

Dec. 16, 1969

W. A. RAMSEY ET AL
APPARATUS FOR FEEDING, SEVERING AND FOLDING LABELS
AND PRESENTING SAME IN SUCCESSION FOR USE

3,484,098

Filed Feb. 13, 1967

3 Sheets-Sheet 1

FIG. 8

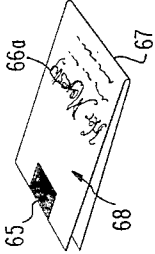


FIG. 7

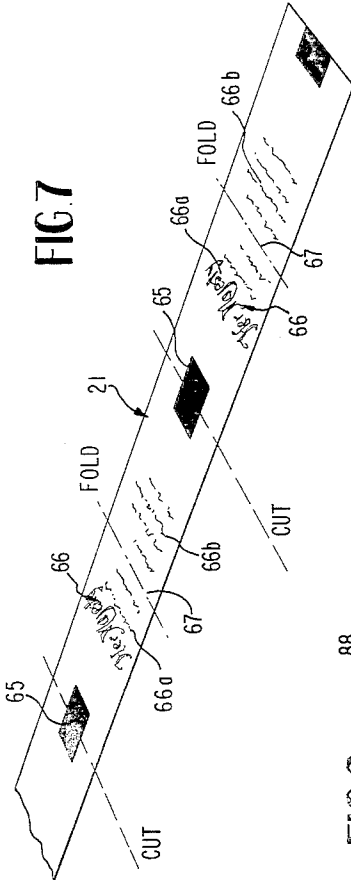


FIG. 1

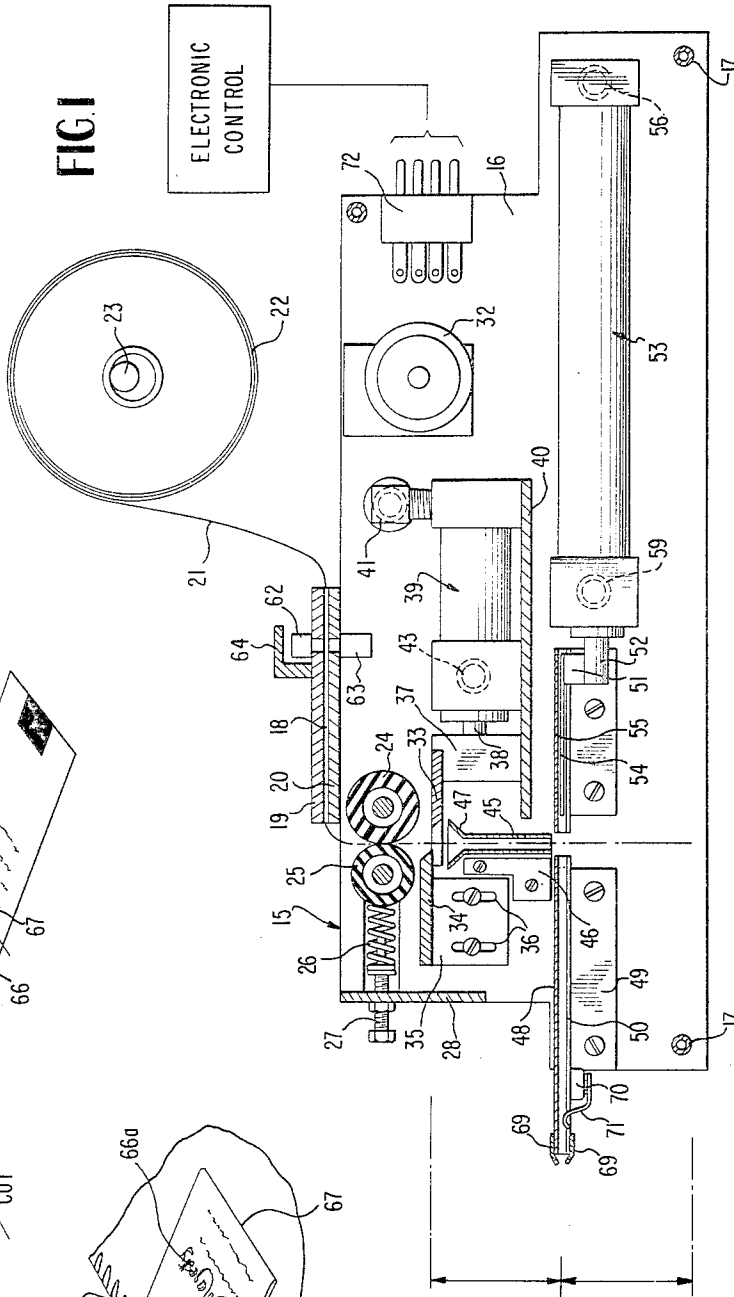
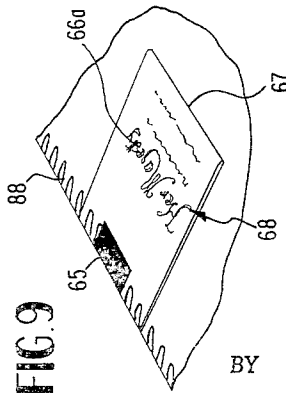


FIG. 9



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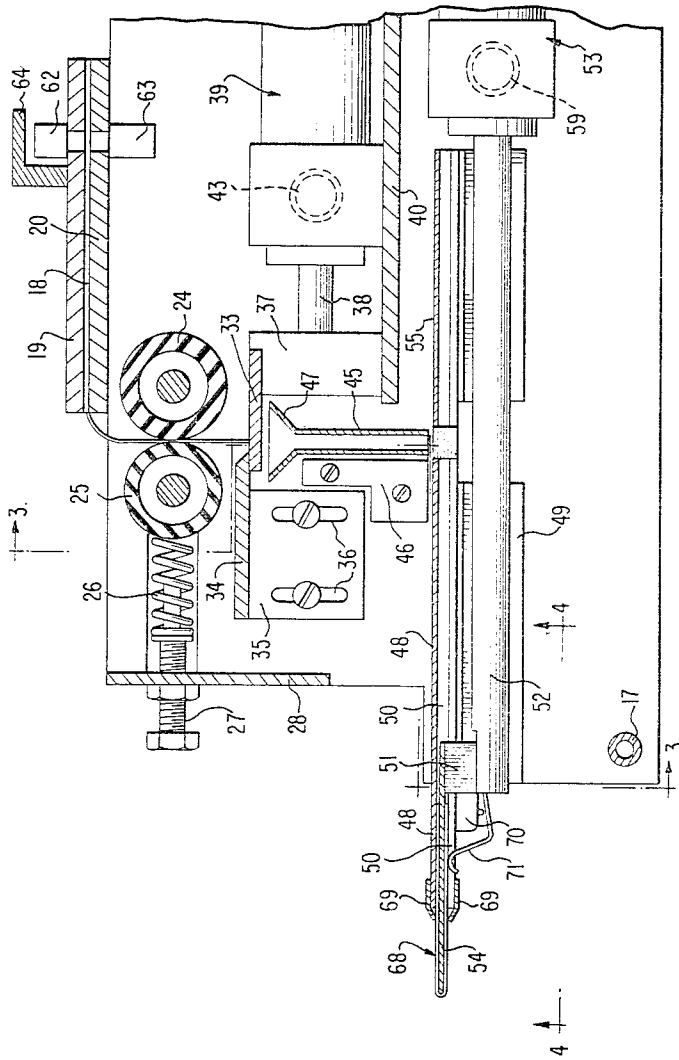


FIG. 2

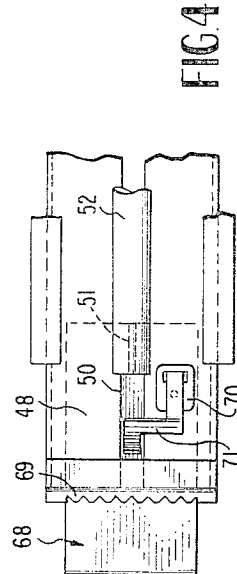


FIG. 4

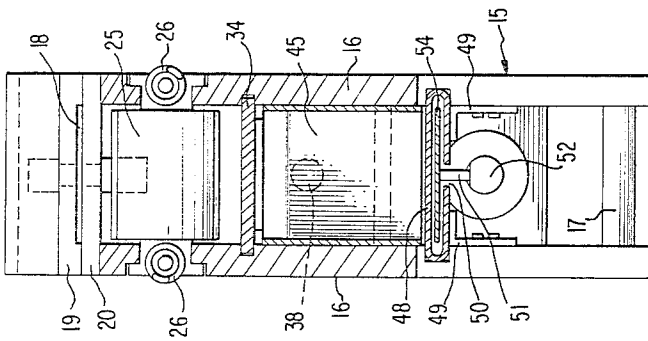


FIG. 3

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APPARATUS FOR FEEDING, SEVERING AND FOLDING LABELS AND PRESENTING SAME IN SUCCESSION FOR USE

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U.S. Cl. 270—83

11 Claims

ABSTRACT OF THE DISCLOSURE

An apparatus which automatically unwinds labels or the like from a supply roll and advances them and senses regions between blocks of indicia and severs the material at these points to produce individual separated labels; followed by the automatic folding of each individual label and the orderly presentation of labels, one at a time, to a user at a work station. The removal of each individual label by the user causes automatic recycling of the apparatus and the automatic presentation of the next label.

BACKGROUND OF THE INVENTION

The present invention is concerned with the application of folded cloth labels to articles of apparel. Customarily, such labels carry data pertinent to the garment, such as size, manufacturer's name, trademark, fiber content, and the like.

It has been the practice in the prior art for the sewing machine operator, when applying each label to a garment, to first retrieve the loose end of the printed or woven continuous roll of labels and manually fold the label at the center of the printed data area thereon so that portions of the data will be placed on the front and rear sides of the folded labels. The label is manually severed from the roll of material and its ends are inserted into the seam of a garment and sewn therein by the sewing machine. The loose end of the ribbon on the roll is then dropped and must again be retrieved manually when another label is to be formed and applied to a garment. The above steps are quite awkward and time-consuming and the label attaching operation has been traditionally inefficient and costly.

Certain prior art machines are known for feeding and severing label producing material for general application and for folding over the cut edges of labels. The prior art also reveals photoelectric sensing means used in connection with label dispensing and cutting. However, none of these prior art teachings are suitable for accomplishing the objectives of the present invention in the automatic feeding, severing, folding and individual presentation of labels to a worker with the printed indicia thereon accurately located.

SUMMARY OF THE INVENTION

The invention takes advantage of a simplified electronic control circuit which may be powered from the sewing machine power switch. The control circuit is constructed to automatically initiate the feeding of printed or woven labels in continuous ribbon form from a supply roll. The ribbon contains blocks of printed indicia and opaque regions spaced uniformly and equidistantly between the indicia blocks. A photoelectric scanner senses the presence of the opaque regions and disables the feeding means and while the ribbon is at rest initiates simultaneously the operation of severing and folding mechanisms. The ribbon is severed at the center of each opaque region to form the individual labels. The folding means engages each severed label in turn and folds it squarely in the

middle of two portions of the printed indicia block so that one part of the indicia will appear on the front side of the folded label during use and another part on the rear side of the label. The label folding means advances each folded label to a holding station where the label is presented to the sewing machine operator for easy grasping and removal from the apparatus. The action of removing each label from the apparatus operates a switch in the circuit means which causes immediate recycling of the apparatus and the presentation of the next following label for removal. The above sequence of operation reduces considerably the length of time required by the operator in applying each label to the garment, as should be obvious. Once the apparatus is set up for operation, the sewing machine operator need only grasp and remove each folded label at the work station and apply it to the garment seam in the usual manner and in so removing each label, the next succeeding label will be automatically presented by the apparatus in proper folded condition for use entirely automatically. The invention eliminates entirely the several awkward manual steps ordinarily involved in the prior art and the only manual step remaining is the act of removing the label from the apparatus while the label is held for convenient grasping and in prefolded condition.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is a vertical longitudinal section taken substantially centrally through the apparatus with parts in elevation, the label cutting and folding means being in retracted or inactive positions;

FIGURE 2 is a fragmentary sectional view similar to FIGURE 1 on an enlarged scale showing the cutting and folding means in the active positions;

FIGURE 3 is a transverse vertical section taken on line 3—3 of FIGURE 2;

FIGURE 4 is a fragmentary bottom plan view taken approximately on line 4—4 of FIGURE 2;

FIGURE 5 is a side elevational view of the apparatus looking at the side opposite to that being viewed in FIGURE 1;

FIGURE 6 is an electrical schematic diagram of the control circuit employed in the apparatus;

FIGURE 7 is a perspective view of plural labels before severing and folding;

FIGURE 8 is a perspective view of a single label after severing and folding; and

FIGURE 9 is a further perspective view of a single label applied to the seam of a garment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings, wherein like numerals designate like parts, the numeral 15 designates the framework or support structure of the apparatus which consists essentially of a pair of spaced opposed vertical side plates 16, suitably rigidly interconnected as by cross members 17. As illustrated, the apparatus forms a slender upstanding mechanical unit which may be mounted directly on the sewing machine so that the labels will be presented to the operator for removal at a most convenient location. The electronic control chassis, to be described, housing the required circuitry and the solenoid air valve, are mounted under the sewing machine table to avoid obstructing the work area.

The mechanical unit or section of the apparatus further comprises an upper horizontal shallow guide passage 18, formed by a pair of plates 19 and 20 fixedly mounted upon the tops of the side plates 16. The guide passage 18 is dimensioned to receive and guide a continuous cloth ribbon or strip 21, fed from a supply roll 22 freely rotatably

mounted upon a support spindle 23 suitably supported above the mechanical unit. The guide passage 18 maintains the ribbon 21 substantially flat and smooth during its passage through the guide.

Adjacent to the discharge end of the passage 18 and immediately therebelow are a pair of gripping feed rolls 24 and 25, suitably supported on shafts which in turn are supported by the side plates 16. The rolls 24 and 25 are disposed between the side plates 16, as shown. The axis of the feed roll 24 is fixed with respect to the side plates 16, whereas the roll 25 is shiftable laterally and urged into gripping relationship with the roll 24 by a pair of adjustable tension springs 26, connected with adjusting screws 27, mounted upon a rigid end wall portion 28 of the apparatus framework. By this means, the tension or contact pressure between the feed rolls may be varied. As best shown in FIGURE 5, the feed roll 24 is positively driven through a pulley 29 on one end of its shaft and disposed outwardly of one side plate 16. This pulley is powered by an endless belt 30 driven from another pulley 31 powered from the armature shaft of a motor 32 suitably supported on the apparatus framework and intermittently driven in a manner to be described. The feed roll 25 is unpowered.

Immediately below the two feed rolls is a reciprocating knife 33 and a coating blade or die 34, the latter being carried by an adjusting plate 35 having vertical adjusting slots 36, whereby the height of the die 34 may be accurately regulated. The knife 33 is fixedly secured to a head 37 on the piston rod 38 of an expansible and retractable air cylinder-piston unit 39, fixedly secured to a horizontal support plate 40 of the apparatus unit, between the side plates 16. The cylinder-piston unit 39 has an air inlet fitting 41 connected therein near one end of the unit, receiving compressed air from a line 42 located outwardly of one side plate 16. The exhaust fitting 43 of the cylinder-piston unit 39 communicates with an exhaust line 44 exteriorly of the adjacent side plate 16 as shown in FIGURE 5.

A vertically extending flattened guide tube 45 is disposed immediately below the knife 33 and coating die and is carried by a suitable bracket plate 46. The upper end of the guide tube 45 is preferably flared as shown at 47 so that the ribbon 21 may readily enter the same and be guided vertically.

At the lower end of the guide tube 45, there is positioned a somewhat similar horizontal guide tube 48, carried by a mounting bracket 49. The guide tube 48 has a central slot 50 in its bottom wall, extending longitudinally to accommodate an upstanding lug 51 on the piston rod 52 of a second extensible and retractable cylinder-piston unit 53 also disposed between the side plates 16 and suitably supported. The lug 51 carries a horizontal label-pushing and folding blade 54 which is flat and this blade enters the horizontal guide tube 48 during the operation of the invention to advance each folded label to the sewing machine operator. The guide passage afforded by the tube 48 is sized to accommodate the blade 54 and the folded label with only the necessary clearance around the blade, so that the label will be maintained flat and smooth. In the retracted position, FIGURE 1, the blade 54 is substantially enclosed and protected by a shield 55.

The air inlet fitting 56 of the cylinder-piston unit 53 receives its compressed air from the previously-described line 42, and there is a T-fitting 57 in this line communicating with a pressurized main line 58 so that both units 39 and 53 may receive compressed air at their rear or inlet ends at the proper time.

The unit 53 also has an exhaust fitting 59 at its forward end communicating with an exhaust pipe or conduit 60, FIGURE 5, connected with a T-fitting 61 in the previously-mentioned exhaust line 44, whereby both cylinder-piston units may be exhausted.

Suitably mounted upon the plate 19 is a photoelectric cell or detection element 62 arranged to scan one side of

the ribbon 21 as it passes through the passage 18. Immediately below the passage on the plate 20 is a coating light source 63 for directing light across the passage 18 and through the ribbon 21 to the photoelectric cell 62, the latter being covered by a shield 64.

Referring to FIGURE 7, the ribbon or strip 21 which is made of woven cloth has uncolored relatively translucent characteristics except for relatively small blackened opaque areas 65 thereon which occur at regular intervals. Between the opaque areas 65, the ribbon bears printed or woven indicia blocks 66 and these indicia blocks are also equidistantly spaced and occur at regular intervals along the length of the continuous ribbon 21. Each indicia block 66 may conveniently be divided into two indicia areas 66a and 66b, said areas separated by a small unprinted area 67; as will be explained, the folding of each separated label 68, FIGURE 8, occurs at the folding line 67 or unprinted area. By virtue of this arrangement, each folded label has one of the indicia areas 66a and 66b on each side thereof.

At the discharge end of the horizontal guide tube 48, the same carries a pair of opposed toothed somewhat resilient label gripping blades or jaws 69 which frictionally engage the upper and lower sides of each label 68 as the same is advanced by the pushing and folding blade 54 to the position for grasping and removal by the sewing machine operator. The jaws 69 do not interfere with the removal of the label by means of the fingers but they steady the label and prevent its premature displacement on the blade 54. A normally closed switch 70 is mounted on the lower side of the horizontal guide tube 48 and has an actuator arm 71 which may enter the slot 50 and bear against the bottom of the label 68, as shown in FIGURES 2 and 4. This serves to hold open the normally closed switch 70 until the label 68 is removed from the blade 54. A connector 72 is mounted upon the rear end of the apparatus at a convenient location for connection with the electronic control chassis beneath the sewing table, now to be described in connection with FIGURE 6.

Referring to FIGURE 6, power is applied to the control circuits of the apparatus from the sewing machine power switch, not shown, across the primary 73 of transformer 74; this may be either 110 volts or 220 volts 60 cycle. The secondary 75 of transformer 74 provides 24 volts AC which is rectified by the bridge 76 and applied through a switch 77 to one winding 32 of the motor, not shown, through a wire 78. The same rectified voltage is applied to a solenoid air valve 79 through wire 78 and to the anode of a silicon controlled rectifier (SCR) 86. The 120 cycle full wave rectified voltage from the bridge 76 is also filtered by the action of a resistance 81 and capacitor 82 and regulated to 22 volts by Zener diode 83. This supplies stable voltages for the trigger circuits, to be explained, while the unfiltered DC is applied directly to the motor and solenoid circuits.

When power is applied to the apparatus with no ribbon in the passage 18 or when the light transmitting part of the ribbon is beneath the photocell 62, the light source 63 illuminates and energizes photocell 62, firing SCR 84. The motor winding 32 is energized thereby and the motor runs and will continue to run until photocell 62 is darkened by a black or opaque area 65. The motor is connected by belt 30 with the feed roll 24, as previously explained.

When the ribbon 21 or strip is inserted into the guide passage 18 and pushed through until it is engaged by feed rolls 24 and 25, the ribbon is fed downwardly through the guide tube 45 until a black area 65 is read by the photocell 62. The black areas 65, evenly spaced between the printed data blocks 66, provide a step feed control and activate the circuits to stop the motor 32 by removing the trigger signal from SCR 84; and energize the solenoid air valve 79 by the voltage rise at the anode of SCR 84, applied through capacitor 85 to the gate of SCR 86.

When this occurs, air pressure is applied to air cylinder-piston units 39 and 53 causing the following action. Knife 33 moves forwardly relative to die 34 and cuts the ribbon or strip 21 which has been properly step-fed and positioned by the action of the black area 65 under the photocell 62. The pushing and folding blade 54 travels forwardly contacting the severed label 68 at the fold line 67 or between the indicia areas 66a and 66b. The blade 54 carries the severed label into the flat guide tube 48, thereby causing folding of the label substantially on the line 67. The folded end of the label 68 is carried beyond the end of the tube 48, FIGURE 2, and beyond the gripping jaws 69, as shown in FIGURE 2.

When capacitor 85 has reached full charge through resistance 87, the positive trigger voltage is no longer felt at SCR 86 and the solenoid air valve 79 is de-energized, returning both cylinder-piston units 39 and 53 to their retracted positions shown in FIGURE 1. Thus, both units 39 and 53 are automatically extended and retracted in unison during the operation of the apparatus.

Each label 68 is held securely in the folded condition and protruding beyond the end of tube 48 by the gripping elements 69. Each label remains in this position until needed by the sewing machine operator, who merely grasps the label between the fingers and removes it in the folded condition for placement in the seam 88 indicated in FIGURE 9. As shown, the cut ends of each label are sewn into the seam 88 while the folded end 67 remains free of attachment to the garment. As shown in FIGURE 2, the folded label 68 also serves by engagement with the actuator 71 to hold open the normally closed contact of switch 70.

When the operator removes the label 68 from the extended blade 54, the contact of switch 70 closes, FIGURES 1 and 6, making contact with the grounded tube. Transistor 89 (which is biased into conduction through resistance 90 when switch 70 is open) is thereby turned off and the collector rises to +22 volts. A positive pulse is thereby applied through capacitor 91 and diode 92 to trigger SCR 84 and to close the circuit for the winding 32, starting the motor, not shown, which runs by this means until capacitor 91 has reached full charge through resistance 93, at which time this positive voltage is no longer felt at the gate of SCR 84. However, during this relatively short run time, the ribbon has moved so that the black area or spot 65 is no longer under the reading head or photocell 62. The photocell now sensing light maintains the gate of SCR 84 positive and the motor 32 runs until the next black area 85 is read by the photocell 62, starting the cycle of operation over again.

Further, as depicted in FIGURE 6, the power supply circuit contains a signal light 94 which is activated when power switch 77 is closed. The gate of SCR 84 is grounded through a variable resistance 95. Another variable resistance 96 is connected in series with the light source 63 so that the intensity of the latter may be varied. A power buss 97 interconnects power line 98 with the several elements 62, 63 and 90, as shown. Other elements of the circuitry, not specifically enumerated, are conventional.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

We claim:

1. Apparatus for dispensing labels comprising means to feed and guide labels that are in continuous strip form, said continuous strip having uniformly spaced indicia blocks and detectable areas for the respective indicia blocks, means for detecting the detectable areas of the strip as the strip is being fed and guided, means to sever the strip for forming individual labels, each label bearing one of the indicia blocks, means to engage each severed individual label substantially at its longitudinal

center and to fold the label transversely upon its self and to advance the folded label to a delivery point where the label may be grasped and removed, mechanisms for operating the severing means and said folding and advancing means when said strip is at rest, and control circuit means for said apparatus connected with the detecting means and operable to interrupt the operation of the feed means and initiate the operation of the severing means and folding and advancing means when a detectable area is detected.

2. Apparatus for dispensing labels to a machine operator according to claim 1, and an apparatus recycling switch including a switch actuator in the path of each folded label at said delivery point, said actuator engaged by the label at the delivery point and the removal of the label from the apparatus causing said switch to initiate recycling of the apparatus, said switch connected in the control circuit means.

3. Apparatus for dispensing labels according to claim 2, and holding jaw means on the apparatus at the delivery point and engaging each label to stabilize the same until it is removed.

4. Apparatus for dispensing labels comprising a guide passage for plural labels in continuous strip form adapted to maintain the strip substantially flat, said strip having uniformly spaced printed indicia blocks and intervening uniformly spaced detectable areas, a photoelectric sensing device on the apparatus for sensing the passage of the detectable areas through the guide passage, feed roll means engaging said strip and drawing the same through the guide passage from a supply source, a severing mechanism on one side of the feed roll means to sever said strip respective to each detectable area and thereby form individual labels each having a printed indicia block thereon, a guide device having a passage and a coacting label folding and advancing blade arranged substantially at right angles to the label at the time of severing, said blade being shiftable to push the folded label to a use station where the label may be grasped and removed from the blade, means to operate the severing mechanism and said blade substantially simultaneously, and control circuit means operably associated with said sensing device and with said means to operate said severing mechanism and said blade to coordinate the operation of the feed roll means, severing mechanism and said blade.

5. Apparatus for dispensing labels according to claim 4, wherein the severing means comprises a reciprocating knife and a coacting die arranged substantially at right angles to the direction of feed of the strip, and said means to operate the severing mechanism and blade substantially simultaneously comprising a pair of fluid-pressure operated extensible and retractable units.

6. Apparatus for dispensing labels according to claim 5, wherein the feed roll means are between said guide passage and said severing mechanism, and including power means under control of the circuit means to activate the feed roll means intermittently.

7. Apparatus for dispensing labels according to claim 6, and in additional guide device for said strip arranged between the severing mechanism and said blade substantially at right angles to the blade.

8. Apparatus for delivering folded cloth labels individually comprising means to feed cloth labels in strip form from a supply roll and to sever the strip at predetermined points to separate individual labels therefrom, each separated label hanging substantially freely and vertically when severed from the strip, a relatively stationary flattened straight guide channel arranged substantially at right angles to each separated label with its rear end disposed immediately forwardly of each separated label and substantially at the longitudinal center of the label, and a reciprocating flat label folding and delivery blade arranged immediately rearwardly of each separated label substantially at right angles thereto and rearwardly of and in alignment with the flattened guide channel, said blade adapted to move forwardly substantially simultane-

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ously with the severing of each label from the strip so that the leading end of the blade immediately engages each separated label near its longitudinal center and folds each label transversely into substantially two equal portions, said two equal portions lying above and below said blade and being carried forwardly by the blade into and through the flattened guide channel, the leading end of the blade delivering the folded bight portion of each label to a point in advance of the forward end of the guide channel, the coacting blade and guide channel being sufficiently long to contact and support each folded label over the entire surface area thereof, power means connected with said blade to move it forwardly and rearwardly, normally closed switch means mounted on the guide channel, in proximity to the forward end thereof, and adapted to be actuated by the label carried by the blade, and circuit means connected between said switch means and said power means, whereby when the blade is in the forwardmost delivery position the switch means is open whereby the blade remains in the forwardmost position until a label is removed therefrom, whereupon the switch means is actuated to close the circuit means thereby energizing the power means to return the blade to the rearward position.

9. The apparatus of claim 8, wherein said label folding and delivery blade is of approximately the width of each label and the internal width of the flattened guide channel is only slightly greater than the width of the

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blade so that the blade and guide channel will coact to maintain each label in a substantially flat and smooth condition during the folding and delivery operation.

10. The apparatus of claim 8, and yielding gripping jaws on the forward end of the guide channel to hold said two portions of each folded label against the blade when the blade is in the forwardmost delivery position with each label.

11. The apparatus of claim 8, wherein said power means is an extensible and retractable device including a plunger which underlies the blade and moves beneath said flattened guide channel, and an element securing the blade rigidly to the plunger, said guide channel having a slot formed through its bottom wall and receiving the element.

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U.S. Cl. X.R.

83—203, 358, 365

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,484,098

December 16, 1969

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It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading to the printed specification, lines 6 and 7, "assignors to Her Majesty Underwear Company, Mauldin, S. C., a corporation of South Carolina" should read -- assignors to Her Majesty Industries, Inc., Mauldin, S. C., a corporation of South Carolina --.

Signed and sealed this 8th day of September 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.

Commissioner of Patents