

Nov. 7, 1944.

A. F. SHIELDS

2,362,413

TAPING MACHINE

Filed May 3, 1941

3 Sheets-Sheet 1

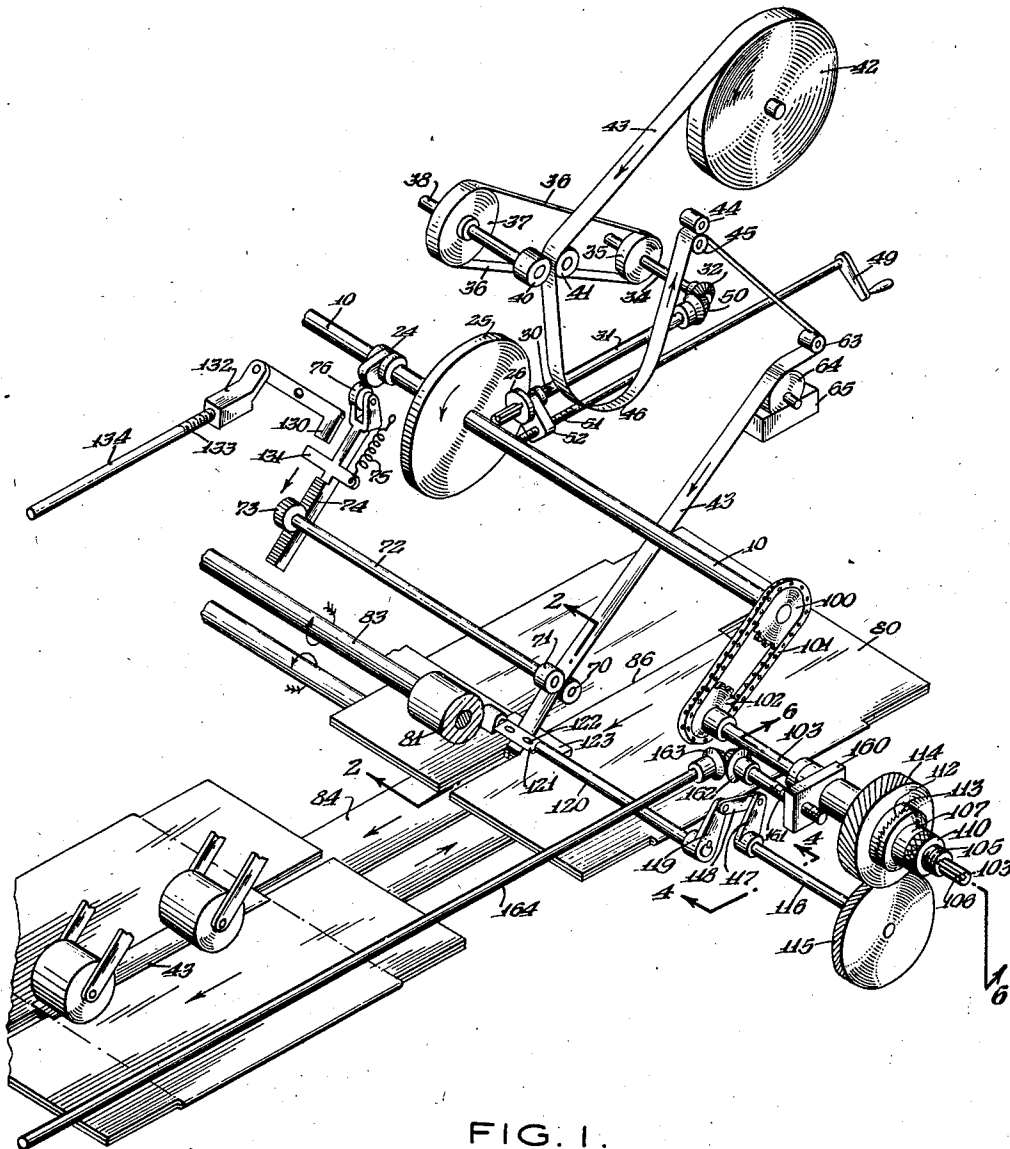


FIG. 1.

INVENTOR.
Albert F. Shields
BY
Samuel Ostrofsky
ATTORNEY.

Nov. 7, 1944.

A. F. SHIELDS

2,362,413

TAPING MACHINE

Filed May 3, 1941

3 Sheets-Sheet 2

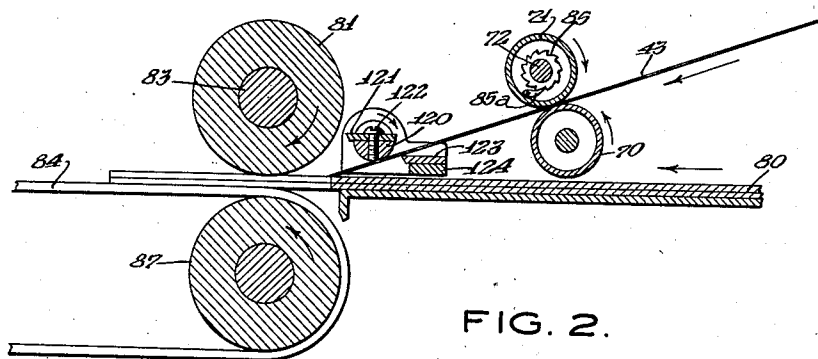


FIG. 2.

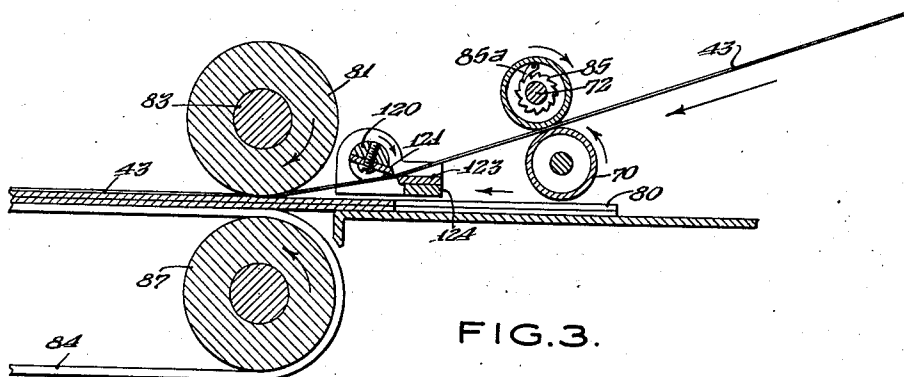


FIG. 3.

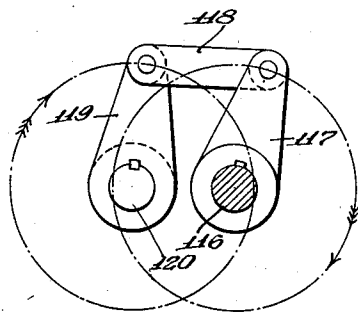


FIG. 4.

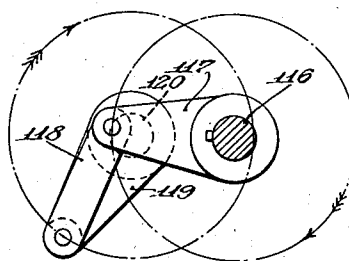


FIG. 5.

INVENTOR.

Albert F. Shields

BY

Samuel Petrovich

ATTORNEY.

Nov. 7, 1944.

A. F. SHIELDS

2,362,413

TAPING MACHINE

Filed May 3, 1941

3 Sheets-Sheet 3

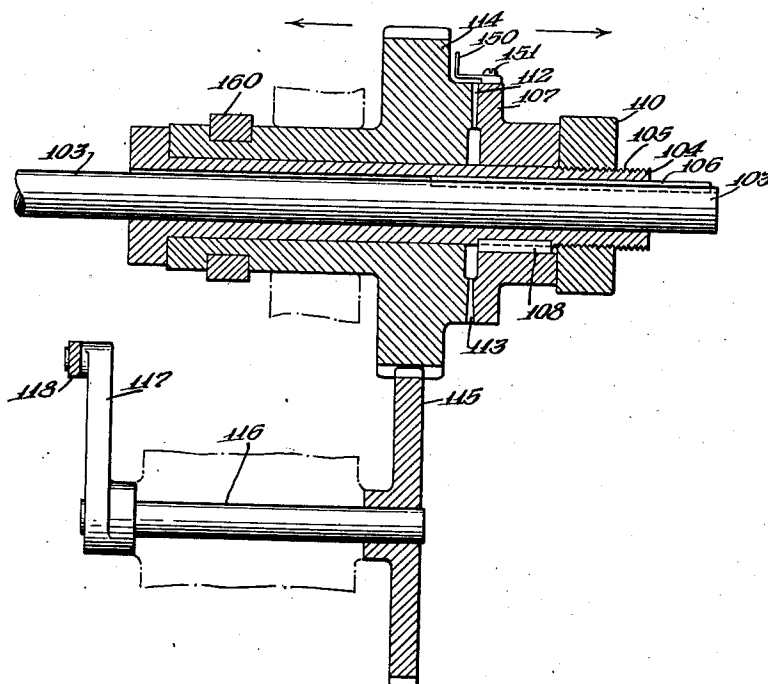


FIG. 6.

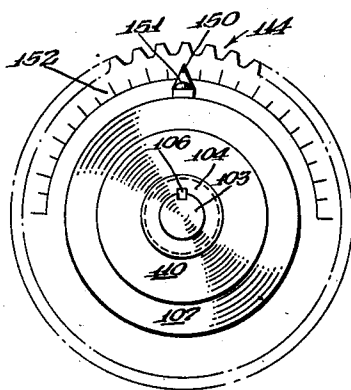


FIG. 7.

INVENTOR
Albert F. Shields
BY *Samuel C. Sturges*
ATTORNEY

UNITED STATES PATENT OFFICE

2,362,413

TAPING MACHINE

Albert F. Shields, Jamaica, N. Y., assignor to
S. & S. Corrugated Paper Machinery Co., Inc.,
Brooklyn, N. Y., a corporation of New York

Application May 3, 1941, Serial No. 391,701

17 Claims. (Cl. 93—56)

This invention relates to devices for automatically taping the seams of paper boxes, cartons or the like, and is particularly directed to mechanisms for cutting the tape to the proper lengths.

To this extent, the present application is a continuation in part of application Serial No. 198,979, filed March 30, 1938, which has matured into Patent No. 2,248,744, July 8, 1941. In this type of machine, it is preferable to deliver the tape to the carton seam in strips of definite length and to allow sufficient time between delivery of each successive strip to permit the successive cartons to be brought into position to receive the tape.

In accordance with my present invention, I provide novel cut-off mechanism for controlling the length of the tape after the same has been fed onto a predetermined portion of the advancing carton and for properly severing the tape in the required lengths.

It is further an object of my invention to provide a novel automatic tape cutting mechanism of simple construction.

Another object of my invention is to provide a novel automatic tape-cutting mechanism which is simply and accurately adjustable.

Still another object of my invention is to provide novel means for automatically cutting the tape to the length to be used for each cycle of carton seaming.

A further object of my invention is to provide novel cyclical cutting means which may be readily varied for automatically determining the interval between successive cycles of taping.

These and other objects of my invention will become more apparent in the following description of a preferred embodiment thereof taken in connection with the drawings, in which:

Figure 1 is a general view of one embodiment of my invention, shown in perspective.

Figure 2 is a detail enlarged cross sectional view taken along line 2—2 of Figure 1.

Figure 3 corresponds to Figure 2 showing a different position of the elements thereof.

Figure 4 is a detail enlarged side view partly in cross section, taken along line 4—4 of Figure 1.

Figure 5 is a view corresponding to that of Figure 4, showing a different position of the elements thereof.

Figure 6 is a cross-sectional view taken along line 6—6 of Figure 1 looking in the direction of the arrows.

Figure 7 is an end view of the dial-setting mechanism taken from line 7—7 of Figure 1.

Referring now to Figure 1, the control shaft

10 is continuously rotated by any suitable power source. A cam 24 is mounted on control shaft 10 and cooperates in the control of the feeding of the tape in a manner hereinafter described. Friction disk 25 is also mounted on the control shaft 10 and rotates friction pinion 26 slidably mounted on shaft 31 by key 30. Shaft 31 is fitted with bevel gear 50 which engages with bevel gear 32 of shaft 34. Through pulley 35 and belt 36 shaft 34 turns pulley 37 on shaft 38.

Rotation of shaft 38 causes the rotation of feed pulley 40 and idler pulley 41, at a rate determined by the distance of the friction pinion 26 from the center of the friction pulley 25; the greater the distance, the greater the speed. Thus the strip of tape 43 is fed from the roll of tape 42 at a constant rate. This rate of feed may be adjusted to suit the length of strips to be used by means of the handle 49 having threaded end 51 engaging with the bearing nut 52. Nut 52 alters the center distance between pulleys 25 and 26 along the keyed part of the shaft 31.

After being unwound from roll 42 by the feed pulleys 40, 41, tape 43 passes between pulleys 44, 45 which permit it to form a loop 46. Tape 43 then passes around guide pulley 63 and moistening roller 64 which rotates in liquid container 65, and finally to the feed pulleys 70, 71. Tape 43 is of a type well known in the art, preferably a paper strip having adhesive material on one side thereof. Moistener 64, 65 serves to wet the adhesive to permit the seam joining action of tape 43 in a manner well known.

Pulleys 70, 71 perform two functions, namely that of guiding the end of the tape to its proper position at the beginning of the seam to be taped, as well as that of feeding a predetermined length of tape to the seam prior to its being cut-off by shear blade 61. Pulley 70 is an idler pulley. Pulley 71, on shaft 72, is rotated by pinion 73 which engages with rack 74. Rack 74 is moved in the direction of the arrow once during each revolution of the shaft 10 by means of cam 24 which is brought to rear against cam followers 76. Spring 75 acts in a direction to oppose the rack motion due to cam 24. Shaft 72 is thus activated to move in an intermittent reciprocatory manner.

To prevent reverse rotation of the feed pulleys 70, 71, the rotation of pulley 71 is made unidirectional by a ratchet incorporated within said pulley. Details of the mechanism of pulley 71 are shown in Figures 2 and 3. Ratchet 85, secured to shaft 72, is acted upon by pawl 85a which is mounted on the rim of the roller 71. Clockwise rotation of the shaft 72 causes roller

71 to rotate therewith, causing tape 43 to be fed in the direction of the arrow, as shown. Reversal of direction of rotation of the shaft 72 has no effect on the roller 71 since the pawl 85a slips on ratchet 85, and accordingly there is no effect on the movement of tape 43.

In Figure 1, I have shown a conveyor belt 84 operated on rollers 87 on which cartons 80 are moved in succession. The cartons first pass under roller 81. Roller 81 is used to affix the forward end of wetted tape 43 to the beginning of the seam 86, and, as the box 80 is moved in the direction of the arrows, it presses the tap firmly onto seam 86 to seal it.

The roller 81 mounted on shaft 83, is driven from the same power source as is the control shaft 10 and is driven in synchronism therewith.

Control shaft 10 carries at its outer end a sprocket 100 which through chain 101 drives the sprocket 102 mounted on the shaft 103. A sleeve 104 having a threaded end 105 is mounted on the shaft 103 and engaged with the keyway 106 in said shaft in such a manner that although the sleeve may move longitudinally with respect to the shaft 103, it must necessarily rotate therewith.

Clutch element 107 is mounted on the sleeve 104 and is in engagement with the keyway 108 in said sleeve also in such a manner that it may slide longitudinally with respect to the sleeve but must rotate therewith.

Nut 110 is mounted on the threaded end 105 of the sleeve and may be adjusted in such a manner that the serrated surface 112 of the clutch element 107 may be brought to bear against the corresponding serrated surface 113 of the helical gear 114. Helical gear 114 meshes with helical gear 115 which in turn is mounted upon shaft 116. The opposite end of shaft 116 carries the crank 117 which is connected by the link 118 to the crank 119, the latter crank 119 being mounted on the end of the shaft 120 which carries the rotating knife 121.

The rotatable knife 121 consists of a knife blade secured by the screws 122 or any other suitable means passing therethrough to a milled portion of the shaft 120. The knife blade 121 cooperates with the stationary knife 123 which is mounted on the block 124 which in turn is supported above the path of the blanks to which the tape is to be applied.

The tape 43 after having been fed forward by the pulleys 70 and 71, passes between the shaft 120 and the stationary knife blade 123 in such a manner that when the edge of the knife blade 122 rotates into engagement with the edge of the stationary blade 123, it will be severed thereby.

Accordingly, the blanks to which tape is to be applied are fed forward on the tapes beneath the roller 81 which rotate just beyond the knives. The tape is fed forward intermittently in accordance with the passage of the blanks to which the same is to be applied, and is cut off after a predetermined length of tape has been fed.

Referring now to the mechanism previously described, the rotation of the control shaft 10 causes the cam 24 to rotate. This in turn bears against the cam follower 76, thus causing the rack 74 to be moved against the tension of the spring 75, thus causing the pinion 73 to rotate and thus rotating the shaft 72, which in turn rotates the roller 71. The rotation of roller 71 serves in the manner previously described, to

feed the tape along for a length determined by the amount of rotation given to the roller 71.

When the rack moves backward once more, under the influence of spring 75, the pawl and ratchet arrangement within the roller 71 previously described, prevents the rotation of the of the shaft 72 from causing the roller 71 to rotate in a reverse direction and hence does not affect the tape.

It is thus clear that each time the rack is caused to move in the direction of the arrow, the roller 71 feeds the tape forward. The length of the tape to be fed depends naturally upon the movement imparted to the rack. Where the rack is moved a relatively short distance, the roller 71 will be rotated for a relatively low number of revolutions and will accordingly feed a shorter length of tape along. Where the rack is permitted to move a greater distance, then the larger number of rotations of the roller will cause the feeding of a greater length of tape.

In order to adjust the length of the tapes which are to be successively fed to the cutter and roller for application to the blanks, I have provided an adjustable stop 130 which cooperates with a lug 131 on the rack. The cooperation between the lug 131 and the stop 130 prevents the tension spring 75 from pulling the rack back to its original position and therefore prevents it from following the cam completely.

Accordingly, when the stop 130 is set for relatively short tapes, then it will prevent the rack from returning to neutral position or from following the cam at every point of its revolution. Accordingly, the cam will actuate the cam follower 76 and the rack 74 only during a very restricted portion of its revolution and therefore will cause a relatively slight movement of the rack resulting in the feeding of relatively less tape.

When the stop is moved upwardly and towards the right with respect to Figure 1, then the cam follower and the rack will be able to follow the movement of the cam more completely and greater movement of the rack will result and relatively more tape will be fed. The stop 130 is mounted on the threaded block 132 which in turn is mounted on the threaded end 133 of the adjustment shaft 134. Rotation of the adjustment shaft 134 will cause the block 132 to move along the shaft in one direction or the other depending upon the direction of rotation of the shaft 134 and will accordingly serve to adjust the stop 130 in order to vary the movements of the rack in the manner and for the purposes previously described.

It is necessary, however, in order that the rollers 70 and 71 should function properly, that there be no unnecessary tension on the tape which will impede the accurate function of the rollers. Accordingly, the cooperation between the friction disk 25 and the friction pinion 26 will in the manner previously described, operate rollers 40 and 41 to withdraw the tape from the roll 42 and cause the slack loop 46 to be formed.

The amount by which the rollers 40 and 41 feed the tape 43 is, of course, determined by the position of the pinion 26 with respect to the control shaft 10 and adjustment of the position of this pinion by means of the handle 49 in the manner previously described will serve to effect this adjustment.

Accordingly, whenever the stop 130 is adjusted by the shaft 134 in order to vary the length of the tape, the handle 49 should also be adjusted in

order likewise to vary the amount of slack created by rollers 40 and 41. Preferably, and in the commercial embodiment of this device, shaft 434 and the shaft which carries handle 49 should be so interlocked that a single adjustment will result in simultaneous adjustment of the stop and of the friction pinion 26.

The rotating knife blade 422 should also be so adjusted that it will operate immediately after the feeding cycle has taken place, that is, after the rack 74 has completed its movement in the direction of the arrows, the knife 121 should rotate into engagement with the knife 123, allowing an interval of time sufficient for the proper length of tape to be pulled through by the box before severing the tape.

For this purpose, it is necessary to rotate the knife or adjust the same so that the movement of engagement between blades 121 and 123 will occur at just the right instant. The engagement of the blades with each other should be set back where a longer tape is required, and should be advanced when a shorter tape is necessary. The adjustment is such that when the desired amount of tape has been pulled out, the rotating knife blade 121 should in its cycle reach engagement with the knife blade 123.

Thus, for instance, Figures 1, 2 and 4, show the position of the knife blades and the cranks and links (especially seen in Figure 4) just before cutting. Figures 3 and 5 show the position of the knife blades and especially the links (Figure 5) some time after the feeding operation has stopped and the tape cutting operation is being performed. The position shown in Figure 5 is the position assumed by cranks 119 and 117 at the moment the cutting operation takes place.

At this point, the effective radius of rotation of the knife shaft with respect to the operating shaft 116 is such that maximum speed of rotation of knife shaft is reached and it is most desirable to effect a cut at such maximum speed. It is necessary, therefore, to adjust shafts 116 and 120 with respect to each other so that the position of Figure 5 will always be reached at the moment that sufficient tape has been pulled out and accordingly it is necessary to rotate links 117 and 119 in a direction opposite to the direction of the respective arrows in order to reach the position which the shafts should assume at the moment of the inception of the tape feeding operation.

If, for instance, the position of Figures 4 and 1 is the position for a medium sized tape, then, should a longer tape be required and should the blanks be spaced from each other by a lesser distance so that the same number of blanks pass beneath the tape feeder as before, it will be necessary to rotate shaft 116 and cranks 117 and 119 counterclockwise to a position permitting the feeding of a longer tape before the knife blades meet. By this means, a rotary cut-off is provided for the tape instead of an oscillatory cut-off and this cut-off is a continuous operation which reduces the noise and wear. In addition, the rotary cut-off may be easily adjusted simultaneously with the adjustment of other portions of the apparatus.

This adjustment depends simply on the loosening of the nut 110 which then permits a relatively simple movement in order to induce the necessary rotation of the parts hereinbefore described. The nut 110 is loosened and the clutch element 107 is then moved sideways so that the serrated surface 112 thereof is no longer in en-

gagement with the serrated surface 113 of the helical gear 114. The helical gear may now be rotated about the sleeve 104 without the necessity for any rotation of shaft 103. Helical gear 114 is, however, always enmeshed with helical gear 115.

Manual rotation of helical gear 114 now causing rotation of helical gear 115, will rotate shaft 116 and thus cause the cranks 117 and 119 to be adjusted in the manner previously described. When the adjustment for a particular length of tape has thus been made, then the nut 110 is adjusted so that the clutch element 107 is forced into engagement with the helical gear 114, the helical gear 114 now becomes secured to and rotatable by shaft 103 and the operations previously described may now be performed.

It is obvious, of course, that the clutch element 107 cannot rotate with respect to the sleeve which in turn cannot rotate with respect to the shaft, by reason of the keyways previously described. Accordingly, the rotary displacement of the helical gear 114 on the shaft will give an immediate indication of the length of the path from the Figure 4 position to the cutting position of Fig. 5. For this reason, a simple dial indicating the adjustment may be provided, the pointer 150 being secured in any suitable manner, as for instance by the screw 151, to the clutch element 107, and the dial 152 being placed on the side surface of the helical gear 114.

The dial 152 may then be marked off in $\frac{1}{8}$ " or other units which will indicate the length of tape to be cut for any particular adjustment. This adjustment, however, since it depends on the tape feeder adjustment previously mentioned and also on the axial position of the helical gears is a relatively rough one and other vernier means may be provided in order to secure a fine adjustment.

Such means may depend upon the fact that when one helical gear is slid with respect to the other while it is held against rotation, the other gear is necessarily forced to rotate slightly. Accordingly, sleeve 104 which is slidable longitudinally along the shaft 103 carries the threaded block 160 in the threaded perforation of which is mounted the threaded end of rod 161.

Bevel gear 162 on the end of rod 161 meshes with bevel gear 163 on the end of rod 164 which latter rod may be rotated in any suitable manner. The rotation of rod 164 results in the rotation of rod 161 and in corresponding movement of the block 160 thus resulting in corresponding longitudinal movement of the sleeve 104 on the shaft 103. Since the sleeve 104 of the helical gear 114 is locked against rotation on the shaft by means previously described, then the movement of the helical gear 114 while it is enmeshed with the helical gear 115 will result in a slight rotation of the helical gear 115, thus rotating cranks 117 and 119 and giving the final vernier adjustment. Such adjustment may, if desired or necessary, be made while the machine is running.

It is clear, of course, that the adjustment of the speed of operation of the entire mechanism and thus the adjustment of the speed of operation of control shaft 10 and of shafts 83 and 14, regardless of blank size, may be secured by the interposition of a Reeves drive or other adjustable drive or speed changer between the source of power and the shafts 10, 83, and 14.

While in the foregoing I have shown individual adjustments for each of the elements, it will be obvious that each of the adjustments may, in

appropriate cases, be interlocked with each other so that the same may be simultaneously performed by a single adjustment mechanism.

The advantage of the present tape feeding mechanism and tape cut-off over the elements of the prior art is that all of the cutting elements are continuous and rotary. The noise and wear inherent in the operation of an oscillatory cutter is therefore overcome and the efficiency of the apparatus is thus greatly increased.

The rotary cut-off of my invention also simplifies all adjustment problems in tape feeding and tape applying mechanisms and serves further to integrate each part of the mechanism since rotary members of this type are more easily connected to operating members than are oscillatory means.

In the foregoing, I have described the preferred embodiment of my device and many variations of each of the modifications will now be evident to those skilled in the art. I therefore prefer to be bound, not by the specific disclosures herein, but only by the appended claims.

I claim:

1. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, and completely severing said predetermined length from the remaining portion thereof, said tape cutting knife rotating continuously during and between successive tape applying operations, said knife being mounted on a rotatable shaft and being movable into cutting position at a fixed point of each cycle of rotation of said shaft and means for adjusting said knife with respect to the tape feeding mechanism so that each tape feeding operation begins when the knife has reached a fixed point in each cycle of rotation.

2. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, and completely severing said predetermined length from the remaining portion thereof, said tape cutting knife rotating continuously during and between successive tape applying operations, said knife being mounted on a continuously rotatable shaft and movable into cutting engagement with said tape once during each cycle of rotation and means for adjusting said knife with respect to the tape feeding mechanism so that each tape feeding operation begins when the knife is in a selected position in its cycle of rotation.

3. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been

fed, and completely severing said predetermined length from the remaining portion thereof, said tape cutting knife rotating continuously during and between successive tape applying operations, said knife being mounted on a shaft, means for continuously rotating said shaft to cyclically move said knife into tape cutting position in synchronism with said tape feeding mechanism; and additional means for rotating said shaft to adjust the position of the knife in each cycle with respect to the inception of the tape feeding operation.

4. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, and completely severing said predetermined length from the remaining portion thereof, said tape cutting knife rotating continuously during and between successive tape applying operations, said knife being mounted on a shaft, means for continuously rotating said shaft to cyclically move said knife into tape cutting position in synchronism with each tape feeding operation; and additional means for rotating said shaft to change the portion of each cycle of rotation at which the knife will reach tape cutting position.

5. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, and completely severing said predetermined length from the remaining portion thereof, said tape cutting knife rotating continuously during and between successive tape applying operations, said knife being mounted on a shaft, means for continuously rotating said shaft to cyclically move said knife into tape cutting position in synchronism with each tape feeding operation; and additional means for adjusting said shaft with respect to said tape feeding operation so that each tape feeding operation commences when said knife is at a selected point in the cycle.

6. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, and completely severing said predetermined length from the remaining portion thereof, said tape cutting knife rotating continuously during and between successive tape applying operations, said knife being mounted on a shaft, means for continuously rotating said shaft to cyclically move said knife into tape cutting position in synchronism with each tape feeding operation; and additional means for adjusting said shaft with respect to said tape feeding operation so that each tape feeding operation commences when said knife is at a selected point

in the cycle, the speed of rotation of said knife shaft varying cyclically; said shaft reaching its maximum speed of rotation when said knife is at tape cutting position.

7. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft; a crank on said knife shaft; a crank on said drive shaft; a link connecting said cranks for transmitting continuous rotative movement from said drive shaft to said knife shaft; a power connection between said tape feeding mechanism and said drive shaft for moving said knife into tape cutting position in synchronism with each tape feeding operation; said drive shaft being releasable from said power connection and independently rotatable to adjust the cyclical position of the knife with respect to the inception of each tape feeding operation.

8. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft; a crank on said knife shaft; a crank on said drive shaft; a link connecting said cranks for transmitting continuous rotative movement from said drive shaft to said knife shaft; a power connection between said tape feeding mechanism and said drive shaft for moving said knife into tape cutting position in synchronism with each tape feeding operation; said drive shaft being releasable from said power connection and independently rotatable to adjust the cyclical position of the knife with respect to the inception of each tape feeding operation, said power connection comprising an additional rotatable shaft, a helical gear mounted thereon; a helical gear on said drive shaft; said gears interengaging.

9. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft; a crank on said knife shaft; a crank on said drive shaft; a link connecting said cranks for transmitting continuous rotative movement from said drive shaft to said knife shaft; a power connection between said tape feeding mechanism and said drive shaft for moving said knife into tape cutting position in synchronism with each tape feeding operation; said drive shaft being releasable from said power connection and independently rotatable to adjust the cyclical position of the knife with respect to the inception of each tape feeding operation, said power connection comprising an additional rotatable shaft, a first gear concentric with said

additional shaft, means releasably interconnecting said gear and shaft; a second gear on said drive shaft; said gears interengaging; said means interconnecting said first gear and its shaft being releasable to permit independent movement of said drive shaft.

10. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft; a crank on said knife shaft; a crank on said drive shaft; a link connecting said cranks for transmitting continuous rotative movement from said drive shaft to said knife shaft; a power connection between said tape feeding mechanism and said drive shaft for moving said knife into tape cutting position in synchronism with each tape feeding operation; said drive shaft being releasable from said power connection and independently rotatable to adjust the cyclical position of the knife with respect to the inception of each tape feeding operation, said power connection comprising an additional rotatable shaft, a first gear concentric with said additional shaft, means releasably interconnecting said gear and shaft; a second gear on said drive shaft; said gears interengaging; said means interconnecting said first gear and its shaft being releasable to permit independent movement of said drive shaft, and an indicator for registering the degrees of said independent movement of said drive shaft.

11. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft; a crank on said knife shaft; a crank on said drive shaft; a link connecting said cranks for transmitting continuous rotative movement from said drive shaft to said knife shaft; a power connection between said tape feeding mechanism and said drive shaft for moving said knife into tape cutting position in synchronism with each tape feeding operation; said drive shaft being releasable from said power connection and independently rotatable to adjust the cyclical position of the knife with respect to the inception of each tape feeding operation, said power connection comprising an additional rotatable shaft, a first gear concentric with said additional shaft, means releasably interconnecting said gear and shaft; a second gear on said drive shaft; said gears interengaging; said means interconnecting said first gear and its shaft being releasable to permit independent movement of said drive shaft, and an indicator for registering the degree of said independent movement of said drive shaft, said indicator comprising a fixed pointer, and a dial on said first gear.

12. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said

blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft; a crank on said knife shaft; a crank on said drive shaft; a link connecting said cranks for transmitting continuous rotative movement from said drive shaft to said knife shaft; a power connection between said tape feeding mechanism and said drive shaft for moving said knife into tape cutting position in synchronism with each tape feeding operation; said drive shaft being releasable from said power connection and independently rotatable to adjust the cyclical position of the knife with respect to the inception of each tape feeding operation, said power connection comprising an additional rotatable shaft, a first helical gear concentric with said additional shaft, means releasably interconnecting said gear and shaft; a second helical gear on said drive shaft; said gears interengaging; said means interconnecting said first gear and its shaft being releasable to permit independent movement of said drive shaft.

13. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft; a crank on said knife shaft; a crank on said drive shaft; a link connecting said cranks for transmitting continuous rotative movement from said drive shaft to said knife shaft; a power connection between said tape feeding mechanism and said drive shaft for moving said knife into tape cutting position in synchronism with each tape feeding operation; said drive shaft being releasable from said power connection and independently rotatable to adjust the cyclical position of the knife with respect to the inception of each tape feeding operation, said power connection comprising an additional rotatable shaft, a first helical gear concentric with said additional shaft, means releasably interconnecting said gear and shaft; a second helical gear on said drive shaft; said gears interengaging; said means interconnecting said first gear and its shaft being releasable to permit independent movement of said drive shaft, one of said helical gears being slidable longitudinally along its shaft while in rotative engagement therewith and in interengagement with the other helical gear for additionally independently moving said drive shaft.

14. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft; a crank on said knife shaft; a crank on said drive shaft; a link connecting said cranks for transmitting continuous rotative movement from said drive shaft to said knife

shaft; a power connection between said tape feeding mechanism and said drive shaft for moving said knife into tape cutting position in synchronism with each tape feeding operation; said drive shaft being releasable from said power connection and independently rotatable to adjust the cyclical position of the knife with respect to the inception of each tape feeding operation, said power connection comprising an additional rotatable shaft, a first helical gear concentric with said additional shaft, means releasably interconnecting said gear and shaft; a second helical gear on said drive shaft said gears interengaging; said means interconnecting said first gear and its shaft being releasable to permit independent movement of said drive shaft, said first helical gear being slidable longitudinally along its shaft while in rotative engagement therewith and in interengagement with said second helical gear for additionally independently moving said drive shaft to obtain an adjustment of the cyclical position of the knife with respect to the inception of the tape feeding operation.

15. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft; a crank on said knife shaft; a crank on said drive shaft; a link connecting said cranks for transmitting continuous rotative movement from said drive shaft to said knife shaft; a power connection between said tape feeding mechanism and said drive shaft for moving said knife into tape cutting position in synchronism with each tape feeding operation; and means for rotating said shafts to adjust the cyclical position of the knife with respect to the inception of the tape feeding operation.

16. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft connected to said knife shaft; said drive shaft being releasable from said power connection and independently rotatable to adjust the cyclical position of the knife with respect to the inception of each tape feeding operation, said power connection comprising an additional rotatable shaft, a first helical gear concentric with said additional shaft, means releasably interconnecting said gear and shaft; a second helical gear on said drive shaft; said gears interengaging; said means interconnecting said first gear and its shaft being releasable to permit independent movement of said drive shaft.

17. Apparatus for applying tapes to blanks comprising tape feeding mechanism, tape applying mechanism, and a rotatable tape cutting knife; means for successively advancing said blanks into engagement with said tape applying mechanism, said tape feeding mechanism simultaneously feeding said tape into engagement with said applying mechanism, said tape cutting knife

severing said tape when a predetermined length has been fed, said knife being mounted on a shaft; a drive shaft connected to said knife shaft; a power connection between said tape feeding mechanism and said drive shaft for moving said knife into tape cutting position in synchronism with each tape feeding operation; said drive shaft being releasable from said power connection and independently rotatable to adjust the cyclical position of the knife with respect to the incep-

tion of each tape feeding operation, said power connection comprising an additional rotary shaft, a first gear concentric with said additional shaft, means releasably interconnecting said gear and shaft; a second gear on said drive shaft; said gears interengaging; said means interconnecting said first gear and its shaft being releasable to permit independent movement of said drive shaft.

ALBERT F. SHIELDS.