form but reversed so that the slidable members 59 and 60 are reciprocated oppositely by the vertical reciprocation of the cam plates with their ends alternatively in stack supporting positions within the hopper 30 to engage and support the extremities of the hinge 46 of the bottom carton 32 of the stack. The stack-supporting ends of the members 59 are each shown as having a tab 71 inclined to one side for steadying engagement with a side of the carton bottom. Each slide 60 has a downwardly and outwardly inclined wedge face 72 spaced from its carton supporting end and such carton supporting ends of the members 60 are spaced above the carton supporting ends of the slides 59 by a distance that will permit the ends of the carton hinges 46 to be received between them.

Referring to FIGS. 5 – 8, it will be seen that at the end of each revolution of the discs 68, the ends of the members 59 are in a position supporting the stack of cartons and the ends of the members 60 are in their retracted positions, see FIG. 5. As the cam plates 56 and 57 are slid downwardly, the members 60 are advanced as the members 59 are retracted, see FIG. 6, until see FIG. 7 the lowermost carton 32 is free to fall unless it adheres to the bottom of the stack then supported by the slides 60. In the event the lowermost carton does not fall free, the cam faces 72 of the advancing members 60 forcibly free it. On the upward stroke of the cam plates, the travel of the members 59 and 60 is reversed as shown in FIG. 8 to retract the members 60 and advance the members 59 again into their stack supporting positions.

In order that each dispensed carton 32 is advanced by a conveyor flight 33 in engagement with the trailing edge of its bottom 45, the hopper 30 is provided with a plate 73 hingedly connected at 74 to the rear adjacent its bottom and forwardly and downwardly inclined normally to rest on hopper flanges 75 so as to support the cover 47 of a dispensed carton 32 and be in a position to be engaged and forced upwardly by an advancing flight 33 thus to ensure that the cover is not caught thereby and that the flight 33 will engage the rear edge of the carton bottom 45.

The embodiment of the invention illustrated by FIGS. 11 and 12 employs means to steady the stack, a feature sometimes advantageous when only a few cartons are left in the stack since they are supported only at the ends of their hinges 46. As this feature is an additional one, the reference numerals indicating corresponding parts of this embodiment are distinguished by the suffix addition "A."

Each side guide plate 38A has its opening 58A T-shaped to accommodate the stabilizer head 76 desirably having laterally spaced resilient contacts 77, one for engagement with the carton bottoms 45 and one for engagement with the carton covers 47. Each head 76 includes a slidable member 78 riding on top of the slidable member 59A and 60A and yieldably urged towards the cartons by a spring 79 attached thereby by a pin 79A and to the appropriate one of the side walls 52A by a pin 79B. Engagement of the pins 79A with the outer edges of

the assembly side walls 52A limits the inner movement of the members 78. At its outer end, each member 78 has a stop 80 engageable with a shoulder 81 with which the outer exposed end of each member 59A is provided when the members 59A are withdrawn. With this arrangement, the stabilizer heads 76 lightly engage a carton 32 except when the members 59A are withdrawn.

In the embodiment of the invention illustrated by FIGS. 13 – 23, the hopper is generally indicated at 85 and shown as having side walls 86 interconnected adjacent the top and bottom of their ends through spacers 87 with the spacers 87 at the ends associated with vertical guide plates 88 and 88A. The hopper 85 is adapted to be supported over the conveyor 31A in the same manner as the hopper 30 is supported over the conveyor 31 and like the hopper 30, it has a plate 89 connected to the side walls 86 by a pivot 90 adjacent their rear bottom edges, the plate 89 normally resting on flanges 91 in a forwardly inclined position above the conveyor, the hinged plate 89 functioning in the same manner as the plate 73 of the embodiment of the invention illustrated by FIGS. 1 – 10. Centrally of the side walls 85 there are transversely aligned vertical guide ribs 92 shaped and dimensioned for positioning the ends of hinges 94. The ribs 92 are narrow edged to permit entry into the V-shaped notch 93 often provided at each end of the hinge 94 between a carton cover 95 and its bottom 96, see FIG. 19. The shape and dimensions of such a notch often varies with different manufacturers. The guide plates 88 and 88A are interchangeable thus to adapt the hopper for use with cartons having locking flaps hinges to their covers as well as their having their locking flaps hinged to their bottoms so that in either case their hinges 94 will be in alignment with the guide ribs 92.

Each hopper side wall 86 has supporting structure, shown as a housing 97, for a slideway assembly generally indicated at 98. The sides of the hopper 85 with their attached assemblies are identical and, accordingly, opposite faces of the assemblies are shown in FIG. 13. As may be best seen in FIGS. 14 – 16, each assembly 98 consists of a pair of vertically aligned plates 99 interconnected by members 100 extending through horizontal slots 101 in the side walls of the housing 97. The members 100 also extend through spacers 102 which space the plates 99 from the sides of its housing 97. Between the plates 99, the members 100 pass through a spacer 103, a lower spacer 104, and an upper spacer 104A common, respectively, to the two upper and lower connecting members 100. The spacer 103, together with the spacers 104 and 104A establish a pair of vertical spaced slideways for cam plates 105 and 106. The cam plates 105 and 106, together with the intermediate spacers 104 and 104A provide a transverse slideway for slidable members 107 and 108, the members 108 resting on the members 107 and the members resting on the spacers 104. Each of the guide ribs 92 includes an arm functioning as a spacer 104A. The cam plate 105 has a cam track 109 receiving a follower 110 with which each of the members 107 is provided and the cam plate 106 has a cam track 111 receiving the follower 112 with which each of the members 108 is provided. The cam plates 105 and 106 are interconnected at their bottom ends by a clip 113 having a pivotal connection 114 with a rod 115 whose other end has a pivotal connection 116 with a pin 117 for connection to the appropriate one of the discs 68 of the drive 70, see FIG. 1.

From the foregoing, it will be apparent that the slideway assemblies 98 are adjustably supported by their housings 97 for movement towards or away from the hopper 85 for reasons presently to be explained. In order that such adjustments may be easily and accurately made, each housing 97 is provided with an arm 118 connected thereto by a pivot 119 and to the slideway assembly 98 within that housing by a pivot 120 extending through a slot 121. The other end of the arm 118 traverses an arcuate series of recesses 122, each representing a predetermined distance and adapted to receive the retractable locking pin 123 provided with a knob 124. As previously stated, the various makes of cartons differ from one another with the variations in the length of the hinges between their covers and bottoms as one example. The ability to adjust the positions of the assemblies relative to the hoppers enables such variations in construction to be accommodated.

In any position of the assemblies 98 relative to their housings 97, the ends of the slidable members 107 and 108 have operative positions within the hopper 85 and the ends of the members 108 are spaced above the ends of the members 107 so as to receive between them end portions of the carton hinge 94. It will be noted that the members 108 have downwardly and outwardly inclined shoulders 125 adjacent their stack-supporting ends. Reference is first made to FIG. 14 wherein the cam plates 105 and 106 are shown raised with the cam followers of the members 107 and 108 in the bottom vertical parts 109A and 111A, respectively, of the cam tracks 109 and 111 so that further upward movement would not affect the position of the slidable members. The ends of the members 107 are in their fully advanced, stack-supporting positions, underlying the end portions of the lowermost carton hinge 94, see FIG. 20. The ends of the members 108 are fully retracted and are inoperative.

As the cam plates 105 and 106 move downwardly together, the outwardly inclined portion 109B of the cam track 109 causes rearward or retracting movement of the slide 107 until it reaches the junction of the track portion 109B with the inwardly inclined cam track portion 109C, see FIG. 17. At this point the ends of the members 107 are fully retracted and the carton supported thereby is free to fall unless the lowermost carton adheres to the bottom of the stack now supported by the ends of the members 108 which were advanced by the inwardly inclined cam track portion 111B into the intermediate vertical portion 111C.

It will be noted that each assembly 98 has a finger 126 connected to one of its side plates 99 by a pivot 127 on which it is fast. As may be seen in FIG. 14, the pivot 127 has one end of a spring 128 connected thereto as by the cotter pin 129. The other end of the spring 128 is connected to the same side plate 99 as at 130 thereby to provide that the fingers 126 are yieldably though lightly held in a horizontal position. The fingers 126 are positioned below the slides 107 to receive a carton whether it falls free when the slides 107 are retracted or are wedged from the bottom of the stack and support that carton at the ends of its hinge 94. The leading edges 131 of the slides 107 are cam surfaces and these are of substantial vertical extent and the fingers 126 are located so that flange portions of a carton held thereby are in their path.

In FIG. 21 one of the members 107 is shown as approaching but still out of its fully retracted position in which the stack is no longer supported thereby and one of the members 108 as shown in a stack-supporting position with its follower 112 approaching the cam track portion 111C. In FIG. 22, one of the members 108 is shown as it would be with its cam follower 112 in the cam track portion 111C and now in support of the stack and one of the members 107 advancing as its cam follower is now in the track 109C. At this point, the ends of the members 108, whose upper surfaces are preferably downwardly inclined, have so increased the distance between the margins of the two lowermost cartons that the ends of the members 107 may also enter between them. At this stage, the members 107 have advanced to bring their cam surfaces 131 into positions in which they are disposed substantially as a continuation of the cam shoulder 125 of the member 108.

Continued movement of the cam plates in the same direction causes advance of the members 108 for a short distance as each of the cam followers 112 is engaged by a cam tract portion 111D with the members 107 moving therewith until the cam followers 112 are entrant of the cam track portion 111E, the positions illustrated by FIG. 23 with the two sets of members cooperating in effecting positively the release of the adhering carton which now drops and is caught by the fingers 126. The members 107 continue to advance and during their final advance, their cam surfaces 131 engage the carton held by the fingers 126 and force it downwardly, the fin-

gers **126** yielding until the carton is released to drop upon the conveyor. This arrangement ensures the deposit of the cartons on the conveyor at the same part of each cycle. As the fingers **126** are part of the assemblies **98**, their positions are adjustable therewith. On opposite movement of the cam plates the stack again becomes supported by the members **107** when the members are again in their FIG. **20** position.

From the foregoing it will be appreciated that dispensers in accordance with the invention are well adapted to meet the requirements of nested article dispensing.

We claim:

1. A dispenser for ejecting nested articles from a stack, the articles being of a type having marginal portions by which they may be supported and which are spaced so that ends of supporting members may be inserted between them from opposite sides of the stack to force them apart if they adhere one to another, said dispenser comprising a hopper for a stack of said articles, and assemblies, one for each side of said hopper, each assembly including first supporting members movable into and out of positions within the hopper in which their proximate ends support the stack, second supporting members movable into and out of positions within the hopper in which their proximate ends support the stack, the proximate ends of the second members being spaced from the ends of the first members and shaped and dimensioned to enter between the marginal portions of two articles when the stack is supported by the first member ends, the supporting ends of the second members including cam portions operable to force said articles apart, vertical slideways, one at each side of the hopper and means vertically reciprocal within the slideways to actuate said first and second members so that they are alternately in support of the stack with the cam portions operative as the end portions of the second member advance into their stack-supporting positions, the actuating means of each assembly including vertically extending cam tracks, one for each supporting member, each sup-porting member having a cam follower in engagement with the appropriate track, and together with said assemblies providing transversely aligned slideways for said first and second supporting members.

2. The dispenser of claim **1** in which the actuating means are cam plates, each having an appropriate one of the cam tracks.

3. The dispenser of claim **1** in which the cartons are either of the type having locking flaps hinged to their bottoms or of the type having locking flaps hinged to their covers and the hopper includes a spacer detachably attachable to either the front or the rear of the hopper to enable the hinge axis of both types of cartons to occupy the same vertical, transverse plane.

4. the dispenser of claim **1** in which there is a support projecting from each hopper side, each assembly is mounted on a support for movement towards or away from the hopper to vary the stack-supporting position of the supporting members.

5. The dispenser of claim **4** in which each assembly is slidable horizontally with reference to its support and each support includes an arm pivoted thereto with one end connected to the supported assembly and has an arcuate series of holes traversed by the other arm end, said other arm including a member releasably seated in a selected one of said holes.

6. The dispenser of claim **4** in which the open cartons present a notch between their bottoms and their covers at each end of their hinge and there is a notch entering guide at both sides of the hopper extending therein vertically above the path of the slides, and each guide is a part of the appropriate one of the assemblies.

7. The dispenser of claim **1** in which the proximate ends of the cam tracks in control of the first members effect their operative position in both the upper and lower position of the vertically reciprocable means and their inoperative positions at an intermediate position of said means.

8. The dispenser of claim **7** in which each assembly includes a finger underlying the ends of the first supporting members in a position to receive and support a carton dropping when the ends of the first members are retracted in a position to be engaged and forced downwardly by the cam surfaces thereof, and resilient means yieldably holding each finger in said receiving and supporting position.

9. The dispenser of claim **1** in which the proximate ends of the second supporting members also include a laterally disposed shoulder engageable with one of the carton walls that are joined by the hinge to stabilize that carton.

10. The dispenser of claim **1** in which each assembly comprises side structures, means interconnecting the side structures adjacent each corner to provide a vertical slideway for the vertically reciprocable means and the horizontal slideways for the slides.

11. The dispenser of claim **1** in which the vertically reciprocable means include a separate plate for each cam track and the supporting members are confined between the plates.

12. The dispenser of claim **11** in which the supporting members of each assembly are supported in a side-by-side relationship.

13. The dispenser of claim **11** in which the supporting members of each assembly are arranged one above the other for relative sliding movement.

14. The dispenser of claim **2** in which each assembly comprises a pair of side members, means interconnecting the side members adjacent each corner of said member to provide the vertical slideways for the actuating means and the horizontal slideways for the supporting members, the interconnecting means spacing the vertical slideways from the side members and from each other, the two cam plates confining the supporting members between them.

15. The dispenser of claim **14** in which the interconnecting means include three spacers, the middle spacer defining with each of the other spacers the vertical slideways.

16. The dispenser of claim **15** in which the upper middle spacer of each assembly that is at the inner end thereof includes a guide extending vertically within the hopper.

17. The dispenser of claim **14** in which there is a support projecting from each hopper side and provided with horizontal slots through which the interconnecting members extend, and means to lock each assembly to its support in a selected position relative thereto.

18. A dispenser for depositing such stacked articles as egg cartons one-by-one on a conveyor, said dispenser comprising a hopper for holding a stack of articles over the conveyor, transverse slideways opening into the hopper through both sides thereof, slides in said slideways, two slides on each side of the hopper and reciprocable into and out of positions in which their ends are in a stack-supporting position within the hopper, the ends of one corresponding pair of slides being spaced above the ends of the other pair of corresponding slides by a distance such that marginal portions of a carton can be received between them, and means to reciprocate said slides so that first the lowermost ends and then the uppermost ends are in support of the stack with the lowermost ends withdrawn during such reciprocation to release the lowermost carton while the uppermost ends are in their stack-supporting positions and the uppermost ends withdrawn while the lowermost ends are in their stack-supporting positions, each of the uppermost ends having a downwardly and outwardly inclined shoulder operable at least partially to dislodge the lowermost carton if it adheres to the bottom of the stack when the lowermost ends are withdrawn, and a third slide at least at one side of the hopper and including a transverse head engageable with the carton directly above the uppermost slide ends, said third slide and the slideway including that end including portions interengageable to prevent third slide movement or to cause outward movement of the third slide therewith, and resilient means yieldably urging said third slide into a position in which its head engages said carton.

19. A dispenser for ejecting nested articles from a stack, the articles being of a type having marginal portions by which they may be supported and which are spaced so that ends of supporting members may be inserted between them from opposite sides of the stack to force them apart if they adhere one

to another, said dispenser comprising a hopper for a stack of said articles, first supporting members movable linearly into and out of positions within the hopper in which their proximate ends support the stack, said proximate ends including subjacent cam portions, second supporting members movable linearly into and out of position within the hopper in which their proximate ends support the stack, the proximate ends of the second members being spaced from the ends of the first member and shaped and dimensioned to enter between the marginal portions of two articles when the stack is supported by the first member ends, the supporting ends of the second members including cam portions operable at least to so increase the space between said two articles that the proximate ends of the first member may also be entered between them, and means to actuate said first and second members so that they are alternately in support of the stack and include positions of the second member in which their ends are entered between the two articles to at least increase the space between them and positions of the first members in which their proximate ends are also entered therebetween if said two articles are then adhering, one to the other, then to force them completely apart.

20. The dispenser of claim 19 and resiliently yieldable means at each side of the hopper operable to catch an article if it drops freely from the bottom of the stack when the ends of the first members are withdrawn and hold the caught article in the path thereof when their proximate ends are again advanced beyond the positions in which they have forced the articles apart then to be engaged by their cam portions and forced downwardly causing the yieldable means to release it.

21. The dispenser of claim 19 in which the supporting members and actuating means at each side of the hopper are assemblies adjustable relative thereto to vary the extent to which the ends of both the first and second members enter the hopper and the yieldable means are carried by the assemblies.

22. The dispenser of claim 20 in which the yieldable means comprise pivotable fingers, one for each assembly, and springs, one for each finger and yieldably urging it into a substantially horizontal position.

23. A dispenser for ejecting nested articles from a stack and depositing them on a conveyor, the articles being of a type having marginal portions by which they may be supported and which are spaced so that ends of supporting members may be inserted between them from opposite sides of the stack to force them apart if they adhere one to another, each article also having a centrally located, downwardly opening, transverse channel and the conveyor having spaced flights that are to engage the leading wall of the channels, said dispenser comprising a hopper for a stack of said articles, first supporting members movable into and out of positions within the hopper in which their proximate ends support the stack, said proximate ends including subjacent cam portions, second supporting members movable into and out of position within the hopper in which their proximate ends support the stack, the proximate ends of the second members being spaced from the ends of the first member and shaped and dimensioned to enter between the marginal portions of two articles when the stack is supported by the first member ends, the supporting ends of the second members including cam portions operable at least to so increase the space between said two articles that the proximate ends of the first member may also be entered between them, means to actuate said first and second members so that they are alternately in support of the stack and include positions of the second member in which their ends are entered between the two articles to at least increase the space between them and positions of the first members in which their proximate ends are also entered therebetween if said two articles are then adhering, one to the other, then to force them completely apart, and a transversely hinged, forwardly extending plate underlying the rear portion of the hopper, said hopper including marginal portions maintaining the leading edge of the plate in a position to be engaged and raised by said flights, said plate otherwise holding the part of the article rearwardly of the channel in a raised position thus providing that the flights engage said leading wall.

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