July 1, 1969 E. F. TOWNSEND 3,452,712

APPARATUS FOR REMOVING INDIVIDUAL LAMINATES FROM A CONTINUOUS BACKING SHEET

Filed Aug. 29, 1966 Sheet 1 of 3

Fig. 1.

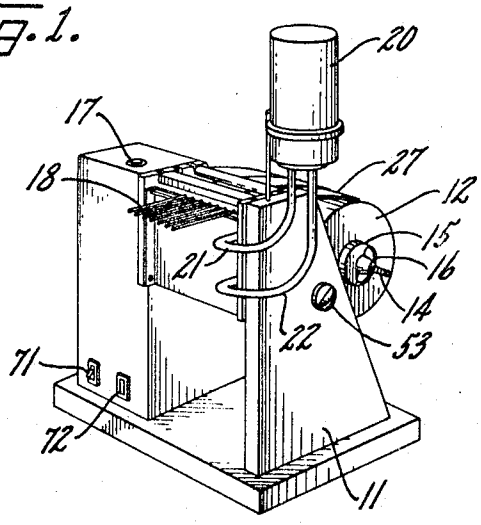
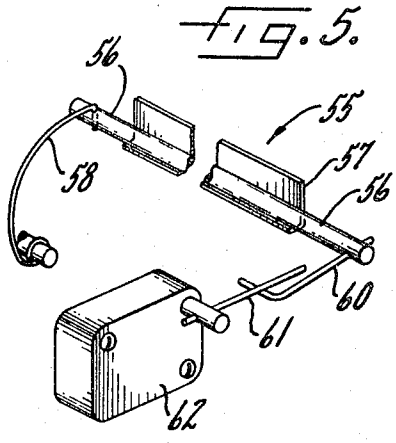


Fig. 5.



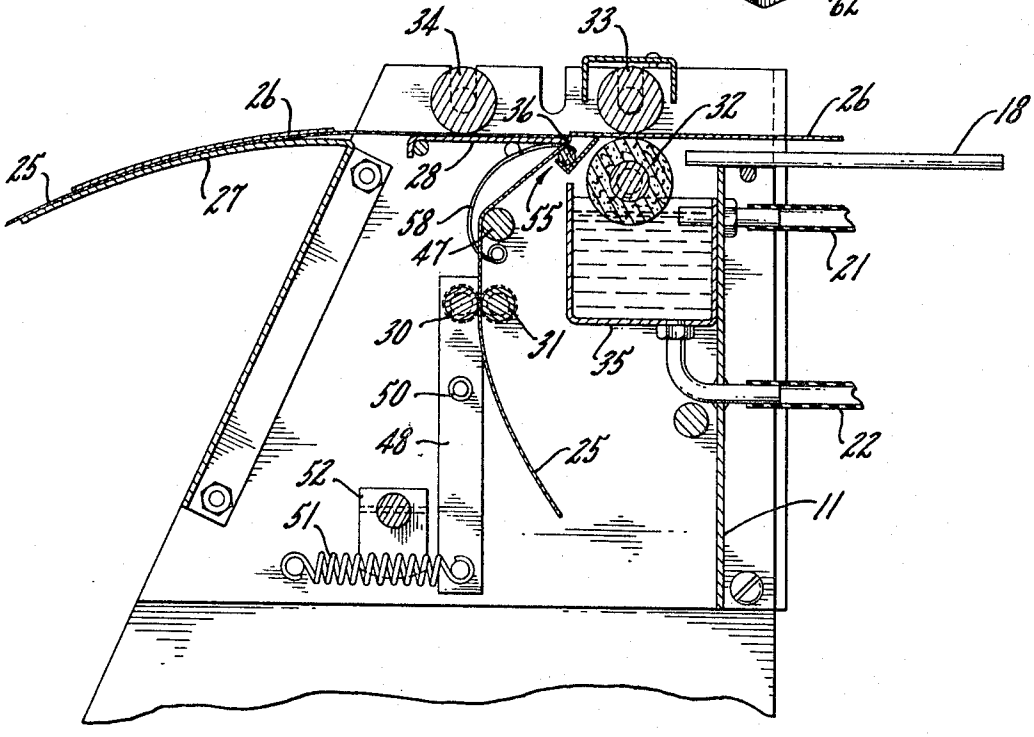


Fig. 4.

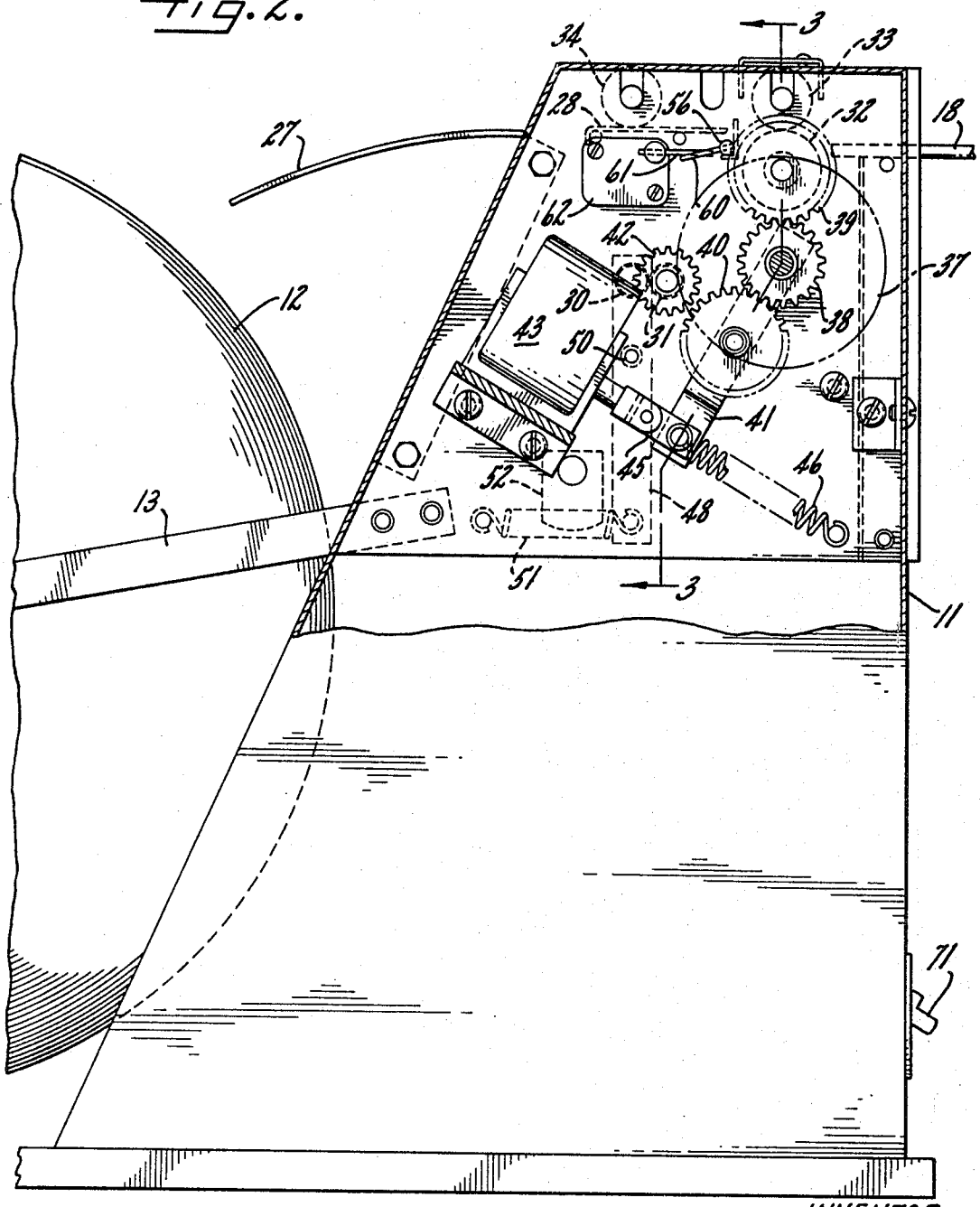
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Fig. 2.



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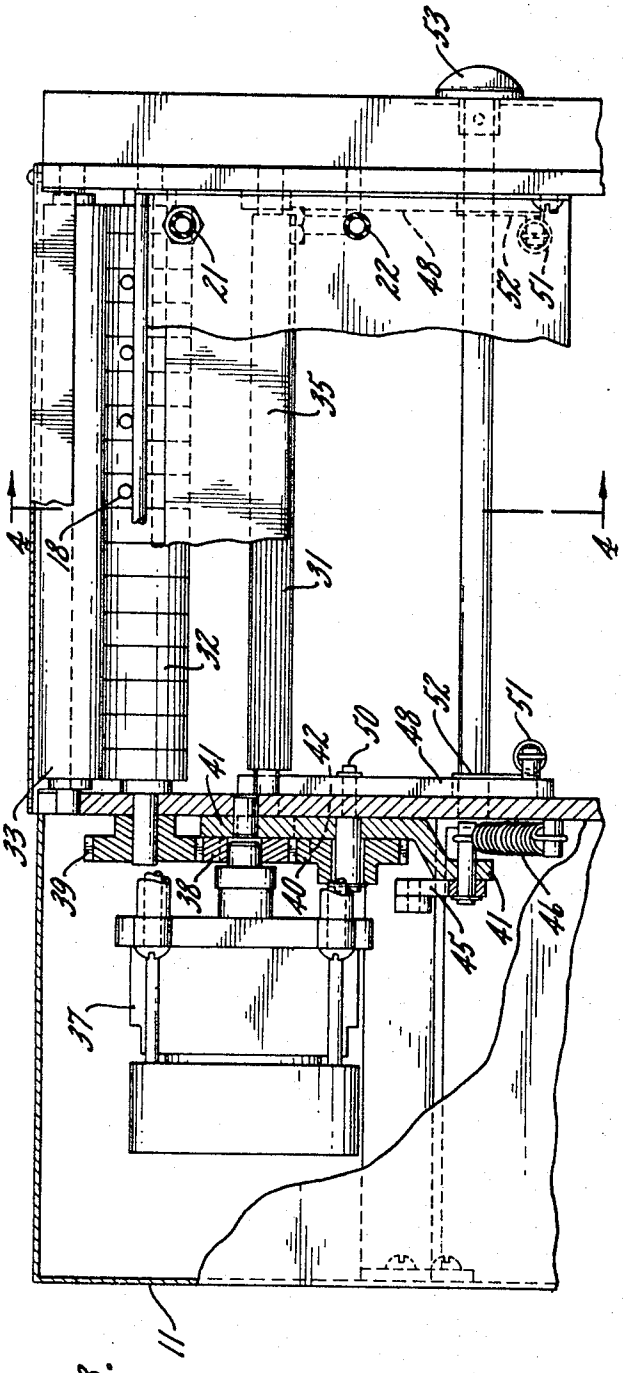


FIG. 3.

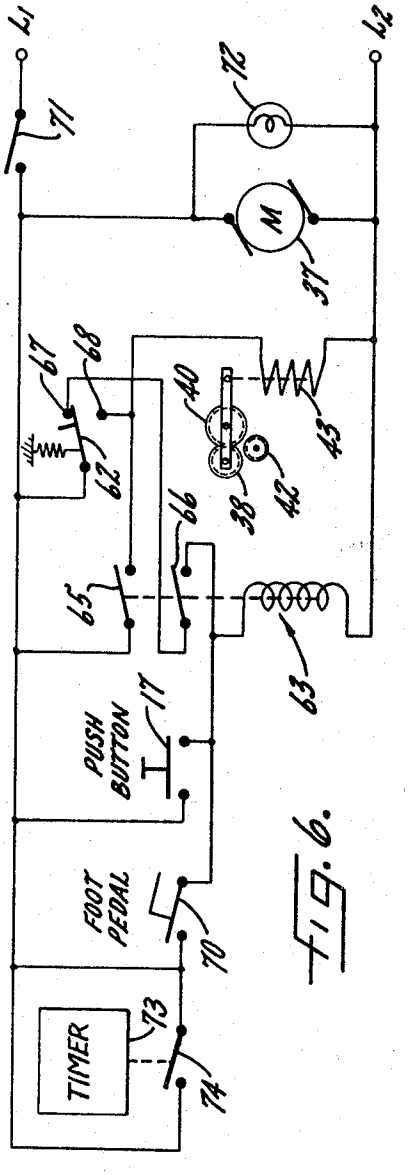


FIG. 6.

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APPARATUS FOR REMOVING INDIVIDUAL LAMINATES FROM A CONTINUOUS BACKING SHEET

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U.S. Cl. 118—249
10 Claims

ABSTRACT OF THE DISCLOSURE

A label-stripping machine is described which, on a signal, draws a precut label from a rolled backing sheet and dispenses it ready for use. The apparatus is further characterized in that it contains a control mechanism which terminates the backing sheet feed as each label is separated from the backing sheet. In addition an applicator is provided which supplies solvent to one side of the labels to activate adhesive thereon.

Description of the invention

This invention concerns apparatus for the removal of thin adhesive-backed laminates from a protective backing sheet. In particular, it concerns the removal of individual pre-cut metal foil appliques from continuous strips or rolls of thin paper backing.

Adhesive-backed appliques serve widely as labels, name plates and in other decorative applications. They are conventionally backed with paper which is treated with a release agent so that it may readily be peeled from the back of the applique which may then be applied to the intended surface. A convenient method of packaging and storing such appliques is to apply the individual parts to a continuous strip or web of backing sheet which may be rolled around a mandrel and subsequently stored or shipped in rolled form.

When the individual laminates are to be used, they are stripped from the roll, the adhesive activated by solvent if of that type, and the backing sheet discarded. Separating the individual parts from the backing sheet and readying them for application is a difficult task for the operator where it involves manual separation of the applique from its backing sheet and the handling of the adhesive backed part to apply solvent. It is desirable to free the operator from as much of this operation as possible, thereby enabling him to devote his attention to positioning the part on the intended surface and relieving him of the tedious, messy and difficult task of stripping each individual laminate by hand and applying solvent.

Accordingly, it is a principal object of the present invention to provide an apparatus for the stripping of individual appliques from a rolled backing sheet which relieves the operator of the task of stripping the laminate and activating its adhesive by hand. In more particularity, this object contemplates an apparatus for this purpose which will produce a stripped, solvent-activated applique ready for use at the touch of a button.

A further object of the present invention is to provide a label-stripping apparatus for dispensing laminates from a rolled backing sheet, which, when triggered by the operator, will draw the backing sheet from the roll until a laminate is found, strip and dispense the laminate with its adhesive activated and ready for application, and then stop until another cycle is initiated by the operator. Allied with this object is the provision of such an apparatus which may be controlled by a timer, thereby dispensing parts at regular predetermined time intervals regardless of the particular spacing of the parts on the rolled backing sheet.

Other objects and advantages will become apparent upon reading the following description and dependent claims and upon reference to the drawings in which:

FIG. 1 is a perspective of the apparatus of the present invention;

FIG. 2 is a section taken through the power train of the apparatus;

FIG. 3 is a section taken in the plane 3—3 of FIG. 2;

FIG. 4 is a section taken in the plane 4—4 of FIG. 3;

FIG. 5 is a fragmentary perspective of the sensing lever and switch which forms a part of the apparatus; and

FIG. 6 is a schematic circuit diagram of the control circuit of the apparatus.

Turning to the drawings, there is shown in FIGURE 1 a label-stripping machine constructed according to the present invention. The machine consists of a sheet-metal frame **11** carrying a roll **12** of individual appliques on a continuous backing sheet. The roll **12** of individual appliques is supported at the rear of the machine on an arm **13** having a cross shaft **14** over which the hub **15** of the roll **12** may be slipped and secured by a wing nut **16**.

As will be explained more fully hereinafter, the operator initiates the process of stripping and dispensing a part by pressing a pushbutton actuating switch **17**. When the machine finds a part on the roll **12**, the part is stripped and presented to the operator on a rack **18** where it may be easily grasped. A supply of solvent for use with solvent-activatable adhesives is contained in a reservoir jar **20** suspended above the machine and feeding solvent through a feed tube **21**. A return tube **22** controls the flow of solvent from the reservoir **20** and maintains a constant level of solvent within the machine.

The roll **12** consists of a continuous backing sheet **25** having individual appliques **26** adhering to it at spaced locations. The spacing is not always exactly the same from one applique **26** to the next because of certain inaccuracies during the application of the parts to the roll. Occasional blank spaces due to a missing part may also exist, but these are accommodated by the present apparatus as will be hereinafter explained.

Guiding the backing sheet **25** as it is drawn from the roll **12** is a web guide **27** which is rigidly attached to the frame **11**. The backing sheet **25** is thus directed into the stripping apparatus, which consists basically of a stripping plate **28**, a pair of pull-through pinion rolls **30**, **31**, a pair of delivery rollers **32**, **33**, and a hold-down roller **34**. The stripping is accomplished by drawing the backing sheet **25** with its attached applique **26** over the relatively sharp radius **36** of the stripping plate **28**. The applique **26**, being of relatively stiff material such as metal foil, is unable to follow the sharp change of direction over the radius **36**, while the thin paper backing sheet **25** does so easily. It may therefore be seen that by merely pulling the backing sheet strip **25** down and away from the stripping plate **28** the applique **26** continues forward and into the delivery rollers **32**, **33**. The applique and backing sheet are guided into engagement with the stripping plate **28** by the hold-down roller **34** which turns freely and is made sufficiently heavy to supply the required hold-down force without the use of springs or other pressure means. The roller **33** also rotates freely against its companion delivery roller **32**, being held down merely by its own weight. This is sufficient to cause the delivery rollers **32**, **33** to pull the stripped applique **26** forward away from the stripping plate **28** after the applique is finally freed from the backing sheet **25**.

The delivery roller **32** is preferably fabricated from a stack of felt disks in order to provide a wicking action to transfer solvent from a solvent tray **35** fed from the reservoir **16** by the feed tube **17** and return tube **18** in the well-known manner of a watering device. From the delivery rollers **32**, **33**, the applique **26** is deposited on the

rack **18**, which consists merely of several parallel wire fingers directed outward so that the operator may grasp the part between the individual fingers and lift or pull it away.

In accordance with the invention, the pull-through pinion rollers **30, 31** are connected to their source of driving power by a clutch so that they may be started and stopped intermittently. A drive motor **37** powers a drive pinion **38** which in turn drives a gear **39** on one end of the delivery roller **32**. For powering the pinion rollers **30, 31**, an idler gear **40** is also provided which meshes with the drive pinion and is mounted on a shiftable lever **41** pivoted about the drive axis of the motor **37** and drive pinion **38**. The drive pinion **38** and idler gear **40** are thus always in mesh. A pinion roll drive gear **42** is affixed to the end of the driven pinion roll **31**, and by shifting the lever **41** to one side, the idler gear **40** comes into mesh with the roll drive gear **42**, causing it to be driven. Shifting is accomplished by means of a solenoid **43** connected to the lever **41** by a link **45**. A return spring **46** serves to draw the lever **41** back when the solenoid **43** is deenergized, disengaging the gears. The motor **37** runs continuously while the stripping machine is in operation, and the delivery rollers **32, 33** are thereby continuously driven, while the pinion rollers **30, 31** are driven intermittently through the clutching action of the pinion drive gear **42** and idler gear **40** as selectively engaged by the solenoid **43**.

The path of the backing sheet web **25** as it passes over the sharp radius **36** of the stripping plate **28** turns back upon itself somewhat so that the backing sheet makes about a 45° angle to itself as it is drawn over the radius **36**. This insures that the applique **26** will be broken free and stripped off as the backing sheet is drawn through. The angle is maintained by a crossbar **47** over which the backing sheet **25** passes to enter the nip of the pinion rollers **30, 31**. There pinion rollers **30, 31** are caused to engage and firmly grip the backing sheet **25** as it is pulled through by supporting one roller **30** on a pair of pivoted bars **48** in which the ends of the roller **30** are journaled. Each bar **48** is pivoted about a fulcrum **50**, and the roller **30** is resiliently urged into engagement with the driven roller **31** by spring **51** at the base of each bar **48**.

In order to momentarily spread the pinion rollers **30, 31** for purposes of threading the backing sheet web **25** into the mechanism when loading a new roll **12** into the machine, a cam **52** is provided which is rotatable by means of an external knob **53** where it may be easily grasped by the operator. By turning the knob **53** 90°, the cam **52** urges the lower portion of the bar **48** against the springs **51**, and the pinion rollers **30, 31** are thereby spread for loading.

As a further feature of the invention, a sensing means is provided which detects the presence of a stripped applique **26** and halts the pulling action of the pinion rollers **30, 31** when a part has been delivered to the rack **18**. A sensitive trip lever **55** is provided for this purpose. The trip lever, as is best shown in FIG. 5, consists of a crossbar **56** pivoted to the frame **11** at each end, and provided with an L-shaped bracket **57** which is resiliently but movably urged into the path of appliques issuing from the stripper plate **28** by a spring **58** which is pinned to one end of the crossbar **56**. At the other end, a trip arm **60** is provided which engages a wire finger **61** attached to the operating shaft of a sensitive momentary-contact DPST electrical switch **62**. The switch **62** is preferably of a type generally known as a "coin" switch because a very small force (such as the weight of a coin) is sufficient to actuate it. The switch **62** is actuated by movement of the wire finger **61** over a relatively small arc, such as 10°. To avoid damage in the event of a jam, or if the operator attempts to manipulate the trip lever **55** by hand, the trip arm **60** is made of relatively flexible spring wire to allow it to flex without damage to the switch **62**.

As shown in FIG. 4, when a part **26** is carried forward into the nip of the delivery rollers **32, 33** by the drawing action of the pinion rollers **30, 31** on the backing sheet **25**, the trip lever **55** is forced downward, actuating the switch **62**. After the laminate **26** has passed through the delivery rollers **32, 35** and cleared the trip lever **55**, the trip lever is again returned to its normal position by the spring **58**, and the switch **62** returns to its normal position.

Further according to the invention, a circuit means is provided whereby the stripping machine, when actuated by the operator by means of the push-button switch **17**, continues to draw the backing sheet web **25** from the roll **12** until a laminate is found, stripped, and delivered to the rack **18**. To accomplish this function, a relay **63** is provided which is energized on actuation of the push-button **17** to close a first and a second set of contacts **65, 66**. The first contacts **65** complete that portion of the circuit including the solenoid **43**, thereby engaging the pinion roller drive gear **42** with the idler gear **40** as has been previously described. The second contacts **66** connect the relay **63** through the sensitive switch **62** attached to the trip lever **55**.

The sensiive DPST switch **62** is in its normal position as illustrated in FIG. 6 when the trip lever **55** is not depressed. It will be seen that only a momentary actuation of the push-button **13** is necessary to pull in the relay **63**, which stays energized due to the fact that the normally closed contacts **67** of switch **62** serve to complete the relay circuit through the second relay contacts **66** which are also closed while the relay **63** remains energized. As soon as an applique **26** depresses the trip lever **55**, the switch **62** is thrown to its alternate position in which the relay circuit is broken by the opening of contacts **67**, the relay falls out, thereby opening the switch contacts **65, 66**. However, the solenoid **43** still remains energized due to the fact that its circuit is now completed by the normally open contacts **68** of the switch **62**. The pinion rollers **30, 31** thus continue to operate, drawing the backing web **25** through and continuing to strip off the applique **26**. When the part **26** has been completely stripped and carried past the trip lever **55** by the delivery rollers **32, 33**, the trip lever **55** and the connected sensitive switch **62** return to their normal positions, breaking the circuit of the solenoid **43** and interrupting the power to the pinion rollers **30, 31**. The movement of the backing web **25** is thus stopped until the cycle is again initiated by actuating the push-button **17**.

In keeping with the invention, manual or automatic operation is provided. For manual operation, a foot pedal switch **70** is connected in parallel with the push-button switch **17**, so that either switch can be used to initiate the operating cycle of the machine. An off-on master switch **71** is also provided at the front of the machine, and a pilot light **72** is located adjacent the off-on switch **71** to indicate that the machine is running and ready for operation.

For automatic operation, an interval timer **73** and associated switch **74** may also be utilized to cause the machine to strip and present an applique **26** for use by the operator at predetermined spaced intervals of time, thus freeing the operator entirely from manual operation of the machine.

I claim as my invention:

1. In a stripping machine for removing separate individual laminates adhered by a layer of adhesive to a backing sheet web, having a stripping plate having an edge over which said backing sheet and adhering laminates may be drawn to dislodge said laminates from said backing sheet, and pull-through means for engaging said backing sheet and drawing it past said edge to dislodge said laminate; the combination comprising, selectively engageable power means for powering said pull-through means, means including a switch for initiating the powering of said pull-through means, sensing means for detecting the detachment of a laminate from said backing sheet, and circuit means for disengaging said power means when said sensing means has detected that said laminate has been detached.

2. A stripping machine according to claim 1 including relay means for maintaining the powering of said pull-through means after said initiation and in which said circuit means opens said relay means responsive to said sensing means.

3. A stripping machine according to claim 1 in which said sensing means comprises a resiliently swingable lever, which lever is displaced by the presence of a laminate in process of being stripped, a switch electrically interconnected with said circuit means, and a motion-transmitting coupling operably interconnecting said lever and said switch.

4. A stripping machine according to claim 3 in which said lever is positioned in the path of a laminate issuing from said stripping plate in process of being stripped and after said backing sheet has been drawn away therefrom.

5. A stripping machine according to claim 1 and further comprising a pair of cooperating delivery rollers in constant rotation during machine operation for drawing stripped laminates away from said stripping plate and past said sensing means.

6. A stripping machine according to claim 5 for removing separate individual laminates adhered by a layer of solvent-activatable adhesive to a backing sheet web further comprising means for feeding solvent to one of said constantly driven rollers engaging the adhesive on the back side of said laminates, said one of said driven rollers being adapted to coat the adhesive with the solvent.

7. A stripping machine according to claim 1 in which said pull-through means comprises a pair of resiliently engaged rollers and said power means includes a clutch, said rollers being driven by said power means through said clutch.

8. A stripping machine according to claim 1 in which said means including a switch for initiating the powering of said pull-through means includes a timer for repetitively and automatically cycling the stripping operation.

9. In a stripping machine for removing separate individual laminates adhered by a layer of adhesive to a backing sheet web, having a frame, a stripping plate on said frame having an edge over which said backing sheet and adhering laminates may be drawn to separate said backing sheet from the adhesive on said laminates, and a support

for positioning a roll of unstripped laminates in feeding position relative to said stripping plate; the combination comprising, a pair of resiliently engaged pull-through rollers located adjacent said stripping plate and engageable with said backing sheet as said backing sheet is pulled past the edge of said stripping plate, a pair of constantly-driven rollers in the path of stripped laminates issuing from the said stripping plate and engageable for drawing said laminates past said stripping plate, a motor drivingly connected to said pull-through rollers through a selectively operable solenoid-actuated clutch, circuit means for controlling said clutch including a first switch for engaging said clutch to initiate the drawing of said backing sheet past said stripping plate thereby dislodging said laminates, said circuit means also including a relay for maintaining the engagement of said clutch after the release of said switch, and a resiliently swingable lever in the path of dislodged laminates issuing from said stripping plate, said lever being operably connected to a second switch interconnected with said circuit means and effective to disengage said relay and clutch, thereby halting the stripping process after an individual laminate has been stripped from said backing sheet and drawn past said lever.

10. A stripping machine according to claim 9 having means for feeding solvent to one of said constantly driven rollers engaging the adhesive in the back of the laminates for coating the adhesive with the solvent.

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U.S. Cl. X.R.

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