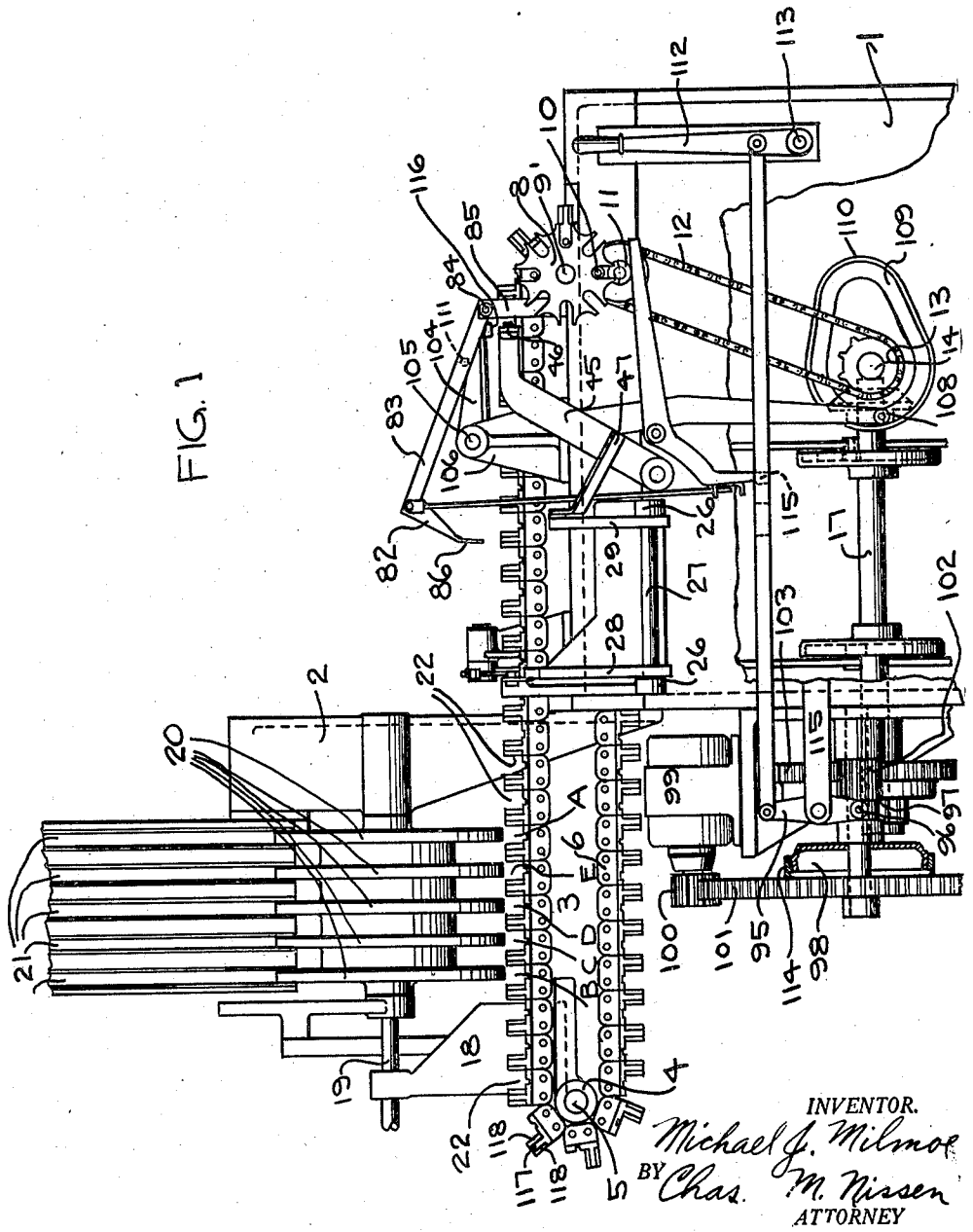
Feb. 4, 1936. M. J. MILMOE 2,029,933

RAZOR BLADE PACKAGING MACHINE

Filed July 3, 1929 7 Sheets-Sheet 1

FIG. 1



Feb. 4, 1936. M. J. MILMOE 2,029,933

RAZOR BLADE PACKAGING MACHINE

Filed July 3, 1929 7 Sheets-Sheet 2

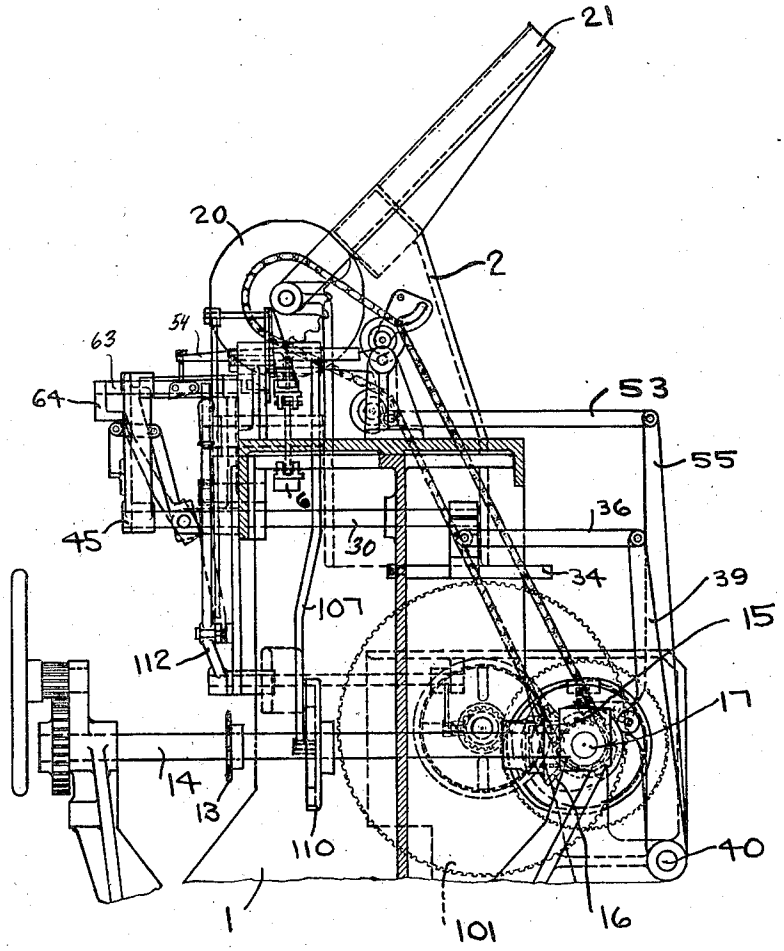


FIG. 2

INVENTOR.
Michael J. Milmoe
BY Chas. M. Nissen
ATTORNEY

Feb. 4, 1936. M. J. MILMOE 2,029,933

RAZOR BLADE PACKAGING MACHINE

Filed July 3, 1929 7 Sheets-Sheet 3

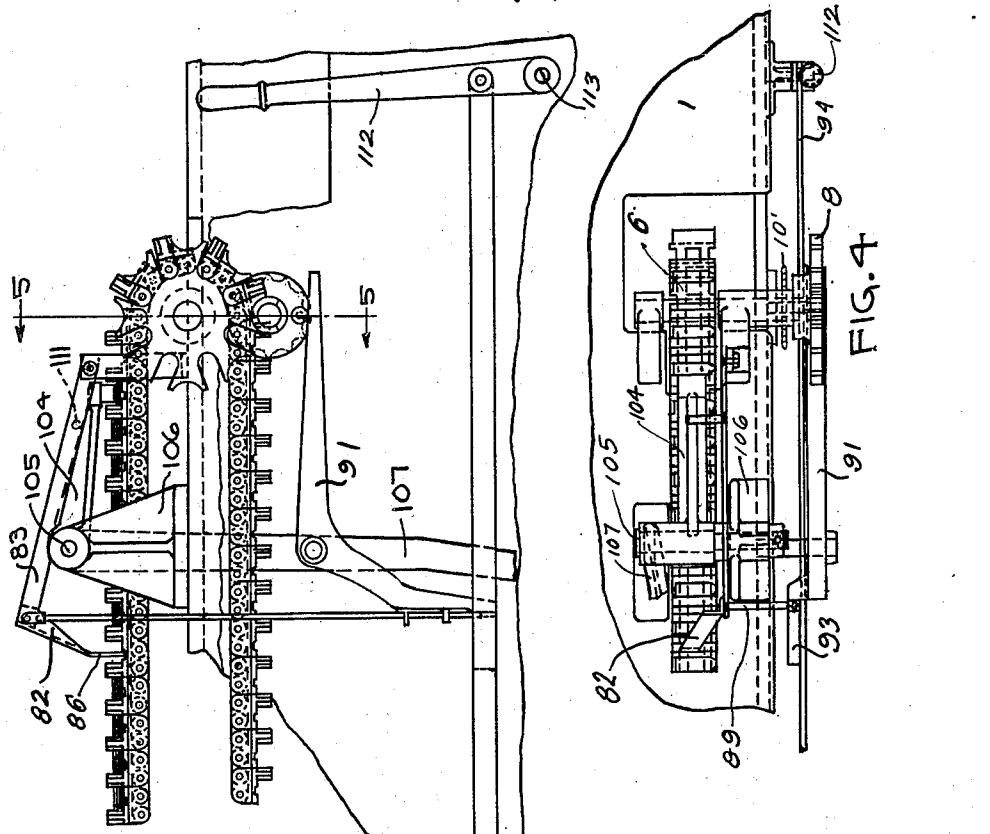


FIG. 4

FIG. 3

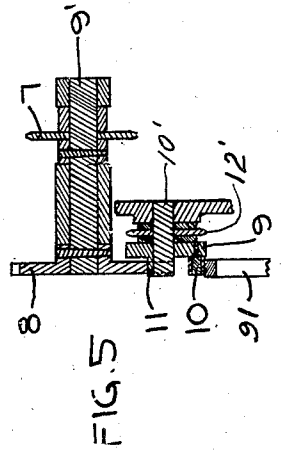


FIG. 5

INVENTOR
Michael J. Milmoe
BY Chas. M. Nissen
ATTORNEY

Feb. 4, 1936. M. J. MILMOE 2,029,933

RAZOR BLADE PACKAGING MACHINE

Filed July 3, 1929 7 Sheets-Sheet 4

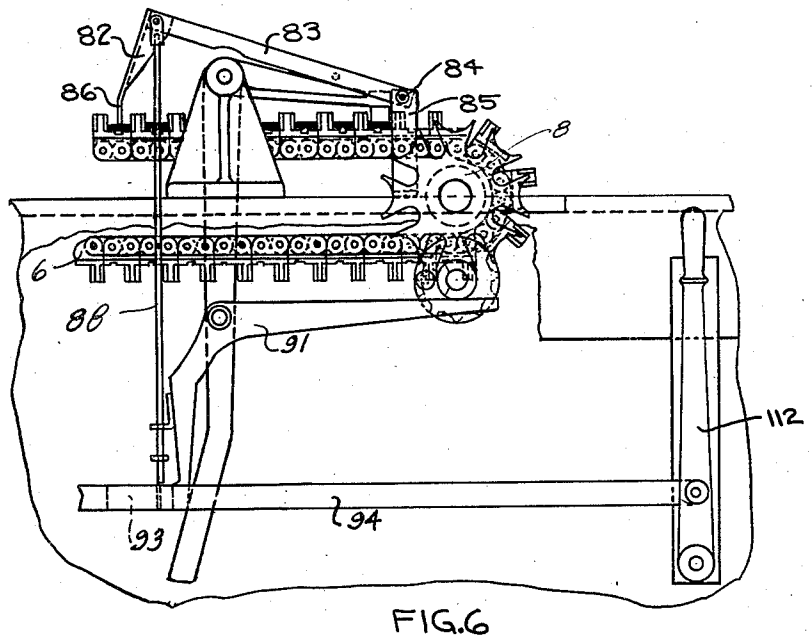


FIG.6

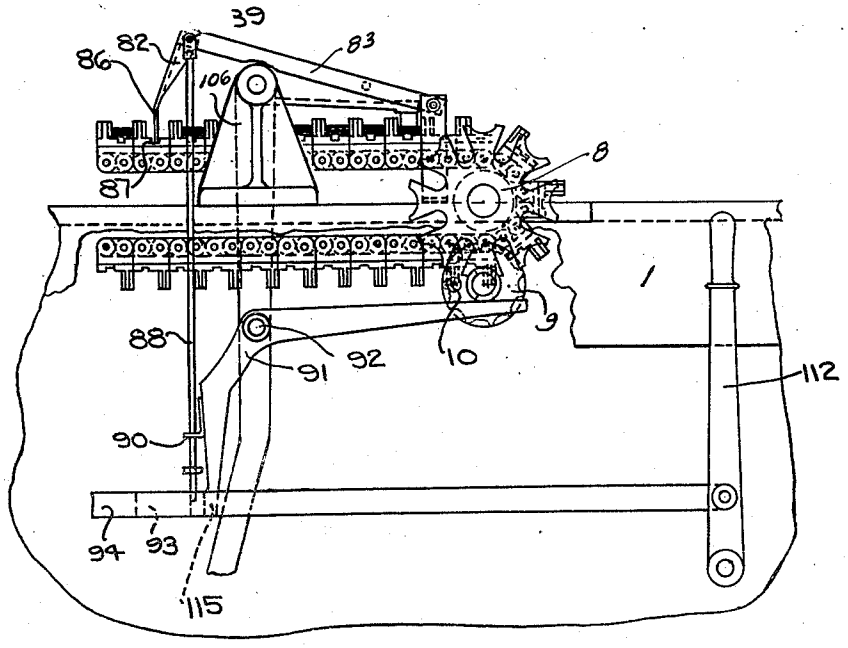


FIG.7

INVENTOR.
Michael J. Milmoe
BY Chas. M. Nissen
ATTORNEY

Feb. 4, 1936. M. J. MILMOE 2,029,933

RAZOR BLADE PACKAGING MACHINE

Filed July 3, 1929 7 Sheets-Sheet 5

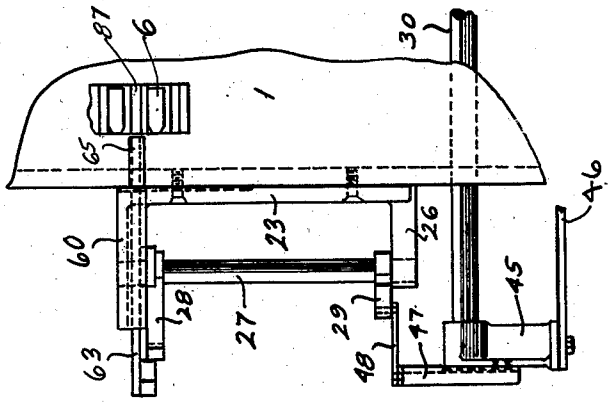


FIG. 9

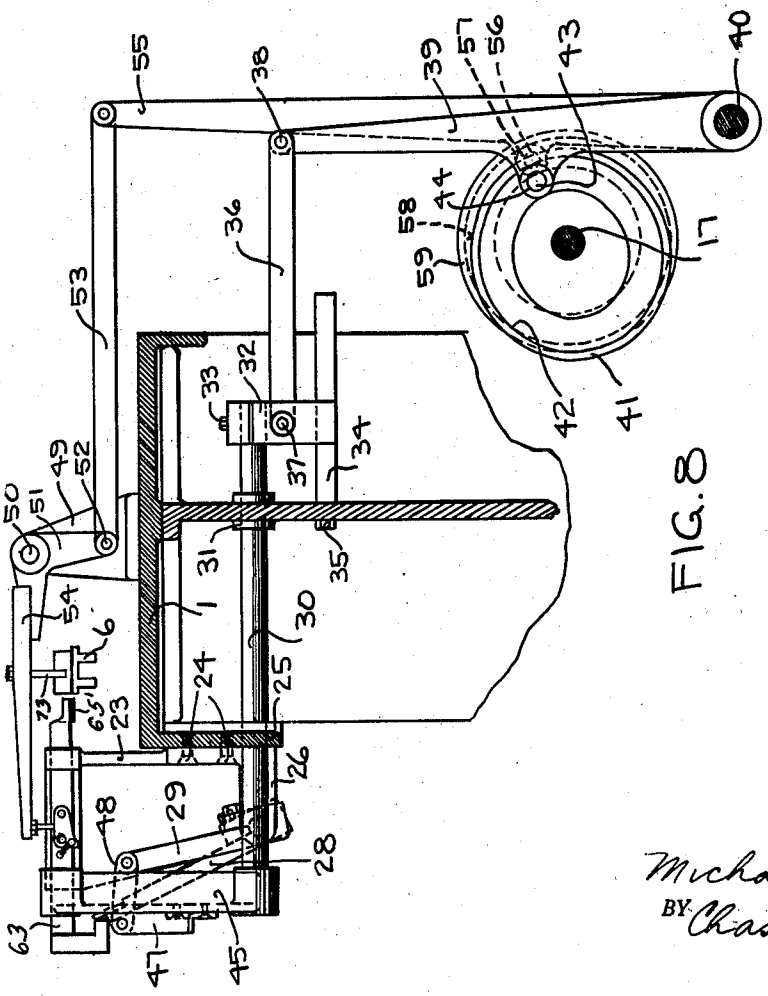


FIG. 8

INVENTOR.
Michael J. Milmoe
BY Chas. M. Nissen
ATTORNEY

Feb. 4, 1936. M. J. MILMOE 2,029,933

RAZOR BLADE PACKAGING MACHINE

Filed July 3, 1929 7 Sheets-Sheet 6

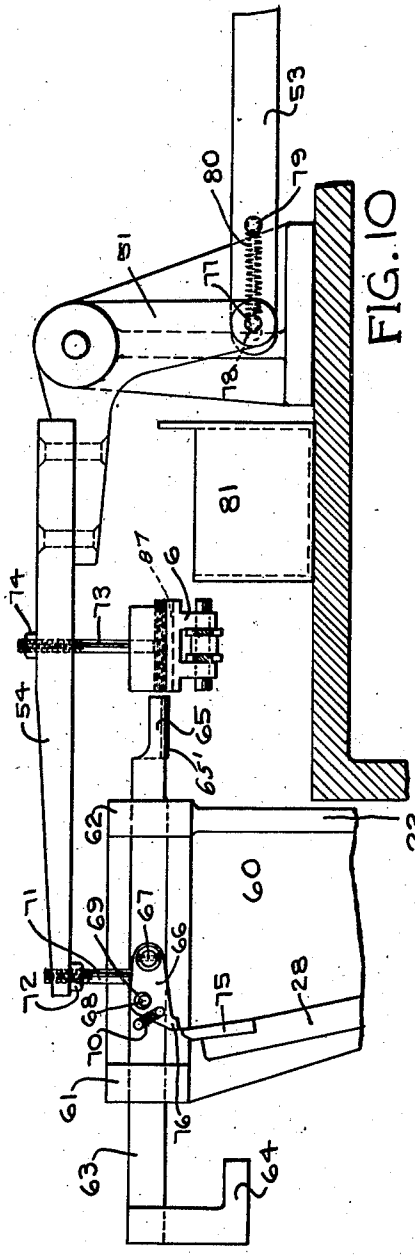


FIG. 10

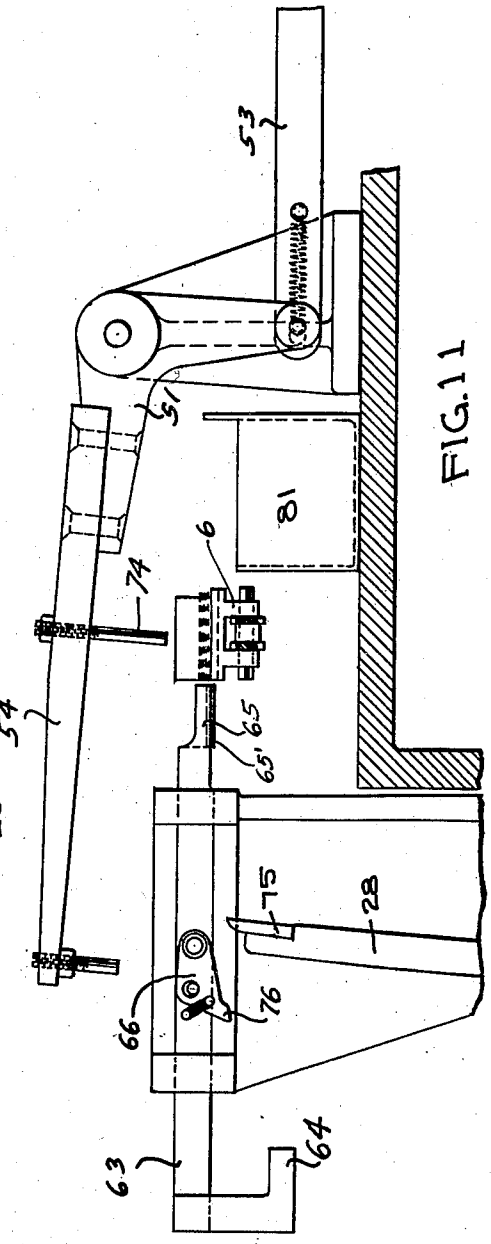


FIG. 11

INVENTOR
Michael J. Milmoe
BY Chas. M. Nissen
ATTORNEY

Feb. 4, 1936. M. J. MILMOE 2,029,933

RAZOR BLADE PACKAGING MACHINE

Filed July 3, 1929 7 Sheets-Sheet 7

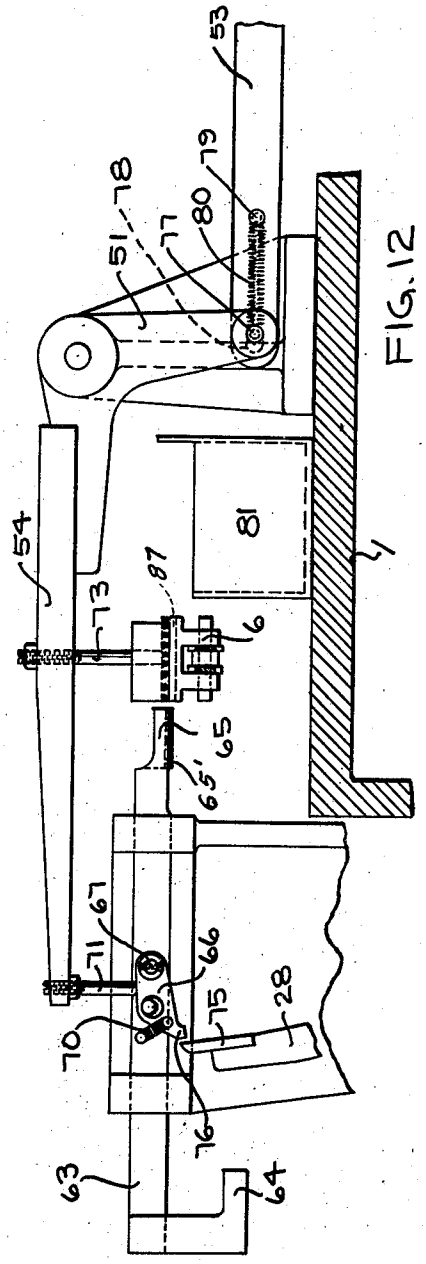


FIG. 12

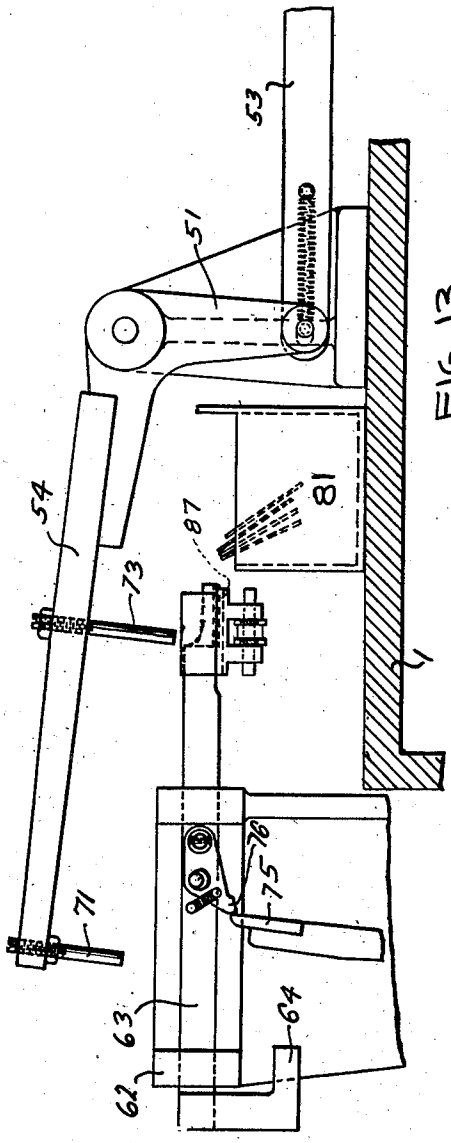


FIG. 13

INVENTOR
Michael J. Milmoe
BY Chas. M. Nissen
ATTORNEY

Patented Feb. 4, 1936 2,029,933

UNITED STATES PATENT OFFICE

2,029,933

RAZOR BLADE PACKAGING MACHINE

Michael J. Milmoe, Chicago, Ill., assignor to F. B. Redington Company, Chicago, Ill., a corporation of Illinois

Application July 3, 1929, Serial No. 375,616

40 Claims. (Cl. 226—14)

The present invention relates to a machine which is adapted to place a predetermined number of articles within a carton, and the embodiment shown illustrates how this invention is adapted to be used in a machine for placing safety razor blades in cartons. Ordinarily, in machines of this type, means are provided for depositing a plurality of articles in a pocket or on a support in stacks and other means are provided for moving these stacks of articles into cartons. It is very important in machines of this nature that the correct number of articles be placed in each carton and especially that there are at least the advertised number of articles in each carton.

One object of this invention, therefore, is to provide a means for detecting when a stack of articles contains less than the required number of articles so that none of the stacks which contain less than the required number of articles will be inserted in any of the cartons.

Another object of this invention is to provide a means for ejecting each and every stack of articles from the support upon which they are mounted, into some suitable receptacle other than the cartons in which the stacks are normally to be placed. Articles collected in the receptacle are later placed in the feeding machine which feeds the articles into stacks on the support.

Another object of this invention is to stop the operation of the machine as soon as a stack of articles is ejected from said support into said receptacle to enable the operator to place a stack containing the correct number of articles in the place of the stack ejected from the support.

Referring more particularly to the drawings:—

Fig. 1 is a front elevation of a machine embodying my invention;

Fig. 2 is an end elevation thereof;

Fig. 3 is an elevational view of the device for stopping the machine after one of the stacks of articles has been ejected from the conveyer;

Fig. 4 is a plan view of part of the mechanism shown in Fig. 3;

Fig. 5 is a cross section taken along the line 5—5 of Fig. 3;

Figs. 6 and 7 are views similar to Fig. 3 showing the parts in various positions of adjustment;

Fig. 8 illustrates the manner in which a stack of articles is ejected from the conveyer when it is found that said stack contains less than the required number of articles;

Fig. 9 is a plan view of part of the mechanism shown in Fig. 8; and

Figs. 10 to 13, inclusive, show part of the ejecting mechanism shown in Fig. 8 but with the various members of this mechanism in different positions of adjustment.

My invention is shown embodied in a machine for packaging safety razor blades. These blades are relatively thin and it is very difficult to detect by means of the eye when less than the required number of blades are in a stack, especially in view of the fact that the machine operates very rapidly. However, it is very important that at least the required number of blades be inserted in a carton since a customer is often displeased, and rightfully so, when he discovers that a carton contains less than the advertised number of blades. It often happens that the feeding means does not form a stack having at least the advertised number of blades due to the fact that the supply of blades in the feeding mechanism runs out or due to the fact that a blade is not picked up by one of the conveyers in the feeding mechanism. It is rarely the case that the stack of articles contains more than the required number of blades and even if it did, there would be very little necessity for providing means to detect this as a customer is seldom displeased by receiving more than the required number of articles. The manufacturer, on the other hand, loses very little by having an extra blade occasionally inserted in a package. Therefore, the main object of this invention is to provide means for insuring that at least the minimum advertised number of blades will be inserted in each carton.

Referring more particularly to Fig. 1, it will be seen that the machine comprises a frame 1 having a suitable base (not shown) for supporting the frame in an upright positon. This frame 1 is substantially T-shaped in cross-section, as will be readily seen from an inspection of Fig. 2, and is adapted to support practically all of the elements connected with the operation of this machine. I have shown a bracket member 2 rigidly supported on one end of the frame 1. This bracket member 2 carries a projecting member 3 which has a bearing member 4 rigidly fastened thereto and this bearing member 4 is adapted to support a shaft 5 which carries a sprocket over which a conveyor chain 6 having pockets 22 therein is trained, said chain also being supported by a second sprocket 7 (Fig. 5) which is located behind the Geneva gear 8 and is mounted on the shaft 9' which is the same shaft which supports said Geneva gear. Both the Geneva gear and the sprocket are rigidly fastened to the shaft 9 as best illustrated in Fig. 5 so that whenever the Geneva gear is rotated, the sprocket 7 will rotate therewith, and, as a result, cause

the chain to move in the same direction as the teeth on the sprocket.

The chain 6 is moved intermittently by means of the Geneva gear 8 and co-operating gear 9 which is mounted on shaft 10' and carries the pin 10 and the segmental portion 11, as in the usual Geneva gear construction. The gear 9 is given a continuous movement of rotation by means of the chain 12 driven from the sprocket 13 mounted on the shaft 14 and trained over sprocket 12' rigid with shaft 10', the shaft 14 being driven directly by means of co-operating bevel gears 15 and 16 mounted on the main drive shaft 17 and the shaft 14, respectively. The continuous rotation of the gear 9 imparts an intermittent rotation to the gear 8 in a manner which is well understood since the type of Geneva movement shown is one which is old and well known.

The extension 3 carries a bracket 18 and this bracket together with the bracket 2 supports the rotatable shaft 19 which carries a plurality of wheels 20 for feeding razor blades to the conveyer chain 6. These wheels 20 are diagrammatically shown in Fig. 1 and receive razor blades from hoppers 21 arranged in alinement therewith. This means for feeding the razor blades to the conveyer is only diagrammatically illustrated in the drawings in view of the fact that it forms no part of the invention herein disclosed but is shown merely for the purpose of illustrating that some sort of automatic means is used to feed the articles to the conveyer. For a complete description of the feeding means, it is only necessary to refer to my patent, No. 1,711,647, on a Feeding mechanism, issued on May 7, 1929. Briefly, however, it might be stated here that each of the wheels 20 is so timed with relation to the intermittent movements of the conveyer 6 that each will deposit a single blade in the adjacent pocket 22 of the conveyer between each successive movement of the conveyer. Each successive movement of the conveyer 6 moves a pocket from the position illustrated to the position occupied by the pocket directly in front thereof. Thus, it will be seen that each pocket will receive a blade from each of the wheels 20 and if five wheels are used, each pocket to the right of and including the pocket indicated at A should have five razor blades therein and the pockets B, C, D and E should have 1, 2, 3 and 4 blades therein, respectively, after each feeding of blades into the pockets adjacent the wheels 20.

Sometimes, however, one of the wheels 20 does not deposit a blade in the pocket located directly therebelow; and, consequently, when the pockets leave the position A, they contain less than the required number of blades. Due to the fact that the conveyer moves rather rapidly and also due to the blades being very thin, it is very difficult to determine by observation whether or not each pocket contains the required minimum number of blades and it is necessary to provide an automatic means for that purpose. This automatic means not only detects when a pocket contains less than the required number of blades but also provides a means for ejecting all of the blades from the pocket which contains less than the required number so that the operator can insert a stack of blades in said pocket without the necessity of first determining the number of blades missing from the stack in the pocket. It is not necessary to stop the machine in order that the operator may be able to place the required number of blades in the vacant pocket but in the event that he fails to place the required number of blades in a vacant pocket before it reaches a predetermined position, an automatic stop mechanism on the machine will stop the movement of the chain so that the pocket can be filled before it reaches the position where an ejector is provided for moving blades in a pocket into a carton adjacent said position.

I will first proceed to describe the means for detecting when there is less than the required number of blades in a pocket. This means is best illustrated in Figs. 1 and 8 to 13, inclusive, and comprises a plate 23 fastened by means of the screws 24 to the apron 25 on the frame 1. This plate 23 has upstanding brackets 26 rotatably supporting a shaft 27 to which the arms 28 and 29 are rigidly fastened so as to constrain said arms to move with the shaft 27.

In order to impart movement to the shaft 27, I provide a rod 30 slidably mounted in suitable bearings in the apron 25 and in the boss 31. The bracket 32 is rigidly clamped to the rod 30 by means of the screws 33 and a guide 34, fastened to the frame 1 by the bolt 35, is adapted to engage a groove in the lower end of the bracket 32 to prevent the rod 30 from rotating in its bearings. A link 36 has one of its ends pivotally connected as at 37 to the bracket 32 and has the opposite end thereof pivotally connected at 38 to the arm 39 rotatably mounted on the shaft 40 which is arranged in substantially parallel relation with the shaft 17. The shaft 17 has a cam 41 rigidly fastened thereto, said cam having a cam groove 42 for receiving a roller mounted on the shaft 43 carried by an extension 44 on the arm 39. Thus, it will be seen that rotation of the shaft 17 imparts an oscillating movement to the arm 39 about the shaft 40 and this oscillating movement of the arm 39 imparts a reciprocating movement to the rod 30. The cam groove 42 is so designed as to move the rod 30 to the right (Fig. 8) just after the conveyer comes to rest, and to cause the shaft 30 to move to the left just before the conveyer again begins its movement.

The rod 30 is provided with the bracket 45, rigidly fastened to the end opposite to that on which the bracket 32 is mounted, and is adapted to carry an ejector 46 which moves the articles from the pockets into the cartons in a manner well known in the art to which this invention pertains. Rigidly fastened to the bracket 45 is an arm 47 pivotally connected by means of a link 48 to the arm 29 so that as the rod 30 reciprocates, the arm 29 is given a rocking movement about the axis of the shaft 27 and this in turn causes a rocking movement of the arm 28 for a purpose I will later describe.

Referring to Fig. 8, it will be noted that the frame 1 carries a bracket 49 and that a shaft 50 supported thereby carries a bell crank lever 51 which has one arm thereof pivoted at 52 to the link 53 and which has an extension 54 rigidly connected to the other arm thereof. Movement is imparted to the bell crank lever 51 by means of the link 53 due to its connection with the oscillating arm 55 rotatably mounted on the shaft 40. This oscillating arm 55 is similar to the oscillating arm 39 and is oscillated by means of a roller 56 on extension 57 thereof operating in a groove 58 of the cam 59 rigidly fastened to the shaft 17. The cam groove 58 is so designed as to impart a counter-clockwise rotation of the bell crank lever 51 just after the chain comes to rest and to impart a clockwise rotation to said bell crank prior to the time when the chain again begins to move. Thus, it will be seen that the arm 28 begins its

clockwise rotation toward the chain 6 at about the same time that the bell crank lever 51 begins a counter-clockwise rotation about the shaft 50 to move the extension 54 toward the chain 6.

Fig. 10 illustrates the position of the arm 28 and extension 54 shortly after they have begun their movement toward the chain 6. The plate 23 carries an integral bracket member 60 having bearings 61 and 62 for slidably supporting the ejector bar 63 which is non-rotatably mounted in said bearings and carries a lug 64 at one end thereof, the opposite end being provided with a head 65 for ejecting articles from the pockets 22 of the conveyer. The head 65 has a tongue 65' located on the under side thereof and is adapted to slide in the groove 87 (Fig. 7) so as to make sure that the edges of all blades in the pocket are engaged by the ejector head 65 or ejector 46 which is similar to ejector 63, as said ejectors move into the pockets. An arm 66 is pivoted on a stud 67 mounted on the ejector bar 63 and a pin 68 extends through an opening 69 in the arm 66, said opening being substantially larger than the pin 68 so as to permit a slight rocking movement of the arm 66 about the stud 67. A spring 70 normally holds the arm 66 in the position illustrated in Fig. 10 and this arm is adapted to be moved downwardly against the action of the spring 70 by means of a pin 71 adjustably mounted on the end of the extension 54 and locked in place by means of the lock nut 72. A second adjustable pin 73 is mounted intermediate the ends of the extension 54 and is held in place by means of the lock nut 74.

Fig. 10 illustrates a pocket provided with the correct number of blades therein and the pins 73 and 71 are adjusted so that when the lower end of the pin 73 is just touching the topmost blade of the stack in the pocket, the lower end of the pin 71 is just resting upon the upper surface of the arm 66 and thus, no movement will be imparted to the arm 66 when the link 53 moves the bell crank 51 in a counter-clockwise direction. This permits the plate 75 on the end of the arm 28 to pass by the lug on the arm 66 without engaging the same. Therefore, it will be seen that when the correct number of blades are in the pockets of the conveyer, the plate 75 will not engage the lug 76 as the arm 28 moves to the right, and, consequently, the ejector bar 63 will not be operated and the blades will remain in the pockets.

The link 53 is connected to the bell crank 51 by means of a lost-motion connection which comprises a pin 77 mounted rigidly on one of the arms of the bell crank 51 and adapted to pass through a slot 78 arranged longitudinally of the link 53 at one end thereof. A second pin 79 is rigidly fastened to the link 53 and a spring 80 normally holds the pin 77 against the right-hand portion of the slot 78.

When the correct number of blades are in the pocket beneath the pin 73, said pin will come into contact with the top blade of the stack before the link 53 has reached its full movement to the right and this will stop rotation of the bell crank 51. Thereafter, as the link 53 continues its movement to the right, the spring 80 will be extended and the pin 77 will ride in the slot 78. The cam 59 is so designed as to cause the extension 54 to begin its upward movement just after the plate 75 on the arm 28 has passed by the lug 76, as is best illustrated in Fig. 11. This is for a purpose which will later be described.

In Figs. 12 and 13, I have illustrated the operation of the mechanism just described in the event that there are less than the required number of blades in the pocket. These figures show four blades in the pocket just below the pin 73 and since this is less than the required number, it is desired to provide means to eject these blades from the pocket. As the extension 54 descends, the pin 73 will come into contact with the top blade of the stack in the pocket and since this top blade is lower than the top blade of the stack containing five blades, the pin 73 will descend farther than it would when five blades are in the pocket and, as a result, the pin 71 will also move downwardly farther than illustrated in Fig. 10. This extra movement of the pin 71 rocks the lever 66 about its pivot 67 and places the lug 76 in the path of movement of the plate 75 on the arm 28, the arm 66 moving against the action of the spring 70. Therefore, the plate 75 will come into contact with the lug 76 and since the lug 76 is connected to the ejector bar 63, this ejector bar will be caused to move to the right and as it enters the pocket 22, it will engage the ends of the blades therein and continued movement of the ejector bar to the right will cause the blades to be ejected from the pocket into the receptacle 81 provided for that purpose. The extension 54 raises the pin 73 from engagement with the blades in the pocket in ample time to permit the ejector to eject the blades from the pocket without interference, as will be seen in Fig. 13.

The lug 64 on the ejector bar 63 is provided for the purpose of replacing the ejector bar in the position illustrated in Fig. 10 after it has been moved to the position shown in Fig. 13. This lug is adapted to be engaged by the plate 75 as the same moves to the left or in a counter-clockwise direction about its pivot. At the end of the movement of the plate 75 to the left, this plate will have moved the ejector bar to its extreme left-hand position, as is best illustrated in Fig. 8. The spring 70 returns the arm 66 to its normal position as soon as the lug 76 is released by the plate 75 during its rearward movement. The parts then are in a position to operate as required by the stack of blades in the next pocket presented below the pin 73.

The operation of the device so far described merely has to do with the ejecting of the blades from the pocket in the event that there are less than the required number therein, it being obvious that where there are more than the required number of blades in the pocket, no movement will be imparted to the ejector bar 63 the same as when there are just the required number of blades therein. However, it is necessary to stop the conveyer as soon as a pocket has been emptied in order that the operator may insert therein a stack containing the correct number of blades. Otherwise, when the empty pocket comes to the position where the blades normally are ejected from the pockets into the cartons, there will be no blades in the pocket to be ejected and, consequently, the carton will not receive any blades.

After the ejector bar 63 has ejected the blades from a pocket which contains less than the required number of blades, the chain will continue its intermittent movement until the empty pocket is directly under the extension 82 of the lever 83 pivoted at 84 to a bracket 85 on the frame 1, as illustrated in Figs. 3 or 7. As the empty pocket reaches this position, the extension 82 moves downwardly and the finger 86 thereon moves into

the notch 87, as best illustrated in Figs. 3 and 7. This movement of the extension 82 causes the rod 88 to move downwardly due to the fact that the rod 88 is pivoted at 89 to the extension 82 and lever 83. The lower end of this rod 88 is guided in a bracket 90 on one arm of the bell crank lever 91 pivoted at 92 to the frame 1, the other end of the bell crank lever being arranged to engage the pin 10 on the Geneva gear 9 at each revolution of the Geneva gear. As the pin 10 engages the bell crank lever 91, the bell crank is caused to rotate clockwise about its pivot 92, and this, in turn, causes the lower end of the bell crank to move to the left, as viewed in Figs. 3, 6 and 7. This movement of the bell crank lever is instigated after the rod 88 has moved downwardly the full permitted extent of its travel. Thus, if the pocket is empty, the rod is permitted to move downwardly as far as illustrated in Fig. 7, the finger 86 limiting the downward movement of the rod 88 by the engagement of said finger with the bottom of the slot 87. In this position, the lower end of the rod 88 is arranged just to the right of a block 93 mounted on the clutch shifting link 94 connected by means of a toggle link 95 and pin 96, operating in the groove 97, to one member 98 of the clutch which connects the motor 99 in driving relation with the shaft 17 through the intermediary of the gears 100, 101, 102 and 103. The other member 114 of the clutch is rigidly attached to the gear 101.

The projection 115 on the bell crank lever 91 normally has a movement about the bell crank lever 91 which will carry said projection substantially all the way toward the block 93 but does not come into contact with the block and therefore will not shift said block and, as a result, the clutch shifting link 94, to disengage the clutch members. However, when an empty pocket presents itself below the extension 82 and the lower end of the rod 88 is thus arranged between the block 93 and the projection 115, the projection 115 will engage the lower end of the rod 88 before it completes its clockwise rotation about the pivot 92 and, as a result, the continued movement of the projection in the same direction moves the lower end of the rod 88 and the block 93 to the left, as viewed in Figs. 3, 6 and 7, thus causing the clutch members 98 and 114 to disengage, to interrupt the driving connection between the motor 99 and the shaft 17. The rod 88 is made of sufficient thickness so that when it is interposed between the block 93 and the projection 115, the projection 115 will move the clutch operating link 94 sufficiently to disconnect the clutch members 98 and 114. The thickness of the rod 88 may be varied to suit the conditions of the particular machine in which it is used. Since the Geneva gears 8 and 9 are driven from the shaft 17, it will readily be seen that as soon as the driving connection between the motor and the shaft 17 is interrupted, the conveyer chain 6 will stop and remain stopped until the operator again puts the machine in motion. Before placing the machine in motion again, he inserts a stack containing the correct number of blades in the empty pocket, it being necessary for him to first raise the lever 83 to bring the finger 86 out of the pocket. When the finger 86 is brought down upon the top of this stack of blades which the operator has placed in the previously empty pocket, the lower end of the rod 88 will not be interposed between the block 93 and the projection 115 and, consequently, the clutch operating link may be moved to the right by means of the hand lever 112 pivoted at 113, to re-establish connection between the clutch members 98 and 114 and the machine will again be set in motion and operate as previously described. The hand lever 112, of course, may be used to manually disengage the clutch members 98 and 114, as desired.

In the event that the pocket which stops directly below the extension 82 contains the correct number of blades, then it will readily be seen that the rod 88 will not move downwardly as far as illustrated in Fig. 7 due to the engagement of the finger 86 with the top blade of the stack in said pocket. The rod 88 is adjusted so that with the finger 86 in engagement with the top blade of a stack containing the correct number of blades, the lower end of said rod will be arranged entirely above the block 93 on the clutch shift link 94, as illustrated in Fig. 6. Therefore, as the bell crank lever 91 is rocked about its pivot in a clockwise direction, the link 94 will not be moved to the left, as previously described, but will remain inoperative, the clutch sections of the clutch for connecting the motor 99 in driving relation with the shaft 17 remaining in engagement and the conveyer 6 continuing its intermittent movement until an empty pocket presents itself below the extension 82.

A means necessarily must be provided to raise the lever 83 each time the chain begins to move so that the finger 86 will not interfere with the movement of the chain to its next successive position. For this purpose, I provide an arm 104 pivoted at 105 to a bracket 106 on the frame 1. This arm 104 has an arm 107 extending downwardly toward the base of the machine and this arm 107 carries a roller 108 adapted to engage the cam groove 109 of the cam 110 which is adapted to rotate with the shaft 14. The arm 104 is adapted to engage a pin 111 on the lever 83 and, as the arm 104 rotates in a counter-clockwise direction, the lever 83 will be moved upwardly due to the engagement of the arm 104 with the pin 111. The clockwise movement of the arm 104 permits the lever 83 to rotate counter-clockwise due to its own weight and the weight of the parts carried thereby. The cam groove 109 is so designed as to cause the lever 83 to be raised just prior to the time when the chain begins its movement to its next successive position so that the finger 86 will clear the partitions between the various pockets.

The arm 104 is also provided with a pressing member 116 which is adapted to engage the topmost blade of the stack of blades in the pocket which is at the position where the ejector 46 moves the blades from the pocket into the carton. The pressing member 116 engages said topmost blade close to the limit of its clockwise rotation, the remaining movement in said clock-wise direction being for the purpose of causing the pressing member 116 to press the blades firmly into engagement with each other so that as the ejector 46 begins to move the blades into the carton, they will occupy a minimum amount of space so as to enable them to enter the carton more readily. After the ends of the blades adjacent the carton have begun their movement into the carton, the pressing member 116 is raised so as not to interfere with the further movement of the ejector 46.

It will be noted that the links of the chain each carry a projection 117 having beveled portions 118 on that part of the projection which is located at the front of the machine. As the links come into alinement, the pockets 22 are formed

by means of the opposed faces of adjacent projections 117 on the links. The beveled edges on the projections are for the purpose of assisting the movement of either ejector into the pockets.

The operation of the device is as follows:—

The wheels 20 each deposit a blade in the adjacent pockets 22 of the conveyer 6 at each successive movement of said conveyer and if the correct number of blades are in the pockets 22 after they pass the position A, then the chain will continue its intermittent movement due to the fact that the pin 71 will not cause the lug 76 to move into the path of the plate 75 and thus cause the ejecting of the blades from the pockets which move successively past said ejector. If all the pockets are full as they pass the position below the extension 82, there will be no actuation of the clutch shifting link 93 for the reasons previously set forth. If, however, there are less than the required number of blades in the pocket after it passes the position A, then the blades will be ejected from this pocket and the clutch shifting link 93 will be operated as soon as any pocket which the operator does not previously fill reaches the position below the extension 83, as previously described. The operator is warned that a pocket has been emptied by the ejector bar 63 by the recoil of the ejector and if able to do so places a stack containing the correct number of blades in the empty pocket before it reaches the stop mechanism. As soon as the machine is stopped, the operator can manually lift the lever 83 and place a stack containing the correct number of blades in the empty pocket and move the clutch shifting lever 112 to re-establish the connection between the clutch members 98 and 114. The machine will then continue to function until another empty pocket is presented below the extension 82. Thus, it will be seen that a very simple arrangement has been provided for detecting when a pocket contains less than the required number of blades and for automatically ejecting the blades from the pockets which contain less than the required number of blades and for thereafter stopping the machine to permit the operator to insert the correct number of blades in the empty pocket if and when necessary.

It will be understood, however, that, if desired, I may use a different form of conveyer than that illustrated as it is possible to readily adapt this invention to other types of machines. Also, I may use various other means for imparting to the several parts of my machine the movements which I have described for said parts as the embodiment shown merely illustrates my invention as applied to a particular machine.

Also, it will be understood, of course, that while I have shown my invention applied to a razor blade packaging machine, it is equally applicable to machines for packaging other articles, whether a single article is to be placed in a carton or a plurality of articles. For instance, in machines where articles such as tooth paste tubes and the like are inserted in the pockets by hand, the operator occasionally neglects to put an article in a pocket. By providing such a machine with a stop mechanism such as that illustrated herein, the conveyer may be stopped and an article inserted before the pocket reaches the position adjacent the ejector which is adapted to move the article into a carton.

Any number of blades may comprise a stack as my device is adapted to detect when less than a desired number is in a stack regardless of the number in the stack. The detector or stopping mechanism may both be used in a machine or it may be desirable to use just one or the other.

My invention can also be used where a package containing a plurality of articles is inserted in each of the pockets. The package also may contain bulk goods or the like.

Obviously, those skilled in the art may make various changes in the details and arrangement of parts without departing from the spirit and scope of the invention as defined by the appended claims, and I therefore do not wish to be restricted to the precise construction herein disclosed.

Having thus fully disclosed an embodiment of my invention, what I claim and desire to secure by Letters Patent of the United States is:—

1. A machine of the class described comprising means for receiving a predetermined number of articles formed in a stack, a single means for detecting when there are less than the required number of articles in said stack, and a normally inoperative ejector operated by said detecting means for ejecting the stack of articles from the receiving means in the event that there are less than the required number of articles therein.

2. A razor blade packaging machine comprising a support for receiving a stack of razor blades containing a predetermined number of said blades, means for moving the support to a position where the blades are ejected into a carton, means for detecting when there is less than the required number of blades in said stack, and means for stopping the movement of said support when the detecting means detects that there are less than the required number of blades in a stack on said support.

3. A razor blade packaging machine comprising a support, a means for placing a predetermined number of blades in a stack on said support, means for detecting when a stack contains less than the required number of blades, means for moving a stack of blades off of said support when it is found to contain less than the required number of blades, and means to stop the movement of said support thereafter.

4. A packaging machine comprising a movable support adapted to support a plurality of stacks of articles thereon each stack being intended to contain a predetermined number of articles, means for moving said stacks to a position where said stacks will be ejected from said support into a carton, means for detecting when there is less than the required number of articles in any one of said stacks, and for thereafter stopping the movement of said support.

5. In a razor blade packaging machine, the combination with a movable support adapted to be intermittently moved from a loading position to an unloading position, means for placing a stack of razor blades on said support, a detector member movable to a series of detecting positions in engagement with said stack for detecting when there is less than the required number of razor blades in said stack, and an ejector member for ejecting a stack of razor blades from said support when it is found that said stack contains less than the required number of razor blades, said ejector member being adapted to operate prior to the time when said support reaches the unloading position.

6. A packaging machine for packaging a plurality of articles comprising an intermittently movable support adapted to have stacks of articles arranged thereon and movable therewith, means for intermittently moving said support to

thereby cause stacks of articles supported by said support to move to successive positions between a loading position and a normal unloading position, a detector member movable to a series of detecting positions in engagement with said stack for detecting when a stack contains less than the required number of articles, and an ejector for moving each stack which contains less than the required number of articles off of said support at one of the successive positions which said stack occupies between the loading and normal unloading position.

7. A device as claimed in claim 6 in which means is provided for stopping the movement of the support when a stack of articles containing less than the required number of articles, is moved off of said support.

8. A packaging machine comprising a support, means for stacking articles thereon in superimposed relation to form a stack, means for moving said support from a loading to an unloading position, an ejector, and means for engaging the end of said stack adapted to actuate the ejector to move the articles off of the support if and when the stack contains less than the required number of articles and before the same reach said unloading position.

9. A razor blade packaging machine comprising a conveyer, pockets in said conveyer each adapted to receive a stack of blades in superimposed relation, means for intermittently moving said conveyer so that said stacks occupy successive positions relative to the machine, an ejector member located at one of said positions for ejecting each stack of blades arriving at said position if and when it is determined that said stack contains less than the required number of blades, said ejector member being controlled by a detector member engageable with the top of said stacks.

10. A machine of the class described comprising an endless conveyer, pockets in said endless conveyer, means for intermittently moving said conveyer so that the pockets occupy successive positions, an ejector for ejecting a stack of blades from its respective pocket when said pocket arrives at one of said positions, and means for rendering said ejector operative only in the event that the stack of blades in said pocket contains less than the required number, said last named means comprising a single detector member engageable with the stack.

11. In a razor blade packaging machine, the combination with a support, of an endless conveyer mounted on said support, means for moving said endless conveyer, pockets in the conveyer for receiving stacks of blades, means for ejecting all stacks which contain less than the required number of blades from their respective pockets as said pockets are positioned adjacent the ejecting means, and means for stopping the movement of the conveyer after a pocket has been emptied.

12. In a razor blade packaging machine, the combination with a support, of an endless conveyer mounted on said support, means for moving said endless conveyer, pockets in the conveyer for receiving stacks of blades, means for ejecting all stacks which contain less than the required number of blades from their respective pockets as said pockets are positioned adjacent the ejecting means, and means for stopping the movement of the conveyer when an empty pocket in the conveyer arrives at a position other than at the position adjacent the ejecting means.

13. In a packaging machine, the combination with a conveyer adapted to support a series of stacks of articles, an arm having means thereon adapted to engage the uppermost article in each stack as said stacks arrived at a predetermined position, an ejector for ejecting a stack of articles located at said position, a continuously moving member for imparting a reciprocating movement to said ejector, means for operatively connecting said continuously moving member to said ejector to enable the ejector to eject a stack of articles off of said conveyer, and means controlled by the means which contacts with the uppermost article in the stack for establishing operative connection between said continuously moving means and said ejector if and when a stack contains less than the required number of articles.

14. In a razor blade packaging machine, the combination with a conveyer adapted to support a series of stacks of blades, an arm having means thereon adapted to engage the uppermost blade in each stack as said stacks arrive at a predetermined position, an ejector for ejecting a stack of blades located at said position, a continuously moving member for imparting a reciprocating movement to said ejector, means for operatively connecting said continuously moving member to said ejector to enable the ejector to eject a stack of blades off of the conveyer, means controlled by the means which contacts with the uppermost blade in the stack for establishing operative connection between said continuously moving means and said ejector if and when a stack contains less than the required number of blades, and means to stop the movement of the conveyer when a stack of blades has been ejected off of the conveyer by the ejector.

15. In a device of the class described, the combination with an endless conveyer, of pockets in said conveyer for receiving stacks of blades, means for moving said conveyer past a position where all stacks containing less than the required number of blades are to be moved out of the pockets in which they are located, means located at said position for moving said stacks out of their respective pockets, a continuously moving means adapted to be operatively connected to said last-mentioned means to cause said last-mentioned means to move toward the conveyer for the purpose of moving said stacks out of said pockets, and means adapted to contact with the stacks as they arrive at said position for establishing said operative connection if and when a stack located at said position contains less than the required number of blades.

16. A device such as claimed in claim 15 which includes a means for stopping the operation of the conveyer when a stack of blades has been moved out of its respective pocket.

17. In a machine of the class described, the combination with a continuously moving chain having pockets therein, a movable arm located over said chain, means for moving said arm to cause it to move toward a pocket located therebeneath, a pivoted rod carried by said arm, a clutch, a continuously moving clutch shifting lever adapted to move into close proximity with means operatively connected to said clutch, said clutch being adapted to connect the driving means for the machine to the means which drives said chain, said rod being so arranged as to be interposed between the clutch operating lever and the means which is operatively connected to the clutch when an empty pocket is presented be-

neath said arm, so that the clutch shifting lever will transmit motion to said means connected to said clutch for shifting said clutch into inoperative position.

18. Means for stopping the movement of a conveyer having a plurality of article receiving pockets therein, comprising a movable arm having an extension which is adapted to enter each pocket as it is presented at a predetermined position, a clutch operating lever and movable means for operating said lever movable relatively toward and from each other but not contacting with each other under normal conditions so that the movable means will not operate said lever, said movable arm having means carried thereby adapted to be interposed between said movable means and said lever when an empty pocket is presented at said position so that said movable means will operate said lever to release a clutch which connects the driving means with the conveyer, thereby stopping the movement of said conveyer whenever an empty pocket is presented at said position.

19. A device of the class described comprising an ejector for moving articles out of their normal position on a support, means for contacting with the articles on said support having a normal movement which will not operate said ejector when the correct number of articles are arranged on said support adjacent the ejector, said contacting means being permitted to have an extended movement which will operate said ejector when the articles on said conveyer adjacent the ejector are less than the required number.

20. In a machine of the class described, the combination with means for supporting a series of stacks of articles, of means for moving said stacks past a predetermined position to a packaging position, and an injector for ejecting all stacks off said first-mentioned means which contain less than the required number of articles before the same reach said packaging position, said ejector being inoperative to remove any stacks which are delivered at said first-mentioned position which contain at least the correct number of blades, said ejector being controlled by a single detector member engageable with said stacks.

21. In a machine of the class described, the combination with a means for supporting a plurality of groups of articles, of means for moving said groups of articles toward a packaging position, means for ejecting each and every group of articles having an unintended number therein from said supporting means before it reaches said packaging position, said ejecting means being inoperative to remove any groups from said supporting means which have at least the required number of articles therein, said supporting means being accessible for the placing of articles thereon as it approaches said packaging position.

22. In a packaging machine, the combination with means for moving a plurality of groups of articles along a normal predetermined path, of a member for moving groups of articles out of their normal path if and when said group contains an incorrect number of articles, said member being inoperative whenever there are the correct number of articles in a group, said member being controlled by a detector member movable to a series of detecting positions in engagement with said groups of articles.

23. A razor blade packaging machine comprising a support for receiving a group of razor blades and for carrying said group to a position at which said group is to be moved into a carton, and mechanism for removing a group from said support before the same reaches said position if and when said group contains less than the required number of articles, said support being accessible for the placing of blades thereon as it approaches said cartoning position.

24. In a packaging machine, the combination with a conveyor for feeding groups of articles along a predetermined path to a packaging position, of a member for engaging and ejecting from said path each and every group of articles which contain less than the desired number of articles to prevent their reaching said position without preventing the groups having at least the correct number of articles therein from reaching said position, and means for ejecting all the articles from said conveyer at said packaging position.

25. In a packaging machine, the combination with means for moving groups of articles along a predetermined path, of normally stationary means for moving a group of articles out of said path when said group contains less than the required number of articles, and a single detector member adapted to contact with each of said groups for detecting when a group contains less than the required number of articles and for thereafter actuating said normally stationary means for the purposes herein set forth.

26. A machine of the class described, comprising an endless conveyor, pockets in said endless conveyor, means for intermittently moving said conveyor so that the pockets occupy successive positions, an ejector member for ejecting a group of articles from its respective pocket when said pocket arrives at one of said positions, said ejector member being inoperative except in the event that said group contains an undesired quantity of said articles and being controlled by a detector member movable to a series of detecting positions in engagement with said group of articles.

27. In a packaging machine, the combination with a conveyer adapted to support a plurality of groups of articles, of a contact member movable to engage each group of articles at a predetermined position, a member movable in timed relation to the movement of said conveyer, an ejector for removing the articles from said conveyer at said position, and driving means carried by said ejector and said movable member adapted to be normally out of operative relation with each other but rendered operative to drive said ejector when said contact member engages a group of articles which contains an undesired number thereof.

28. In a packaging machine, the combination with a conveyer adapted to support a plurality of groups of articles, of a contact member movable to engage each group of articles at a predetermined position, a member movable in timed relation to the movement of said conveyer, an ejector for removing the articles from said conveyer at said position, driving means carried by said ejector and said movable member adapted to be normally out of operative relation with each other but rendered operative to drive said ejector when said contact member engages a group of articles which contains an undesired number thereof, and means for stopping said conveyer when a group of blades have been ejected.

29. In a packaging machine, the combination with a movable normally inoperative ejector for ejecting desired groups of articles off a carrier, of a means contacting with said groups as the same

are arranged in the path of movement of said ejector, and means for rendering said ejector operative to move along its intended path if and when said contacting means engages a group of articles having an unintended number therein.

30. In a packaging machine, the combination with a support adapted to receive a plurality of stacks of articles, of a single detector movable to a series of detecting positions and adapted to engage each of said stacks, an ejector for ejecting a stack of articles from said support, a member movable in a predetermined continuously repeating cycle, for imparting movement to said ejector, means for operatively connecting said last-mentioned member to said ejector to cause said ejector to move a stack of articles out of its normal position, and means controlled by the detector which contacts with one of said stacks of articles, for establishing operative connection between said ejector and said member which moves in said continuously repeating cycle, if and when a stack contains an undesired number of articles.

31. In a packaging machine, the combination with a conveyer movable to convey groups of articles to a predetermined position, of a movable member having a contact thereon for engaging said groups at said position, after a predetermined movement of said movable member, an ejector movable to engage a group of articles at said position and move the said group out of its position on said conveyer, a second member movable in a predetermined timed relation to the movement of said conveyer, adjustable means constrained to move with said ejector and movable into and out of a position in the path of movement of said second member, and means on said first member for moving said adjustable means into the path of said second member when a group of articles which has an undesired number of articles therein is arranged at said position thereby permitting an extended movement of said first member which causes that member to operate said adjustable means and position the same in the path of said second member.

32. In a machine of the class described, the combination with a means for moving stacks of articles to a predetermined position, of an ejector which is movable to move articles from that position, a member movable into and out of a position adjacent the position occupied by said stacks when at said position, a reciprocating member, operative connections between said ejector and said reciprocating member, means normally holding said connections inactive; means for rendering said connections active when said movable member is permitted to have a predetermined amount of movement, and means for preventing said movable member from having said predetermined amount of movement whenever a stack having the desired number of articles therein is moved to said position to intercept the movement of said movable member, stacks having other than the desired number of articles being ineffective to render said operative connections active.

33. A device as set forth in claim 32 in which a driving mechanism positively actuates said movable member through its path of movement and in which a yielding connection is provided in said driving mechanism to permit less than the intended movement of said movable member when said movable member engages a stack having a desired number of articles therein.

34. A device as set forth in claim 31 in which means is provided for returning said ejector to its inoperative position after a group of articles has been moved thereby out of its position on said support.

35. Means for stopping the movement of a conveyer having a plurality of article receiving pockets therein, comprising a movable arm having an extension which is adapted to enter each pocket as it is presented at a predetermined position, a clutch operating lever and movable means for operating said lever movable relatively toward and from each other but not contacting with each other under normal conditions so that the movable means will not operate said lever, said movable arm and movable means having a detachable connection rendered operative to connect said movable means and said lever when an empty pocket is presented at said position so that said movable means will operate said lever to release a clutch which connects the driving means with the conveyer, thereby stopping the movement of said conveyer whenever an empty pocket is presented at said position.

36. In a packaging machine, the combination with a conveyer having a plurality of pockets therein and movable along a predetermined path, said pockets being adapted to receive articles therein to be conveyed by said conveyer to successive positions along the path of movement of said conveyer, a pair of ejectors located at different positions along said path of movement of said conveyer, one of said ejectors being for the purpose of ejecting articles from said conveyer into a carton, and the other of said ejectors being for the purpose of ejecting all articles from a pocket which is incompletely filled without being operative on the pockets which contain at least the correct number of articles, and means for actuating each of said ejectors to perform its intended function.

37. In a packaging machine, the combination with a conveyer having a plurality of article receiving pockets, means for positioning a plurality of articles in each of said pockets, means for moving said conveyer to present said pockets at different positions, and a pair of ejectors adapted to operate on differently constituted groups of articles in said pockets at different positions, one of said ejectors being adapted to discharge an improperly constituted group of articles from a pocket at a given position, and the other of said ejectors being adapted to eject properly constituted groups of articles at another position and position them in a container whereby improperly constituted groups are not ejected from said conveyer into a container.

38. In a machine of the class described, means for placing a stack of superposed articles upon a conveyer, a single detector for detecting the size of the stack while on the conveyer, and an ejector controlled by said detector for ejecting the stack from the conveyer when said stack is not of predetermined size.

39. In a machine of the class described, a traveling conveyer having a pocket for receiving an article, a means operable at one position of the pocket for detecting the condition of the article and for ejecting it from the pocket when the article is not in predetermined condition, and means operable when the thus emptied pocket reaches a second position in emptied condition to stop the conveyer, the pocket being accessible between its first and second positions for the reinsertion of an article of proper condition.

40. In a machine of the class described, means for placing a stack of articles in superposed relation upon a conveyer, a detector member movable to a series of detecting positions in engagement with said stack to determine the size thereof while on said conveyer, and an ejector controlled by said detector for ejecting the stack from the conveyer when said stack is not of predetermined size.

MICHAEL J. MILMOE.