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POWER-OPERATED TAPE DISPENSER

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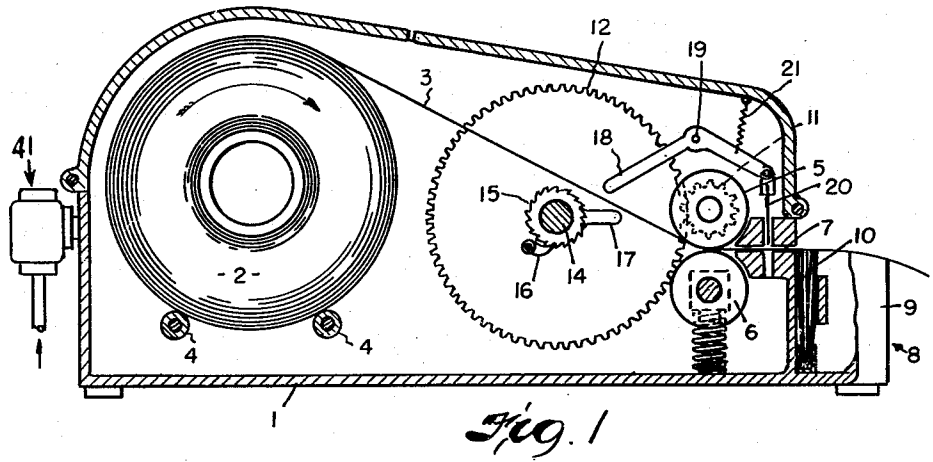


Fig. 1

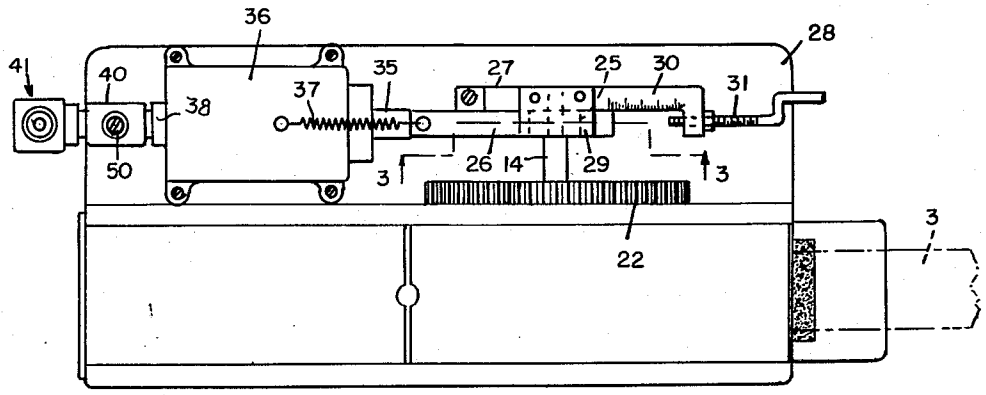
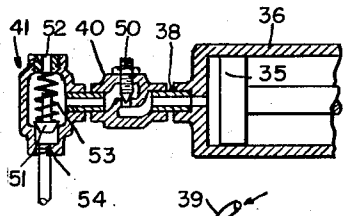


Fig. 2



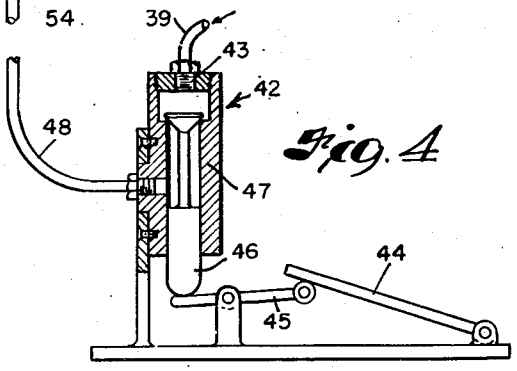


Fig. 4

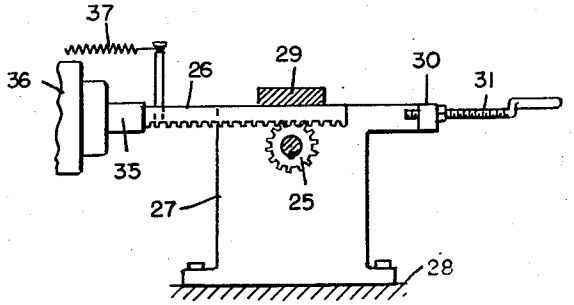


Fig. 3

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POWER-OPERATED TAPE DISPENSER

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1 Claim. (Cl. 118—42)

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The present invention relates generally as indicated to a power operated tape dispenser and more particularly to a pneumatically operated dispenser wherein cut-off of the tape is effected on the return stroke of the feeding mechanism.

The operation of tape dispensers such as are presently in common usage for the dispensing of moistened tape in predetermined lengths entails considerable operator fatigue since the dispensers are usually located above the work area or packing table and therefore the operator must reach up and swing the operating handle through a considerable arc in order to dispense several feet of the moistened tape as is often required in the sealing of large cardboard cartons and the like.

One object of the present invention is to eliminate the necessity of such long reaching and to enable the dispensing of predetermined lengths of moistened tape simply by operating a foot lever or the like and which upon release of the foot lever allows the tape feeding mechanism to return to its starting position to effect cut-off on the return stroke, both hands of the operator being free for the application of the tape to the carton.

Another object of this invention is to provide a control for the power operating mechanism by which the rate of feed of the tape can be regulated so as to assure proper moistening of tape as it is fed past a moistening device.

Another object of this invention is to provide means for assuring rapid return of the feeding mechanism whereby the cut-off mechanism is properly operated as an incident to such rapid return.

Other objects and advantages will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail one illustrative embodiment of the invention, this being indicative, however, of but one of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

Fig. 1 is a side elevation view of a typical tape dispenser with a portion of the casing broken away to illustrate the internal construction thereof for feeding and cutting the tape;

Fig. 2 is a top plan view illustrating my power control device operatively associated with the tape dispenser of Fig. 1;

Fig. 3 is a detail cross-section view taken substantially along the line 3—3, Fig. 2; and

Fig. 4 is a piping diagram illustrating the air flow control valves and operating mechanism.

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Referring now more particularly to the drawing and first to Fig. 1, the tape dispenser is shown as comprising a case 1 in which a roll 2 of gummed paper tape 3 is supported for rotation on suitable rollers 4:4, the tape 3 from said roll 2 passing between a feed roller 5 and a back-up, preferably spring-loaded, roller 6 and fed thereby through a slit 7 in said case 1 and past a moistening device 8 which may comprise a reservoir 9 for water and a brush strip 10 which by capillary action draws water to the tips of the bristles for moistening the underside of the tape 3 as the latter is moved in contact therepast. Driving of feed roll 5 may be effected as through the pinion gear 11 thereon in mesh with a driving gear 12, the diameters of said gears and said feed roll being selected so that approximately 180° turning of the drive shaft 14 and thus of the gear 12 in a clockwise direction effects counter-clockwise rotation of said feed roller 5 to feed a relatively long length of tape, as for example three to four feet.

In order that the feed roll 5 will be driven only in a counter-clockwise direction as viewed in Fig. 1, the shaft 14 has only a one-way driving connection with gear 12, effected as by means of a ratchet wheel 15 non-rotatable on said shaft and a spring-loaded pawl 16 pivoted on said gear.

For the purpose of cutting the tape 3 on the return stroke of the shaft 14, the latter is provided with an actuator cam or lug 17 which engages one end of a knife operating lever 18. Said lever 18 is mounted on a pivot 19 between its ends and carries a knife 20 at its other end. Thus, as the lug 17 passes the end of the operating lever 18, the knife 20 will be forced downwardly to cut the tape 3 and, of course, the movement of the lug 17 past the operating lever 18 will permit the knife to be restored to inoperative position by the spring 21 connected to said lever.

In the conventional hand-operated tape dispenser the manual operating handle is connected to the shaft 14 and an adjustable stop will be provided on the graduated segment 22 of the case to arrest movement of the handle to a predetermined degree so as to dispense a predetermined length of tape.

The present invention contemplates power operation of shaft 14 and in the illustrated embodiment comprises a gear 25 on said shaft 14 with which is engaged a reciprocable gear rack 26. The end of said shaft 14 is journalled as in a bracket 27 fixed on the base 28 of the device and is provided with a lateral extension 29 to serve as a guide to maintain the gear rack 26 in engagement with the gear 25. Said bracket 27 is provided with a further extension 30 in which is threaded a stop screw 31 for adjusting the stroke limit of the gear rack and thereby adjusting the

degree of rotation of shaft 14 so that a predetermined length of tape 3 will be dispensed during each stroke of the gear rack toward the right as viewed in Figs. 2 and 3.

The left end of said gear rack 26 is secured to the piston 35 of a signle-acting pneumatic cylinder 36 and tension spring means 37 are provided to fully and rapidly retract the gear rack 26 and piston 35 whenever air pressure in said cylinder is released or vented.

As best shown in Figs. 2 and 4, the cylinder 36 is provided with a single air inlet and air exhaust port 38 which is alternately communicated with an air pressure supply line 39 and the atmosphere through a throttling valve 40, a quick exhaust valve 41, and a foot control valve 42, the latter having an inlet port 43 to which the air supply line 39 is connected.

The foot control valve 42 is operated as by a suitable lever mechanism including a pivoted foot operated lever 44 which through an intermediate pivoted lever 45 lifts the valve member 46 from its seat in the valve body 47 to thereby permit air to flow through hose 48 to the quick exhaust valve 41. When foot pressure on lever 44 is released, air pressure urges valve member 46 downwardly to seated position.

The throttling valve 40 may be, as shown, in the form of an ordinary needle valve which, upon screwing in or out of the valve member 50 thereof, regulates the rate of air flow therethrough so that the tape 3 will be dispensed at just the right rate of speed for proper and complete moistening thereof as it passes the moistening brush 10.

The quick exhaust valve 41 is in the form of a shuttle valve including a spring-loaded valve member 51 generally resembling a check valve which is unseated by air pressure in the line 48, the exhaust port 52 then being closed by said member 51 whereby air under pressure is allowed to flow through said valve 41 and through valve 40 into the pneumatic cylinder 36. When the air pressure in line 48 is cut off by closing of valve 42, the valve member 51 will be actuated by the spring 53 to close the intake port 54 and to open the exhaust port 52 whereby the air from the pneumatic cylinder 36 may be exhausted through the throttle valve 40 and through the quick exhaust valve 41 to the atmosphere.

In operation, the tape dispenser is mounted at a convenient place on or above the packing table and the operator turns the adjusting screw 31 so that the desired length of tape 3 will be dispensed during each forward stroke of the piston 35 and gear rack 26, and for this purpose the extension 30 may be provided with indicia, as shown, with which the end of the screw 31 is adapted to be aligned. When it is desired to dispense such predetermined length of tape 3, the operator simply depresses the foot lever 44 to open the foot control valve 42 and thereby allow air under pressure to flow from supply line 39 and through the foot control valve, the line 48, the quick exhaust valve 41, and the throttle valve 40 into cylinder 36, the valve 40 of course being adjusted so that the piston 35 in said cylinder 36 will be actuated against the force of spring 37 and that required to rotate the feeding mechanism at a desired rate of speed for proper moistening of the tape. Then, upon release of the foot lever 44, the air pressure in the air supply line 39 will immediately effect movement of the valve member 46 to a closed position and the consequent drop or equalization of pressure in the line 48 between the foot control valve 42 and the quick exhaust valve 41 will permit the spring 53 in the latter to move the valve member 51 to close the intake port 54 and to open the exhaust port 52 whereby the air in cylinder 36 will be exhausted to the atmosphere through the throttle valve 40 and the quick exhaust valve 41. It is to be noted that the upper mushroom portion of the valve member 46 seats in the body 47 while the lower stem portion is merely slide-guided in said body 47 without packing rings or the like whereby the consequent drop or equalization of pressure is made possible through leakage occurring between the stem portion of the valve member 46 and the bore in the body 47 in which said valve member stem is slidable. Since the spring 37 is now effective to retract the piston 35 and the gear rack 26, the air will be rapidly exhausted without excessive build-up in pressure between the piston 35 and the throttle valve 40 whereby the piston movement is substantially unimpeded and relatively rapid. In this way, the lug 17 of the cut-off mechanism rapidly trips the knife 20 to effect a clean cut of the tape 3. The lug 17 in passing the knife operating mechanism permit restoration thereof to inoperative position so that as soon as the foot lever 44 is again depressed, the operation of the feeding mechanism can proceed with the tape 3 being forced through the case 1 and past the moistening brush 10.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in the following claim, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:

The combination with a tape dispenser of the type which includes an operating member which, when moved a predetermined distance in one direction at predetermined speed, feeds a predetermined length of tape at predetermined speed past a tape moistening device and which, when moved in the opposite direction, operates a knife to sever the length of moistened tape; of a power device for operating said member, said power device comprising a fluid motor including a movable element operatively connected to said operating member, a fluid pressure supply line leading to said motor for effecting fluid pressure actuation of said movable element in one direction, valve means in said line effecting alternate supply and release of fluid under pressure to and from said motor and including an adjustable needle valve for effecting control of the rate of flow of fluid under pressure to said motor to regulate the rate of movement of said movable element and thus to regulate the rate of movement of said operating member in such one direction for proper moistening of the tape, and spring means for actuating said movable element and operating member in the opposite direction upon release of the fluid under pressure as aforesaid for operation of the knife.

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