United States Patent

[11] **3,526,189**

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[21] Appl. No. **668,762**
[22] Filed **Sept. 19, 1967**
[45] Patented **Sept. 1, 1970**
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[54] **LABEL PRINTING AND ISSUING APPARATUS**
7 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** **101/288,** 197/133, 64/30, 156/384
[51] **Int. Cl.** **B41f 1/08**
[50] **Field of Search** 101/288, 228, 92, 253, 196, 44; 197/133; 156/384, 277; 197/133P; 64/30

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Assistant Examiner—Clifford D. Crowder
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ABSTRACT: Apparatus for successively printing pressure sensitive labels carried on a backup tape and for successively removing the printed labels from the tape includes a spindle supporting a removable drum receiving the tape from which the labels have been removed and, the spindle is driven by an electric motor through a gear drive having a friction clutch. A detent wheel is adjustably attached to the drum and has peripherally spaced notches which correspond to the angular displacement of successive labels on the tape and are successively engaged by a pivotal pawl, and the pawl and motor are operated by the printer drive to provide for precise advancement of the tape immediately following each printing operation.

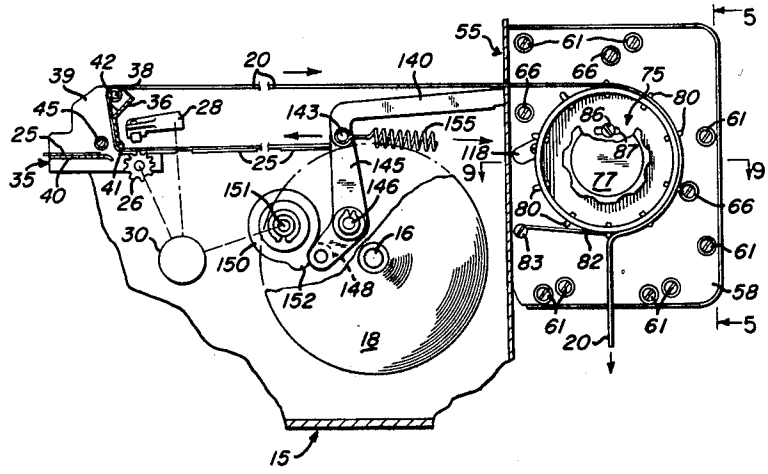


FIG-1

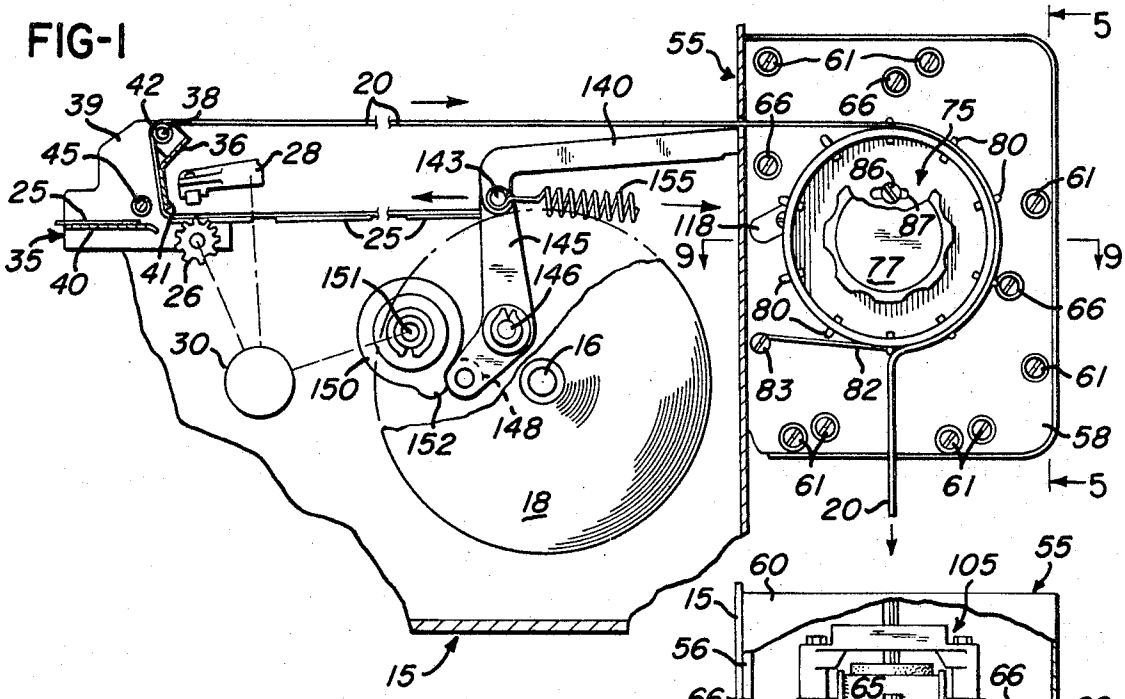


FIG-2

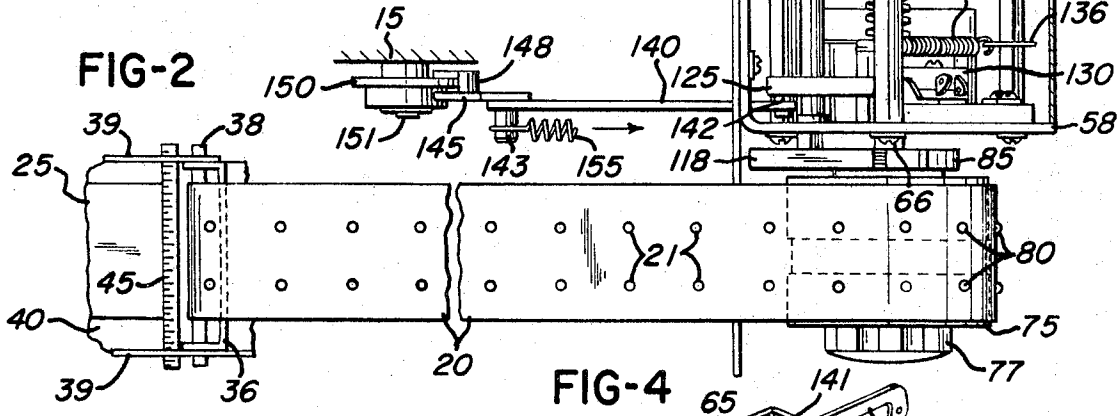


FIG-3

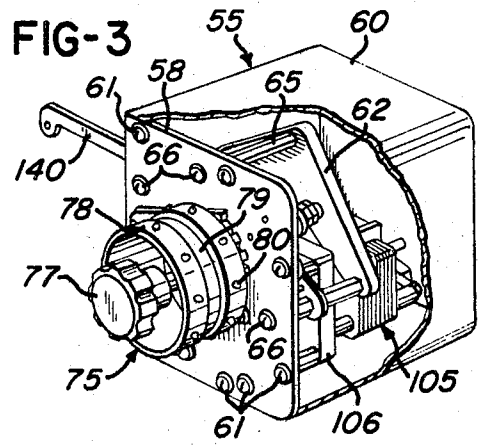
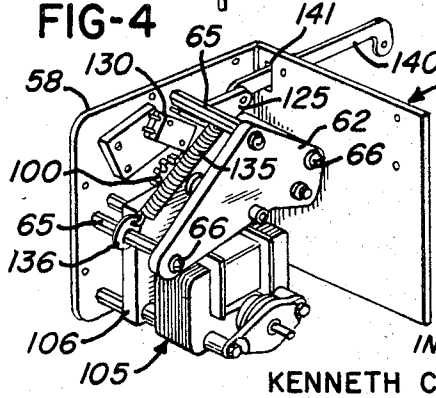


FIG-4



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FIG-5

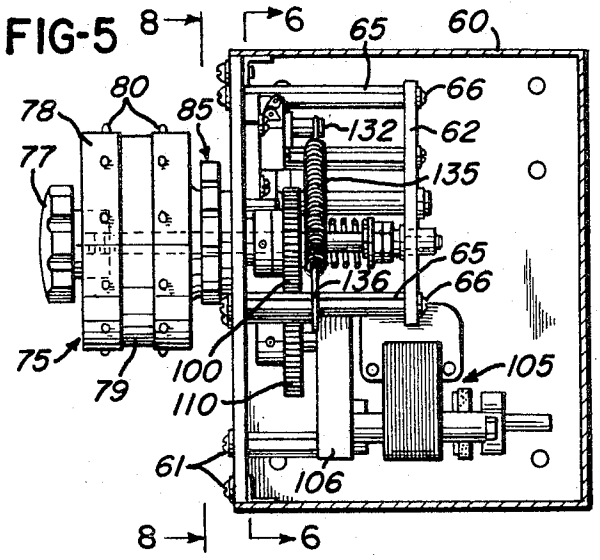


FIG-6

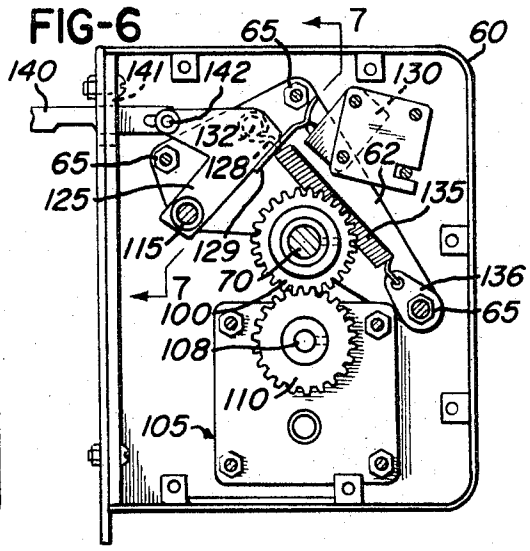


FIG-7

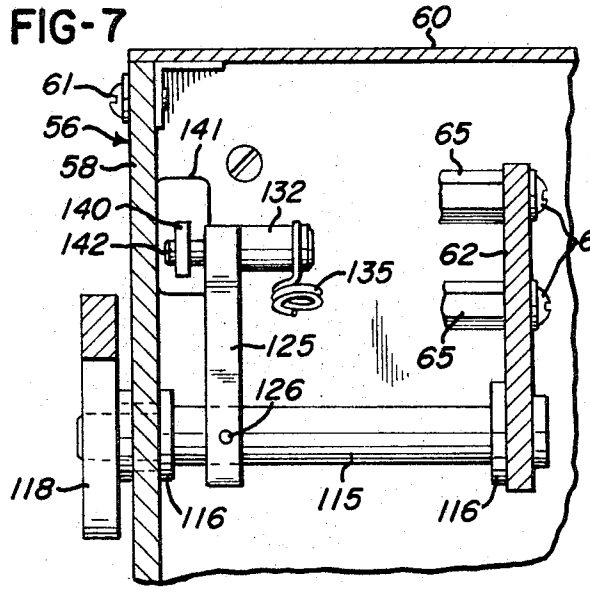


FIG-8

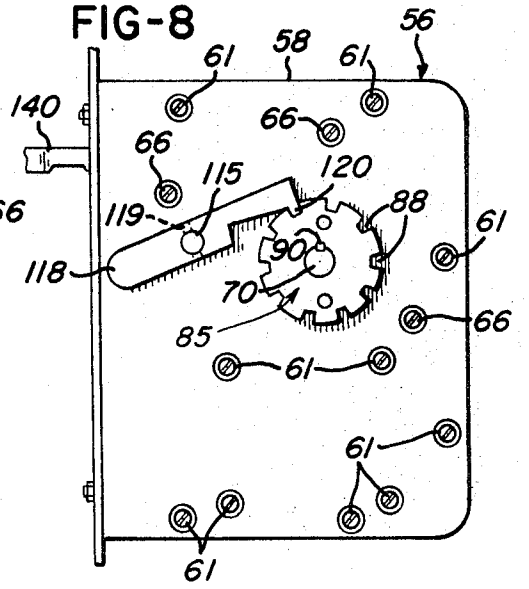
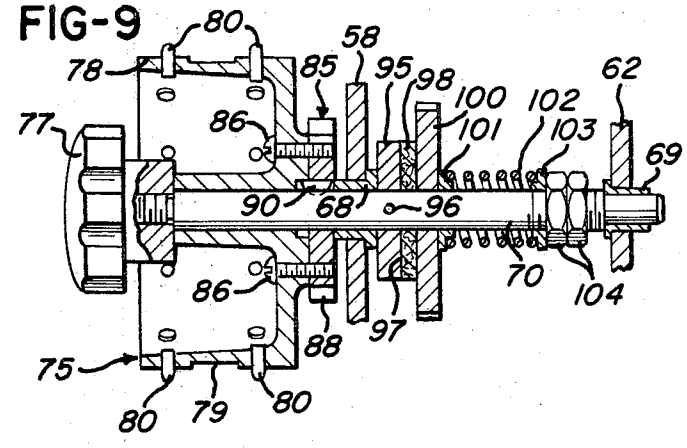


FIG-9



LABEL PRINTING AND ISSUING APPARATUS

BACKGROUND OF THE INVENTION

The invention relates generally to apparatus which receives pressure sensitive labels successively carried by a backup strip or tape, successively prints the labels with variable information, and then successively removes them from the tape for application onto a package or other article. The apparatus is particularly adapted for use in a system where each pressure sensitive label is printed immediately prior to application onto an article with certain information, which may vary with each article. For example, the apparatus is ideally suited for use on a scale system as disclosed in U.S. Pat. No. 2,948,466 which issued to the assignee of the present invention. In general, this system is constructed to weigh food products or other commodities and to issue a label therefor with the weight and the computed value printed thereon. Scales of this character are particularly useful for food markets of the self-service type selling commodities such as meat in pre-packaged form, with the printed label being attached to the package before the package is placed in the display case ready for selection by a customer.

One form of apparatus for successively issuing a pressure sensitive label is disclosed in U.S. Pat. application Ser. No. 478,868, filed August 11, 1965, now U.S. Pat. No. 3,447,992, and assigned to the assignee of the present invention. Due to the various sizes of labels commonly required for accommodating various types of commodities, however, it has been found desirable to provide for interchanging rolls of tape carrying pressure sensitive labels of different sizes.

Usually, the spacing of the labels on the backup tape varies according to the size of the labels. Thus the interchangement of rolls produces a problem in obtaining precise registration of each size label and the type wheels of the printing mechanism since it is necessary to advance the backup tape in precise successive increments according to the successive spacing of the labels on the backup tape.

SUMMARY OF THE INVENTION

The invention is directed to an improved tape feed or drive mechanism which is ideally suited for use with apparatus as disclosed in the above patent and application and which provides the important feature of convenient interchangement of different rolls of pressure sensitive labels of various sizes and spacing on the backup tape. In addition, the drive mechanism of the invention provides for obtaining precise registration of each label with the printer type wheels so that each label receives its corresponding information at a predetermined location on the label.

In accordance with a preferred embodiment of the invention, the tape feed mechanism incorporates a drum which is removably mounted on a rotatable spindle and has circumferentially spaced pins for engaging the backing tape after the labels have been removed. The spindle is driven by an electric motor through a gear train incorporating a friction slip clutch. A detent wheel is adjustably secured to the drum and has a plurality of peripherally spaced notches which successively receive the tip of a spring loaded pivoted pawl to provide for positive rotary indexing of the drum and corresponding precise advancement of the tape.

The pawl and a switch in series with the motor are actuated by a lever connected by a link to a rocker arm operated by a drive for the printer type wheels so that the pawl is momentarily released from a notch and the motor is energized to rotate the drum immediately following each printing operation, whereby each printed label is immediately stripped or removed from the tape and presented for application to the article corresponding to the information printed on the label.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevational view of apparatus constructed in accordance with the invention and showing the general arrangement of the major components;

FIG. 2 is a top view of apparatus shown in FIG. 1;

FIG. 3 is a perspective view of the tape advancing mechanism shown in FIG. 1 with a portion of the housing broken away;

FIG. 4 is another perspective view of the mechanism shown in FIG. 3 with the housing removed;

FIG. 5 is a view of the tape advancing mechanism taken generally along the line 5—5 of FIG. 1;

FIG. 6 is a section generally on the line 6—6 of FIG. 5;

FIG. 7 is a section generally on the line 7—7 of FIG. 6;

FIG. 8 is a section generally on the line 8—8 of FIG. 5; and

FIG. 9 is an enlarged fragmentary section generally on the line 9—9 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The label printing and issuing apparatus shown in FIG. 1 generally includes a frame **15** which may also be the main support frame of the printer shown in the above patent. The frame **15** supports a spindle **16** on which a roll **18** of backup tape **20** is mounted for free rotation. The tape **20** is provided with two longitudinally extending rows of uniformly spaced perforations **21** (FIG. 2) and carries a series of pressure sensitive labels **25** having a top adhesive surface adjoining the tape **20** (FIG. 1).

The tape **20** with the labels **25** thereon is directed from the roll **18** to a space between a series of printing or type wheels **26** and a hammer **28** where each successive label receives printed information relating to the weight, price per pound and computed price of the article placed on the scale as mentioned above. The type wheels **26** are set, and the hammer **28** is actuated by a main printer drive **30** so that the hammer strikes the top side of the tape **20**, causing the type impression of the preset wheels **26** to mark the labels **25**. It is to be understood that a label of practically any shape can be used, including a rectangular, square or oval shaped label, and in each case, the perforations **21** are positioned in precise relationship with the labels **25** for accurate indexing of each successive label with respect to the printing mechanism.

Following the printing operation on the label, the tape **20** is directed and advanced into a separator **35** which comprises a plate **36** having ears which are hinged for movement on a shaft **38** supported by parallel spaced side plates **39** extending upwardly from a bottom support plate **40**. The plate **36** may be pivoted to provide an enlarged opening for conveniently inserting the tape **20** between the plate **36** and the bottom support plate **40**. The bottom edge **41** of the plate **36** is provided with a relatively sharp radius around which the tape **20** is directed and then travels upwardly over a roller **42** mounted on the shaft **38**.

As the backup tape **20** proceeds around the sharp edge **41**, the labels **25** are successively stripped from the tape **20**, and each label extends outwardly onto the bottom support plate **40**. A machine screw **45** is supported by aligned holes formed within the side plates **39** and is positioned directly above the support plate **40** adjacent the plate **36**. Thus when a label **25** is stripped from the tape **20** and advanced onto the plate **40**, the threads of the screw **45** engage the adhesive surface of the trailing end portion of the label and prevent it from traveling upwardly with the backup tape **20** around the roller **42**.

After the tape **20** is separated from the labels **25**, it wraps the roller **42** and travels rearwardly generally parallel with and spaced above the run of the tape **20** carrying the labels **25**. A tape feed or drive mechanism **55** is mounted at the rear of the apparatus and is adapted to grip the tape **20** from which the labels have been removed and to pull the tape and labels past the type wheels **26** and through the separator **35** in successive increments immediately after each label is printed.

The drive mechanism **55** includes an angle mounting bracket **56** which is secured to the rear of the main frame **15** as shown in FIG. 2. The bracket **56** includes a rearwardly extending vertical wall **58** which supports a box-like housing **60** secured by a series of screws **61** (FIG. 1). A flat wall member **62** is spaced parallel to the wall **58** of the bracket **56** within the

housing 60 and is supported by three laterally extending spacing posts 65 secured to the walls 58 and 62 by screws 66 (FIGS. 1 and 4).

Aligned bearings 68 and 69 (FIG. 9) are mounted on the walls 58 and 62, respectively, and support a spindle 70 having a portion projecting in a cantilevered manner from the wall 58. A hollow drum 75 has a hub portion mounted on the spindle 70 and is secured to the spindle by a knob 77 threaded on the outer end portion of the spindle. The drum 75 has a generally cylindrical outer surface 78 in which is formed a circumferential recess 79.

A plurality of circumferentially spaced pins 80 are mounted on the drum 75 and project outwardly from the surface 78 on opposite sides of the recess 79, and these pins 80 are precisely spaced in accordance with the size of the labels 25 to engage the perforations 21 of the backing tape 20, which wraps partly around the drum as shown in FIG. 1. A flat spring 82 is mounted on the stud 83 projecting outwardly from the wall 58 of the bracket 56, and projects into the recess 79 within the drum 75 for stripping the backup tape 20 from the pins 80 at approximately a six o'clock position (FIG. 1).

A detent wheel 85 (FIGS. 8 and 9) is secured to the drum 75 by a pair of screws 86 extending through arcuate slots 87 (FIG. 1) formed within the end wall of the drum and threaded into the wheel 85. A series of notches 88 (FIG. 8) are formed in the outer periphery of the detent wheel 85, and are precisely spaced in the same angular relation as the pins 80. A key 90 secures the detent wheel 85 to the spindle 70, but the drum 75 may be rotatably adjusted relative to the detent wheel 85 and spindle 70 after the screws 86 are released in order to establish initial registration of the labels with respect to the printing mechanism through the action of the pins 80 in the perforations 21.

A collar 95 (FIG. 9) is rigidly secured by a pin 96 to the spindle 70 adjacent the inner surface of the wall 58 and has a radial flat face 97. A flat flexible friction washer 98 is mounted on the spindle adjacent the collar 95, and a spur gear 100 is mounted on the spindle 70 adjacent the friction washer 98. The gear 100 is engaged by a washer 101 receiving one end of a compression spring 102 and the opposite end of the spring 102 seats against a washer 103 engaging a pair of nuts 104 threaded onto the end portion of the spindle 70 adjacent the wall 62.

An electric motor 105 (FIG. 5) drives a closely coupled gearbox 106 having an output shaft 108. A spur gear 110 is mounted on the shaft 108 and meshes with the spur gear 100 on the spindle 70. Thus the drum 75 is rotated by the motor 105 through the gearbox 106 and the slip clutch provided by the collar 95, friction washer 98 and gear 100. The torque resistance at which the gear 100 will slip relative to the collar 95 can be adjusted simply by changing the compression of the spring 102 by adjusting the lock nuts 104.

A shaft 115 (FIG. 7) is supported in front of the spindle 70 by aligned bearings 116 mounted on the walls 58 and 62. An elongated pawl 118 (FIG. 8) is secured by a cross pin 119 to the end portion of the shaft 115 which is outboard of the wall 58. The pawl 118 has a tip 120 which fits with a close tolerance into each of the notches 88 of the detent wheel 85, and when so engaged, it locks the assembly of the drum 75, detent wheel 85 and spindle 70.

An L-shaped lever 125 (FIGS. 6 and 7) is secured by a cross pin 126 to the shaft 115 inboard of the wall 58 and has a nose portion 128 (FIG. 6) which engages an actuating arm 129 of a normally ON switch 130 mounted on the wall 58 and connected in series with the motor 105. A stud 132 (FIG. 7) projects from the lever 125 and receives one end of a tension spring 135 having its opposite end connected to a retainer plate 136 mounted on the lowermost spacing post 65. The spring 135 biases the lever 125 to hold the switch 130 in its OFF position.

An elongated arm 140 (FIGS. 1 and 2) extends through a slot 141 formed within the bracket 56 and has one end portion pivotally connected to the lever 125 by a stud 142 (FIGS. 2 and 7) projecting from the lever. The opposite or forward end portion of the arm 140 is hook-shaped and is pivotally connected by a pin 143 to the upper end of a rocker arm 145 pivotally mounted on a stud 146 secured to the main frame 15 adjacent the spindle 16. A roller 148 is mounted on the other end of the rocker arm 145 and engages the outer surface of a cam 150 mounted on a shaft 151 driven by the main drive 30. The cam 150 has a single lobe 152, and the roller 148 is held in contact with the outer peripheral surface of the cam by a tension spring 155 connecting the pin 143 to the frame 15.

In operation, after a label 25 receives the information produced by the type wheels 26 and hammer 28, the lobe 152 of the cam 150 engages the roller 148 and thereby rotates the rocker arm 145 counterclockwise (FIG. 1) to produce corresponding counterclockwise rotation of the lever 125 and shaft 115 (FIG. 6). This rotation momentarily releases the tip 120 of the pawl 118 from a notch 88 of the detent wheel 85 and simultaneously releases the actuating arm 129 of the switch 130 to energize the motor 105. The motor rotates the drum 75 and pulls the backup tape 20 around the lower edge of the plate 36 causing the printed label to be removed from the tape and advanced onto the platform or support member 40.

As soon as the roller 148 drops off the lobe 152 of the cam 150, the pawl 118 is released so that its tip 120 rides on the outer surface of the detent wheel 85 under the force exerted by the spring 135. When the drum 75 has rotated by an amount corresponding to the spacing of the notches 88 on the detent wheel 85, the tip 120 of the pawl 118 drops into the next successive notch and thereby stops rotation of the drum. Simultaneously with the movement of the tip 120 into the next successive notch 88 of the detent wheel 85, the nose portion 128 of the lever 125 actuates the arm 129 of the switch 130 to open the circuit to the motor 105. Any rotation or coasting of the output shaft 108 of the gearbox 106 after the tip 120 of the pawl 118 has dropped into a notch 88 produces slipping of the gear 100 relative to the collar 95 through the friction washer 98 but does not change the precise registration of the labels 25 with the type wheels 26.

From the drawing and the above description, it can be seen that a label printing and issuing apparatus constructed in accordance with the invention provides desirable features and advantages. For example, by providing the separate motor 105 for driving the drum 75 and the positive indexing of the drum provided by the pawl 118 and detent wheel 85, the backup tape 20 is pulled through the separator 35 in successive predetermined increments as provided by the notches 88 on the detent wheel 85 and thereby assures precise registration of each label 25 with the type wheels 26 for receiving the printed information. The actuation of the motor control switch 130 with the movement of the pawl 118 also provides a simplified and dependable means for energizing the motor 105 in response to operation of the main drive 30.

Another important feature of the invention is provided by the convenient removability of the drums 75 and the detent wheel from the spindle 70. That is, by removing the knob 77 and manually releasing the pawl 118, the drum 75 and detent wheel 85 can be removed as a unit and replaced by another drum and corresponding detent wheel having respective pins 80 and notches 88 arranged to accommodate another size of label. Thus the apparatus can be quickly and conveniently changed for handling rolls of tape carrying different size labels. Furthermore, with the detent wheel 85 secured to the spindle 70 by the key 90 and the drum 75 adjustable relative to the detent wheel 85 by use of the screws 86 in arcuate slots 87, the drum 75 can be conveniently adjusted relative to its corresponding detent wheel to provide precise initial registration between the first or leading label 25 on the backup tape 20 and the type wheels 26.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention.

I claim:

1. In apparatus for receiving a tape carrying a series of successively spaced pressure sensitive labels having an adhesive coating on one side in contact with the tape, including means for printing each successive label with predetermined information and means for removing each label from the tape for application to an article, and drive means connected to operate said printing means, an improved mechanism for pulling the tape in precise increments corresponding to the size of the labels on the tape to provide precise corresponding registration of each label relative to said printing means, said mechanism comprising a rotatable spindle having a cantilevered end portion, a drum mounted on said end portion of said spindle to facilitate removal of said drum and having a generally cylindrical outer surface adapted to receive a portion of the tape from which the labels have been removed, means for effecting positive drive engagement between said outer surface of said drum and the tape, a motor having an output shaft rotatable independently of said drive means for said printing means, means connecting said shaft to said spindle to produce rotation of said drum in response to energizing of said motor, a switch connected to control said motor, a stop wheel mounted for rotation with said drum and having a plurality of angularly spaced stop surfaces, a movable pawl positioned to engage successively said stop surfaces, means for operating said switch in response to movement of said pawl, and means actuated by said drive means for said printing means for moving said pawl.

2. Apparatus as defined in claim 1 including means for securing said stop wheels to said drum for removal therewith as a unit to provide for conveniently interchanging different said drum and corresponding said stop wheels according to the size and spacing of the labels on the tape.

3. Apparatus as defined in claim 1 wherein each of said stop surfaces extends radially.

4. Apparatus as defined in claim 1 wherein said connecting means include a friction slip clutch to provide for rotation of said output shaft after said drum is stopped.

5. Apparatus as defined in claim 4 wherein said friction clutch includes a rigid drive member mounted on said spindle and having a radial face, a friction washer mounted on said spindle adjacent said face, a gear rotatably mounted on said spindle adjacent said friction washer, adjustable spring means for urging said gear against said friction washer, and a gear mounted on said output shaft of said motor drive and driving said gear on said spindle.

6. Apparatus as defined in claim 1 including pivot means supporting said pawl adjacent said drum, and means providing for manually pivoting said pawl to provide for conveniently interchanging said drums.

7. Apparatus as defined in claim 1 wherein said drive means for said printing means includes a rotary driven cam, a pivotable lever having follower means engaging said cam, and a link member connecting said lever to said pawl.