May 11, 1948. J. J. QUIGLEY ET AL 2,441,372

CARTON-FORMING MACHINE

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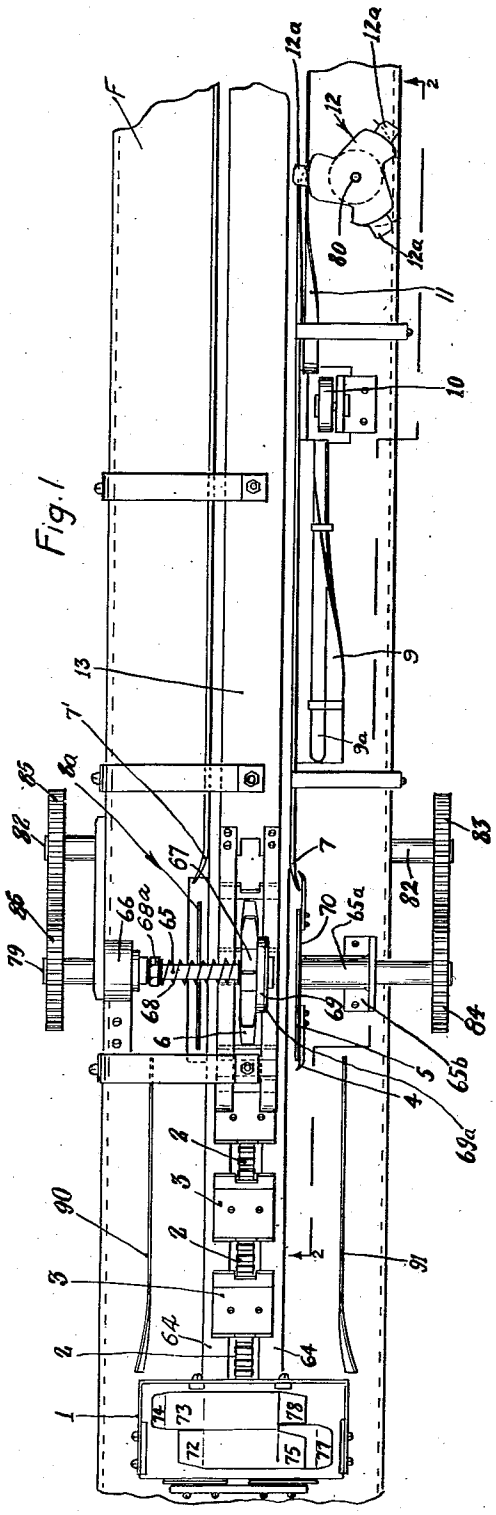


Fig. 1

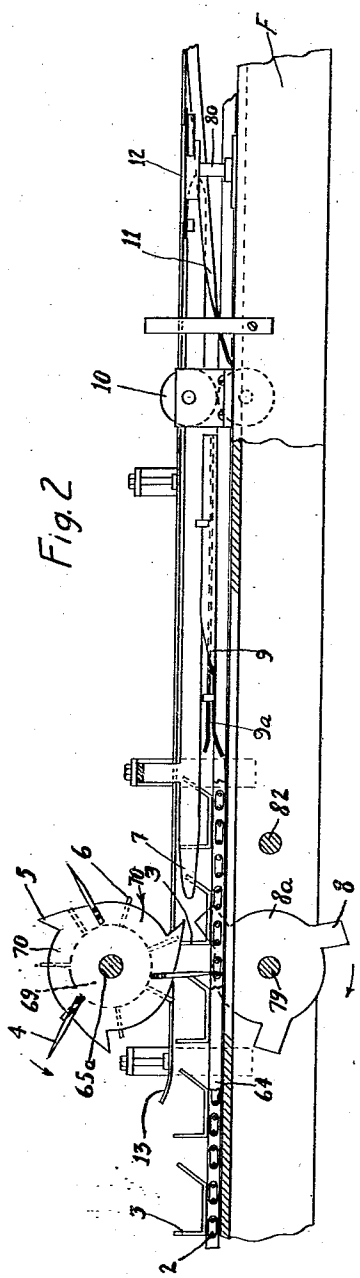


Fig. 2

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CARTON-FORMING MACHINE

Filed Oct. 4, 1946 6 Sheets-Sheet 2

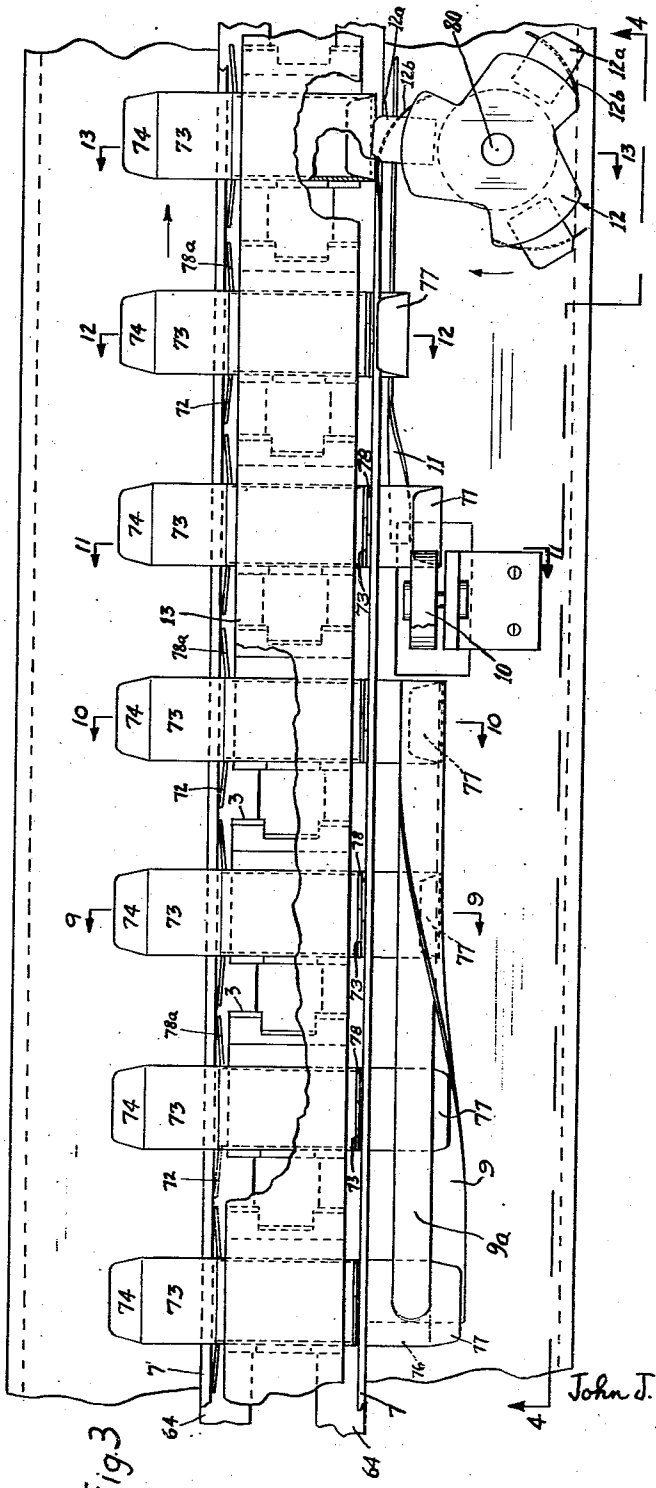


Fig. 3

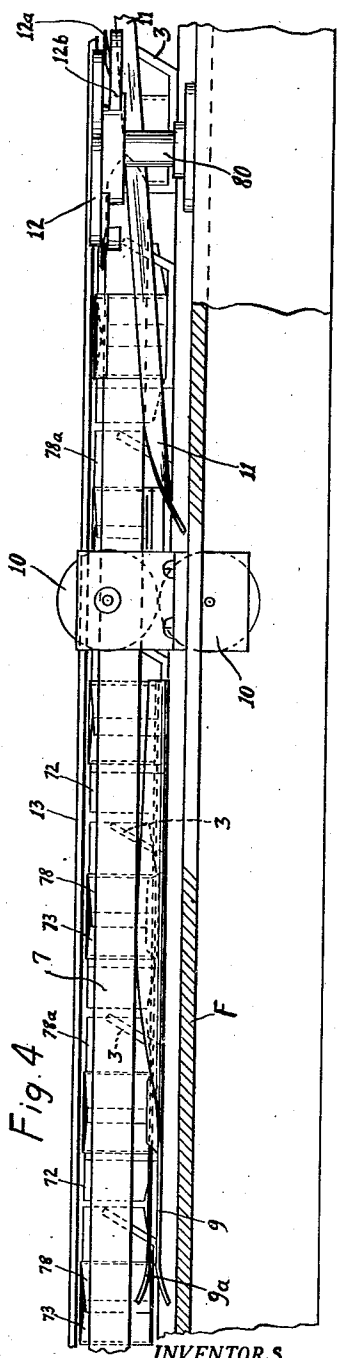


Fig. 4

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May 11, 1948. J. J. QUIGLEY ET AL 2,441,372

CARTON-FORMING MACHINE

Filed Oct. 4, 1946 6 Sheets-Sheet 3

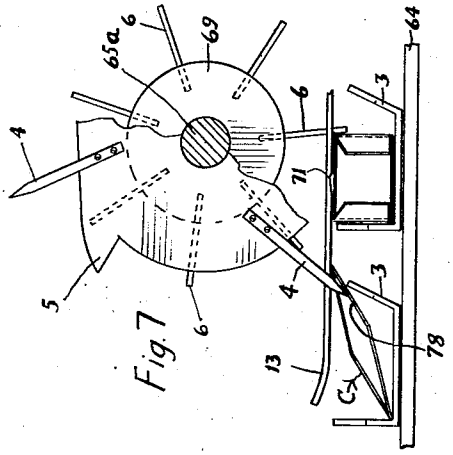


Fig. 7

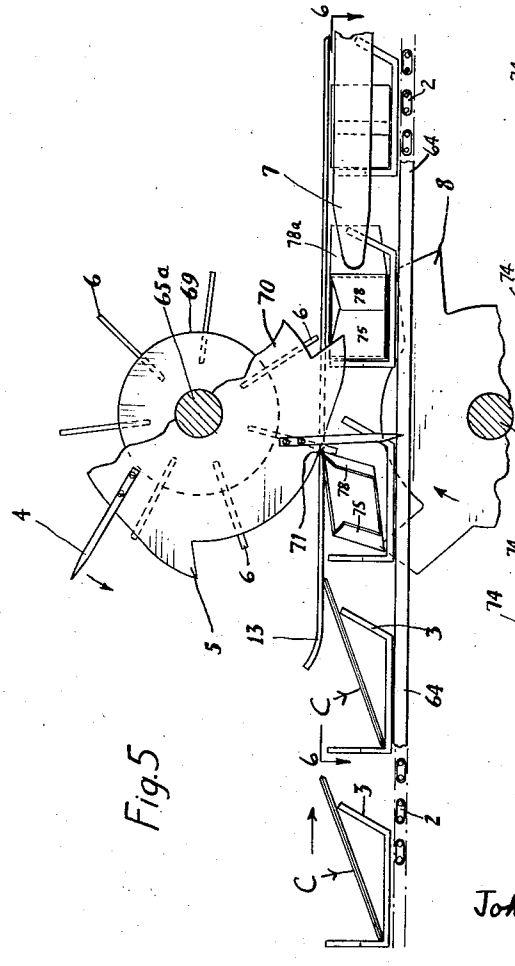


Fig. 5

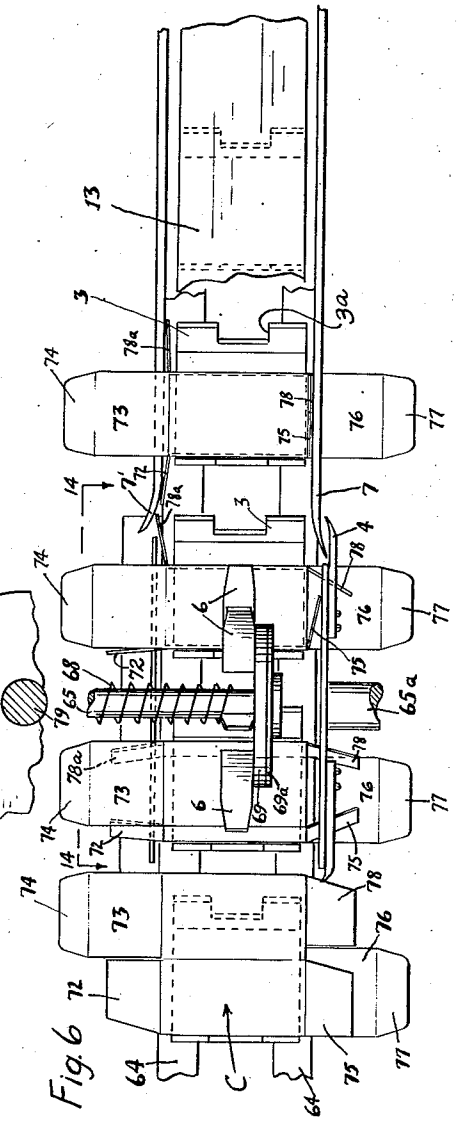


Fig. 6

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CARTON-FORMING MACHINE

Filed Oct. 4, 1946 6 Sheets-Sheet 4

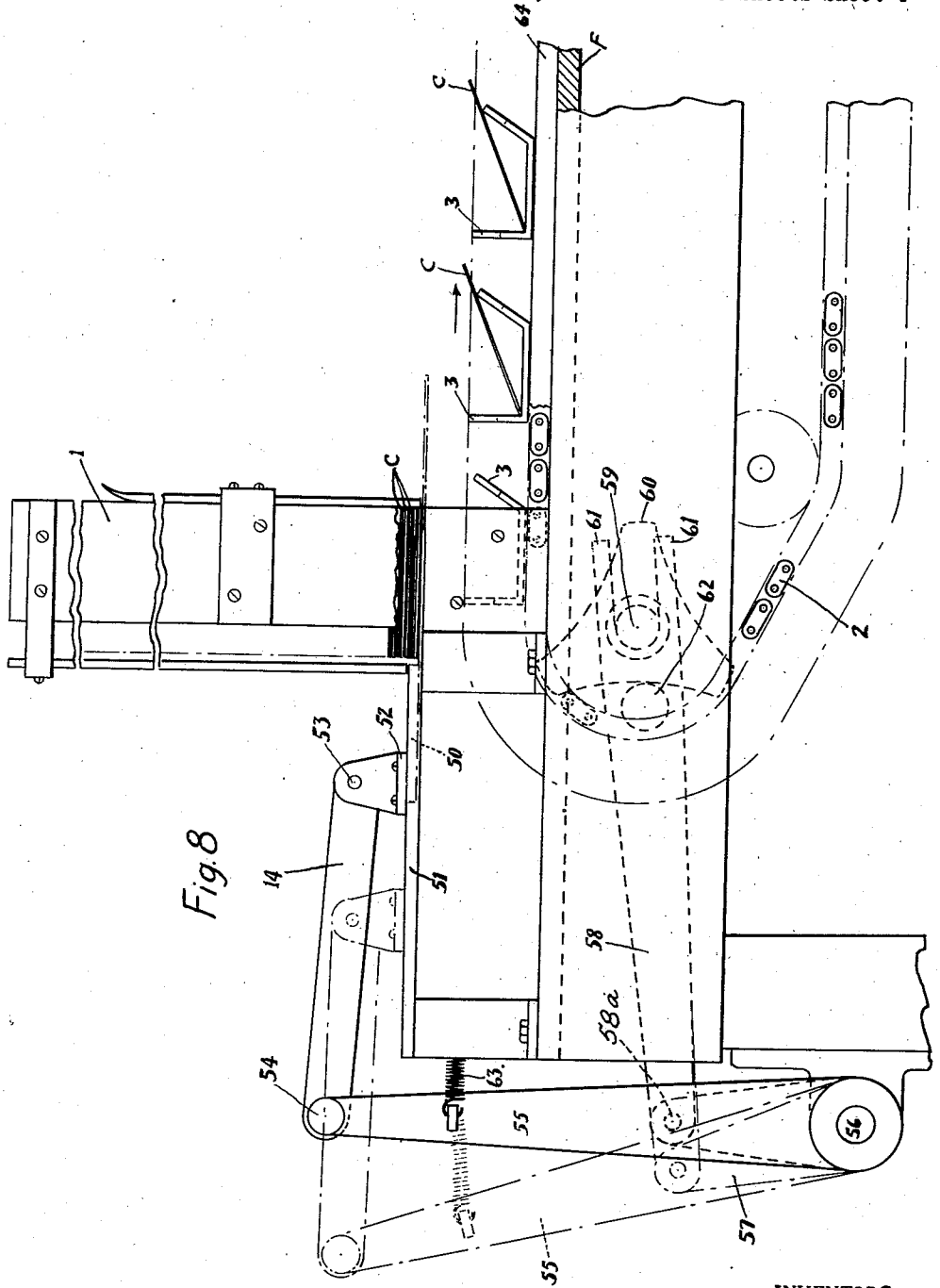


Fig. 8

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CARTON-FORMING MACHINE

Filed Oct. 4, 1946 6 Sheets-Sheet 5

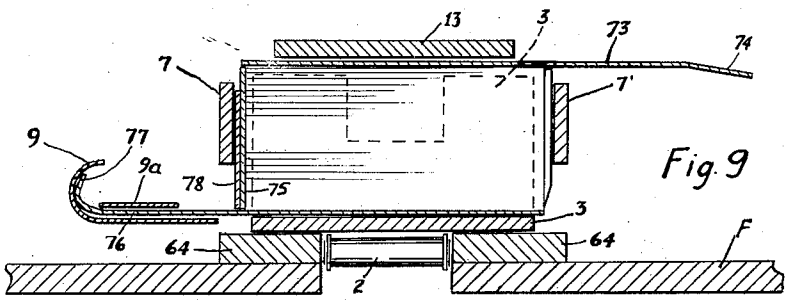


Fig. 9

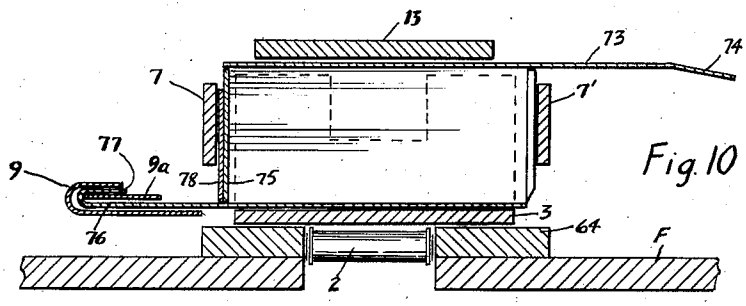


Fig. 10

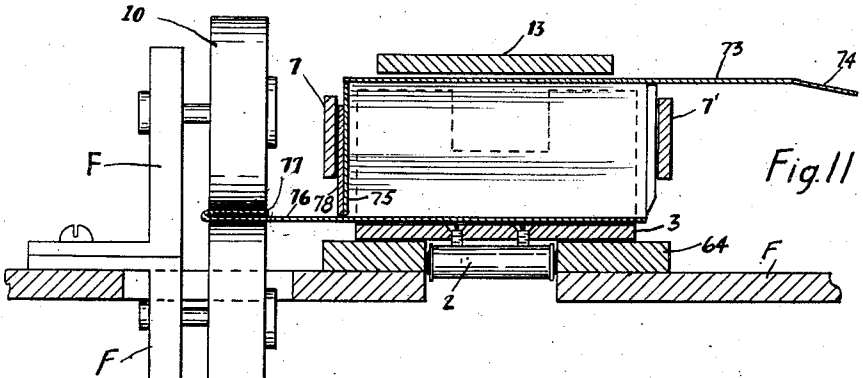


Fig. 11

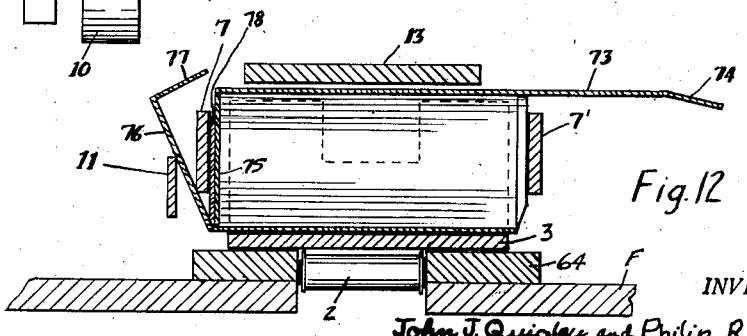


Fig. 12

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May 11, 1948. J. J. QUIGLEY ET AL 2,441,372

CARTON-FORMING MACHINE

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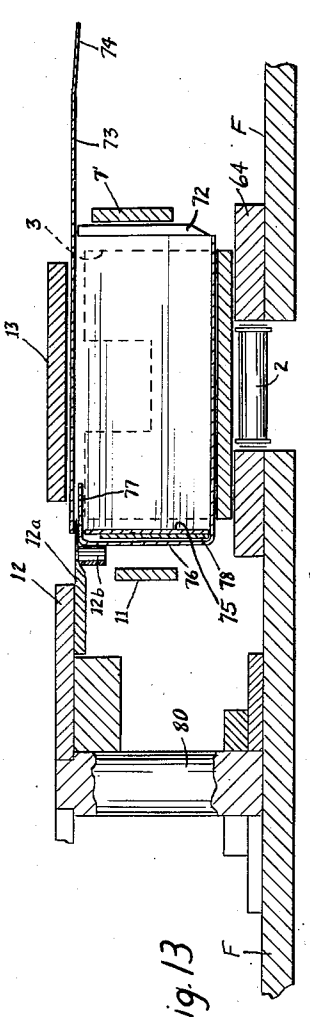


Fig. 13

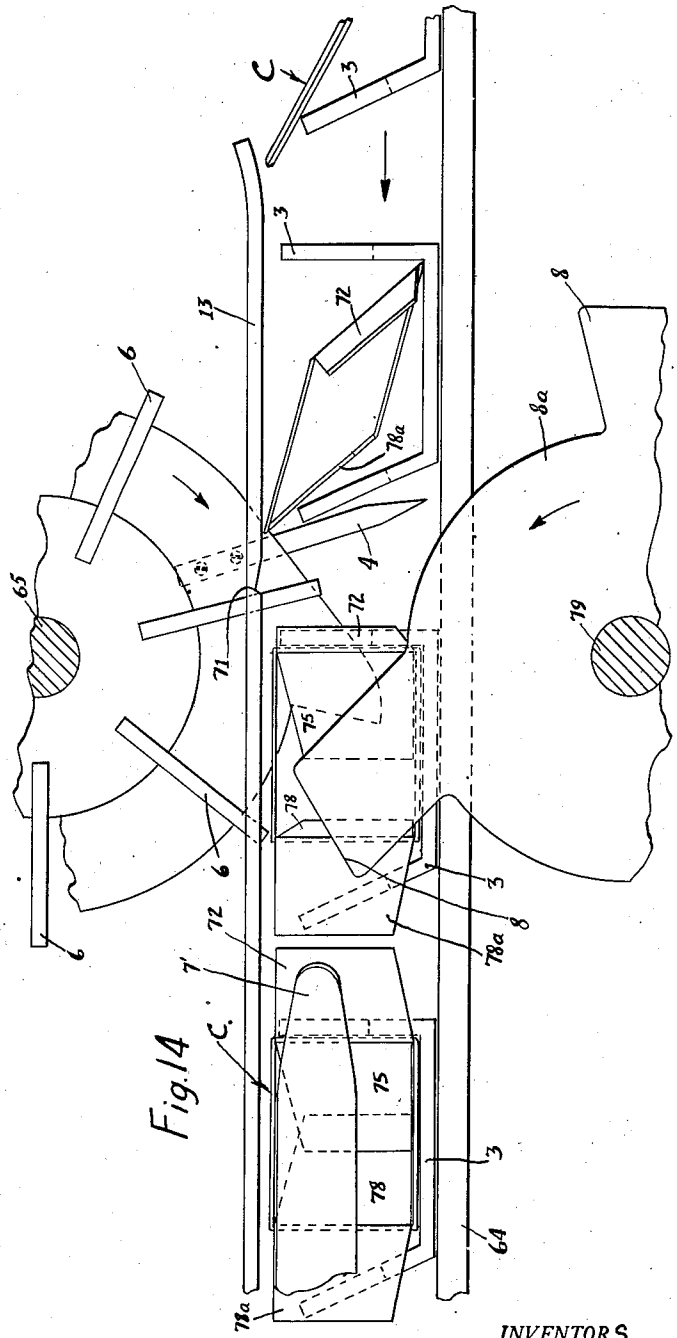


Fig. 14

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Patented May 11, 1948 2,441,372

UNITED STATES PATENT OFFICE

2,441,372

CARTON-FORMING MACHINE

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Application October 4, 1946, Serial No. 701,282

12 Claims. (Cl. 93—53)

1

Our invention relates to a new and improved machine and method for setting-up flat, knocked-down cartons from their flat, knocked-down form to their open assembled form, with one end of the assembled carton open, so that the respective article can be inserted in the set-up carton.

The main object of our present invention is the setting up of cartons which are made, packed and shipped in flat, knocked-down form. In the present illustration of our invention, the carton has a body which consists of four rectangular walls of identical shape and dimensions. These walls are classified as a front wall, a rear wall and two side walls. Each side wall is provided at its respective ends with respective side-wall flaps. At one end of said body, the front wall has a closure flap which is provided with an end locking flap. At the other end of said body, the rear wall is also provided with a closure flap which has a respective end locking flap. The cartons are made of cardboard or other suitable material, whose walls and flaps are hingedly connected to each other in the usual manner.

According to our invention, I provide an endless conveyor chain which has respective top and bottom horizontal runs. A series of spaced pockets are connected to said conveyor chain, and these pockets pass successively in the top run of the conveyor chain below a chute, from which the flat cartons are transferred by a pusher, one by one. Each transferred flat carton falls into a respective pocket in inclined position, with the anterior edge of each flat carton located below its posterior edge. The body of the carton is then opened until said body has the desired final rectangular cross-section. The side-wall flaps at one end of the carton are then turned inwardly, and the respective closure flap at said end of the carton is then turned inwardly into closing position with its locking flap tucked inwardly of the respective longitudinal body wall. The side wall flaps at the other end of the carton are turned outwardly, thus keeping said end open for the insertion of the filling.

Numerous additional objects and features of our invention will be apparent from the following description and claims and the appended drawings, which illustrate a preferred embodiment thereof.

Fig. 1 is a top plan view of a machine according to our invention.

Fig. 2 is a side elevation of a part of said machine, the representation of its anterior end-portion being omitted.

Fig. 3 is an enlarged detail top plan view of

2

a part of the machine, which shows the parts for inwardly bending the side-wall-flaps and the closure flaps.

Fig. 4 is a section on the line 4—4 of Fig. 3.

Fig. 5 is an enlarged detail side elevation of the mechanism which performs the first operation in setting up the carton.

Fig. 6 is a top plan view of Fig. 5.

Fig. 7 is a detail side elevation which further illustrates said first operation in setting up the carton.

Fig. 8 is a detail side elevation which shows the chute in which the flat and unopened cartons are piled, and the mechanism for feeding said flat cartons from said chute, one by one.

Figs. 9–13 inclusive are sectional views on the lines 9—9, 10—10, 11—11, 12—12 and 13—13 respectively of Fig. 3.

Fig. 14 is a side eleavtion of the side of the machine which is opposed to that which is illustrated in Fig. 5.

For convenience, the left end of the machine as it is shown in Fig. 1, where the chute 1 is located, is called the inlet end of the machine, and the elevation taken at the bottom of Fig. 1 is called the front elevation of the machine.

Referring now to the drawings in detail, the flat cartons used in the embodiment of my invention illustrated in the drawings are best shown at the left end of Figure 6. Each carton has a body C comprising four longitudinal walls, which, in this illustration of the invention, are of identical rectangular shape. Fig. 6 shows two of these longitudinal walls, at the left of said figure, and for convenience, the right longitudinal wall shown here is designated as the front wall of the body. The other, i. e. the left longitudinal body wall shown at the left end of Fig. 6, is one of two side walls. The front body wall has a front closure flap 73, which has a locking flap 74. The side-wall which is exposed at the left of Fig. 6, has respective side-flaps 72 and 75. The rear wall of the carton-body has a rear closure-flap 76, which has a locking-flap 77. The side-wall, which is under the front wall at the left of Fig. 6, has a side-flap 78 which is shown in full lines in Fig. 6, and another side-flap 78a which is shown in broken lines in Fig. 6, and in full lines in Fig. 14.

Figure 8 shows the flat cartons piled in chute 1, which is located at the inlet end of the machine. A reciprocating slide 50 is guided to slide to-and-fro in guides 51 which are provided in the frame of the machine, and the flat cartons are pushed out of the chute, one by one, by said reciprocat-

ing slide. The anterior and posterior walls of chute 1 are broken away at their bottoms so that pusher slide 50 can enter the bottom of chute 1 in order to push out the bottom flat carton. The thickness of the slide 50 is little less than the height of a single flat carton. Plate 52 is fixed to the top of pusher slide 50. Said plate 52 has an upstanding lug which is pivotally connected by pivot pin 53 to a link 14, which is connected by pivot pin 54 to arm 55, and this arm 55 is connected by pivot pin 56 to the frame of the machine. As shown in Fig. 8, one end of a biasing tension spring 63 is fixed to arm 55, while the other end of this tension spring is fixed to the frame of the machine. Arm 55 is thus biased by spring 63 to turn clockwise, and cause pusher slide 50 to move to the right, referring to Fig. 8, and push the bottom flat carton out of chute 1.

A cam-follower arm 58 is connected to arm 55 by pivot pin 58a. The posterior end of arm 58 is forked to provide legs 61, between which the lateral cam-shaft 59 is located. Cam 60 is fixed to cam-shaft 59. The usual cam-roll 62 is turnably connected with cam-follower arm 58, and said turnable cam-roll 62 abuts the periphery of cam 60. The pusher slide 50 will be given a complete reciprocation during each one-third revolution of cam 60.

Fig. 8 shows part of an endless conveyor chain 2, which is mounted on respective sprockets. This chain 2 has horizontal top and bottom runs. It is constantly actuated at constant speed. One of said sprockets is fixed to the lateral cam-shaft 59, which, during the operation of endless conveyor chain 2, operates cam 60. This cam cooperates with cam-roll 62, thus causing reciprocation of arms 58 and 55 and pusher slide 50. The broken-line position of arm 55 in Fig. 8 shows it at the beginning of a feeding stroke of shoe 50, while the full line position of arm 55 in Fig. 8 corresponds to the end of a feeding stroke. The flat cartons are thus removed from the chute, one by one, and located in pockets of the conveyor chain 2, as will be explained in more detail further below.

A series of pockets 3, which are spaced equally from each other, are connected to the endless conveyor chain 2. As shown in Figures 6 and 8, each pocket 3 consists of a bottom wall, a left end-wall which is perpendicular to said bottom wall, and a right end-wall which is inclined to said bottom wall. Each inclined end-wall of each pocket 3 has a notch or recess 3a, which is shown in Fig. 6. The pockets 3 have no side walls. As shown in Figs. 5 and 6, the pockets 3 slide in the top run of the conveyor chain 2, upon longitudinal and horizontal rails 64.

Each of the flat cartons removed from chute 1, as described above, is received by a pocket 3, and is initially located therein in the inclined position shown in Figure 8, the ends of said flat carton projecting equally in front and in rear of the pocket 3, as shown, for example, in Figure 3 or 6 at the left. When a flat carton is pushed to the right out of chute 1, referring to Fig. 8, it is thus pushed between suitable longitudinal guides 90 and 91 respectively for alignment purposes. When the left end of said flat carton is pushed beyond chute 1, said flat carton falls into a respective pocket 3, which is then located in receiving position, so that each carton is held upwardly inclined from left to the right, with the right end of the carton projecting to the right beyond the respective pocket 3 as shown in Fig. 8. Each carton thus falls vertically between the respective longitudinally guides, to be received accurately in a respective pocket 3.

The initial operation in opening the flat body C of the cartons deposited in pockets 3, takes place as follows:

Referring to Figs. 1 and 2, a lateral shaft 65 is turnably mounted in a bearing 66, which is fixed to the frame of the machine. Said shaft 65 is rotated, without being moved in a direction parallel to its axis. A disk 67 is turnably mounted on the shaft 65, so that the shaft 65 and the disk 67 can turn freely relative to each other. A series of radial fingers 6, of equal length, are fixed to the disk 67. The disk 67 is slidable along the shaft 65 in a direction parallel to its axis to a very slight extent. A compression spring 68 forces the disk 67 against a flange 69 which is integral with the shaft 65, thus frictionally coupling the disk 67 to the shaft 65. One end of spring 68 abuts a nut 68a, which is fixed to shaft 65.

A second disk 70 is fixed to the shaft 65. This second disk 70 is provided with pointed projections 5. Radial fingers 4 are also fixed to said disk 70.

As shown in Fig. 7, the machine is provided with a fixed abutment 13, below shaft 65, and, as shown in Fig. 1, this abutment 13 is longitudinally slotted under the shaft 65, in order to permit the fingers 6 fixed to the disk 67, to pass through abutment 13. Abutment 13 is also provided with a notch 71 (see Fig. 7).

In Figs. 1 and 2, the longitudinal movement of pockets 3 is from the left to right. Viewed from the front of the machine, as in Fig. 2, the shaft 65 is turned counterclockwise. This applies to Fig. 5 and Fig. 7, in which the shaft 65 is turned counterclockwise, and the pockets 3 move from left to right, in unison with the top run of the conveyor chain.

Upon movement of the pockets 3, the top edges of the flat carton bodies C deposited in said pockets, contact slidably with the bottom face of abutment 13, as shown in Figure 7. The fingers or pins 4 of disk 70 are located above the flaps 78 (see Fig. 6) of the flat cartons deposited in pockets 3. The shaft 65 and the disk 70 fixed to the shaft, are rotated at sufficient angular velocity, so that the free ends of said pins 4 are moved at greater longitudinal velocity than the chain 2, when the free ends of said pins are close to the bottom portions. Hence each pin 4 will strike a flap 78 and exert downward and longitudinal pressure toward the right on said flap 78, thus partially opening the flat body C, as shown at the left of Fig. 7. Although flap 78 is hingedly connected to the respective side-wall of body C, said hinge connection is sufficiently stiff, so that the downward pressure and longitudinal pressure on each flap 78, which is exerted by a pin 4 will turn the respective side-wall of the carton body, which is connected to flap 78, relative to the opposite side wall of the carton body.

After thus partially opening the carton body, the pin 4 clears and passes longitudinally beyond the respective flap 78, which then bends relative to its respective side-wall of the carton body, in order to permit the pin 4 to move longitudinally beyond the respective pocket 3 and the respective carton.

Referring to Fig. 5, after the carton body has been partially opened in the above described manner by a finger 4, the top edge of the partially opened carton engages notch 71 provided in

abutment 13. Upon the continued movement of conveyor 2 and pocket 3, the body of the carton is opened until the body has a rectangular cross-section.

When the body of the carton is thus opened until it has the desired rectangular cross-section, its edge slips out of the notch 71. At this point, the right-hand wall of the body of the carton which is shown in Fig. 7 abuts one of the fingers 6, which holds said body in open rectangular formation. That is, the radial distance from the axis of rotation of the shaft 65, to the tip of the finger 4, exceeds said radial distance to the tip of the finger 6. Therefore, while the finger 4 overruns the respective carton so as to partially open it as indicated in Fig. 7, the longitudinal movement of the opened carton is faster than the longitudinal movement of the tip of the finger 6. Therefore, the disk 67 slips relative to the shaft 65, while the respective finger 6, keeps the carton body in open rectangular body formation.

While the respective finger 6 is thus holding a respective carton C in open formation, a respective pointed extension 5 of disk 70 inwardly bends one of the end flaps.

As mentioned above and shown in Fig. 6, at the left hand thereof, the carton C is provided with respective end flaps 72 and 75 at one of its side walls. The wall which is below said side wall, in Fig. 6, has a closure flap 76, and the latter has an end flap 77. The other body wall which is shown in Fig. 6 and has been denoted above as the front wall of the body, has a closure flap 73, which has an end flap 74. The wall which is below said front wall has an end flap 78. Said last mentioned wall has a companion flap 78*a* to flap 78, this being shown in broken line in Fig. 6. Each pin 4 strikes a respective flap 78. Each pointed extension 5 inwardly bends an end flap 75.

The next steps in setting up the carton are brought about by guides 7 and 7′ and finger 8 of disk 8*a*. As shown in Fig. 1, the frame of the machine has a longitudinal guide 7 fixed thereto, and the front end portion of said guide 7 is laterally inclined. Said end portion of the guide 7 acts as a cam member, to inwardly bend the flap 78, and to keep said flap 78 in inwardly bent position, overlying the flap 75. At the same time, the companion guide member 7′ turns the flap 72 outwardly to the open position, while flap 78*a* is bent to the open position by means of a respective finger 8, which is integral with disk 8*a*, which is fixed to a shaft 79. This shaft 79 turns reversely to shaft 65.

The next step is to bend the end flap 77 until it abuts the closure flap 76. As shown in Figs. 9 and 10, adjacent the closure flap 76, the guide 9 is associated with a tongue 9*a*, which is fixed to the frame F. The closure flap 76 is thus passed between the planar bottom portion of the guide 9 and the flap tongue 9*a*, while the concavo-convex end portion of the guide 9 bends the end flap 77 relative to the closure flap 76, until said end flap 77 overlies the tongue 9*a*, and is parallel to the closure flap 76. The respective carton then passes beyond the tongue 9*a*, between a pair of pressure rolls 10 (see Fig. 11), which press the end flap 77 against the closure flap 76. These pressure rolls 10 are mounted upon suitable respective shafts which are provided with bearings in the frame of the machine. When the end flap 77 passes beyond the pressure rolls 10, it springs into the position shown in Fig. 12, in which it is substantially perpendicular to the closure flap 76. A guide 11 (see Fig. 12), which is fixed to the frame of the machine, then gradually upwardly turns the closure flap 76.

As shown in Figs. 3 and 13, a series of blades 12*a* are fixed to a plate 12 connected to a shaft 80. This shaft 80 is timed so that shortly before the insertion of flap 77 under the respective body wall, one of said blades 12*a* bends said flap 77 relative to its closure flap 76, thus inserting the flap 77 into the final position shown in Fig. 13. Each blade 12*a*, therefore, acts as a guide for the insertion of a respective end flap 77. Each blade 12*a* also has a pusher 12*b*, which pushes the flap 76 tightly into closing position.

The main shaft 82 of the machine is driven by any suitable motor.

As shown in Fig. 1, the shaft 82 is geared to shaft 65 by means of gears 83 and 84. Shaft 82 is geared to shaft 79 by means of gears 85 and 86. The conveyor chain 2 is driven from the shaft 82 by any suitable drive.

The pressure rolls are idler rolls. The shaft 80 is also driven from the main shaft 82 by any suitable drive.

It will be understood that my invention is not limited to the details shown in the drawings and described above, and may be carried out with various modifications without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain having substantially horizontal top and bottom runs, and being provided with spaced pockets connected to said conveyor chain, each of said pockets being adapted to receive one carton removed from the chute, revolving means provided with finger members, which, in cooperation with a longitudinally arranged abutment, are adapted to cause gradual opening and squaring of the cartons placed in the pockets, said revolving means being also provided with members adapted to inwardly bend a first end flap at one end of the carton, guide means adjacent said one end of the carton, for inwardly bending a second end flap which in inwardly bent position overlies said first end flap, companion guide means at the other end of the carton for outwardly bending a first end flap at said other end, and a revolving means adapted to outwardly bend a second end flap at said other end of the carton, and cooperating longitudinally spaced guide means and revolving means acting on said first end of the carton and causing the closure flap at said one end to turn inwardly into closing position with its locking end flap tucked inwardly of a longitudinal body wall of the carton.

2. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, reciprocating means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain actuated at substantially constant speed, having substantially horizontal top and bottom runs and being provided with spaced pockets connected to said conveyor chain, said pockets having no side walls, each of said pockets consisting of a bottom wall, a first end wall which is substantially perpendicular to said bottom wall, and a second end wall which is inclined to said bottom wall and has a notch or recess, each pocket

being adapted to receive one flat carton removed from the chute in inclined position, the ends of said flat carton projecting in front and in rear of the pocket, revolving means provided with finger members which in cooperation with a longitudinally arranged abutment are adapted to cause gradual opening and squaring of the cartons placed in the pockets, said revolving means being also provided with members adapted to inwardly bend a first end flap at one end of the carton, guide means adjacent said one end of the carton for inwardly bending a second end flap which in inwardly bent position overlies said first end flap, companion guide means adjacent the other end of the cartons, for outwardly bending a first end flap and a revolving means adapted to outwardly bend a second end flap at said other end of the carton, and cooperating longitudinally spaced guide means and revolving means acting on said one end of the carton and causing the closure flap at said one end of the carton to turn inwardly into closing position with its locking end flap tucked inwardly of a longitudinal body wall of the carton.

3. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, reciprocating means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain actuated at substantially constant speed, having substantially horizontal top and bottom runs and being provided with spaced pockets connected to said conveyor chain, said pockets having no side walls, each of said pockets consisting of a bottom wall, a first end wall which is substantially perpendicular to said bottom wall, and a second end wall which is inclined to said bottom wall and has a notch or recess, each pocket being adapted to receive one flat carton removed from the chute in inclined position, the ends of said flat carton projecting in front and in rear of the pocket, revolving means provided with finger members, which in cooperation with a longitudinally arranged abutment are adapted to cause gradual opening and squaring of the flat cartons placed in the pockets, said revolving means being also provided with members adapted to inwardly bend a first end flap at one end of the carton, said revolving means comprising a first disc provided with radial fingers adapted to strike a flap at said one end of the flat carton placed in a pocket and thus cause partial opening of the flat carton body, said first disc being also provided with pointed projections adapted to inwardly bend one end flap at said one end of the carton, and a second disc provided with radial fingers adapted to hold the squared carton in open rectangular formation, guide means adjacent said one end of the carton for inwardly bending a second end flap which in inwardly bent position overlies said first end flap, companion guide means adjacent the other end of the carton for outwardly bending a first end flap and a revolving means comprising a disc provided with projections adapted to outwardly bend a second end flap at said other end of the carton, and cooperating longitudinally spaced guide means and revolving means acting on said one end of the carton and causing the closure flap at said one end of the carton to turn inwardly into closing position with its locking end flap tucked inwardly of a longitudinal body wall of the carton.

4. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, reciprocating means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain actuated at substantially constant speed, having substantially horizontal top and bottom runs and being provided with spaced pockets connected to said conveyor chain, said pockets having no side walls, each of said pockets consisting of a bottom wall, a first end wall which is substantially perpendicular to said bottom wall, and a second end wall which is inclined to said bottom wall and has a notch or recess, each pocket being adapted to receive one flat carton removed from the chute in inclined position, the ends of said flat carton projecting in front and in rear of the pocket, revolving means provided with finger members, which in cooperation with a longitudinally arranged abutment are adapted to cause gradual opening and squaring of the flat cartons placed in the pockets, said revolving means being also provided with members causing inwardly bending of a first end flap at one end of the carton, said revolving means comprising a first disc provided with radial fingers adapted to strike a flap at said one end of the flat carton placed in a pocket and thus cause partial opening of the flat carton body, said one disc being also provided with pointed projections adapted to inwardly bend one end flap at said one end of the carton, and a second disc provided with radial fingers adapted to hold the squared carton in open rectangular formation, guide means adjacent said one end of the carton for inwardly bending a second end flap which in inwardly bent position overlies said first end flap, companion guide means adjacent the other end of the carton for outwardly bending a first end flap and a revolving means comprising a disc provided with projections adapted to outwardly bend a second end flap at said other end of the carton and cooperating longitudinally spaced guide means and revolving means acting on said one end of the carton, said means comprising a first guide having a planar bottom portion and a concavo-convex marginal portion, said guide being associated with a tongue parallel with the planar bottom portion of the guide, a pair of pressure rolls longitudinally spaced from said guide, a second guide longitudinally spaced from said pressure rolls, a revolving disc longitudinally spaced from said second guide and provided with a series of blades, said first guide, said pressure rolls, said second guide and said disc acting in subsequent steps on said first end of the carton and causing the closure flap at said end of the carton to turn inwardly into closing position with its locking end flap tucked inwardly of a longitudinal body wall of the carton.

5. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, reciprocating means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain actuated at substantially constant speed, having substantially horizontal top and bottom runs and being provided with spaced pockets connected to said conveyor chain, said pockets having no side walls, each of said pockets consisting of a bottom wall, a first end wall which is substantially perpendicular to said bottom wall, and a second end wall which is inclined to said bottom wall and has a notch or recess, each pocket being adapted to receive one flat carton removed from the chute in inclined position, the ends of said flat carton projecting in front and in rear of the pocket, revolving means provided

with finger members, which in cooperation with a longitudinally arranged abutment are adapted to cause gradual opening and squaring of the flat cartons placed in the pockets, said revolving means being also provided with members causing inwardly bending of a first end flap at one end of the carton, said revolving means comprising a first disc provided with radial fingers adapted to strike a flap at said one end of the flat carton and thus cause partial opening of the flat carton body, said one disc being also provided with pointed projections adapted to inwardly bend one end flap at said one end of the carton, and a second disc provided with radial fingers adapted to hold the squared carton in open rectangular formation, guide means adjacent said one end of the carton for inwardly bending a second end flap which in inwardly bent position overlies said first end flap, companion guide means adjacent the other end of the carton for outwardly bending a first end flap and a revolving means comprising a disc provided with projections adapted to outwardly bend a second end flap at said other end of the carton and cooperating longitudinally spaced guide means and revolving means acting on said one end of the carton, said guide means and revolving means comprising a first guide having a planar bottom portion and a concavo-convex marginal portion, said guide being associated with a tongue parallel with the planar bottom portion of the guide, the planar bottom portion of said first guide and the tongue associated therewith being adapted to receive and pass between them the closure flap of the first end of the carton, while the concavo-convex marginal portion of said first guide is adapted to bend the respective end flap relative to said closure flap, a pair of pressure rolls longitudinally spaced from said first guide, said pressure rolls being adapted to press said end flap against said closure flap, a second guide longitudinally spaced from said pressure rolls, said second guide being adapted to gradually upwardly turn said closure flap, a revolving disc longitudinally spaced from said second guide and provided with a series of radially arranged blades which are adapted to bend said end flap relative to its closure flap and insert it into its final position in the carton.

6. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain having substantially horizontal top and bottom runs and being provided with spaced pockets connected to said conveyor chain, each pocket being adapted to receive one carton removed from the chute, means for opening and squaring the flat cartons placed in said pockets, said means comprising a revolving disc provided with radially arranged fingers adapted to cause partial opening of the flat cartons in said pockets, and a longitudinally arranged abutment acting on the top edge of the cartons placed in the pockets.

7. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain having substantially horizontal top and bottom runs and being provided with spaced pockets connected to said conveyor chain, each pocket being adapted to receive one carton removed from the chute, means for gradual opening and squaring of the flat cartons placed in said pockets, said means comprising a first revolving disc provided with radially arranged fingers adapted to cause partial opening of the flat cartons in said pockets by striking an end flap at one end of the carton, a longitudinally arranged abutment adapted to be engaged by a top edge of the carton placed in a pocket, and a second revolving disc provided with radial fingers adapted to hold the carton body in open rectangular body formation.

8. In a mechanism of the kind described, a vertical chute for piling flat, knocked-down cartons one above the other, means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain having substantially horizontal top and bottom runs and being provided with spaced pockets connected to said conveyor chain, the pockets having no side walls, each pocket consisting of a bottom wall, a first end wall which is substantially perpendicular to said bottom wall, and a second end wall which is inclined to said bottom wall and has a notch or recess, the ends of the flat cartons deposited in the pockets projecting in front and in rear of the pocket, means for opening and squaring the flat cartons placed in the pockets and means for inwardly bending a first and a second end flap at one end of the carton, said means for inwardly bending said end flaps comprising a revolving disc provided with peripheral projections acting on a first end flap to inwardly bend the same, and a longitudinally arranged guide means acting on a second end flap to inwardly bend the same and cause it to overlie said first end flap.

9. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain having substantially horizontal top and bottom runs and being provided with spaced pockets connected to said conveyor chain, each pocket being adapted to receive one carton removed from the chute, means for opening and squaring the flat cartons placed in said pockets, means for outwardly bending end flaps of side walls at an end of the opened carton, said means comprising guide means adjacent said end of the carton, for outwardly bending the end flap of one side wall, and a disc provided with radially extending fingers adapted to outwardly bend the end flap of the other side wall.

10. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain having substantially horizontal top and bottom runs and being provided with spaced pockets connected to said conveyor chain, each pocket being adapted to receive one carton removed from the chute, means for opening and squaring the flat cartons placed in said pockets, means for inwardly bending an end flap of a side wall at one end of the opened carton and means for causing to inwardly bend an end flap of another side wall at said one end of the opened carton, means for closing the closure flap at said one end of the opened carton, said means comprising a first guide having a planar bottom portion and a concavo-convex marginal portion, said guide being associated with a tongue parallel with the planar bottom portion of the guide, a pair of pressure rolls longitudinally spaced from

said guide, a second guide longitudinally spaced from said pressure rolls, and revolving disc longitudinally spaced from said second guide and provided with a series of radial blades.

11. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, means for removing said flat cartons one by one from the bottom of the chute, an endless conveyor chain having substantially horizontal top and bottom runs and being provided with spaced pockets connected to said conveyor chain, each pocket being adapted to receive one carton removed from the chute, means for opening and squaring the flat cartons placed in said pockets, means for inwardly bending an end flap of a side wall at one end of the opened carton and means for causing to inwardly bend an end flap of another side wall at said one end of the opened carton, means for closing the closure flap at said one end of the opened carton, said means comprising a first guide having a planar bottom portion and a concavo-convex marginal end portion, said guide being associated with a tongue parallel with the planar bottom portion of the guide, the planar bottom portion of said guide and the tongue associated therewith being adapted to receive and pass between them said closure flap, while the concavo-convex marginal portion of said guide is adapted to bend the respective end flap relative to said closure flap, a pair of pressure rolls longitudinally spaced from said first guide, said pressure rolls being adapted to press said end flap against said closure flap, a second guide longitudinally spaced from said pressure rolls and being adapted to gradually upwardly turn said closure flap, a revolving disc longitudinally spaced from said second guide and provided with a series of radially arranged blades adapted to bend the end flap relative to its closure flap and insert it inwardly of a longitudinal body wall of the carton into closing position.

12. In a mechanism of the kind described, a substantially vertical chute for piling flat, knocked-down cartons one above the other, means for removing said flat cartons one by one from the bottom of the chute, an endless chain having substantially horizontal top and bottom runs, actuated at a substantially constant speed and being provided with spaced pockets connected to said conveyor chain, each pocket being adapted to receive one carton removed from the chute, means for gradual opening and squaring of the flat cartons placed in said pockets, said means comprising a first revolving disc provided with radially arranged fingers adapted to cause partial opening of the flat cartons in said pockets by striking an end flap at one end of the carton, the free ends of said fingers being moved at greater longitudinal velocity than the conveyor chain, a longitudinally arranged abutment adapted to be engaged by a top edge of the carton placed in a pocket, and a second revolving disc provided with radial fingers adapted to hold the carton body in open rectangular body formation, the longitudinal movement of the opened carton being faster than the longitudinal movement of said radial fingers at their tips.

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