Dec. 6, 1955 E. A. GOVATSOS 2,726,003

MACHINE FOR APPLYING LABELS TO GOODS

Filed June 30, 1953 2 Sheets-Sheet 1

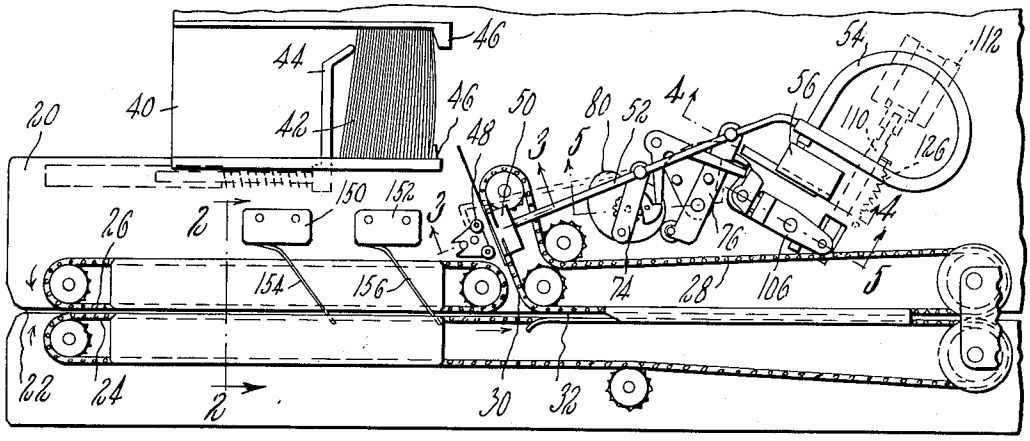


Fig. 1.

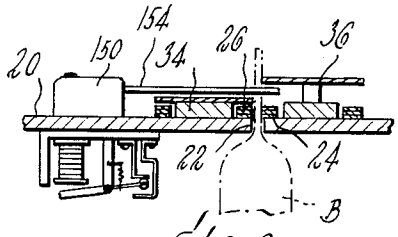


Fig. 2.

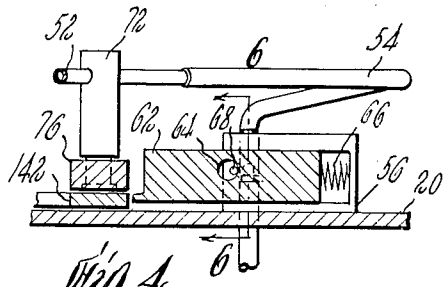


Fig. 4.

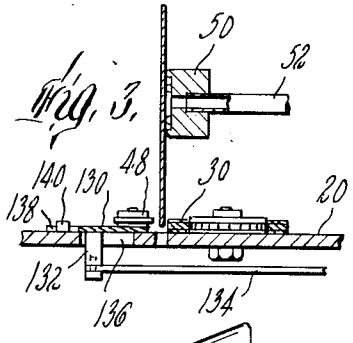


Fig. 3.

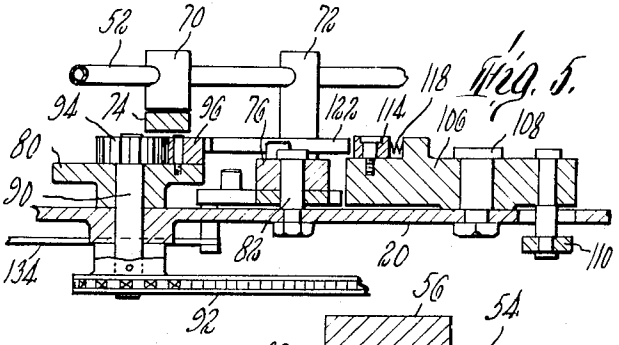


Fig. 5.

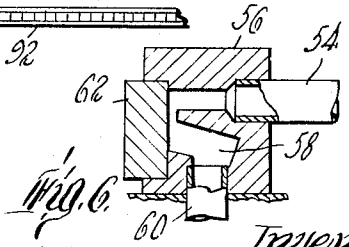


Fig. 6.

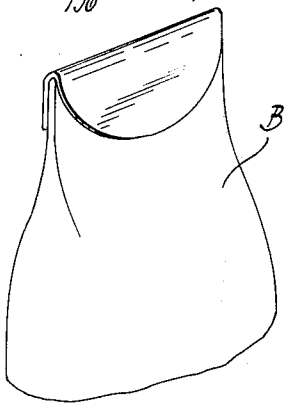


Fig. 7.

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MACHINE FOR APPLYING LABELS TO GOODS

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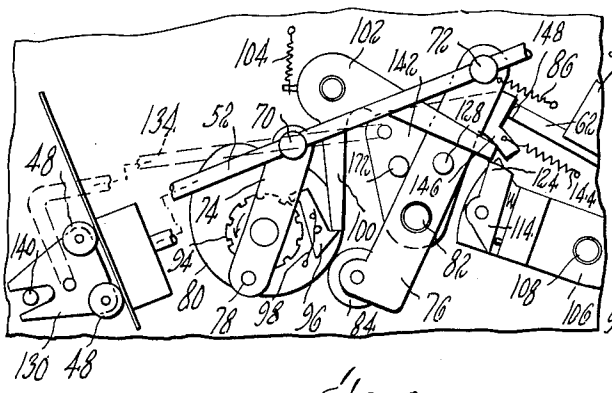


Fig. 8.

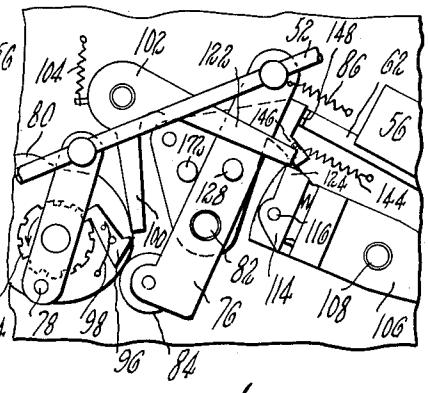


Fig. 9.

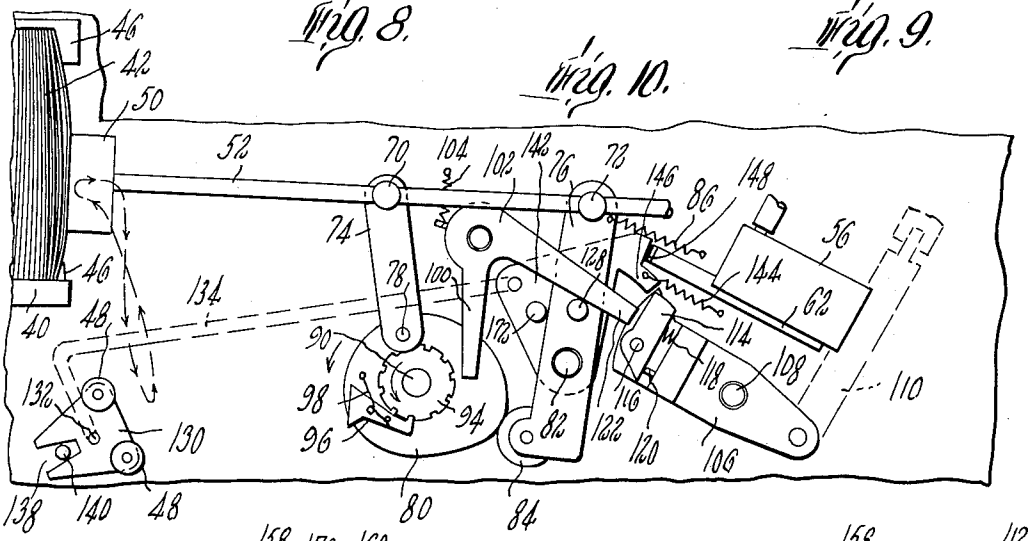


Fig. 10.

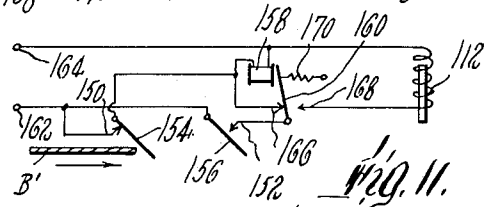


Fig. 11.

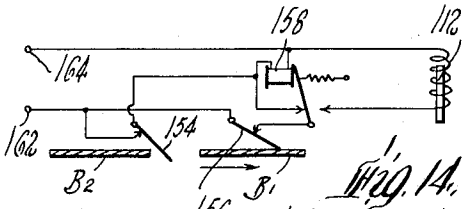


Fig. 14.

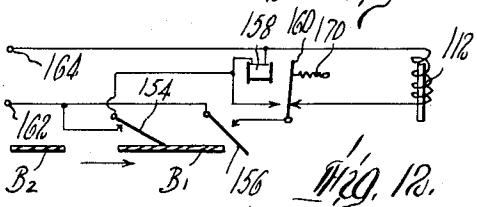


Fig. 12.

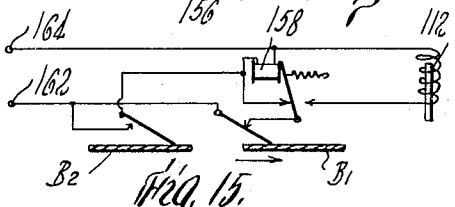


Fig. 15.

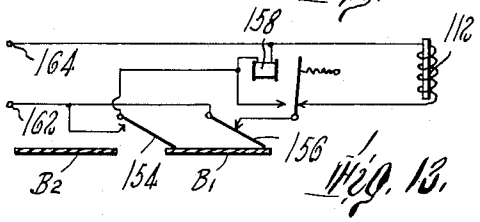


Fig. 13.

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MACHINE FOR APPLYING LABELS TO GOODS

Edward A. Govatsos, Quincy, Mass.

Application June 30, 1953, Serial No. 365,143

5 Claims. (Cl. 216—55)

This invention relates to mechanism for operating on a series of articles which may be introduced in regular or irregular succession. In the embodiment of the invention hereinafter described mechanism is provided for applying labels to a succession of bags which contain any desired small articles of commerce, the labels being applied in such a way as to seal the bags. It is an object of the invention to construct the machine and its control means in such a way as to promote rapid operation without interference between the parts of the machine operating on successive bags in the series. For this purpose the mechanism for transferring labels from a magazine to the station where they are applied to the bags is controlled by novel electrical circuits as hereinafter described. For a more complete understanding of the invention, reference may be had to the following description thereof and to the drawings, of which—

Figure 1 is a plan view of mechanism embodying the invention;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is a section on the line 4—4 of Figure 1;

Figure 5 is a section on the line 5—5 of Figure 1;

Figure 6 is a section on the line 6—6 of Figure 5;

Figure 7 is a fragmentary isometric view of a sealed bag;

Figures 8, 9 and 10 are plan views, on a larger scale, of a portion of the mechanism shown in Figure 1, showing the parts in different positions of operation; and

Figures 11 to 15, inclusive, are diagrammatic views of the electrical control apparatus, showing successive stages of operation.

The mechanism illustrated on the drawings is conveniently mounted on a horizontal table **20** which has a slot **22**. Along one side of the slot and just above the table is a stretch of a long conveyor chain **24**. A shorter conveyor chain **26** is on the opposite side of the slot. One or both of these chains is constantly driven by means not shown. A third conveyor chain **28** which is also driven constantly, is guided by pulleys so that it has a stretch **30** approaching the slot at a steep angle, the chain then passing around one of the guide pulleys to travel along as at **32** opposite and adjacent to a part of the conveyor on the other side of the slot **22**. Bags introduced edgewise into the slot **22** from the left (Figure 1) are gripped between the conveyors **24** and **26** and advanced toward the right to the end of the conveyor **26**, whereupon the conveyor **32** takes hold and continues the movement of the bag. Cover plates **34** and **36** may be mounted over portions of the conveyors **24** and **26**, the adjacent edges of these plates being spaced to serve as guides for the upper portion of each bag B which is advanced along the slot **22**, as indicated in Figure 2. A suitable magazine **40** for labels is mounted on the table **20** and is conveniently located with respect to the conveyor **30**. The magazine may consist of an open-ended trough in which a supply of labels **42** are pressed by a pusher **44** against detaining

elements **46** on the side walls of the trough at the delivery end. The pusher **44** is spring-pressed and bears against the rearmost label on a line offset from the median toward the side edge of the labels remote from the slot **22**. This permits the labels to fan out slightly along their other side edge so as to promote easy separation of individual labels from the supply by means hereinafter described.

Mechanism for transferring labels one by one from the magazine **40** to a stand-by position wherein the leading portion of a label which has been taken from the magazine is between the conveyor **30** and a pair of press rolls **48** is shown in Figures 1, 8, 9 and 10. This comprises a suction head **50** on the end of a rigid tube **52** which is connected by a flexible tube **54** to a valve box **56**. A passage **58** in the box connects the tube **54** with a tube **60** (Figure 6) which leads to a suction pump (not shown). The box **56** has a valve slide **62** which normally encloses the passage **58** but when moved to the right (Figure 4) moves a hole **64** into registry with part of the end of the tube **54** so as to connect the latter with the open air which blows directly into the tube. When this occurs, the suction in the tube **54** is quickly broken. The slide **62** is pressed toward the shut position by a spring **66**, the movements of the slide being limited by a stop in **68** in the hole **64**.

The tube **52** which carries the suction head **50** passes through and is fixed to two posts **70** and **72** which are swivelly mounted, respectively, at an end of a link **74** and at an end of a cam actuated lever **76**. The link **74** is pivotally connected at its other end to a crank pin **78** on a cam disc **80**. The lever **76** is rockable about a post **82** which is secured to the table **20**. The lever **76** carries in the end remote from the post **72** a cam follower **84** which is pressed against the edge of the disc **80** by a spring **86** attached to the lever **76**. The link **74** and the lever **76** control the movements of the suction head **50**. Movements of the link cause lateral movements of the suction head between its positions at the magazine and at the stand-by station, while movements of the lever **76** cause movement components of the head in the direction of the axis of the tube **52**, e. g., toward and away from the supply of labels in the magazine.

The cam disc **80** is loosely mounted on a vertical shaft **90** (Figure 5) which is constantly rotated by suitable driving connections **92**. A ratchet wheel **94** is fixed on the upper end of the shaft **90** immediately above the disc **80**. A pawl **96** is rockably mounted on the upper face of the disc **80** and is pressed by a spring **98** into operative engagement with the ratchet wheel **94**. When the pawl is thus engaged, the disc rotates with the ratchet wheel. However, the pawl is normally held out of engagement with the ratchet wheel by an arm **100** of a bell-crank **102** which engages a notch in the pawl **96** to rock it out of engagement with the ratchet wheel as indicated in Figures 1 and 8. To release the pawl **96** at the right times, the bell-crank **102** is rocked slightly counterclockwise and is promptly rocked back by a spring **104** so that the arm **100** is in position to catch in the notch in the pawl and rock it to disconnect the disc from the ratchet wheel after it has completed one rotation.

To rock the bell-crank **102**, a lever **106** is mounted on the table **20** to rock about a pivot **108**. One end of this lever is connected by a link **110** to the armature of a solenoid **112**. The other end of the lever **106** carries a dog **114** pivoted at **116** and pressed by a spring **118** to press against a stop **120**. Adjacent to the dog **114** is the free end of the other arm **122** of the bell-crank **102**. When the lever **106** is rocked counterclockwise by energization of the solenoid **112** the corner **124** of the dog **114** snaps past the end of the bell-crank arm **122** and then bears against the side of the arm as indicated

in Figure 8. When the solenoid is deenergized, the lever **106** is rocked back by a spring **126** (Figure 1). This momentarily rocks the bell-crank **102** to the position shown in Figure 9, releasing the pawl **96** so that the disc **80** starts rotating. Just before the lever **106** reaches the end of its rocking stroke, the corner **124** of the dog moves clear of the side surface of the arm **122**, releasing the bell-crank which is thereupon rocked by the spring **104** until it is stopped by a stop-pin **128** (Figure 10). The end of the arm **100** is then in position to intercept the pawl **96** and to disengage the disc **80** from the rotating ratchet wheel **94** when the disc has completed a single revolution.

The press-rolls **48** which oppose the stretch **30** of the moving conveyor chain at the stand-by station are mounted on a triangular plate **130** which slides on the surface of the table **20** and is connected by a swivel stud **132** to a rod **134** under the table, the stud extending down through a guide slot **136** in the table (Figure 3). The plate **130** has a guide slot **138** in which rides a pin **140** fixed on the table to maintain the line of centers of the rolls **48** approximately parallel to the conveyor stretch **30**. The other end of the rod **134** is pivotally attached to a plate **142** which rocks about the post **82**. A spring **144** urges the plate clockwise to draw the rolls **48** against the conveyor **30**. Such movement is normally prevented by a nose **146** of the plate **142** which bears against the end of the lever **106** while the solenoid **112** is deenergized. Energization of the solenoid releases the nose **146** and permits the spring to pull the rolls **48** against the conveyor **30**. A shoulder **148** on the plate **142** pushes against the end of the valve slide **62** when the plate is rocked, thus breaking the suction in the head **50**. The energization of the solenoid **112** also cocks the apparatus so that upon deenergization, a cycle of operations occurs as the cam disc **80** makes a revolution. In the ordinary operation of the machine, energization of the solenoid **112** is quickly followed by deenergization which starts rotation of the cam disc from the position shown in Figure 8.

An electric control system for energizing and deenergizing the solenoid at the proper moments is illustrated diagrammatically in Figures 11 to 15. Two electric switches **150** and **152** are mounted on the table near the slot **22** to be actuated by light arms **154** and **156**, respectively, which normally extend across the slot diagonally. The switch **150** is normally closed, but is opened when the leading edge of an article such as a bag B rocks the arm **154**. It remains open until the trailing edge of the article passes clear of the arm **154**. The switch **152** is normally open but is closed when the leading edge of an article rocks the arm **156**. It opens again when the trailing edge of the article moves past the arm **156**. The switch **150** is connected in series with the coil **158** of a relay switch **160** between leads **162** and **164** from a power supply. The armature of the switch **160** is connected to a pole of the switch **152** and is movable alternatively into contact with two terminals **166** and **168**. The other pole of the switch **152** is connected to the power lead **162**. The terminal **166** is connected through the coil **158** to the lead **164**. The terminal **168** is connected through the solenoid **112** to the lead **164**. A spring **170** pulls the armature **160** into contact with the terminal **168** except when the coil **158** is energized to hold the armature in contact with the terminal **166**.

When a series of objects B1, B2, etc. are introduced into the slot **22**, the switch **150** is closed and the switch **152** is open. When the leading edge of the first article B1 reaches the arm **154**, the switch **150** opens. This deenergizes the coil **158** and lets the spring **170** shift the armature **160** from the terminal **166** to the terminal **168** (Figure 12). When the article B1 reaches the arm **156**, the switch **152** closes (Figure 13) and the circuit is completed to energize the solenoid **112**. This has the effect of cocking the apparatus preparatory to a revolution of the cam disc **80**, and also results in the press rolls **48** being moved against the conveyor **30** and the suction being relieved in the head **50** so that a label held in the stand-by position is advanced toward the slot **22** just in time to register with the object B1 which is passing the arm **156**. Accurate registration of the labels and articles can be had by adjusting the position of the switch **152** and arm **156** toward or from the stand-by station. In order to energize the solenoid **112** with the wiring system shown, it is necessary that the horizontal length of each article be at least as great as the distance between the arms **154** and **156**.

An object of the wiring system shown is to speed up operation of the machine by starting operation of the mechanism for transferring a label from the magazine to the stand-by position before the joining of the previous label to an article has been completed. For this purpose the solenoid **112** remains energized as long as both switch arms **154** and **156** are deflected by the article. When, however, the trailing edge of the article B1 passes and releases the arm **154** (Figure 14) the switch **150** closes, energizing the relay coil **158** and opening the switch **160**, **168** to deenergize the solenoid **112**. This starts the cycle of operations to transfer another label from the magazine to the stand-by position to be ready for the article B2. It is important that this cycle be allowed to proceed to completion before the solenoid **112** is reenergized. Premature energization of the solenoid, when successive articles are closely spaced, is prevented by the wiring system shown. Thus if the leading edge of the article B2 reaches the arm **154** before the article B1 has cleared the arm **156** (Figure 15), nothing happens as the relay coil **158** remains energized by the circuit through the closed switches **160**, **166** and **152** until the trailing edge of the article B1 passes and releases the arm **156** to open the switch **152**. This deenergizes the relay coil **158** so that the armature **160** shifts to the terminal **168**, but since the switch **152** is open, there is no change in the solenoid **112**. When the leading edge of the article B2 now strikes the arm **156**, the solenoid **112** is energized, thus cocking the apparatus. Deenergization thereafter occurs when the trailing edge of the article B2 passes the arm **154**. Likewise with each succeeding article, the solenoid **112** is energized when the leading edge of the article rocks the arm **156** and is deenergized when the trailing edge of the same article clears the arm **154**. Thus the time interval available for transferring a label from the magazine to the stand-by position is the time required for an article to travel the distance between it and the preceding article plus the distance between the arms **154** and **156**.

A cycle of operation of the machine is as follows. The leading edge of an article strikes the arm **156** to start the feeding of the label in the stand-by position so that both article and label reach the junction point simultaneously. That is, the rocking of the arm **156** by the article results in the energization of the solenoid **112** to rock the lever **106**, break the suction in the head **50** to release the label then held by the head at the stand-by position and press the feed rolls **48** against the label so that it will be advanced by the conveyor **30**. The solenoid remains energized until the trailing edge of this article clears the arm **154**, whereupon the solenoid is deenergized and the disc **80** revolves as hereinbefore described. At the beginning of the rotation of the disc, the cam follower **84** is nearly at the lowest point of the cam so that during the first quarter turn of the disc the lever **76** rocks slightly clockwise. This results in a slight but sufficient withdrawal of the suction head from the label which it has been holding. At the same time the link **74** swings the head laterally with increasing speed toward the magazine. This swing is completed by the second quarter turn of the disc **80** during which the

lever **76** is gradually rocked counterclockwise, moving the head forward or toward the left as shown in Figure 1. During the third quarter turn of the disc, the cam follower **84** rides over the high point of the cam and then into a depression to move the head forward into engagement with the label supply in the magazine and then away from the magazine to withdraw a label therefrom. As the cam follower **84** approaches the high point of the cam, the lever **76** engages a stop pin **172** on the plate **130** to rock the plate counterclockwise thus restoring suction in the head **50** and pushing the press rolls **48** back from the conveyor **30**. During the final quarter turn of the disc, the link **74** brings the head with a label to the stand-by position which is reached when the disc is disconnected from the ratchet wheel **94** and stopped by the engagement of the end of the arm **100** in the notch in the pawl.

I claim:

1. Control apparatus for a machine which includes an energizable member and mechanism to perform one operation when the member becomes energized and to perform a second and different operation when the member becomes deenergized, said apparatus comprising a relay switch having a coil, an armature and two terminals for alternative contact by said armature, a power wire connected to one pole of said coil and also to one pole of said member, a normally closed switch biased to the closed position, a normally open switch biased to the open position, said switches being arranged for successive engagement by articles to be operated on to open the closed switch and thereafter to close the open switch before the normally closed switch closes again, a second power wire connected to a pole of the normally closed switch and to a pole of the normally open switch, a connecting wire from the other pole of said normally closed switch to the other pole of the relay coil and to the relay terminal which is engaged by the armature when the coil is energized, a connecting wire from the other pole of the normally open switch to the relay armature, and a connecting wire from the other relay terminal to the other pole of said member.

2. Apparatus of the class described comprising means for conveying successive articles past a predetermined point, a magazine for labels spaced from said point, an electrically energizable member, means responsive to deenergization of said member to remove a label from said magazine and to transfer said label to a stand-by position near said point, means responsive to energization of said member to release the label at the stand-by position and cause it to be advanced to said point for application to an article conveyed thereto, and control means for said member comprising two single throw switches successively engageable by each said article before it reaches said point and means operating to energize said member when an article engages the second of said switches and to deenergize said member when said article moves clear of the first of said switches.

3. Apparatus for applying labels to articles, comprising means for conveying a series of articles in succession past a predetermined point, a magazine spaced from said point, and means for removing single labels from said magazine and transferring each said label to a stand-by position near said point, said transferring means comprising a rigid tube, a suction head on one end of said tube, a valve block with a transverse passageway therethrough and a suction connection communicating with said passageway, a flexible tube connected at one end to said block in line with said passageway and at the other end to said rigid tube, a valve slide normally closing the other end of said passageway, said slide having a hole therethrough movable into registry with said passageway, a pivoted member rockable against said slide to move it to open-valve position, means normally preventing rocking of said pivoted member to engage said slide, and a solenoid connected to said last named means and energizable to shift said preventing means to inoperative position, whereby said slide is shifted to relieve suction in said suction head.

4. Apparatus as in claim 3, and means at said stand-by position operable to grip and convey a label at said position, and a connection between said gripping means and said pivoted member to actuate said gripping means when said pivoted member rocks to move said valve slide.

5. Apparatus as in claim 4, said transferring means also including a cam disc, means responsive to deenergization of said solenoid to rotate said disc a single revolution, a crank pin on said disc, a link connecting said crank-pin to said rigid tube to impart lateral movement thereto when the disc revolves, and a lever carrying a cam follower at one end engaging the edge of said cam disc and connected at the other end to said rigid tube to impart longitudinal movements thereto for engaging and withdrawing a label from said magazine.

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