Oct. 22, 1957 R. W. HOITT 2,810,437

TAPE DISPENSER AND CUTTER MECHANISM THEREFOR

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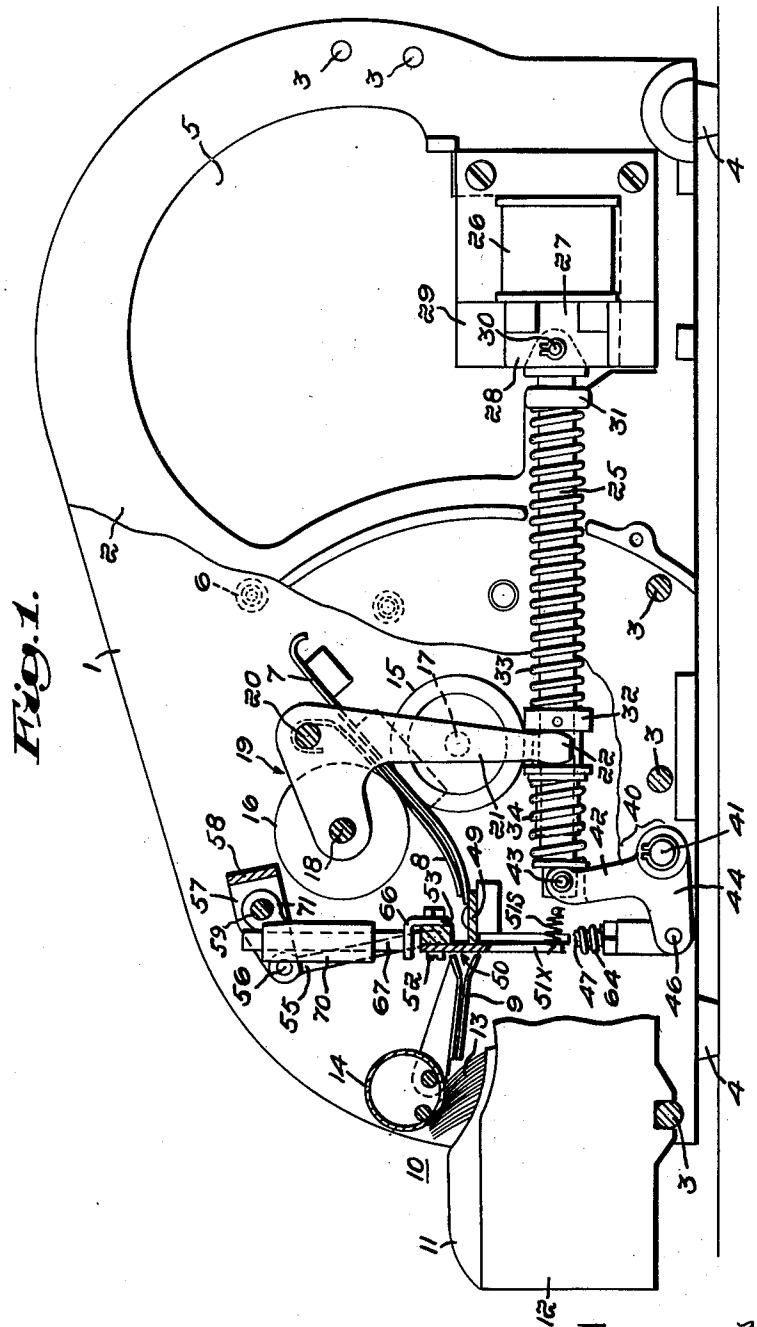


Fig. 1.

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Fig. 2.

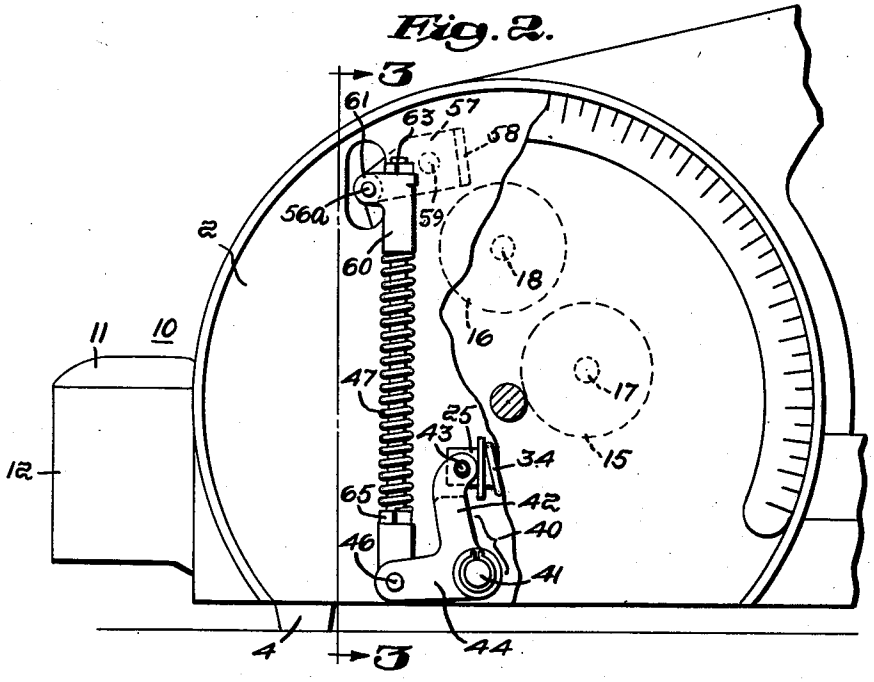
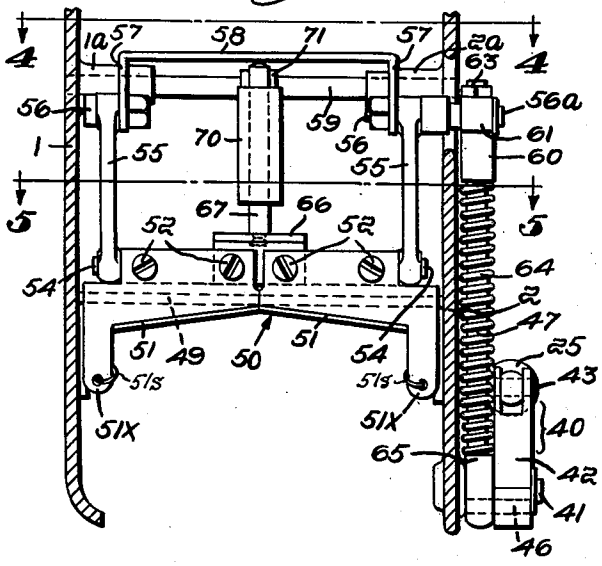


Fig. 3.



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Fig. 4.

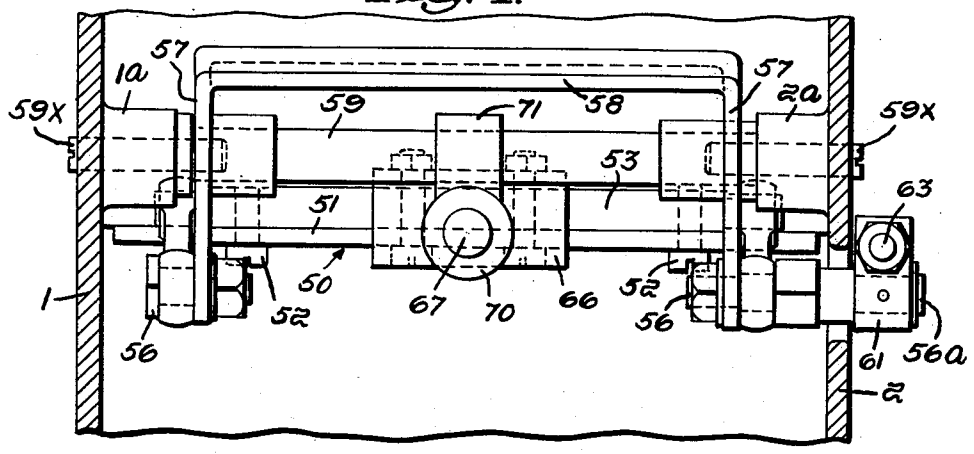
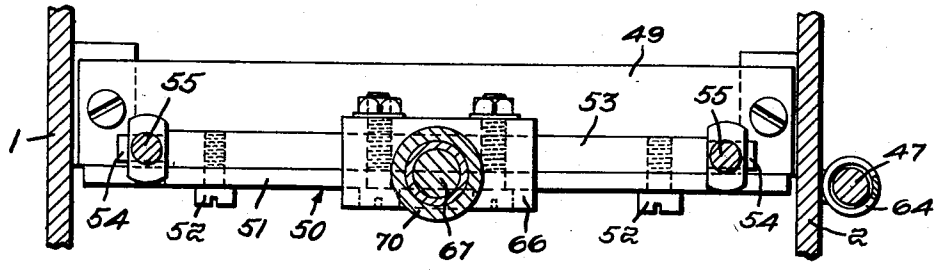


Fig. 5.



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TAPE DISPENSER AND CUTTER MECHANISM THEREFOR

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Application June 24, 1954, Serial No. 439,034

8 Claims. (Cl. 164—49)

The general class of machines and devices known as tape dispensers or strip servers, for delivering lengths of adhesively conditioned paper and other tape and strip material includes automatic, semi-automatic and manual machines. The present invention pertains to the general machine class mentioned and has as a main object to improve the efficiency and clean severing capacity of the cutter mechanism and its cooperation with the feeding and other elements of the machine as a whole.

For the purposes of the present disclosure the improved servering mechanism and associated operating means is illustrated as incorporated into a tape dispenser of the automatic type with which it peculiarly cooperates. In the broader aspects however the present invention is applicable as well to the various other types of strip servers and tape dispensers including the semi-automatic and the manual devices under the broad class stated.

In the drawings illustrating by way of example one embodiment of the invention:

Fig. 1 is an elevational view looking onto the right side of the tape dispenser, with cover elements removed and the front portion of the right side frame broken away to expose the feeding, moistening and severing means;

Fig. 2 is a right side elevation of the front portion of the machine of Fig. 1 with the outer side cover plate broken away into the outer mechanism compartment external to the right side frame;

Fig. 3 is a vertical cross-sectional view of the tape severing means;

Fig. 4 is a view in horizontal section through the machine side frames substantially as on the line 4—4 of Fig. 3 and showing the cutter means in top plan, upon a larger scale; and

Fig. 5 is a horizontal section as on the line 5—5 of Fig. 3.

The exemplary machine of the drawings comprises a frame or housing with laterally spaced left and right side frames **1** and **2** held assembled as by cross members **3**. The machine as a whole is portable and is adapted to stand on a longitudinal supporting surface such as a counter or shipping room table where it is supported as by cushioned feet **4**.

The rear portion of the machine housing provides between the side frames **1**, **2** a well **5** for a supply of the tape in roll form in position to be drawn upon. From the supply roll the tape advances forwardly over a guide roll **6**, thence forwardly through a guide channel comprising lower and upper guides **7**, **8** to and past the cutter mechanism to be described, and thence through a further guide or throat **9** so as to pass in moisture-receiving relation past a moistener unit designated generally at **10** beyond which it is presented across a delivery guide **11**. The moistener unit as shown comprises a reservoir **12** with upwardly protruding brush or other capillary moistener **13** in tape-moistening position beneath a bodily floating depresser element **14** shown as of the large diameter rotary form of my prior

Patent 2,565,451 of August 21, 1951 to which however the present invention is not limited.

The tape from the roll supply is advanced by a pair of rotary feed rolls or wheels **15**, **16** at least one of which is power driven and the other of which is herein bodily movable to and from feeding relation with the tape. In this example the roll **15** is the driven one, sometimes herein referred to as the lower or rear roll. The companion bodily movable roll **16**, in the upper or forward position is not directly power driven but is free to turn in tape feeding and measuring engagement with the tape and the driven roll. It will be understood that the tape path at the feeding means may be horizontal, vertical or at an intermediate angle as illustrated. The power driven roll **15** is fast on the inner end of a short transverse shaft **17** having bearing support on the left side frame **1** with the outer end operatively connected through suitable worm or other reduction gearing to the drive motor (not shown).

The upper or tape length measuring roll **16** is rotatably mounted by means of a short shaft **18** at the forward end of the upper arm of a carrier lever **19** intermediately supported for rocking movement by a horizontal cross shaft **20** extending between the side frames **1**, **2**. A second and generally vertical arm **21** of the carrier lever **19** extends downwardly and laterally outward, terminating in a forked portion **22** which straddles the main actuator or control rod **25**.

In Fig. 1 the upper feed roll **16** is shown in the raised inactive or non-feeding position. Movement of the generally vertical arm **21** of the roll carrier lever **19** rearwardly, toward the right in Fig. 1, bodily shifts the feed roll **16** down into tape-feeding relation with the driven lower roll **15**. This action is herein accomplished automatically under the control of the operator through electro-magnetic means including the mentioned actuator rod **25**.

The latter is bodily movable longitudinally in one and the opposite direction to begin and to terminate an operating cycle, herein rearwardly or toward the right in Fig. 1 at the start of the cycle. This actuator element **25** is operated by a solenoid **26** on the machine frame. The armature **27** of the solenoid is formed with a cross head **28** slidable in a fixed guide **29**. Said controller or actuator rod **25** has its rear end attached as at **30** to the solenoid armature **27** and is itself slidably guided and supported intermediately as by a bearing lug **31** on the adjacent side frame **2**. At the front end it is supported by pivotal connection to the cutter-operating bell-crank designated generally at **40**.

Behind the mentioned forked lower end **22** of the lower arm **21** of the upper roll carrier lever **19** the actuator rod **25** has adjustably fixed on it a collar **32** providing a thrust bearing for the front end of a relatively strong coil spring **33** surrounding the rear and intermediate portions of the actuator rod and thrusting at its rear end against the bearing lug **31**. This spring is installed under some tension and the rod collar **32** is so located that in the normal or inactive status, the solenoid **26** being de-energized, the actuator **25** automatically assumes the Fig. 1 position, forward or toward the left, with the upper feed roll **16** lifted to the non-feeding position shown. Buffering means as at **34** may be provided at the fore end of the actuator **25**, between it and the roll carrier arm **21**.

As previously indicated, the actuator **25** serves also to effect operation of the tape severing knife or cutter mechanism. The cutter bell-crank element **40** previously mentioned is rockably supported on a stud **41** on the adjacent side frame **2**. The generally vertical arm **42** of this bell-crank is pivotally connected at **43** to the front end of the actuator **25**. The other and generally horizontal forward

arm 44 of the cutter bell-crank 40 has its front end pivoted as at 46 to the lower end of an adjustable generally vertical cutter connector rod 47.

The cutter mechanism proper comprises a fixed blade 49 disposed with its forward cutting edge transverse to and immediately below the path of the tape formed by the guides 7 and 8 already described. The other element of the cutter or shear comprises a movable blade indicated as a whole at 50. It is herein of the quillotine type and is novelly supported, arranged and operated, in the manner best seen in Figs. 3 to 5 and as read in connection with Figs. 1 and 2.

This movable cutter element or blade 50 is adapted for cutting movement substantially perpendicular to the path of the tape and in shearing cooperation with the fixed blade 49, so as to sever or shear the appropriate length of tape advanced beyond the cutting station and through the moistening means to the point of delivery. Said movable cutter 50 preferably is formed in a plurality of sections 51, 51 symmetrically arranged and with the respective cutting edge portions slightly inclined oppositely in the manner of a wide inverted V. These blade sections 51 are removably secured as by screws 52 to the front face of a cutter bar 53 having axial hubs 54 at the respective ends.

Said movable cutter element 50 including the cutter bar 53 is suspended for cutting travel across the tape path by means of a pair of links 55 having at the respective lower ends free and rather loose pivotal reception on the cutter bar hubs 54. At the upper end said links 55 are similarly loosely pivotally hung on transverse studs 56 on the forward ends of the arms 57 of a carrier yoke 58. This yoke in turn is itself pivotally supported on a fixed transverse axis furnished by a stationary shaft 59 demountably held at its opposite ends on side frames 1, 2 as by stud screws 59*x* extending through lateral bosses 1*a*, 2*a* on the respective frames.

Actuation of the movable cutter 50 is effected from the main actuator rod 25 and through the cutter bellcrank 40 and cutter rod 47 already mentioned. If desired such connecting rod or link 47 may be directly pivotally connected at the respective ends to the arm 44 of the actuator-operated element 40, and to the cutter carrier 58 as at 56*a*, in a generally similar manner for example as the pivotal links 55 connect the movable cutter 50 to said cutter carrier, to be described. In the illustrated example, wherein the action is powered and automatic the connection between the actuator-operated element 40 and the cutter includes an optional buffering or shock-absorbing feature. Accordingly provision is made for a yieldable and adjustable connection between said cutter rod 47 and the carrier yoke 58. For this purpose the cutter rod 47 is slidably and rotatably extended at its upper end through a slide-bearing connector member or elongated guide collar 60 having a forwardly projecting apertured bearing-boss 61 pivotally received on a lateral extension 56*a* of the adjacent stud 56 of the carrier yoke 58. The upper end of the cutter rod 47 above the bearing connector 60 has a retaining head 63. A relatively strong compression spring 64 surrounds the cutter rod 47, thrusting between the lower end of the bearing connector 60 and an adjusting nut 65 on said rod at the lower end thereof. Thus the blade-moving force is transmitted through the buffering spring 64 with attendant relief of the powered action of the cutter.

Provision is further made for central guidance of the movable blade 50 in general self-parallelism and in a plane of action, herein substantially vertical, which is approximately normal to the cutting edge of the fixed blade 49 and in which the movable blade is centrally maintained with reference to said fixed blade, that is, in the direction transverse of the machine and paralleling the blades, and whereby the movable blade 50 is most effectively presented in shearing coaction with the fixed blade 49. The cutter bar 53 has centrally formed on or attached to it a foot or bracket 66 carrying a fixed upright guide post 67. This latter slidably and freely rotatively receives an elongate bearing sleeve 70 having a rearward apertured boss 71 freely rotatively hung on a stationary axis on the machine frame. Such fixed axis may, as here shown, be that of the shaft 59 or it may be otherwise defined in a position parallel to but rearwardly or otherwise spaced or separate from the shaft 59.

This central slide-guide connection 67, 70 as between the movable blade element 50 and a fixed horizontal axis on the machine frame, herein the fixed axis of the cross shaft 59, centers and presents said blade in accurate cutting relation to the fixed blade 49 despite the relatively free pendant or floating support of the movable blade by the described carrier yoke 58 and linkage 55. Further, by reason of the loose pivotal conection as between the cutter bar 53 and its supporting links 55, the movable blade 50 is afforded the capacity to accommodate itself to the fixed blade 49 by a pivotal self-adjustment in the plane of the tape path and about the axis of said post 67 which as stated is maintained substantially perpendicular to the tape path and in an action path approximately normal to the cutting edge of the fixed blade 49. In other words, the central region of the movable blade 50, intermediate the ends thereof, is positively but freely slidably and rotatably guided and located with reference to a line, herein substantially vertical, which is approximately normal to the cutting edge of the fixed blade 49 at the midpoint thereof.

It will be understood that the movable blade 50 is held yieldably in spring-biased shearing relation to the fixed blade 49 as by means of tension springs 51*s* connected at the forward ends to the lower ends of depending legs 51*x*, 51*x* on the blade sections 51, 51 and anchored at the rear ends upon the machine frames. Thus it will be apparent that the carrier yoke 58 and the movable blade assembly 50—57 involves three transverse and generally horizontal pivotal axes, at 59, 56 and 54 in the illustrated example, affording for the blade a tape-path-crossing or guillotine type of cutting movement while in addition the central generally upright axis as afforded by the guide post 67 and slide collar 70 thereon centers and controls the movable blade 50 in its laterally centrally positioned and substantially perpendicular cutting relation approximately normal to the fixed blade 49 while giving it capacity for self-adjustment in the plane of the tape path and rotatably about the axis of said post. Additionally contributing to said self-adjustment capacity is the feature that the slide collar 70 for the blade guide post 67 is itself pivotally hung by means of its apertured boss, Figs. 3 and 4, rotatably received on a transverse axis constituted by the shaft 59 in the illustrated example, said shaft or if preferred a separate one paralleling it thus providing an automatically pivotal supportive function. Consequently the whole unit comprising the blade 50, cutter bar 53, post 67 and slide collar 70 is unitarily pivotally movable about the plural-function axis 59. Hence there is afforded for the blade 50 a corresponding additional bodily movability toward and from the fixed blade 49 in the direction of the tape path, as permitted by the constraining spring means 51*s*, 51*s*, and by the supportive and guiding linkage illustrated and described. Accurate and complete servance of the tape accordingly results from a minimal travel of the movable cutter blade and at a high speed in a substantially instantaneous action of cutting-off descent at the end of an operating cycle, and of return elevation and clearance of the tape path prior to start of the tape feed for the next cycle. Also by reason of the substantially full-floating and automatic self-adjusting capacity the cutter performs efficiently to sever tapes of the various compositions and weights including the fibrous reinforced, fabric based and other tapes which are relatively difficult to cut off cleanly and certainly.

The described cutter mechanism is especially adapted for high speed operation and for automatic actuation in

a tape dispenser of the automatic or power driven type wherein the parts in general are subject to greater operating force and attendant stresses than in the case of non-powered and manual machines and devices. The machine here selected for the purposes of illustration and into which the described cutter means is uniquely built, may in other respects be generally similar to that of the pending application of Eino E. Lakso, Serial No. 251,920, filed October 18, 1951, now Patent No. 2,776,833, and having a common assignee with the instant application.

As more fully disclosed and claimed in the said Lakso application, the machine incorporates adjustable tape length measuring means and associated means for automatically terminating an operating cycle when the selected length of tape has been fed, moistened and readied for severance, herein by the improved cutter mechanism described. The machine preferably includes a main switch for starting the drive motor and making power accessible to the machine. With the power on, an operating cycle is started at any time at the will of the operator through a control switch which energizes and locks in the solenoid, the cycling of the machine thereafter being automatic and subject to a selectively set length control. Energization of the solenoid shifts the rolls to feeding relation, insures clearance of the movable cutter blade **50** from the tape path, and starts the tape feed. In the illustrated embodiment such opening or clearing movement of the blade **50** attendant on closure of the rolls to feeding relation is power-actuated by the solenoid **26**, and the subsequent return cutting motion of the blade **50** is under the influence of the actuator return-spring **33**.

When the selected length of tape has been advanced the solenoid **26** automatically is de-energized and the actuator **25** is returned by the spring **33**, herein forwardly to the left in Fig. 1, rocking the cutter bell-crank **40** and moving the guillotine cutter blade **50**, herein downwardly, across the path of the tape to sever it cleanly, into the actuated position as shown in Fig. 3. Between operations the movable blade **50** normally stands in said down position, while on subsequent energization of the solenoid, retraction of the actuator **25** first elevates it. The construction, arrangement and timing of the parts is such that the movable blade **50** is positively retracted from the tape path so that the latter is clear before the feed rolls **15**, **16** are brought to feeding relation with the tape. In other words a brief interval is provided for retraction of the knife **50** before the movable feed roll **16** is brought into feeding relation with the tape opposite the lower and driven feed roll **15**. Capacity for adjustment in this respect is afforded through the adjustable cutter rod **47** supplemented as required by positionally adjusting the collar **32** upon the actuator rod **25**.

My invention is not limited to the particular embodiment thereof illustrated and described herein, and I set forth its scope in my following claims:

I claim:

1. In a tape dispenser having a frame with guide means for tape from a supply and means to advance the tape for delivery in adhesive condition, tape shearing means comprising a fixed blade transversely disposed in the plane of the tape path and a generally parallel blade element movable approximately normally to the tape path, a yoke-like carrier for the movable blade rockable on a fixed axis transverse to and in a plane paralleling the tape path, suspending links for the movable blade having the respective ends pivoted to the carrier and to said movable blade, and guide means comprising a post on the movable blade and a slidably and rotatably guiding bearing sleeve on the post and pivotally supported coaxially with the carrier, whereby the substantially central perpendiculars at mid-length of the fixed and movable blades are maintained in approximate coincidence while affording the movable blade pivotal self-adjustment capacity about said perpendiculars and also toward and from the fixed blade.

2. A tape cutter assembly for a tape dispenser comprising a carrier mounted to rock about a fixed axis of support transverse to and paralleling the path of tape to be severed, said carrier having parallel spaced arms radial of said axis, a cutter blade element straddling the tape path, links pivotally connecting the end portions of the blade element to said arms respectively, a guide post fixed centrally on the blade element with its axis substantially in the plane of and approximately perpendicular to the cut line of the severing edge thereof, and a bearing sleeve slidably and rotatably received on the guide post and supported to pivot about a fixed axis paralleling the cut line.

3. A tape cutter assembly according to claim 2 wherein the pivotal support axis for the bearing sleeve coincides with that for the cutter blade carrier.

4. A guillotine type cutter blade for tape dispensing machines comprising a guillotine unit including a cutter bar and a blade element secured thereto, aligned hanger bearings at the respective ends of said unit transverse to and in parallelism with the plane of the tape to be severed and loosely pivotally linked to a unit supporting and operating rockable carrier, a guide post centrally fixed on said unit and projecting oppositely to and in the general plane of the blade element for confining the unit as a whole to a general substantially straight linear movement approximately perpendicular to the tape plane, and a sleeve in which the guide post is slidably and rotatably confined and guided, the sleeve having a bearing boss apertured transversely of the sleeve and in parallelism with the plane of the tape for pivotally mounting said sleeve upon a fixed axis of support in a plane spaced from and paralleling that of the tape to be severed.

5. In a powered tape dispenser having a frame, a pair of separable feed rolls thereon and means to drive one of them to feed the tape, tape severing means including a fixed blade and a blade movable guillotine-fashion across the tape path to sever the tape, an actuator movable in one direction to close the rolls into tape feeding relation and to remove the movable blade from the tape path, and movable in the other direction to separate the rolls and to effect tape severing action of the movable blade, pivotal mounting and operating means for the movable blade connected to the actuator and having a fixed axis of support parallel to the path of the tape to be severed, links loosely and pivotally interconnecting said mounting and operating means with the movable blade, and central guide means for said movable blade affording it capacity for pivotal self-adjustment with respect to said mounting and operating means about an axis approximately normal to the cut line at the fixed blade, said central guide means comprising a guide post member and a bearing sleeve member relatively slidably and rotatably interengaged, one said member fixed on said movable blade and the other said member mounted to pivot on an axis parallel to that of said pivotal mounting and operating means for the movable blade.

6. In a powered tape dispenser according to claim 5, a construction wherein the movable blade pivotal mounting and operating means includes a cutter rod movable in the direction of its axis and providing pivotal link connection with the actuator, the pivotal connection at one end of the rod comprising a pivoted connector member slidably receiving said rod, a coil spring surrounding the rod and bearing at one end upon said connector member, and a stop formation on the rod for the spring end distal to the connector member, whereby in one direction the blade moving force is transmitted through and buffered by the spring.

7. In a powered tape dispenser according to claim 6, a construction wherein electromagnetically controlled means is provided for operating the actuator element to move the blade in the direction wherein said coil spring performs the transmitting and buffering.

8. In a powered tape dispenser according to claim 5, a construction wherein the movable blade pivotal mounting

and operating means includes a cutter rod movable in the direction of its axis and providing pivotal link connection with the actuator, the pivotal connection at one end of the rod comprising a pivoted connector member slidably receiving said rod, and buffering means operatively interposed between the rod and said connector member.

References Cited in the file of this patent

UNITED STATES PATENTS

1,726,229 Kantor ---------- Aug. 27, 1929
1,799,533 Remnsnider ---------- Apr. 7, 1931
2,192,132 Gautier ---------- Feb. 27, 1940
2,405,790 Krueger ---------- Aug. 13, 1946
2,408,363 Beckman et al. ---------- Oct. 1, 1946
2,521,370 Holmwood et al. ---------- Sept. 5, 1950
2,521,871 Rabon ---------- Sept. 12, 1950
2,601,898 Vestorsky ---------- July 1, 1952
2,693,708 Baer et al. ---------- Nov. 9, 1954
2,734,571 Martell ---------- Feb. 14, 1956