

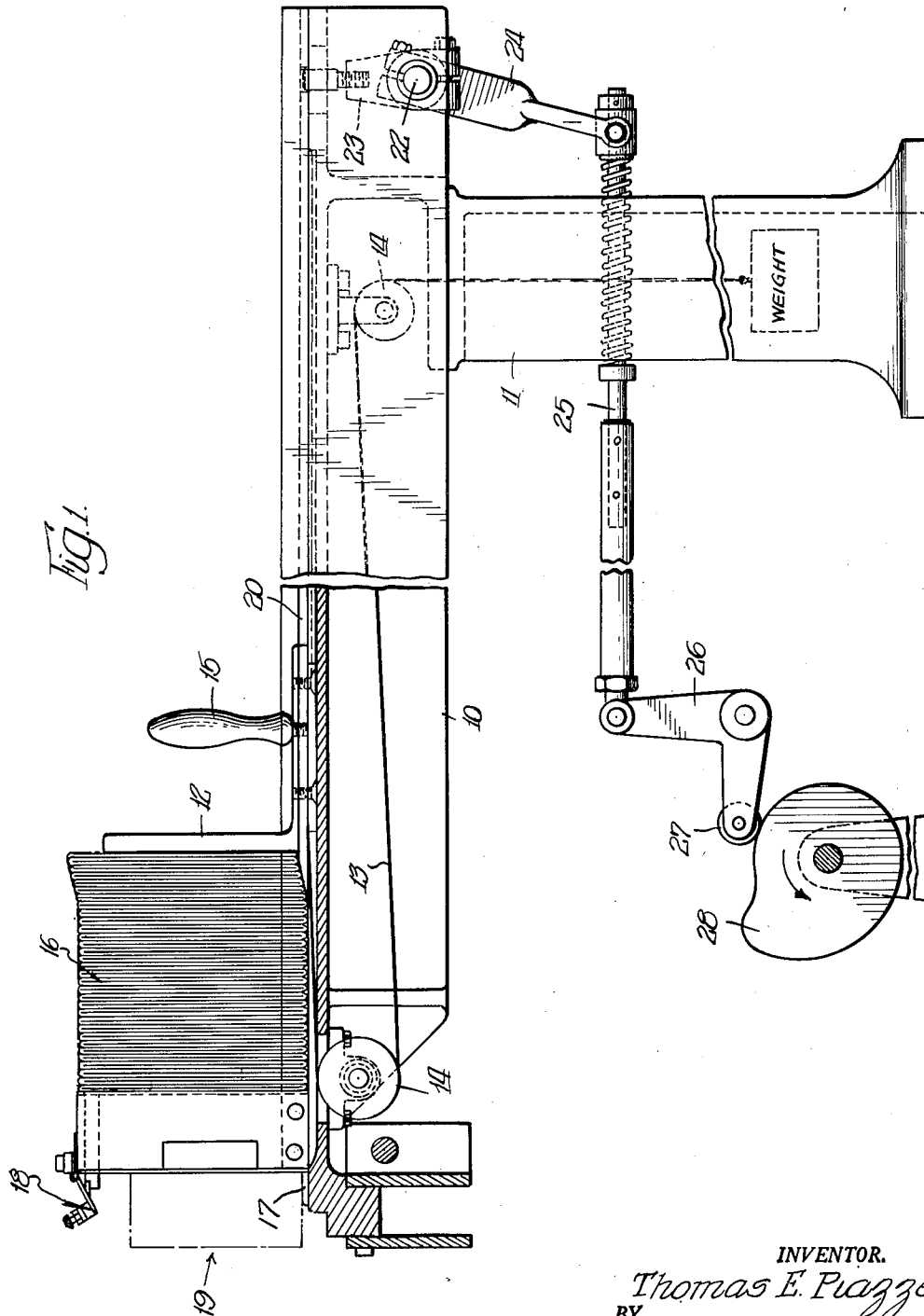
Feb. 13, 1951

T. E. PIAZZE
CARTON HANDLING MACHINE

2,541,607

Filed Sept. 27, 1946

4 Sheets-Sheet 1



INVENTOR.
Thomas E. Piazza,
BY
Cromwell, Trust & Warden.
attys.

Feb. 13, 1951

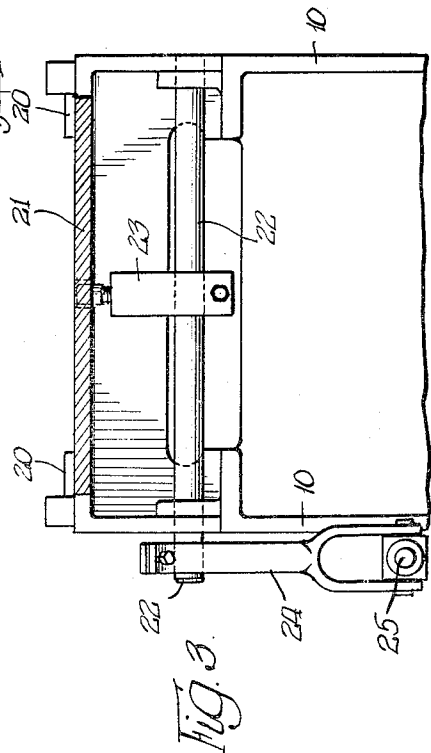
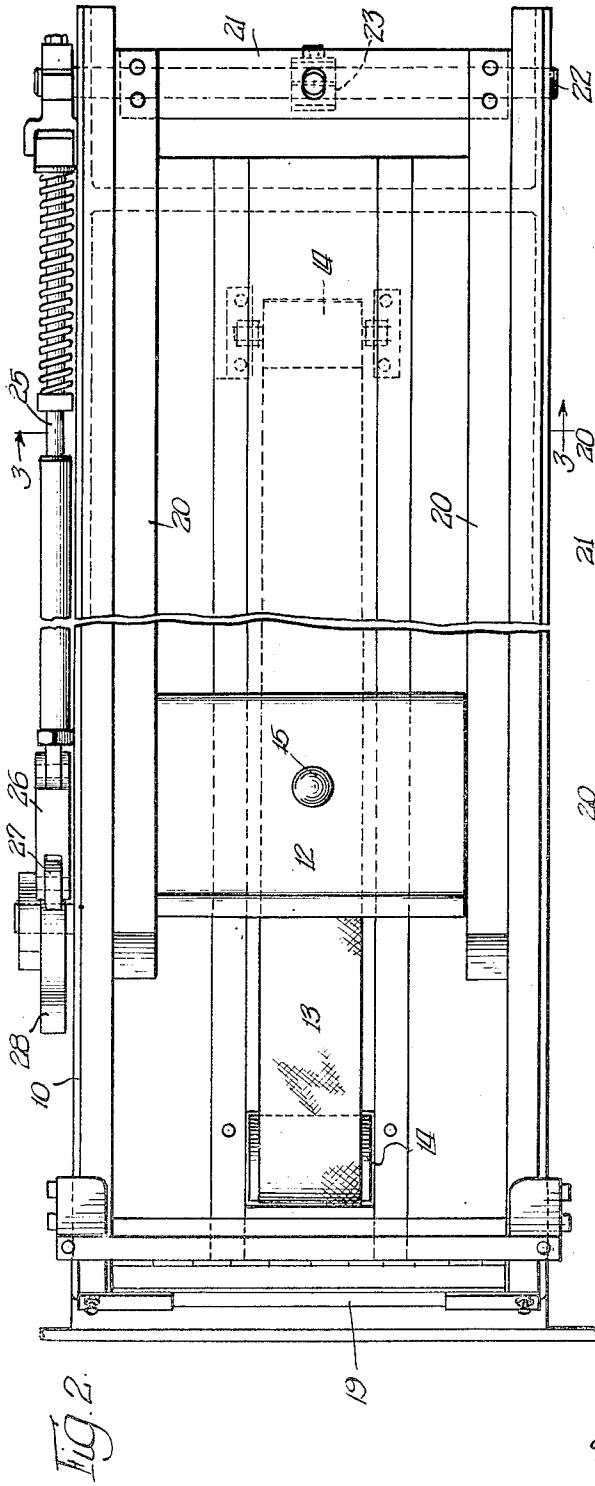
T. E. PIAZZE

2,541,607

CARTON HANDLING MACHINE

Filed Sept. 27, 1946

4 Sheets-Sheet 2



INVENTOR.
Thomas E. Piazza,
BY
Cromwell, Christ & Warden.
attys

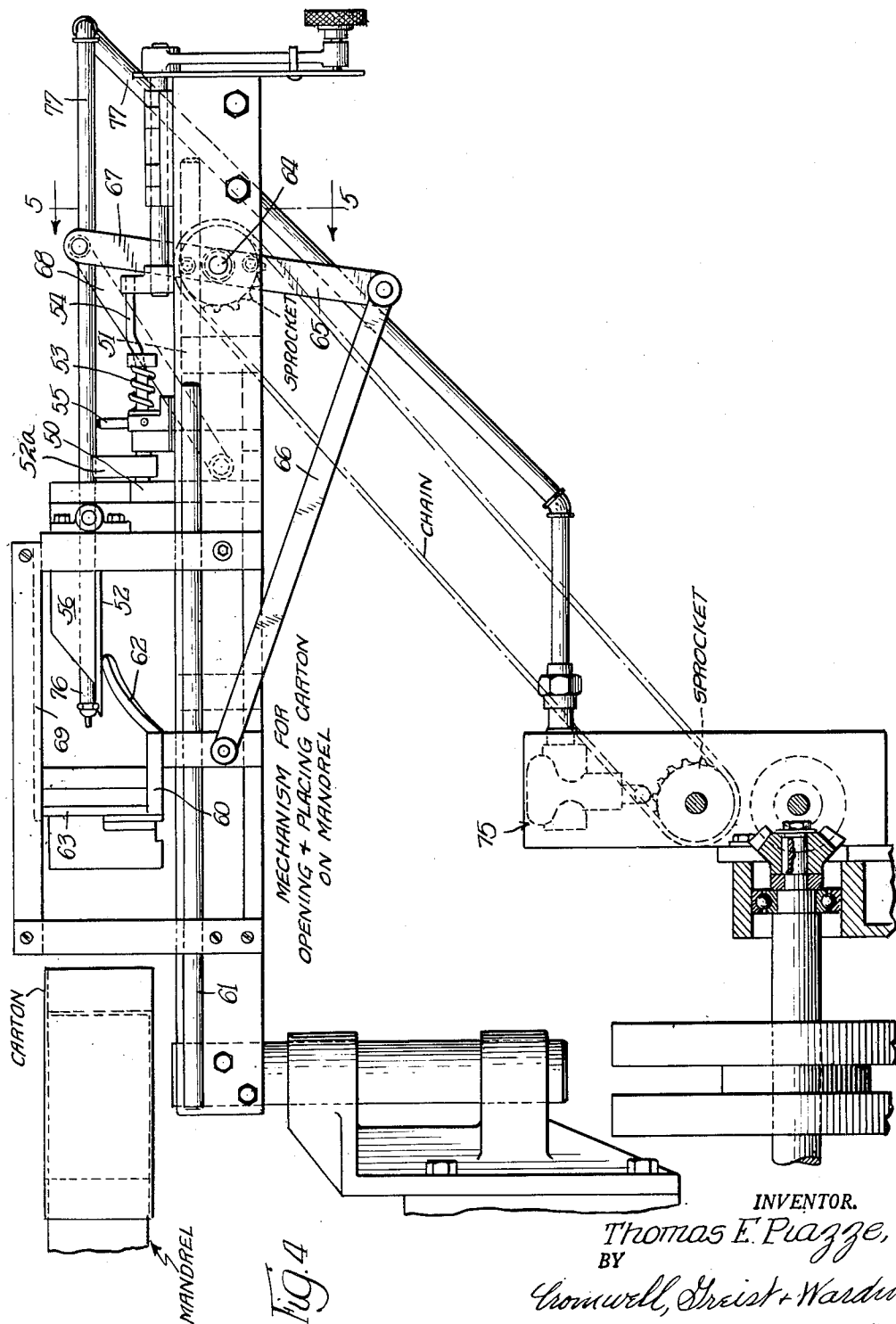
Feb. 13, 1951

T. E. PIAZZE
CARTON HANDLING MACHINE

2,541,607

Filed Sept. 27, 1946

4 Sheets-Sheet 3



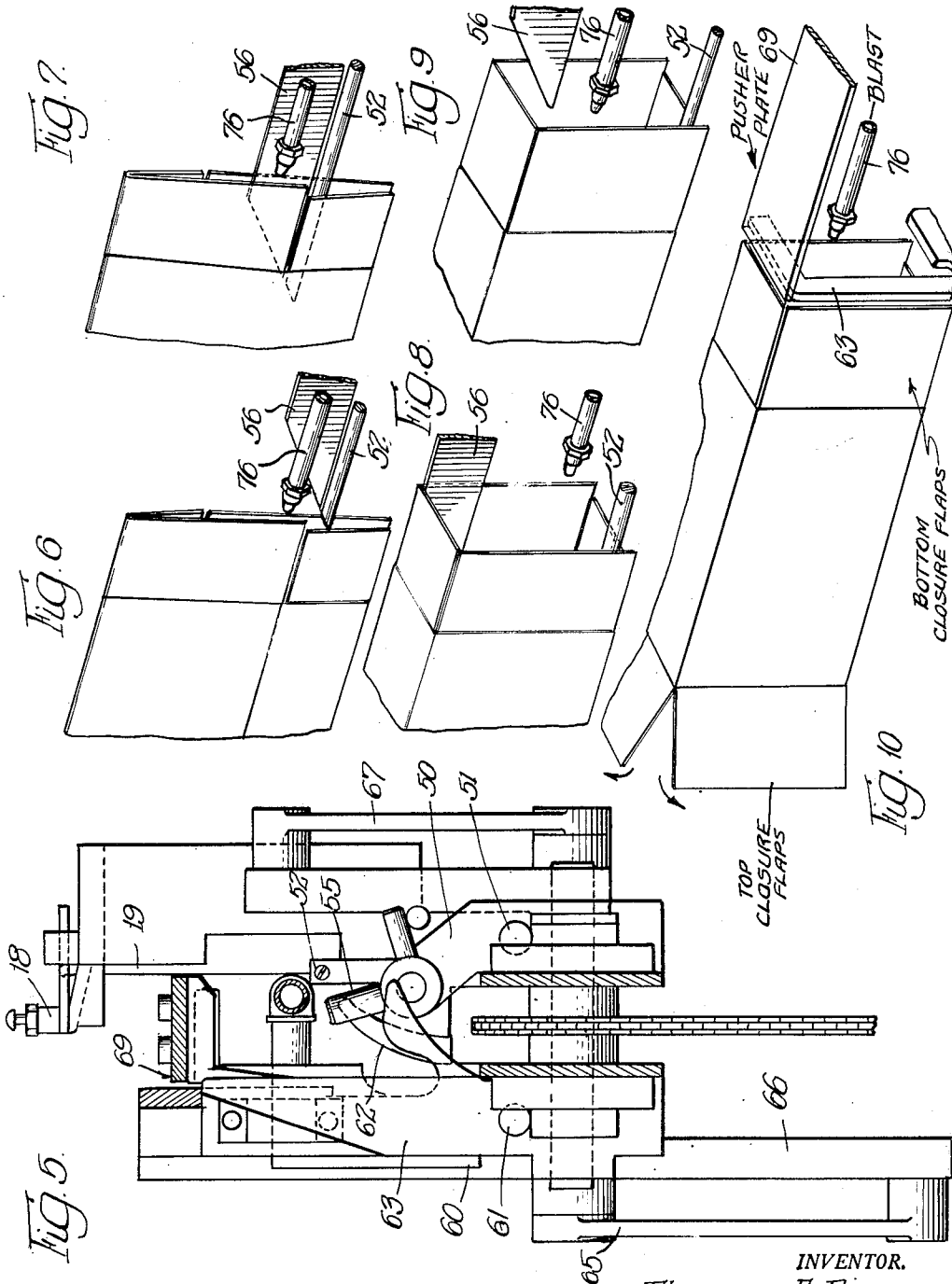
Feb. 13, 1951

T. E. PIAZZE
CARTON HANDLING MACHINE

2,541,607

Filed Sept. 27, 1946

4 Sheets-Sheet 4



INVENTOR.
Thomas E. Piazza,
BY
Cromwell, Christ & Warden
Attys

UNITED STATES PATENT OFFICE

2,541,607

CARTON HANDLING MACHINE

Thomas E. Piazza, Mount Vernon, Ohio, assignor
to Shellmar Products Corporation, Chicago, Ill.,
a corporation of Delaware

Application September 27, 1946, Serial No. 699,762

15 Claims. (Cl. 93—53)

1

This invention has to do with carton handling machines, having particular reference to mechanism for handling collapsed types of cartons which have top and bottom closure flaps which are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, and the provision of such mechanism is a principal object of the invention.

More specifically, it is an object of the invention to provide a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, improved mechanism for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, mechanism to open said carton and to place the same on the mandrel, and means to expand the top closure flaps of the carton to permit the same to be placed on the mandrel.

Another object of the invention is the provision of a carton feeding mechanism including a reciprocating carton support which has a relatively rapid rearward thrust and a relatively slow forward thrust, whereby large or lengthy stacks of cartons can conveniently be handled.

A further object of the invention is the provision of mechanism which includes two reciprocal carriages, one of which has an actuatable projecting member adapted to enter a collapsed carton and to open the same, and the other of which has an actuating member adapted to actuate the projecting member, and a pusher member thereafter to push the opened carton onto a mandrel.

Still another object of the invention is to provide means, including a nozzle disposed adjacent the bottom closure flaps of an opened carton, which nozzle is adapted to inject a blast of fluid into the carton in such a manner that the top closure flaps are expanded to permit the carton readily to be slipped or pushed onto a mandrel.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevational view, partly in section and with parts removed, of mechanism for advancing a stack of collapsed cartons so that

2

the first carton is placed in position readily to be opened;

Fig. 2 is a plan view of the apparatus depicted in Fig. 1;

Fig. 3 is a transverse sectional view of the top portion of the mechanism taken along the lines 3—3 of Fig. 2 and looking in the direction of the arrows;

Fig. 4 is a side elevational view, partly in section and with parts removed, illustrating a preferred embodiment of mechanism for opening cartons received from the carton advancing mechanism depicted in Fig. 1, and for placing the carton on the mandrel;

Fig. 5 is a transverse sectional view taken along the line 5—5 of Fig. 4 and looking in the direction of the arrows;

Fig. 6 is a perspective view of a portion of the carton and portions of the opening mechanism about to enter a collapsed carton and to open the same;

Fig. 7 is a view similar to Fig. 6 illustrating an initial stage in the opening of the carton;

Fig. 8 is a view similar to Figs. 6 and 7 showing a further stage in the opening of the carton;

Fig. 9 is a view similar to the preceding figures illustrating an opening mechanism being withdrawn from the opened carton; and

Fig. 10 is a view similar to the preceding figures illustrating a simultaneous operation of a pusher plate to push the carton onto the mandrel as a blast of air is directed into the carton to strike the mandrel and to expand the top closure flaps as indicated by the arrows.

Referring now more particularly to Figs. 1, 2 and 3 of the drawings, there is shown a mechanism for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened. This comprises side frame members 10 supported on a standard 11.

Mounted between the tops of the side frames is a pusher member, or plate, 12 having secured thereto a weighted strap or belt 13 passing around pulleys 14, 14, journaled between the side frames. An upstanding handle 15 is secured to the plate 12 for convenience in withdrawing the latter against the pull of the weight on the belt 13 when it is desired to add more cartons to the stack of cartons as shown generally at 16.

The bottom of the first carton in the stack lies against the abutment ledge 17 to arrest forward movement of the bottom of the first carton as well as the stack until this carton has been removed.

Secured to the frame of the machine above the first of the stack of cartons is a weighted pivotally mounted tripper member 18 adapted to release the top of the carton and to hold it against the abutment ledge 17 while the carton is being opened until the carton has reached the posi-

3

tion shown in dotted lines as indicated generally at 19.

It is sometimes desirable to continue feeding cartons over a long period of time without the necessity for constantly withdrawing the weighted pusher member 12 and adding additional cartons to the stack 16 at short intervals. If the pusher member 12 is pulled far back toward the end of the side frames and the number of cartons in the stack considerably increased, it becomes difficult properly to feed or advance the cartons to a point in this mechanism where they can be opened with convenience. Therefore, there has been provided a reciprocating carton support in the form of spaced apart tracks 20, 20. At the rear end of the frames these tracks are joined together by a bridging piece 21. Mounted below the bridging piece 21 in the side frames 10, 10, is a shaft 22. This is connected by a link 23 to the bridging piece 21. At one end of the shaft is an arm 24 slidably connected to the end of a spring-cushioned connecting link 25 which in turn is connected to a bell crank 26 having a cam roller 27 operated by a cam member 28. This arrangement as will be observed by the contour of the cam is such that the reciprocating carton supports, or tracks, 20, 20, will be given a relative sharp or rapid rearward thrust and a relatively slow forward thrust. In this manner the stack of cartons can evenly and properly be fed in conjunction with the operation of the pusher member 12 toward the station at which they are to be opened.

The mechanism for opening the carton is best depicted in Figs. 4 and 5 and more graphically illustrated in Figs. 6 through 10. It will be understood that the opening mechanism is disposed at right angles to the advancing stack of cartons as can more readily be seen from Figs. 4 and 5.

The mechanism for opening the carton and placing the same on the mandrel preferably consists of two reciprocating carriages which by-pass each other and in doing so one of the carriages causes the carton opening mechanism to function after it has passed before the oncoming stack of cartons. After the carton opening mechanism has opened the carton the first carriage pushes the same onto the mandrel. These carriages will now be described.

The carton opening carriage indicated beginning with the numeral 50 is slidably mounted on a shaft 51. This carriage has a projecting member, or finger, 52 which is movably mounted in the carriage 50. While the projecting member 52 is cam actuated, as will more fully appear hereinafter, it is automatically spring retracted by the spring 53 mounted on the rod 54 secured to the rear of the carriage. The finger 52 is carried by arms 52a and is turned through an arc of about 90° by the action of the cam roller 55 when it rides against the bottom of the cam 62. Also connected to the carriage is a cam roller 55 which is adapted to actuate the finger 52 against the action of the spring 53.

Mounted in fixed position on the carriage is a projecting member, or blade 56. This also rides the carriage together with the projecting finger 52 and also is adapted to enter the carton.

The other reciprocating carriage, indicated beginning with the numeral 60, slidably is mounted on the shaft 61. It carries a projecting or cam actuating member 62. It also carries a pusher plate 63 (see also Figs. 5 and 10) having an extension 69. Note that the pusher plate is

4

generally L-shaped or cut out in a curved manner to accommodate the action of the actuatable projecting member, or finger, 52.

Both carriages are preferably driven by a conventional chain and sprocket arrangement. One of the sprockets is secured to the center of a shaft 64 journaled in the frames 10, 10. An arm 65 is secured to one end of the shaft and connects the carriage 60 by means of a link 66. The other end of the shaft 64 has secured thereon an arm 67 having a connecting link 68 secured to the carriage 50. As the chain and sprocket arrangement is brought into motion the arms 65 and 67 are rotated, thus reciprocating the carriages 50 and 60 so that they constantly by-pass each other. In doing so, the projecting, or camming member, 62 first passes the first carton advancing on the stack 16 and meets the oncoming carriage 50 to strike the cam roller 55 which actuates the carton opening member 52. By this time the carton opening member 52 and the blade 56 have entered the carton. As each carriage reaches its limit of advance the roller cam 55 following the actuating cam member 62 turns the projecting member 52, now inside the carton, outwardly and downwardly in such a manner that the collapsed carton is opened because the member 52 strikes a wall thereof and brings the carton into squared position. The blade 56 has also entered the carton together with the projecting member 52. Its function, however, is to remain fixed against the opposite side wall of the carton to hold the carton in position while the hinged remaining three walls are brought into squared or opened position by the actuatable projecting member 52. All this is graphically illustrated in Figs. 6, 7 and 8 where the carton is shown in opened position. The cut-out portion of the pusher plate 63 readily accommodates the projecting opening finger 52 as the latter reaches its downward movement. As each carriage 50 and 60 again by-pass each other in the opposite direction the spring retracted roller 55 will be released by the cam 62 and permit the projecting finger 52 to return to its normal upraised position. However, the carton having been opened, and the pusher plate 63 having engaged the edges of the bottom closure flaps of the carton, the latter will be pushed onto the mandrel. In order to insure that the top closure flaps, opposite the bottom closure flaps, will not jam against the mandrel, it is necessary that they be expanded, or opened, a sufficient distance to accomplish this. This operation must be extremely well timed and for this purpose the following means, now to be described, is utilized.

The means to expand the top closure flaps of the carton to permit the same to be placed on the mandrel preferably include a fluid actuating medium. A conventional device for timing the injection of a fluid, such as air or any other suitable medium, is indicated generally with the numeral beginning at 75. This type of device needs no further elaboration and it should be understood that it functions in synchronism with the operation of the chain-sprocket actuating mechanism for reciprocating the carriages 50 and 60. The novel feature embodied by this means consists of a nozzle 76 connected to a conduit 77 which in turn is connected to the device 75 which contains an air port or valve which opens periodically to inject air through the nozzle 76.

It will be observed that the nozzle 76 preferably does not enter the carton but at the moment just prior to its operation is disposed adjacent the

5

bottom closure flaps of the opened carton just as the pusher plate is about to strike the bottom edges of the flaps and push the carton onto the mandrel. At this moment, that is, just before the carton is pushed upon the mandrel, it is desirable to expand the top closure flaps. A blast of fluid, or air, at this instant from the nozzle, through the opened carton, striking the end of the mandrel, and being deflected outwardly therefrom, will open, or expand, the top closure flaps as indicated by the arrows. At this moment also, the reciprocating carriage 60 carrying the pusher plate 63 is brought into operation and the carton is pushed onto the mandrel thereby without difficulty. The extension 69 follows in the path of the pusher plate, contacting the next succeeding upstanding carton, i. e. the first one in the stack being advanced thereby resisting the pressure of the stack of cartons 16, thus preventing the stack from falling into the return path of the pusher plate.

The bottom closure flaps can now be closed by any suitable mechanism after the application of glue or any other desirable fastening means to prepare the carton for receiving a commodity to be packaged therein.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising in combination, mechanism for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, mechanism to open said carton and immediately to place the same on said mandrel, and nozzle means whereby to direct a blast of air through said carton and against said mandrel to expand the top closure flaps of the carton to permit the same to be placed on said mandrel.

2. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising in combination, mechanism, including a weighted pusher member, for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, mechanism to open said carton and to place the same on said mandrel, and nozzle means whereby to direct a blast of air through said carton and against said mandrel to expand the top closure flaps of the carton to permit the same to be placed on said mandrel.

3. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for

6

packaging a commodity within the carton, the improvement comprising in combination, mechanism for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, including an abutment ledge to arrest forward movement of the bottom of the first carton and a tripper member to release the top of said carton and to hold it against said ledge until the carton is opened, mechanism to open said carton and immediately to place the same on said mandrel, and nozzle means whereby to direct a blast of air through said carton and against said mandrel to expand the top closure flaps of the carton to permit the same to be placed on said mandrel.

4. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising in combination, mechanism, including a reciprocating carton support, for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, mechanism to open said carton and immediately to place the same on said mandrel, and nozzle means whereby to direct a blast of air through said carton and against said mandrel to expand the top closure flaps of the carton to permit the same to be placed on said mandrel.

5. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising in combination, mechanism for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, mechanism, including a reciprocable carriage having a projecting member adapted to enter said carton, to square said carton and to place the same on said mandrel, and nozzle means whereby to direct a blast of air through said carton and against said mandrel to expand the top closure flaps of the carton to permit the same to be placed on said mandrel.

6. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising in combination, mechanism for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, and mechanism, including a reciprocable carriage having projecting members adapted to enter said carton, one of said members being fixedly mounted on said carriage and the other of said members being pivotally mounted thereon, a cam member to actuate said other member to open said carton in position to be placed on said mandrel, and a pusher plate to push said carton onto said mandrel.

7. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising in combination, mechanism for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, mechanism to open said carton, including a reciprocable carriage having a projecting member adapted to by-pass said carton before it is opened and thereafter to place said carton on

7

said mandrel, and nozzle means whereby to direct a blast of air through said carton and against said mandrel to expand the top closure flaps of the carton to permit the same to be placed on said mandrel.

8. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising in combination, mechanism for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, mechanism, including two reciprocable carriages, one of which has an actuatable projecting member pivotally mounted on said one carriage and adapted to enter the collapsed carton and to open the same, and the other of which has an actuating member adapted to actuate said projecting member, and a pusher member thereafter to push said opened carton onto said mandrel, and nozzle means whereby to direct a blast of air through said carton and against said mandrel to expand the top closure flaps of the carton to permit the same to be placed on said mandrel.

9. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising in combination, mechanism for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, mechanism to open said carton and to place the same on said mandrel, and means, including a nozzle disposed adjacent the bottom closure flaps of said opened carton and adapted to provide a blast of fluid therein and against said mandrel, to expand the top closure flaps of the carton to permit the same to be placed on said mandrel.

10. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising in combination, mechanism for advancing a stack of collapsed cartons so that the first carton is placed in position to be opened, mechanism, including two reciprocable carriages, one of which has an actuatable projecting member adapted to enter the collapsed carton and to open the same pivotally mounted on said one carriage, and the other of which has an actuating member adapted to actuate said projecting member, and a pusher member, including a carton stack retaining member attached thereto and reciprocable therewith, thereafter to push said opened carton onto said mandrel, and nozzle means whereby to direct a blast of air through said carton and against said mandrel to expand the top closure flaps of the carton to permit the same to be placed on said mandrel.

11. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising mechanism, including a reciprocable carriage having a projecting member adapted to enter said carton, to open said carton in position to be placed on said mandrel, said projecting member being connected to an

8

arm which is pivotally mounted on said carriage to turn said projecting member through an arc of approximately 90° to square said carton from collapsed position, and a pusher member for pushing said opened carton onto said mandrel.

12. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising mechanism, including a reciprocable carriage having projecting members adapted to enter said carton, one of said members being fixedly mounted on said carriage and the other of said members being pivotally mounted thereon, a cam members to actuate said other member to open said carton in position to be placed on said mandrel, and a pusher plate to push said carton onto said mandrel.

13. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising mechanism to open said carton, including a reciprocable carriage having a pusher plate with a projecting member adapted to by-pass said carton to hold the stack in position before it is opened and thereafter to push said carton on said mandrel after it is opened.

14. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising mechanism, including two reciprocable carriages, one of which has an actuatable projecting member pivotally mounted on said one carriage and adapted to enter the collapsed carton and to open the same, and the other of which has an actuating member adapted to actuate said projecting member, and a pusher member thereafter to push said opened carton onto said mandrel.

15. In a carton handling machine, wherein collapsed cartons having top and bottom closure flaps are to be opened and placed on a mandrel so that the bottom closure flaps can be closed for packaging a commodity within the carton, the improvement comprising means, including a nozzle disposed adjacent the bottom closure flaps of said opened carton and adapted to provide a blast of fluid therein and against said mandrel, to expand the top closure flaps of the carton to permit the same to be placed on said mandrel, and a pusher plate for pushing said carton onto said mandrel.

THOMAS E. PIAZZE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,342,047	Howard	June 12, 1920
1,636,014	Robinson	July 19, 1927
1,779,817	Lane	Oct. 28, 1930
1,783,912	Van Der Pyl et al.	Dec. 2, 1930
1,993,751	Reid	Mar. 12, 1935
2,217,784	Bennett et al.	Oct. 15, 1940
2,241,817	Howard	May 13, 1941
2,251,883	Hartmann	Aug. 5, 1941
2,291,010	Vergobbi	July 28, 1942