



(19)

Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 894 726 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.02.1999 Bulletin 1999/05

(51) Int. Cl.⁶: **B65C 1/02**

(21) Application number: **98202431.7**

(22) Date of filing: **20.07.1998**

(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

(72) Inventors:
• **Meyers, William J.**
Rochester, New York 14650-2201 (US)
• **Saveliev, Alex**
Rochester, New York 14650-2201 (US)

(30) Priority: **31.07.1997 US 903630**

(74) Representative:
Parent, Yves et al
KODAK INDUSTRIE,
Département Brevets,
CRT - Zone Industrielle
71102 Chalon-sur-Saône Cedex (FR)

(71) Applicant: **EASTMAN KODAK COMPANY**
Rochester, New York 14650 (US)

(54) Mechanism for applying labels to the inside of a carton

(57) A method for applying labels to the inside of containers and a label applicator comprises moving containers (14) on a commercially available carton picker (7,8), picking up labels with a vacuum head (9) that is part of the carton picker nest, moving the labels at the same speed as that of the moving containers, entering the containers where the labels are blown off the applicator heads and onto the inside of the containers.

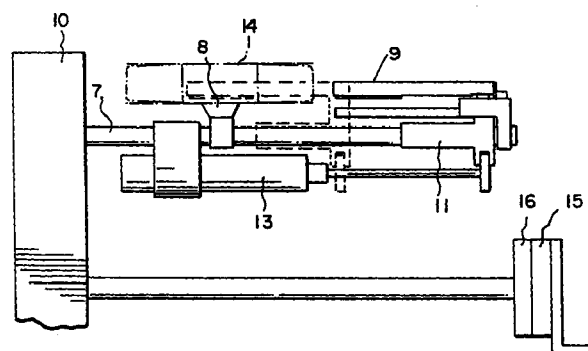


Fig. 3b

EP 0 894 726 A1

Description

FIELD OF THE INVENTION

[0001] This invention relates to a label feeder. More particularly, the invention relates to a label applicator mechanism and method which delivers individual labels to open-ended containers as the containers move through the infeed process of cartoning machines.

BACKGROUND OF THE INVENTION

[0002] Label applicators typically apply labels to articles as the articles are presented to the label applicator. Usually, the labels are releasably adhered, in a single column, to an elongated backing strip. The label applicator removes one of the labels from the backing strip and releasably retains it at a labeling station. As the articles to be labeled near the removed label, it is applied to the articles. Label applicators of this type are shown, for example, in U.S. Patent Nos. 4,574,027; 4,787,953; 4,915,565; 5,112,430; 5,091,040; 5,174,852; 5,275,685; and 5,306,375.

[0003] Label applicators of this type, while satisfactory for many applications can introduce delay into an assembly or packaging operation in which labeling must be carried out. For example, time is lost when label insertion through the end of a container, application of the label to the inside of a container and withdrawal of the applicator must occur during the dwell time (carton stationary) of the process cycle. Also, all three operations must occur at the same station since the tooling would interfere with the motion of the container during the index period (carton moving) of the process cycle.

[0004] Other work operations also involve the repetitive supply of elements to a work station so that such elements can be affixed, assembled, laminated, etc., to articles being conveyed through the work station. In some of the work operations, the repetitive supply of the elements is the slowest step in the process, and accordingly, this limits the speed with which the articles can be conveyed through the work station. Thus, other work operations involve problems similar to the label application problem described above.

[0005] An additional problem in adding labeling capacity to cartoning machines is accessibility to the containers as they move down through their erection, product loading, flap gluing and discharge areas.

[0006] Most labels are applied directly on the outside of the container using direct applications to apply the label to the outside of the carton or container for the goods sold. However, in many applications, for instance in the sale of consumer goods such as a photographic film and like materials to be sold in department stores or discount stores where shoplifting is a major problem, the labels that are adhered to the cartons are treated either electrically or magnetically to register that the carton has been paid for before it left the premises. Thus,

counter salespeople will deactivate the labels as they are paid for so that a store's detectors will not be activated in order to prevent theft.

[0007] The problem with these labels is that they are still susceptible to theft. In many cases, the labels on the outside of the container can be removed or switched prior to its reaching the cash register. Because of this problem, many department stores and other retailers are asking manufacturers of these goods to put the labels in the inside of the carton or container so they can be read accurately and the label can not be tampered with. This represents a major problem for manufacturers, as it is very inconvenient to apply labels to the inside of a carton. To use the processes described above that are used to apply the labels to the outside of the containers will require tedious apparatus and extreme difficulty applying to the inside of containers. It would be very difficult to do so without stopping or, at least substantially slowing down the packaging process. This results in much higher costs for the product to be sold.

[0008] The use of a label applying apparatus to the processing system which can be done expeditiously and at high speeds while applying the labels to the inside of containers without holding up or slowing down the packaging process has heretofore eluded the efforts of those in the industry.

SUMMARY OF THE INVENTION

[0009] Accordingly it is an object of the present invention to provide a label device which can apply labels at high speed to individual product units on a continuous flow basis.

[0010] It is an additional object of the present invention to provide such a device which can apply the label to the inside of the containers and at a speed that is commensurate with the processing speed in many applications.

[0011] It is a further object of the present invention to provide a method using this apparatus to label containers in the inside without slowing down the packaging operation.

[0012] It is a still further object of the present invention to provide a device and a method for labeling difficult shaped containers with the same mechanism.

[0013] Tagging is not normally a process that is done on a cartoning machine. Tagging is generally the last process before the carton is sealed where the product is loaded into it. The present invention provides a method of tagging before the carton is retained/captured in carton buckets on most cartoning machines.

[0014] In accordance with these and other objects of the invention, an automatic labeling device is provided for applying the labels to product units. The device consists of a commercially available carton picker in which each picker head is modified by adding additional hardware. This hardware includes a label applicator head,

that accepts a label from a label dispenser, along with its actuator. The modified picker head partially erects the carton, inserts a pre-dispensed label into the carton and applies the label. This modified picker head which we call a picker nest then continues its normal function of loading the labeled carton into the carrier bucket of the cartoning machine.

[0015] The carton picker device includes 3-head carton picker nests affixed radially on a center hub. Each picker nest has a vacuum cup component along with a label applicator component. The label applicator slides in the same direction as the axis of rotation, thus enabling the applicator to travel inside the carton as the carton travels around the center axis. This actuation could be accomplished through a pneumatic gland in which ports are opened or closed as the nest rotates. These nests are integrated with a commercially available label dispensing machine such that a label is dispensed to a vacuum grid on the label applicator head. Since the label applicator is linked to the vacuum cup which holds the partially erect carton, a predetermined motion may be executed that will permit the applicator head to enter the carton and apply the label.

[0016] The advantages of this method are: tags or labels can be applied to the inside of cartons while the product is being packaged; the percentage of product tagged or labeled can be 25, 33, 50 or 100 depending on the request by the customer; packaging of the product is not dependent upon receiving pre-tagged or labeled cartons which could be a scheduling concern; and all product currently requiring tags or labels need not be done manually.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Figure 1 describes the process of picking non-erect cartons from a carton hopper, transporting, and then loading erect labeled cartons into the carrier bucket of a cartoning machine.

[0018] Figure 2 shows the position of the vacuum cup picker, the applicator head, and a label.

[0019] Figure 3 shows a modified vacuum cup picker head (picker nest).

[0020] Figure 4 shows a stationary element of air vacuum porting gland.

[0021] For a better understanding of the present invention, together with other and further objects, advantages and capabilities thereof, reference is made to the following detailed description and appended claims in connection with the preceding drawings and description of some aspects of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] Figure 1 shows the process a commercially available 3-head carton picker 20 goes through, starting with picking a non-erect carton 21 by means of vacuum,

using a vacuum cup from a carton hopper 5 in a carton storage area. The cartons are stacked together in their flat, non-erect state. The carton picker head/vacuum cup picker moves the carton in proximity to the carrier bucket 18 of a commercially available cartoning machine (not shown). These cartoning machines move equally spaced carrier buckets in line on a horizontal plane. The carrier buckets are designed to hold open cartons and convey them through the process where product is loaded into each carton. The carton is then sealed shut while still retained in the carrier bucket. The carton is then discharged off the end of the cartoner as the carrier buckets reach the end of their travel and are conveyed back into position to accept a new carton. As the picker head places the carton into the carrier bucket an interference is created which causes the non-erect carton to be pushed open. As the carton is forced open it is captured in the carrier bucket. The vacuum is turned off the vacuum cup at this time so that it may continue on its circular travel.

[0023] During this process labels are dispensed onto the inside of the cartons. The process of the present invention allows the labeling of the inside of a carton, such as photographic film containing cartons, while not slowing down or stopping the packaging process where the cartons are conveyed through the process by a conveyor (not shown in the drawings). The process consists of applying labels by a conventional label feeder 1 to cartons which are moving through an infeed of a packaging process by i) picking up labels to be applied to said cartons with applicator heads containing vacuum grids; ii) picking up cartons with vacuum cup pickers; iii) moving said labels on said applicator heads by means of pneumatics from outside the carton to inside the carton; iv) blowing the labels onto the inside of cartons; and v) moving the applicator heads out of the carton so that the cartons can be placed into the carrier bucket on the cartoning machine. Generally steps i to v are repeated and the labels are prepared to be moved at the same speed as the containers.

[0024] In Figure 2 the process begins with a label feeder 1 dispensing a label 2 to the vacuum grid (not shown) on the label applicator head 3 during the time the vacuum carton picker 4 is picking a carton out of the carton hopper 5 (shown in Figure 1).

[0025] Figure 3 shows a carton picker nest which includes the standard commercially available carton picker head along with additional components affixed to the picker head. The carton picker consists of a rotary support shaft 7 on which a carton picker vacuum cup 8 is mounted. The additional components of the applicator head assembly include a label/tag applicator head 9 with a vacuum grid, vacuum head slide support 11 and a pneumatic actuator 13. This assembly retains the label after it is dispensed from the label feeder. The label applicator head is attached to the rotary shaft support and is able to be moved along the shaft. This allows for a fixed distance between the carton, that is held by

the vacuum cup on the carton picker head, and the label that is held by the vacuum grid on the applicator head. The applicator is able to be actuated into and out of the carton residing on the vacuum picker head.

[0026] The carton picker heads rotate counter clockwise about a common axis. The support shaft 7 is able to move toward and away from the center of this axis while always keeping the vacuum cup pointed away from the center by means of gearing mounting inside the mechanical drive housing 10.

[0027] The applicator head assembly includes the label applicator head 9 which has vacuum and blow on capabilities, the vacuum head slide support 11 which includes a self adjusting spring loaded pivot mechanism 12 for aligning the applicator head to the label as it is fed off the label feeder, the pneumatic actuator 13 and the pneumatic gland porting hardware that supplies pressurized air and vacuum to the applicator head and actuator. The pneumatic actuator may be a commercially available air cylinder.

[0028] The pneumatic gland porting unit 18 as shown in Figure 4 powers the actuator that moves the applicator head into and away from the carton 14 being held on the vacuum cup picker. The automatic gland porting has two elements mating flat surfaces rotating against each other. One stationary element 15 has grooves cut in an arc that faces the other element which rotates. On the non-mating side of the stationary piece, air or vacuum is supplied. Holes are drilled from this supply to the grooved areas. The second rotating element 16 of the automatic gland porting unit has holes in the mating face that lead to devices that need pressurized air or vacuum to function. When the hole in the rotating element travels over the grooved area in the stationary element, flow of air or vacuum from the supply to the device results. This in turn powers the device on the rotating element for the duration of time that the hole is over the groove.

[0029] Figure 3 shows the pivot mechanism 12 which is self adjusting and spring loaded for aligning the label applicator head 9 to the label feeder. Figure 2 shows the label feeder 1 as the pivot mechanism engages the fixed stop 17 and the label 2 being transferred to the label applicator head 3.

[0030] The label is applied to the carton by blowing the label off the vacuum grid on the applicator head and onto the inside surface of the carton. The cartons on the vacuum cup picker are in a semi-erect state. This means that the 4-sided carton does not have its adjacent walls set at 90°. Cartons are conveyed for continuously conveying a series of identified product containers in which the product is to be sold. The product is loaded into the containers and closed or glued shut on this machine.

[0031] The advantages of the apparatus and method are that the labels can be applied to the inside of cartons while the product is being packaged. All product currently requires labels to be applied manually or to

stop or slow down the packaging process when the labels are applied. In addition, the packaging of the product is not dependent on receiving prelabeled cartons which causes packaging problems. In addition, a certain percentage of product can be labeled rather than all. Thus, the percentage of product labeled using the apparatus and method of this invention could be anywhere from 1% to 100% of products labeled.

[0032] The label feeder/dispenser machine can be conventional commercially available machines.

[0033] The labeling machine advances the label 2 and liner upon demand. As the label liner passes over a peel bar the label separates from the liner and is placed on the vacuum grid of the applicator head. The label liner 6 is the label backing strip. It has release agent on the surface so labels may be removed without damage to the adhesive side of the label.

[0034] Labeling machines that apply labels to containers are commercially available such as the label application model 2111 by Label-Aire which allows high speed label application up to 1600 inches of label per minute.

[0035] This labeling machine contains microprocessor controls and can handle a wide variety of label sizes and can be moved from one production line to another.

[0036] While the invention has been described with particular reference to a preferred embodiment, it will be understood by those skilled in the art various changes can be made and equivalents may be substituted for elements of the preferred embodiment without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation to a teaching of the invention without departing from the essential teachings of the present invention.

Claims

1. Apparatus for applying labels to the inside of product containers as the containers are being fed on carton pickers by a conveyor into a carrier bucket on cartoning machines, said apparatus comprising:

a 3-head carton picker;
a vacuum applicator head containing a vacuum grid wherein the head actuates in the same direction as the axis of rotation; a pneumatic gland porting that supplies air to a pneumatic actuator which actuates the head; the applicator head being capable of being actuated during the rotation of the picker head;
a label feeder;
a carton hopper; and
a pivot mechanism for aligning the applicator head to the label as it is fed off the label feeder.

2. The apparatus of claim 1 wherein the translation device is a slide translation device.

3. The apparatus of claim 1 wherein the vacuum support is mounted on the translation device.
4. A process of applying labels to cartons which are moving on a carton picker in a packaging process comprising:
 - i) picking up labels to be applied to said cartons with applicator heads containing vacuum grids;
 - ii) picking up cartons with a vacuum cup picker;
 - iii) moving said labels on said applicator heads by means of pneumatics from outside the carton to the inside the carton;
 - iv) blowing the labels onto the inside of cartons
 - v) moving the applicator heads out of the cartons so that the cartons could be placed into a carrier bucket on a cartoning machine.
5. The apparatus of claim 1 wherein the apparatus contains a plurality of vacuum heads.
6. The apparatus of claim 1 wherein the vacuum head contains means to blow labels onto the inside of cartons.
7. The process of claim 4 wherein steps i to v are repeated.
8. The process of claim 4 wherein the labels are moved at the same speed and direction as the conveyor.

35

40

45

50

55

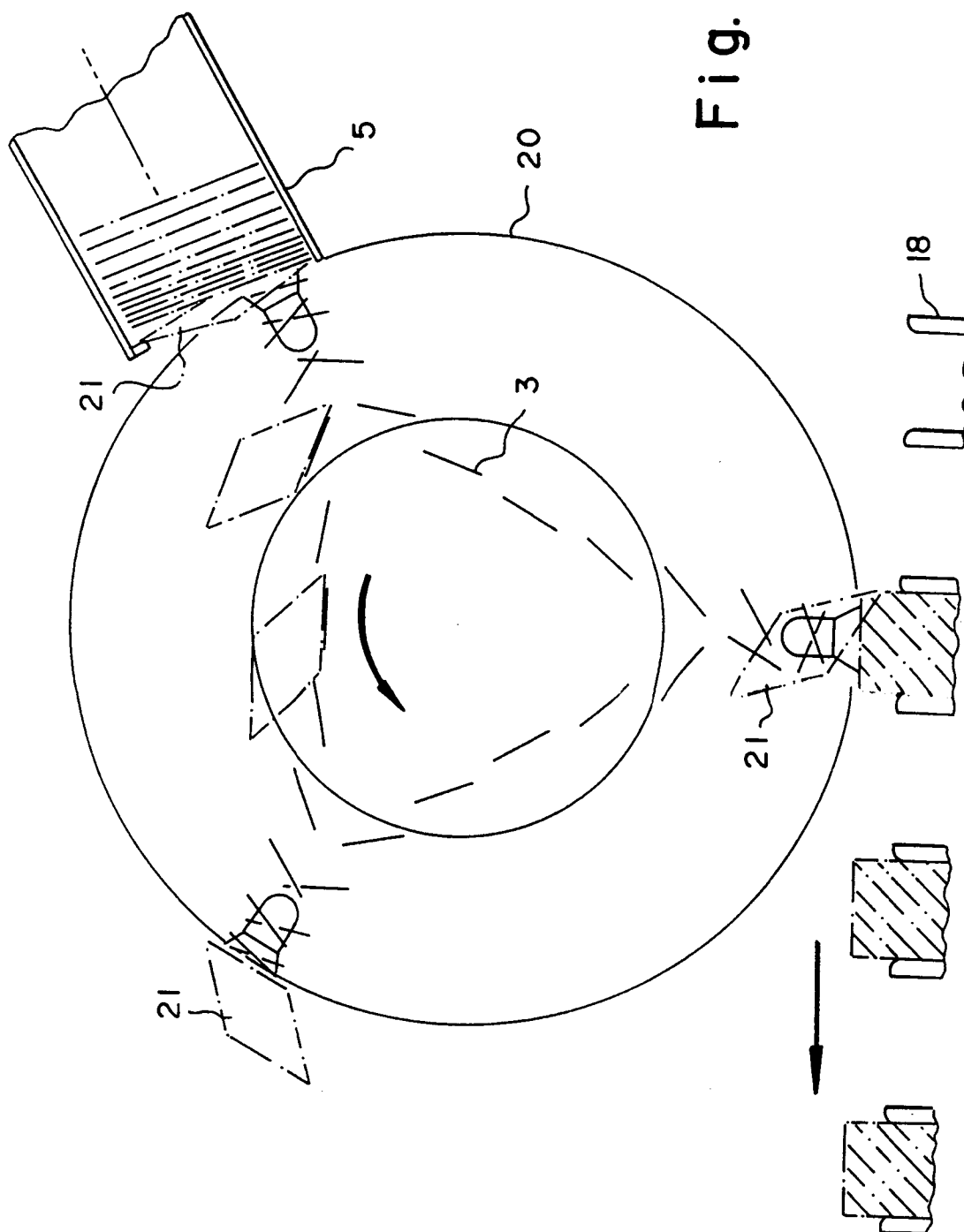


Fig. 1

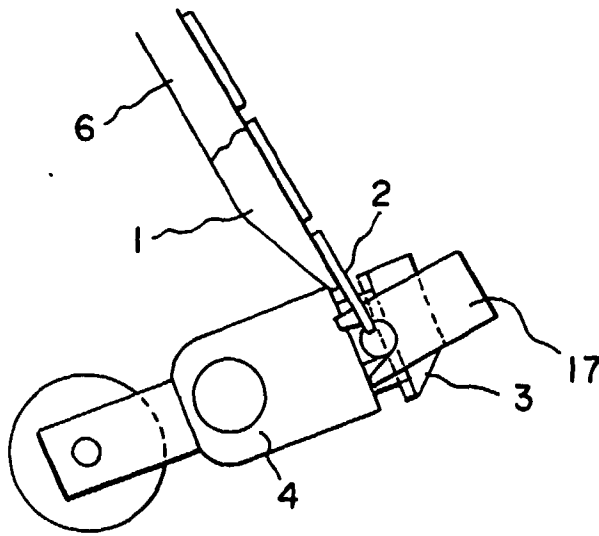


Fig. 2a

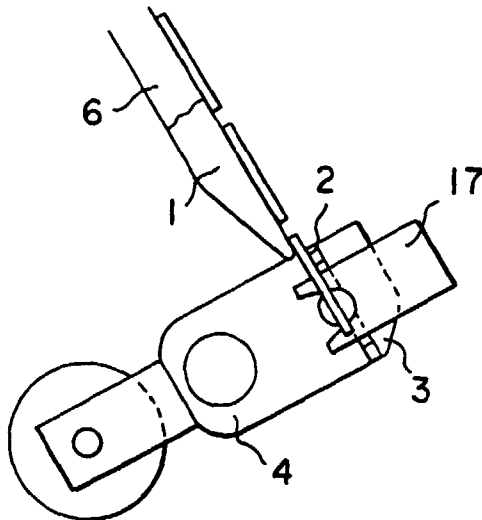


Fig. 2b

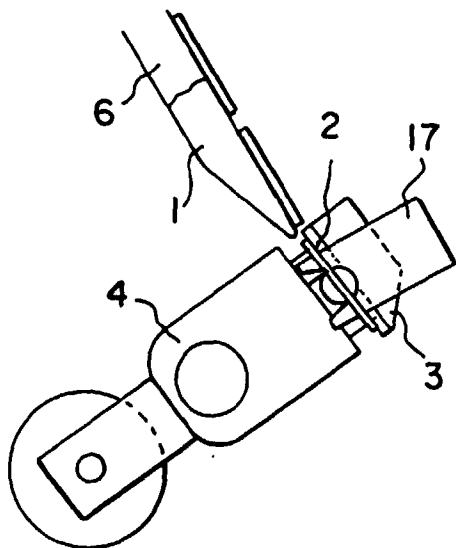


Fig. 2c

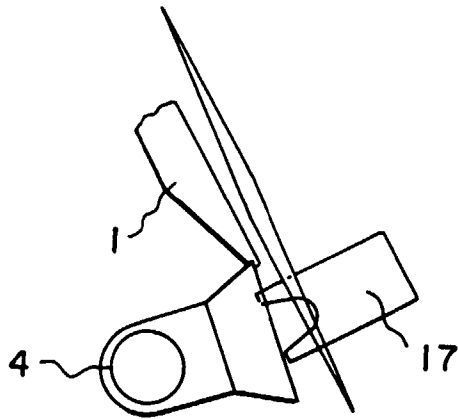


Fig. 2d

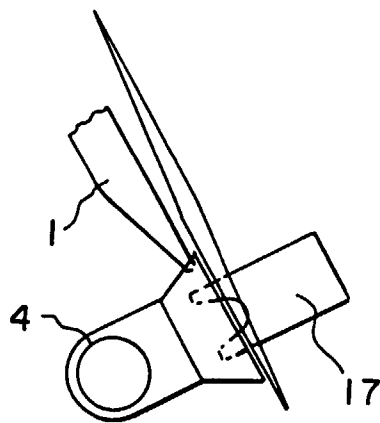


Fig. 2e

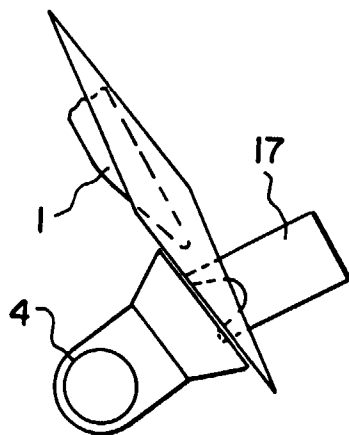


Fig. 2f

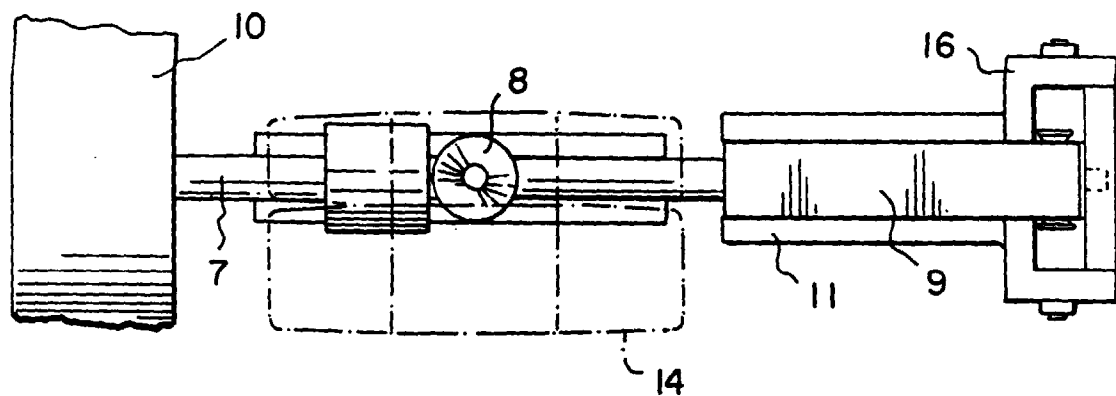


Fig. 3a

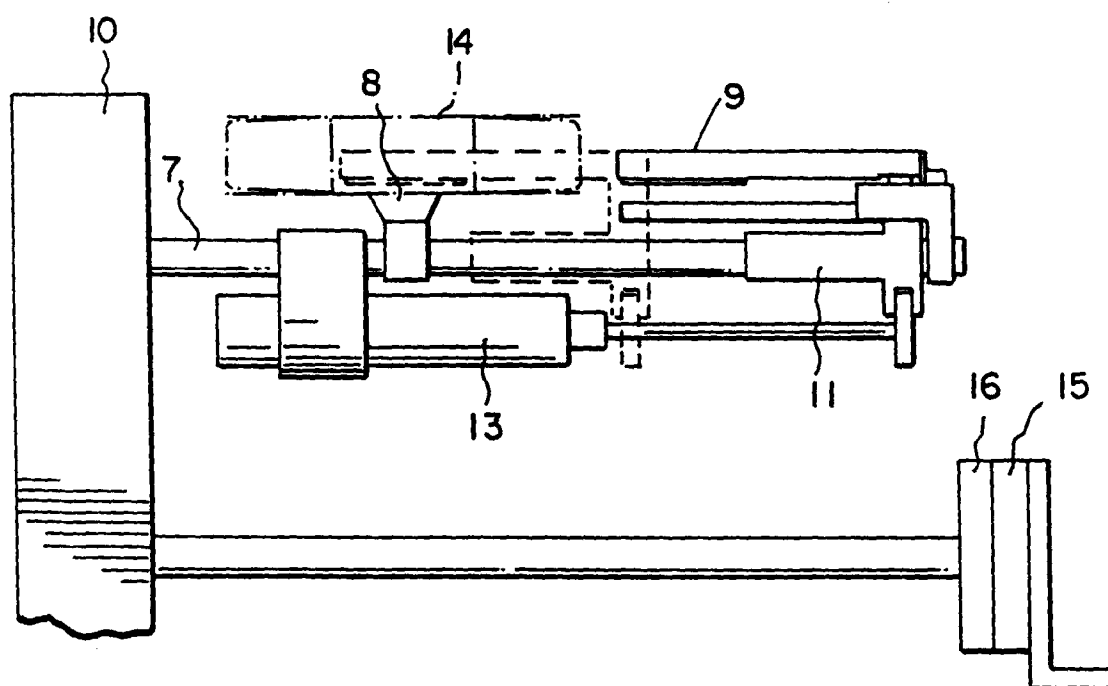


Fig. 3b

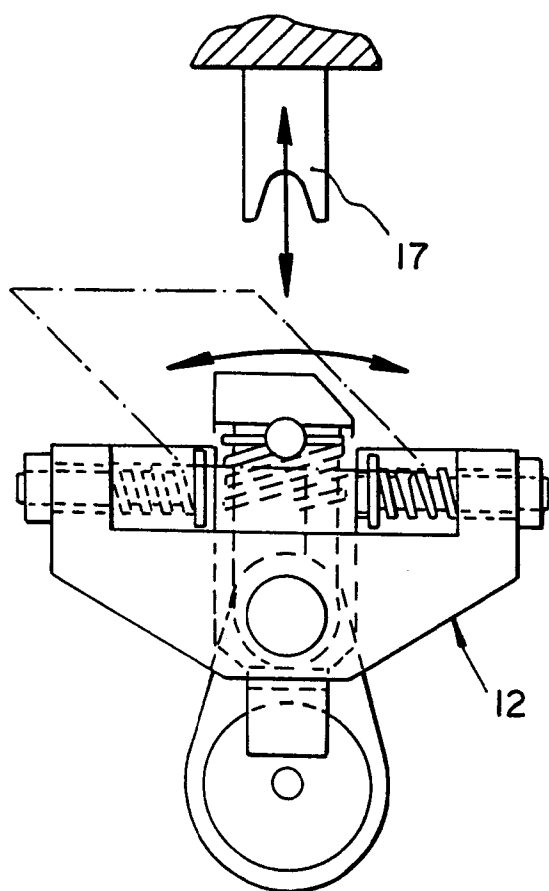


Fig. 3c

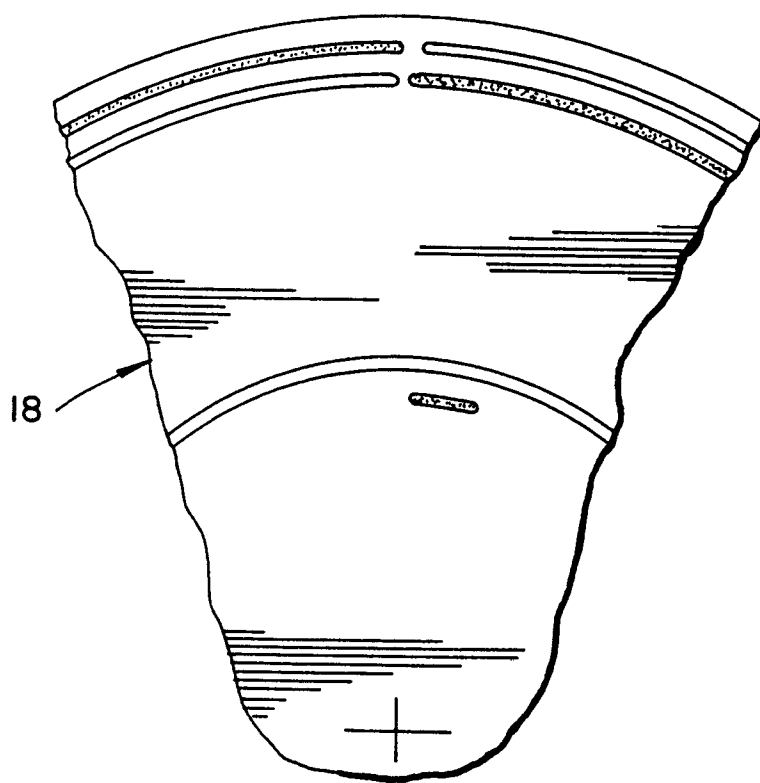


Fig. 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 20 2431

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.6)
A	US 4 871 348 A (Y. KONAKA) 3 October 1989 * column 2, line 5 - line 44 * * figure 1 * ---	1,4,5	B65C1/02
A	US 3 841 623 A (C. MCCARTHY ET AL.) 15 October 1974 * column 2, line 28 - line 66 * * figure 1 * ---	1,4	
A	US 5 081 445 A (P. GILL ET AL.) 14 January 1992 * column 1, line 12 - column 2, line 1 * * column 7, line 17 - line 33 * -----	4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65C B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 November 1998	Examiner Smolders, R
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)