Nov. 6, 1951 E. C. BURHANS 2,574,087

CARTON HANDLING DEVICE

Filed Oct. 29, 1947 4 Sheets-Sheet 1

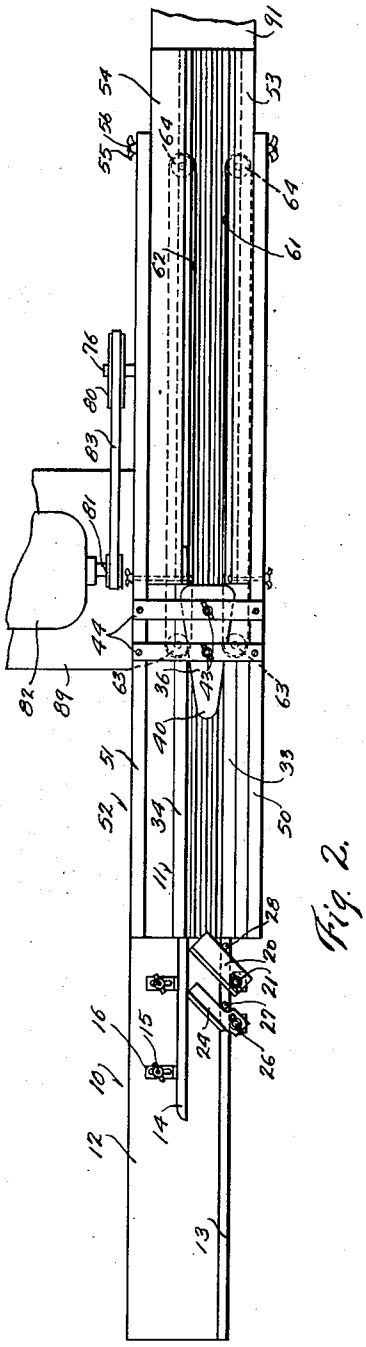


Fig. 2.

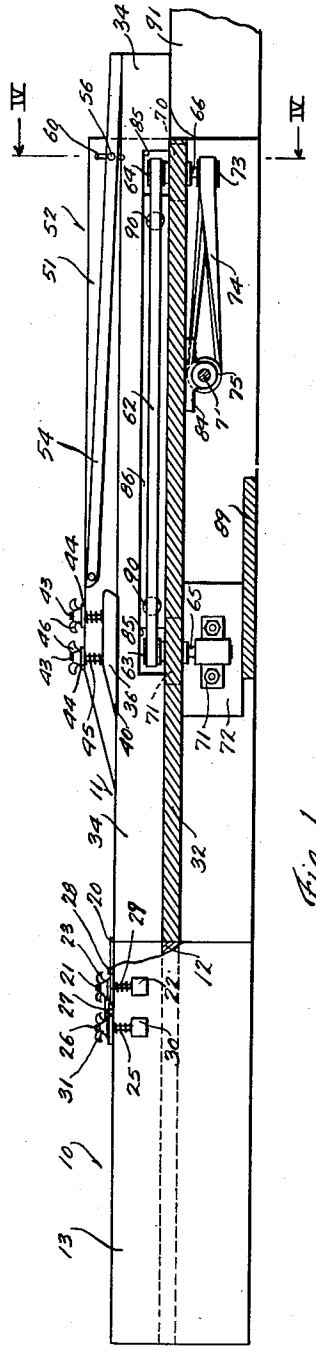


Fig. 1.

INVENTOR.

Eugene C. Burhans

BY Beau, Brooks, Buckley & Beau.

ATTORNEYS.

Nov. 6, 1951 E. C. BURHANS 2,574,087

CARTON HANDLING DEVICE

Filed Oct. 29, 1947 4 Sheets-Sheet 2

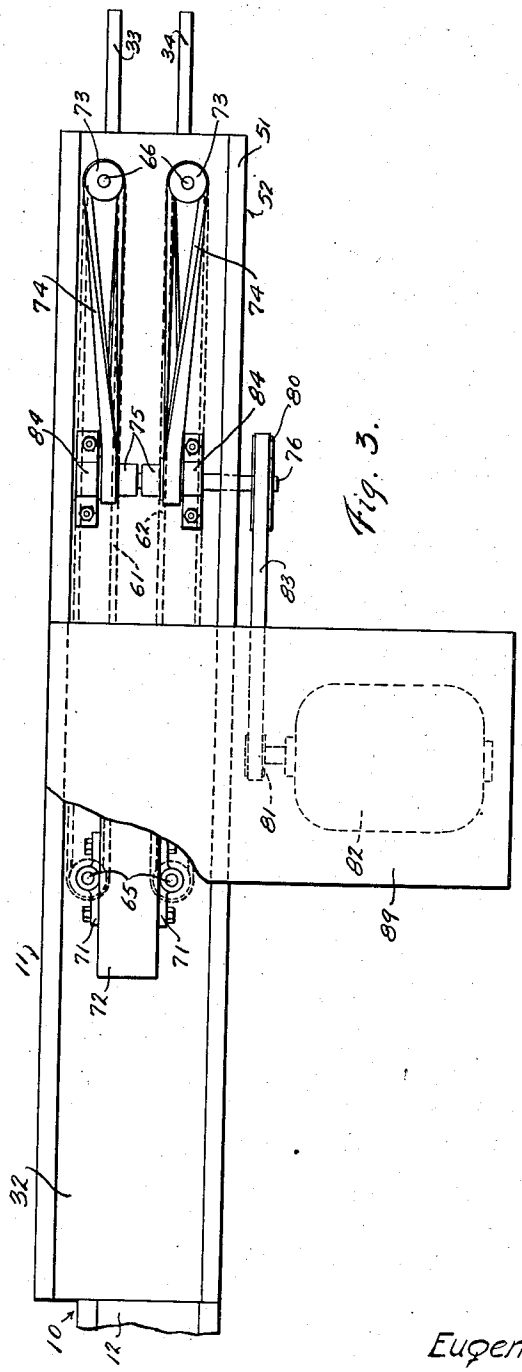


Fig. 3.

INVENTOR.
Eugene C. Burhans

BY Bean, Brooks, Buckley & Bean.
ATTORNEYS.

Nov. 6, 1951 E. C. BURHANS 2,574,087

CARTON HANDLING DEVICE

Filed Oct. 29, 1947 4 Sheets-Sheet 3

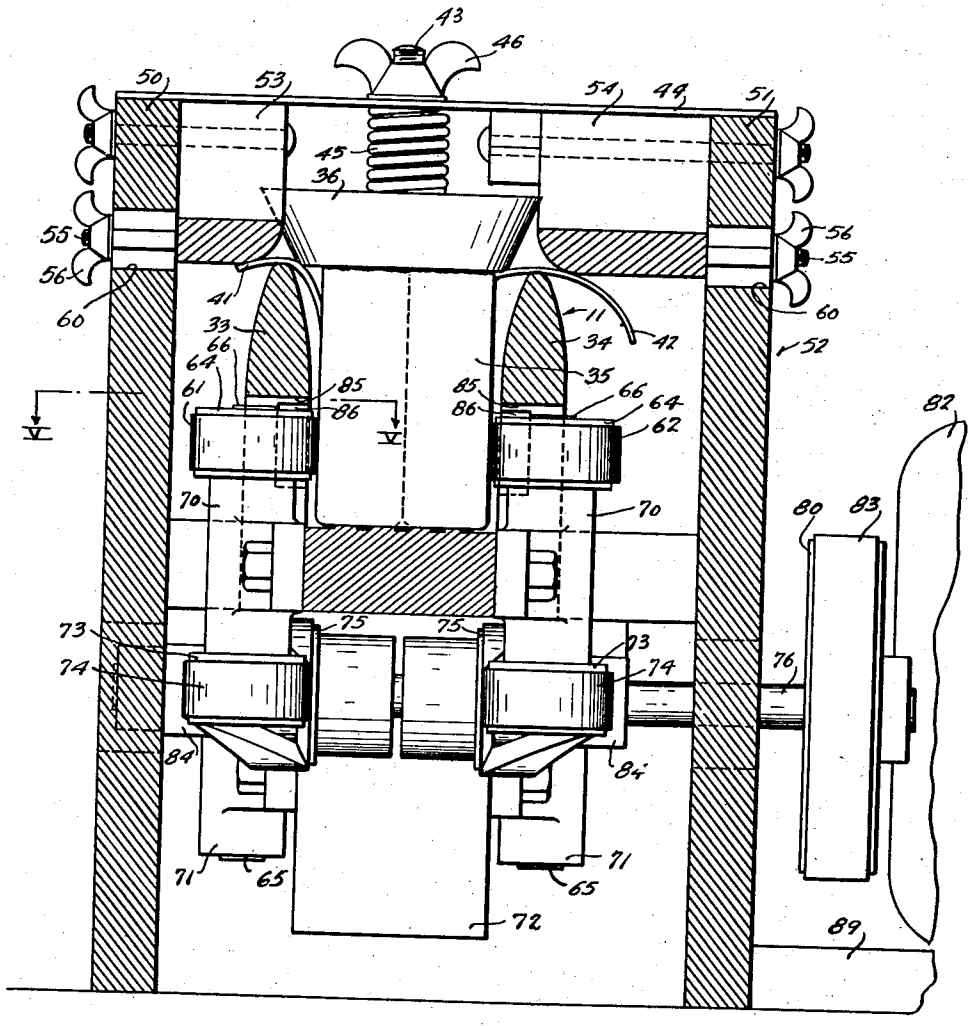


Fig. 4.

INVENTOR.
Eugene C. Burhans
BY Beau, Brooks, Buckley & Beau.
ATTORNEYS.

Nov. 6, 1951 E. C. BURHANS 2,574,087

CARTON HANDLING DEVICE

Filed Oct. 29, 1947 4 Sheets-Sheet 4

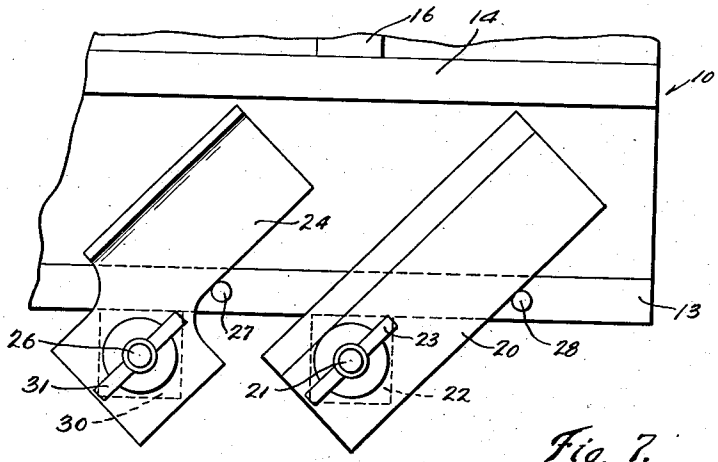


Fig. 7.

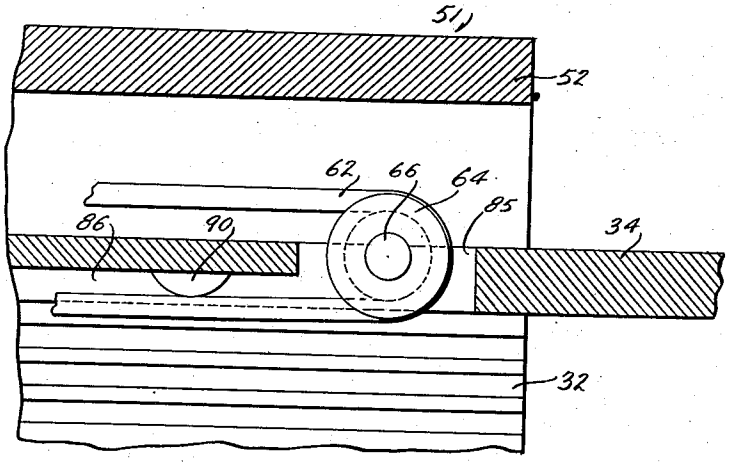


Fig. 5.

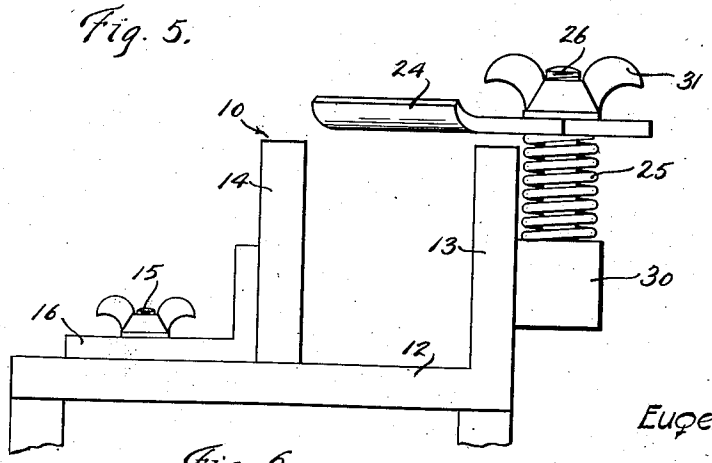


Fig. 6.

INVENTOR.
Eugene C. Burhans

BY Beau, Brooks, Buckley & Beau.
ATTORNEYS.

Patented Nov. 6, 1951

2,574,087

UNITED STATES PATENT OFFICE

2,574,087

CARTON HANDLING DEVICE

Eugene C. Burhans, Lockport, N. Y.

Application October 29, 1947, Serial No. 782,807

5 Claims. (Cl. 30—2)

1

My invention relates in general to carton handling devices, and in particular to a device for handling cartons containing individual packages of merchandise, for instance, packages of cigarettes, which are to be imprinted by stamp-imprinting machine.

It is well known to those skilled in the art that a State tax is placed upon each package containing cigarettes, and each package must have a tax stamp placed thereon before it can be sold to a customer. The stamp may be affixed to the package by a decalcomania or by being imprinted directly upon the cellophane wrapper of the package. Certain machines have been developed whereby the exposed ends of the packages in a carton may be run through the machine and have a suitable stamp imprinted thereupon without having to remove them from the carton. The cartons, however, must first be opened by cutting along the sealed flap and across both ends thereof so as to expose the ends of the packages. This is accomplished at present by means of a knife of some sort held in one hand by the operator while the carton is held by his other hand in a position most convenient and safe for hand severing. The position of the carton must then be changed so as to bring the severed side uppermost and the flaps formed on the cartons by thus breaking the sealed joint must then be folded back by the use of both hands. While the flaps are being held in such folded position by the hands of the operator, the carton is fed into the stamp-imprinting machine. By present-day methods, therefore, the cartons must be handled a number of times and arranged in a number of different positions in order to accomplish the above-mentioned manual operations.

It is a principal object of my invention to provide a device in which the carton may be fed in a selected position by hand and, during such feeding, have the walls of both ends cut across the upper edges at points opposite the joints between the flaps and also have the adhesive between the flaps broken after which further movement, without a change in relative position, causes the flaps to be folded backwardly ready for passage into and through the stamp-imprinting machine.

Another object is to provide a single stationary cutter held by a chute in which the cartons are supported as they are being cut, an adjustable guide being provided in front of the cutter, whereby the carton may be held in proper position for predetermined registration with the knife.

2

Another object is to provide a shoe in the path of travel of the severed carton to spread the open flaps released by the severing and spreading action of the knife.

Another object is to provide flap-engaging members for pressing the flaps downwardly and toward the sides of the carton prior to being fed into the stamp-imprinting machine.

A further object is to provide a transfer chute for guiding and supporting the cartons as the flaps thereof are being turned downwardly.

Moreover, power means are provided in my device for feeding the cartons through the transfer chute toward the stamp-imprinting machine.

Furthermore, my device is so designed that the carton is fed by manual means until such time as the shoe has engaged the flaps thereof, and, after being fed by the power means through the transfer chute, the carton remains idle until it is fed into the stamp-imprinting machine by movement of the next succeeding carton.

Moreover, my invention permits an operator to greatly increase the number of cartons handled in a given time over that which can be accomplished by present day hand methods, and to accomplish the work in a safer and more facile manner.

The above objects and advantages have been accomplished by the device of the accompanying drawings. In the drawings:

Fig. 1 is a side sectional elevation of my complete device, the transfer chute thereof being sectioned along the longitudinal center line thereof;

Fig. 2 is a plan view of the device;

Fig. 3 is a bottom view showing the carton feeding device;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 1;

Fig. 5 is an enlarged fragmentary transverse sectional plan view taken on the line 5—5 of Fig. 4;

Fig. 6 is an enlarged fragmentary plan view showing the cutting knife and carton guide; and

Fig. 7 is an enlarged fragmentary end elevation of the cutting chute.

My device comprises in general a cutting chute 10 and a transfer chute 11 arranged in longitudinal alignment with each other and designed to guide and support the carton from the time it enters the device until it is ready to be fed into the stamp-imprinting machine.

The cutting chute is formed with a base 12 for supporting the carton, and with an upstanding wall 13 to align and guide the carton while it is being fed through the chute. An adjusting

wall 14 is carried by the base and is fastened in adjusted position by means of bolts 15 secured to the base and passing through angle members 16 carried by the wall. The space between the walls 13 and 14 is adjusted so that the carton when resting on one of its narrow longitudinal edge surfaces will be snugly supported therebetween, while it is being manually passed through the chute. A stationary cutting knife 20 is disposed across the top of the cutting chute and is carried by bolt 21. This bolt is mounted in a block 22 secured to the outside face of the wall 13. The knife is formed with an aperture for passage over the upper end of the bolt 21 and a helical spring 29 is mounted upon the bolt, having one end bearing upon the block 22 and the other end disposed under the knife 20. A wing nut 23 is disposed upon the upper end of the bolt serving to hold the knife firmly upon the upper end of the spring. Adjustment of the position of the knife is thereby brought about by the adjustment of the wing nut 23 upon the bolt 21. A guide 24 is located in front of the cutter and is mounted upon the upper end of a helical spring 25. This spring is mounted upon a bolt 26 carried by a block 30 secured to the outer face of the wall 13 of the cutter chute. The bolt 26 passes through the guide and a wing nut 31 engaging the upper end of the bolt serves to adjust the position of the guide. The guide is so adjusted that the cartons as they are being fed are held down upon the bottom of the cutting chute. The cutting knife may therefore be adjusted to pass under the top flap of the carton and between it and the under flap and thereby break the adhesive holding the flaps in place. The knife also cuts into and across the end wall at each end of the carton. Stop pins 27 and 28 are carried by the wall 13 for preventing rotative movement of the knife and guide, respectively.

The transfer chute 11 is suitably held in registering position with the cutting chute 10 and is formed with a grooved base 32 and two spaced upstanding walls 33 and 34. These walls are preferably tapered on their inner surfaces and are more widely spaced than the walls 13 and 14 of the cutting chute 10 so that when the carton has been opened it may be free to expand slightly to separate the flap and the severed sides thereof.

After the carton illustrated at 35 in Fig. 4 has been opened and fed into the transfer chute, it passes underneath an unfolding shoe 36. This shoe is tapered toward the advance end both as to width and thickness whereby it is provided with a tapered point 40 for engagement under the flaps of the carton, thus serving to hinge them around the corners of the carton thereby opening up one side of the carton and exposing the ends of the packages contained therein. In Fig. 4 the carton 35 is shown being fed through the transfer chute 11, and the flaps 41 and 42 formed by the severing and separating operation of the knife are shown as being folded over along the longitudinal edges of the carton, the flap 41 being in engagement with the upper edge of the wall 33 of the transfer chute and the flap 42 being in engagement with the upper edge of the wall 34 of said chute. The shoe 36 is preferably carried by two spaced bolts 43 which are secured to the shoe and are extended upwardly for passage through two registering apertures formed in two spaced cross members 44. A helical spring 45 is arranged about each of the bolts 43 and has its ends bearing against the top of the shoe and the under surface of the cross member, whereby the shoe is held in adjusted position under tension of the springs. The upper ends of the bolts extend through the cross members and each of them has an adjusting wing nut 46 screwed thereon.

The transfer chute is formed with a body 52 having upstanding walls 50 and 51 enclosing the walls 33 and 34 of the transfer chute. The body walls 50 and 51 are in spaced relations with the chute walls 33 and 34, respectively, thereby providing channels for the passage of the carton flaps 41 and 42 as they are being folded down toward the sides of the carton. Since these flaps are of different widths, the adjacent walls are spaced to accommodate the flaps. Carried upon the inner faces of the body walls 50 and 51 are flap-engaging members 53 and 54, respectively. These members are pivoted at their advance ends to the walls 50 and 51 at a slight distance above the upper edges of the walls 33 and 34 of the transfer chute and are therefore inclined downwardly as they extend rearwardly in the direction of movement of the carton. The free edges of the flap-engaging members slightly overhang the upper edges of the walls 33 and 34 of the transfer chute and thus engage the flaps 41 and 42 as they leave the shoe 36 and serve to continue the bending-over movement of the flaps as the carton is moving toward the discharge end of the transfer chute. The inner edges of the flap-engaging members are curved or tapered, and the upper engaging edges of the walls of the transfer chute are likewise tapered so as to cause the flaps to smoothly conform to the bent shape given them by the shoe 36 and the flap-engaging members 53 and 54 and to finally bring them to a position where they are substantially folded against the side of the carton as the same reaches the end of the transfer chute. The ends of the flap-engaging members and the surfaces of the walls of the transfer chute are so adjusted as to hold the flaps in their final position ready for entrance into the stamp-imprinting machine. Each of the flap-engaging members is adjusted by means of a wing nut 55, carried at the outer end of a bolt 56 attached to the member and passing through a slot 60 formed in the body walls 50 and 51.

It has been found desirable to move the cartons manually during the severing and flap separating operation, but in order to facilitate movement of the severed cartons through the transfer chute, I have provided a power feeding device. Such device comprises two oppositely arranged feed belts 61 and 62 engaging spaced pairs of upper feed belt pulleys 63 and 64 and rotatable in a horizontal plane. The pulleys 63 and 64 are carried by vertically arranged feed belt shafts 65 and 66. The shafts 66 are mounted in feed belt shaft bearings 70 secured preferably to the bottom 32 of the transfer chute 10. Each shaft 65 is preferably mounted in a pair of spaced shaft bearings 71 secured to opposite sides of the chute and to an extension 72 thereof. A pair of lower feed belt pulleys 73 are mounted on the lower ends of the feed belt shafts 66 and are driven by means of drive shaft belts 74 which pass over drive shaft pulleys 75 carried by the drive shaft 76. This drive shaft is arranged in a horizontal plane and the drive shaft belts 74 are twisted so as to conduct power from the drive shaft to the feed belt shafts 66. The drive shaft carries a driven pulley 80 which is connected to the drive pulley 81 of the motor 82 by means of a drive

belt 83. The drive shaft is carried in suitable bearings 84, which are secured preferably to the bottom surface of the bottom 32 of the transfer chute 11.

As shown in Figs. 4 and 5, the feed belt pulleys are mounted in suitable recesses 85 formed through the walls 33 and 34 of the transfer chute, and the inner face of each of the feed belts is preferably located in a longitudinal recess 86 formed in the inner face of each of said walls. In order to secure proper frictional contact of the faces of the belts with the carton as it is being fed through the transfer chute, I preferably place a button 90 of some sort behind each of the belts and within and at the bottom of each of the recesses 86 of the walls and preferably near the end of the belt recess in order to press those portions of the belts opposite the buttons outwardly into contact with the carton as shown in Fig. 5.

The parts of my device are so arranged that the severing flap-separating action on the carton is accomplished by manual movement of the carton and the first severed carton is carried into the transfer chute by the movement of the next manually fed carton as it is being severed. The first carton, therefore, is brought into engagement with the point of the shoe 36, which serves to open the flaps thereof by the movement of the next succeeding carton as it is being severed, so that the operator can be assured that the flaps are properly engaged by the shoe before the power feeding means is brought into operation. The third carton as it is manually moved through the cutter chute serves to cause the opposite side faces at the end of the first carton to engage the feed belts 61 and 62, whereby the carton will be moved forwardly by the belts until it has reached a position where its trailing end has passed the pulleys 64. After this end of any carton has passed these feed pulleys, it will remain stationary in the transfer chute until it is fed forwardly into the stamp-imprinting machine by the movement of the next succeeding carton.

The stamp-imprinting machine may be of any well-known type, and for convenience of illustration I have shown but the apron 91 thereof which is arranged at the ends and preferably underneath the extended walls 33 and 34 of the transfer chute.

From the foregoing it will be obvious that the cartons, after having been removed from the packages in which they are received from the manufacturer, are fed one at a time by hand through the cutting chute 10 where the flaps are loosened from each other and the ends of the carton are severed. Without change of position, the first severed carton is fed by the movement of the next succeeding carton as it is being fed into the transfer chute and, as a third carton is being severed, the first carton has engaged the unfolding shoe 36 and the feed belts 61 and 62, whereupon it is automatically carried through the transfer chute and deposited in a position at the ends of the extended walls 33 and 34 of such chute where it is ready to be fed into the stamp-imprinting machine by the belt-fed movement of the next succeeding carton. It will thus be seen that by means of my invention that the carton has to be handled but once by the operator and that its relative position is not changed from the time it is fed into the cutting chute until it emerges from the stamp-imprinting machine. Obviously, after emerging from the stamp-imprinting machine the flaps of the carton may then be sealed by any well-known means which are not shown or described since they do not form part of my invention.

Obviously, while I have shown and described two separate chutes, it will be understood that one continuous chute may be employed if desired. Furthermore, a rotary knife may be employed instead of the flat knife shown and described. These, and other modifications of the details herein shown and described may be made without departing from the spirit of my invention or the scope of the appended claims, the form shown being merely a preferred embodiment thereof.

What is claimed is:

1. A carton handling device comprising a chute for periodically receiving manually fed cartons so positioned as to have their longitudinal flaps disposed upwardly, said chute having spaced vertical walls for guiding and supporting a carton while being severed by movement thereof through the chute, and a single stationary knife supported solely by one of said walls and extending obliquely across the chute for registration with the joint between the longitudinal flaps to break the seal therebetween, said knife having a single cutting edge facing the advancing end wall of the carton and so positioned as to have its free end extending away from such advancing end for obliquely cutting through such end wall from the advancing vertical edge at one longitudinal side of the carton toward the vertical edge of the opposite longitudinal side thereof, said knife serving to break the adhesive at the joint between the longitudinal flaps of the carton and to cut through the rear end wall of the carton from the inside outwardly.

2. A carton handling device comprising a chute for periodically receiving manually fed cartons so positioned as to have their longitudinal flaps disposed upwardly, said chute having spaced vertical walls for guiding and supporting a carton while being severed by movement thereof through the chute, a single stationary knife supported solely by one of said walls and extending obliquely across the chute for registration with the joint between said longitudinal flaps to break the seal therebetween, said knife having a single cutting edge facing the manually fed carton for cutting the end wall at the advance end of the carton inwardly from the outside, breaking the adhesive at the joint between said flaps, and cutting the opposite end wall outwardly from the inside thereof as the carton is manually moved through said chute, and a stationary guide carried by the chute in advance of said knife, said guide being supported independently of said knife, and having its guiding edge facing the advancing carton for positioning and maintaining the carton flaps in registration with said knife during the travel of the carton under the guide.

3. A carton handling device comprising a chute, said chute having a vertically arranged wall for supporting a hand fed carton against lateral movement, a vertically arranged helical spring supported by a stationary part of said chute, a fixed bolt passing through said spring, a single stationary knife having an aperture for engagement with the upper end of said bolt, said knife having its cutting edge facing the advancing carton and arranged at substantially right angles to the axis of the bolt, said knife bearing against and being supported in a substantially horizontal plane upon the upper end of said spring, and an adjusting nut mounted

upon the upper end of the bolt and bearing against the upper surface of the knife for placing said spring under compression and for adjusting the vertical position of said knife.

4. A carton handling device for opening and feeding cartons to and through a stamp-imprinting machine, comprising a cutter chute, a transfer chute in longitudinal arrangement with said cutter chute, a vertically arranged helical spring suported by a stationary part of said cutter chute and having its upper end extending above walls of said cutter chute, a fixed bolt passing through said spring, a single stationary knife having an aperture for engagement with the upper end of said bolt, said knife bearing against and being supported in a substantially horizontal plane solely by the upper end of said spring, an adjusting nut mounted upon the upper end of said bolt and bearing against the upper surface of the knife for placing said spring under tension and for adjusting the vertical position of the knife, whereby it will engage the forwardly moving carton at the joint between the flaps and thereby loosen the flaps for folding about the two upper longitudinal edges of the carton to expose the packages contained therein, a shoe carried by the transfer chute and disposed in the path of travel of the moving carton for engagement with the underside of said flaps to unfold them, said transfer chute having spaced walls, a body for said transfer chute having vertical spaced walls enclosing and being substantially coextensive with said transfer chute walls, said body walls being spaced from said transfer chute walls, and folding means carried by said body walls and disposed within the space between them and the transfer chute walls, said folding means being located above and cooperating with transfer chute walls to fold the flaps downwardly toward the side walls of the carton around the longitudinal edges thereof for passage through the stamp-imprinting machine.

5. A carton handling device comprising a chute, a single stationary cutting knife carried by said chute, said knife having a forwardly facing cutting edge for co-action with the carton as it is manually fed through the chute for breaking the seal between the carton flaps and for severing the end wall at the advance end of the carton inwardly from the outside, and for severing the wall at the opposite end of the carton outwardly from the inside, thereby forming loose flaps along the two upper longitudinal edges of the carton, a shoe carried by the chute and disposed in the path of travel of the moving carton for engagement with the undersides of said flaps to unfold them, said shoe being spaced from the cutting knife a distance greater than the length of a carton, whereby the carton may be stopped in its manual travel after passing the knife and before engaging the shoe, vertically spaced body walls surrounding a portion of said chute, said body walls being in spaced relation with the chute walls, folding means carried by said body walls and disposed within the space between them and the chute walls for cooperation with the chute walls to fold the flaps of the carton downwardly toward the side walls thereof, and traveling belt means disposed in the side walls of the chute for frictional engagement with the opposite sides of the carton, said belt means having their advance ends positioned at a point in the chute substantially midway the shoe, whereby after the flaps of the carton become initially engaged with the shoe, the carton will be automatically fed through the chute, the opposite active ends of the belts being disposed inwardly from the end of the chute a distance equal substantially to the length of the carton, whereby the carton will come to rest after passage through the automatic feeding device.

EUGENE C. BURHANS.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,484,722	Lawson	Feb. 26, 1924
1,953,098	Becker	Apr. 3, 1934
2,089,774	Wachstein	Aug. 10, 1937
2,162,053	Blatt	June 13, 1939
2,216,884	Kott	Oct. 8, 1940
2,536,421	Burhans	Jan. 2, 1951