May 15, 1951 E. M. BARNES ET AL 2,552,926

TAPE FEEDER, CUTTER, AND MOISTENER

Filed Dec. 19, 1946 3 Sheets-Sheet 1

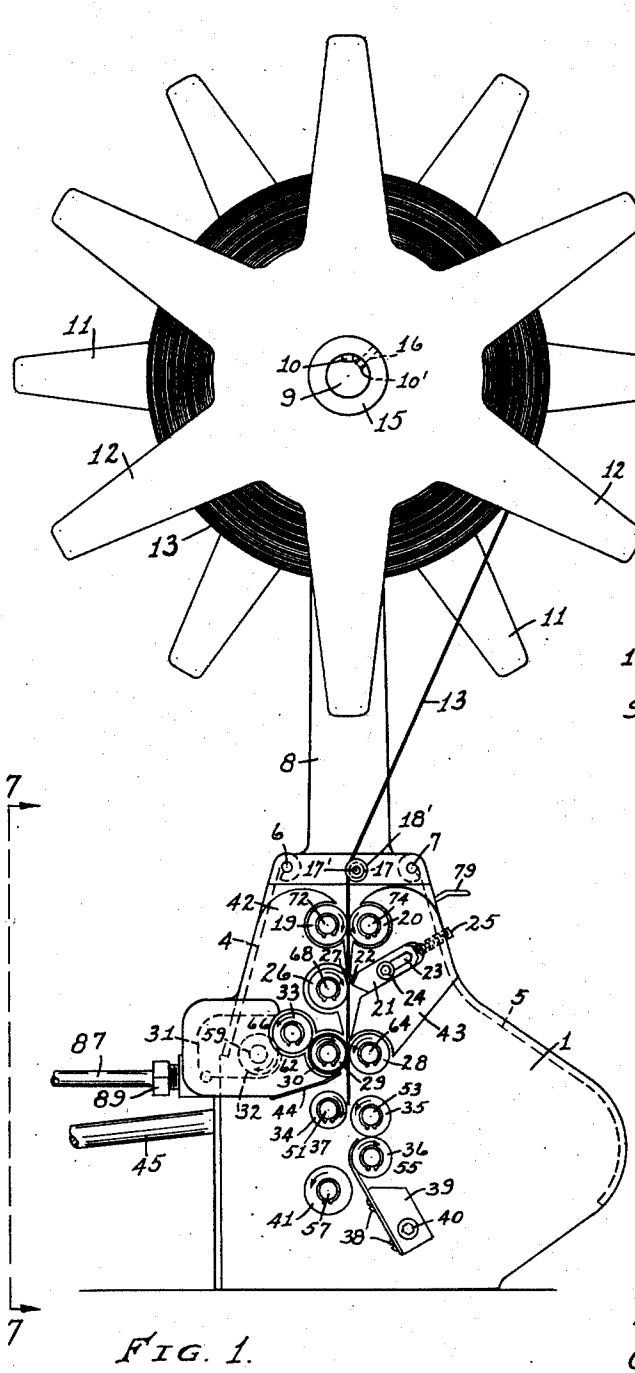



FIG. 1.

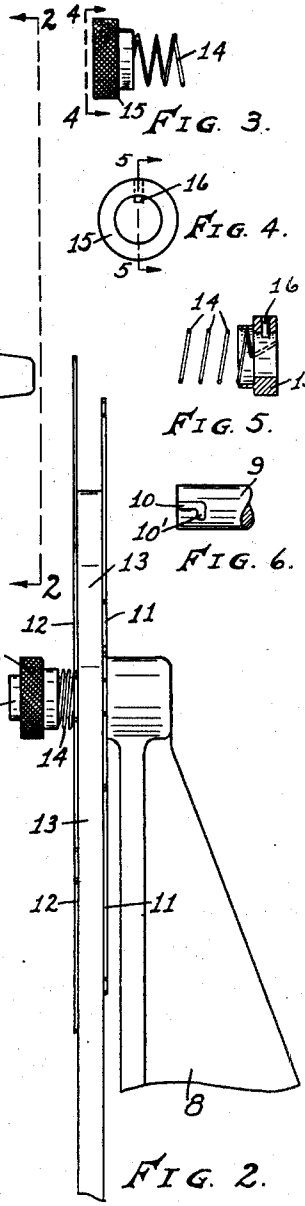



FIG. 2.



FIG. 3.



FIG. 4.



FIG. 5.



FIG. 6.


EVERETT M. BARNES
AND
CLARENCE E. BARNES,
INVENTORS.

BY Donald E. Windle.
ATTORNEY.

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TAPE FEEDER, CUTTER, AND MOISTENER

Filed Dec. 19, 1946 3 Sheets-Sheet 2

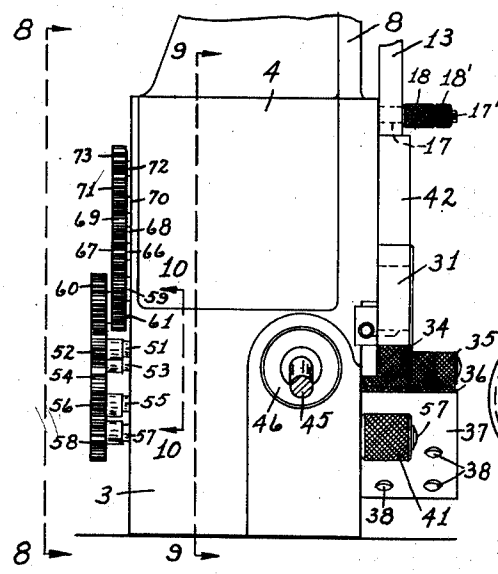


FIG. 7.

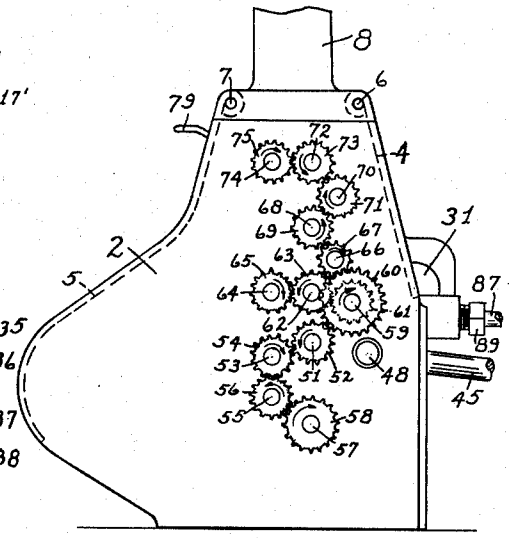


FIG. 8.

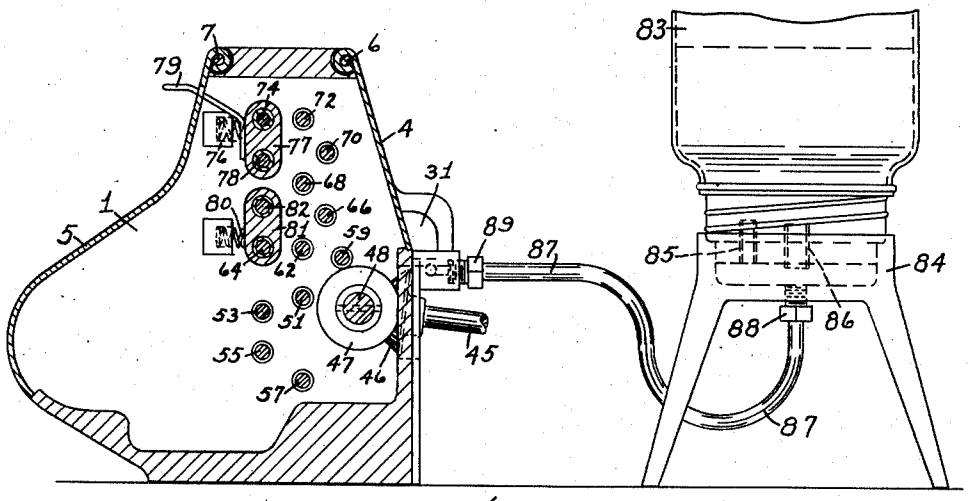


FIG. 9.

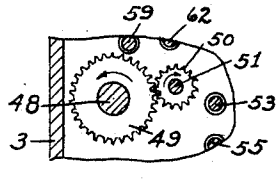


FIG. 10.


EVERETT M. BARNES
AND
CLARENCE E. BARNES,
INVENTORS.

BY Donald E. Windle.
ATTORNEY.

May 15, 1951 E. M. BARNES ET AL 2,552,926

TAPE FEEDER, CUTTER, AND MOISTENER

Filed Dec. 19, 1946 3 Sheets-Sheet 3

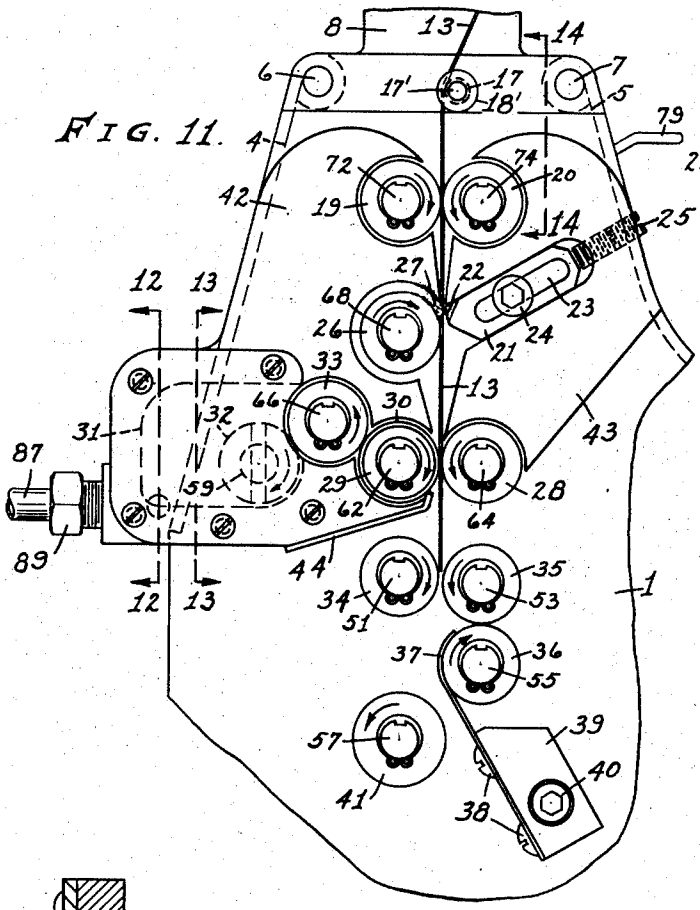



FIG. 11.

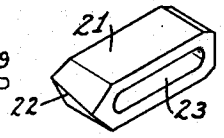



FIG. 15.

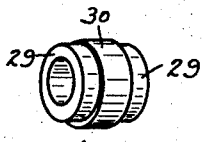



FIG. 16.

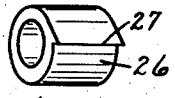



FIG. 17.

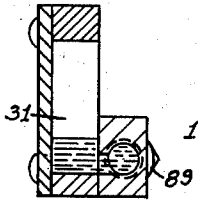



FIG. 12.

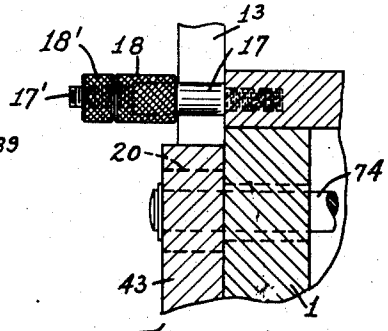



FIG. 14.

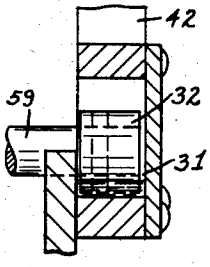



FIG. 13.


EVERETT M. BARNES
AND
CLARENCE E. BARNES,
INVENTORS.

BY Donald E. Windle.
ATTORNEY.

Patented May 15, 1951

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# UNITED STATES PATENT OFFICE

2,552,926

## TAPE FEEDER, CUTTER, AND MOISTENER

Everett M. Barnes and Clarence E. Barnes,
New Paris, Ohio

Application December 19, 1946, Serial No. 717,136

3 Claims. (Cl. 91—14)

1

The mechanism shown in the accompanying three sheets of drawings and hereinafter described and claimed is adapted to be used in connection with a folding mechanism in which paper strips are folded, and in connection with a banding mechanism which is adapted to wrap a moistened banding strip about the folded portion of the paper strips. The mechanism herein shown, described, and claimed, is adapted to provide moistened, gummed tape, for wrapping about the folded portions of the paper strips, and with the tape being introduced into the mechanism between the folding mechanism and the banding mechanism.

We are aware that tape moistening and cutting mechanisms are old in the art, but in the conventional types of mechanisms, moisture is applied to the gummed side of the tape, after which the tape is cut to the desired length, with the resultant clogging of the parts by contact with the moistened surface of the gummed side of the tape.

The principal object of the invention is the provision of a mechanism for supplying gummed tape continuously, in which the tape is sheared to predetermined lengths, after which the same is moistened.

A second object is the provision of a mechanism adapted to feed gummed tape between a series of rollers and between a shearing knife and an engaging cut-off roller, and with other rollers providing a moistening medium to the gummed side of the tape.

Another object is the provision of moistening means, with the same engaging gummed tape at the central portion only, and without the moistening medium being applied to the outer edges of the tape.

A further object is the provision of means for easily and quickly replacing rolls of gummed tape and with means being provided which resiliently maintain one side of the reel assembly in contact with the roll of tape.

A still further object is the provision of means for securing the free end of the tape in non-slipping and in feeding relation in the threading operation of the tape in the mechanism.

Other predominant and particular advantages of the invention will suggest themselves in the course of the following description, and that which is new will be pointed out in the appended claims.

The preferred, and most satisfactory manner of carrying out the principles of the invention is shown in the accompanying three sheets of drawings, in which:

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Figure 1 is a side elevation of a machine, and with the tape-supplying, cutting, and moistening members being shown in connection therewith.

Figure 2 is a partial side elevation, taken from line 2—2 of Figure 1, and showing the tape reeling members.

Figure 3 is a detail side elevation of the tape-reel securing means.

Figure 4 is a front elevation of the tape-reel securing member, taken from line 4—4 of Figure 3.

Figure 5 is a sectional detail through the tape-reel securing means, as taken on line 5—5 of Figure 4.

Figure 6 is a detail showing the end portion of the reel-supporting shaft.

Figure 7 is a detail left end elevation of the housing and mechanism, taken from line 7—7 of Figure 1.

Figure 8 is a rear side elevation of the device, taken from line 8—8 of Figure 7, and showing the drive gear arrangement.

Figure 9 is a detail section through the housing member of the device, taken on line 9—9 of Figure 7, and with the liquid supplying means being shown.

Figure 10 is a detail section, taken on line 10—10 of Figure 7.

Figure 11 is a partial front elevation of the tape feeding, cutting, and moistening means, similar to that shown in Figure 1, but on an enlarged scale.

Figure 12 is a detail section through the liquid reservoir, as taken on line 12—12 of Figure 11.

Figure 13 is also a detail section through the liquid reservoir, and taken on line 13—13 of Figure 11.

Figure 14 is a detail section taken on line 14—14 of Figure 11.

Figure 15 is an isometric detail of the shearing knife member.

Figure 16 is an isometric detail of the tape-contacting moistening roller member.

Figure 17 is an isometric detail of the cut-off roller member.

Like characters of reference designate like parts throughout the several views.

In order that the advantages and the several features of the invention may be more fully understood, we will now take up a detailed description thereof, in which the same will be more fully set forth.

Referring now to the drawings in detail, 1 designates the front face of the housing member, with the rear face of the housing being designated by

numeral 2, and 3 designates the left end of the housing. 4 designates a hinged cover adapted to close the upper portion of the left end of the housing, and 5 designates a hinged cover adapted to close the right end of the housing. Cover 4 is hinged by means of rod 6 and cover 5 is hinged by means of rod 7, with both of the rods extending through and between the front and rear sides of the housing.

A reel-supporting arm 8 extends upwardly from the upper portion of the housing, and with a reel-supporting stud 9 being secured in the upper end portion of the reel-supporting arm. A slot 10 is formed in the outwardly extending portion of stud 9, the purpose of which will be more fully hereinafter set forth.

The reel is comprised of a side plate 11 and a second side plate 12. Plate 11 is positioned on stud 9 adjacent the supporting arm 8, and with plate 12 being positioned on stud 9 after the roll of tape 13 has been placed on the stud member. Plate 12 is maintained in engaged relation against the roll of tape 13 by means of compression spring 14 which has one end thereof adapted to bear against the outer side of plate 12, and with the opposite end thereof being secured in the retaining collar 15, as more clearly shown in Figure 5. Collar 15 has a stud-engaging pin 16 secured therein and projecting thereinto for engagement with slot 10 of stud 9. It will be readily apparent, by reference to Figures 1 through 6 that the roll of tape 13 is held between plates 11 and 12 by pressure applied by spring 14 against plate 12. The collar 15 is secured in place on stud 9 by engagement of the inwardly-extending end of pin 16 with slot 10, and with the pin being seated in portion 10' of the slot.

The tape is fed downwardly from the reel and engages pin 17 which is threaded into the housing, as shown in Figure 14. A knurled member 18 is threaded on outwardly-extending threaded portion 17', with member 18 engaging a shoulder formed on pin 17 and limiting the movement of member 18 toward the housing. Knurled member 18' is threaded onto portion 17' and provides means engaging and locking member 18 in fixed relation. Members 18 and 18' provide means for adjustably changing the exposed tape-contacting portion of pin 17 for accommodating tapes of different widths.

The tape is fed downwardly from pin 17 between a pair of gripping rollers 19 and 20, and into contacting engagement with the end of shearing knife 21. A shearing edge 22 is formed on one end of the knife 21, as shown more clearly in Figures 11 and 15. The shearing knife is secured against the front face of housing 1 by means of threaded screw 24 extending through the slot 23. An adjusting screw 25 provides means of adjustment of the shearing knife 21 with relation to cut-off roller 26. Roller 26 has a hardened shearing projection 27 formed thereon which is adapted to rotate into shearing engagement with the shearing edge 22 of knife member 21, with the engagement of members 27 and 21 shearing the tape which is passing therebetween.

The tape is fed downwardly from its engagement with the cut-off roller 26 and the shearing edge 22 between rollers 28 and 29, and is engaged thereby. Roller 29 has a raised portion 30 formed around the central portion thereof, as shown in Figure 16. A liquid reservoir 31 is provided on the machine, and in which a roller 32 is located and is adapted to rotate in the liquid and to carry the same into contact with the surface of roller 33, from which the liquid is transferred to portion 30 of roller 29 and then transferred to the gummed surface of the tape as the same passes downwardly between rollers 28 and 29. After passing between rollers 28 and 29, the tape passes between another set of rollers 34 and 35. It will be noted, by reference to Figures 1 and 11, that rollers 34 and 35 are not in contacting relation with each other, but the tape is merely guided therebetween in its downward movement.

Roller 36, together with guard member 37, guard-securing screws 38, block 39, and its securing screw 40, together with roller 35, are a part of a banding mechanism shown and described in our application for United States Patent entitled "Banding Mechanisms," Serial No. 699,122, filed September 25, 1946, and now abandoned, and in which the purpose and the operation thereof are more fully set forth.

Roller 36 is provided with guard member 37 which prevents the downwardly travelling tape from engaging the surface of roller 36 in its downward movement.

There are occasional instances in which there may be interruptions of the supply of folded strips engaging the tape adjacent the rollers 35 and 36, and in which event we have provided roller 41 which rotates in the direction indicated by the arrows in Figures 1 and 11. Should there be a cessation in the supply of folded strips engaging the tape, the tape will travel downwardly adjacent the curved surface of guard member 37, and will be discarded to a point remote to other moving parts of the mechanism by contact with roller 41.

Guard and guiding means 42 and 43 provide means guiding the tape in its downward movement between the series of rollers and also prevent the tape from becoming engaged and entangled with the various rollers in its downward movement. Guard member 42 partially surrounds rollers 19, 26, 30, and 33, while guard member 43 partially surrounds rollers 20 and 28. In addition to providing guard means with relation to rollers 20 and 28, guard member 43 also provides guiding means for the adjustment of shearing knife 21, as shown in Figures 1 and 11. Guard member 43 is further provided with a threaded aperture for the reception of the shearing knife adjusting screw 25.

A scraper member 44 is secured to the under side of guard member 42, and has one end thereof in engaging contact with moistening surface 30 of roller 29, and provides means preventing an accumulation of gum material on surface 30.

Power is supplied to the mechanism through shaft 45 which is connected in driven relation to a power supply (not shown), with bevel gear 46 being secured on the end portion thereof and meshing with a companion bevel gear 47 which is secured on shaft 48, as shown in Figure 9. Power is transmitted from shaft 48, through gear 49 meshing with gear 50 which is secured on shaft 51, as shown in Figure 10. Roller 34 is secured on the forward end of shaft 51. Shaft 51 has a second gear 52 secured to the rear end thereof, through which power is transmitted to shaft 53 through gear 54 which is secured thereto, and with roller 35 being secured on the forward end of shaft 53. Power is transmitted from gear 54 to shaft 55 through gear 56 secured on the rear end of shaft 55, and with roller 36 being secured on the forward end thereof. Shaft 57, carrying

roller 41 on the forward end thereof, is powered by means of gear 58 secured on the rear end thereof, and meshing with gear 56. Liquid pick-up roller 32 is secured on the forward end of shaft 59 having gear 60 secured on the rear end thereof, and with gear 60 meshing with gear 52. A second gear 61, secured on shaft 59 between gear 60 and the rear side 2 of the housing, meshes with gear 63 which is secured on the rear end of shaft 62 which carries moistening roller 29 on the forward end thereof. Roller 28, which is secured on the forward end of shaft 64, is powered through gear 65 which meshes with gear 63. Shaft 66 is provided with power through gear 67 secured on the rear end and meshing with gear 63. Roller 33 is secured on the forward end of shaft 66. Cut-off roller 26 is secured on the forward end of shaft 68 which has gear 69 secured on the rear end thereof, and with gear 69 meshing with gear 67. Gear 69 meshes with idler gear 71, which is secured on stub shaft 70, and with gear 71 meshing with gear 73 which is secured on the rear end of shaft 72, and with roller 19 being secured on the forward end of shaft 72. Gear 75 is secured on the end of shaft 74 and meshes with gear 73, and power is transmitted through shaft 74 to roller 20 which is secured on the forward end of the shaft.

It will be noted, by reference to Figure 9, that roller 20 is spring-loaded toward roller 19 by means of spring 76 bearing against block 77. Block 77 is pivotally positioned on shaft 78 which is journalled in the front and rear side members. Spring-loading of roller 20 permits movement thereof away from roller by downward pressure on lever 79 which is rigidly secured to block 77. The end portion of lever 79 extends outwardly through an aperture formed through hinged cover 5, and with the separation of the rollers 19 and 20 providing means for threading the tape between the rollers.

Roller 28 is spring-loaded toward moistening roller 29 by means of spring 80 bearing against block 81 through which shaft 64 is pivotally positioned with relation to pivot shaft 82, as shown in Figure 9, with the spring-loading of roller 28 providing positive contact of the tape against the moistening surface 30 of roller 29.

Liquid to be used in moistening the gummed surface of the tape is supplied from a suitable storage member 83 which is removably supported on a suitable supporting member 84. Storage member 83 is provided with liquid leveling means 85 which has the lower end thereof adjusted to the level of liquid to be maintained in liquid reservoir 31. Tube member 86 provides means communicating from storage member 83 to a pan formed in supporting member 84. Liquid is conveyed from the pan of supporting member 84 to the liquid reservoir 31 by means of connecting tube member 87, and with the connecting tube being removably secured to the supporting member by means of connection 88, and to liquid reservoir by means of connection 89.

*Operation*

In the operation of the device, a roll of tape 13 is positioned on stud 9 against reel plate 11, after which reel plate 12 is positioned on the stud and with the plate 12 bearing against the opposite side of the roll of tape from plate 11, after which collar 15, carrying spring 14, is positioned on the stud with pin 16 engaging slot 10 of the stud member. With spring 14 engaging plate 12, collar 15 is pressed toward the reel until pin 16 reaches the inner end of slot 10, after which the collar is turned in a clockwise direction until the projecting end of pin 16 is seated in slot portion 10' of stud 9, and with the collar 15 being locked against movement away from the reel.



The end of tape 13 is fed downwardly from the reel and over pin 17, thence downwardly into engagement between rollers 19 and 20. In order to thread the tape between rollers 19 and 20, it is necessary to move roller 20 slightly away from roller 19 by pressing downwardly on the projecting end portion of lever 79. After the end of the tape is positioned between rollers 19 and 20, the downward pressure on lever 79 is released, and roller 20 is forced toward roller 19 by means of spring 76. Further manual threading of the tape is unnecessary as the tape is moved downwardly by reason of its engagement between the gripping surfaces of rollers 19 and 20, in the rotation thereof.

The tape 13 is fed downwardly by engagement thereof with rollers 19 and 20 and into engagement with the shearing edge 22 of knife member 21. Rotation of cut-off roller 26 brings the shearing projection 27 thereof into engagement with the tape at its point of contact with edge 22 of the knife member. The rotation of roller 26 causes a shearing action of edge 27 against edge 22 and the tape is sheared thereby. It will be noted, by reference to Figures 1, 11, and 15, that the shearing edge 22 is angularly disposed with relation to member 21 and also with relation to axis of roller 26. The angularity of edge 22 provides means whereby the edge of the tape is sheared square in its downward movement in its engagement with rotating edge 27 of roller 26.

It will be noted that the distance between the axis of rollers 28 and 29 with relation to axis of roller 26 is less than the circumferential travel of the projection 27. It is therefore obvious that the lower end of the travelling tape 13 is engaged between rollers 28 and 29 before that particular length of tape is sheared.

As the tape passes between rollers 28 and 29, the gummed side thereof is moistened by contact with the moistened surface 30 of roller 29. Liquid is collected by roller 32 which is in running contact with the liquid in the reservoir 31, with the liquid being transferred from roller 32 to roller 33 by the contact of the rollers. The liquid is then transferred to surface 30 of roller 29 by contact of surface 30 with roller 33, and is transferred to the gummed surface of the tape 13 by contact with surface 30. It will be noted, by reference to Figure 16, that surface 30 is of comparatively less width than roller 29. The surface 30 is also of less width than the tape 13, and with only the central portion of the gummed tape contacting the moistening surface 30. It is apparent then that the outer edge surfaces of the gummed side of the tape is not moistened. Upon engagement of the tape with the folded paper strips (not shown) and the passage thereof between rollers 35 and 36 (not shown and described in the above-mentioned application Serial No. 699,122), the moistening medium is spread to the outer edge surfaces of the tape by reason of the pressure applied thereto in the passage between rollers 35 and 36, and thereby eliminating an excess of liquid which would be present if the entire width of the gummed tape would be moistened in its passage between rollers 28 and 29.

It will be further noted, by reference to Figure 11, that the distance from the line of tangency

between the rollers **35** and **36** and the point of engagement of contact of the tape between rollers **28** and **29** is less than one length of the sheared tape, and with the upper end portion of one piece of sheared and moistened tape being supported between rollers **28** and **29** while the lower end portion of the tape is engaged by the folded paper strips travelling toward the tangency line of rollers **35** and **36**. As the tape and the folded paper strips pass into engagement with rollers **35** and **36**, the upper end portion of the one piece of tape is being released from between rollers **28** and **29** by the downward movement of the tape therebetween.

Roller **34** merely serves as a guide to the downwardly moving tape and provides means positioning the tape with relation to rollers **35** and **36** for engagement by the folded paper strips.

Although the preferred embodiment of the invention has been shown and described, we desire that it be understood that minor changes may be made in the several parts and in the arrangement thereof, insofar as the changes therein may fall within the scope of the appended claims.

Having now shown and described the invention, what we claim, is:

1. In combination with a tape feeding, cutting, and moistening device, means cutting the tape during its continuous travel therethrough, said cutting means secured to the device and comprising a continually rotating cut-off roller having a cutting edge formed across the circumferential face thereof, a stationary shearing knife forming a part of the machine and having a shearing edge in angular relation to the path of the tape, with the cutting edge of the cut-off roller operating in shearing contact with the angularly disposed shearing edge of the shearing knife, and with the angular position of the shearing edge of the shearing knife forming a square cut-off of the tape being fed between the shearing knife and the rotating cut-off roller.

2. In combination with a tape feeding, cutting, and moistening device, tape cutting means forming a part of said device, means advancing tape continuously to and between the cutting means, said tape cutting means being composed of a fixed shearing knife and a continually rotating cut-off roller having a shearing edge formed across



the face thereof, with the shearing edge of the cut-off roller operating in shearing contact with the fixed shearing knife, and with the shearing edge of the fixed shearing knife being angularly disposed with relation to the path of tape feeding between the cutting means.

3. In combination with a tape feeding, cutting, and moistening device, a knife member adjustably secured to said device and with a shearing edge formed on one end thereof adjacent the path of tape passing through the device, with the shearing edge of the knife member being formed angularly with relation to the body portion of the knife member and in angular relation to the path of the tape, a cut-off roller rotatably positioned on the device and located adjacent the angularly-disposed shearing edge of the knife member, with a shearing edge being formed across the circumferential face of the cut-off roller and with the rotation of the cut-off roller bringing the shearing edge thereof into shearing contact with the shearing edge of the knife member, and with the angularly-disposed shearing edge of the knife member forming a square cut on tape feeding between the shearing edge of the knife member and the shearing edge of the cut-off roller, and with the cut-off roller and the tape being in continuous motion.

EVERETT M. BARNES.
CLARENCE E. BARNES.


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