March 3, 1964 H. C. EISENMAN 3,122,955

TAPE DISPENSER

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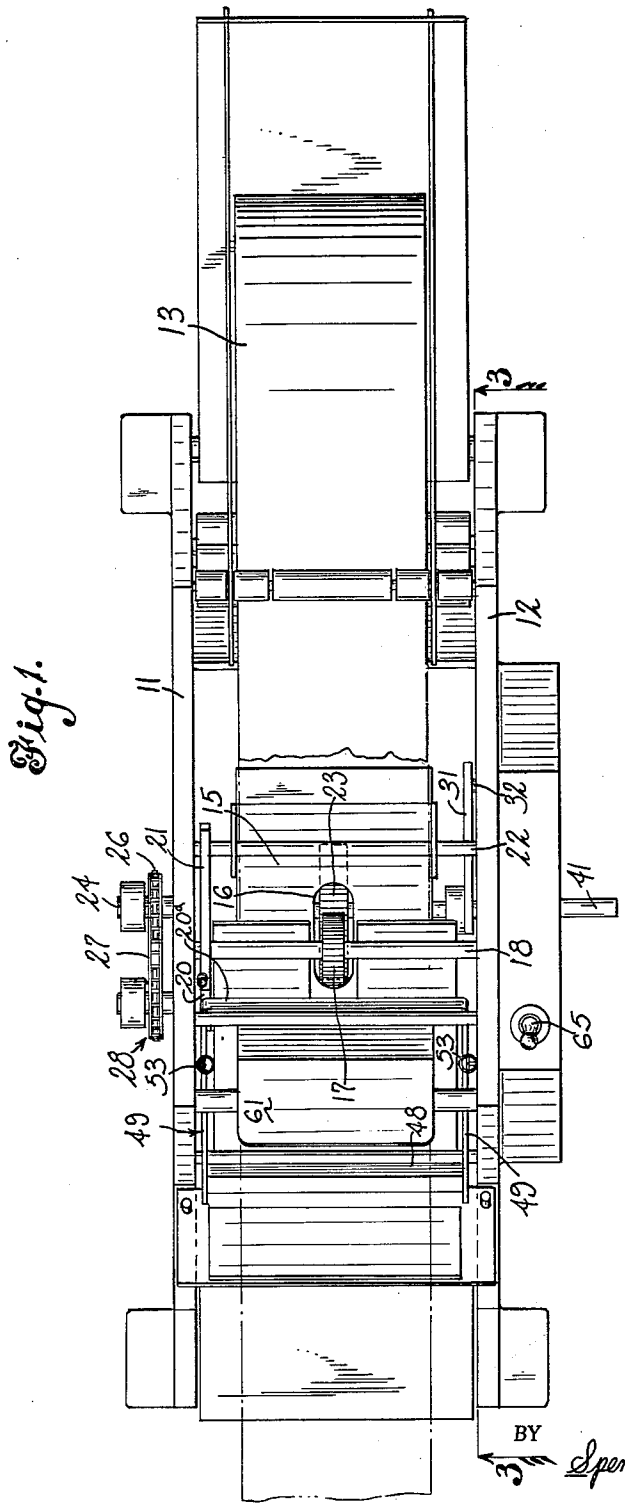


Fig. 1.

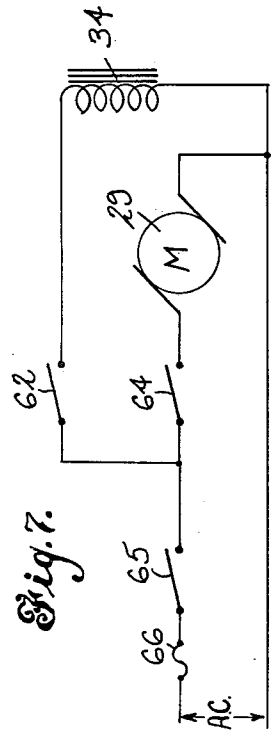


Fig. 7.

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Fig. 2.

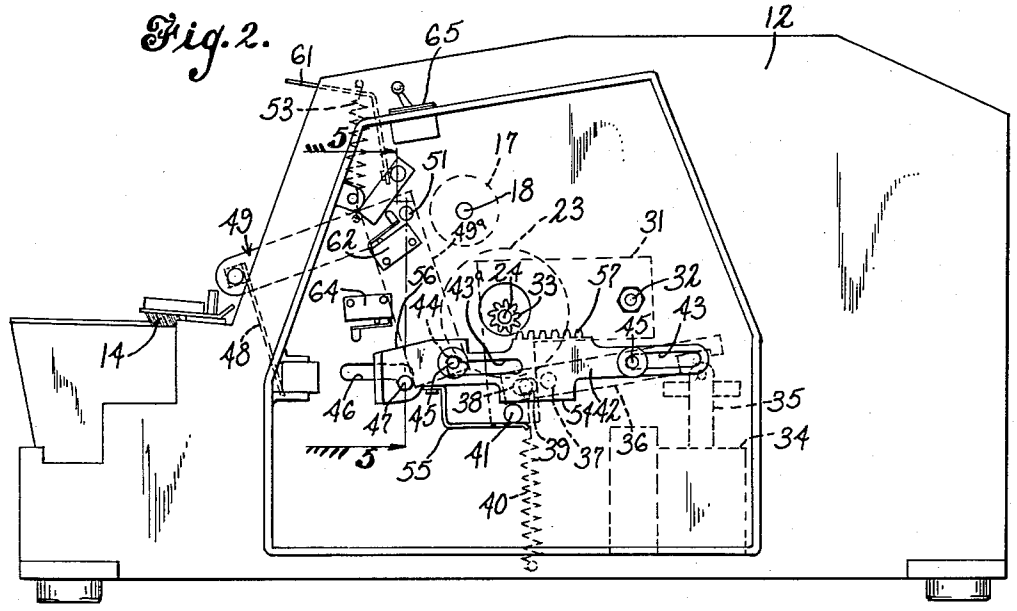
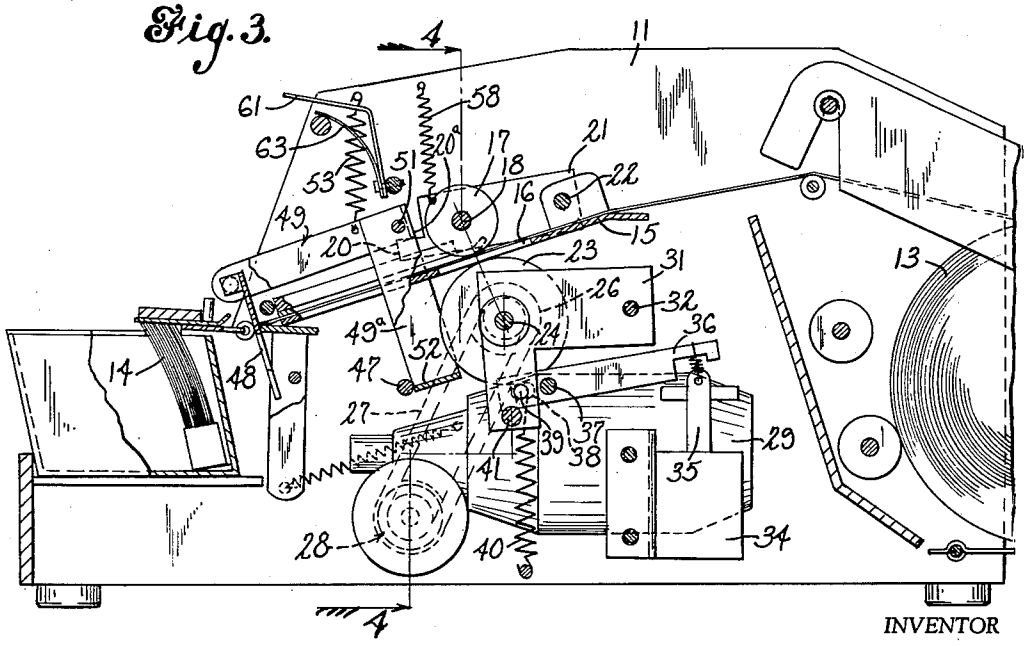


Fig. 3.



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Fig. 4.

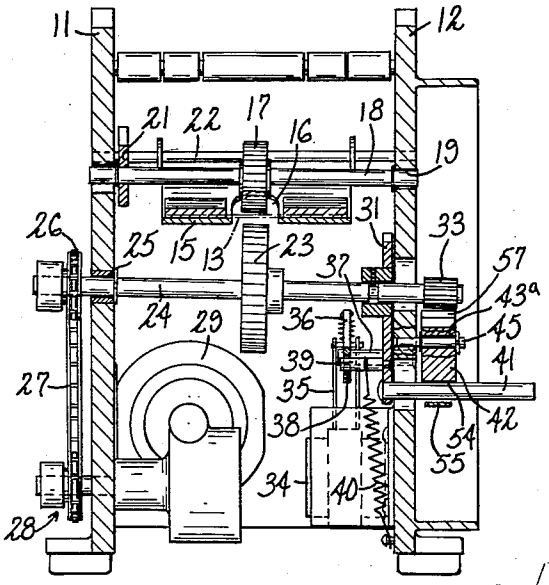


Fig. 5.

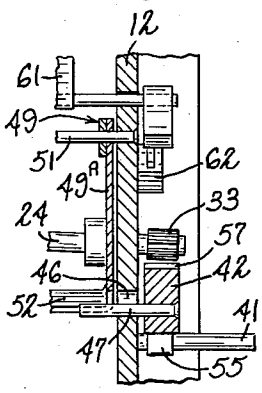


Fig. 6.

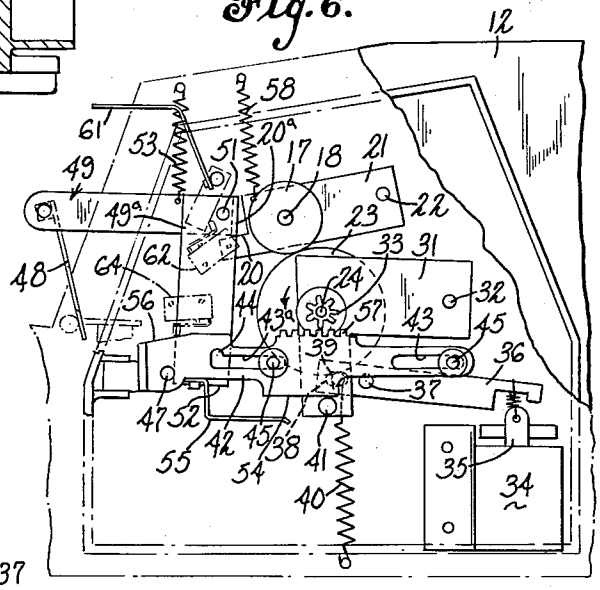
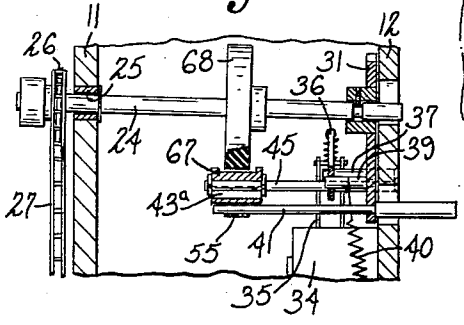


Fig. 8.



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TAPE DISPENSER

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Filed Mar. 20, 1962, Ser. No. 181,060
15 Claims. (Cl. 83—233)

This invention relates to tape dispensers and, while not limited thereto, may be advantageously employed in a dispenser of the type which dispenses random lengths of tape. The invention may also be embodied in a dispenser of the type which in operation feeds gummed tape past the tape-severing means and a moistener so that a severed length of tape may immediately upon dispensing be applied to the surface or surfaces to which it is to adhere. However, it is to be understood that the invention is not limited to a dispenser which dispenses gummed tape.

In most, if not all, packaging and sealing operations time is a very important factor, and tape-dispensing machines, particularly those which are motor driven, are generally utilized in such operations to rapidly dispense tape. These machines should quickly initiate dispensing of tape and quickly and cleanly sever a length of tape dispensed with but a minimum of manipulation by a machine operator. The present invention may be embodied in such a motor-driven machine, but it is believed that it is not limited to such use.

One object of the invention is to provide a tape dispenser having improved tape-severing means.

Another object is to provide a tape dispenser having improved means for actuating the movable cutter element of the tape-severing means.

Still another object of the invention is to closely relate functionally and otherwise the tape-feeding means of the dispenser with the tape-severing means.

Other objects of the invention will be apparent from the following detailed description of two embodiments of a tape dispenser.

In the drawings:

FIG. 1 is a top plan view of a tape-dispensing machine embodying the invention, having a roll of tape shown in full lines in the chamber with the tape being shown in phantom where it passes through the dispensing and severing mechanisms;

FIG. 2 is a right side elevational view of the dispensing machine with the side cover removed showing the interrelation of the operating parts of the mechanism in accordance with the invention;

FIG. 3 is a right side elevational sectional view taken along line 3—3 of FIG. 1;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 3;

FIG. 5 is a partial sectional view taken along line 5—5 of FIG. 2;

FIG. 6 is a partial elevational view similar to FIG. 2 with certain portions broken away for the sake of clarity, showing the dispensing and severing mechanism in the position for tape feed;

FIG. 7 is a schematic diagram of the operating circuit of the machine according to the invention; and

FIG. 8 is a partial sectional view similar to FIG. 4 illustrating a modified form of the tape dispenser.

Referring now to the form of FIGS. 1 through 4, a tape dispenser is provided with left and right side walls 11 and 12, respectively, which are suitably spaced and secured together to form the frame of the machine. A roll of tape 13 is carried in a chamber provided in the machine, as is well known in the art, and the tape is threaded past the feeding and severing stations as will hereafter be described. Tape with gum on one side

may be passed over a moistening brush 14 as the tape is dispensed in a manner common to machines of this type. Tape 13 overlies a platform 15 which is mounted between the side walls and provided with an aperture 16. Positioned above the aperture in platform 15 is an idler roller or wheel 17 which is rotatably mounted on a shaft 18. One end of shaft 18 is rockably mounted in a bearing 19 secured in side wall 12 and the other end of the shaft is journalled in a rockable plate 21 which is pivoted on a shaft 22 secured between the side wals. A spring 58 attached between rockable plate 21 and left side wall 11 urges rockable plate 21 in a clockwise direction about shaft 22 as shown in FIG. 3 thereby urging bodily movable wheel 17 to a clearance position above platform 15.

A roller or wheel 23 is secured to a shaft 24 having one end thereof projecting through and journalled in a bearing 25 rockably mounted in side wall 11. The projecting end carries a chain gear 26 which drives shaft 24 by means of a chain 27 through a gear and shaft arrangement 28 driven by a motor 29 mounted to side wall 11.

The other end of shaft 24 projects through and is journalled in a rocking member 31 which is pivoted to right side wall 12 at pivot 32. The shaft 24 projects through a clearance aperture in the right side wall and is provided with a pinion gear 33 secured to the end thereof, the purpose of which will appear hereinafter.

A solenoid 34 provided with a solenoid plunger 35 is mounted to right side wall 12. The solenoid plunger 35 is yieldably attached to one end of a lever 36 which is pivoted to right side wall 12 intermediate its ends by means of a pin 37. An ovalized slot 38 is provided in the other end of lever 36 and carries a pin 39 secured to rocking member 31. A spring 40 is attached between pin 39 and right side wall 12 to urge lever 36 and rocking member 31 in a counterclockwise direction as viewed in FIG. 3 when solenoid 34 is not activated. As will be more fully described hereafter, it may be seen that operation of solenoid 34 will cause lever 36 to rotate in a clockwise direction about pin 37 as viewed in FIG. 3, thereby urging rocking member 31 in a clockwise (FIG. 3) direction about pivot 32, thus raising wheel 23 with relation to platform 15. Rocking member 31 also carries a lifting pin 41 which projects through and extends beyond an aperture in right side wall 12.

Referring now to FIGS. 2 through 5, a slide 42 is mounted adjacent the outer face of right side wall 12. Slide 42 is provided with longitudinally extending elongated slots 43 and 43a, the slot 43a being provided with an angular extension 44. A pair of guide pins 45 is secured to right side wall 12 with one pin riding in each of the last-mentioned slots. A cutter pin 47 is secured to slide 42 and extends within the chamber defined by the left and right side walls through a clearance hole 46 in the right side wall.

A pair of laterally spaced bell crank levers 49 are pivoted intermediate the left and right side walls on a rod 51 extending between the walls, and a cutter blade 48 is mounted between one end of one lever and the corresponding end of the other. The other ends of the bell crank levers are fixedly joined by a suitable bar 52 forming with these levers a yoke 49a, a portion of which is in contact with the portion of cutter pin 47 extending through right side wall 12. A pair of springs 53 extending between bell crank levers 49 and the respective left and right side walls urge the bell crank levers in a clockwise direction about rod 51 as viewed in FIG. 3, thereby urging cutter blade 48 to a raised position and urging cutter pin 47 in a direction towards the front of the machine or to the left as viewed in FIG. 3.

Since cutter pin 47 engageable with the yoke extends from slide 42, it will readily be seen that springs 53 also urge the slide to the left as viewed in FIG. 2. However,

engagement of pin 45 in detent slot 44 prevents the slide from moving toward the left, when the slide is in the position of FIG. 2, thereby holding cutter blade 48 in the down position. A portion 20a of said yoke is adapted to engage a projection 20 on rockable plate 21 to urge the rockable plate in a counterclockwise (FIG. 2) direction about shaft 22 under the influence of the springs 53 when the yoke 49a is rotated.

Lifting pin 41 which extends through right side wall 12 as hereinabove described, projects through immediately below a lower horizontal surface 54 on slide 42. An elbowed arm is suitably attached to slide 42 and has a portion 55 parallel but spaced below horizontal surface 54, thereby defining a horizontal slot in which lifting pin 41 may slide. The upper forward portion of slide 42 is provided with a sloping cam surface 56 and the upper central portion of the slide is provided with a plurality of rack teeth 57.

An operating lever 61 is suitably pivoted for vertical swinging movement between the left and right side walls and is adapted to engage, when depressed, a switch 62. A leaf spring 63 yieldably holds operating lever 61 out of contact with switch 62. A second switch 64 is mounted to the outer side of right side wall 12 in a position which will hereinafter become apparent. A master switch 65 is provided for support from the side 12 of the frame.

The circuitry for operation of the machine is shown in FIG. 7. As shown schematically, a power source such as an A.C. source is connected across a fuse 66 and master switch 65 which are in series. Solenoid 34 is connected in series with the circuit with switch 62 in series therewith. Motor 29 is in parallel with solenoid 34 and switch 62, and second switch 64 is connected in series with the motor.

Turning now to the operation of the machine, it may best be described with reference to FIGS. 2, 3 and 6 and the circuit diagram of FIG. 7. At rest or in the normally off position, the relation of the elements is as shown in FIG. 2. Solenoid 34 is deactivated thereby allowing lever 36 to be urged in the counterclockwise (FIG. 2) direction by means of spring 40. Such urging also urges rocking member 31 in the counterclockwise direction, thereby holding wheel 23 below the top plane of platform 15 which has tape 13 threaded thereover. The position of rocking member 31 holds lifting pin 41 in its lower position against horizontal arm 55 attached to slide 42. This causes pin 45 to be held in detent slot 44 which is the position attained at the end of the previous cycle. The rear or rest position of slide 42 locks bell crank levers 49 in the position shown in FIGS. 2 and 3 by means of cutter pin 47, thereby holding cutter blade 48 in a down or tape-path-blocking position. The position of the bell crank levers also permits rockable plate 21 to be acted upon by spring 58, thereby holding wheel 17 above the plane of platform 15 and out of contact with the tape.

By closing master switch 65, the machine may now be operated. Depression of operating lever 61 thereafter closes switch 62, thereby activating solenoid 34 as may be seen in the schematic diagram. The activation of solenoid 34 rotates lever 36 in the clockwise (FIG. 6) direction thereby raising wheel 23 through rocking member 31 to a position to contact the underside of tape 13 through aperture 16 in the platform. The rotation of rocking member 31 also raises lifting pin 41 against the lower horizontal surface 54 of the slide and causes relative movement of the pin 45 and detent slot 44. This permits the pressure on cutter pin 47 applied through the bell crank levers by means of springs 53 to move the slide toward the front of the machine or to the left as shown in FIG. 2, while maintaining its alignment by the cooperation of guide pins 45 in elongated slots 43. No interference between pinion gear 33 and rack teeth 57 will be encountered since the pinion gear was raised along with wheel 23, both of which are attached to shaft 24 supported in part on rockable plate 31. When slide 42 attains the maximum forward position, cutter blade 48 will have been sufficiently raised to avoid blocking the tape path. The position of the elements at this point is shown in FIG. 6. During the previous rotation of bell crank levers 49, rockable plate 21 was rotated in the counterclockwise (FIG. 6) direction through projection 20 thereby bringing wheel 17 in contact with the upper surface of tape 13, thereby providing frictional contact of wheels 17 and 23 with the tape therebetween.

As slide 42 reaches the forward position thus assuring that cutter blade 48 is clear of the path of the tape, cam surface 56 contacts and closes switch 64, thereby operating motor 29 as will be seen in the schematic diagram of FIG. 7. By means of the motor drive as heretofore described, wheel 23 is driven through shaft 24. The frictional engagement of the wheel 23 with the tape drives or feeds the latter with wheel 17 acting as a backup element and idler.

Upon release of the operating lever, solenoid 34 is deactivated and allows lever 36 to rotate in a counterclockwise (FIG. 6) direction under the force of spring 40. Through pin 39 in slot 38, rocking member 31 is rotated in a counterclockwise direction, taking drive wheel 23 out of contact with the underside of the tape. This also, through shaft 24, lowers pinion gear 33 into engagement with rack teeth 57 on the slide and, since the rotation of the shaft is in the direction shown by the arrow in FIG. 6, the slide will be driven by the pinion to the right or back toward its initial rest position. As the rack is driven to the right, cutter pin 47 engaging yoke 49a drives the bell crank levers in a counterclockwise (FIG. 6) direction, thereby causing cutter blade 48 to descend and sever the dispensed tape in a well known manner. The rotation of he bell crank levers 49 of the aforementioned yoke also releases the pressure on the rockable plate carrying wheel 17, to further relieve frictional contact of the feed mechanism with the tape. The cooperation between the rockable plate and the bell crank levers 49 of the aforementioned yoke which carries the tape-severing member 48 is such that the feed roll 17 is never in a feeding position when the tape-severing member is in a tape-blocking position.

After the slide has been driven toward the rear position to the required extent, cam surface 56 releases switch 64, thereby cutting off the power to drive motor 29. As the slide is accelerated toward its rear or rest position prior to opening of the contacts of switch 64, the initial momentum of the slide, together with the inertia of the shaft of motor 29, transports the slide very rapidly. Also, as the slide is driven to the right, horizontal arm 55 engages the under side of lifting pin 41 which is pulled down through spring 40. This urges the slide to a lower position so that pin 45 will be urged into detent slot 44 when the slide attains the rest position. It will also be seen in FIG. 2 that at the rest position pinion gear 33 is out of contact with rack teeth 57, thus allowing the motor to coast to rest.

Each depression of the operating lever will cause the mechanism to move to the position for dispensing tape and tape will be dispensed so long as the operating lever is depressed. As soon as the lever is released, the slide will be driven back to the rest position with concurrent severing of the tape by means of the cutter blade.

It may be noted that if for any reason it is desirable to manually move the tape-feeding rolls 17 and 23 into their operative positions, this may be done by grasping the pin 41 which projects from the frame, as shown in FIG. 4, and lifting this pin. The pin 41 may also be lifted manually for the purpose of cleaning or removing the tape-severing element 48 from the yoke 49.

An alternate form of construction is shown in FIG. 8 wherein like numerals designate like parts. In this embodiment, the slide 67 is positioned below driven wheel 68 which is provided with a frictional surface so that it will contact and drive slide 67 in a manner similar to the driving of slide 42 by means of pinion gear 33 in the embodiment shown in FIGS. 1 through 6. In all

other respects, the operation of the device is identical.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A feeding and severing mechanism for a machine for dispensing tape from a roll comprising a feed shaft having a tape engaging wheel thereon, said shaft being movable between tape engaging and non-engaging positions, electrically operated means for controlling the position of said shaft dependent on the state of energization thereof, a motor drivably connected to said shaft, severing means, and actuating means connected to said severing means, said shaft being arranged upon movement from a feeding position to a non-feeding position in response to a change in the state of energization of said electrically operated means to drivably engage said actuating means to allow said motor to drive said actuating means and said severing means connected to said actuating means through the path of the tape.

2. A feeding and severing mechanism for a machine for dispensing tape from a roll comprising frictional feeding means adapted to selectively engage the tape for the feeding thereof, said frictional means comprising a shaft having a tape engaging feed wheel thereon, electrically operated means for moving said shaft between tape feeding and non-feeding positions, a switch for operating said electrically operated means, a motor connected to said shaft, and severing means made ready in response to said electrically operated means and driven by said motor through said shaft when said shaft is moved to a non-feeding position to sever tape dispensed by said frictional feeding means.

3. A feeding and severing mechanism for a machine for dispensing tape from a roll comprising frictional feeding means adapted to selectively engage the tape for the feeding thereof, said frictional feeding means comprising a shaft having a feed wheel thereon, electrically operated means for moving said shaft between tape feeding and non-feeding positions, a first switch for operating said electrically operated means, resiliently biased severing means urged to a ready position for severing the dispensed tape, cutter drive means for driving said severing means to sever tape, said cutter drive means releasing said resiliently biased severing means to the ready position responsive to said electrically operated means, a motor connected to said shaft, for driving said feeding means and means on said shaft for drivably engaging said cutter drive means when said shaft is moved to a non-feeding position to drive said severing means to sever tape, said cutter drive means being effective to de-energize said motor upon movement thereof by said shaft to a predetermined position.

4. A feeding and severing mechanism for a machine for dispensing tape from a roll comprising frictional feeding means adapted to selectively engage the tape for the feeding thereof, said frictional feeding means comprising a shaft having a feed wheel thereon, a solenoid for controlling the position of said shaft between tape feeding and non-feeding positions, an operating switch in series with said solenoid for controlling the operation thereof, a movable cutter adapted to sever the dispensed tape, at least one resilient member urging said movable cutter to a ready position, cutter drive means cooperating with said movable cutter to drive said movable cutter to effect tape severing, said cutter drive means releasing said movable cutter to a ready position in response to the operation of said solenoid, a motor connected to said shaft for alternately driving said frictional feeding means for the dispensing of tape and said cutter drive means for the severing of tape dependent on the position of said shaft, and a second switch connected in series with said motor for de-energizing said motor responsive to the position of said cutter drive means in driving said severing means to sever dispensed tape.

5. A feeding and severing mechanism for a machine for dispensing tape from a roll, comprising feeding means movable between tape engaging and non-engaging positions, a movable cutter assembly adapted to sever dispensed tape, at least one resilient member urging said movable cutter assembly to a ready position, cutter drive means cooperating with said movable cutter assembly to drive said movable cutter assembly to effect tape severing when said feeding means is in a non-feeding position, said cutter drive means releasing said movable cutter assembly to a ready position in response to movement of said feeding means to a tape-engaging position, drive means connected to said feeding means to dispense tape and engage and drive said cutter drive means for the severing of tape dependent on the position of said feeding means, and operating means arranged to control the position of said feeding means to selectively dispense and sever tape.

6. A machine for dispensing and severing tape, comprising a frame, a motor secured to said frame, a shaft rockably mounted in said frame, a feed wheel fixedly mounted on said shaft, drive means connected between said motor and said shaft for driving said shaft, a solenoid secured to said frame, rocking means connected between said shaft and said solenoid for rocking said shaft in response to the operation of said solenoid to cause said feed wheel to drivingly engage and disengage the tape to be fed, a cutter assembly swingably mounted on said frame and having tape-blocking and tape-clearing positions and adapted to sever tape as it moves from the tape-clearing to the tape-blocking position, resilient means urging said cutter assembly to the tape-clearing position, a cutter drive assembly slidably mounted on said frame and having an advanced and a rest position, a portion of said cutter drive assembly engaging said cutter assembly, said cutter drive assembly being urged to the advanced position by said resilient means, said cutter drive assembly including detent means for yieldably holding said cutter drive assembly at the rest position, said rocking means being also connected to said cutter drive assembly for effecting release of said detent means, a cut-off drive gear mounted on said shaft and adapted to engage and drive said cutter drive assembly when said feed wheel is drivingly disengaged from the tape, first control means cooperating with said solenoid to control the operation thereof, and second control means secured to said frame and responsive to the position of said cutter drive assembly for controlling the operation of said motor.

7. A machine for dispensing and severing tape comprising a frame, a motor secured to said frame, a first shaft rockably mounted in said frame, a first feed wheel fixedly mounted on said shaft, drive means connected between said motor and said shaft for driving said shaft, a solenoid secured to said frame, rocking means connected between said shaft and said solenoid for rocking said shaft in response to the operation of said solenoid to cause said feed wheel to drivingly engage and disengage the tape to be fed, a cutter assembly swingably mounted on said frame and having a rest and a raised position and adapted to sever tape as it descends to the rest position, resilient means for urging said cutter assembly to the raised position, a cutter drive assembly slidably mounted on said frame and having a forward and a rest position, a portion of said cutter drive assembly engaging said cutter assembly, said cutter drive assembly

being urged to the forward position by said resilient means, said cutter drive assembly including detent means for yieldably holding said cutter drive assembly at the rest position, said rocking means being also connected to said cutter drive assembly for effecting release of said detent means, a cut-off drive gear mounted on said shaft and adapted to engage and drive said cutter drive assembly when said feed wheel is drivingly disengaged from the tape, first control means cooperating with said solenoid to control the operation thereof, and second control means secured to said frame and responsive to the position of said cutter drive assembly for controlling the operation of said motor.

8. The structure defined in claim 7 wherein said first control means comprises a switch in series with said solenoid to actuate said solenoid when said switch is manually closed.

9. The structure defined in claim 7 wherein said cutter assembly comprises a cutter shaft secured to said frame parallel to said first shaft, a pair of spaced bell crank levers rotatably mounted intermediate their ends on said cutter shaft, a cutter blade mounted between said levers at one end of said pair of levers, and a spacer bar mounted between said levers at the other end of said pair of levers, whereby said levers, said cutter blade and said spacer bar form a rigid unit swingably mounted on said cutter shaft for movement of said cutter blade between the rest and raised position.

10. The structure defined in claim 7 and further including a second shaft rockably mounted in said frame parallel to said first shaft, a second feed wheel rotatably mounted on said second shaft, said feed wheels adapted to have their circumferential surfaces frictionally engage each other with the tape therebetween to effect positive dispensing of the tape, and second rocking means connected to said second shaft for rocking said second feed wheel to drivingly engage and disengage the tape to be fed, said second rocking means contacting said cutter assembly whereby said second feed wheel is rocked to the driving position by movement of the cutter assembly to the raised position.

11. The structure defined in claim 7 wherein said cutter drive assembly comprises a slide, at least two longitudinally extending slots in said slide, a pin mounted to said frame and extending through each of said slots, one of said slots having a slotted portion extending transversely from an end thereof wherein said pin in said slotted portion defines said detent means, and a cutter control arm extending from said slide and adapted to engage said cutter assembly, said slide being provided with an upper longitudinally extending cam surface for controlling the operation of said second control means, and a longitudinally extending rack portion for engagement by said cut-off drive gear.

12. The structure defined in claim 11 wherein said rocking means includes a lifting arm engaging said slide to release said slide from the detent position when said solenoid is actuated.

13. The structure defined in claim 11 wherein said second control means comprises a switch in series with said motor for controlling the operation of said motor, said switch being mechanically operated by the cam surface on said slide responsive to the position of said slide.

14. A machine for dispensing and severing tape comprising a frame, a motor secured to said frame, a shaft rockably mounted in said frame, a feed wheel fixedly mounted on said shaft, drive means connected between said motor and said shaft for driving said shaft, a solenoid secured to said frame, rocking means connected between said shaft and said solenoid for rocking said shaft in response to the operation of said solenoid to cause said feed wheel to drivingly engage and disengage the tape to be fed, a cutter assembly swingably mounted on said frame and having a rest and a raised position and adapted to sever tape as it descends to the rest position, resilient means for urging said cutter assembly to the raised position, a cutter drive assembly slidably mounted on said frame and having a forward and a rest position, a portion of said cutter drive assembly engaging said cutter assembly, said cutter drive assembly being urged to the forward position by said resilient means, said cutter drive assembly including detent means for yieldably holding said cutter drive assembly at the rest position, said rocking means being also connected to said cutter drive assembly for effecting release of said detent means, said feed wheel being provided with a frictional surface and adapted to engage and drive said cutter drive assembly when said feed wheel is drivingly disengaged from the tape, first control means cooperating with said solenoid to control the operation thereof, and second control means secured to said frame and responsive to the position of said cutter drive assembly for controlling the operation of said motor.

15. A feeding and severing mechanism for a machine for dispensing tape from a roll comprising frictional feeding means adapted to selectively engage the tape for the feeding thereof, a solenoid for controlling the position of said frictional feeding means, an operating switch in series with said solenoid for controlling the operation thereof, a movable cutter adapted to sever the dispensed tape, at least one resilient member urging said movable cutter to a ready position, cutter drive means cooperating with said movable cutter to drive said movable cutter to effect tape severing, said cutter drive means releasing said movable cutter to a ready position in response to the operation of said solenoid, a motor for alternately driving said frictional feeding means for the dispensing of tape and said cutter drive means for the severing of tape, and a second switch connected in series with said motor for operating said motor responsive to the position of said cutter drive means, said cutter drive means comprising a slide, slidably mounted to the machine and adapted to slide between a forward and a rest position, detent means cooperating with said slide to yieldably hold it in the rest position, means cooperating with said slide responsive to said solenoid for releasing said slide from the detent position, and means attaching to said slide and engaging said movable cutter to control the position of said movable cutter in response to the position of the slide.

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