United States Patent

[11] **3,565,035**

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[54] **LABEL COATING APPARATUS**
26 Claims, 8 Drawing Figs.

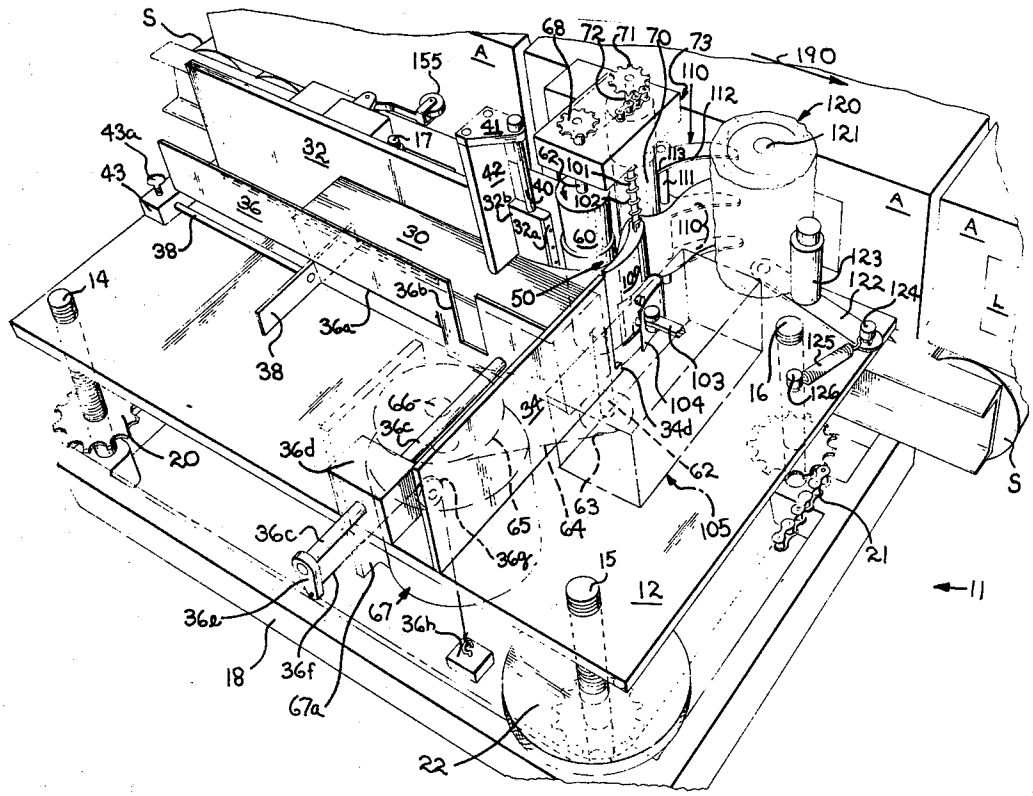
[52] **U.S. Cl.** **118/62,** 118/204, 118/236, 118/259, 118/261
[51] **Int. Cl.** **B05c 11/12,** B05c 1/02
[50] **Field of Search** ..... 156/(Cursory); 118/(Cursory), 236, 261, 602, 259, 258, 62, 204; 271/26

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ABSTRACT: A labeling apparatus adapted to store a given supply of labels, deliver said labels sequentially past a glue applicator and thence to an application station; the apparatus including a reservoir arrangement for the labels, pneumatic means for removal of labels, one at a time, a transfer roller and a glue applicator; all controlled to operate in the manner intended.



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SHEET 1 OF 3

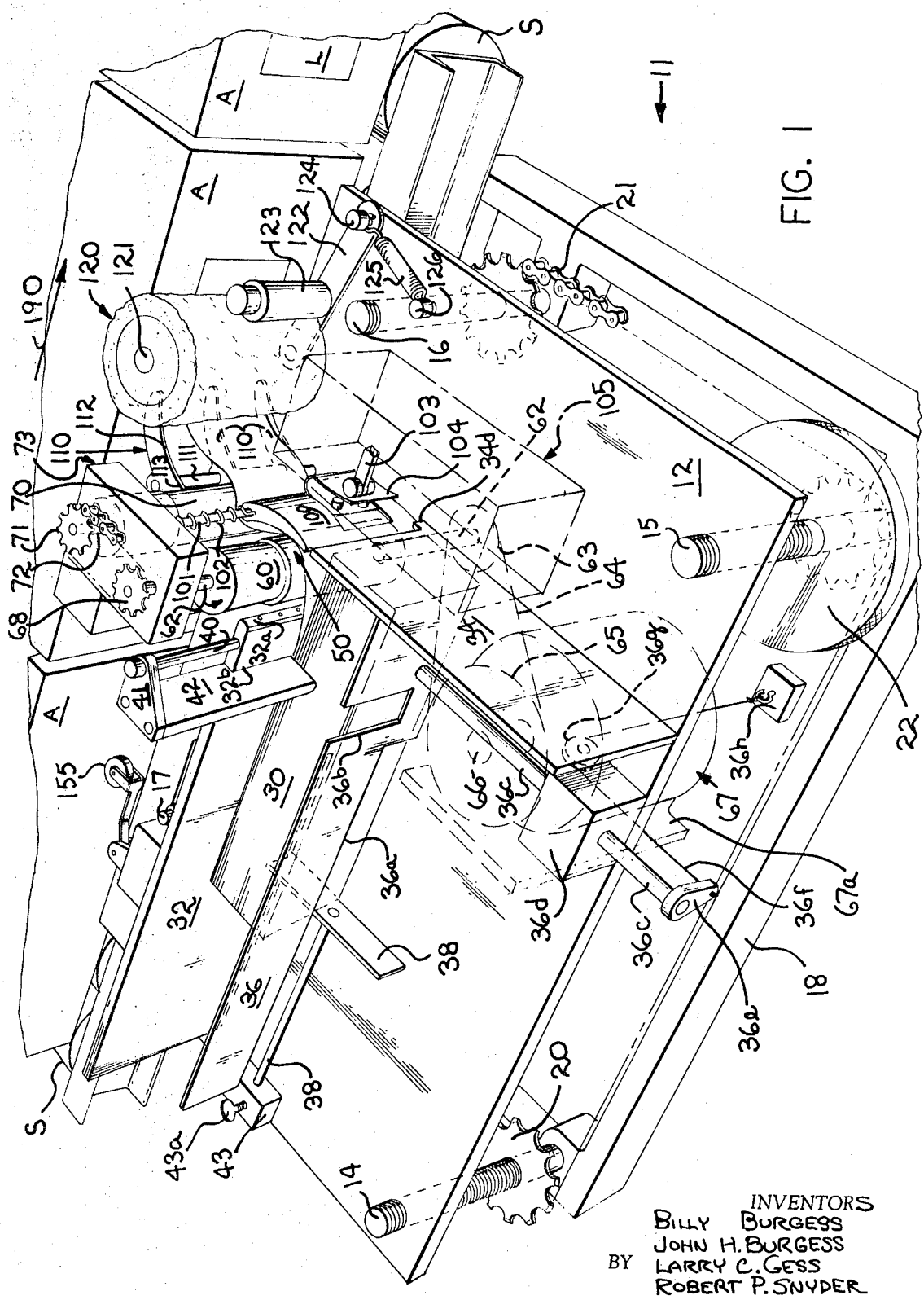


FIG. 1

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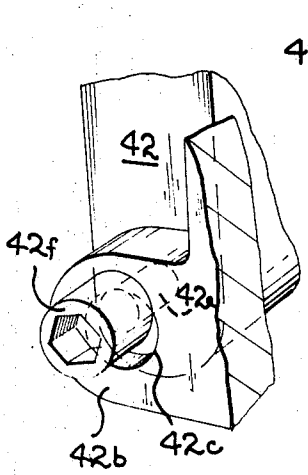


FIG. 5

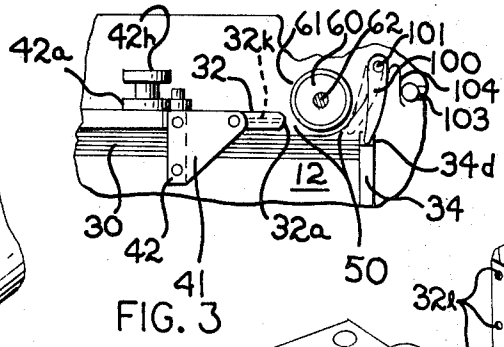


FIG. 3

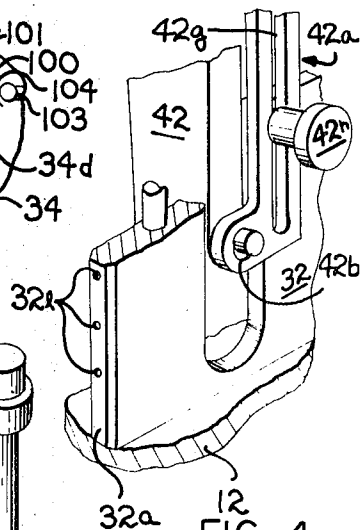


FIG. 4

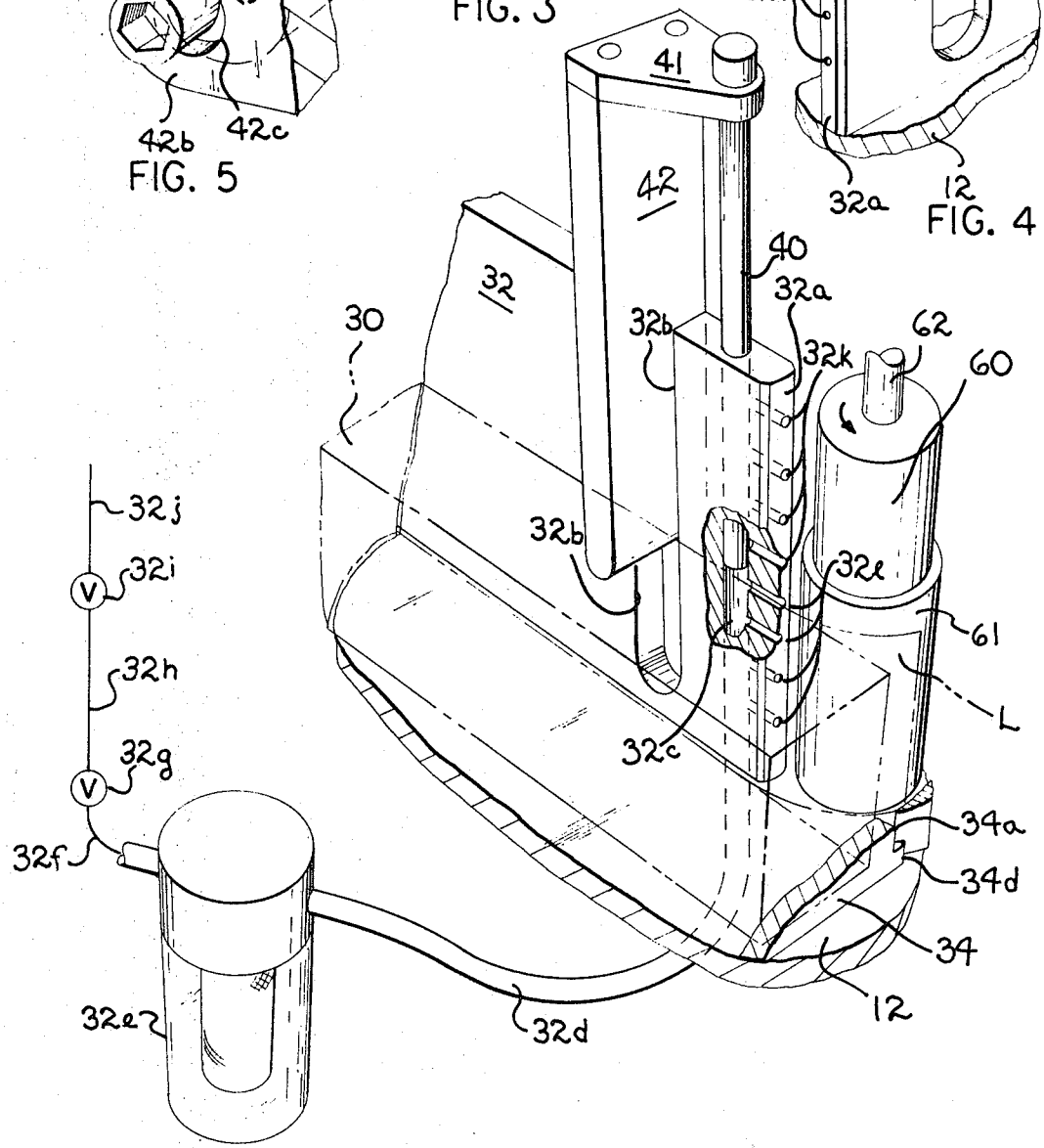
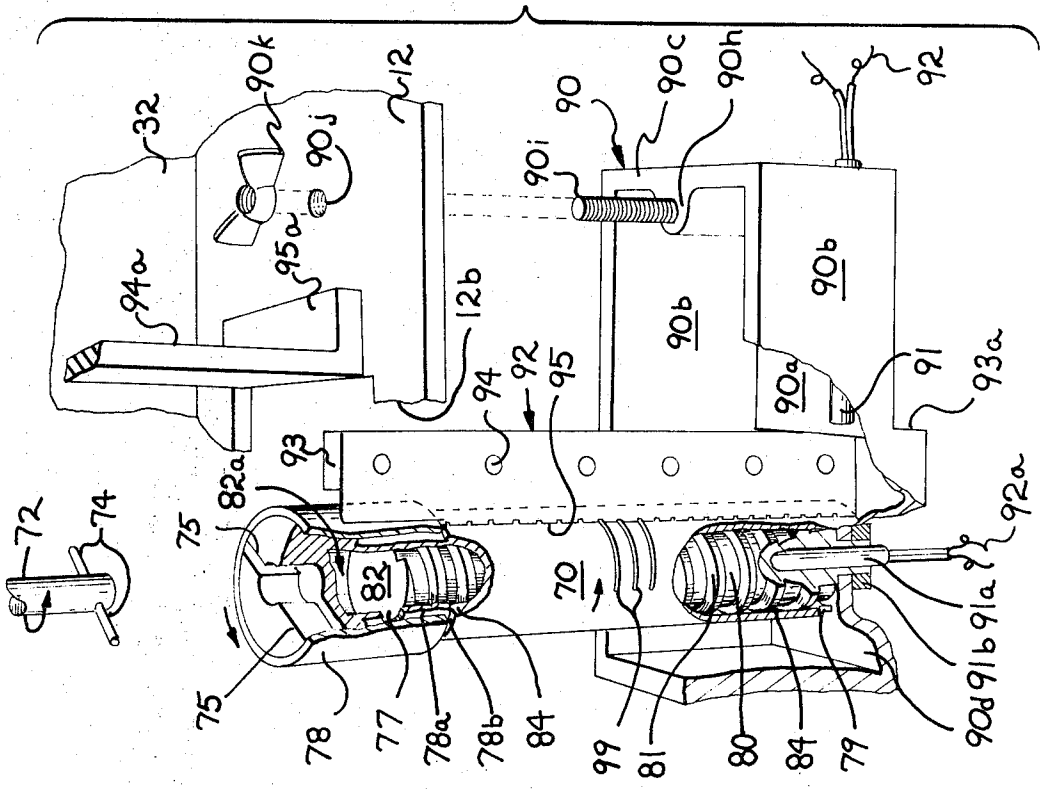


FIG. 2

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FIG. 6



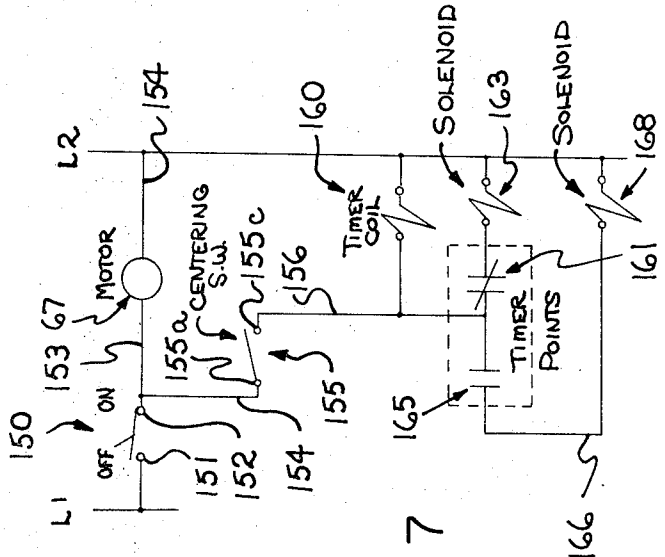


FIG. 7

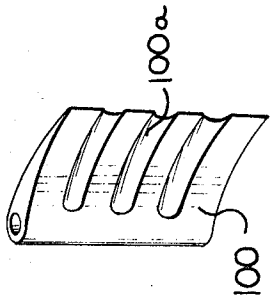


FIG. 8

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LABEL COATING APPARATUS

The present invention relates to an apparatus for applying labels to articles, e.g., products, controlled to move serially along a conveyor apparatus.

There are a large variety of labeling apparatus known in the art. Labeling apparatus or machines up to the present time have been largely unsatisfactory for a variety of reasons including the following. Present apparatus are cumbersome, expensive and inefficient. The present apparatus are subject to malfunction and consequent downtime of the product line which features desirably a labeling apparatus in line therewith.

Many of the present day labeling machines involve a moving "magazine" containing the labels, requiring extensive mechanisms for moving the magazine from a remote position to a label delivery and application position. Many of the present labeling apparatus are beset by the problem of delivering double labels rather than a single label. Present machines are also undesirable because they require extensive downtime to change the internal features of the machine to accommodate a different size of label desired because of a different product to which the label is to be applied. With present machines, the glue supply and the various glue applicator components become clogged during temporary stoppage of the labeling for any reason.

It is a principal object of the present invention to provide a label apparatus which overcomes all of the deficiencies of label machines known heretofore.

In particular, it is an object of the present invention to provide a labeling apparatus which is of relatively simple and economical construction and at the same time provides reliable trouble-free single label delivery operation.

It is also an object of the present invention to provide a label apparatus which can be very quickly changed to accommodate a label of a different size and, as well, to accommodate a given label to a package or article of a given dimension. It may be here mentioned that the labels are most desirably applied to the product in a balanced location. The most common example resides in a consideration of how to apply a label to a rectangular planar sidewall. In such instance, it is usually desirable to have the label centered on the sidewall, both vertically and laterally.

It is still another object of the present invention to provide a label apparatus which can apply labels at an extremely rapid rate without any accompanying difficulty, either in terms of double labels or any difficulty of encountering a "no label" situation. In other words, the labeling apparatus of the present invention is extremely reliable, simple, economical and universal in terms of the size of label and the type and size of package or article to which the label is to be applied.

It is also an object of the present invention to provide an apparatus which includes arrangements for avoiding premature gelation of adhesive.

It is still another object of the present invention to provide a label apparatus which operates with a single power source, e.g., an electric motor powered by a suitable supply of current.

The above-enumerated objects, as well as many other objects of the present invention, will become apparent to those skilled in the art from the following detailed description taken in conjunction with the annexed sheets of drawings on which there is presented, for purposes of illustration only, a single embodiment of the present invention.

IN THE DRAWINGS

FIG. 1 is a three-fourth perspective view of the apparatus;

FIG. 2 is a three-fourth perspective view of one portion of the apparatus enlarged for purposes of showing in greater detail a particularly preferred feature of the present invention;

FIG. 3 is a partial top plan view of the segment of the apparatus illustrated in FIG. 2;

FIG. 4 is likewise a view also of the feature illustrated in FIGS. 2 and 3, but in perspective view formed from the reverse side of that shown in FIG. 2;

FIG. 5 is a somewhat enlarged view of one portion of the apparatus as viewed in FIG. 4;

FIG. 6 is an enlarged perspective view of an important part of the apparatus of the invention shown with the component parts thereof spaced apart for purposes of providing a clearer illustration;

FIG. 7 is a circuit diagram of the control system for the label apparatus of the present invention; and

FIG. 8 is an enlarged elevation view of one component of the apparatus for purposes of illustrating a preferred construction.

Referring now more specifically to the drawings, the complete labeling apparatus **11** is shown in FIG. **1**. Reference numeral **12** identifies a horizontal base plate supported on threaded legs **14**, **15**, **16** and **17**. The legs are each threadingly engaged to the base plate **12** and they in turn are mounted on a base support **18**. Each leg includes an integral sprocket **20** which is synchronously connected to the other sprockets by endless chain **21**. A knurled adjustment wheel **22** is secured to the leg **15**. Rotation thereof rotates the leg **15** and, as well, the other legs via the movement of the sprocket and chain arrangement whereby the base plate **12** moves vertically upwardly or downwardly, depending on the rotation of the wheel **22**. An array of labels **30** rests on the upper surface of the base plate **12**, stacked on edge in flush registering abutment, as shown. The labels rest in a reservoir area defined by a first upstanding wall member **32**, a second upstanding wall member **34**, a movable plate **36** in parallel relationship with the upstanding wall **32** and a linear bar **38** in spaced parallel relationship with the wall **34**. Wall **34** includes a foot portion **34*d*** on the edge **34*a*** for a purpose to be described hereinafter. The wall members **32** and **34** are secured to the base plate. Wall **34** is perpendicularly disposed to the wall **32** with one edge **34*a*** spaced from edge **32*a*** of upstanding wall member **32** and generally in alignment therewith to define a gateway **50** therebetween. The labels **30** rest flushly in horizontal array against the wall **32** with their end edges at one end contacting wall **34**, as shown. The opposite edges of the labels are in contact with bar **38** to which is attached rearwardly extending rod **38*a*** extending slidably through bearing block **43** mounted along the margin of the base plate **12**, whereby the bar **38** is movable to and fro towards the wall member **34**, and its location can be set via the setscrew means **43*a***. Wallplate **36** is cut away at **36*a*** to provide for movement of the bar **38**. Wallplate **36** is notched as at **36*b*** and upstanding wall **32*a*** contains a corresponding notch **32*b*** proceeding from the upper edge similarly to notch **36*b***. A connecting rod **36*c*** extends from wallplate **36** through a block bearing **36*b*** mounted on the base plate **12**, terminating in a connected ear portion **36*e***. A cord **36*f*** is secured to the ear member **36*e*** which extends back toward the wallplate **36** beneath the base plate **12** over pulley **36*g*** carried by the base plate and thence downwardly as urged by weight **36*h***. The arrangement just described urges the wallplate **36** toward wall **32** to hold the labels **30** firmly against wall **32**.

Wall member **32** has formed therein, proximately to and parallel with vertical edge **32*a***, an internal bore **32*c*** (see FIG. **2**). This bore **32*c*** connects at its bottom extremity through base plate **12** with conduit **32*d***. Conduit **32*d*** connects with a combination filter and pressure reservoir cylinder **32*e*** which in turn connects via line **32*f*** with valve **32*g*** connected by line **32*h*** with valve **32*i***. Valve **32*i*** connects via line **32*j*** with a suitable air supply. Valve **32*g*** is an "on-off" air valve controlled by a solenoid **163** (see FIG. **7**). Valve **32*i*** is manually set throttling valve for adjusting the amount of pressure in the line **32*h*** extending through the pressure reservoir **32*e*** in line **32*d*** to the bore **32*c***. Connecting with the vertical bore **32*c*** are a plurality of orifices **32*k*** which extend normally therefrom to the facing edge **32*a*** of the upstanding wall **32**. A rod **40** extends freely but snugly slidably down into the bore **32*c***. A connecting plate **41** connects the rod **40** with a tamper bar **42** which is in parallel-spaced relationship and depends coextensively with the rod **40**. The tamper bar **42** slides in notch **32*b*** and normally rests on the upper edges of labels **30**, as shown in FIG. **2**; the labels **30** being shown in dotted outline. In the position as shown, the upper four orifices **32*k*** in edge **32*a*** are

covered whereby any air flowing through conduit 32*d* connects only through the four lower orifices 32*e* which are not covered by rod 40, for purposes as will be explained hereinafter. A slotted arm 42*a* (see FIGS. 3, 4 and 5) includes an offset ear portion 42*b* containing an elongated hole 42*c*. A stud 42*e* extends normally from the tamper bar 42 through the enlarged hole 42*c*, terminating in an enlarged head 42*f*, whereby the tamper bar 42 is free to move vertically within the limits provided by the elongated hole 42*c*. The elongated slotted arm 42*a* includes the linear slot 42*g* providing, via the fastening nut 42*h*, vertical positioning of the tamper bar 42 at any desired setting within the limits of the slot 42*g*. The nut 42*h* threadingly engages a threaded hole in wall 32.

The walls 32 and 34 together with the movable plate 36 and movable bar 38 provide a reservoir for the labels 30. As indicated, the spacing of perpendicular walls 32 and 34 leaves the gateway 50 between the edge 32*a* of wall 32 and edge 34*a* of wall 34. Just outside the reservoir and partly in the gateway 50 is a vertical, rotatable transfer roller 60 bearing a rubber covering 61 for a portion of its height. The roller 60 lies midway in the gate 50 and is rotatably connected with the base plate 12 and includes a drive shaft 62 extending vertically through base plate 12 to connect with sprocket 63 which is in turn connected by chain 64 with sprocket 65 mounted on shaft 66 extending upwardly from electric motor 67 which, when energized, causes (via the shaft 66, chain 64, sprocket 63 and shaft 62) the transfer roller 60 to rotate. The motor 67 is mounted on the base support 18 and partially supported by vertical wall 67*a*.

Reference numeral 100 identifies an arcuate guide shoe member having an enlarged portion through which extends a vertical mounting shaft 101 secured at one extremity of the base plate 12 and the upper extremity in the overhead 73. A spring 102 encircling shaft 101 extends from the overhead down to the shoe with the ends secure, thereby holding the guide shoe normally in the position shown in solid outline in FIG. 3. The guide shoe is controlled to move reciprocatingly from that position to a position (shown in dotted outline) just contacting the rubber-covered transfer roller 60 as urged by arm 103 controlled by solenoid 168 (FIG. 7). The solenoid connects to arm 103 and is located in the box 105 shown in dotted outline on base plate 12 abutting wall 34. A U-shaped spring 104 has one leg riveted to the guide shoe and the other leg is free for contact by the solenoid arm 103. The U-shaped spring cushions the reciprocating movement of the arm 103. Thus, movement of the solenoid arm 103 first compresses the U-shaped spring member 104 and then urges the guide shoe towards the transfer roller and then back to the retracted position shown in dotted outline in FIG. 3. In a preferred form of construction, the guide shoe 100 has formed on its concave surface a plurality of spaced, horizontal scooplike grooves 100*a* which define slight corrugations in the tapered edge, as shown in FIG. 8. Also, the rubber covering 61 on the transfer roller preferably has a corrugated surface as defined by a plurality of spaced grooves which are offset with respect to the grooves 100*a* in the surface of the guide shoe. These just-described features cooperate to lend stiffness to the label as it passes therebetween in a manner to be described.

A vertically spaced array of label doctor members 110 are mounted on a shaft 111 in spaced relationship with the glue roller 70. The doctor blades are of curved contour as at 112. One edge extremity 113 of the doctor blades 110 rides against the rotating glue roller surface, preventing labels from wrapping thereabout, and the median portion is contoured as indicated at 112 to direct the label curvilinearly in the manner shown. A resiliently covered press roller 120 is rotatingly carried on a shaft 121, in turn mounted on arm 122 which pivots about stud 123. The arm 122 includes, at the end opposite roller 120*a*, upstanding stud 124 connected via spring 125 to a stud 126 upstanding from the base plate 12 urging, by the foregoing construction, the resilient roller 120 against the surface S of the article A, compressing a single label L thereagainst in the manner to be more particularly described hereinafter.

A centering switch 155 is mounted along one marginal edge of the base plate 12 which is proximate the glue roller 70. A conveyor system S (not a part of the present invention) delivers a plurality of articles A tangentially past the apparatus for purposes of having labels applied thereto. As the articles proceed from left to right as viewed in FIG. 1, they actuate the switch 155. This switch can be located and is adjustable just along the margin of the apparatus 11 and, in fact, can be situated further upstream or downstream as the labeling situation requires, as described in connection with FIG. 7.

A glue roller 70 is situated in upstanding spaced parallel relationship with the transfer roller 60 on the line extending away from the gateway 50. It is rotatingly mounted on the base plate 12 and is driven in the same direction of rotation as transfer roller 60 through an overhead drive arrangement consisting of sprocket 68 mounted on shaft 62, sprocket 71 mounted on shaft 72 and chain 69. The glue roller is coaxially mounted on shaft 72.

The shaft 72 driven by the sprocket 71 extends down through the overhead arrangement 73 and connects via oppositely projecting fingers 74 (see FIG. 6) with slots 75 formed in the upper cap 76 of the glue roller cylinder 70. This arrangement also provides a quick disconnect of the glue roller from the drive shaft 72 for a reason to be explained hereinafter. Beneath the cap 76, the glue roller 70 is essentially a hollow sleeve which telescopically receives a rod 80 having a continuous helical land or gear portion 81 formed on the exterior thereof and terminating at the upper end in a head 82 which is below the cap 76, leaving a space 82*a*. The cylindrical sleeve member (glue roller) has a plurality of apertures 77 formed in the space 82*a* above said head portion 82. The outer sleeve 70 also includes apertures 79 in its lower extremity proximate the bottom wall 90*d*. A cylindrical element 78 surrounds the upper portion of the cylinder 70 defining a depending skirt which extends downwardly below the apertures 77. The rod 80 is mounted stationary on bottom wall 90*d* of vessel 90 composed additionally of spaced parallel sidewalls 90*b* and spaced end walls 90*c*. The rod 80, as indicated, is secured upstandingly from the bottom wall 90*a*, and particularly an end segment thereof 90*d* which is somewhat lower than the remainder 9*a*. Portions of the sidewalls have been broken away in order to show the interior construction and securement of the rod 80 to the bottom wall segment 90*d*. The vessel 90 constitutes a reservoir for a glue or adhesive. A resistance element 91 projects through end wall 90*c*, terminating in terminals 92 adapted to be connected to a source of current. A similar resistance element 91*a* extends upwardly through fitting 91*b* into the interior of rod 80 and additionally terminates in terminals 92*a* suited for connection with a source of electricity. The resistance elements permit the maintenance of a uniform elevated temperature of the so-called "hot melt" adhesion in the vessel 90 and proximate the glue roller 70. Resistance element Resistance element 91 is thermostatically controlled (not shown) while resistance element 91*a* is connected for constant operation via an on-off switch whereby, for cold-setting adhesives, the element may be disconnected. A bar 93 is secured to the bottom wall, partially supported by the wall 93*a* marking the margin between the main bottom wall level 90*a* and the lower bottom wall level 90*b*. Secured as at 94 to the bar 93 is a thin doctor blade 92 having a serrated edge as at 95 which scrapes against the cylinder (glue roller) 70. The doctor blade can be formed of a variety of materials, preferably an abrasion resistant plastic. The end wall 90*c* includes a reinforced ear portion 90*h* into which is set a threaded stud 90*i* adapted to extend up through aperture 90*j* in wall 12 for engagement with wingnut 90*k*. The base plate 12 is cut away as at 12*b*, permitting the vessel 90, the rod 81 and glue roller assembly 70 to be moved upwardly in the direction indicated by the dotted lines; the bar 93 being then partially supported against lateral movement by the support member 94*a* having the flange portion 95*a* secured to the bottom wall 12. The just-described feature constitutes a very desirable feature of the present invention in that glue roller and the glue reservoir can be dropped from the apparatus

generally by simply disengaging the wingnut **90***k*. This feature is desirable when it becomes necessary to have a changeover in adhesive composition as, for example, changing from a cold-setting adhesive to a "hot melt" adhesive.

The operation of the glue roller **70** and glue vessel reservoir **90** is as follows. The glue is contained in the vessel **90**. The outer sleeve **70** and the interior rod **81** define an annular passageway **84** interrupted by the helical land portion **81** of the rod **80**. Adhesive in the vessel **90** passes through the apertures **79** spaced about the lower extremity of the sleeve entering the vertically extending annular passageway **84** between the sleeve **70** and the rod **80**. Rotation of shaft **72** translated by fingers **74** and slots **75** in the head portion **76** rotates the sleeve **70** in the direction indicated by the arrows, causing, as a consequence, contact of the moving interior surface of the sleeve **79** with the adhesive in the lower region of the passageway, causing, in turn, the adhesive to move upwardly in passageway **84** by reason of the continuous helical land proceeding in spiral fashion upwardly in counterclockwise direction. The rotation of the sleeve being counterclockwise, the adhesive or glue proceeds upwardly through the annular passageway to the space **82***a* above the head portion **82** of the rod from which it flows through the apertures **77** to the outer surface of the sleeve **70**, draining downwardly between the space **78***a* between the skirt **78**, thence over the shoulder **78***b* and thence to the outer surface from which it falls by gravity downwardly back into the vessel **90**. The skirt portion **78** prevents splattering of the glue as might otherwise occur through the centrifugal force of the rotation of the glue roller **70**. As the glue passes down the outer cylindrical surface of sleeve **70**, the doctor blade strips off excess adhesive, leaving spaced bands **99** of adhesive.

In FIG. **7**, there is disclosed a circuit diagram suitable for controlling the operation of the apparatus. It includes lines L1 and L2 and a principal "on-off" switch **150** which, as shown, is in the "off" position but, by actuation to the "on" position, connects terminals **151** and **152**, connecting lines L1 and L2 via lines **153** and **154**, impressing a current flow in motor **67** which causes continuous rotation of the transfer roller **60** and, through the overhead **73**, the glue roller **70** as described herein before. At the same time, current flows in line **154** leading to terminal **155***a* of centering switch **155**. When this normally open switch is closed by reason of contact with a package moving along the conveyor system, the line current flows to terminal **155***c* and line **156** and energizes timer coil **160**. The normally closed points **161** of the timer connects the current in line **156** with line L2 across solenoid **163**, opening momentarily the normally closed air valve **32***g* in FIG. **2**. This timer, of course, is adjustable as to the duration in which the current is impressed across the solenoid **163**. Thus, after a predetermined amount of time, the normally closed points **161** are opened by the timer coil and normally open points **165** are closed, whereby the current flows through line **166** to line L2 actuating solenoid **168**, moving arm **103**, thereby urging connected guide shoe **100** against the transfer roller **60** as cushioned by spring **104**. This position is maintained until the package is moved past and out of contact with centering switch **155** which disconnects terminal points **155***a*—**155***c*, cutting off flow of current to the lines **156** and **166**, deactivating solenoid **168** and the timer whereby the normally closed points **161** are closed and the normally open points **165** are opened. The circuit is thus ready for a repeat cycle as initiated by the next package closing contact with switch **155**.

From the foregoing, it will be appreciated that with the labels positioned in the reservoir area, a package article A proceeding down the conveyor system S will contact the deflection switch **155**, closing same, causing in timed sequence (via timer **160**) actuation of the solenoid **163**, momentarily opening the air valve **32***g*, sending a pulse of air of preset pressure via throttling valve **32***i* through line **32***f* to the combination reservoir and filter **32***e* and thence through conduit **32***d* to the bore **32***c* from which the air pulse proceeds out the orifices **32***k* which are not covered by rod **40** as determined by the location of the tamper bar **42**. The latter is set by the height of labels in the reservoir. At the same time, the pulse of air exerts an upward force on the rod **40** which, due to the overhead connection plate **41**, causes a momentary upward movement of the tamper bar **42** followed by a falling back down upon the upper edges of the labels, maintaining the upper edges of the labels in registration. Limited upper movement of the rod **40** and tamper bar **42** is controlled by the stud **42***e* in the elongated hole **42***c* and the ear portion **42***b* of the slotted arm **42***a* FIGS. **4** and **5**). The pulse of air through the orifices **32***k* across the surface of the endmost label L and through the restricted path defined by the position of the transfer roller **60** (see FIG. **3**) causes a single label, and particularly the end segment proximate the wall **34**, to move out of flush engagement with the remainder of the plurality of labels and towards and through the gate **50** in the direction of the transfer roller **60**. Due to the control of the timer coil **160**, there is effected, in timed relationship with the pulse of air, a movement of solenoid **168** which operates, through the arm **103** and the U-shaped spring **104**, to move guide shoe **100** into contact with the rubber covering **61** carried by rotating transfer roller, urging the end of the label thereagainst. The transfer roller, of course, is continuously rotating as previously described whereby the physical contact urges the label, as partially directed by the guide shoe towards the continuously rotating glue roller **70**, into tangential contact therewith and beyond, assisted by the inherent stiffness of the label. The label "doctor" members **110** and the curvilinear edges **112** prevent the label from being wrapped about the glue roller but rather deflect the label in the manner shown in FIG. **1** towards the article which is moving simultaneously past in the direction indicated by the arrow **190**. The label bears, by reason of its contact with the glue roller, spaced lines or bands **99** of adhesive which cause the label to adhere to the article. The label is then pressed firmly against the article by the resilient or cushioned cover on roller **120** which is urged against the article by the spring and pivoted arm construction as described previously. Movement of the article out of closing contact with switch **155** terminates the cycle, leaving the components in their original position.

The next article proceeding along the conveyor system then recloses switch **155** which initiates the same sequence of operation including the pulse of air, removal of a single label, the tamping down of the upper edges of the label, the timed sequential actuation of the solenoid moving the guide shoe; all of these cooperating to move the next label through the gateway **50**, and urged by the transfer roller tangentially past the glue roller and onto the article.

It will be noted that the cutaway notch **36***b* accommodates the tamper bar **42** when the supply of labels has been reduced sufficiently that the reservoir plate **36** is moving into close proximity with the upstanding wall member **32**.

The adhesive in the vessel **90** flows continuously and circuitously through the glue roller annular passageway **84** as urged by rotation of the cylinder about the helical land on the stationary upstanding rod **81**, thereby preventing any premature setting up of the glue or adhesive as might otherwise occur during a temporary shutdown of the labeling line or the finishing line. Normally, in prior art labeling apparatus, a shutdown of any type would considerably interfere with the efficiency of the labeling operation since the glue or adhesive during such time would be in a static condition, leading to gelation at critical regions and/or components of the glue applicator. In the apparatus of this invention, as indicated, the glue is moving continuously. Also, provisions are made for maintaining an even elevated temperature in the case of hot melt adhesives, avoiding chilling and gelation as frequently occurs in prior equipment due to the necessity for exterior hose conduits, etc.

It will be appreciated that the deflection switch **155** may be located along the margin of the apparatus in any preselected location, depending upon the linear dimension of the article to which the label is to be applied. As a matter of fact, the deflec-

tor switch may be adjustably mounted on a bar bearing a scale with predetermined settings, permitting location of the deflector switch at a given scale indicia corresponding to a package size and based also upon a consideration of the linear dimension of the label. With this arrangement, the apparatus can be set up to allow the label to be applied to the article in a predetermined centered relationship with respect to the margins or ends of the article. Instead of the contact switch **155**, of course, it is envisioned that for certain applications a photoelectric cell would be preferable.

Similarly, vertical centering of the label on the article is relatively simply accomplished by adjustment of the single adjustment wheel **22** which actuates all of the support legs in threaded engagement with the base plate **12**.

It is an important feature of the present invention that either recharging of the label reservoir or changing to a different sized label can be accomplished very simply. The set screw **43***a* controlling marginal bar member **38** and adjusting nut **42***b* (on the rear side of the tamper bar **42**) controlling the tamper bar **42** are loosened, permitting the tamper bar **42** and rod **40** assembly to be elevated to a position corresponding to the height of the labels (or removed altogether) and the adjustable bar **38** to be moved away from wall member **34** to accommodate the new label of the given length. The bar is brought up firmly against the edges of the labels and the securement means **43** is tightened. At the same time, of course, the wallplate **36** is simply moved away from upstanding wall **32** a distance corresponding to the number of labels to be inserted into the reservoir. The notch **36***a* permits the wallplate **36** to move forwardly towards the wall **32** regardless of the position of the bar **38**.

The simultaneous air movement of a single label and the air movement of the tamper bar **42** represents an important feature of the present invention.

A feature of construction which aids in ensuring single label delivery is the provision for a foot portion **34***d* (FIGS. **1**, **2** and **3**) on the wall **34**. The foot portion serves as an edge abutment for the labels, whereby they will not escape between the wall proper **34** and the guide shoe.

The label apparatus of the present invention is quite small, adding to its desirability and utility. The apparatus as illustrated measures 20½inches in length × 12⅛inches in width × 16 inches in height. It weighs 50—65 pounds. It can, of course, be scaled to a larger size if desired. The apparatus of the size above indicated can handle labels measuring from 4 to 13 inches in length and ½o 3½inches in width (height as stacked in the reservoir).

The apparatus as described has been operated continuously for extended periods of time without encountering an instance of either delivery of "double labels" or "no labels". The apparatus described is also capable of rapid operation. For example, label delivery of several hundred labels per minute has been achieved over extended periods of time with no difficulty. The rotational velocity of the transfer roller and glue roller can be adjusted by changing the pulley drive system or use of a rheostat governing motor speed. Further, the relative speed of rotation of the transfer roller and glue roller can be changed by selection of appropriate drive sprockets in the overhead **73**. Usually, we have found that the glue roller should be rotating slightly faster than the transfer roller. This assists in preventing buckling of the label as it moves across the surface of the glue roller. A ratio of 5/6 has been found very desirable. Thus, 10 teeth on the glue roller drive sprocket and 12 teeth on the transfer roller drive sprocket represents a typical arrangement for achieving this ratio.

It will be appreciated that the apparatus as described is suited for applying labels to articles, packages, etc., moving from left to right as illustrated in FIG. **1** and this is termed a "right-hand" model. Obviously, "left-hand" models can be constructed utilizing the same features but of essentially "reverse hand" construction to accommodate article flow from right to left. The apparatus of this invention can also be employed for applying labels on the top or upper surface of continuously moving articles or packages. For this purpose, the apparatus as viewed in FIG. **1** is simply arranged in 90° disposition with the plate **12** vertical and with the rollers consequently horizontal instead of vertical. The glue delivery system to the glue roller is changed simply by providing for gravity delivery of the glue to the surface of the glue roller.

Although not shown, it should be appreciated that adjustment of the timer can provide considerable variance in the timed sequence of the air pulse duration and, as well, the time interval between air pulse and movement of the arcuate guide shoe **100**. The latter, however, remains reasonably constant due to the proximity of the label, the transfer roller, the orifices and the guide shoe.

A subsidiary feature of the present invention resides in the provision for the reservoir/filter member **32***e* in the air conduit. Principally, this chamber operates as a safety spring or cushion whereby the pulse of air impressed in the conduit by the sudden opening of the valve **32***g* (by actuation of switch **155** and solenoid **163**) is not as such directed across the end portions of the labels through orifices **32***k*. Rather, since air is compressible, the chamber **32***e* operates as a surge tank, providing a cushion or spring action whereby the pulse of air is moderated before projecting across the face of the endmost label, thereby giving a more even pressure or venturi effect resulting in more even reliable label removal.

It, of course, will be appreciated that the glue roller **70** and stationary rod **80** may be modified to provide for the location of the helical land portion on the inside surface of the glue roller instead of on the rod. Also, various surface configurations of the rod and glue roller can be employed.

From all of the foregoing, it can be seen that an extremely efficient, compact and reliable, trouble-free labeling apparatus has been provided.

Modifications may be resorted to without departing from the spirit and scope of the present invention as defined in the appended claims.

We claim:

1. A label handling apparatus comprising:

a horizontal base plate;

means upstanding from said plate defining a reservoir for a plurality of labels, tickets or the like stacked on edge in mutually flush, registering relationship, said reservoir means including a gateway adapted to allow an end segment of a label proximate thereto to move out of flush abutment with the remainder of said labels;

an upstanding transfer roller, adapted for rotation about its vertical axis, located proximate said gateway and spaced slightly outside said reservoir area;

a glue applicator located in spaced relationship with said transfer roller on a line extending away from said gateway; and

means for delivering a pulse of air across said gateway and at the same time tangentially across the surface of said transfer roller, thereby urging the end segment of the closest label out of flush contact with the remainder of said labels and toward said transfer roller and thence by said transfer roller to said glue applicator.

2. The apparatus as claimed in claim **1**, wherein said glue applicator comprises an upstanding glue roller adapted for rotation about its vertical axis.

3. The apparatus as claimed in claim **2**, which includes guide shoe means controlled to urge said label into contact with said rotating transfer roller and thence, in combination with said transfer roller, into contact with said glue applicator and beyond.

4. The apparatus as claimed in claim **2**, which includes means for delivering an adhesive to the surface of said glue roller.

5. The apparatus as claimed in claim **4**, wherein said delivery means includes:

a vessel having a bottom wall and upstanding marginal sidewalls;

a stationary rod upstanding from said bottom wall;

a hollow sleeve constituting the glue roller telescopically disposed about said rod defining an annular passageway therebetween, said sleeve end proximate said bottom wall of said vessel including means fluidly connecting said vessel and said annular passageway, said sleeve having an aperture therein proximate the upper end of said inner rod; and

means urging fluid in said vessel into said annular passageway upwardly therethrough and through said aperture to drain by gravity down the exterior surface of said sleeve.

6. The apparatus as claimed in claim 5, wherein said fluid urgement means includes a particular surface configuration of one of the exterior surface of said rod and the interior surface of said sleeve such that rotation of said sleeve effects urgement of said fluid upwardly in said annular passageway.

7. The apparatus as claimed in claim 6, wherein said fluid urgement means comprises a helical band formed on said exterior surface of said rod.

8. The apparatus as claimed in claim 5, which includes a serrated doctor blade disposed with its serrated edge in contact with the exterior surface of said sleeve and inclined against the direction of rotation of said sleeve as to strip spaced portions of said adhesive from said exterior surface onto the outer side of said blade.

9. The apparatus as claimed in claim 5, wherein said reservoir means includes:

a first upstanding planar wall member secured to said baseplate;

a second upstanding planar wall member secured to said baseplate, said second wall being disposed normally to said first wall member and with one edge spaced from an edge of said first wall member and in alignment with said first wall member to define said gateway;

said first wall being adapted for flushly abutting said array of labels and said second wall adapted for contact with the end edges of said labels; and

means for urging said labels against said first wall member.

10. The apparatus as claimed in claim 9, wherein said means for delivering a pulse of air comprises a passageway formed in said first wall member proximate the gateway, said passageway terminating in an orifice directed flushly across said gateway.

11. The apparatus as claimed in claim 10, wherein said first wall member includes in the edge proximate said gateway a plurality of vertically spaced apertures flushly connecting with said passageway, thereby providing for air pulses sufficient in vertical array to accommodate various sizes of labels.

12. The apparatus as claimed in claim 11, which includes a rod member adapted to slide reciprocably down into said passageway in said first wall responsive to the vertical dimension of labels in said reservoir, thereby confining air movement only to those apertures not covered by said rod and corresponding to said vertical dimension.

13. The apparatus as claimed in claim 12, which includes a leg member connected to said rod and in generally spaced parallel relationship, said leg terminating in a bottom edge normally resting on the upper edge of the labels in said reservoir, said leg and rod translating said position of said leg to the appropriate location of said rod in said passageway to provide uncovered apertures corresponding to the vertical dimensions of the labels.

14. The apparatus as claimed in claim 13, wherein said rod and leg are mounted for vertical oscillatory movement responsive to repeated pulses of air impressed on the bottom of said rod whereby said leg lower edge repeatedly taps the upper edges of said labels, maintaining edge registration and label height continuity as labels are sequentially removed from said reservoir.

15. The apparatus as claimed in claim 5, wherein said baseplate is cut away as to accommodate said vessel with its upper edge in registry with said cutaway, said hollow sleeve extends upwardly in spaced parallel relationship with said transfer roller, and includes means to rotate said transfer roller and cylinder glue roller continuously and simultaneously and means for releaseable securement of said delivery means to said baseplate whereby said vessel may be easily disassembled for cleaning or change in adhesive.

16. The apparatus as claimed in claim 1, wherein said reservoir means includes:

a first upstanding planar wall member secured to said baseplate,

a second upstanding planar wall member secured to said baseplate, said second wall being disposed normally to said first wall member and with one edge spaced from an edge of said first wall member and in alignment with said first wall member to define said gateway;

said first wall being adapted for flushly abutting said array of labels and said second wall adapted for contact with the end edges of said labels; and

means for urging said labels against said first wall member.

17. The apparatus as claimed in claim 16, wherein said means for delivering a pulse of air comprises a passageway formed in said first wall member proximate the gateway, said passageway terminating in an orifice directed flushly across said gateway.

18. The apparatus as claimed in claim 17, wherein said first wall member includes in the edge proximate said gateway a plurality of vertically spaced orifices fluidly connecting with said passageway, thereby providing for a number of air pulses sufficient in vertical array to accommodate various sizes of labels.

19. The apparatus as claimed in claim 18, which includes a rod member adapted to slide reciprocably down into said passageway in said first wall responsive to the vertical dimension of labels in said reservoir, thereby confining air movement only to those apertures not covered by said rod and corresponding to said vertical dimension of said labels.

20. The apparatus as claimed in claim 19, which includes a leg member connected to said rod and in generally spaced relationship, said leg terminating in a bottom edge normally resting on the upper edge of the labels in said reservoir, said leg and rod translating said position of said leg to the appropriate location of said rod in said passageway to provide uncovered apertures corresponding to the vertical dimension of the labels on the edges of which the leg edge rest.

21. The apparatus as claimed in claim 20, wherein said rod and leg are mounted for vertical oscillatory movement responsive to repeated pulses of air impressed on the bottom of said rod whereby said leg lower edge repeatedly taps the upper edges of said labels, maintaining edge registration and label height continuity as labels are sequentially removed from said reservoir.

22. The apparatus as claimed in claim 16, wherein said reservoir means includes a linear bar member in spaced parallel relationship with said second wall and adjustable means for preselectively setting the bar member at any given distance from said second wall to thereby accommodate a variety of label sizes.

23. The apparatus as claimed in claim 16, wherein said last-mentioned means includes a movable wall member in spaced parallel relationship with said first wall, a connecting arm extending rearwardly and being slidably mounted in a bearing and extending therethrough, a pulley mounted beneath said base plate between the extremities of said connecting arm and a weighted line extending over said pulley and connected to the end of said connecting arm urging said arm and movable wall member toward said first wall, thereby constantly maintaining the labels in the reservoir in firm self abutment as labels are sequentially removed from said reservoir.

24. The apparatus as claimed in claim 23, wherein said reservoir means includes a linear bar member in spaced parallel relationship with said second wall and adjustable means for preselectively setting the bar member to any given dimension from said second wall to thereby accommodate a variety of label sizes.

25. The apparatus as claimed in claim 1, which includes means for vertical adjustment of said baseplate.

26. The apparatus as claimed in claim 25, wherein said vertical adjustment means comprises a plurality of threaded legs threadingly engaging said baseplate, sprocket means secured to each of said legs, a continuous chain engaging said

sprockets encirclingly and means for rotating one of said legs, thereby simultaneously rotating the other legs whereby said baseplate moves uniformly upwardly or downwardly responsive to the direction of rotation of said rotation means.