May 9, 1950 A. P. KRUEGER 2,507,445

TAPE SERVING MECHANISM

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Fig. 1.

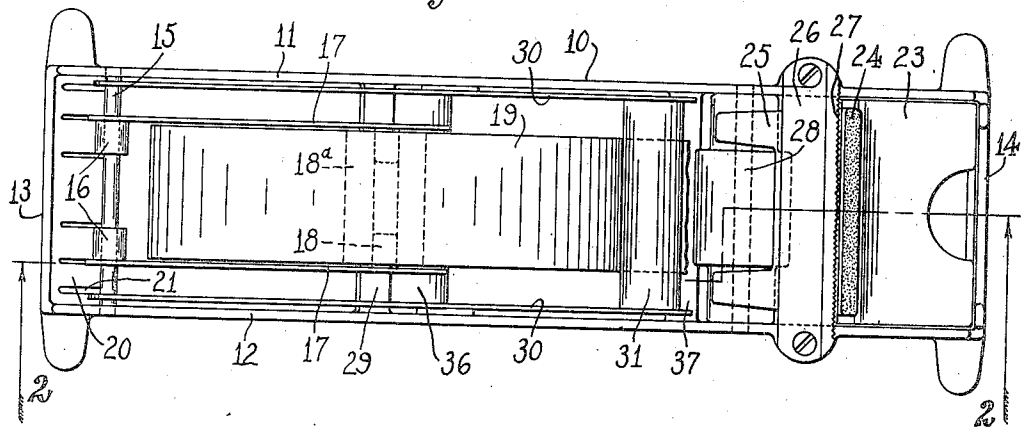
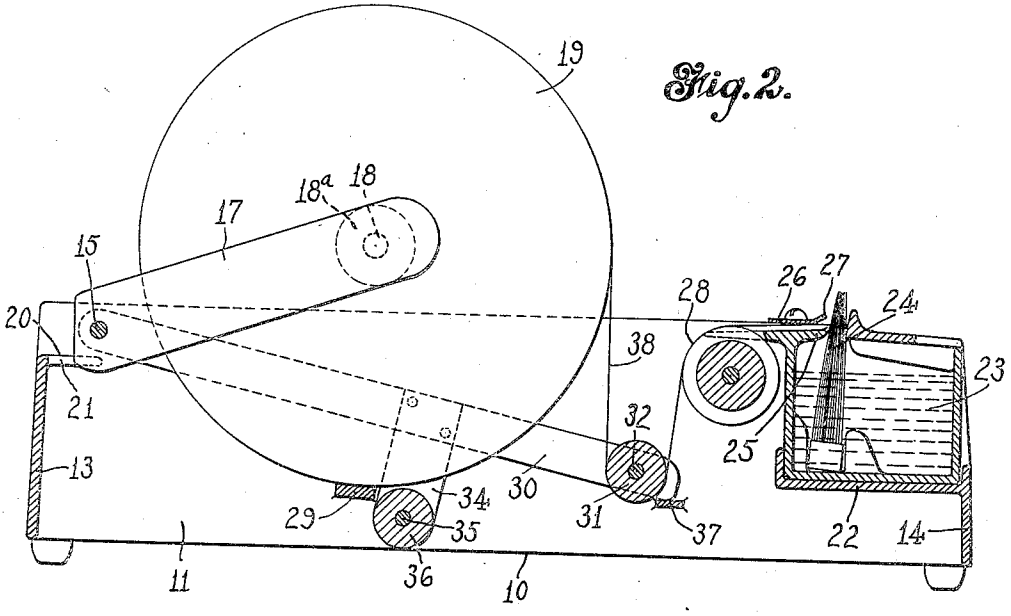


Fig. 2.



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TAPE SERVING MECHANISM

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Fig. 3.

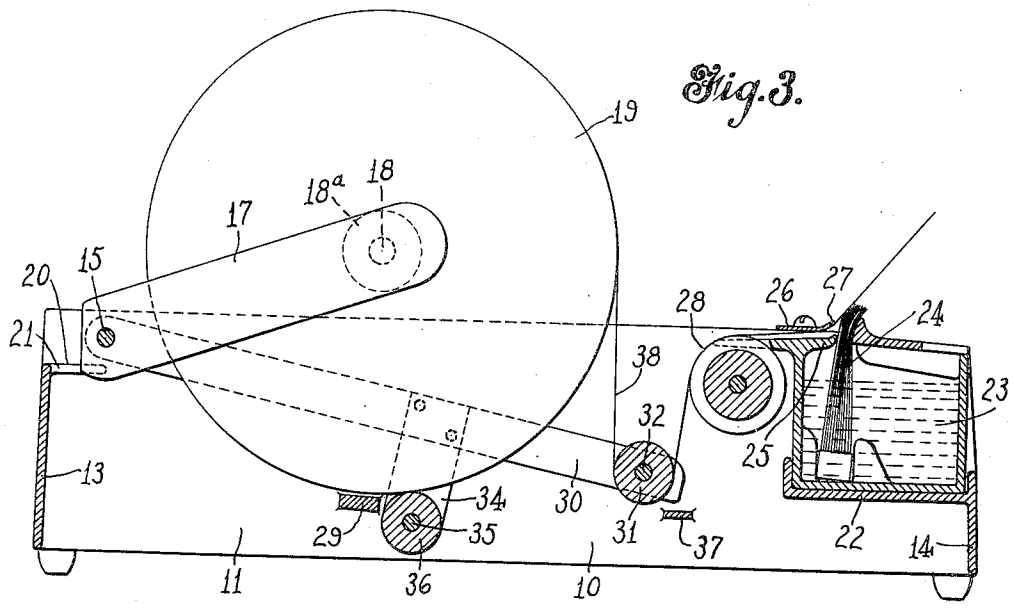


Fig. 4.

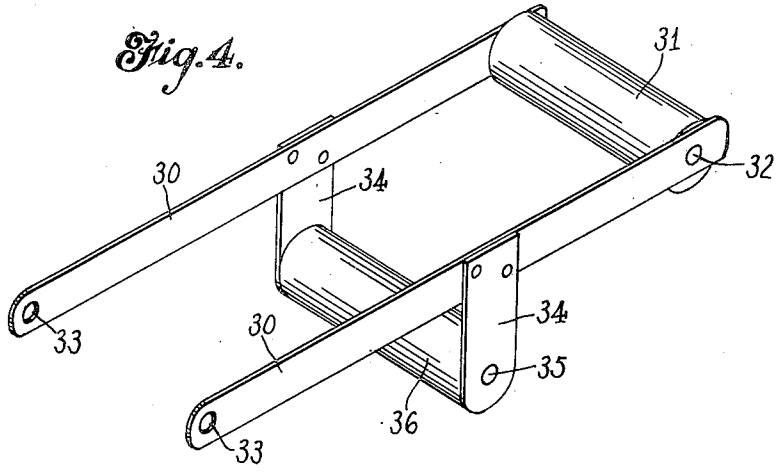
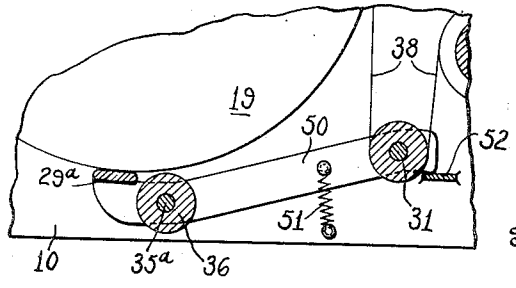


Fig. 7.



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TAPE SERVING MECHANISM

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Fig. 5.

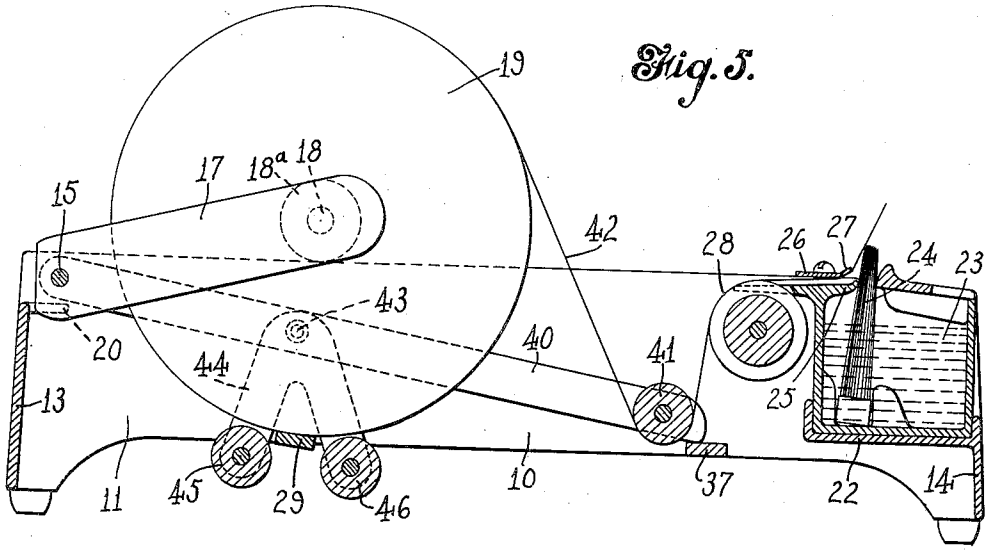
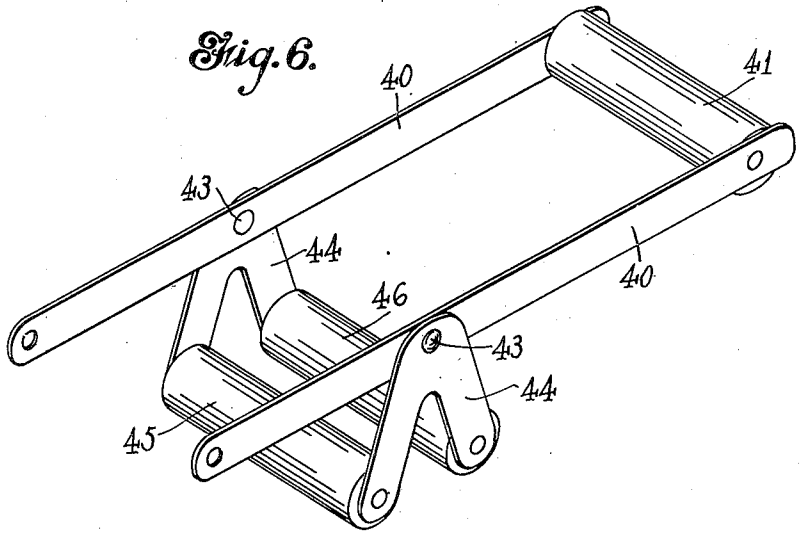


Fig. 6.



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UNITED STATES PATENT OFFICE

2,507,445

TAPE-SERVING MECHANISM

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Application July 26, 1945, Serial No. 607,223

16 Claims. (Cl. 242—55.5)

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This invention relates to tape-serving mechanisms, and more particularly to a device for delivering a gummed tape or paper strip from a source of supply, such as a roll or the like, in moistened condition ready for application to a parcel or package.

Such devices usually comprise a support or frame having provision for supporting the roll of tape and a moistening unit or brush over which the gummed surface of the tape is drawn, so that it will be properly moistened for application to the package. It is desirable to have the roll of tape so supported that it will revolve relatively freely when tension is exerted upon the strip of tape to draw it from the roll, although it is also desirable to have a certain amount of tension on the tape, particularly in a machine from which the tape is drawn by hand, so that the tape will be drawn over the moistening brush with sufficient pressure to be properly moistened. However, if the roll is so supported that it will turn freely or sufficiently freely that an excess of effort is not required to draw the tape from the roll, it often occurs that the roll continues to rotate under its acquired momentum after the discontinuance of the tension. In other words, if the operator grasps the end of the strip of tape and draws it from the machine with a rapid motion, the momentum acquired by the roll during the time that unwinding tension is applied to the tape will cause the roll to continue to rotate after the desired length has been delivered, thus causing a certain amount of the tape to pile up in loose layers about the roll, which will in turn interfere with the operation of the device when it is again used.

The disadvantage above referred to is particularly noticeable when the supply roll is supported upon anti-friction rollers, as is often the case. While such a support enables the tape to be drawn from the roll in a satisfactory manner, it will not check the overthrow or the continued rotation of the roll under the momentum or inertia acquired during the application of tension in an unwinding direction. I contemplate in the present invention, therefore, providing a tape-dispensing machine wherein the roll will be frictionally restrained from rotating when the tape is not under tension, but, when the tape is placed under tension, this friction will be relieved so as to permit the supply roll to rotate more freely and thus not require an excess of force to operate the device. Moreover, as soon as the tension upon the tape is discontinued, the roll will again be placed under friction, so that the rotation of

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the roll will be checked, and overthrow will be reduced to a minimum.

One object of the invention is to provide a new and improved device for dispensing gummed tape.

Another object of the invention is to provide a machine for dispensing gummed tape, such that overthrow of the tape at the end of a dispensing operation will be prevented.

Still another object of the invention is to provide a machine for dispensing gummed tape having means for normally restraining the tape roll against rotation, but which restraining means will be either eliminated or greatly reduced in effect when tension is applied to the tape to draw it from the supply roll.

More specifically, the invention resides in providing in a tape-dispensing machine, supporting means for the supply roll of tape comprising a friction member and an anti-friction member, the supply roll, when at rest, being supported upon the friction member, and the friction and anti-friction members being relatively movable so that, when tension is applied to the tape in an unwinding direction, a substantial portion or all of the weight of the supply roll will be transferred from the friction member to the anti-friction member to relieve the friction and permit relatively free turning of the roll.

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 top plan view of tape-serving machine embodying my invention;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 2, showing the parts in positions assumed when the tape is being drawn from the supply roll;

Fig. 4 is a perspective view of the means for relieving restraining friction upon the roll when tension is applied to the tape;

Fig. 5 is a sectional view similar to Fig. 2, showing a modified form of my device;

Fig. 6 is a perspective view of the carriage shown in Fig. 5; and

Fig. 7 is a detail view showing a further modified form of my invention.

To illustrate a preferred embodiment of my invention, I have shown a tape-dispensing mechanism comprising a support or frame 10 comprising upstanding side walls 11 and 12 connected together by webs 13 and 14 at their rear and front ends respectively, this frame forming a support for the various elements of the device.

Secured in the side walls 11 and 12 adjacent the upper rear corner thereof is a rod or shaft 15 having loosely mounted thereon a pair of hubs 16 carrying forwardly extending arms 17, these arms having inwardly projecting pins 18, upon which is rotatably mounted the spool 18a of the supply roll of tape 19. As the hubs 16 are loosely mounted on the rod 15, the arms may swing freely about this rod to accommodate rolls of various sizes, and may also be moved longitudinally of the rod, so as to vary the spacing therebetween in order to accommodate rolls of tape of various widths. A plate 20 may be secured to the frame, which plate is provided with a series of slots 21 adapted to receive the rear ends of the arms 17, so as to hold the latter in properly spaced positions according to the width of the tape being used. It will, of course, be understood that as the supply of tape is used and the roll 19 becomes smaller, the arms 17 will drop about the rod 15, their rear ends moving freely within the slots 21.

Adjacent the forward portion of the frame a web 22 provides a support for a water receptacle 23 within which is mounted the brush 24 in which the liquid rises by capillary action to moisten the tape as its gummed surface is pulled over the brush. A throat through which the tape is drawn is provided by a lower guide member 25 herein shown as formed integrally with the receptacle 23 and an upper guide plate 26 having a serrated edge 27 against which the tape may be torn off when a sufficient quantity thereof has been drawn from the roll. Rearwardly of the guide members 25 and 26 is a guide roller 28 rotatably mounted between the side walls 11 and 12 over which the tape passes and by which it is properly guided between the guide plates.

The supply roll 19 normally rests upon a transversely disposed member 29 herein shown as secured to the walls 11 and 12 of the frame, and which member exerts a certain amount of friction upon the surface of the tape on the roll, so that free turning of the latter about the pins 18 is restrained. Means are provided, however, as previously explained, to transfer at least a portion of the weight of the tape from the friction support member 29 to an anti-friction member or roller when tension is applied to the tape in a direction to draw the same from the roll, as will now be described.

Pivotally mounted upon the supporting frame is the frame or carriage shown in Fig. 4. This carriage, as illustrated, comprises spaced arms 30 carrying at their forward ends a roller 31, which roller is loosely mounted upon a pin 32 joining the forward ends of the arms and serving to hold them in spaced relation. The rear ends of the arms 30 are pivoted to the frame of the machine and, as illustrated, are provided with openings 33 which loosely receive the rod 15, so that these arms are pivoted coincidentally with the arms 17. The arms may, however, be pivoted to the frame at any point desired, depending upon the particular characteristics or dimensions of the mechanism with which they are used, the pivot point being chosen to secure the proper leverage, as will be hereinafter explained.

Depending from the arms 30 are a pair of supporting straps 34, these straps supporting a pin 35 upon which is loosely mounted a roller 36, and the forward end of the arms 30 are normally supported as shown in Fig. 2 by a web member 37 extending between the side walls 11 and 12. As also shown in Fig. 2, the tape 38 as it comes from the roll is trained about the roller 31 and then is directed upwardly over the roller 28, so that tension applied to the free end of the tape to draw it from the roll will tend to raise the roller 31 and the carriage upon which the roller is mounted.

In the normal or rest position of the parts, as shown in Fig. 2, when the forward ends of the arms 30 are supported upon the member 37, it will be noted that the upper surface of the roller 36 lies slightly below and out of engagement with the lower surface of the supply roll 19, thus causing the weight of the latter to be borne by the support member 29, so that the frictional force due to the weight of the roll and the friction of the surface of the tape with the member 29 will tend to restrain rotation of the roll. However, when tension is applied to the free end of the tape to draw it over the brush 24, the roller 31 and the carriage to which it is attached will be raised about the pivot rod 15, thus raising the roller 36 into contact with the lower surface of the roll 19, as shown in Fig. 3. As a result, the weight of the roll, or a substantial part of its weight, will now be carried by the anti-friction roller 36 and will be taken from the anti-friction member 29, thus permitting the roll 19 to revolve relatively freely. This will permit the user of the device to draw the tape from the roll with comparatively little opposing friction. As soon, however, as a sufficient length of tape has been pulled from the roll and it is torn off against the serrated edge 27 of the plate 26, tension upon the tape will be discontinued and the carriage will again drop upon the support 37, thus permitting the weight of the roll 19 to be carried entirely by the member 29 which will immediately check the rotation of the roll and reduce overthrow or continued rotation of the latter due to its momentum.

While, as shown, the arms 30 are pivoted upon the rod 15 for convenience, the pivot point of these arms may be varied as desired in order to provide the desired relation between the movement of the rollers 31 and 36. It will, of course, be apparent that the nearer the roller 36 is to the pivot point of the arms, the greater will be the required movement of the roller 31 in order to raise the roller 36 into contact with the supply roll, and it is desirable to limit the movement of the roller 31, so that, when the carriage drops from its raised position in Fig. 3 to the rest position shown in Fig. 2, the free end of the tape will not be withdrawn rearwardly to such an extent that it would no longer extend into the throat provided by the members 25 and 26. Also the distance of the roller 36 from the pivot point of the arms 30 will determine the tension which must be applied to the tape to transfer the weight of the supply roll from the fixed support member 29 to the anti-friction member 36, and, therefore, the tension under which the tape is drawn from the machine may be regulated by adjustment of this distance. These and other considerations will determine the position of the roll 36 with respect to the pivot points of the arms 30.

Whether or not the roll of tape 19 will be raised completely from the support 29 will depend to some extent on the way that tension is applied to the tape by the operator. For example, a slow steady pull of the tape may only relieve the support 29 of a sufficient amount of

the weight of the roll so that the frictional force exerted by the support will equal the tension exerted upon the tape. If, however, a sudden or more violent pull is exerted upon the tape in order to secure a supply quickly, the roll will, in that event, be lifted entirely from the support and be borne by the roller 36.

In Figs. 5 and 6 of the drawing, I have shown a somewhat modified form of my invention in which two anti-friction rollers are provided for the roll of tape, one upon each side of the fixed support. In this instance, a carriage is provided comprising the arms 40 similar to the arms 30 shown in Fig. 4, these arms being pivoted at their rear ends to the frame upon the shaft 15. These arms carry at their forward ends the roller 41 about which the tape 42 is trained as it comes from the roll, this roller acting as the roller 31 of Fig. 4. Also the frame is provided with the fixed or stationary support 29 upon which the roll of tape 19 normally rests.

Pivotally suspended at 43 from each of the arms 40 are V-shaped hangers 44 rotatably carrying the rollers 45 and 46, and, as shown in Fig. 5, the hangers are so disposed upon the arms 40 so that one will lie at each side of the fixed support 29. These hangers are pivotally attached to the arms, so that the rollers 45 and 46 may adjust themselves to the roll of tape as the carriage is lifted, thus insuring that the tape will be supported upon both of the rollers. The rollers are spaced a sufficient distance apart so that, when the carriage is raised by the unwinding of the tape, they will pass by the support 29 and raise the weight of the tape or a substantial part thereof from the fixed support 29 and thereby relieve the tension so as to permit relatively free turning of the roll.

It may be noted that in this case the pivot points 43 of the hangers 44 are spaced closer to the pivot points of the arms 40 than is the roller 36 shown in Fig. 4, thus requiring a greater movement of the roller 41 but less effort on the part of the operator to raise the roll of tape from the fixed support 29 than is required in that form of my device shown in Figs. 1 to 4. This movement, however, will not be sufficiently great to withdraw the end of the tape to a position where it will be inaccessible.

In the forms of my invention thus far described, I have shown the frictional supporting member 29 as fixed in the frame, and the supporting roller 36 as movable relatively to the support 29 in order to take the weight of the roll of tape from the latter. As it is only necessary to effect relative movement between these members, the roller 36 may be mounted upon a fixed axis and the supporting member 29 may be movable, and the same result achieved. Such a construction is shown in Fig. 7 of the drawings, wherein the roller 36 is rotatably mounted upon an axis 35a secured in the side walls of the frame 10 of the machine. A pair of arms 50 (only one of which is shown) are pivoted upon the axis 35a, one arm being disposed adjacent each of the side walls of the frame, as are the arms 30, previously described. At their forward ends these arms carry the roller 31, around which the tape 33 is trained in its passage from the machine, and the arms 50 are urged downwardly by the spring 51, the movement in this direction being limited by a stop 52 against which the forward ends of the arms engage.

The rear ends of these arms carry a support 29a, which is secured to the arms and connects them together at their rear ends. As will be observed from Fig. 7 in the normal position of the parts, when the arms 50 are held against the stop 52 by the spring 51, the friction support 29a supports the roll of tape 19 and holds it above the anti-friction roller 36, so that resistance will be offered to the rotation of the roll. However, when tension is applied to the free end of the tape to draw it from the machine, the roller 31, and therefore the arms 50, will be raised against the tension of the spring 51, thus lowering the friction member 29a and transferring a substantial part or all of the weight of the roll of tape 19 to the anti-friction roller 36, thus permitting the roll 19 to rotate relatively freely. It will be understood that the tape roll 19 is supported in a manner similar to that shown in Figs. 2 and 5.

As illustrated, my improvements are applied to a tape-dispensing device in which the tape is withdrawn from the roll by hand, but it will be understood that the invention is equally applicable to a tape-dispensing machine provided with the usual form of feed rollers to draw the tape from the roll.

While I have shown and described some preferred embodiments of my 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 claims.

What I claim is:

1. A tape-dispensing machine comprising a frame, means carried thereby for supporting a roll of tape by engaging the outer surface of the roll, said means comprising a friction member and an anti-friction member, said friction member normally carrying the preponderance of the weight of the roll, means for transferring at least a part of said weight to said anti-friction member, said last-named means including an element engaged and lifted by the tape as it comes from the roll, and means for restraining forward movement of the roll.

2. A tape-dispensing machine comprising a frame, means carried thereby for supporting a roll of tape by engaging the outer surface of the roll, said means comprising a friction member and an anti-friction member, means for supporting said members for relative movement, and means for moving one member relatively to the other to transfer at least a part of the weight of the roll from one to the other of said members, said last-named means comprising a member engaged and moved by the tape as it comes from the roll.

3. A tape-dispensing machine comprising a frame, means fixedly secured to the frame to support a roll of tape and upon which the roll is adapted to rest, an anti-friction member, means movably supporting said member in a normal position below the tape roll, and means to raise said member to position to engage and support the tape roll, said means comprising an element engaged and moved by the tape as it comes from the roll.

4. A tape-dispensing machine comprising a frame, means carried by the frame to support a roll of tape and upon which the roll is adapted to rest, an anti-friction member, means movably supporting said member in a normal position below the tape roll, and means to raise said member to position to engage and support the tape roll, said last-named means comprising a tape-engaging member actuated by a pull upon the tape in a direction to draw it from the roll.

5. A tape-dispensing machine comprising a frame, means carried by the frame to support a roll of tape and upon which the roll is adapted to rest, an anti-friction member, means movably supporting said member in a normal position below the tape roll, and means to raise said member to position to engage and support the tape roll, said last-named means comprising a roller around which the tape is trained in its movement from the roll.

6. A tape-dispensing machine comprising a frame, means carried by the frame to support a roll of tape and upon which the roll is adapted to rest, an anti-friction member, means movably supporting said member in a normal position below the tape roll, means to raise said member to a position to engage and support the tape roll, said last-named means comprising a roller around which the tape is trained in its movement from the roll, a movable mounting for said roller, and means connecting said mounting with said anti-friction member.

7. A tape-dispensing machine comprising a frame, means carried thereby for supporting a roll of tape comprising a friction member and an anti-friction member disposed below the roll to engage the lower surface thereof, means for supporting said members for relative movement, means for moving one member relatively to the other to transfer at least a part of the weight of the roll from one to the other of said members, said last-named means including a tape-engaging member actuated by tension upon the tape in a direction to dispense the latter, and said one member returning to its normal position after the discontinuance of said tension.

8. A tape-dispensing machine comprising a frame, means carried thereby for supporting a roll of tape comprising a friction member and an anti-friction member, said anti-friction member normally standing below and spaced from said roll, a pivoted support upon which said anti-friction member is carried, and a roller carried by said support around which the tape is trained whereby unwinding tension upon the tape raises said support and anti-friction member to take the weight of the roll from said friction member.

9. A tape-dispensing machine comprising a frame, supporting means fixed on said frame upon which a roll of tape to be dispensed is adapted to rest, a second frame pivoted to said main frame and carrying a roller, said roller being disposed adjacent to but below said supporting means, and said second frame also carrying adjacent its forward end a tape-engaging member around and below which the tape is trained whereby tension upon the tape in a direction to dispense the same raises said frame and roller to engage and support the tape roll.

10. A tape-dispensing machine comprising a frame, supporting means fixed on said frame upon which a roll of tape to be dispensed is adapted to rest, a second frame pivoted to said main frame and carrying a roller, said roller being disposed adjacent to but below said supporting means, said second frame also carrying adjacent its forward end a tape-engaging member around and below which the tape is trained whereby tension upon the tape in a direction to dispense the same raises said frame and roller to engage and support the tape roll, and said second frame returning to its original position when said tension is discontinued.

11. A tape-dispensing machine comprising a frame, supporting means fixed on said frame upon which a roll of tape to be dispensed is adapted to rest, a second frame pivoted to said main frame and carrying a roller, said roller being disposed adjacent to but below said supporting means, said second frame also carrying adjacent its forward end a tape-engaging member around and below which the tape is trained whereby tension upon the tape in a direction to dispense the same raises said frame and roller to engage and support the tape roll, and said second frame returning to its original position by gravity when said tension is discontinued.

12. A tape-dispensing machine comprising a frame, supporting means fixed to the frame upon which a roll of tape is adapted to rest, a carriage pivoted to said main frame, a roller rotatably mounted on said carriage below which the tape is trained as it comes from the roll, a hanger structure pivoted to said carriage, and a pair of rollers carried by said hanger structure below the roll of tape and adapted to engage and support the same when the carriage is raised.

13. A tape-dispensing machine comprising a frame, supporting means fixed to the frame upon which a roll of tape is adapted to rest, a carriage pivoted to said main frame, a roller rotatably mounted on said carriage below which the tape is trained as it comes from the roll, a hanger structure pivoted to said carriage, a pair of rollers carried by said hanger structure below the roll of tape and adapted to engage and support the same when the carriage is raised, and one of said rollers being disposed upon each side of said support.

14. A tape-dispensing machine comprising a frame, a friction member upon which a roll of tape is normally supported, means movably mounting said member on the frame, an anti-friction member carried by the frame adjacent said friction member, means to lower said friction member to shift the preponderance of weight of the roll of tape to said anti-friction member, said means comprising a roller around which the tape is trained in its movement from the roll, a movable mounting for said roller, and means connecting said mounting with said friction member.

15. A tape-dispensing machine comprising a frame, a friction member upon which a roll of tape is normally supported, means movably mounting said member on the frame, an anti-friction member carried by the frame adjacent said friction member, means to lower said friction member to shift the preponderance of weight of the roll of tape to said anti-friction member, said means comprising a roller around which the tape is trained in its movement from the roll, a movable mounting for said roller, means connecting said mounting with said friction member, and spring means normally holding said friction member in an upper position wherein the roll of tape is supported thereby.

16. A tape-dispensing machine comprising a frame, means carried by the frame to support a roll of tape comprising a friction member and an anti-friction member, means movably mounting said friction member on the frame, means actuated by tension applied to the free end of the tape to lower said friction member and shift the weight of the roll to said anti-friction member, and spring means to raise the roll from said anti-friction member upon release of said tension.

ALFRED P. KRUEGER.

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