United States Patent [19]

Graham

[11] **3,766,706**

[45] **Oct. 23, 1973**

[54] **CASE PACKER**

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[73] Assignee: **R. A. Pearson Company**, Spokane, Wash.

[22] Filed: **Dec. 30, 1971**

[21] Appl. No.: **213,996**

[52] **U.S. Cl.** ..... **53/124 D**, 53/62, 53/159, 53/260

[51] **Int. Cl.** **B65b 63/02**

[58] **Field of Search** ..... 53/124 D, 124 R, 53/62, 159, 251, 260; 100/264

[56] **References Cited**

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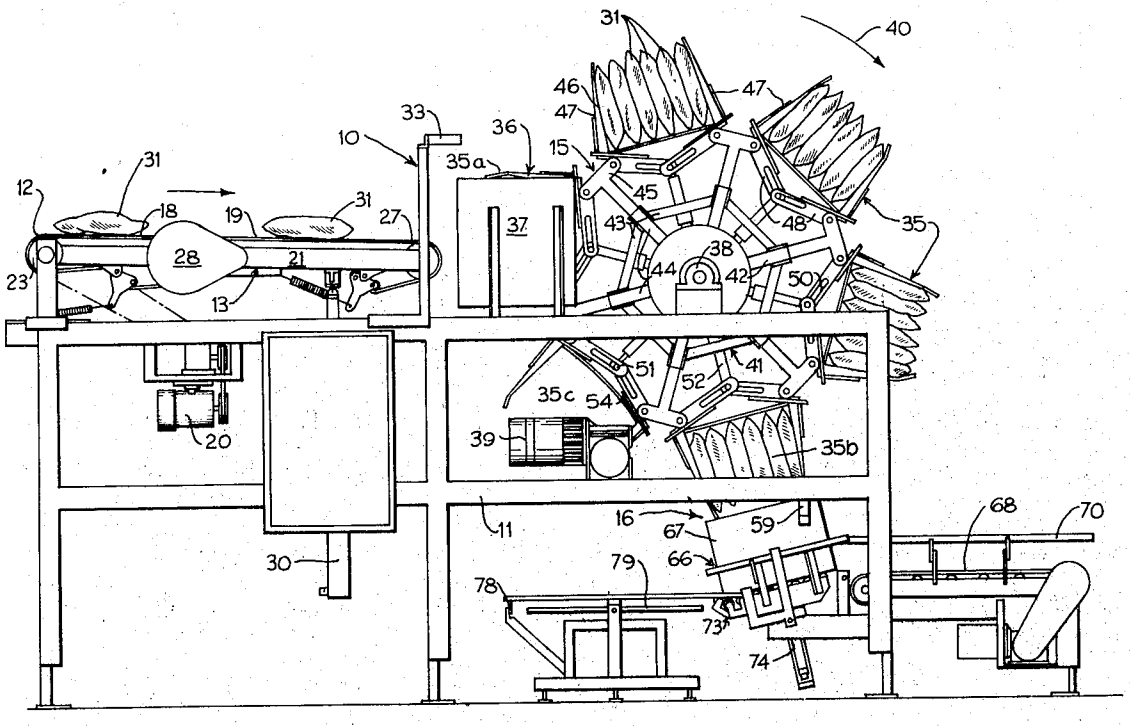
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Primary Examiner—Travis S. McGehee
Attorney—Greek Wells et al.

[57] **ABSTRACT**

A case packer for grouping and packing product-containing flexible bags in the form of enclosed pillows or packets into cartons used for shipping purposes. The machine includes a vertically pivotal conveyor for successively feeding and stacking the bags between paired radial jaws of a vertically oriented wheel. After receiving a set number of bags, the jaws are activated to close, gripping and compressing the grouped bags. The wheel is rotatably indexed to bring each set of loaded jaws to a carton loading station. A carton is lifted to partially enclose the bags as the jaws are relaxed, allowing the bags to fall into the box, which is then removed for further processing or shipment.

9 Claims, 10 Drawing Figures



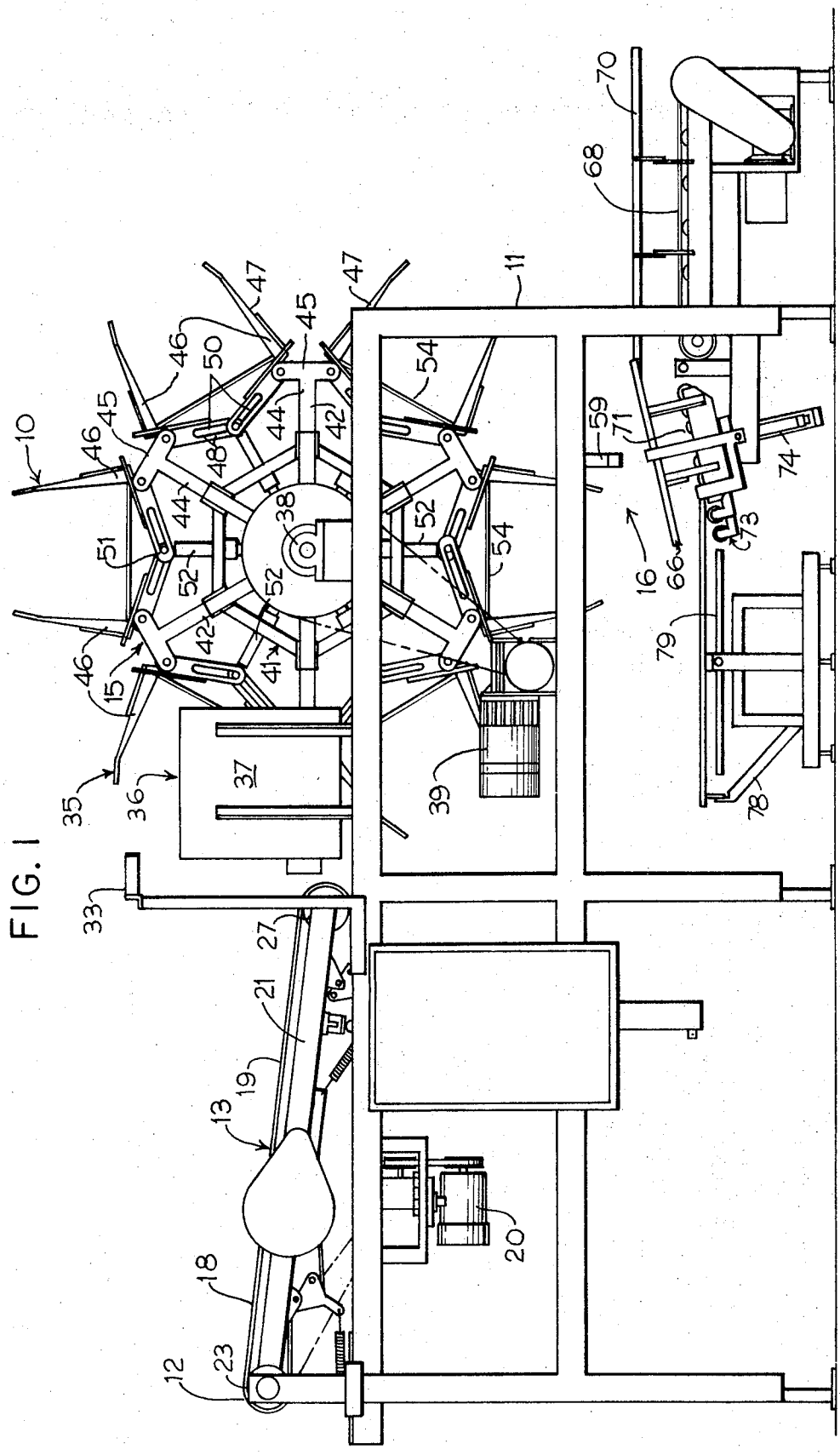

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FIG. 1

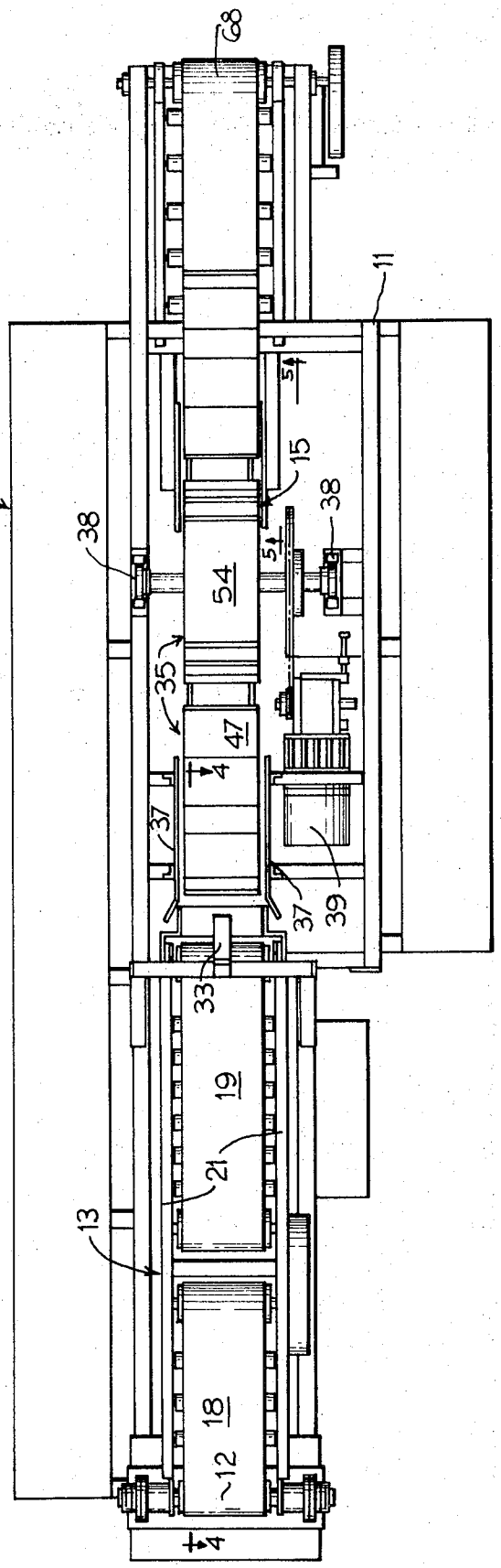


FIG. 2

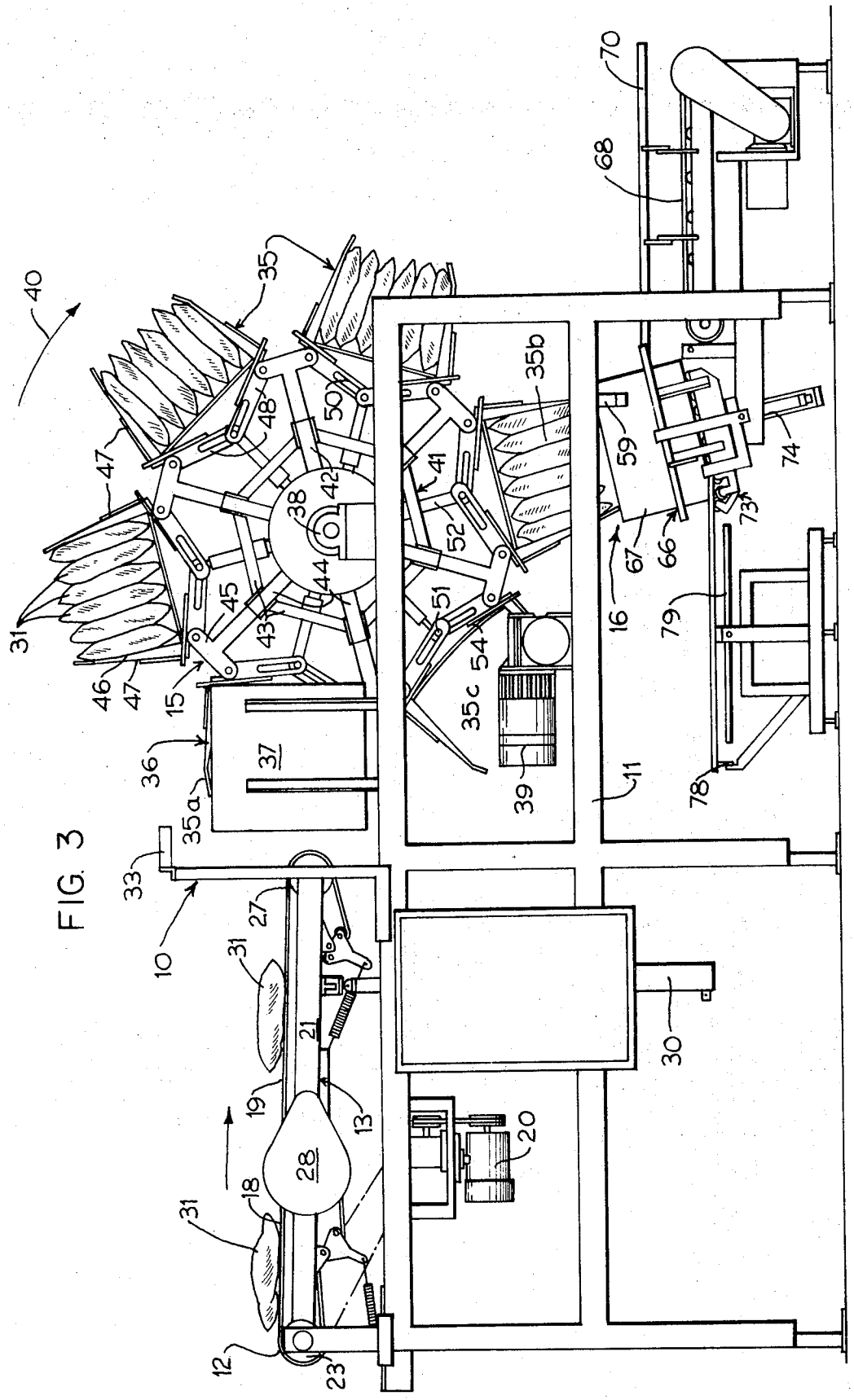

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FIG. 3

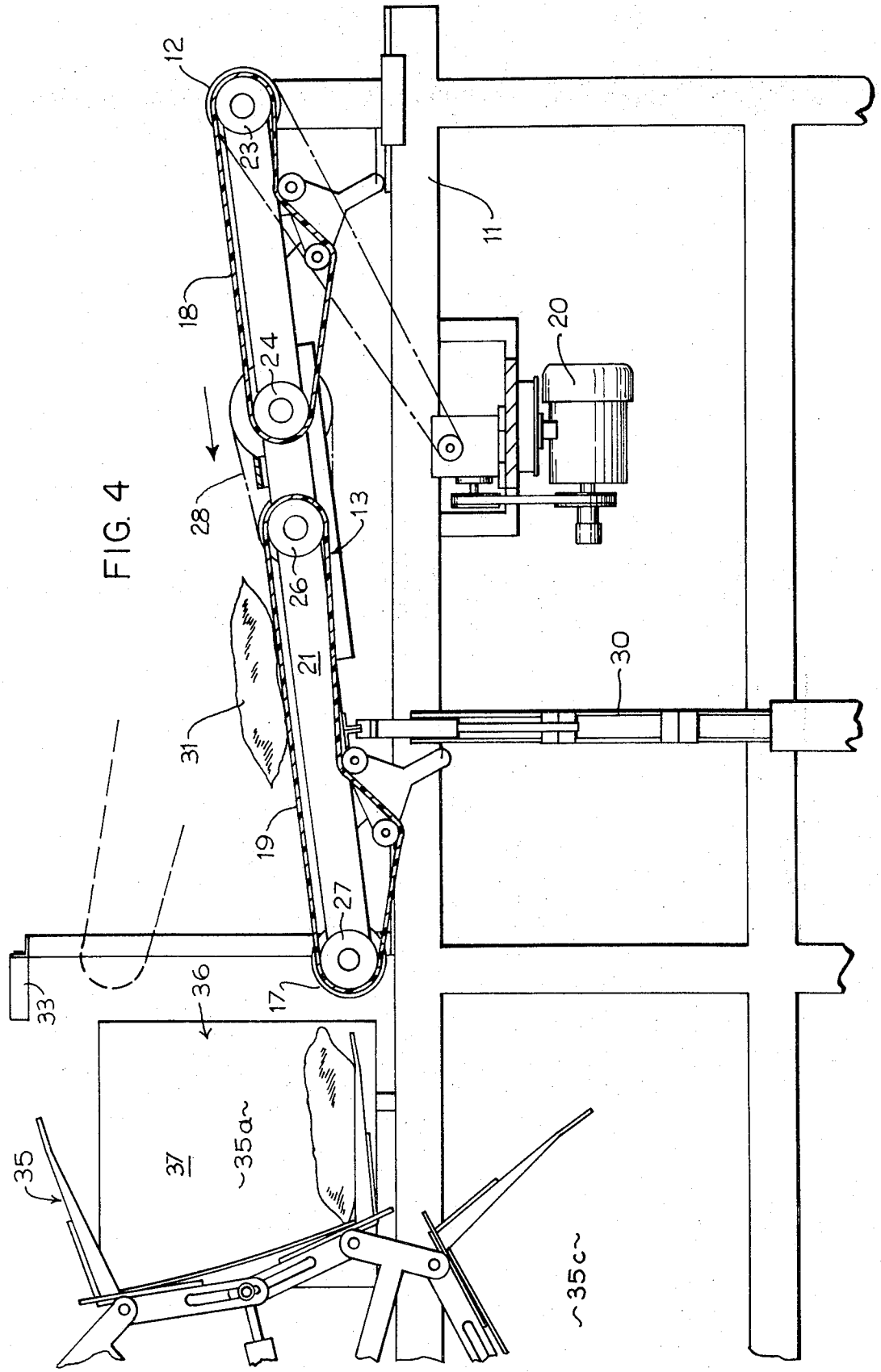


FIG. 4

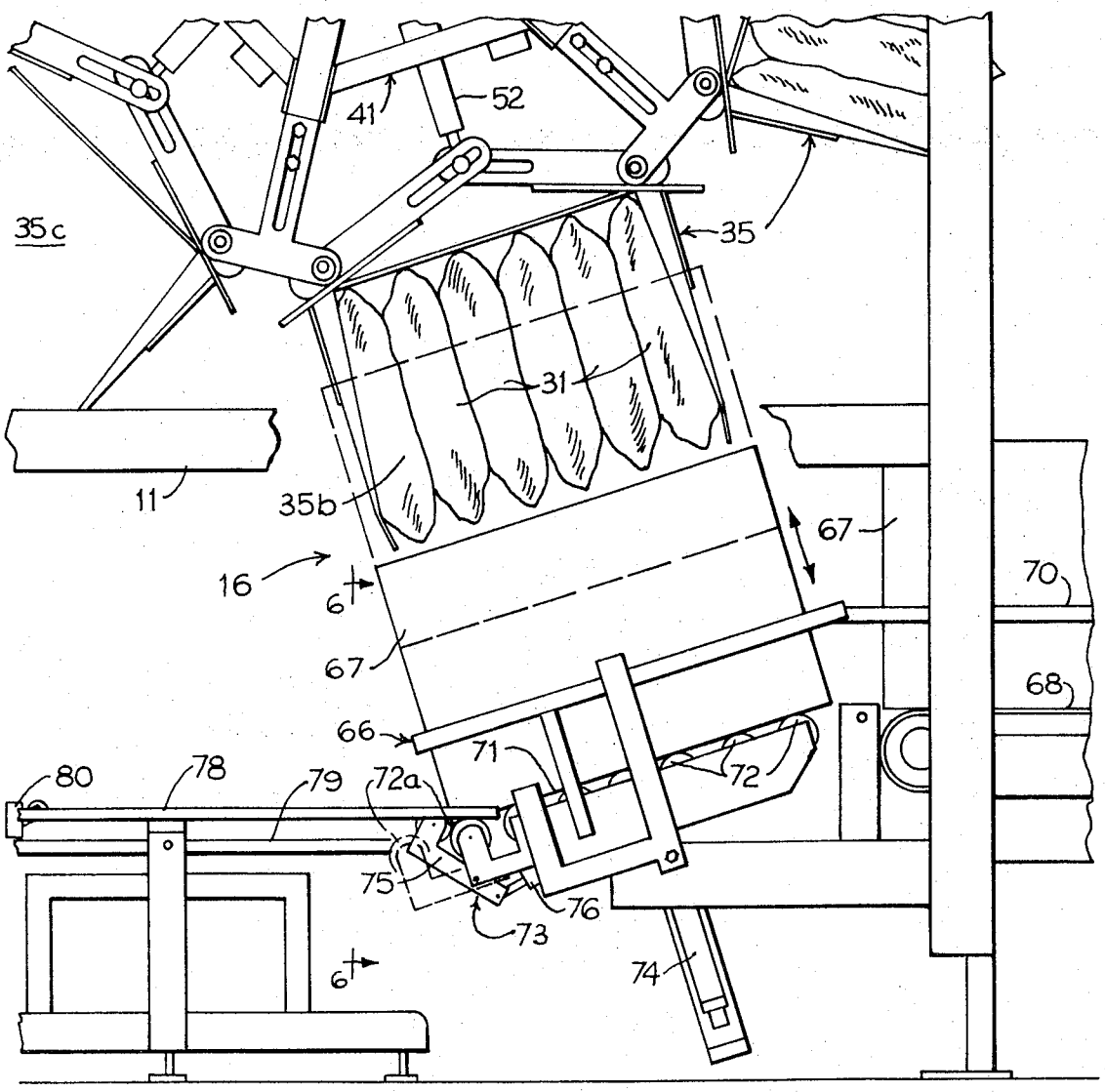

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FIG. 5

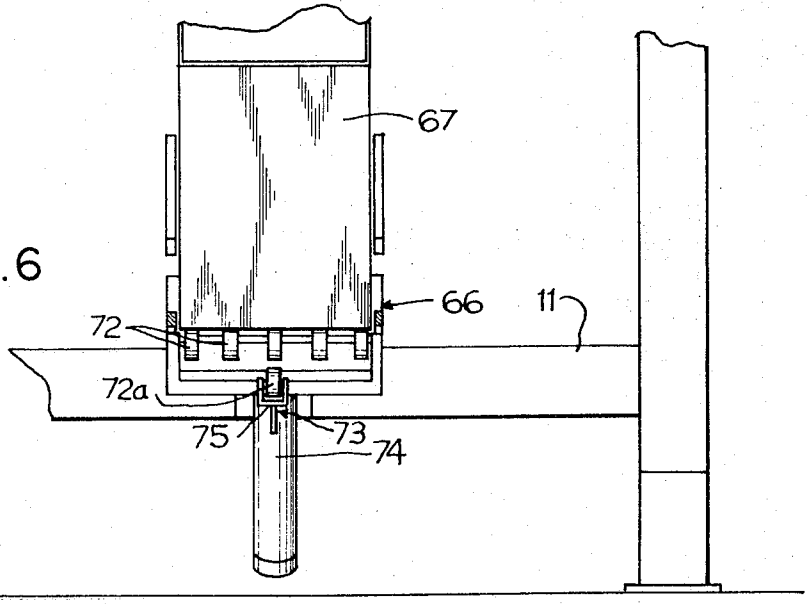

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FIG. 6

FIG. 7

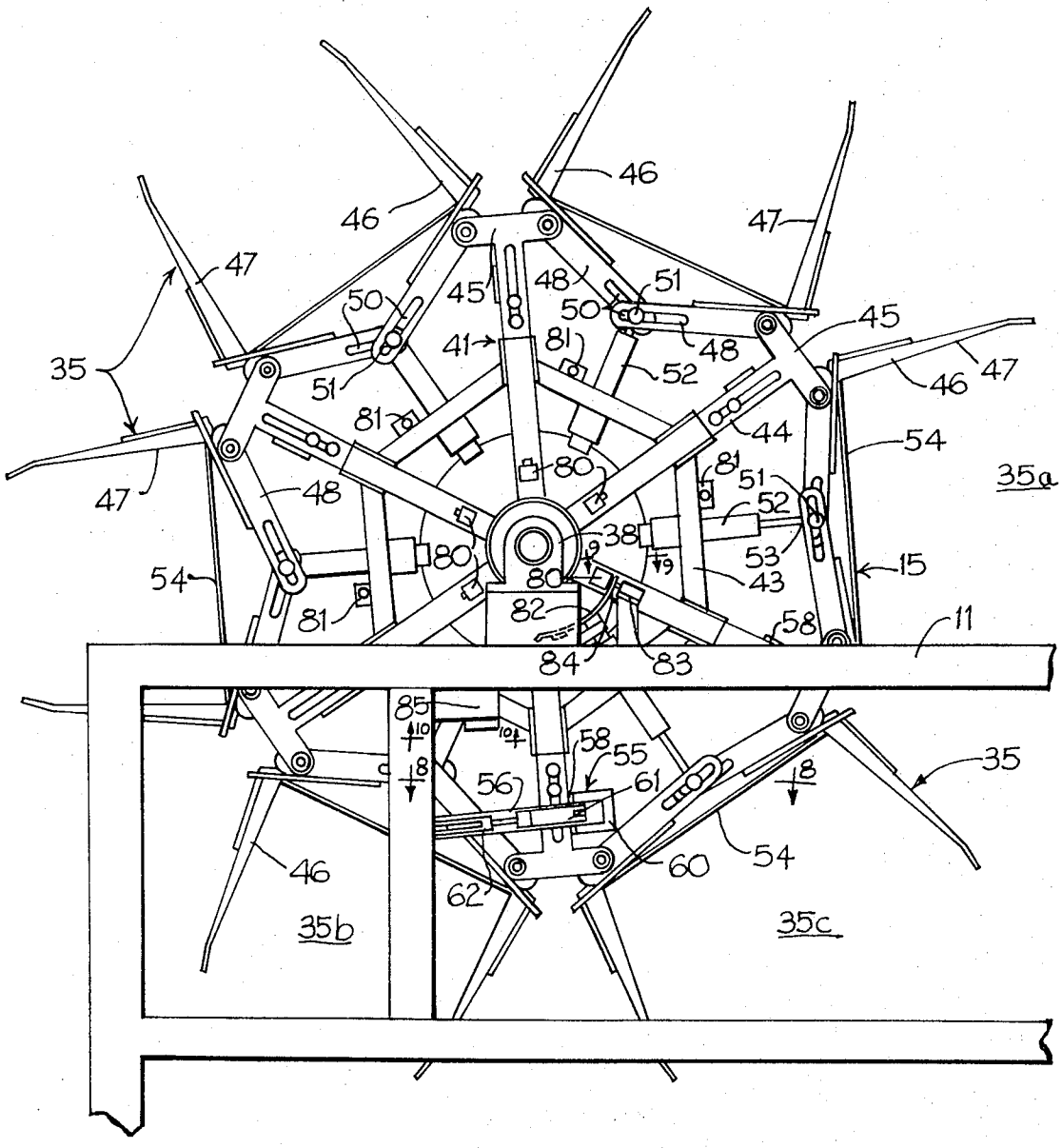

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FIG. 8

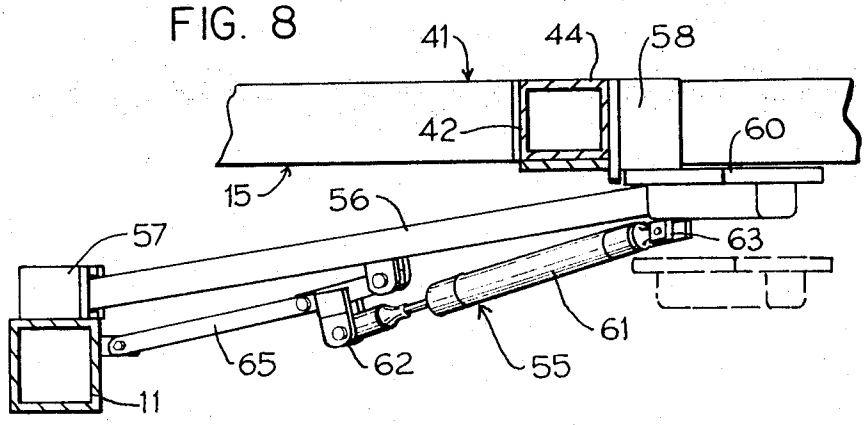
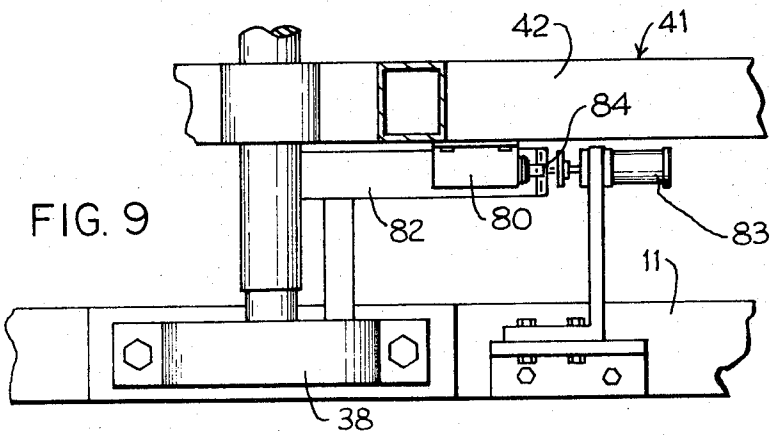


FIG. 9



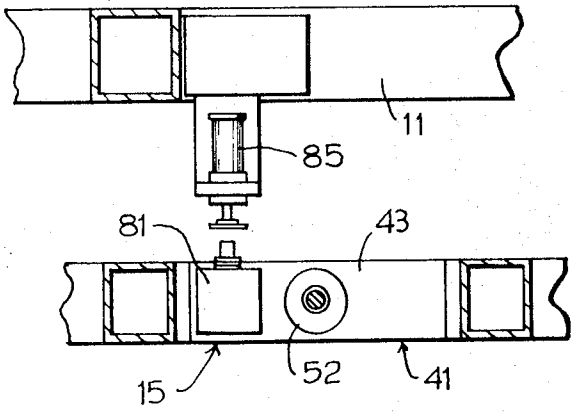


FIG. 10

CASE PACKER

BACKGROUND OF THE INVENTION

The apparatus is designed to mechanically pack articles within a case in a stacked relationship. While applicable to the packing of many different article configurations, it is designed specifically for the automatic packing of flexible packages having a pillow or packet configuration, such packages requiring compression of a stack for effective packing to minimize later movement of such packages in the receiving case. The machine was specifically designed to handle flexible packages of frozen bulk french fried potatoes, which have been primarily placed in receiving cases by hand methods.

One problem in effective packing of such product packages is the requirement for relatively high capacity in handling the incoming flow of such packages. It would seriously hamper such an operation where the equipment temporarily stopped during further processing of each stack of packages. Therefore, the present apparatus provides almost continuous receiving capability for incoming packages by compressing the stacked packages and placing them in receiving cases at locations remote from the loading station where the incoming packages are received.

Exemplary prior patents relating to the present apparatus are as follows:

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SUMMARY OF THE INVENTION

The disclosed apparatus basically comprises paired jaws mounted on a movable framework for receiving and handling the incoming articles or packages. Power means are connected between the framework and the paired jaws to cause the jaws to spread or close for compression purposes. A jaw indexing mechanism controls the position of the framework to shift the paired jaws between a jaw loading station and a case loading station. An incoming conveyor is directed to the jaw loading station to place a stack of articles between the paired jaws. Control devices are connected to the jaws to open the jaws for the reception of a stack of articles and to close the jaws to compress the articles in a stack prior to discharge of the articles into a receiving case at the case loading station.

A first object of this invention is to provide a high capacity apparatus for receiving, compressing and discharging a stack of articles, such as flexible containers, into a receiving open case.

Another object of this invention is to provide a multi-jawed apparatus for simultaneously receiving, compressing and discharging stacks of articles or containers.

Another object of this invention is to provide a relatively simple mechanical apparatus for carrying out the required steps necessary in packing articles such as flexible sealed containers.

These and further objects will be evident from the following disclosure, taken along with the accompanying drawings, which illustrate a preferred form of the invention.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevation view of the apparatus;

FIG. **2** is a top plan view of the apparatus;

FIG. **3** is a view similar to FIG. **1**, illustrating the operation of the apparatus;

FIG. **4** is an enlarged fragmentary sectional view taken along line **4—4** in FIG. **2**, illustrating operation of the apparatus;

FIG. **5** is an enlarged fragmentary sectional view taken along line **4—4** in FIG. **2**, illustrating discharge of stacked containers into a receiving case;

FIG. **6** is an enlarged fragmentary sectional view taken along line **6—6** in FIG. **5**;

FIG. **7** is an enlarged side elevation showing only the movable framework assembly and taken from the side opposite to that illustrated in FIG. **3**;

FIG. **8** is an enlarged fragmentary sectional view taken along line **8—8** in FIG. **7**, showing the wheel indexing lock assembly;

FIG. **9** is an enlarged fragmentary sectional view taken along line **9—9** in FIG. **8**; and

FIG. **10** is an enlarged fragmentary sectional view taken along line **10—10** in FIG. **8**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present apparatus in general utilizes a movable framework in the form of a multi-sided wheel having a plurality of sets of paired jaws movably mounted on the wheel for selectively receiving, compressing and discharging stacks of articles such as sealed flexible bags or pouch containers. As can be seen in FIG. **3**, the individual containers are fed into the machine from the left in a longitudinal row along a conveyor that is longitudinally aligned with the wheel and which intersects the wheel at a case loading station to one side of the wheel axis. The incoming conveyor is elevationally stepped upon the discharge of each package to arrange the packages in a vertical stack on the receiving set of paired jaws. When the desired stack has been fed between a pair of jaws, the jaws are closed toward one another on the wheel to compress the stack to a total height which can be received in a shipping case. The loaded jaws are incrementally rotated over the top of the wheel and angularly indexed in controlled increments. As each set of paired jaws reaches a case loading station beneath the wheel axis, an upwardly open case is indexed and brought into registry with the stationary jaws. The loaded case is raised or moved radially inward relative to the wheel so as to cause partial insertion of a pair of jaws within the case. These jaws are then relaxed to permit the packages to slide into the receiving case by gravity. The case is then lowered or moved radially outward from the wheel axis and discharged onto a receiving table or conveyor. The several steps of stacking the containers, compressing each stack, and discharging the stacked containers into a case are accomplished simultaneously in a continuing sequence of operation that occurs about the movable framework or wheel. Thus, the apparatus has the capability of receiving a continuous flow of incoming packages without interrupting such receipt for the remaining necessary operations.

Referring now to the drawings in more detail, and especially to FIGS. **1** and **3**, the case packing machine is generally indicated by reference numeral **10**. It includes a peripheral framework **11** supporting a vertically pivotal input conveyor **13** at an input end **12**. Bags of accumulated material, such as frozen french fries or other bulk material, are passed from conveyor **13** to a

rotatable wheel 15 which carries successive accumulated stacks of bags between peripheral jaws 35 to a case loading station 16.

As seen in FIG. 4, conveyor 13 includes elongated opposed side members 21 pivotally supporting transversely spaced endless belts 18, 19 having co-planar upper delivery runs. Conveyor 13 is vertically pivotal about a horizontal transverse axis adjacent input end 12 co-axial with a driving drum 23 of the first endless belt 18. A motor assembly 20 powers drum 23 to move belt 18 about a course defined by drum 23 and a second drum 24.

Endless belt 19 is slightly spaced from belt 18 and powered about a longitudinal course defined by rotatable drums 26, 27. Drum 26 communicates with adjacent drum 24 through a stepped-up driving linkage 28, which powers belt 19 at a greater velocity than that of belt 18. By differentiating the velocities of belts 18, 19 a minimum distance may be maintained between bags 31 on belt 19 regardless of the spacing on belt 18.

A staged cylinder 20 (FIG. 4) is pivotally mounted under belt 19 to index conveyor 13 upwardly from an initial position to five selective elevated positions. Each bag 31, as it leaves belt 19 breaks the beam of photoelectric cell assembly 33 which activates staged cylinder 30 to extend one stage upwardly, thereby stacking the bags 31 in a vertical pattern within radially extending jaws 35 of wheel 15 described below. Bags 31 are stacked in groups of six within jaws 35 at a jaw loading station 36, by utilizing an impulse counter operatively connected to the circuit of photoelectric cell assembly 33. After the sixth bag passes the assembly 33, the impulse counter activates cylinder 30 to lower conveyor 13 to the initial position from which the bag-stacking procedure is repeated to load the next successive set of jaws 35. Upon receiving the pre-set number of bags, wheel 15 is powered to partially rotate, bringing the next successive set of empty jaws 35 to loading station 36.

Jaw loading station 36 includes spaced upright side walls 37 fixed to frame 11 adjacent the output end 17 of conveyor 13. Walls 37 serve to keep bags 31 vertically aligned so as they are transferred by conveyor 13 to jaws 35. The remaining bag suppporting structures of loading station 36 are the movable jaws 35 of wheel 15.

Wheel 15, as shown in the drawings, is hexagonal, having six peripheral sets of jaws 35. The paired jaws 35 extend outward from the wheel axis in substantially radial orientation. It is to be noted however, that wheel 15 could utilize more jaw assemblies than shown, or as few as one, depending on the production rate required.

Frame 11 rotatably supports wheel 15 about a horizontal transverse axis within bearings 38. A movable wheel framework 41 comprising radially extendng spokes 42 equally separated by intermediate spacing bars 43 provides support for each jaw assembly 35. Members 42 are T-shaped, each having an enlongated radial element 44 and a cross member 45.

Each end of cross members 45 provides pivotal support for a clamp arm assembly 46 of jaws 35. Arms 46 are L-shaped in configuration, each having an outwardly extending rectangular clamp plate 47 and an integral, inwardly angled slide bar 48. The slide bars 48 of each jaw assembly 35 overlap one another along a common longitudinal slot 50, in each. A pin 51, fixed to one end 53 of the ram of a hydraulic cylinder assembly 52, slidably engages slots 50 for each jaw assembly 35. The cylinder assembly 52 is rigidly fixed to bar 43. Therefore, when cylinder assembly 52 is activated to extend the ram, the slide bars 48 are pivoted outwardly and the attached clamp plates 47 are spread apart. When cylinder assembly 52 is retracted, slide bars 48 pivot inwardly, moving clamp plates 47 together. A flexible backing belt 54 (FIGS. 4, 5) is fixed between the inward side edges of plates 47 to further assist in vertically aligning bags 31 during stacking.

A motor 39 is utilized to rotate and angularly index wheel 15 incrementally in the direction indicated by an arrow 40 in FIG. 3. Each increment of rotation involves a 60° movement of wheel 15. Thus, after a series of 4 increments involving a movement of 240°, jaws 35 shown in the position 35*a* will have moved to the position shown at 35*b*.

A stop assembly 55, shown in detail in FIG. 8 is utilized to assist in such indexing by physically limiting the rotation of wheel 15 to the 60° increments described above. Stop 55 includes an elongated arm 56 pivotally attached to an upright member of frame 11, through a resilient shock absorbing connector 57. As seen in FIG. 7, arm 56 is inclined slightly away from the upright frame member to achieve a perpendicular relationship with the engaged spoke 42 of wheel 15. A pad 58 is fixed to each spoke 42 at a position facilitating engagement by the side edge of a stop plate 60 which is rigidly fixed to the outer end of arm 56.

Stop assembly 55 is powered to pivot inward and outwardly of a double acting hydraulic cylinder assembly 61 operatively fixed between arm 56 and an offset toggle linkage 62. Cylinder assemby 61 is pivotally connected at one end 63 to arm 56 at a position adjacent stop plate 60 and at its opposite end 64 to a projecting bracket of an elongated linkage member 65. Toggle linkage 62 is designed to allow cylinder 61 to freely pivot arm 56 inward or outwardly.

When extended, it mechanically absorbs longitudinal stress without transfer of resulting stress to cylinder 61. This action eliminates cylinder wear due to abrupt tensioning of arm 56 as stop plate 60 engages a stop pad 58 to selectively lock the wheel 15.

Hydraulic cylinder assembly 61 is retracted by the previously described impulse counter at the fifth count. It is extended automatically following incremental rotation of wheel 15.

Each group of bags 31 are transferred into respective cases 67 at case loading station 16 through operation of a conveyor-fed case lifting assembly 66. Cases 67 are directed onto lifting assembly 66 by a horizontal feed conveyor 68. Longitudinal rails 70, located at either side of conveyor 68 serve to guide the empty cases 67 onto the inclined supporting surface 71 (FIGS. 5, 6) of case lifter 66. Surface 71 is comprised of a plurality of rollers 72 which allow each empty case 67 to move down the incline to an upwardly projecting stop 73.

Each case 67 breaks the beam of a photoelectric cell assembly 59 upon reaching stop 73. This serves to indicate proper positioning of a receiving case. During case placement, the wheel 15 is loaded and incrementally rotated to locate a group of bags 31 directly above case 67. Surface 71 is then raised by a cylinder assembly 74 to the position indicated by dotted lines in FIG. 5. Jaws 35 enter and are partially enclosed by case 67. Jaws 35 are relaxed within case 67 allowing bags 31 to fall into case 67. This is accomplished by releasing pressure at

both sides of the respective cylinder assembly **52.** Cylinder **74** is then retracted to lower the filled case to its original elevation.

Stop **73** includes a roller **72***a*, rotatably journalled at the uppermost end of a bellcrank **75** which is pivotally supported by surface **71.** A double acting hydraulic cylinder assembly **76** is mounted between surface **71** and bellcrank **75** for pivoting bellcrank **75** to stop or release cases on surface **71.** Stopping and releasing positions of stop **73** are shown in dotted and solid lines respectively in FIG. **5.** Roller **72***a*is utilized at its lowered position as an extension of inclined surface **71.**

Full cases, upon being released by stop **73,** gravitationally slide from case lifter **66** onto the adjacent rotatable surface **79** of a receiving table **78.** A limit switch **80** is engaged by the released case to activate cylinder **74** to raise stop **73** for receiving the next successive empty case **67.** Full cases are removed from table **78** for further processing and shipment.

Throughout the rotation of wheel **15,** each set of jaws **35** are controlled to open, close and relax individually by the operation of valves **80, 81** shown generally in FIG. **7** and in detail by FIGS. **9** and **10.** Radial spokes **42** each support a valve **80** for fully opening and partially closing an operatively attached set of jaws **35.** Valves **80** are operated to fully open jaws **35** as they are engaged along a semicircular cam **82** (FIGS. **7, 9**). Cam **82** is positioned on frame **11** to operate valves **80,** to hold jaws **35** open from a position **35***c* (FIG. **7**) to the jaw loading position **35***a* where the plunger **84** of a valve **80** comes to rest on the retractable plate of a solenoid **83.** Upon counting the last of a series of six bags from conveyor **13,** the impulse counter activates solenoid **83** (FIG. **9**) to retract prior to rotation of wheel **15.** This causes valve plunger **84** to extend, thereby activating the loaded set of jaws **35** to partially close, slightly compressing bags **31** contained therein. Bags **31** are held by the resulting compressive pressure exerted by partially closed jaws **35** as wheel **15** is indexed from position **35***a* to **35***b*. At position **35***b*, bags **31** are released into a case **67** by the operation of valve **81** (FIGS. **7, 10**).

A valve **81** is fixed to each spacing bar **43** adjacent an operatively connected cylinder **52.** Valves **81** are individually activated, at position **35***b*, to relieve pressure in cylinder **52** opening jaws **35** slightly to allow bags **31** to fall into a lifted case **67.** A solenoid **85** is fixed to frame **11** adjacent jaw position **35***b* for activating each valve **81** as it is indexed on wheel **15** to that position. Solenoid **85** is activated by a limit switch (not shown) located to complete a circuit as a case **67** is lifted to partially enclose the jaws **35** in position **35***b*.

It is to be noted that the transfer of bags **31** from conveyor **13** to jaws **35** and the transfer of bags **31** from jaws **35** into a case **67** are accomplished simultaneously. The apparatus therefore is capable of receiving cases without interruption. It is designed for high volume usage in industrial applications where the flow of incoming bags is continuous.

Modifications might be made with respect to the disclosed details of this structure within the general outline of the apparatus, and therefore only the following claims are intended to limit the scope of this invention.

Having thus described my invention, I claim:

1. In a case packer for articles requiring stacking, stack compression and insertion of individual stacks into a receiving case:

a movable framework rotationally mounted about a fixed horizontal axis on a supporting frame;

paired jaws mounted to said movable framework in opposed positions extending outward from said axis in spaced substantially radial orientation with respect to said axis, the jaws being selectively movable with respect to the framework between a spread position and a closed position;

first power means on said framework operatively connected to said jaws for causing said jaws to assume their spread position or alternately causing said jaws to assume their closed position;

jaw indexing means operatively connected to said movable framework for selectively locating said framework angularly about said axis for shifting said jaws between a jaw loading station and a case loading station displaced from one another, the paired jaws being downwardly inclined in a direction outward from said axis when located at said case loading station;

incoming conveyor means directed toward the jaw loading station for selectively placing a plurality of articles within paired jaws located at said jaw loading station, the articles being so placed in a stack with adjacent articles in side-by-side abutment with one another;

first control means operatively connected to said first power means for actuating said first power means so as to cause the jaws to assume their spread position during placement of articles therein by said incoming conveyor means;

second control means operatively connected to said first power means for actuating said first power means so as to cause the jaws to assume their closed position following placement of a stack of articles therein;

case conveyor means for directing open cases individually to the case loading station;

and means for causing a stack of articles held between the jaws to be discharged therefrom into a case at said case loading station following location of said jaws at the loading station in response to operation of said jaw indexing means.

2. The apparatus as set out in claim **1** wherein the axis is horizontal;

the lowermost one of said paired jaws being substantially horizontal when located at said jaw loading station.

3. The apparatus as set out in claim **1** wherein

said framework mounts a plurality of said paired jaws located equiangularly about said axis;

said jaw indexing means being operable to successively locate adjacent pairs of said jaws at said jaw loading station and subsequently successively locate such pairs of said jaws at said case loading station by causing the framework to be incrementally rotated about said axis.

4. The apparatus as set out in claim **3** wherein the axis is horizontal;

the lowermost one of said paired jaws being substantially horizontal when located at said jaw loading station.

5. An apparatus as set out in claim **3** wherein each jaw of said paired jaws is pivotally connected at its inner end to said framework about individual axes parallel to and spaced radially outward from said axis.

6. An apparatus as set out in claim 3 wherein each jaw of said paired jaws is pivotally connected at its inner end to said framework about individual axes parallel to and spaced radially outward from said axis;

said first power means comprising individual powered mechanical devices mounted to the framework movably controlling the respective jaws of each of said paired jaws to orient each jaw about its respective axis relative to said framework.

7. In a case packer for placing stacks of articles within open cases:

a stationary support framework;

an upright movable framework in the form of a multisided wheel rotatably mounted to said support framework about a central horizontal axis transverse to the wheel;

a plurality of sets of paired transverse jaws movably mounted to the movable framework at the individual side of the wheel, the paired jaws being extended outward from said axis along substantially radial projections, the respective jaws of each of said paired jaws having opposed inner transverse faces spaced from one another;

individually operable means on said movable framework for varying the spacing between the jaws of each of said paired jaws between a first condition wherein a stack of articles can be received between them and a second condition wherein a stack of articles therebetween are compressed along the stack height to a reduced height capable of being inserted into a case;

index means on said support framework operatively connected to said movable framework for imparting incremental rotational motion to said movable framework about said axis to thereby shift said paired jaws between a jaw loading station and a case loading station angularly displaced from one another about said axis, the inner transverse faces of the paired jaws being downwardly inclined in a direction outward from said axis when located at said case loading station;

an infeed conveyor on said support framework having a delivery run directed to said jaw loading station on said movable framework;

case positioning means on said support framework for individually locating upwardly open cases beneath said movable framework downwardly adjacent to said case loading station;

and means for causing a stack of articles held between the paired jaws at said case loading station to be discharged from between the paired jaws.

8. In a case packer for placing stacks of articles within open cases;

a stationary support framework;

an upright movable framework in the form of a multisided wheel rotatably mounted to said support framework about a central horizontal axis transverse to the wheel;

a plurality of sets of paired transverse jaws movably mounted to the movable framework at the individual sides of the wheel, the paired jaws being extended outward from said axis along substantially radial projections, the respective jaws of each of said paired jaws having opposed inner transverse faces spaced from one another;

article feed conveyor means longitudinally aligned with said movable framework leading to a jaw loading station intersecting the rotational path of movement of said paired jaws about said axis;

index means on said support framework operably connected to said movable framework for selectively locking the movable framework stationary relative to said axis with one set of said paired jaws located at said jaw loading station;

case delivery means alongside said movable framework for selectively bringing an open case into registry with a second set of said paired jaws while the movable framework is locked by said index means;

and movable support means on said support framework connected to said article feed conveyor means for shifting the position of said article feed conveyor means relative to said support fraemwork in a series of successive steps whereby articles discharged thereby are stacked one on another at said jaw loading station.

9. In a case packer for placing stacks of articles within open cases;

a stationary support framework;

an upright movable framework in the form of a multisided wheel rotatably mounted to said support framework about a central horizontal axis transverse to the wheel;

a plurality of sets of paired transverse jaws movably mounted to the movable framework at the individual sides of the wheel, the paired jaws being extended outward from said axis along substantially radial projections, the respective jaws of each of said paired jaws having opposing inner transverse faces spaced from one another;

article feed conveyor means longitudinally aligned with said movable framework leading to a jaw loading station intersecting the rotational path of movement of said paired jaws about said axis;

index means on said support framework operably connected to said movable framework for selectively locking the movable framework stationary relative to said axis with one set of said paired jaws located at said jaw loading station;

case delivery means alongside said movable framework for selectively bringing an open case into registry with a second set of said paired jaws while the movable framework is locked by said index means;

wherein said case delivery means comprises:

a conveyor having an upper surface along which upwardly open cases are moved to said case loading station;

a section of said conveyor located at said case loading station being radially movable with respect to said axis;

and power means on said support framework operatively connected to said section for selectively moving said section radially inward toward said axis following reception of a case thereon and locking of said movable framework by said index means, the amount of such inward movement being such as to result in the partial insertion of a set of said paired jaws within the case.

* * * * *