June 23, 1964 D. H. FAIREST 3,138,508

METHOD OF APPLYING MARGINALLY-GUMMED LABELS TO CYLINDRICAL ARTICLES

Filed May 1, 1961 3 Sheets-Sheet 1

Fig.1.

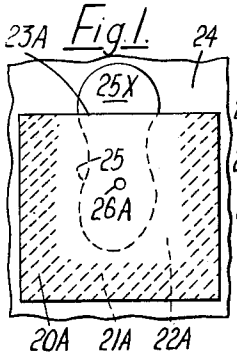


Fig.2.

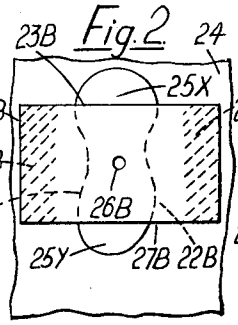


Fig.3.

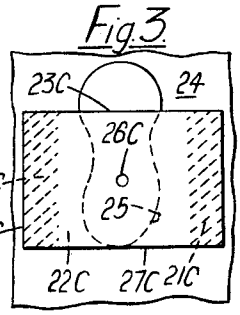


Fig.4.

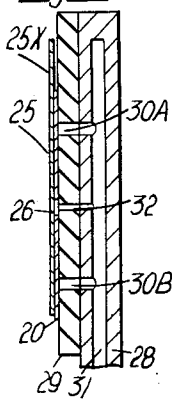


Fig.5.

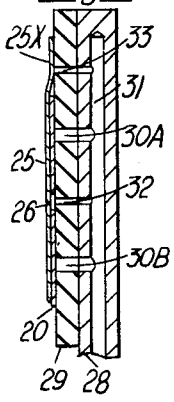


Fig.6.

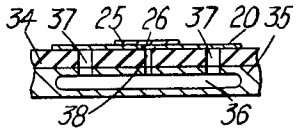


Fig.7.

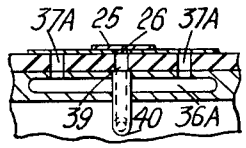


Fig.8.

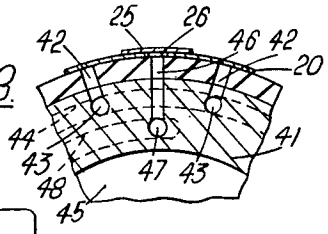
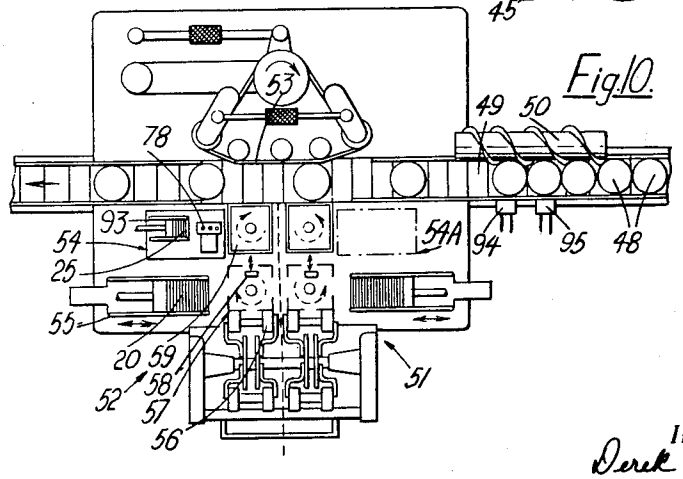


Fig.10.



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METHOD OF APPLYING MARGINALLY-GUMMED LABELS TO CYLINDRICAL ARTICLES

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Fig. 11.

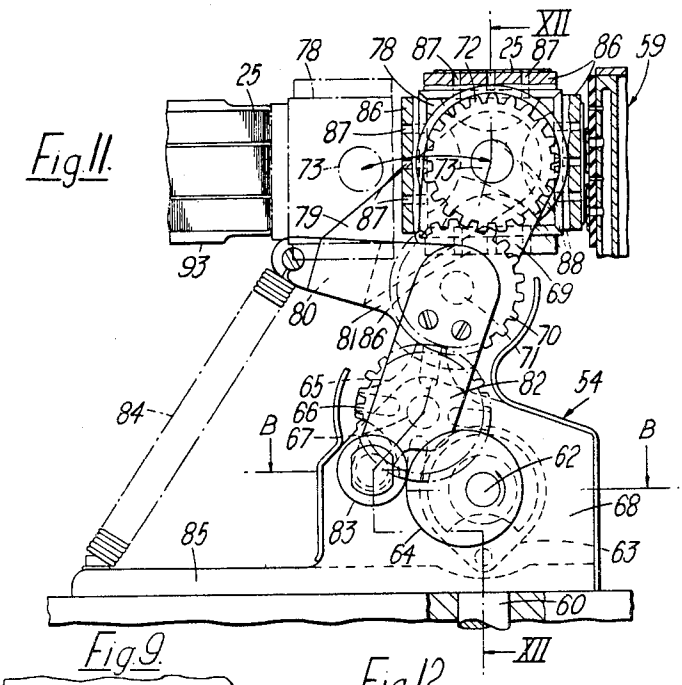


Fig. 9.

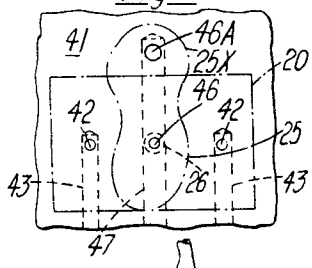


Fig. 12.

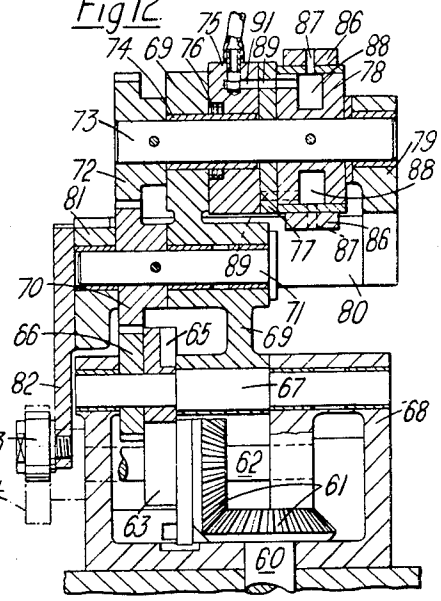


Fig. 13.

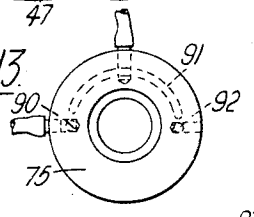
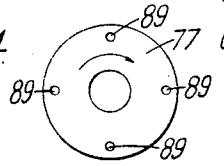


Fig. 14.



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METHOD OF APPLYING MARGINALLY-GUMMED LABELS TO CYLINDRICAL ARTICLES

Filed May 1, 1961 3 Sheets-Sheet 3

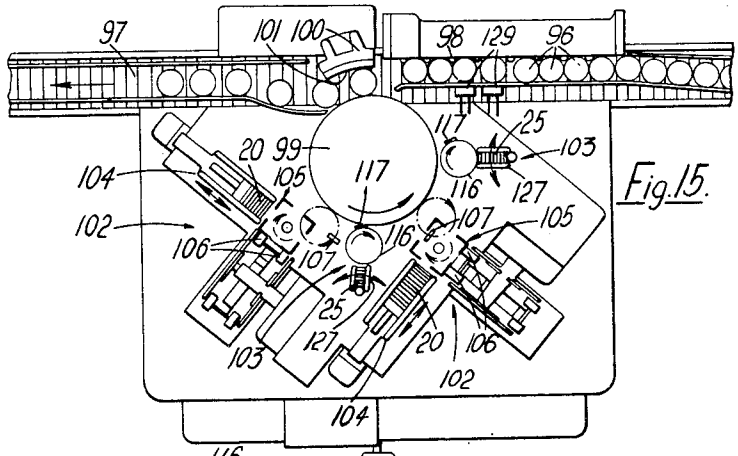

Fig. 15.

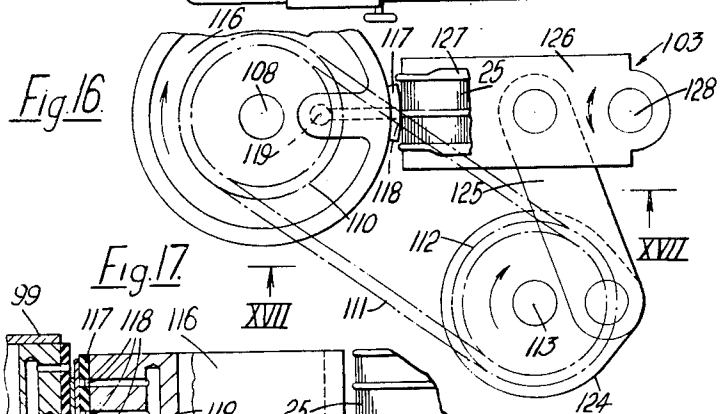

Fig. 16.

Fig. 17.

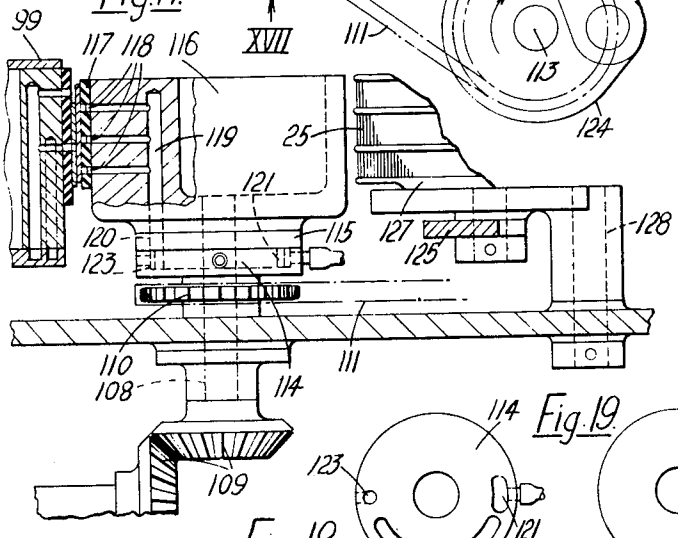

Fig. 18.

Fig. 19.

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METHOD OF APPLYING MARGINALLY-GUMMED LABELS TO CYLINDRICAL ARTICLES

Derek H. Fairest, Sheffield, England, assignor to Morgan Fairest Limited, Sheffield, England, a British company

Filed May 1, 1961, Ser. No. 106,666
4 Claims. (Cl. 156—215)

This invention relates to methods of applying labels to bottles and like articles (hereafter referred to as "articles") with the labels enclosing between themselves and the articles sheets of material consisting of advertising devices, gift tokens, receipe sheets, or bearing other matter desired to be presented with the articles but not on the labels themselves.

According to the present invention, a method of applying to an article a label and a sheet of material to be enclosed between the label and the article comprises applying gum marginally to one face of a label to leave an ungummed central area that extends longitudinally to at least one ungummed margin, the label having a hole through such area, holding the other ungummed face of the label by suction, presenting to the ungummed central area a sheet of material less in width than that area and holding it to the label by suction applied through the hole in the label, and applying the combined assembly of marginally-gummed label and suction-held sheet of material to a bottle or like article, for the sheet of material to be retained in a pocket formed by the marginally-adhering label and the article.

If ony one ungummed margin is reached by the central area, the final result is a pocket open at that margin. The length of the applied sheet of material may be such that it protrudes beyond the opening of the pocket, so that its presence on the labelled article can be readily noted, and the protruding portion can be used for extraction of the sheet from the pocket. However, a sheet longer than the label could protrude from one end or from opposite ends of a pocket formed by having two opposite ungummed margins on the label, since the tension of the label on the article would hold the sheet to the article.

The invention will now be described with reference to the accompanying drawings, in which:

FIGURES 1 to 3 are elevations of three different marginally-gummed labels holding an ungummed sheet to a cylindrical surface;

FIGURES 4 and 5 are fragmentary vertical sections of delivery members provided with different suction means for holding both a marginally-gummed label and an ungummed sheet;

FIGURES 6 and 7 are fragmentary horizontal sections of flat delivery plates provided with different suction means for holding both a marginally-gummed label and an ungummed sheet;

FIGURE 8 is a horizonal section of a curved delivery plate provided with suction means for holding both a marginally-gummed label and an ungummed sheet;

FIGURE 9 is a fragmentary elevation of the delivery plate of FIGURE 8 showing additional suction means for holding the ungummed sheet;

FIGURE 10 is a small scale diagramamtic plan of one form of labelling machine for carrying out the invention;

FIGURE 11 is an enlarged front elevation of the unit of FIGURE 10 employed for presenting ungummed sheets to the delivery member;

FIGURE 12 is a section generally on the line XII—XII of FIGURE 11;

FIGURES 13 and 14 are respective elevations of the fixed and rotary valve plates appearing in FIGURE 12;

FIGURE 15 is a small-scale diagrammatic plan of another form of labelling machine for carrying out the invention;

FIGURE 16 is an enlarged plan of one of the units of FIGURE 15 employed for presenting ungummed sheets to the delivery member, the unit being shown in the process of extracting an ungummed sheet from a stack;

FIGURE 17 is a part-sectional elevation taken from the line XVII—XVII of FIGURE 16, but with the unit in the process of presenting an ungummed sheet to the delivery member; and

FIGURES 18 and 19 are respective plans of the fixed and rotary valve plates appearing in FIGURE 17.

In FIGURE 1, a label 20A that has previously been gummed marginally at 21A along three sides, to leave an ungummed central area 22A extending longitudinally to the upper margin 23A, holds to the cylindrical surface 24 of an article an ungummed sheet 25 (e.g. an advertising device). The length of the sheet 25 is such that it protrudes beyond the opening or ungummed margin 23A of the pocket formed between the ungummed area 22A of the label and the cylindrical surface 24 of the article, so that its presence on the article can be readily noted, and the protruding portion 25X can be used for extraction of the sheet from the pocket. The label 20A has a hole 26A through the ungummed area 22A, whereby the sheet 25 may be held by suction applied through the hole, as will be described presently with reference to FIGURES 4 to 9.

The sheet 25 need not necessarily be held within a three-sided pocket formed by the label, but may be held to the article by the tension of the label. Thus, in FIGURE 2, a label 20B, which is considerably shorter than the label 20A, and that has previously been gummed marginally at 21B along two opposite sides, to leave an ungummed central area 22B extending to both the upper margin 23B and the lower margin 27B, holds by its tension alone the ungummed sheet 25 with its upper end 25X and its lower end 25Y protruding from opposite ends of the two-sided pocket formed between the ungummed area 22B and the cylindrical surface 24 of the article; and in FIGURE 3, a label 20C, which has a length substantially equal to the ungummed area 22A of the label 20A, and that has previously been gummed marginally at 21C along two opposite sides, to leave an ungummed central area 22C extending to both the upper margin 23C and the lower margin 27C, holds by its tension alone the ungummed sheet 25, which is disposed so that only its upper end 25X protrudes from the two-sided pocket formed between the ungummed area 22C and the cylindrical surface 24 of the article. Holes 26B, 26C through the ungummed areas 22B, 22C, respectively, serve for the application of suction to the sheet 25 through the holes, as will now be described with reference to FIGURES 4 to 9.

In FIGURE 4, a delivery member 28 (which may be an arm, a finger, or a plate) has a resilient surface 29 with large suction apertures 30A, 30B fed from a supply duct 31 and adapted to hold the label 20 above and below the hole 26, with the ungummed face of the label to the surface 29. A further suction aperture 32 adapted to register with the hole 26 and apply suction from the duct 31 to the sheet 25 has a substantially smaller cross-section than the apertures 30A, 30B so that the suction applied to the label 20 up to the time when the hole 26 is covered by the sheet 25 is not adversely affected by exposure of the aperture 32 to the atmosphere. A further small aperture 33 (FIGURE 5) may be provided above the aperture 30A, to hold the protruding portion 25X of the sheet 25 and resist any tendency for the sheet 25 to rotate about the suction hold through the hole 26 in the label 20, the sum of the cross-sections of the apertures 32, 33 being substantially less than the apertures 30A, 30B so that the suction applied to the label 20 up to the time when both apertures 32, 33 are closed by the sheet 25 is not adversely

affected by exposure of the apertures 32, 33 to the atmosphere.

In FIGURE 6, the label 20 is adapted to be held by its ungummed face to a resilient surface 34 of a flat delivery plate 35, by suction applied from a duct 36 through apertures 37, one to each side of the hole 26, and the sheet 25 is adapted to be held by suction applied through the hole 26 by a smaller aperture 38 from the duct 36, while in FIGURE 7 similar suction apertures 37A are supplied from a duct 36A to hold the label 20, but the hole 26 in the label registers with suction aperture 39 supplied from a separate duct 40, so that the suction hold on the label 20 is completely unaffected by exposure of the aperture 39 when not closed by the sheet 25.

In FIGURES 8 and 9, a curved delivery plate 41 (e.g. forming part of a continuously rotary delivery drum) has suction apertures 42 from separate ducts 43 adapted to register with an arcuate port 44 in a valve plate 45 during the arc of travel of the delivery plate that it is required to hold the label 20, and a further suction aperture 46 (to register with the hole 26 in the label 20) from a duct 47 adapted to register with another arcuate port 48 in the valve plate during the arc of travel of the delivery plate that it is required to hold the sheet 25. The duct 47 may extend to a further suction aperture 46A (FIGURE 9) for holding the protruding portion 25X of the sheet 25.

The disposition of suction apertures is not limited to those shown in FIGURES 4 to 9, but may be governed by the size, shape, and relative disposition of labels and sheets to be held by any particular delivery member, as well as by their manner of presentation to the articles by the delivery member.

In FIGURE 10, articles 48 are carried on a slat conveyor 49 at the spacing determined by a feed worm 50, as required for application to each article of a label on one side by the righthand mechanism 51 and a further label on the opposite side by the left-hand mechanism 52, an endless belt 53 on the opposite side of the conveyor 49 serving to roll the articles across labels presented by both mechanisms. The essential elements of the mechanism 51 and their drives are well-known while the essential elements and drives of the mechanism 52 are similar to those of the mechanism 51, but with the addition of a novel unit 54 for presenting sheets 25 for simultaneous application with labels 20 to the articles 48. Thus, the following description of the mechanism 52 is applicable to the mechanism 51, except where it apertains to the unit 54 alone.

In the mechanism 52, the labels 20 are extracted in turn from a reciprocating stack 55 by gum applied by rollers 56 to the apertured sides of an intermittently rotatable square pick-up box 57 and then transferred by a reciprocating pusher 58 to an intermittently rotatable square delivery box 59, each side of which comprises a delivery plate having suction means (as shown in FIGURE 11) corresponding to FIGURE 5. The delivery box 59 carries each label 20 in turn to a position alongside and facing the conveyor 49, for an article 48 (that has already had a label applied to one side by the mechanism 51) to be rolled by the belt 53 across the side of the box 59 and the label 20 held thereon, for the label 20 to be applied to the article. Both at transfer of the label 20 from the box 57 and at delivery of the label 20 to the article, the box 59 is in position of rest and, at the intermediate position of rest between transfer and delivery, the unit 54 presents a sheet 25 to be held to the delivery box 59 by suction applied through the hole 26 in the label 20 and (as shown in FIGURE 11 and with reference to FIGURE 5) by suction applied to the protruding portion 25X.

The mechanism 51 could serve equally well for the simultaneous application of labels 20 and sheets 25, by disposing the unit 54 or a further similar unit in the broken line position 54A.

The unit 54 has an input drive shaft 60 (FIGURES 11 and 12) from the underneath drive (not shown) of the machine, and the drive from the shaft 60 is transmitted by bevel gears 61 to a shaft 62 carrying the driving member 63 of a Geneva-stop mechanism and an eccentric cam 64. The driven member 65 of the Geneva-stop mechanism is secured to a pinion 66 and mounted with that pinion on a shaft 67, which is journalled in a housing 68 and carries a swinging arm 69, and a pinion 70 meshing with the pinion 66 is carried by a shaft 71 journalled in the arm 69, while a further pinion 72 meshing with the pinion 70 is carried by a shaft 73 which is also journalled in the arm 69. A bearing bush 74 for the shaft 73 carries a fixed valve plate 75 (see also FIGURE 13), which is urged by a spring 76 into close contact with a rotary valve plate 77 (see also FIGURE 14) secured to one side of a square transfer box 78 on the shaft 73, and beyond the box 78 the shaft 73 is journalled in an arm 79 at one end of a bracket 80, the other end of which has an arm 81 journalled on the shaft 71. Secured to the arm 81 is a depending rocker arm 82 carrying a follower roller 83, which is kept in contact with the periphery of the eccentric cam 64 by a tension spring 84 secured at one end to the bracket 80 and at the other end to an extension 85 of the base of the housing 68.

Each side of the box 78 has a pad 86 conforming closely to the size and shape of the sheets 25, with suction apertures 87 from a chamber 88 communicating with a port 89 in the rotary valve plate 77, and each port 89 is brought in turn into communication with a high vacuum supply port 90 closely followed by an arcuate low vacuum supply port 91, which in turn is followed closely by an exhaust port 92, all in the fixed valve plate 75, as the valve plate 77 is rotated intermittently with the box 78 by the motion transmitted through the train of gears 66, 70, 72 from the driven member 65 of the Geneva-stop mechanism.

The swinging arm 69 is oscillated on the shaft 67 by the eccentric cam 64 acting on the roller 83 and through the rocker arm 82, to reciprocate the box 78 between the delivery box 59 and a stack 93 for the sheets 25, with the intermittent rotation of the box 78 timed to take place around the mid-point of travel of the box 78. The suction apertures 87 of any pad 86 brought to the stack 93 are subjected to high vacuum from the port 90 for extraction of the foremost sheet 25 from the stack, and then during the two stages of intermittent rotation to the facing position are subjected to low (or holding) vacuum from the arcuate port 91, until the pad is about to present its sheet 25 to the delivery box 59 to be held by suction applied through the hole 26 in a label 20 already carried by the box 59, when the apertures 87 are exhausted by communication of the chamber 88 with the port 92 for the sheet 25 to be freed from the pad 86. The train of pinions 66, 70, 72 ensures that each pad as it is brought to the stack 93 lies parallel to the foremost sheet 25 in the stack and, as it is brought to the delivery box 59, lies parallel to the side of the delivery box 59, despite the swinging of the arm 69 about the shaft 67.

Since the labels 20 and the sheets 25 are separately presented at two different positions of rest of the sides of the delivery box 59, the additional application of the sheets to the articles 48 does not interfere with the basic labelling rate of the machine. By not supplying sheets, i.e. by removal of the stack 93 or immobilisation of the unit 54, the machine is directly available for applying labels alone.

The stack 93 may be mounted in any well known manner for reciprocation between the position shown in FIGURE 11 and a position in which it cannot be contacted by the transfer box 78, so that the usual detector 94 (FIGURE 10) that is effective to prevent presentation of a label 20 by withholding the stack 55 from the pick-up box 57 in the event of an interruption in the supply of articles 48 may also be effective to withhold the stack 93 and prevent presentation of a sheet 25. The usual

detector 95 associated with the mechanism 51 is also provided, to prevent presentation of a label that would normally be applied to the other side of an aritcle 48.

In the machine of FIGURE 15, articles 96 are carried on a slat conveyor 97 at the spacing determined by a feed worm 98, as required for simultaneous application of a label 20 and a sheet 25 to each article by a continuously rotatable delivery drum 99 in association with a presser member 100 having a surface 101 concentric with the drum 99. The labels 20 are presented to the delivery drum by mechanisms 102 which with the drum and presser member are well-known, while the sheets 25 are presented by a novel unit 103 provided in duplicate, one in association with each of the mechanisms 102.

In each mechanism 102, the labels 20 are supplied from a reciprocating stack 104 to an intermittently rotatable pick-up box 105, the faces of which are gummed by gumming rollers 106, and the labels are transferred by a continuously rotatable transfer member 107 to the delivery drum 99, where they are held by suction means (as shown in FIGURE 17) corresponding to FIGURES 8 and 9, at spaced intervals around the drum. The mechanisms 102 present the labels in alternation to alternate suction means, so that the reciprocating and intermittent rotary motions take place at only half the speed that would be required of a mechanism 102 serving alone to present labels 20 to all the suction means around the drum.

Each unit 103 has an input shaft 108 (FIGURES 16 and 17) driven through bevel gears 109 from the main underneath drives (not shown) of the machine, and the shaft 108 carries a sprocket 110 for a chain drive 111 to a sprocket 112 on an auxiliary shaft 113. The shaft 108 also carries a non-rotatable or fixed valve plate 114 (see also FIGURE 18), a rotary valve plate 115 (see also FIGURE 19), and a continuously rotatable transfer drum 116 with which the valve plate 115 rotates. The drum 116 carries a pad 117 conforming closely to the size and shape of the sheets 25 and having suction apertures 118 from a duct 119 which is permanently in communication with a port 120 in the rotary valve plate 115, and the port 120 is connected successively with a short arcuate, high vacuum supply port 121 in the fixed valve plate 114, followed by a long arcuate, low vacuum supply port 122 and an exhaust port 123, as the drum 116 rotates. The auxiliary shaft 113 carries a crank disc 124 having a connecting link 125 to a plate 126 carrying a stack 127 for the sheets 25, the plate 126 being pivotable on a shaft 128 so as to oscillate the stack 127 for substantially pure rolling contact to take place between the pad 117 and the foremost sheet 25 in the stack.

As the pad 117 rolls on the foremost sheet 25 in the stack 127, the sheet is extracted from the stack by high vacuum from the port 121, and is held to the pad by low vacuum from the port 122 during rotation of the drum 116 to bring the pad into rolling contact with the delivery drum 99, when the apertures 18 are exhausted by communication with the exhaust port 123, the timing of the drives to the drum 99 and the drum 116 being such that the sheet 25 is aligned with the ungummed central area of a label 20 carried by one of the suction means of the drum 99. As suction in the apertures 118 is exhausted, suction is applied to the sheet 25 through the hole 26 in the label 20, for the sheet to be held to the delivery drum 99 with the label and applied to an article rolled between the drum 99 and the presser member 100.

Since the labels 20 and the sheets 25 are separately presented to the continuously rotatable delivery drum 99 by continuously rotatable means, the additional application of the sheets to the articles 96 does not interfere with the basic labelling rate of the machine. By not supplying sheets, i.e., by removal of the stacks 127, or immobilisation of the units 103, or shut-off of the high vacuum supply to the ports 121, the machine is directly available for applying labels alone.

The usual detectors 129, FIGURE 15), associated with the mechanisms 102 to prevent presentation of a label 20 by with-holding the appropriate stack 104 from the corresponding pick-up box 105 in the event of an interruption in the supply of articles 96, may also be effective to cut off the high vacuum supply to the port 121 of the corresponding unit 103, to prevent presentation of a sheet 25 in the absence of a label 20 to receive it.

What I claim is:

1. A method of applying to an article a label and a sheet of material to be enclosed between the label and the article comprising applying gum marginally to one face of a label to leave an ungummed central area that extends longitudinally to at least one ungummed margin, the label having a hole through such area, holding the other ungummed face of the label by suction, presenting to the ungummed central area a sheet of material less in width than that area and holding it to the label by suction applied through the hole in the label, and applying the combined assembly of marginally-gummed label and suction-held sheet of material to an article.

2. A method of applying to an article a label and a sheet of material to be enclosed between the label and the article comprising applying gum marginally to one face of a label to leave an ungummed central area that extends longitudinally to one ungummed margin, the label having a hole through such area, holding the other ungummed face of the label by suction, presenting to the ungummed central area a sheet of material less in width than that area and holding it to the label by suction applied through the hole in the label, with one end of the sheet of material protruding beyond the ungummed margin, and applying the combined assembly of marginally-gummed label and suction-held sheet of material to an article.

3. A method of applying to an article a label and a sheet of material to be enclosed between the label and the article comprising applying gum marginally to one face of a label to leave an ungummed central area that extends longitudinally to two opposite ungummed margins, the label having a hole through such area, holding the other ungummed face of the label by suction, presenting to the ungummed central area a sheet of material less in width than that area and holding it to the label by suction applied through the hole in the label, with at least one end of the sheet protruding beyond an ungummed margin, and applying the combined assembly of marginally-gummed label and suction-held sheet of material to an article.

4. A method of applying to an article a label and a sheet of material to be enclosed between the label and the article comprising applying gum marginally to one face of a label to leave an ungummed central area that extends longitudinally to at least one ungummed margin, the label having a hole through such area, holding the other ungummed face of the label by suction, presenting to the ungummed central area a sheet of material less in width than that area, holding the sheet to the label by suction applied through the hole in the label, with one end of the sheet protruding beyond the ungummed margin, holding the protruding portion of the sheet by suction, and applying the combined assembly of marginally-gummed label and suction-held sheet of material to an article.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 197	Cheney	Feb. 23, 1904
1,344,080	Galibert	June 22, 1920
1,686,354	Wallace	Oct. 2, 1928
2,167,305	Kropp	July 25, 1939
2,422,314	Rheinstrom	June 17, 1947
2,498,667	Fischer et al.	Feb. 28, 1950
2,565,975	Lissimore	Aug. 28, 1951
2,773,617	Weiss	Dec. 11, 1956
2,936,921	Schulz	May 17, 1960