This invention relates generally to dispensers for pressure-sensitive, adhesive tape, and particularly to such dispensers which are substantially fully automatic.

Pressure-sensitive, adhesive tape, such as the transparent, cellophane type, is widely used domestically to seal articles, packages and the like. Although this type of tape is satisfactory for most domestic uses, it has not found general acceptance in industry and commerce because of the high cost per seal relative to other types of tape, especially where large volumes are involved. The high cost per seal is attributable almost entirely to the use of too much of this type of tape by the ordinary user, and to tape dispensers which permit the user to use too much. It has been found in practice that seal made of a length of one and one-half to two inches of this type of tape is adequate for most industrial and commercial sealing requirements; however, few users are aware of this, and therefore, they use considerably more tape than is necessary. If only the required length of tape is utilized, the cost per seal diminishes significantly and many industrial and commercial sealing applications for this type of tape which presently are thought to be uneconomic, become economically feasible. Therefore it is extremely desirable that a dispenser for pressure-sensitive, adhesive tape be provided which will prevent the wastage of the tape by users by automatically determining the length of each piece of tape that is dispensed and a user is permitted to remove.

It is an object of the invention to provide an improved dispenser for pressure-sensitive, adhesive tape, particularly of the transparent, cellophane type, wherein the length of each piece of tape that is to be dispensed for each pull can be selectively determined in advance, and the dispenser is set to dispense pieces of tape of only such length, and if desired, the dispenser may be locked in such setting.

It is another object of this invention to provide an improved dispenser for pressure-sensitive, adhesive tape having automatic feeding means.

It is another object of the invention to provide an improved dispenser for pressure-sensitive, adhesive tape having automatic control means for the feeding means.

It is another object of the invention to provide an improved dispenser for pressure-sensitive, adhesive tape having improved tape-severing means.

It is another object of the invention to provide an improved, substantially automatic dispenser for pressure-sensitive, adhesive tape which is highly efficient and convenient in operation, in that a length of tape is automatically fed to the user in position to be manually severed from the dispenser by the user in response to the manual severing of the preceding piece of tape by the user, and which is highly economical in operation in that the optimum length of each piece of tape to be severed may be predetermined and fixed, and thereafter the dispenser constantly feeds tape to be manually severed of such length.

The above and other objects and further details of that which I believe to be novel and my invention will be clear from the following description and claims taken with the accompanying drawings.

FIG. 1 is a top plan view of a tape dispenser for pressure-sensitive, adhesive tape which incorporates the instant invention;

FIG. 2 is a side elevational view thereof looking in the direction of the vertical arrow in FIG. 1;

FIG. 3 is an end elevational view thereof looking in the direction of the horizontal arrow in FIG. 1;

FIG. 4 is a sectional view taken substantially on line 4—4 of FIG. 2;

FIG. 5 is a side elevational view on a reduced scale with portions broken away showing the opposite side of the dispenser to the one shown in FIG. 2;

FIG. 6 is a fragmentary side elevational view similar to FIG. 2 but showing some of the movable parts in different positions which they occupy during operation;

FIG. 7 is a plan view of the tape severing member, and FIG. 8 is an end view thereof.

Referring to the drawings, there is illustrated a preferred embodiment of my invention, which comprises an improved, substantially automatic dispenser for pressure-sensitive, adhesive tape that generally includes automatic tape-feeding means, manual tape-severing means, automatic electrically operated means for actuating the tape-feeding means, automatic switching means for the electrically operated actuating means, and control means for the switching means which is automatically operated as an incident to the user's manually operating the tape-severing means, all of which means generally operate and cooperate to automatically provide a predetermined length of tape in position to be manually severed by the user at all times other than during a short period of time immediately after a piece of tape has been manually severed. The illustrated dispenser also includes other improved structural and operational features, such as means for selectively adjusting the tape-feeding means so as to vary such predetermined length.

General Organization

The illustrated tape dispenser is a portable unit, the particular size of which may be varied to accommodate various size rolls of tape, and includes a supporting structure for most of the operating mechanism in the form of a generally rectangular, flat, horizontally disposed base plate 10 which may rest on any suitable surface 5, and a longitudinally and vertically disposed, flat, supporting plate 12 which is rigidly secured at its lower longitudinal edge 14 to the base plate laterally intermediate thereof, as by welding or the equivalent. For the purpose of facilitating an explanation of the illustrated embodiment of the invention, the portion of the dispenser which is disposed at the right-hand sides of FIGS. 1 and 2 will be designated as the "front" of the dispenser, and the portion thereof at the left-hand sides of said figures will be referred to as the "rear" thereof. Therefore, the vertical plate 12 extends from the front to the rear of the dispenser and generally separates the dispenser into two side portions 16 and 18.

The side portion 16 generally comprises the tape-feeding means, the tape-severing means, a portion of the control means for the switching means, and a portion of the actuating means for the tape-feeding means. The side portion 18 generally comprises the remainder of the dispensing means.

Tape Supporting and Feeding Means

The dispenser includes automatic tape-feeding means. With reference particularly to FIGS. 1, 3 and 5, it will be observed that the tape-feeding means comprises a tape roll supporting portion 20 and a tape feeding portion 22. Supporting portion 20 comprises a generally U-shaped bracket 24 having a pair of parallel, spaced, side legs 26 and a connecting bight portion 28. The bracket 24 is positioned so that its bight portion 28 is horizontally disposed and contiguous with the top surface of the plate 10, and its side legs 26 extend vertically upwardly.

Brack-
et 24 is pivotally mounted on a horizontally disposed, transversely extending, pivot pin 30 which is rigidly anchored at one of its ends to the vertical plate 12 and which passes through a forward portion of the bracket near the right portion 28. In each of the upper rear portions of the legs 26 there is disposed a slot 32 which inclines from the rear downwardly to the front; the slots 32 are aligned. The bracket 24 is normally biased to its upstanding position illustrated in solid lines in the drawings by a pair of spaced coil springs 34 which have one of their ends individually anchored to the pins 36 that are rigidly formed on the bracket legs 26, and their other ends anchored to tab extensions 38 that are rigidly secured to the base plate 10. Under certain operating conditions, the bias of springs 34 may be overcome and the bracket pivoted forwardly. It will, therefore, be understood that the supporting bracket 24 is normally biased into its illustrated solid line position by the springs 34, but that it is capable of being pivoted forwardly on its pivot pin 30 to the dotted line position illustrated in FIG. 5.

A roll 40 of pressure-sensitive, adhesive tape, such as the transparent cellophane type, is removably supported on the bracket 24, as by having an octagonally-shaped, supporting drum 42 having opposite extending stub shafts 44 secured thereto that are arranged to be rotatably received in the slots 32 of the bracket legs 26. Roll 40 is frictionally held on the drum 42, as by being forceably mounted thereto when the drum is removed from the dispenser during the preliminary stage of preparing the dispenser for use, i.e., loading it with tape. The frictional contact results from the roll having its hub 46 in firm contact with the pointed edges 48 of the drum. Associated with the supporting means for the roll of tape is braking means in the form of a bent, spring steel bracket 50 which is anchored to the upper surface of the bracket right portion 28, as by having the rivets 52 or equivalent securing means rigidly secure its mounting end 54 thereto. The braking end 56 thereof is reversely bent, as illustrated in FIGS. 2 and 5, and is biased into contact with the periphery of the roll of tape. The braking member 50 functions to properly mount the roll of tape and its supporting drum on the bracket 24 by biasing the drum stub shafts, 44 into the slots, and also functions during operation of the dispenser to facilitate the proper feeding of the tape, as will become apparent.

Tape feeding portion 23 generally comprises a tape strip feeding gear 58 having a plurality of teeth 60 formed thereon. Gear 58 is rotatably mounted on the stub axle 62 which is rigidly secured at one of its ends to and extends transversely from the vertical plate 12. Gear 58 is mounted on the axle 62 near its free end, and therefore, is spaced from the vertical plate 12. Gear 58 is adapted during operation of the dispenser to be rotated in relatively short, angular increments, such as 10°-20°, by electrically operated actuating means to be subsequently described. The gear 58 is mounted so as to rotate only clockwise as viewed in FIG. 5. A strip portion 64 of tape extends from the roll 40, with its adhesive side facing downwardly, to the periphery of the gear 58, where it contacts the teeth thereof. The strip portion 64 is pulled from the roll manually and so extended during preliminary preparation of the dispenser for use. When the gear 58 is rotated by operation of the dispenser, the portion of the tape that is in contact therewith adheres to the gear teeth 60 and pulls some more tape off of the roll 40. The amount of tape that is pulled off the roll is determined by the angular rotation of the gear 58. As a result of such rotation, a length L of tape is made available for manual severing by the user. During pulling of the tape off of the roll 40, the braking portion 56 of the member 50 prevents the roll and drum from rotating or spinning more than is necessary under the circumstances. After the gear has been rotated, the free end of the tape length L is manually removed from the gear teeth, as by grasping it between the thumb and forefinger of the user, and lifting it upwardly. It should be noted that the gear teeth 60 provide adequate adhesion surface for the tape, allowing thereof and yet allows for easy removal of the tape therefrom. When the tape length L is lifted, the nonadhesive side of the tape, first, contacts the control lift bar 66, which forms a part of the control means for the switching means to initiate the next controlled feeding operation as shown, and, then, the tape contacts the knife edge 68 of the tape severing member 70, which is an important element of the tape-severing means.

**Tape-Severing Means**

Severing member 70 can be clearly seen by itself in FIGS. 7 and 8, wherein it will be seen it comprises generally flat member having a mounting portion 72 which is adapted to be secured, as by screws 74, to a supporting arm 76 at the bent end 78 of the latter, which in turn is rigidly secured at its other end 80 to a forward portion of the vertical plate 12, as by rivets 82 or the like. The knife edge 68 faces downwardly, is V-shaped, and has a downwardly facing central point 84 and beveled, side edges 86. The knife edge 68 functions during operation of the dispenser, when the user lifts a length L of tape upwardly, to puncture the tape centrally thereof as the latter is moved upwardly, and thereby, to simultaneously cut outwardly toward both sides of the tape until the length L is fully cut and remains in the hand of the user. It should be observed that the tape cut is made effectively without undesirable twisting of the tape, as occurs in many known prior art devices, and the consequent fouling and wastage of the tape.

**Means for Actuating Tape-Feeding Means**

The automatic means for actuating the tape-feeding means generally comprises a pawl and ratchet assembly, a rack and pinion assembly and means for actuating the rack and pinion assembly. The pawl and ratchet assembly is associated with the feeding gear 58 in such a manner so as to permit rotation of the feeding gear only in one desired direction, namely that in which it pulls tape off the roll 40 and presents a length L in position to be removed and severed by the user (clockwise in FIG. 2 and counterclockwise in FIG. 5). Rotation of the feeding gear 58 in the opposite direction is prevented by the pawl and ratchet assembly, because it would result in fouling of the tape and improper tape feeding. The rack and pinion assembly actsuate the pawl and ratchet assembly in response to being actuated by the means for actuating the rack and pinion assembly.

A pawl 88 is pivotally mounted on pivot pin 90 which is rigidly secured to the gear 58 at the side thereof which faces the vertical plate 12. Pawl spring 92, which is illustrated as being of the leaf type, is mounted on the gear 58 on the same side as and is associated with the pawl 88 in such a manner as to permit rocking of the pawl and slippage of the ratchet assembly without driving the gear 58 when the pawl is contacted by the ratchet 94 when the latter rotates in one direction, but which holds the pawl 88 in force-transmitting position when the ratchet is rotated in the other direction, to thereby drive the gear 58. The ratchet 94 is laterally formed on pinion 96, which is a part of the rack and pinion assembly, and both are freely rotatably mounted on the axle 62, which also supports gear 55, between said gear and vertical plate 12. The pinion 96 has a plurality of teeth that mesh with the teeth formed on the rack 90, which is a part of the rack and pinion assembly. Longitudinal movement of the rack 93 in one direction (to the left in FIG. 6) causes joint rotation of the pinion 96 and ratchet 94 on the axle 62 in one direction (clockwise in FIG. 6), and this motion is transmitted by the ratchet through the paw 88 to the gear 58 so as to cause clockwise rotation of said gear a portion of a circle, depending upon the linear distance moved by the rack 98. Longitudinal move-
ment of the rack 98 in the other direction (to the right in FIG. 6) results in joint rotation of the pinion 96 and ratchet 94 in the opposite direction (counterclockwise in FIG. 6) and results in rocking and slippage of the pawl 88 without any motion of the gear 58 resulting.

The rack 96 is rigidly connected, as by rivets 168, to a slide 160 which has a bearing portion that is slidably guided in a tubular collar 116 that is rigidly secured to the vertical leg 122 of an L-shaped, mounting bracket 118. The horizontal leg 120 of the bracket 118 is rigidly secured to the base plate 40 in any convenient manner. The collar 116 when rigidly secured to the vertical leg 122 has its central opening aligned with an opening 124 formed in the leg 132. The connecting rod extends through the opening in the collar 116 and the opening 124, and the sleeve 110 is horizontally slidably mounted in said openings. The end 126 of the rod 108 is received in a bore 128 formed in the solenoid plunger 3, and is securely pinned thereto by the elongated transverse pin 32 that has a movement of the solenoid plunger 36, the connecting rod, the slide 102, and the rack to the right to their positions illustrated in FIG. 2, as a result of unstrapping of the spring 36.

As was pointed out above, movement of the rack 98 to the left in FIGS. 2 and 6 ultimately results in driving the feeding gear 58 clockwise to present a length of tape to the user for removal and severing, and that movement of the rack to the right does not result in movement of the feeding gear, all by virtue of the cooperative action of the rack and gear assembly and the pawl and ratchet assembly. Therefore, energization of the solenoid coil 142 results in the feeding of a length of tape by the feeding gear 58, and de-energization of the solenoid coil results in the means for actuating the tape feeding means being reset for a subsequent feeding operation.

The motion of a solenoid plunger is rather abrupt, and therefore, means must be incorporated into the dispenser to prevent the tape from being thrown from the spool, to de-energizing and de-energizing the solenoid coil. The electrical energy supply means are designed so that a source of electrical energy is constantly supplied to the solenoid coil wire. The electrical circuit is either opened or closed by switching means in the form of a mercury trip switch 148 that is incorporated into the electrical wiring for the solenoid coil so as to have the ends 150 of the two electrical supply leads 152 form the contacts thereof. The trip switch 148 is mounted in the dispenser for tipping movement to and between two general positions, one wherein the lead tip contacts 150 are immersed in the contact bridging material, such as mercury 154, to close the circuit to the solenoid coil, as illustrated in FIG. 2, and another wherein the lead tip contacts 150 are not immersed in the mercury and the circuit is opened, as shown in FIG. 6.

Switch 148 comprises a sealed bulb 156 which houses the material 154 and the lead tip contacts 150, and which is mounted for tipping motion between the two positions mentioned above. The bulb 156 is firmly supported by a clamp 158 which frictionally grips the bulb and which, in turn, is rigidly secured to a mounting bracket 160 that is pivotally mounted on the vertical plate 12 by the pivot pin 162. The bracket 160 is adapted to extend generally rearwardly therefrom toward an upward angle which supports a weight 170 at its free end.

Therefore, pivoting of the bracket 160 results in tipping of the switch 148. Tipping of the switch 148 results in opening and closing the solenoid circuit and the consequential de-energization and energization of the solenoid coil. The dispenser includes means for controlling the operation of the switch 148.

Control Means for the Switching Means

The switch controlling means generally comprises a weighted roller 172 that is movably mounted for movement between two general positions: one position shown in FIG. 2 wherein it contacts the flange 166 of the switch...
bracket 160 and thereby forces the bracket to pivot and the switch 143 to tip to its position wherein the switch lead tip contacts are bridged and the solenoid coil 142 is energized, and a second position illustrated in FIG. 2, wherein it is out of contact with the switch bracket 160, and therefore, the weight 179 that is supported by the switch bracket is allowed to pivot the bracket and tip and maintain the switch in its position where the switch lead tip controls are not bridged and the solenoid coil is de-energized.

The roller 172 is movably mounted between the foregoing two positions in a controlled manner. The roller 172 is rotatably mounted on a stub axle 174 having a bearing 176 formed at one end which is slidably guided in a slot 178 that is formed in a rocker plate 180.

The rocker plate 180 is mounted for rocking motion between its FIG. 2 and FIG. 6 positions along with its associated member 164 by being rigidly secured, as by the screws 182, to the elongated member 184. The plate 180 and member 184 jointly rock on a pivot pin 186 which is rigidly secured to the vertical plate 12 and extends laterally therefrom. The plate 180 and member 184 are biased to rotate in a clockwise direction in these figures by a coil spring 188, which has one of its ends secured to the member 184 near one end thereof and its other end secured to the solenoid plunger 139. The plate 180 and member 184 are urged to rotate in a counterclockwise direction by the coil spring 190, which has one of its ends secured to the plate 180 and its other end secured to the horizontal leg 120 of the bracket 118.

At one of its ends (the left hand end in FIGS. 2 and 6) the member 184 rigidly supports the upper end of a depending rod 192. The lower end 194 of the rod is disposed so as to cooperate with the pin 132 carried by the solenoid plunger 139, and particularly the end 134 thereof (see FIG. 4). Movement of the pin 132 to the left as viewed in FIG. 2, when the solenoid coil 142 is energized and its plunger 130 and associated connecting rod are moved to the left, results in contact of the portion 134 of the pin 132 with the rod 192 and forcing it to the left so as to jointly rotate the rocker plate 180 and member 184 clockwise. When this occurs, the roller 172 moves from its position illustrated in FIG. 2 to the one illustrated in FIG. 6. When in their FIG. 2 position, the plate 180, member 184, and rod 192 are momentarily maintained therein by the weight of the roller 172, which also tips the switch 148 at that time so as to close its contacts.

The closing of the switch contacts results in energization of the solenoid coil and movement of its plunger 130 and associated connecting rod to the left, and this causes the pin portion 134 to move the rod 192 to rotate the plate 180 and the member 184 clockwise to their FIG. 6 positions. When moved to the FIG. 6 positions, the plate 180 and member 184 are temporarily latched therein by the latch pin 196, which is rigidly mounted on an end of the member 184, the right hand end as viewed in FIG. 6, and the latching member 198.

The latching member 198 is irregularly shaped and includes a generally horizontal leg 200 that is pivotally mounted on pivot pin 202 that is rigidly secured to an upstream tab 204 that is fixed to the base plate 10. Latching member 198 includes a generally vertically extending intermediate leg 206 and an extension leg 208 that terminates in an arcuate cam portion 210. Adjacent the intersection of leg 208 and cam portion 210 there is formed, and arcuate notch 212. As viewed in FIGS. 2 and 6, a coil spring 214 is mounted between the upper surface of the base plate 10 and the corner 216 of the latching member 198 in the vicinity of where the intermediate leg 206 and the horizontal leg 200 intersect, which biases the latching member counterclockwise.

When the rocker plate 180 and member 184 are caused to rotate clockwise about their pivot pin 186, their latching pin 192 engages the cam portion 210 of the latching member 198 and forces it to rotate clockwise against the bias of the spring 214 until the latch pin 196 seats in the notch 212, as shown in FIG. 6. It will be understood that on the occurrence of such movement of the rocker plate 180, that the roller 172 rolls to its FIG. 6 position, and that such action results in the tipping of the switch 148 from its FIG. 2 to its FIG. 6 position and the consequential de-energizing of the solenoid coil. As was pointed out above, this results in the spring 190 forcing the connecting rod and sliding member to the right and resets the means for actuating the tape-feeding means for the next feeding operation of the tape on the occurrence of the next energization of the solenoid coil in response to tipping of the switch 148 by the roller 172 when it moves back to its FIG. 2 condition.

The roller 172 is caused to move from its FIG. 6 to its FIG. 2 position in response to the lifting of a length L of tape that is positioned for removal by the user during severing of the tape. It will be recalled that it was pointed out in the portion of this description pertaining to the tape-feeding and tape-severing means of the dispenser, that when the free end of the tape length L is lifted upwardly by the user, prior to severing the length of tape, the tape contacts the lift bar 66 and it is moved upwardly to initiate the next controlled feeding operation of the tape.

The lift bar 66 as can best be seen in FIG. 1, extends transversely of the front of the dispenser. At one of its lateral ends the lift bar is connected to the front end of a longitudinally extending arm 218, the other end of which is connected to the upper end of a vertically extending arm 220, the lower end of which is connected to the front end of a longitudinally extending arm 222, the opposite end of which is pivotally mounted on the pivot pin 226, which is rigidly fixed to the solenoid frame 135. Near the front of the dispenser, the arm 222 rigidly supports a longitudinally extending pin 228 which is in contact with the lower side of an extending finger 226 which extends from the leg 200 of the latching member 198.

When the parts are disposed as illustrated in FIG. 6, and a length of tape is in the process of being manually severed, the upward movement of the lift bar 66 which is caused by the tape results in the counterclockwise pivoting of the arm 222 about its pivot pin 224, and this results in pin 226 contacting the finger 228 of the latching member 198 and pivoting the latter in a clockwise direction about its pivot pin. This results in movement of the cam portion 210 to the right and allows the stressed spring 190 to rotate the rocker plate 180 and member 184 counterclockwise and move the latching pin 192 out of its latching notch 212. It will be understood that at this point in the operation of the dispenser, when the tape length is being severed, that the solenoid plunger, connecting rod and slide are not in the position illustrated in FIG. 6, wherein the solenoid is illustrated as being energized, but are in the position shown in FIG. 2, wherein the solenoid is illustrated as de-energized. Therefore, the spring 190 is capable of overpowering the spring 188 to cause counterclockwise rotation of the plate 180 and member 184 when the latch pin 196 is unlatched.

After the plate 180 and member 184 rotate counterclockwise, the roller 172 rolls from the right to the left, from its FIG. 6 to its FIG. 2 positions. However, there is some delay before the roller starts to move and it takes a certain amount of time for the roller 172 to move this distance. The cumulative delay insures that the user will have time to completely sever and remove the length L of tape before the roller 172 returns to its initial position. When the latter occurs the roller 172 contacts the switch mounting bracket flange 166, pivots the bracket 160 and tips the switch 148 to its FIG. 2 position to thereby close the switch and circuit to the solenoid coil 142 and thereby energize the solenoid coil. This results in movement of the solenoid plunger 130 and its associated connecting rod, the slide 102 and the rack 98 to the left, as viewed in these figures, and this both: (1) operates through the
rack and pinion assembly and the pawl and ratchet assembly to rotate the feeding gear 58, to thereby feed another length of tape 20 into position to be severed by the user, and (2) causes the pin 132 to contact the rod 192 and pivot the rocker plate 180 and the member 184 clockwise until the latch pin 196 is seated in the notch 212. The roller 172, during this operation rolls to the right to the FIG. 6 position. This permits the switch 148 to move back to its normal position. It will, therefore, be observed that at this time the dispenser is in condition so as to have the next length of tape L in position to be manually severed, and that the very act of severing a piece of tape, results in the automatic feeding of the next length of tape. The operation is delayed sufficiently, however, so that the operator may have adequate time to fully sever and remove the piece of tape.

Means for Controlling Length of Cut Tape Pieces

The length of tape which is presented to the user at the front of the dispenser for severing depends upon the angular movement of the feeding gear 58 and this, in turn, depends upon the linear movement of the rack 98. The latter depends upon the length of the stroke of the slide 163, and this may be predetermined and fixed by positioning a stop 230 so as to define a longitudinal limit of movement of the slide to which the spring 156 biases it. Adjustment of the longitudinal position of the stop 230, therefore, determines the length of the stroke of the slide by fixing the limit of the original position from which the slide is retracted when the solenoid coil is energized.

The position of the stop 230 may be adjusted by virtue of its construction and mounting. The stop 230 has an integral, threaded pin portion 232 which is threadedly received in the threaded bore 234 formed in the adjusting nut 236. The adjusting nut 236 has an external annular groove 238 formed therein which permits the adjusting nut to be rotated positionally in the pull ejection slotted portion 240 of the upstanding tab 242 that is rigidly secured to the base plate 10. The free end of the adjusting nut 232 has a kerf 244 formed therein which is adapted to receive an adjusting implement to turn the adjusting nut. It will be understood that the initial position of the slide 102, which determines the length of its stroke and hence the angular movement of the feed gear, may be set when the parts are in their FIGS. 1 and 2 positions. The stop 230, at that time, is in firm contact with the slide extension 106 as a result of the latter being biased by the spring 156. Turning the adjusting nut 230 rotates the stop 230 and determines a new initial position of the slide 102. If desired, locking means for preventing tampering with the stop adjusting mechanism could be utilized. It should be clearly understood that once the stop 230 is positioned the dispenser continuously presents uniform lengths of tape to be severed.

The general overall construction and operation of the tape dispenser should be apparent from the foregoing. As was pointed out above, means is provided for preventing the tape from tearing, and the feeding means from malfunctioning, during the abrupt feeding stroke which is caused by the solenoid coil 142 when energized. This results from the cooperative action of the feeding gear 58 and the tape roll supporting bracket 24. On the occurrence of an abrupt angular turn of the feeding gear which results from the energization of the solenoid coil, the tape portion 64, as shown in FIG. 5, abruptly pulls or "yanks" on the roll 40; this pull is transmitted through the roll hub 46 and mounting drum 20 to the bracket 24 which in response thereto pivots on its pivot pin 30 counterclockwise, as viewed in FIG. 5, against the bias of its springs 34, which are thereby stressed, to the dotted line position shown therein. The pivoting of the bracket 24 is not sharp; however, it allows the feeding gear 58 to take up as much tape as is needed to present the next predetermined length L of tape to the user for removal without tearing the tape. After the initial abrupt pulling action on the roll 40, the springs 34 unstress and move the bracket 24 back to its original solid line position in FIG. 5. During the pulling of the tape off the roll 40, the member 50 functions to prevent spinning of the roll or removal of the roll mounting drum 20 out of the bracket slots 32.

In view of the foregoing, it should be apparent generally that I have provided an improved, automatic dispenser for pressure-sensitive, adhesive tape which satisfies each and every one of the objects of this invention. It should be specifically apparent that I have provided an improved tape dispenser wherein a length of tape of uniform predetermined length is always ready in position for removal by the user; wherein the act of manually removing the tape actuates the dispenser to automatically feed the succeeding length of tape into position to be removed subsequently; wherein the dispenser is actuated with delayed action when feeding a succeeding length to permit the user to fully remove the previous length of tape before the next succeeding length is fed; wherein the severing means construction is such that it initially forms a central puncture in the tape and then severs the sides of the tape, thereby avoiding twisting and fouling of the tape; wherein the tape feeding gear provides a sure and reliable feed and yet permits the easy removal of the tape therefrom; wherein it is provided for eliminating tearing of the tape during the feeding thereof, and wherein means is provided for selectively determining the uniform length of the tape lengths which are automatically presented for removal. All of the foregoing comprises a significant advance in the type of tape dispenser herein involved, for it substantially broadens the practical areas of usefulness of such dispensers by making the use of pressure-sensitive, adhesive tape of the type herein involved economically feasible for many industrial and commercial applications for which it has heretofore been considered too expensive.

As will be evident from the foregoing description, certain aspects of my invention are not limited to the particular details of construction of the examples illustrated, and I contemplate that various other modifications and applications will occur to those skilled in the art. It is, therefore, my intention that the appended claims shall cover such modifications and applications as do not depart from the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A dispenser for pressure-sensitive adhesive tape comprising: means for rotatably supporting a roll of pressure-sensitive adhesive tape; means for feeding a quantity of the tape to the user of the dispenser for removal; said feeding means being spaced from and arranged to draw the tape off of the roll by engagement with the tape; electrically operated prime mover means comprising a solenoid for powering and actuating said feeding means; switch means for controlling energization of said solenoid; means for controlling said switch means; said solenoid being of a capacity to operate with a plunger stroke force that is adequate to overcome the adhesive tension of the tape on the roll and being operatively associated with said feeding means so as to cause the latter to abruptly feed a predetermined uniform amount of tape when said solenoid is energized;所述密封件包括一个静止的刀片边缘与之前所述前馈部分相同，但当所述突起长度的长度被移动到有效在所述刀片上，使得所述刀片接触的所述前馈线位置所示并被移位。所述移动的线段位置的刀片24的响应使得所述前馈齿轮58以需要的长度保持接合。
its operation is initiated by said movable member; and means for mounting said tape supporting means so as to be movable therein; said tape supporting means but normally biased away therefrom whereby on the occurrence of energization of said solenoid and the abrupt drawing off of the tape from its roll said supporting means is capable of yielding and pivoting toward said feeding means to prevent tearing of the tape.

2. A dispenser as defined in claim 1 wherein said knife edge includes a central point for initially piercing the tape transversely centrally thereof and said knife edge is disposed relative to the tape so as to contact it transversely centrally thereof when the tape is moved against it for severing.

3. A dispenser as defined in claim 1 wherein said switch means comprises a sealed pivotally mounted tip switch which energizes said solenoid when tipped in one direction and deenergizes said solenoid when tipped in the other direction, and said switch-controlling means operates to control tipping of said switch.

4. A dispenser as defined in claim 1 wherein said feeding means comprises a toothed feeding gear; said gear is arranged relative to said tape supporting means so as to be capable of drawing a length of tape off the roll by engaging the adhesive side of the tape and feeding it to the user for removal when said gear is partially rotated in one direction; said actuating means is arranged to so partially rotate said gear and comprises a pawl and ratchet assembly operatively associated with said gear, the pawl being mounted on said gear and associated with the ratchet so as to render said gear capable of rotation in only said one direction, a rack and pinion assembly operatively associated with said pawl and ratchet assembly, the pinion and the ratchet being mounted on a common shaft for joint rotation, the rack being arranged to be moved longitudinally in one direction when the solenoid is energized to cause partial rotation of the pinion and ratchet which is transmitted by the ratchet to the pawl and the pawl to the gear to cause partial rotation thereof in said one direction to feed the tape; said rack and pinion assembly being resettable for the next feeding of the tape when said solenoid is deenergized; and means for selectively adjusting the extent of longitudinal movement of the rack by limiting the length of the stroke of the plunger of the solenoid, whereby the length of the tape to be severed may be selectively fixed.

5. A dispenser as defined in claim 1 wherein said switch means includes electrical contacts that are normally opened but closed to energize said solenoid; and said switch-controlling means mechanism operates with delayed action to close said contacts in response to movement of said movable member which accompanies severing movement of the tape whereby the tape may be fully severed and removed by the user before said solenoid is energized to actuate the feeding of the next length of tape.

6. A dispenser as defined in claim 5 wherein said switch-controlling means mechanism comprises a rocker plate that is pivotally mounted between two positions and supports a roller for longitudinal movement between two positions relative thereto in response to pivoting of said rocker plate; said rocker plate and roller when in one corresponding position causing the contacts of said switch means to be closed to energize said solenoid and when in their other position allowing said contacts to be opened.

7. A dispenser as defined in claim 6 wherein said switch-controlling means includes latching mechanism for latching said rocker plate in said other position, and said movable member operates said latching mechanism to cause unlatching of said rocker plate in response to movement of said movable member which accompanies severing movement of the tape.

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