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(11) **EP 1 057 731 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
06.12.2000 Bulletin 2000/49

(51) Int. Cl.⁷: **B65C 9/18, B65C 9/42**

(21) Application number: **00303776.9**

(22) Date of filing: **05.05.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **13.05.1999 US 311227**

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(54) **Wipe-on label applicator for fruit or vegetables and associated methods**

(57) A labeler (10) includes a frame (12), a label cassette (14) connected to the frame (12) for dispensing a label strip (16) including a carrier (30) and a plurality of labels (32) adhered thereon, a conveyor (22) for advancing articles such as fruit or vegetables (24) along a predetermined path of travel, a label applicator arm (18) pivotally connected to the frame (12) adjacent the label cassette (14), and a label feeder (20) for advancing the label strip along the label applicator arm (18) to a free end thereof. The label applicator arm (18) pivotally extends outwardly from the label cassette (14) along the predetermined path of travel so that the free end of the label applicator arm (18) contacts the articles (24). The label applicator arm (18) includes a V-shaped

notch in the free end thereof, and a resilient roller (41) adjacent the V-shaped notch for pressing separated labels (32) onto the articles (24). The V-shaped notch separates the labels (32) from the carrier (30) to be applied to the articles (24) as the carrier (30) passes through the V-shaped notch and is divided into two waste portions (30a, 30b). The discarded carrier portions (30a, 30b) are withdrawn by the label feeder (20). The label applicator arm (18) includes at least one spring (71) for biasing the label applicator arm toward the conveyor, and a damper (73) for damping movement thereof.

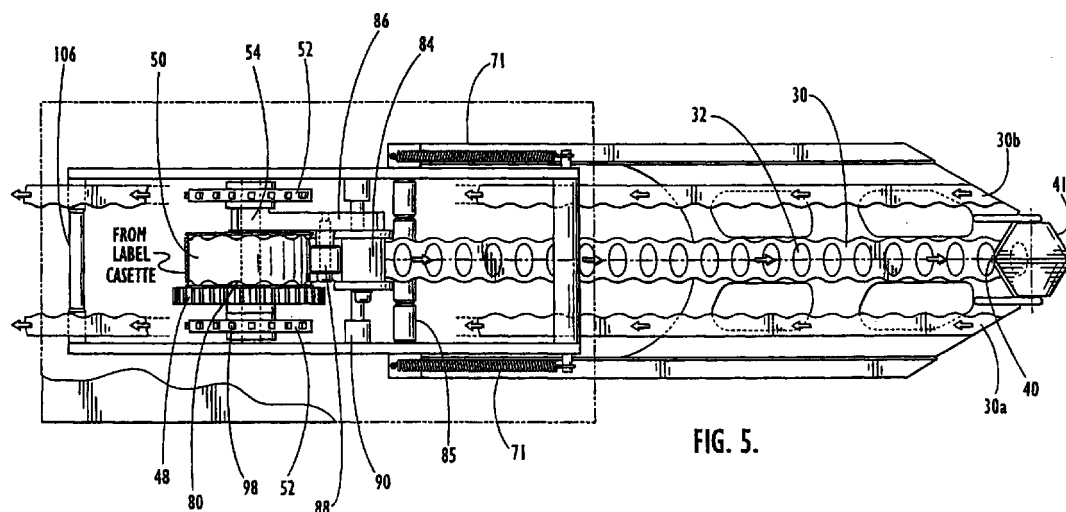


FIG. 5.

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Description

Field of the invention

[0001] The present invention relates to labelers, and, more particularly, to a wipe-on labeler.

Background of the Invention

[0002] Labels are typically applied to fruits and vegetables in packing houses. The speed at which these labels are applied is important because the fruit must be packed and shipped quickly so that the shelf-life in stores will be as long as possible. Generally, the speed at which the labeler dispenses the labels is a limiting constraint. This constraint also results in an inefficient use of other equipment and personnel in the packing house, thus increasing the overall cost of packing fruits and vegetables. Accuracy of applying the labels is also another important factor. Ideally, a hit rate of 100% is desirable. When the hit rate is less, a label is not successfully applied to a fruit. Packing house profitability is adversely affected when a label that would have permitted a higher selling price is not applied to fruit otherwise capable of commanding such a higher price.

[0003] Labelers generally apply pressure sensitive labels using a continuous label strip carrying a plurality of labels for application to the fruit as it is conveyed past the labeler. However, many existing labelers require stiffness in the labeling material, and consequently, paper or laminated labels have to be pre-cut to lay properly on the fruit. Accordingly, vinyl labels may be preferred because they are thin and flexible and more easily conform to any fruit shape, and the adhesion to the fruit is thus better. Unfortunately, applying such labels at high speed may be difficult.

[0004] A number of techniques have been developed to attempt to increase the speed and accuracy of labelers. For example, U.S. Patent No. 4,217,164 to La Mers discloses a bellows type labelling system using pressure sensitive labels attached along a label strip that includes a line of weakness down its middle forming separable halves, with the labels attached over both halves. The label strip is pulled along a fixed plate towards a V-shaped notch in one edge of the plate. At the notch, the two halves of the label strip are drawn through the V-shaped notch with each half over a different side of the V. This causes the two halves of the label strip to follow divergent paths from each other, and also from the label, forcibly releasing the label. The released label is then transferred to articles or an adjacent conveyor by a reciprocating bellows arrangement.

[0005] A significant advance in the art of applying vinyl labels is disclosed in U.S. Patent No. 5,829,351 to Anderson et al., inventors of the present invention. The disclosed labeler again includes a fixed V-notch separator plate. A rotary bellows arrangement is used to transfer the labels from the fixed V-notch to articles on an

adjacent conveyor.

[0006] U.S. Patent No. 5,660,676 to Brooks discloses a wipe-on labeler with a peel blade for separating the labels from the carrier strip. Similarly U.S. Patent Nos. 3,793,114 and 4,017,350 to Thomas disclose a wipe-on labelling machine that dispenses adhesive labels from a label strip that includes supply and collector reels, a pivotal rocker arm carrying an application roller, and an adjustable guide member disposed between the reels and the roller so that the labels on the label strip are peeled therefrom by movement of the label strip around the guide member. A pawl is rockable about the same pivot axis as the pivotal rocker arm for applying pressure against the label strip. The pawl provides a ratcheting index technique for advancing the labels. Accordingly, this labeler is difficult to operate at higher speeds because the ratcheting pivotal rocker arm must swing through a predetermined working stroke before a label is advanced.

[0007] Other wipe-on labelling machines that dispense adhesive vinyl labels include labelers manufactured by Hurst Labeling Systems, PROLABEL, and Booth Auto Pak. The PROLABEL labeler includes an adjustable speed D.C. stepper motor, and an electronic eye sensor for detecting fruit location. These labelers feed the label strip over a flat edge of the applicator arm, which unfortunately may lack accuracy in placing the labels onto the fruit.

Summary of the Invention

[0008] In view of the foregoing background, it is therefore an object of the present invention to provide a labeler and associated method that improves the speed and accuracy at which labels are applied to articles such as fruit or vegetables.

[0009] According to the present invention, there is provided a labeller comprising:

- a frame;
- a label strip comprising a carrier and a plurality of labels adhered thereon;
- a label applicator comprising a V-shaped notch at a free end thereof which, in use, separates the labels from the carrier and divides the carrier into two waste portions;
- a label feeder for advancing the label strip along the applicator to the V-shaped notch and for removing the separated carrier waste portions from the V-shaped notch;
- characterised in that the label applicator comprises an arm movably mounted to the frame whereby in use the free end thereof extends into contact with articles advanced therepast, for application of the labels thereto.

[0010] Because the fruit labeler is effectively a wipe-on labeler, it is less complex than rotary and recip-

rotating type labelers and can place labels at a relatively high speed.

[0011] The label applicator is preferably an arm which pivotally extends outwardly from a label cassette, preferably along a path of travel of the articles so that the free end contacts the articles.

[0012] The label applicator arm also preferably includes a resilient roller attached to the free end adjacent the V-shaped notch for pressing against the articles. The V-shaped notch removes the label from the carrier, and the resilient roller presses the label onto the article as it rolls over the article. This allows the dispensing of vinyl labels, which conform to articles such as fruit better than paper or laminated labels. Consequently, the accuracy or hit rate of the labeler according to the present invention is improved when vinyl labels are dispensed because they more readily conform to the shape of the fruit.

[0013] The label feeder also preferably includes a pair of take-up wheels for respectively taking up the pair of carrier waste portions after being split by the V-shaped notch. Because the carrier halves both support the label, if the labeler dispenses a label when there is no article, the label desirably stays on one of the waste portions and is discarded.

[0014] The label strip preferably has at least one edge with a predetermined profile, and the label feeder includes a dispensing wheel having a similar corresponding profile.

[0015] The label applicator arm preferably includes at least one spring for biasing the label applicator arm towards a conveyor carrying the articles, and a damper for damping pivotal movement of the arm when contacting articles having significant size differences. These features allow the speed of the labeler to be significantly faster than conventional wipe-on labelers.

[0016] The present invention likewise provides a method of applying labels to articles using a labeller comprising a label applicator mounted to a frame and having a V-shaped notch at a free end thereof, the method comprising the steps of:

advancing a label strip towards the V-shaped notch, the label strip comprising a carrier and a plurality of labels adhered thereon;
using the V-shaped notch to divide the carrier into two waste portions and thereby separating the labels from the carrier;
removing the separated carrier portions from the V-shaped notch;
characterised by the step of moving the applicator relative to the frame so as to bring the free end thereof into contact with the articles for application of the labels thereto.

[0017] The method preferably further includes the step of engaging a profiled edge of the label strip with a corresponding profile of a dispensing wheel. Because

the label strip and the dispensing wheel have corresponding profiles, a precise and repeatable location of each label is achieved, which improves the accuracy of dispensing labels to almost 100%. This avoids the use of a more costly electronic edge detector for providing a location of the labels. With the label applicator including means for resiliently biasing the label applicator toward the conveyor and a damper for damping movement of the label applicator when dragged over sequential articles such as fruits having significant size differences, the speed of the preferred labeler is significantly faster than conventional wipe-on labelers.

[0018] Other preferred features and advantages are in the following description and in the dependent claims.

Brief Description of the Drawings

[0019]

FIG. 1 is a perspective view of a labeler embodying the present invention.

FIG. 2 is a top plan view of a portion of the label strip for the apparatus shown in FIG. 1.

FIG. 3 is a bottom plan view of a portion of the label strip of the apparatus shown in FIG. 1.

FIG. 4 is an enlarged view of a portion of the apparatus as shown in FIG. 1.

FIG. 5 is a top plan view of the apparatus shown in FIG. 1 with the cassette removed to better illustrate the label applicator arm.

FIG. 6 is a greatly enlarged bottom plan view of the free end of the label applicator arm of the apparatus of FIG. 1.

Detailed Description of the Preferred Embodiments

[0020] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein.

[0021] Referring initially to FIG. 1, a perspective view of a fruit labeler, generally indicated at 10, is described, embodying the present invention. The fruit labeler 10 includes a frame 12, a label cassette 14 connected to the frame for dispensing a label strip 16, a label applicator arm 18 pivotally connected to the frame adjacent the label cassette, and a label feeder 20 for advancing the label strip along the label applicator arm to a free end thereof. The label feeder is generally indicated by reference 20, which will be described in greater detail below.

[0022] The frame 12 is supported above a conveyor 22, which advances fruit 24 along a predetermined path of travel as will be appreciated by those skilled in the art. The label applicator arm 18 extends outwardly from the

label cassette 14 along the predetermined path of travel so that the free end of the label applicator arm contacts the fruit 24. The conveyor 22 preferably has conventional cradles 26 for holding and positioning individual fruit 24. Other methods of advancing fruit 24 along the predetermined path of travel are acceptable, as will be readily appreciated by one skilled in the art.

[0023] The label strip 16 has a carrier 30 and a plurality of labels 32 adhered thereon, as best shown in FIGS. 2 and 3. The labels 32 are preferably vinyl since vinyl labels are thin and flexible and more easily conform to a variety of fruit shapes than paper or laminated labels. The adhesion to the fruit 24 is better because of this conformity. However, application of the labeler 10 according to the present invention is not limited to vinyl labels, as will be readily appreciated by one skilled in the art.

[0024] Each of the labels 32 has a front face 32a with a decorative design or other identifying indicia printed thereon. The label strip 16 includes a separation line 34 along its length at a middle portion thereof. Preferably, the separation line 34 is perforated but may be a line of weakness as well. The label strip 16 also has at least one edge 36 with a sinusoidal or other predetermined profile which facilitates accurate positioning, as will be described in more detail below.

[0025] Now referring additionally to FIGS. 4-6, the labeler 10 is described in greater detail. The label feeder 20 advances the label strip 16 along the label applicator arm 18 to the free end thereof. The label feeder 20 includes a cassette gear 48, a dispensing wheel 50, a pair of take-up wheels 52, and a drive shaft 54 coupled therebetween. The cassette gear 48 is rotated by a stepper motor 60. The stepper motor 60 is also part of the label feeder 20, and is activated or energized for rotating the cassette gear 48 responsive to a fruit sensing switch 62 positioned adjacent the conveyor 22. The fruit sensing switch 62 detects the approach of fruit 24 in the cradles 26 on the conveyor 22.

[0026] The stepper motor 60 is mounted within a housing 66 attached to the frame 12, and has an output shaft 68 with a drive gear 70 attached thereto. The drive gear 70 meshes with a first idler gear 74 rotatably mounted in the housing 66. A second idler gear 72 is attached to the idler gear 74 and meshes with a cassette drive gear 76. The cassette drive gear 76 is rotatably mounted in the housing 66 with its teeth projecting through and above a protective cover secured to the top of the housing to engage the cassette gear 48 within the frame 12. To accommodate labels of different sizes, the second idler gear 72 is removably secured to the first idler gear 74 so that a gear with the number of teeth necessary to advance the label strip 16 the proper distance may be installed, as will be readily appreciated by one skilled in the art.

[0027] The cassette gear 48 is affixed to the drive shaft 54, as is the dispensing wheel 50 and the pair of take-up wheels 52. The dispensing wheel 50 has a pre-

determined profile corresponding to the profile of the label strip 16. More particularly, the dispensing wheel 50 has a depressed center defined by a pair of opposing sinusoidal side walls 80. The profile edges 36 of the carrier 30 are formed with a shape complementary to and engageable with the sinusoidal side walls 80.

[0028] The label strip 16 is wound on a core 82 which is rotatably supported on handles 12a formed on and extending upward from the frame 12. The label strip 16 is trained around a guide pulley 84 rotatably carried on a tension arm 86 which is loosely carried by the drive shaft 54. A second roller 88 rotatably carried by the tension arm 86 assures the label strip 16 engages the side walls 80 of the dispensing wheel 50. A stepped shaft 90 extends across and is non-rotationally secured to the frame 12. A full diameter section of the stepped shaft 90 is engageable by the guide roller 84 to assure the carrier 30 remains within the side walls thereof. The full diameter section of the stepped shaft 90 also limits the downward travel of the guide roller 84. The guide roller 84 is biased downward by gravity to trap the label strip 16 therebetween, and stop momentum of the label strip and to maintain tension therein. As the label strip 16 is dispensed, it passes over a set of rollers 85 to provide a non-restricting path to the free end of the label applicator arm 18.

[0029] To reduce the amount of bouncing of the label applicator arm 18, particularly when the arm is dragged over two successive fruits having a significant size difference, biasing means and a damper 73 are connected to the label applicator arm 18. In one embodiment, the biasing means preferably includes a pair of springs 71 connected between the label applicator arm 18 and the frame 12. Depending on the amount of bias desired, only one spring 71 may be used. Other methods of biasing the label applicator arm 18 are acceptable, as will be readily appreciated by one skilled in the art. The damper 73, may also comprise a dashpot which cushions or dampens movement of the label applicator arm 18 to avoid damaging the fruit 24 when a label 32 is applied thereto. In another embodiment, the damper is provided by at least one spring adjacent one of the bias springs 71, and its size is about half the length of the bias spring, but larger in diameter. In an alternative embodiment of the label applicator arm 18, the biasing means are provided without the damper 73.

[0030] As stated above, the free end of the label applicator arm 18 includes a V-shaped notch 40 formed by edges 40a, 40b to split the carrier 30 of the label strip 16 along the longitudinal separation line. The V-shaped notch 40 separates the labels 32 from the carrier 30 as the carrier passes over the respective edges 40a and 40b, as best shown in FIG. 6. As the label 32 is separated from the carrier 30, the respective carrier waste portions 30a, 30b pass briefly underneath the label applicator arm 18 and return along the upper surface on opposite sides of the label strip as shown in FIG. 5.

[0031] A resilient roller 41 is connected to the free

end of the label applicator arm 16 via extension 43 for pressing separated labels 32 onto the fruit 24. The roller 41 has an inverted V-shaped region which corresponds to the V-shaped notch 40 in the label applicator arm 18. The roller 41 is preferably a soft material, such as rubber, so as not to damage the fruit 24. As the label 32 is separated from the carrier 30, the roller 41 ensures that the separated label has adequate pressure for adhering to the fruit 24.

[0032] Each half of the separated carrier, i.e., the carrier waste portions 30a and 30b, pass along the upper surface of the label applicator arm 18 and around guide rollers 92 rotatably mounted by a shaft 94. Each waste portion 30a, 30b passes between the guide rollers 92 and the take-up wheels 52, and passes over the top of the take-up wheels. The take-up wheels 52 include a series of peripheral projections 98 which penetrate the respective carrier waste portions 30a, 30b of the carrier 30. A wedge 104 secured to the inside of each side of the frame 12 separates the respective carrier waste portions 30a, 30b from the projections 98 on the respective take-up wheels 52.

[0033] A bar 106 spans one end of the frame 12 and is engageable with a hook (not shown) formed in the housing 66. The bar 106 has enlarged diameter ends, the transition to which tends to center the housing 66 as it is connected to the frame 12. A spring-loaded detent (not shown) is mounted on each side of the frame 12 and engages a recess on the frame to releasably retain the label cassette 14 in place. The label cassettes are interchangeable so that one cassette can be loaded off-line with a reel of label strips 16 while another cassette is operatively engaged with the labeler 10 to apply labels to the fruit 24.

[0034] Once the stepper motor 60 has been activated by the fruit sensing switch 62, the stepper motor accelerates from standstill to a rotational speed which causes the velocity of the labels 32 to match the speed at which they will be dispensed. Matching the speed can be determined by counting the rotations of an idler gear (not shown) engaging the conveyor. When the stepper motor 60 is deactivated, the labels 32 decelerate to a standstill. The acceleration or ramp-up of the stepper motor 60 from standstill, which is initiated by closing the fruit sensing switch 62, is a function of the speed of the conveyor 22, the distance between the cradles 26 carrying the fruit 24, and the maximum tensile force to which the label strip 16 may be subjected.

[0035] Many modifications and other embodiments of the invention will come to the mind of one skilled in the art having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed, and that modifications and embodiments are possible, within the scope of the appended claims.

Claims

1. A labeller (10) comprising:

a frame (12);
a label strip (16) comprising a carrier (30) and a plurality of labels (32) adhered thereon;
a label applicator (18) comprising a V-shaped notch at a free end thereof which, in use, separates the labels (32) from the carrier and divides the carrier into two waste portions (30a, 30b);
a label feeder (20) for advancing the label strip (16) along the applicator 18 to the V-shaped notch and for removing the separated carrier waste portions (30a, 30b) from the V-shaped notch;
characterised in that the label applicator (18) comprises an arm movably mounted to the frame 912) whereby in use the free end thereof extends into contact with articles (24) advanced therepast, for application of the labels (32) thereto.

2. A labeler (10) according to Claim 1, characterised in that the label strip (16) has at least one edge with a predetermined profile (36); and wherein said label feeder (20) comprises a dispensing wheel (50) having a corresponding profile (80) to engage the predetermined profile of the label strip.

3. A labeler (10) according to Claim 2, characterised in that the predetermined profile (36) is sinusoidal.

4. A labeler (10) according to any preceding claim, characterised in that said label feeder (20) comprises a pair of take-up wheels (52) for taking up the respective carrier waste portions (30a, 30b).

5. A labeler (10) according to Claim 4, characterised in that each take-up wheel (52) includes a series of peripheral projections (98) for piercing respective carrier waste portions (30a, 30b).

6. A labeler (10) according to any preceding claim, characterised in that said label feeder (20) further comprises a sensor (62) for sensing a position of each article (24) along a predetermined path of travel and advancing the label strip (16) responsive thereto.

7. A labeler (10) according to any preceding claim, characterised in that a damper (73) is connected to said label applicator (18) for damping movement thereof.

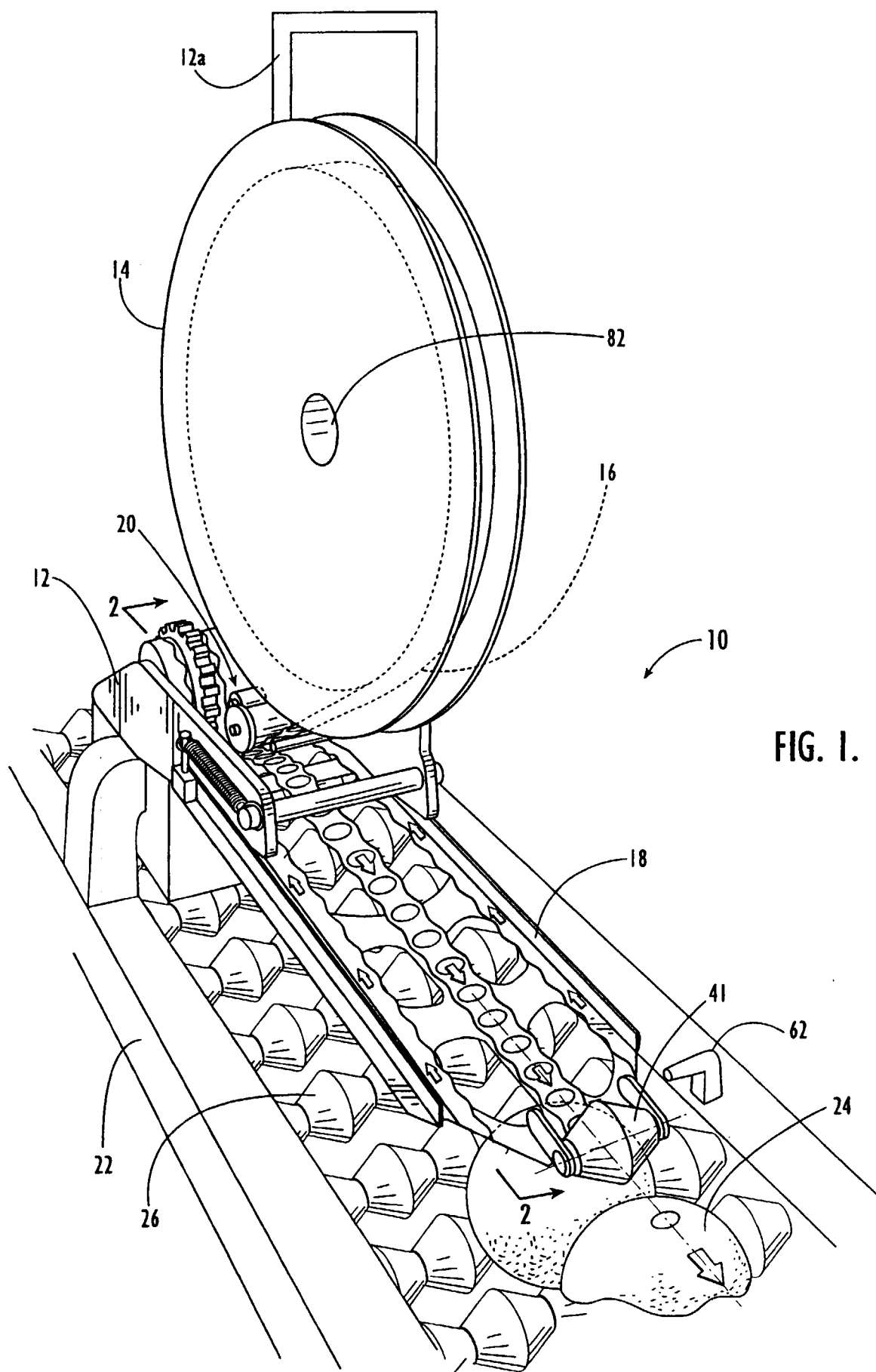
8. A labeler (10) according to any preceding claim, characterised in that biasing means (71) are pro-

vided for biasing the free end of said label applicator (18) toward said articles (24).

9. A labeler (10) according to Claim 8, characterised in that said biasing means comprises at least one spring (71) connected between said frame (12) and said label applicator (18). 5
10. A labeler (10) according to any preceding claim, characterised in that a resilient roller (41) is connected to the free end of said label applicator (18) adjacent the V-shaped notch for pressing separated labels (32) onto the articles (24). 10
11. A labeler (10) according to Claim 10, characterised in that said resilient roller (41) has an inverted V-shape corresponding to the V-shaped notch in the free end of said label applicator (18). 15
12. A labeler (10) according to any preceding claim, characterised in that the plurality of labels (32) are vinyl. 20
13. A labeler (10) according to any preceding claim, characterised in that said label feeder (20) comprises a stepper motor (60) and a gear train (70, 74, 72, 76) connected thereto for advancing the label strip (16) and removing the carrier waste portions (30a, 30b). 25
14. A labeler (10) according to Claim 13, characterised in that said label feeder (20) further comprises a common drive shaft (54) connected to said gear train (70, 74, 72, 76) and mounting a dispensing wheel (50) and a pair of take-up wheels (52); and wherein said pair of take-up wheels (52) have a diameter larger than a diameter of said dispensing wheel (50) to provide tension to the carrier waste portions (30a, 30b). 30
15. A method of applying labels (32) to articles (24) using a labeler (10) comprising a label applicator (18) mounted to a frame (12) and having a V-shaped notch at a free end thereof, the method comprising the steps of: 35
- advancing a label strip (16) towards the V-shaped notch, the label strip (16) comprising a carrier (30) and a plurality of labels (32) adhered thereon; 40
- using the V-shaped notch to divide the carrier (30) into two waste portions (30a, 30b) and thereby separating the labels (32) from the carrier (30); 45
- removing the separated carrier portions (30a, 30b) from the V-shaped notch; characterised by the step of moving the applicator (18) relative to the frame (12) so as to bring the free end 50
- 55

thereof into contact with the articles (24) for application of the labels thereto.

16. A method according to Claim 15, characterised in that the labeler (10) further comprises a dispensing wheel (50) having a predetermined profile (80); and wherein the label strip (16) has at least one edge with a corresponding profile (36) to the predetermined profile (80) of the dispensing wheel (50); and wherein the method further comprises the step of engaging the profile (36) of the label strip with the profile (80) of the dispensing wheel (50).
17. A method according to Claim 15 or 16, characterised by the step of taking up the respective carrier waste portions (30a, 30b) of the carrier (30) using a pair of take-up wheels (52).
18. A method according to Claim 17, characterised in that each take-up wheel (52) includes a series of peripheral projections (98); and wherein the method further comprises the step of engaging the respective carrier waste portions (30a, 30b) with the series of peripheral projections (98).
19. A method according to any of Claims 15-18, characterised by the step of sensing a position of each article and advancing the label strip (16) responsive thereto.
20. A method according to any of Claims 15-19, characterised by the step of damping the movement of the label applicator (18).
21. A method according to any of Claims 15-20, characterised by the step of biasing the label applicator (18) toward a conveyor advancing the articles.
22. A method according to any of Claims 15-21, characterised in that the label applicator (18) further comprises a resilient roller (41), connected to the free end of the label applicator (18) adjacent the V-shaped notch; and wherein the method further comprises the step of pressing separated labels (32) onto the articles (24) using the resilient roller (41).
23. A method according to Claim 22, characterised in that the resilient roller has an inverted V-shape corresponding to the V-shaped notch in the free end of the label applicator (18).
24. A method according to any one of Claims 15-23, characterised in that the plurality of labels are vinyl.



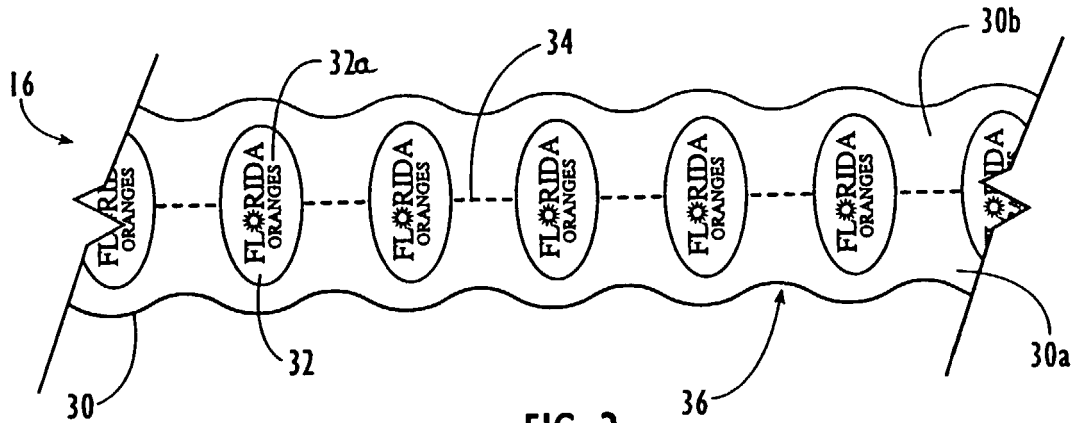


FIG. 2.

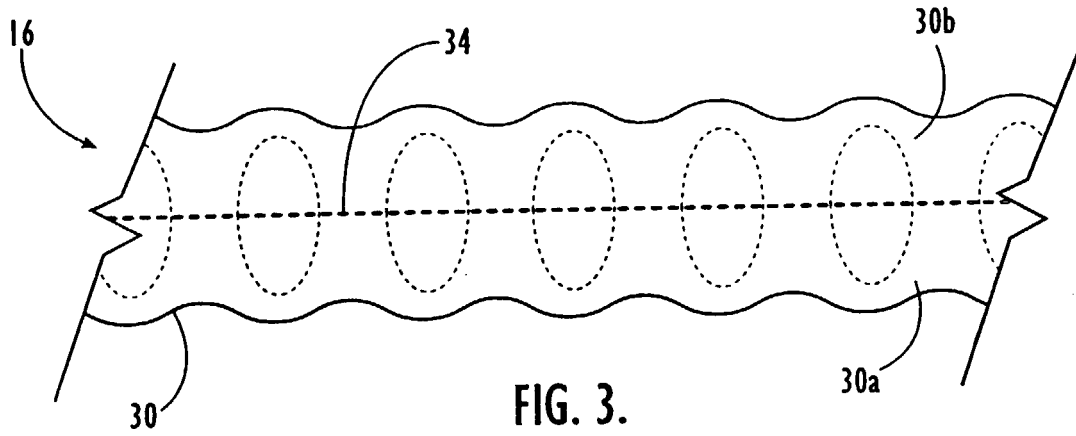


FIG. 3.

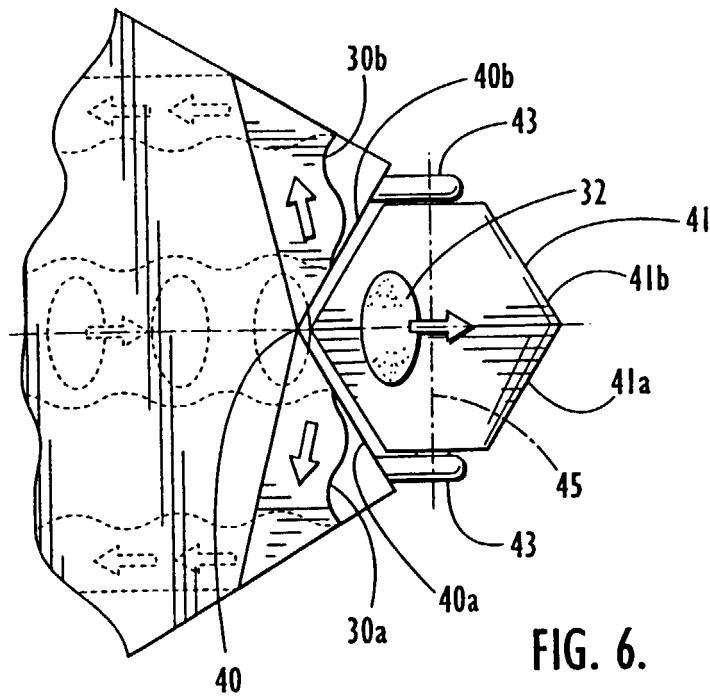
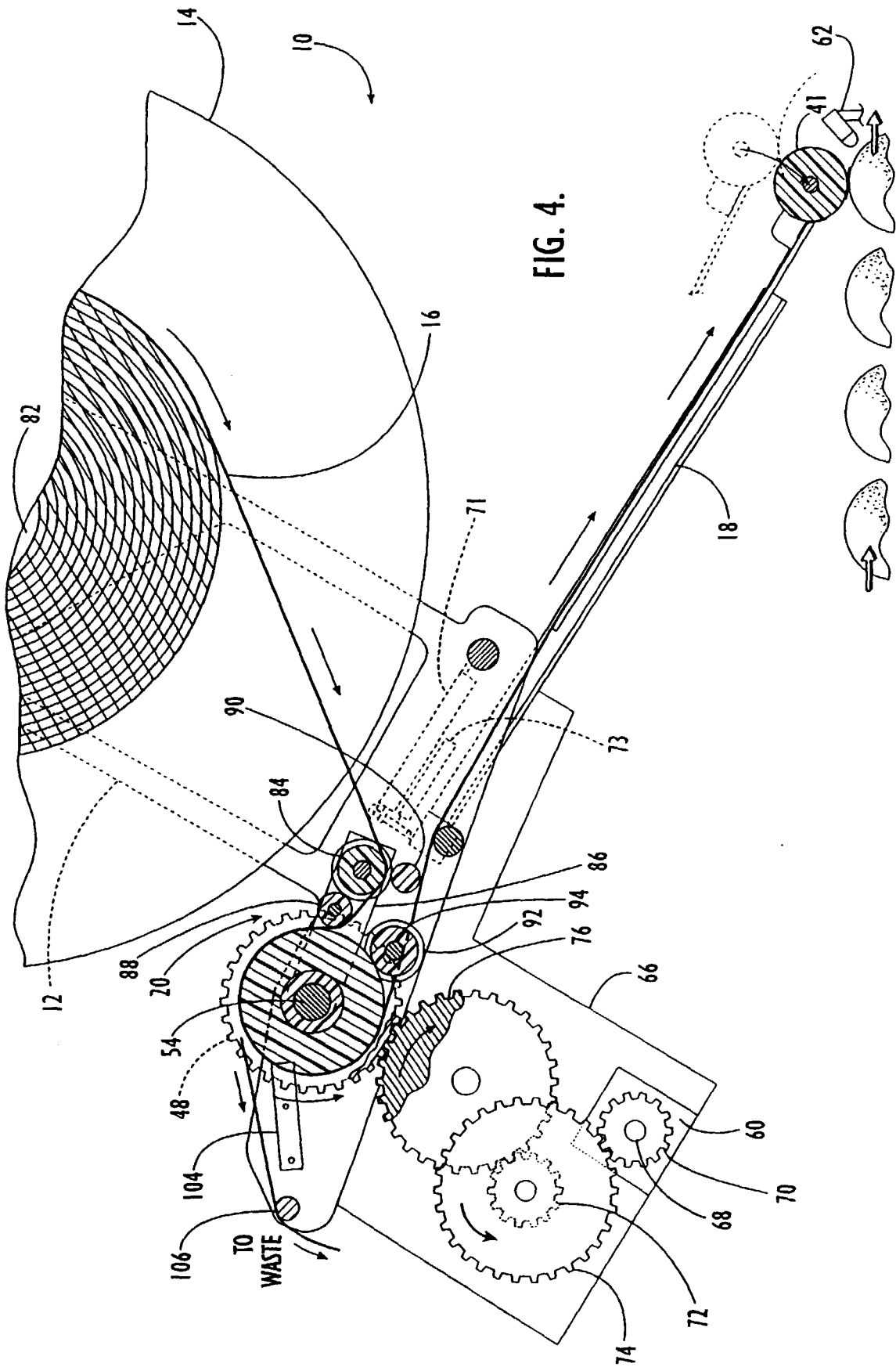


FIG. 6.



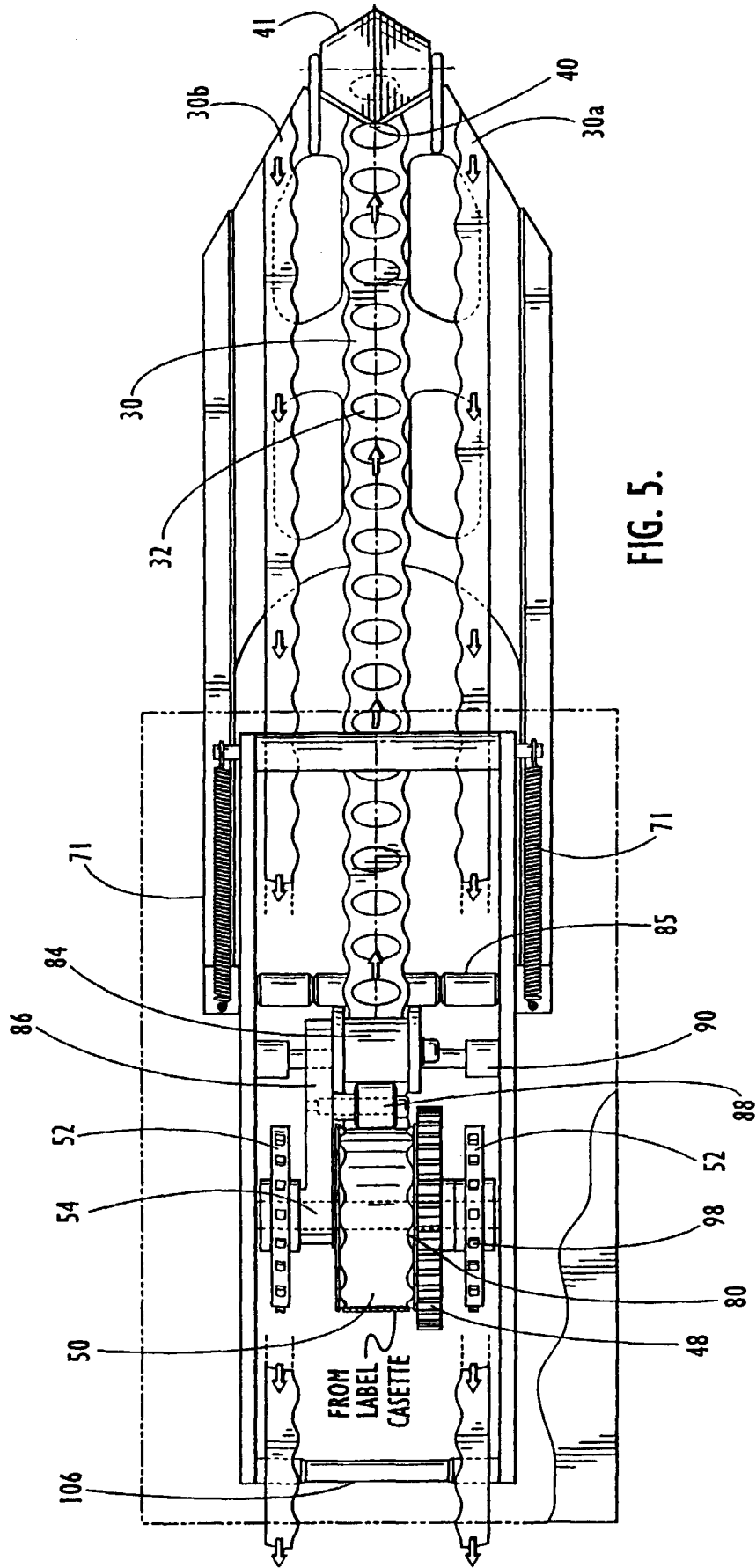


FIG. 5.



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 00 30 3776

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	US 4 896 793 A (BRIGGS PETER D S ET AL) 30 January 1990 (1990-01-30) * column 2, line 57 - column 4, line 14; figure 2 *	1-6, 8-10, 13, 15-19, 21, 22	B65C9/18 B65C9/42
Y,D	US 5 660 676 A (BROOKS ROBERT E) 26 August 1997 (1997-08-26) * column 5, line 2 - column 6, line 13; figures 3, 5 *	1-6, 8-10, 13, 15-19, 21, 22	
A,D	EP 0 879 764 A (FMC CORP) 25 November 1998 (1998-11-25) * column 3, line 38 - column 4, line 24; figures 1, 2, 7 *	1-6, 12, 13, 15-19, 24	
A,D	& US 5 829 351 A (FMC CORP) 3 November 1998 (1998-11-03)		TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	EP 0 017 858 A (HERMANN GMBH CO HEINRICH) 29 October 1980 (1980-10-29) * page 13, line 22 - page 14, line 12; figure 2 *	1, 6-8, 10, 15, 19-22, 24	B65C
A	GB 1 371 126 A (METO GMBH KIND OSCAR) 23 October 1974 (1974-10-23) * figure 1 *	1, 15	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 August 2000	Examiner Wartenhorst, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 30 3776

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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15-08-2000

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 4896793	A	30-01-1990	NONE		
US 5660676	A	26-08-1997	NONE		
EP 0879764	A	25-11-1998	US	5829351 A	03-11-1998
			AU	6705798 A	26-11-1998
			BR	9802125 A	13-07-1999
			CA	2236997 A	23-11-1998
			NZ	330393 A	30-08-1999
			US	6047755 A	11-04-2000
			ZA	9804121 A	20-11-1998
EP 0017858	A	29-10-1980	DE	2915724 A	23-10-1980
GB 1371126	A	23-10-1974	DE	2141710 A	01-03-1973
			ES	400422 A	01-01-1975
			IL	38748 A	31-07-1974
			IT	952131 B	20-07-1973
			ZA	7203435 A	28-02-1973

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82