

- [54] **APPARATUS FOR PREPARING INVENTORY TICKETS AND LABELS FOR USE BY APPLYING THERETO SECTIONS OF DOUBLE-FACED, PRESSURE-SENSITIVE ADHESIVE TAPE**
- [75] Inventor: **Robert F. Davis**, Framingham, Mass.
- [73] Assignee: **Tapeler Corporation**, Framingham, Mass.
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Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 192,078, Oct. 26, 1971, abandoned.
- [52] U.S. Cl. **156/363; 93/36.9; 156/521; 156/572**
- [51] Int. Cl. **B32b 31/00; B31b 19/60**
- [58] Field of Search **156/521, 563, 351, 34, 156/517, 16, 520, 22, 566, 572; 93/36.9**

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Primary Examiner—Douglas J. Drummond

[57] **ABSTRACT**

Apparatus is disclosed for applying to at least one length or section of double-faced, pressure-sensitive adhesive tape to the undersurface of articles, such, for example, as a ticket of the type affixed to merchandise as a part of an inventory control system and positioning each such processed article in a position for removal. Both the tape section applying means and the article positioning means are disclosed as air-operated and their operation is actuated by the removal of a processed article from the apparatus.

21 Claims, 16 Drawing Figures

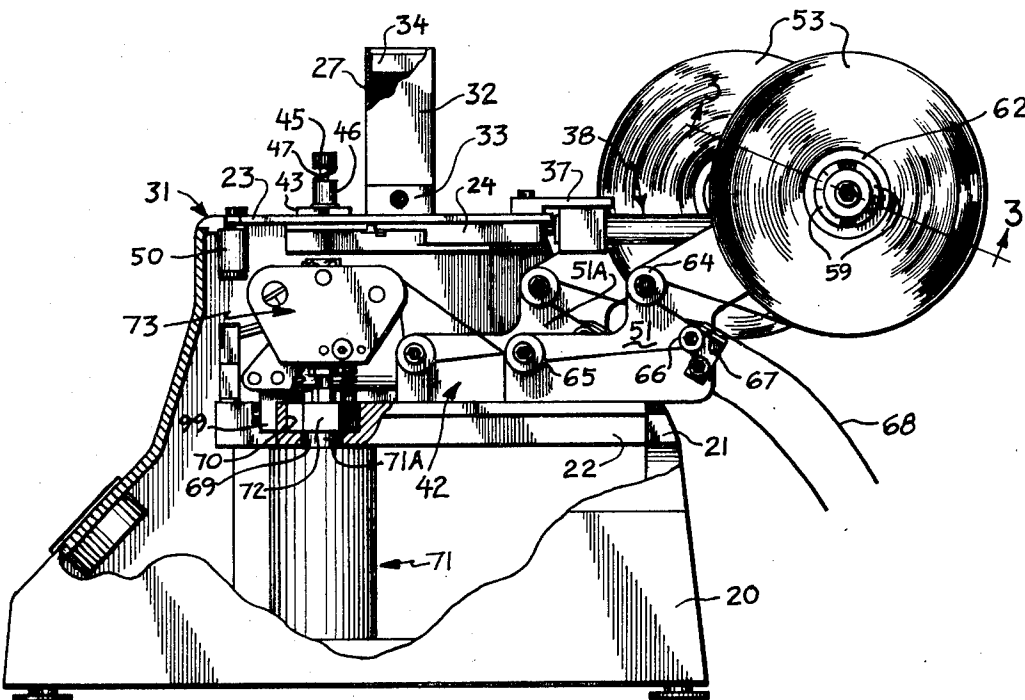


FIG. 1

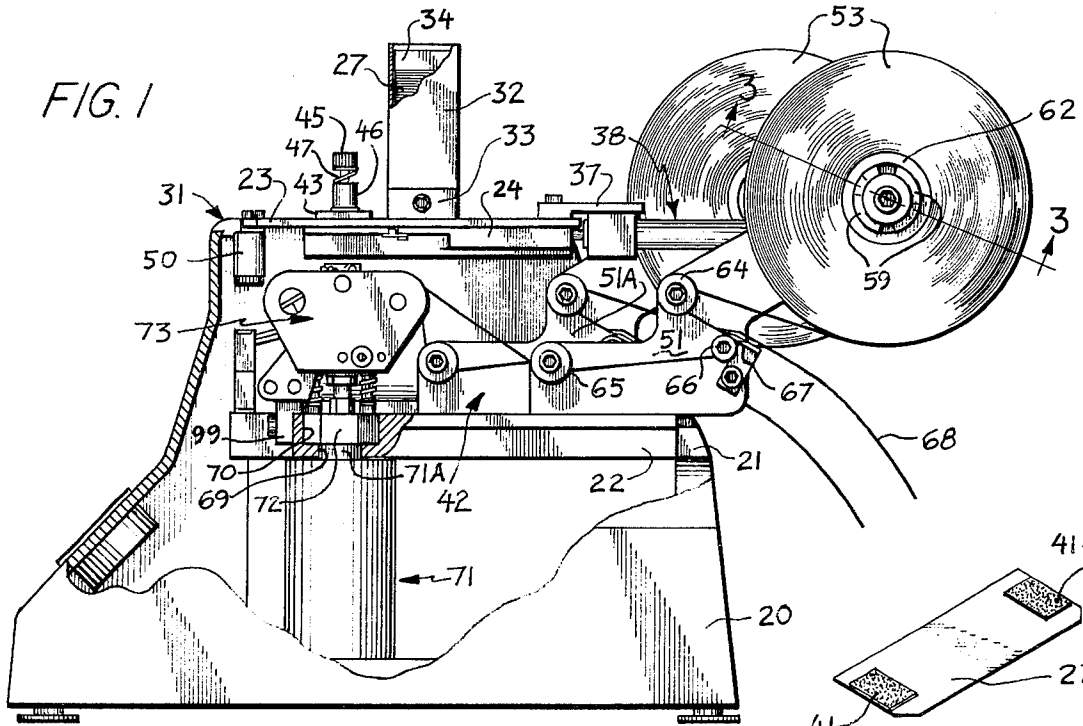


FIG. 1A

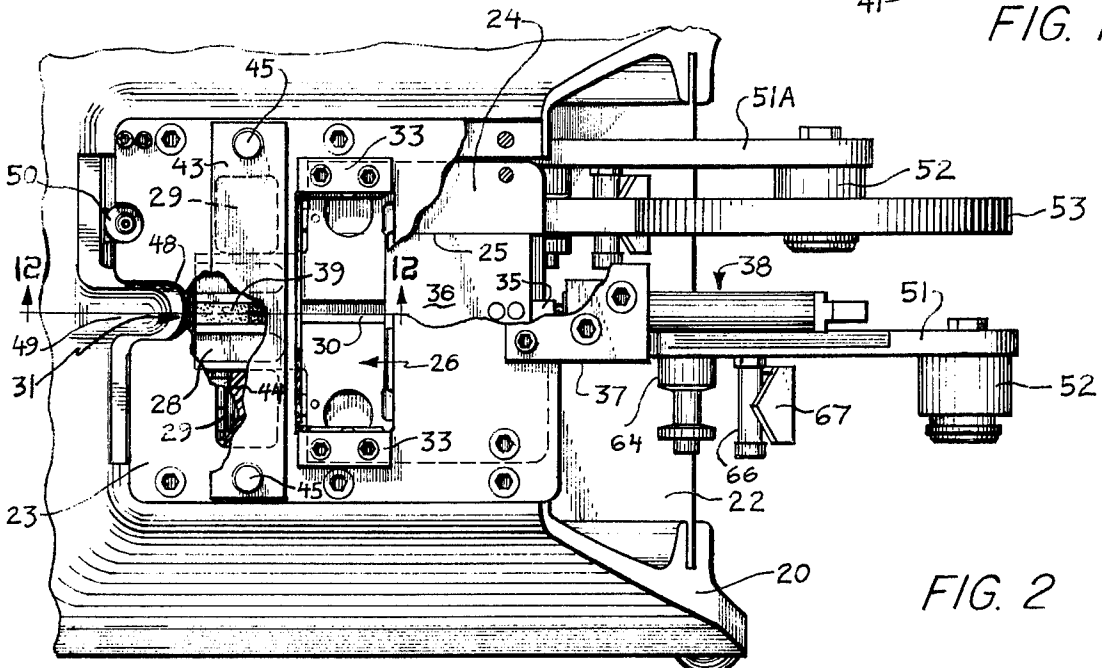


FIG. 2

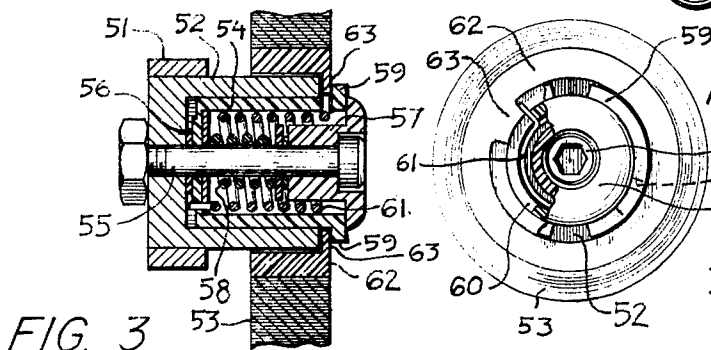


FIG. 3

FIG. 3A

INVENTOR

ROBERT F. DAVIS

BY

Robert F. Davis
ATTORNEY

FIG. 4

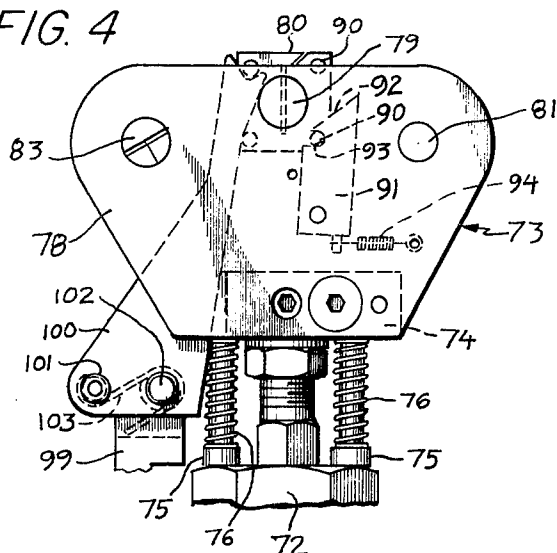


FIG. 5

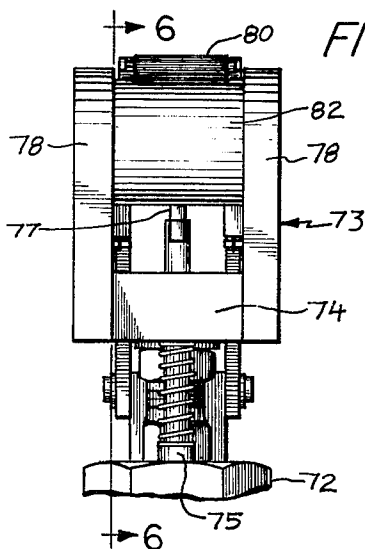


FIG. 6

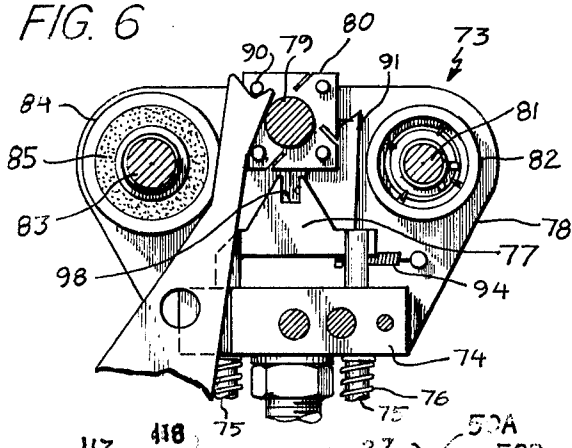


FIG. 7

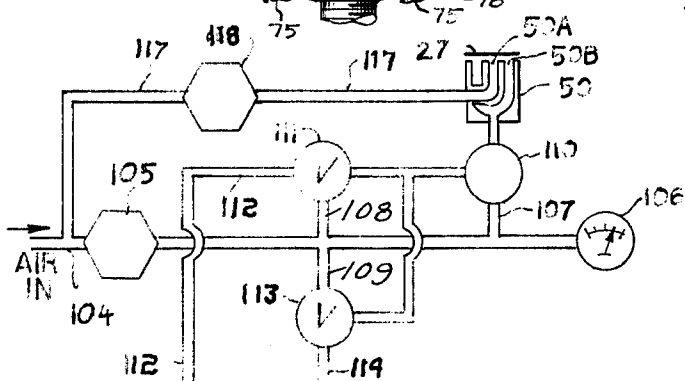
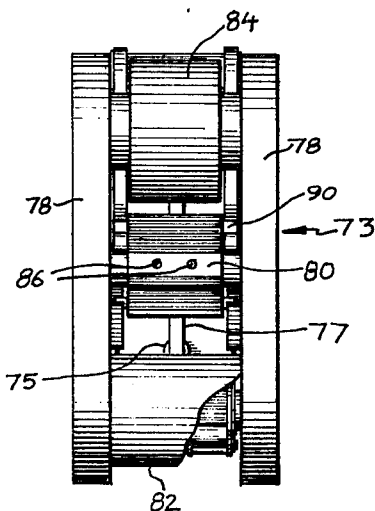


FIG. 9

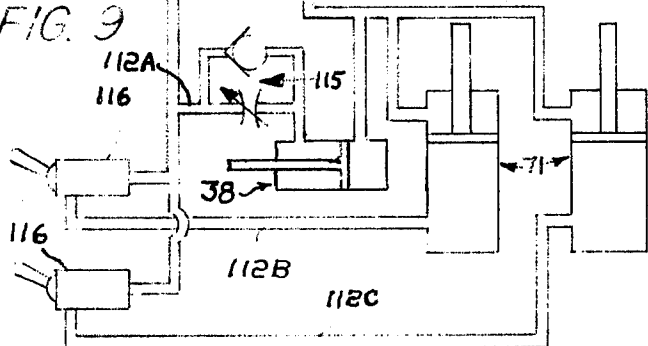
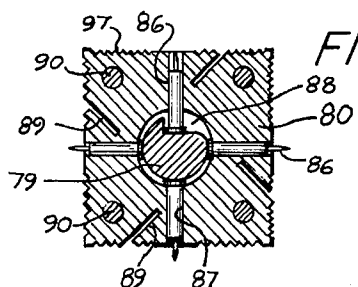


FIG. 8



INVENTOR

ROBERT F. DAVIS

BY

Abd. Spear,
ATTORNEY

FIG. 13

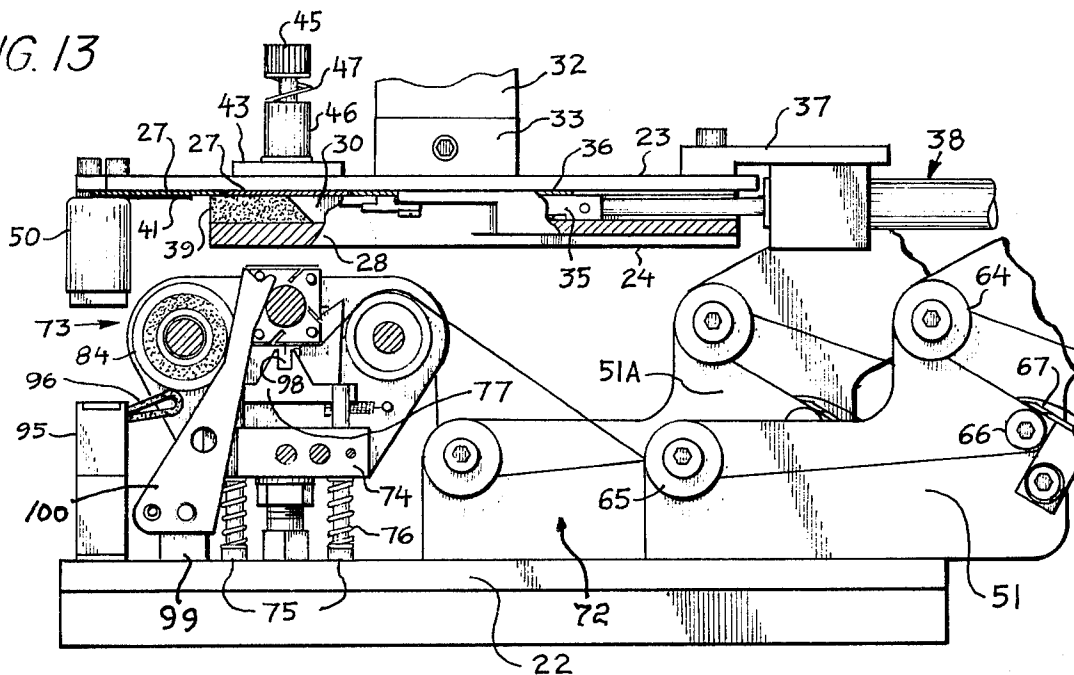
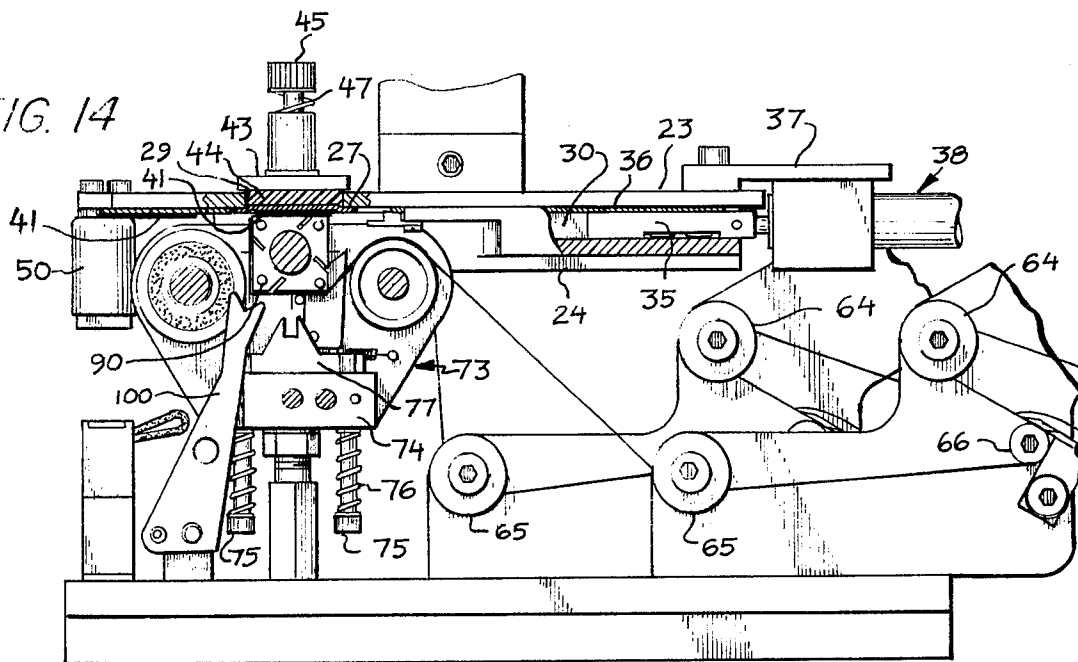


FIG. 14



INVENTOR

ROBERT F. DAVIS

BY

Alfred J. Davis
ATTORNEY

APPARATUS FOR PREPARING INVENTORY TICKETS AND LABELS FOR USE BY APPLYING THERETO SECTIONS OF DOUBLE-FACED, PRESSURE-SENSITIVE ADHESIVE TAPE

The present application is a continuation-in-part of application Ser. No. 192,078, filed Oct. 26, 1971 now abandoned.

BACKGROUND OF THE INVENTION

Inventory control is an important and troublesome business problem and systems for effecting such control commonly require that tickets be applied to the units to be inventoried with the tickets removed at the time of sale and then used in maintaining a check of the available supply of such units.

The inventory tickets are of various types and are variously affixed. Staples and pins have been used but the preferred practice is to use tickets that can be quickly and easily applied and as quickly and easily removed and for that reason, tickets having adhesive applied thereto in a limited or limited areas and in a condition for use when removed from the dispenser are preferred. Apparatus for processing an inventory ticket by applying a heated adhesive thereto is shown in U.S. letters Pat. Nos. 3,262,418 and 3,416,787. While such apparatus has been successfully used, the use of apparatus that requires a hot melt as the adhesive, is as objectionable as apparatus that requires that an adhesive coat be moistened before it can be used.

THE PRESENT INVENTION

The objective of the present invention is to provide apparatus in which the adhesive applied to articles does not require conditioning, an objective attained with apparatus provided with a pathway into one end of which articles are introduced, one-by-one, and with means to advance them along the pathway into a second position. The apparatus also has means operable to pull tape from at least one roll of a double-faced, pressure-sensitive adhesive tape, sever a predetermined length of the tape and press that tape section or sections against the article advanced to the second position. The apparatus includes operating means for both the article advancing and the tape pulling, severing and applying means, the operating means including a control operable when a processed article is removed from the forward end of the pathway. The term "article" as used herein, includes any that can be pushed along a pathway and is to be affixed to another object. By way of examples, the articles may be cards, labels, holding or carrying strips, or inventory tickets, the invention being detailed with particular reference to the last named articles.

THE PREFERRED EMBODIMENT

In the accompanying drawings, there is shown a preferred embodiment of the invention in which -

FIG. 1 is a side view of the apparatus with the housing partly broken away;

FIG. 1A is a perspective view of a processed ticket;

FIG. 2 is a plan view of the apparatus with its cover plate partly broken away;

FIG. 3 is a section taken approximately along the indicated lines 3—3 of FIG. 1;

FIG. 3A is a fragmentary and partly broken away front view of a tape roll mounted on a support;

FIG. 4 is a side view of a tape severing and tape section applying head;

FIG. 5 is an end view thereof;

FIG. 6 is a section taken approximately along the indicated lines 6—6 of FIG. 5;

FIG. 7 is a top plan view of the head;

FIG. 8 is a cross sectional view, on an increase in scale, of the feed block of the tape severing and tape section applying head;

FIG. 9 is a schematic view of the pneumatic circuitry by which the ticket advancing means and the tape severing and tape section applying means are operated;

FIG. 10 is a fragmentary view showing a head of the tape severing and section applying means being retracted and the ticket pushing plate being advanced;

FIG. 11 is a like view but with the head so retracted that the feed block is being turned;

FIG. 12 is a section, on an increase in scale, taken approximately along the indicated lines 12—12 of FIG. 2;

FIG. 13 is another like view showing the head fully retracted and the ticket pushing plate fully advanced;

FIG. 14 is another like view with the head fully raised and the plate fully retracted.

The disclosed apparatus comprises a housing 20 open at the rear and having a slideway 21 for the base plate 22 and a detachable cover plate 23.

A guide plate 24, secured to the undersurface of the cover plate 23, see FIG. 2, has a wide shallow channel 25 extending forwardly under a transverse slot 26 in the cover plate 23 dimensioned for the entry of an article shown as an inventory ticket 27 therethrough. The floor of the channel 25 includes a central narrow extension 28 terminating beyond a transversely aligned pair of ports 29 in the cover plate 23 and has a groove 30 extending centrally thereof and from end-to-end of the extension 28. The front wall of the housing 20 is relieved so that it and the cover plate 23 provides a ticket exit generally indicated at 31. That portion of the cover and guide plates including and extending forwardly of the transverse slot 26 to the exit 31 defines a pathway for the tickets 27 with the means for delivering thereto shown as a magazine 32 releasably secured in a seat surrounding the slot 26 by holders 33, see FIG. 1. A weight 34 in the magazine seats a stack of tickets against the floor of the slideway, the height of which being such that a ticket 27 is a slidable fit therein and that only the bottom ticket of the stack is in the pathway.

A slide 35 in the groove 30 has a plate 36 attached thereto with its forward portion extending forwardly of the slide 35 and of a thickness and length such that it may enter the ticket pathway and push the bottom ticket of the stack forwardly into a position underlying the pair of ports 29 where it is centrally supported by the extension 28. The portion of the ticket pathway underlying the transverse slot 26 is sometimes referred to as the first ticket station and that portion thereof underlying the pair of ports 29 is sometimes referred to as the second station. A mount 37 secured to the rear edge of the cover plate 23 has the cylinder of a piston-cylinder unit 38 attached thereto with its stem extending forwardly and connected to the slide 35 and the unit is operable to reciprocate the slide and its pusher plate to advance a ticket from the first to the second station.

At the forward end of the groove 30, there is a ticket snubber 39, conveniently of a foam rubber, that yields-

bly holds a ticket 27 in the second station. In addition, a spring finger 40, secured to the cover plate 23, extends forwardly for yieldable holding engagement with the central, trailing portion of the upper surface of a ticket 27 at the exit 31. At the second station, as will subsequently be more fully described, sections 41, each of a predetermined length of double-faced, pressure-sensitive adhesive tape, are applied by section forming and applying means, generally indicated at 42, to either or both ends of a ticket 27 at the second station. It will be noted that a backing plate 43 overlies the ports 29 and includes portions 44, one for each port 29 and fitting therein. The ends of the plate 43 are attached to the cover plate 23 by screws 45 which pass freely through end posts 46 with interposed springs 47 providing a yieldable backing for each ticket 27 as the tape lengths 41 are applied thereto.

As a ticket 27 is pushed forwardly from the first station into the second station, if there is a ticket at said second station, it will be forced forwardly with its central portion exposed in an open-ended slot 48 in the front edge of the cover plate 23 below which the housing 20 has a vertical channel 49 providing support for the ticket and also facilitating the gripping of its central portion when it is to be removed. This portion of the ticket pathway is referred to as the third station. It will be noted that the ticket engaging portion of the spring finger 40 is within the slot 48 and upper edge of the housing channel thus securely but releasably holding it at the exit 31 in a position to be removed. The cover plate 23 supports a trigger or sensor 50 which, as will presently be more fully detailed, is operative to actuate the apparatus whenever a ticket 27 is removed from the third station then to effect the replacement thereof with another processed ticket, i.e., a ticket with a section or sections 41 of double-faced, pressure-sensitive adhesive tape applied to its undersurface.

The tape section forming and applying means 42 are mounted on the base plate 22 and include a pair of rearwardly extending arms 51 and 51A each having a mount 52 at its end for the support of a roll 53 of a double-face, pressure-sensitive adhesive tape, see FIGS. 1 and 2.

Each mount 52, see FIGS. 3 and 3A, has, in accordance with U.S. Pat. No. 3,531,057, a cup-shaped member 54 rotatably supported within it by a bolt 55 extending through its closed end and through a washer 56 and connecting it to the appropriate one of the arms 51, 51A. A flanged sleeve 57 is caught by the head of the bolt 55 and bears against a spring 58 backed by the closed end of the member 54 thereby to provide an adjustable drag. The cup-shaped member 54 has a pair of spaced flanges 59 with a slot 60 in back of one of them through which extends one end of a torsion spring 61 whose other end is anchored in the closed end of the member 54.

Each tape roll 53 has a core 62 provided at or adjacent its outer end with a pair of diametrically opposed, inwardly disposed tabs 63 disposed and dimensioned so that they may pass through the gaps between the flanges 59 and be held thereby when the core 62 is turned in a roll unwinding direction, one tab 63 then engaging the protruding end of the spring 61. This arrangement, as more fully detailed in the above referred-to patent, provides a cushion when the tape is subjected to an unwinding pull and also a slack take-up when that pull is released.

Each arm 51, 51A has, see FIGS. 1 and 10 - 14, tape guiding rolls 64 and 65 and a festoon roll 66. The tape from each tape roll 53 is first trained about a guide roll 64, then about the festoon roll 66 and finally about the guide roll 65 and it will be noted that the rolls are so arranged that a small angle exists between the tape at the infeed and outfeed sides of the festoon roll 66 and that a V-shaped stripper plate 67 is secured to each arm adjacent its festoon roll 66 for removing the lining 68 with which most pressure-sensitive, double-faced adhesive tapes are provided.

Adjacent the forward end of the base plate 22 there are, see FIG. 1, laterally spaced and transversely aligned bores 69 having counterbores 70, each in vertical alignment with an appropriate one of the ports 29 at the second station of the ticket pathway. The threaded neck 71A of the cylinder of a piston-cylinder unit, generally indicated at 71, is inserted upwardly through each bore 70 and is anchored by a nut 72 fitting the counterbore. The stem of each piston-cylinder unit 71 has a head, generally indicated at 73, attached thereto.

Each head 73, see FIGS. 4 - 7, includes a head plate 74 which has a threaded connection with the stem of an appropriate one of the piston-cylinder units 71 and carries a pair of vertically slidable plungers 75 backed by springs 76 and with their upper ends connected to a pusher 77, the function of which will presently be explained. The head plate 74 is provided with side plates 78 which support the axle 79 of a square feed block 80, the pin 81 in support of a fairing roll 82 that is rotatable only in the direction in which the tape is unwound, and the axle 83 of the anvil 84 which has a resiliently yieldable core 85.

Each face of each feed block 80 has, see FIG. 8, a pair of pins 86 mounted in bores 87 with their heads backed by the axle 79 thereby to be held with their ends protruding except when, as in the case when a block face is disposed upwardly towards the second station of the ticket pathway, they overlie the cam pocket 88 in the feed block axle 79 which enables them to drop inwardly and become inoperative. As the feed block 80 is again turned, the cam surface of the pocket 88 forces the pins 86 outwardly. The function of the pins 86 is to catch and hold the tape to each of the blocks 80 as the tape passes from the appropriate fairing roll 82 and the function of each anvil 84 is to sever the tape against a corner of a block 80 as it turns so that a severed section 41 is made available for application to the undersurface of a ticket 27 when a unit 71 is operated to advance the appropriate head 73 into its elevated position in which the tape section 41 is pressed upwardly against a ticket 27 at the second station. Each face of the feed block 80 is shown as having a transverse anchoring slot 89 for use in anchoring the tape thereto at the start.

It will be seen that on each side of and adjacent each of its corners, each block 80 has pins 90, and that detents 91, see FIG. 4, pivotally connected to the side plates 78 have cam ends 92 terminating in pockets 93 which receive and hold a pin 90 to prevent retrograde rotation of the blocks 80. The detents 91 are yieldably held in their operative position by springs 94.

At the end of the base plate 22, there is a reservoir 95 for oil and provided with wicks 96 in engagement with the anvils 84 thereby to ensure that the tape does not adhere thereto. It will be noted, see FIG. 8, that

each face of the blocks 80 has a series of grooves 97 that make the area in which the tape is in engagement therewith small in relation to that of a ticket 27 to which the tape sections 41 are to be applied. In addition, the faces may be provided with a release coat such, for example, a polytetrafluoroethylene.

The pushers 77 that have been previously referred to have the important function that, when actuated, they press the tape against the undersurface of the blocks 80 ensuring that the tape is pierced and caught by the pins 86. It will be noted that the pushers 77 have a central, pin-accommodating slot 98 and that they become operative only when, see FIGS. 13 and 6, a block 80 has been turned and returned into its fully retracted position.

The heads 73 are reciprocated by the units 71 and during that upward travel to affix tape sections 41 on the undersurface of a ticket 27 at the second station, tape is pulled from the rolls 53. On the retraction of the heads 73, the blocks 80 are turned to replace the tape sections that were just transferred to the ticket. To effect such turning, see FIG. 4, the plate 22 is provided with U-shaped mounts 99, one for each head 73. A pair of pawls 100, interconnected by the pin 101, are attached to each mount 99 by a pivot 102 in support of a coil spring 103 whose ends bear on the undersurface of the pin 101 and the mount 99. Each pair of pawls extends upwardly within a head 73, one adjacent each of its side walls 78. In the advanced, section-applying position of the heads 73, see FIG. 14, the pawls 100 are positioned by the spring 103 to be engaged by pins 90 when the heads 73 are retracted thereby to turn the blocks 80 a quarter turn as will be apparent from FIGS. 10, 11, and 13. It will be apparent that the pawls 100 yield when the heads are again advanced. In this connection, attention is directed to U.S. Pat. No. 3,625,799.

From the foregoing, it will be apparent that means are provided to advance a ticket from the magazine into the second station and with such advance forcing any ticket at the second station into the third station from which it may be removed and that means are also provided that are operable to deliver sections of double-faced, pressure-sensitive adhesive tape to the undersurface of the tickets at the second station.

Reference is now made to the operating means by which the ticket advancing means and the tape section-applying means 42 are operated and from which the operation of the apparatus will be apparent. In practice, many components of the operating means are supported by the base plate 22 and occupy the spaces below it within the housing 20 but these are omitted from the drawings but reference is made to FIG. 9 in which such means and the several piston-cylinder units are schematically shown.

Air under pressure from a suitable source is connected to a conduit 104 which is provided with a pressure regulating valve 105, a pressure gauge 106 and intermediate branches 107, 108, and 109.

The branch 107 includes a valve 110 that is normally closed. The branch 108 is under the control of a valve 111 that is normally open to connect a conduit 112 to the branch 108 while the conduit 109 is under the control of a normally closed valve 113 connecting the conduit 114 to relief.

The conduit 112 includes branches 112A, 112B and 112C of which the branch 112A is in communication

with the piston-cylinder unit 38 to establish a normally retracted position of the ticket advancing means, and delivered thereby to the unit 38 by-passing the flow regulator 115. The branch conduits 112B and 112C are each under the control of a valve 116 that may be manually operated to enable either one of the tape section applying means 42 to be rendered inoperative. The branch conduits 112B and 112C are in communication with the piston-cylinder unit 71 to establish a normally elevated position of the heads 73 in which they apply tape sections 41 to the undersurface of a ticket 27 at the second station.

Air from the source is also delivered by a conduit 117 controlled by the sensor 50 and provided with a pressure regulating valve 118. The conduit 116 is in communication with the valve 110 and maintains that valve closed whenever a ticket 27 overlies its port 50A and the adjacent annular port 50B of the sensor 50. When the ticket 27 is removed, no air is deflected through the annular port 50B so that the valve 110 opens in response to air delivered through the conduit 107 and is then operable to close the valve 111 and open the valve 113 so that air passes through the conduit 114 to the piston unit 38 which therefore responds to advance a ticket from the first ticket pathway station to the second station thereof and also to the piston-cylinder units 71 thereby to effect the lowering or retraction of their heads 73. The conduit 112 is now connected to relief and the travel of the ticket advancing means is retracted by the flow regulator 115. It will be apparent that the small size of the unit 38 ensures its action in advance of the larger units 71 and that upon the advance of a processed ticket 27 to the third station, the air flow through the sensor 50 is through the port 50B to close the valve 110, whereupon the valves 111 and 112 are reset and the piston-cylinder units, as a consequence, restored to their normal positions.

I claim:

1. Apparatus for preparing articles to adhere to a surface, said apparatus including structure providing a pathway including first and second stations and dimensioned to slidably receive an article, the first station having an entrance to admit articles one at a time into the pathway, reciprocable means attached to said structure and operable to advance an admitted article to the second station and then return into a position rearwardly of said entrance, at least one surface portion of an article at the second station being exposed, said apparatus also including a support for at least one roll of tape provided on both surfaces with a layer of a double-faced, pressure-sensitive adhesive, and means to draw such tape from a roll on said support and sever and apply a predetermined section thereof to the exposed portion of an article at the second station, said applying means including at least one head reciprocable between a retracted first position and a second position, the second position of the head being below the second pathway station with the severed tape length positioned to contact the undersurface of an article at the second station.

2. The apparatus of claim 1 in which there is a third station, and the article on delivery from the first station to the second station pushes any article at the second station to the third station, said third station exposing a portion of a thus processed article for removal therefrom, and including a backing surface and a spring finger attached to the structure and extending into the

third station in a position to seat an article advanced thereto against the backing surface.

3. The apparatus of claim 1 in which the second station of the pathway includes a backing portion with which the article at the second station comes into engagement when a tape section is applied thereto by said tape-applying means, and a resiliently yieldable connection between said backing portion and said structure, and a resilient snubber so positioned in the pathway relative to the second station as to yieldably hold an article advanced thereto.

4. The apparatus of claim 1 in which the structure also has a slideway in alignment with and in communication with the pathway, said slideway being of greater depth than the pathway, and the article-advancing means includes a slide in said slideway provided with a forwardly extending pusher plate dimensioned to slidably fit said pathway, and means mounted on said structure and connected to said slide and operable to reciprocate it.

5. The apparatus of claim 4 in which the means severing a predetermined length from the tape and applying it to the ticket includes a rotatable feed block with the tape trained part way about it, and yieldable pusher means to seat the tape against the downwardly disposed face of the feed block in the first position of the head.

6. The apparatus of claim 5 in which the feed block includes means on each face to secure the tape thereto, the downwardly disposed face is the face first engaged by the tape and the pusher means is operable to urge the tape against the face.

7. The apparatus of claim 4 and means operable in response to the removal of an article from the apparatus first to actuate said article advancing means to advance an article and the tape severing and section applying means to retain the head in its first position and then to retract said article advancing means and to advance the head into its second position when an article has advanced from the second to the third station.

8. The apparatus of claim 7 in which the reciprocable ticket advancing means and the tape section applying means each includes a double-acting piston-cylinder unit and the means operable in response to the removal of the article from the apparatus includes an air conduit provided with first, second, and third branch conduits, the first branch conduit including a first valve that is normally closed, the second branch conduit including a second valve that is normally closed, and the cylinders of said units and in communication therewith when the second valve is open then to effect the retraction of said article advancing means and to advance the head of the section applying means into its second position, the third branch conduit including a third valve that is normally open and the cylinders of said units and normally in connection therewith to effect the retraction of said head and the advance of said article advancing means, and means triggered by the absence or presence of an article at the third station to open and close said first valve, said first conduit then being in communication with and operable to open said second valve and close said third valve.

9. The apparatus of claim 8 in which the means triggered by the advance of an article from the second station is a second air conduit including a sensor through which air is deflected by an article to close said first valve.

10. The apparatus of claim 8 in which there are two heads and each includes a double-acting, piston-cylinder unit to effect the reciprocation of the head between said two positions and the second branch conduit includes branches in communication with both of said units, each including a manually operated valve operable to isolate a unit so as to prevent it from advancing the appropriate one of the heads.

11. The apparatus of claim 4 in which the structure includes a cover plate having said entrance and a guide plate below the cover plate including a narrow portion extending forwardly centrally through the second station exposing two surface portions of an article, and there are two reciprocable heads, one on each side of the forwardly extending portion.

12. The apparatus of claim 11 in which the cover plate has a pair of laterally spaced and transversely aligned ports, each in vertical alignment with an appropriate one of the units and yieldable backing means closing each port.

13. The apparatus of claim 11 in which the guide plate has a groove extending from under the second station forwardly through its central portion and the reciprocable means includes a slide in the groove rearwardly of the first station and the slide includes a forwardly extending pusher plate dimensioned to slidably fit said pathway and of a width such that a substantial portion of the edge of an article is engaged thereby.

14. The apparatus of claim 13 in which a snubber is secured in the groove in a position to yieldably hold a ticket at the second station when advanced thereto.

15. The apparatus of claim 11 in which the cover plate has a central recess extending from the second station and the housing has a vertical, outwardly opening channel.

16. The apparatus of claim 15 and a spring finger secured to the cover plate and extending through its central recess in a position to seat the central portion of an article against the upper end of the channel.

17. Apparatus for applying to the undersurface of a member a section of double-faced, pressure-sensitive adhesive tape, said apparatus including an axially supported, rotatable feed member part way about which such tape is to be trained and which has a plurality of angularly disposed faces, said feed member having a section applying position in which a face is disposed upwardly and below said undersurface, means operable to so turn said feed member as to bring the next adjacent face into said position, means operable to cut the tape at the trailing corner of a tape covered face to provide a section during such turnings, one tape covered face being downwardly disposed in said position, yieldable means operable to push the tape against said downwardly disposed face, and means operable to effect relative movement between said members to bring them into tape section transferring contact.

18. The device of claim 17 in which the feed member has means on each face operable to hold the tape except when that face comes in contact with the undersurface of the member.

19. The device of claim 19 in which the means operable to cut the tape is an anvil engageable by a corner of the block as it turns into a section applying position and means are provided to deliver a release liquid to the surface of said anvil thereby to prevent adhesion of the tape thereto.

20. The device of claim **17** in which the feed member is reciprocated between first and second positions, in the second position the severed tape section on its upwardly disposed face coming into contact with said undersurface and the means yieldably pushing the tape against the downwardly disposed face include a spring-backed pusher in engagement with the tape in the first

position thereof.

21. The device of claim **20** in which the feed member turning means is operable on the return of the feed member to its first position first to cut the tape section and then to effect the operative relationship of the pusher means relative to the feed member.

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