

May 30, 1944.

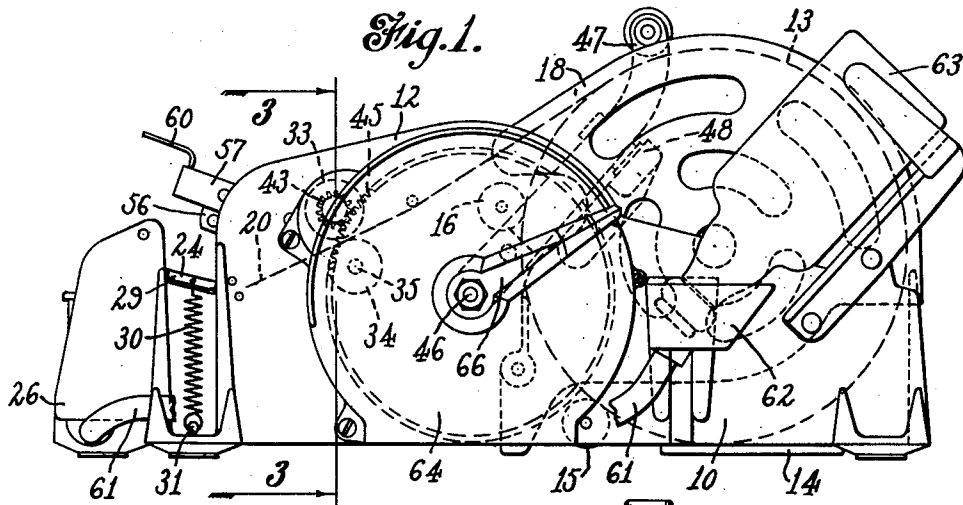
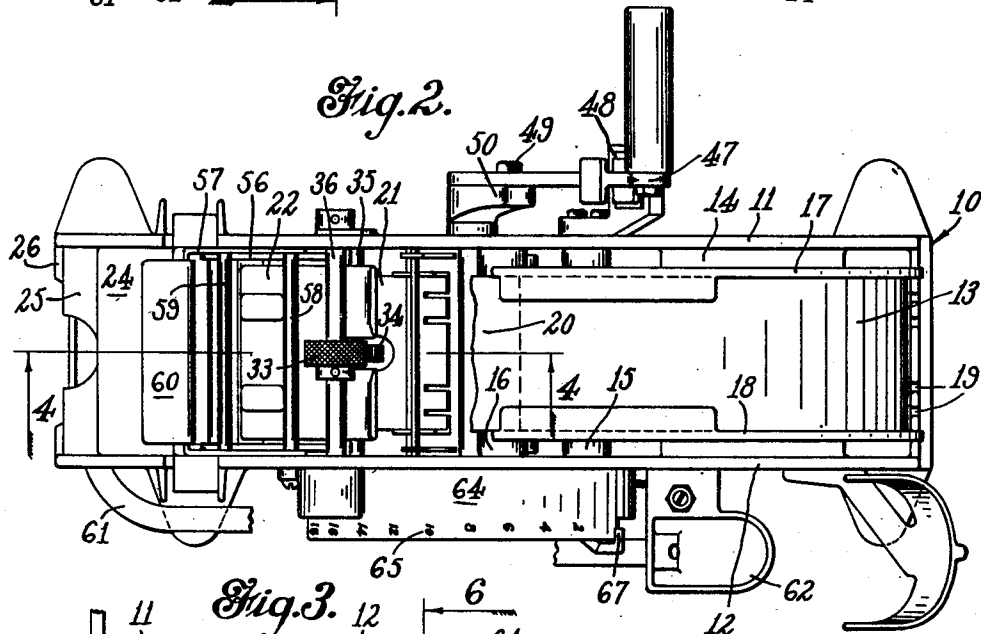
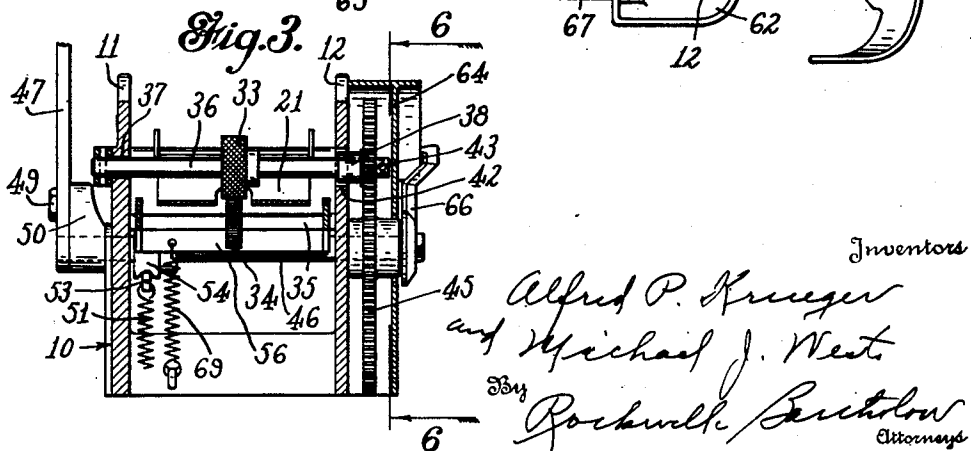
A. P. KRUEGER ET AL

2,350,281

TAPE SERVING MECHANISM

Filed Dec. 11, 1940

4 Sheets-Sheet 1



Inventors

Alfred P. Krueger
and Michael J. West

By Rockwell Britton
Attorneys

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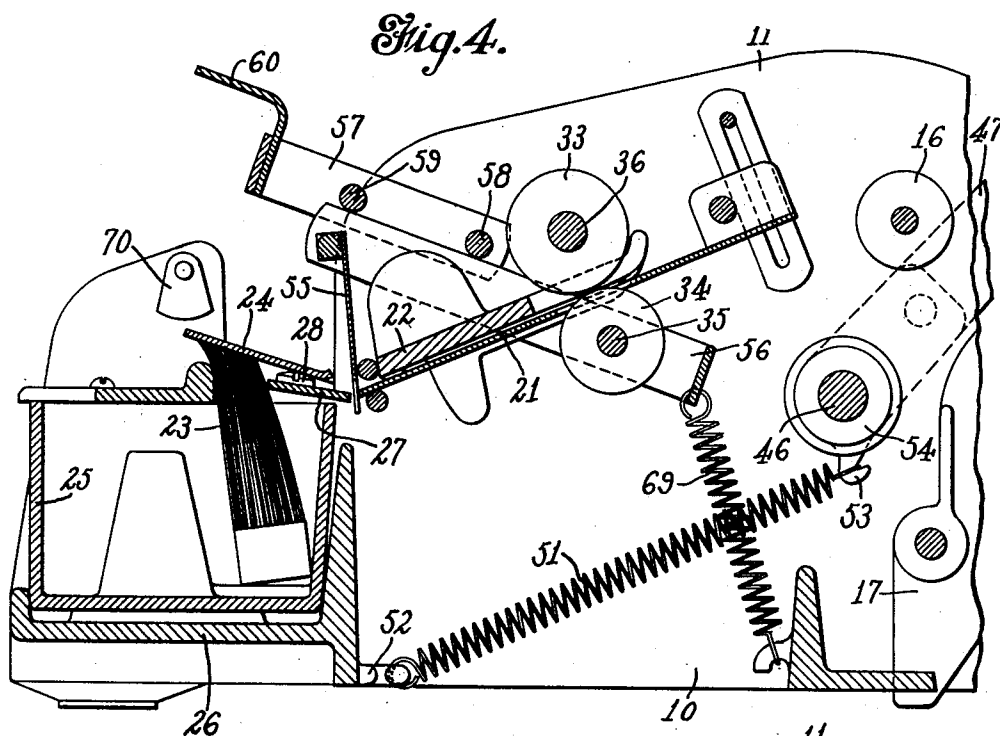
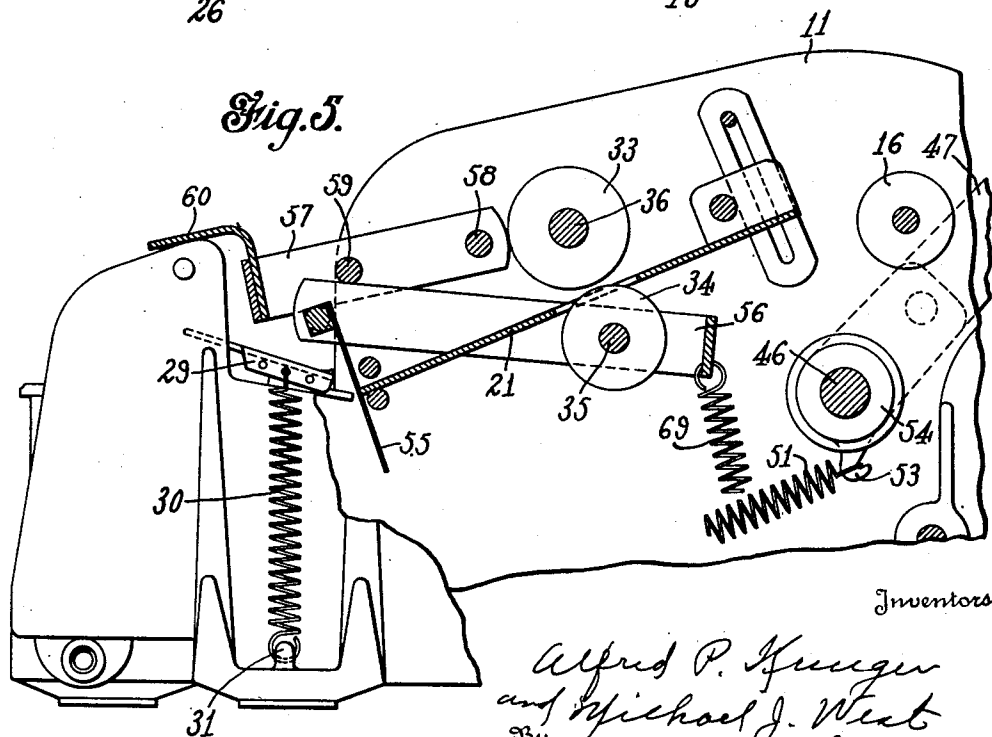
A. P. KRUEGER ET AL

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TAPE SERVING MECHANISM

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4 Sheets-Sheet 2



Inventors

Alfred P. Krueger
and Michael J. West
By Rockwell Burdett Attorneys

May 30, 1944.

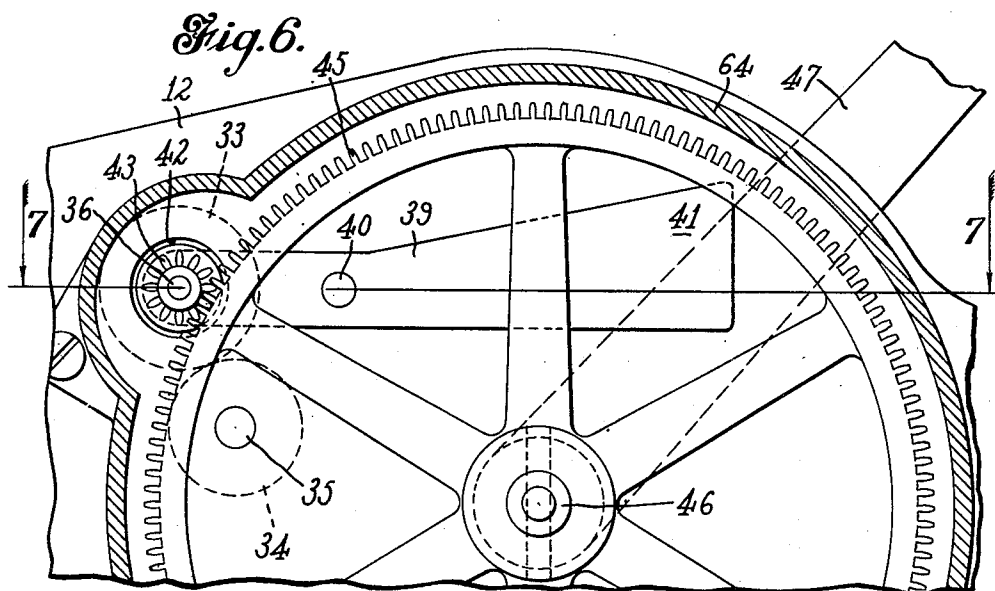
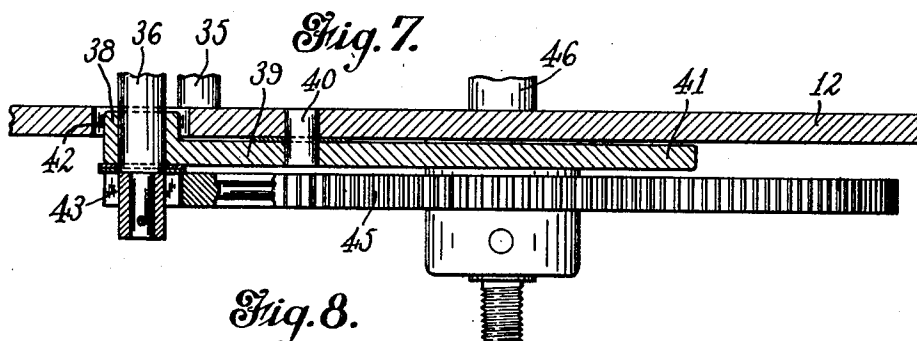
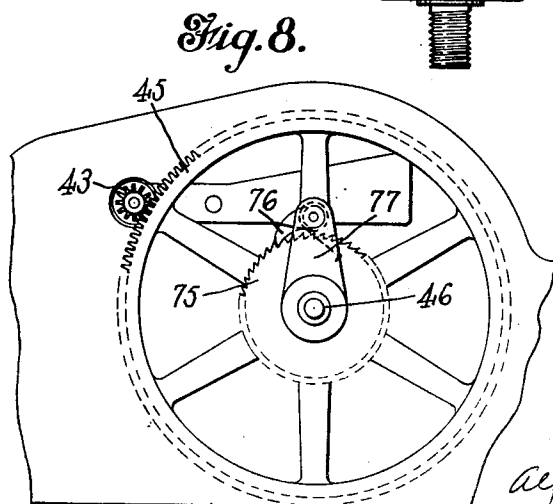
A. P. KRUEGER ET AL

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TAPE SERVING MECHANISM

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4 Sheets-Sheet 3



Inventors

Alfred P. Krueger
and Seymour J. West
By Rockwell B. Bartholomew
Attorneys

May 30, 1944.

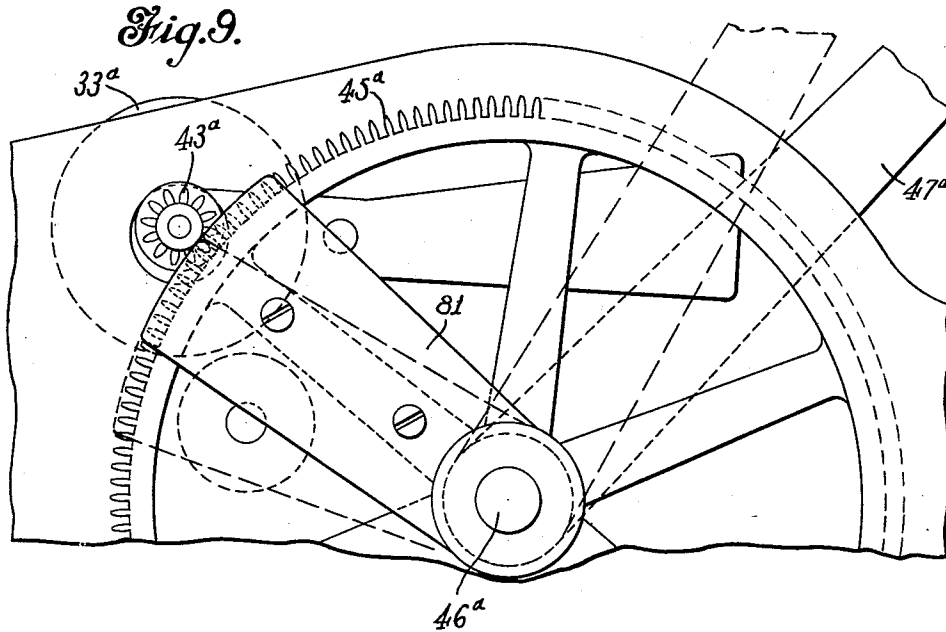
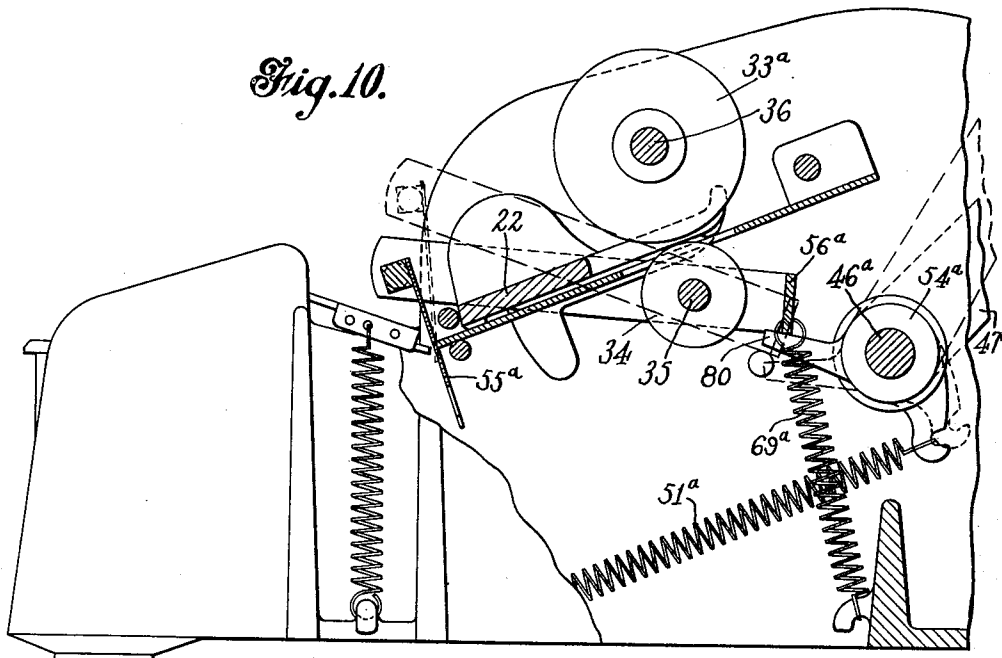
A. P. KRUEGER ET AL

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TAPE SERVING MECHANISM

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4 Sheets-Sheet 4



Inventors

Alfred P. Krueger
and Michael J. West
By Rockwell Bartholow
Attorneys

UNITED STATES PATENT OFFICE

2,350,281

TAPE-SERVING MECHANISM

Alfred P. Krueger, Stratford, and Michael J. West, Shelton, Conn., assignors, by mesne assignments, to Better Packages, Inc., Shelton, Conn., a corporation of New York

Application December 11, 1940, Serial No. 369,612

12 Claims. (Cl. 271—2.4)

This invention relates to tape-serving machines, and more especially to a machine adapted to serve or deliver a length of gummed tape which is moistened in the delivery process so that it is ready for application to a package or parcel.

More particularly it is also contemplated in the present invention to provide means for serving the tape, and to so regulate the tape-serving means that a strip of any desired length (within certain limits) may be served by the machine upon a single stroke of the operating lever, and to so arrange the device that after the tape-feeding means has been operated, the tape may, if desired, be freely drawn from the apparatus by hand, so that a strip of any length required may be drawn from the machine, even though the length of this strip exceeds the maximum length which may be fed by one stroke of the operating lever.

Most machines of this character provide for the actuation of the tape-feeding means by a reciprocating or oscillating lever having a forward and back stroke, this lever operating feed rolls which engage the tape to force it over the moistening element. In order to avoid a back feed of the tape when the handle or lever is returned to its starting position after an operating stroke, this lever usually has a one-way connection with the feed rolls such as a pawl and ratchet connection, so that, while the rolls are actuated upon the forward stroke of the operating lever, they are not actuated on the back stroke thereof.

In addition, when it is desired to feed a predetermined or measured length of tape from the machine, some prior devices have been arranged to separate the feed rolls at the end of the forward stroke or when a desired length of tape has been delivered, so as to positively check the forward feed, and in such machines it is necessary not only to provide a somewhat complicated system of levers or the equivalent to separate the feed rolls at a precise time in the operation of the machine, but it is also necessary to provide some means for returning the feed rolls to tape-contacting position, so that accurate feeding will be effected upon a subsequent stroke of the actuating lever.

Thus prior machines have been somewhat complicated in these respects, and thus rendered expensive to manufacture. In the present invention, a tape-serving apparatus is provided in which the one-way connection between the feed rolls and the operating lever may be eliminated, and one of the feed rolls positively driven at all

times. The complicated devices for separating the feed rolls and returning them to feeding contact with the tape are also eliminated, as the separation of the rolls is effected automatically by the torsional force applied to one of the feed roll shafts by the driving gear, as will be hereinafter explained. It is, of course, as will be illustrated, also possible to employ a one-way connection between the actuating means and the feed rolls if desired, but in most instances this will not be necessary.

One object of the invention is the provision of an improved tape-serving device which will be positive and efficient in operation, and which will be relatively simple in construction.

A still further object of the invention is the provision of a tape-feeding device having tape-feeding means such as rolls which will be automatically thrown into tape-contacting relation at the beginning of the feeding stroke of the operating lever, but be normally maintained out of feeding contact with the tape.

A still further object of the invention is the provision of a tape-feeding machine having a pair of feed rolls normally maintained in a non-feeding position, but automatically moved to feeding position when the rolls are rotated in a forward direction.

A still further object of the invention is the provision of a tape-feeding machine having a pair of feed rolls at least one of which is positively driven at all times during the operation of a feed lever, and which feed roll is automatically moved into feeding relation with the tape upon rotation thereof in a forward direction, and automatically moved out of tape-feeding relation either upon the most minute reverse movement of the lever or upon a forward pull on the tape itself, whereby upon the cessation of motion of the feed lever a length of tape may be freely drawn from the machine by hand.

Other objects of the invention reside in the improvement of various features of the machine of this character, as will appear from the following description and claims.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevational view of a tape-serving device embodying our invention;

Fig. 2 is a top plan view of the same;

Fig. 3 is a sectional view on line 3—3 of Fig. 1;

Fig. 4 is a sectional view through the front portion of the device on line 4—4 of Fig. 2;

Fig. 5 is a view similar to Fig. 4 but showing the parts in a different position;

Fig. 6 is a partial elevational view on line 6—8 of Fig. 3, showing the tape-feeding gears in side elevation;

Fig. 7 is a partial sectional view on line 7—7 of Fig. 6;

Fig. 8 is a view similar to Fig. 6 on a reduced scale, showing a modified form of our invention;

Fig. 9 is a view similar to Fig. 6, showing a further modification of our invention; and

Fig. 10 is a sectional view similar to Fig. 5 of the modified form of our invention shown in Fig. 9.

To illustrate one embodiment of our invention, we have shown in Figs. 1 to 7 of the drawings a tape-serving machine comprising a base or frame 10 having upstanding side walls 11 and 12 providing adjacent the rear ends thereof a space within which may be placed a roll of gummed tape 13, the roll resting upon a bottom plate 14 and also bearing against rollers 15 and 16 mounted between the plates 11 and 12. The roll 13 may be held in position laterally of the device by guide plates 17 and 18, shown more especially in Fig. 2, which plates may be adjusted by means of the notches 19 in the frame to various positions, depending upon the width of the tape being employed.

The strip of tape 20 which is drawn from the roll is adapted to pass over a supporting plate 21 and below a cover 22, which plate and cover provide a guide or throat between which the tape passes to a moistening device comprising the brush 23 and presser plate 24. The brush 23 is mounted within a water reservoir 25, which may be removably seated upon the forward portion 26 of the main frame 10.

A guide plate 27 is mounted below the presser plate 24, the rear edge of this guide plate being slightly spaced from the forward edge of the table 21 so as to permit the passage therebetween of a tape-severing blade, as will be hereinafter described. The member 27 may be secured to the main frame of the machine by screws 28, and the rear portion of the presser plate 24 may rest upon these screws. The latter plate is provided with downwardly turned edges 29 to which are connected springs 30 secured at their lower ends to the frame, as at 31, so that the presser plate will be urged into contact with the brush 23 at all times in order that the lower gummed surface of the strip 20 will be properly moistened.

To feed the tape from the machine, a pair of feed rolls 33 and 34 are provided, the former being above and the latter below the path of the tape between the members 21 and 22. The roll 34 is loosely mounted upon a shaft 35 mounted in the side plates 11 and 12 of the device, while the roll 33 is secured to a shaft 36 rotatably mounted in these plates. As is shown more especially in Fig. 3 of the drawings, the left-hand end of the shaft 36 passes through an opening 37 in the side plate 11, with a fairly snug fit but enjoying a slight freedom of motion. The right-hand end of the shaft 36 is carried in a boss 38 secured to or integral with a link 39 pivoted at 40 to the side plate 12. The rear end 41 of the link extends to the right (Figs. 6 and 7) of the pivot 40 so as to normally substantially balance the other end of the link and the weight of the shaft carried thereby, so as to prevent pressure of one roll on the other when idle, as will be hereinafter explained. The boss 39 ex-

tends within a relatively large opening 42 in the plate 12, so that this boss and the end of the shaft 36 rotatably mounted therein may enjoy an up and down movement with respect to the plate.

The actuating means for the feeding rolls will now be described. Upon the end of the shaft 36, which protrudes from the plate 12, is secured a pinion 43 the teeth of which mesh with those of a gear 45, the gear in the present embodiment of the invention being secured to a shaft 46 rotatably mounted in the side plates 11 and 12. Upon the end of this shaft opposite the gear 45 is a crank or handle lever 47 by which the shaft may be rotated, the lever 47 having an oscillating or reciprocatory movement. The lever in its rear position is designed to contact with a stop 48 secured to the machine, and at its lower end may be detachably secured by a bolt 49 to a crank arm 50 on the shaft 46, so that it may be removed and re-attached in a reverse position in order to give a longer stroke, if desired. A spring 51 is secured at one end to a hook 52 carried by the frame, and secured at its other end to a hook 53 provided on a collar 54 secured to the shaft 46, and tends to maintain the shaft in such a position that the arm 47 is at the beginning of a forward stroke against the stop 48, as shown in Figs. 1 and 2.

Means are also provided to sever the tape, which means takes the form of a severing blade 55 designed to enter the space between the member 21 and the guide 27, as shown more especially in Figs. 4 and 5. This blade is pivotally secured to a U-shaped frame 56 pivotally mounted upon the shaft 35. In order to depress the forward end of the blade or knife frame 56 and the blade 55, a second U-shaped member 57 is pivotally mounted in the side plates 11 and 12 by means of the rod 58, and the sides of this frame are connected by a rod 59, which rests upon the top of the U-shaped frame 56 in order to depress the latter when the frame 57 is depressed by the hand of the operator engaging a manually operable presser member 60.

The reservoir 25 may be supplied with water through a flexible tube 61 leading from the reservoir to a pan 62 above which is supported a water container 63.

The gears 43 and 45 may be covered by a gear casing 64 upon the outside of which indicating marks 65 may be provided to indicate to the operator the length of the strip delivered by the stroke of the crank or lever 47. It will be noted that the shaft 46 extends through the casing 64, and upon the end of this shaft is mounted an indicating arm 66 having on its end a pointer 67 which cooperates with the indicia 65, the arm 66 swinging with the shaft 46 and lever 47.

The operation of the device may now be briefly described. With the parts in the position shown in Figs. 1 to 4, and with the operating handle against the stop 48, it will be noted that the feed rolls 33 and 34 are not in tensioned contact due to the weight of the end 41 of the arm 39. The tape may then be inserted between the feed rolls in the guide throat between the members 21 and 22. In order to feed a length of tape from the machine, the operator grasps the handle 47 and pulls it forwardly, thus rotating the shaft 46 and the gear 45 secured thereon. The teeth of this gear are in constant mesh with those of the pinion 43, and the initial effect of the rotation of the gear 45 serves to move the gear 43 downwardly as permitted by the opening 38 due to

the torsion on the pinion 43. This causes the corresponding end of the shaft 36 to move downwardly, thus bringing the roll 33 into frictional engagement with the upper surface of the tape, so that the latter will be gripped in the roll bite of the rolls 33 and 34 and fed forwardly. It will be understood that the other end of the shaft 36 has sufficient play in the opening of the side plate 11 to permit this movement. The tape will now be fed forwardly between the brush 23 and the presser plate 24 until a desired length has been delivered from the machine. The operator at this time may depress the member 50, and thus actuate the knife frame 56 to depress the blade 55, as shown in Fig. 5, and sever the end of the tape.

It will be understood that if one stroke of the handle 47 does not deliver a sufficient length of tape from the machine, the operator may make a second or repeated strokes of the lever without depressing the knife-operating member 50, or he may, either by releasing pressure upon the handle 47 or by merely discontinuing the forward motion of the handle, draw such additional length of tape from the machine by hand, if desired. This action is permitted because, while any forward movement of the handle 47 or rotation of the gear 45 in an anti-clockwise direction, as shown in Fig. 6, will cause the roll 33 to grip the tape, this roll is not forced toward the roll 34 except by forward movement of the gear 45. That is, as soon as the rotating torque upon the pinion 43 is relieved, the roll 33 will no longer be urged toward its mate.

It will also be understood that when a sufficient length of tape has been served and the handle 47 released, the spring 51 will return the handle to its position of rest, shown in Figs. 1 and 2. During this return movement the gear 45 will be rotated in a reverse direction, and will also rotate the pinion 43, as the teeth of these members are always in engagement. However, the tape will not be fed rearwardly, as, upon the initiation of rearward rotation of gear 45, pinion 43 will be raised, thus separating the feed rolls 33 and 34. It will be apparent, therefore, that, while the feed roll 33 is constantly driven by the gear 45, regardless of the direction in which this gear rotates, nevertheless, owing to the unique method of mounting the shaft 36, the feeding of the tape will be effected only in a forward direction. After the severing blade 55 has been depressed, it is returned to its normal or idle position, shown in Fig. 4, by the spring 59.

It may sometimes be desired to use the plate 24 as a tear-off blade, and a stop 70 is provided on the forward portion of one of the side plates to restrict the upward movement of the plate 24, so that the operator, if he desires, may grasp the end of the served tape and tear it off against the forward edge of the presser plate.

If desired, our improvements may be employed with a one-way connection between the shaft 46 and the gear 45. Such a connection is shown in Fig. 8 of the drawings, where, as illustrated, the gear 45 is loosely mounted upon the shaft 46, and carries a ratchet wheel 75, the teeth of which are engaged by a pawl 76 pivoted to a crank arm 77 secured to the end of the shaft 46. It will be understood that the remaining parts of the device are constructed as illustrated in Figs. 1 to 7, and that this device will operate as described in connection with the prior modification, except that when the lever 47 moves through its backward stroke the

gear 45 will not be rotated. The feed rolls 33 and 34 will, however, remain separated except during a forward stroke of the lever 47, when the rotating torque imparted to the pinion 43 will depress the adjacent end of the shaft 36, so that the only difference between this modification of our invention and that shown in Figs. 1 to 7 of the drawings lies in the provision of a one-way connection between the shaft 46 and gear 45.

In Figs. 9 and 10 of the drawings we have shown a further modification wherein the severing means is automatically actuated after the tape-serving cycle, and does not need any attention from the operator in addition to that necessary to serve the tape from the machine. The device shown in these figures is generally similar to that shown in Fig. 7, except that the manually operable knife-actuating members 57, 59 and 60 are omitted. The knife 55^a is carried in a U-shaped frame 56^a, as previously described, and the collar 54^a secured upon the shaft 45^a is provided with an arm 80 to engage the bight portion of the member 56^a and move the knife from the dotted line position shown in Fig. 10 to the full-line position shown in this figure when the operating lever or handle 47^a is in its rearmost or full-line position.

In feeding tape from this machine, the handle 47^a is drawn forwardly, as heretofore explained, and when released is urged rearwardly by the spring 51^a to the full-line position shown in Figs. 9 and 10, the knife frame being engaged about the time the member 47^a reaches the dotted line position shown in these figures, and during the movement of the member 47^a from the dotted to the full-line positions the knife frame is moved downwardly to sever the tape.

As the feed roll 33^a and associated parts are the same as illustrated in connection with Figs. 1 to 7, it will be seen that when the handle 47^a is pulled forwardly from its full-line position, shown in Figs. 9 and 10, there would be a tendency to feed the tape immediately, before the spring 59^a would have an opportunity to move the blade 55^a upwardly to a sufficient extent to clear the tape path. In order to prevent the feed of the tape against the knife blade, means are provided to hold the feed roller out of position until the handle 47^a has been moved forwardly to the dotted line position shown in Figs. 9 and 10, in which position the blade 55^a lies above the path of the tape. This means takes the form of a masking member 81, shown more especially in Fig. 9, which member is secured to the driving gear 45^a, and covers or masks the teeth of this gear over a small arc, so that its outer edge contacts the hub of the movable pinion 43^a. This mask is of such width that it engages the hub of the pinion 43^a during the movement of the handle lever 47^a between the dotted and full-line positions shown in Figs. 9 and 10, so that the pinion 43^a and feed roll 33^a are held in their upper positions over this range of movement, or, in other words, during the time that the arm 80 engages the knife blade. Therefore, after the tape has been served and the handle 47^a has been released and has been thrown rearwardly by the spring 51^a to effect the severing of the length of tape which has been served, the feed roll 33^a is held out of contact with the tape during the severing operation. When the operator wishes to use the machine in a subsequent tape-feeding operation and the handle 47^a is drawn forwardly,

this forward rotation of the gear 45^a will not be permitted to move the roll 33^a into contact with the tape until after the edge of the mask 81 has passed beyond the hub of the pinion 43^a. This will not take place until the handle has reached the dotted line position shown in Figs. 9 and 10, and the arm 80 has been moved out of engagement with the blade carrier 56^a, and the blade has been moved to its upper position by the spring 69^a. As soon, however, as the mask 81 passes out of engagement with the hub of the pinion 43^a, the rotating torque imparted to this pinion by the gear 45^a will immediately move the shaft 36 and roll 33^a downwardly to initiate the feeding of the tape, so that this feeding takes place when the arm 47^a is moved forwardly from its dotted line position, but not during its movement between the full and dotted line positions.

It will also be obvious that with this form of our invention a rearward movement of the handle at any time during the tape-serving operation will effect the severing of the length of tape which has been served. That is, an operator does not have to bring the handle forwardly through a full stroke, but may arrest the movement of its handle at any time during a stroke when a sufficient length of tape has been served, and by releasing the handle or by moving it rearwardly to its full-line position may operate the cutter. Immediately upon the beginning of the backward stroke of the handle, the roll 33^a is thrown out of frictional engagement with the tape, so that there is no rearward feeding of the tape during the backward stroke of the handle, notwithstanding the fact that the teeth of the gear 45^a and pinion 43^a are in constant mesh.

While we have shown and described some preferred embodiments of our invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What we claim is:

1. In a tape-serving device, means for supporting a roll of tape, feeding means to feed a length of tape from said roll, said feeding means comprising a pair of cooperating feed rolls between which the tape passes, means for rotating one of said rolls, means effective upon the application of the rotating torque to said roll to urge it into frictional contact with the tape when rotated in a forward direction, and means urging said roll away from tape-contacting position except during the forward rotation thereof.

2. In a tape-serving device, means for supporting a roll of tape, feeding means to feed a length of tape from said roll, said feeding means comprising a pair of cooperating feed rolls between which the tape passes, an operating member having a to and fro movement, means connecting said operating member with one of said rolls to rotate the latter in reverse directions when said member is moved in reverse directions, and means effective upon the rotation of said roll in a forward direction to urge the latter into frictional contact with the tape.

3. In a tape-serving device, means for supporting a roll of tape, feeding means to feed a length of tape from said roll, said feeding means comprising a pair of cooperating feed rolls between which the tape passes, an operating member having a to and fro movement, means connecting said operating member with one of said rolls to rotate the latter in reverse direction when said

member is moved in reverse direction, and means effective upon the rotation of said roll in a forward direction to urge the latter into frictional contact with the tape and effective at other times to urge said roll away from tape-contacting position.

4. In a tape-serving device, means for supporting a roll of tape, feeding means to feed a length of tape from said roll, said feeding means comprising a pair of cooperating feed rolls between which the tape passes, driving means for one of said rolls including an oscillatable lever, said driving means urging said roll into frictional contact with the tape, and means to hold said roll out of tape-contacting position during the initial movement of said lever in a direction to effect feeding of the tape.

5. In a tape-serving device, tape feeding means comprising a pair of cooperating feed rolls between which the tape passes, a shaft carrying one of said rolls, at least one end of said shaft being mounted for movement transversely to its axis, a pinion upon said shaft end, a gear rotatably carried by the device the teeth of which engage the teeth of said pinion, and means for rotating said gear, reciprocable to drive said movable shaft and roll in tape feeding direction and in non-tape feeding direction.

6. In a tape-serving device, means for supporting a roll of tape, feeding means to feed a length of tape from said roll, said feeding means comprising a pair of cooperating feed rolls between which the tape passes, a shaft carrying one of said rolls, at least one end of said shaft being mounted for movement transversely to its axis, a pinion upon said shaft end, a gear rotatably carried by the device the teeth of which engage the teeth of said pinion, means for rotating said gear, the arrangement of the parts being such that when said shaft is rotated in a forward feeding direction the roll thereon is thereby urged into frictional contact with the tape, said gear-rotating means including a manually operated member having a to and fro movement to rotate said gear in forward and reverse directions, and means urging said roll out of tape-contacting position when the gear is rotated in a reverse direction.

7. In a tape-serving device, means for supporting a roll of tape, feeding means to feed a length of tape from said roll, said feeding means comprising a pair of cooperating feed rolls between which the tape passes, a shaft carrying one of said rolls, at least one end of said shaft being mounted for movement transversely to its axis, a pinion upon said shaft end, a gear rotatably carried by the device the teeth of which engage the teeth of said pinion, means for rotating said gear, the arrangement of the parts being such that when said shaft is rotated in a forward feeding direction the roll thereon is thereby urged into frictional contact with the tape, and means effective upon the cessation of the forward rotation of said gear to urge said roll out of tape-contacting position.

8. In a tape-serving device, means for supporting a roll of tape, feeding means to feed a length of tape from said roll, said feeding means comprising a pair of cooperating feed rolls between which the tape passes, driving means for one of said rolls including a manually operable member having a to and fro movement, said driving means urging said roll into frictional contact with the tape, and means to hold said roll out of tape-contacting position during a part

of the movement of said manually operable member.

9. In a tape-serving device, means for supporting a roll of tape, feeding means to feed a length of tape from said roll, said feeding means comprising a pair of cooperating feed rolls between which the tape passes, a shaft carrying one of said rolls, at least one end of said shaft being mounted for movement transversely to its axis, a pinion upon said shaft end, a gear rotatably carried by the device the teeth of which engage the teeth of said pinion, means for rotating said gear, the arrangement of the parts being such that when said shaft is rotated in a forward feeding direction the roll thereon is thereby urged toward frictional contact with the tape, and means for holding the roll out of tape-contacting position during a partial rotation of said gear.

10. In a tape-serving device, means for supporting a roll of tape, feeding means to feed a length of tape from said roll, said feeding means comprising a pair of cooperating feed rolls between which the tape passes, a shaft carrying one of said rolls, at least one end of said shaft being mounted for movement transversely to its axis, a pinion upon said shaft end, a gear rotatably carried by the device the teeth of which engage the teeth of said pinion, means for rotating said gear, the arrangement of the parts being such that when said shaft is rotated in a forward feeding direction the roll thereon is thereby urged

toward frictional contact with the tape, and means for holding the roll out of tape-contacting position during a partial rotation of said gear, said means comprising a member mounted upon said gear and engaging said shaft to prevent movement thereof.

11. In strip feeding mechanism, a pair of feed rolls adapted to grip the strip to be fed, one of said rolls being mounted for rotation about an axis displaceable with relation to the axis of the other roll so as to separate the rolls from gripping engagement with the strip, and a reversible driving means for rotating said displaceable roll, said driving means acting upon the displaceable roll to move the roll into gripping engagement with the strip when the driving means is moved to rotate the roll in tape feeding direction.

12. In strip feeding mechanism, a pair of feed rolls adapted to grip the strip to be fed, one of said rolls being mounted on an axle displaceable with respect to the axis of rotation of the other roll so as to separate the rolls from gripping engagement with the strip, a gear on said displaceable axle and reversible driving gearing for driving said axle gear, said reversible driving gearing causing said gripping engagement when moved in tape feeding direction, and causing said separation of the rolls when moved in the opposite direction.

ALFRED P. KRUEGER.
MICHAEL J. WEST.