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(54) Article sorting apparatus.

(57) The invention is concerned with a method and apparatus for sorting articles from a series of batched collection of articles so that a tally is kept of how many articles of a given type are received from each one of a variety of sources in a series of batched collections. The method avoids the task of attaching an identification tag to each article, and includes the steps of attaching each of said articles in a collection (24) sequentially to clip means (20) associated with a transporter device, attaching, adjacent to the sequentially suspended collection of articles, means (21) indicating, by use of coded data provided thereupon, the origin or identity of the collection, moving the clip means (20) and the articles suspended therefrom along the transporter device (10), viewing each article on the transporter device at a data keying station (22) and keying data to a computer to identify the type of article and its sequential position in the collection on the transporter device, forwarding the articles to a series of switch means (18A) and causing selected ones of said switch means to operate to open a clip means (20) in a computer-controlled sequence determined by the keyed-in identifying data so that all articles of any one type are released at a pre-determined position (28) on the transporter device appropriate to that type.

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ARTICLE SORTING APPARATUS

The present invention relates to a method and apparatus for sorting articles into categories.

Known methods for sorting articles, particularly articles of varying sizes and types often involve sorting by hand. The articles may be sorted into categories of colour, size, material or function. Particularly in the case of hospital laundry, where batches of soiled articles require to be sorted into types of garment, for example, sheets, nightwear and so on prior to washing, a problem with the conventional method used is that it is labour intensive and unpleasant for those involved. A further problem is the requirement of keeping a record of the numbers of articles being sorted so that, after washing, the correct number of articles are returned to the relevant ward. The loss of linen through counting discrepancies contributes greatly to the expenses incurred by hospitals.

It is an object of the present invention to provide a new and improved method of sorting articles and apparatus for use therein, which will obviate or substantially mitigate the aforementioned problems.

According to an aspect of the present invention there is provided apparatus for sorting a collection of articles from a series of batched collections comprising a transporter device having a plurality of zones in series therealong, an article receiving station in a first zone thereof, article engagement means for receiving articles from a batched collection on the transporter device in a sequence, means to identify said batched collection as a whole, means to forward said articles in the sequence to an intermediate zone of the apparatus, data input means for the identification of the type of each article in turn in said sequence to be input to a computerised control means, switching means controlled by said computerised control means, a plurality of release zones appropriate to the types of articles being sorted, and means to release said engagement means in a sequence determined by the control means to deposit articles at the appropriate one of said release zones.

In one example of apparatus according to the invention, said articles may comprise a batched collection of soiled articles having as their origin a hospital ward. Conveniently said transporter may include a first, receiving, section followed by an ascending, section in the form of a motorised worm-screw which is coupled to a descending, section in the form of a pole or rail which incorporates spacing devices for the articles. A generally horizontal third section, also in the form of a motorised worm-screw, includes the release zones. Preferably the means for identifying article type is located adjacent the lower part of the descending section and is in the form of a computer with a keyboard for the input of data. The data will identify the type or category to which the articles belong, in this example, the type of soiled garment e.g. sheets, pyjamas and the like.

Suitable means to carry coded data indicating the origin of the soiled articles, i.e. the ward which they belong, is conveniently in the form of a tag having a bar code disposed thereupon and attachable to a clip or to the bag in which the articles were brought to the receiving station. The switching means may comprise an arrangement of variably spaced proximity sensor devices or micro-switches which are connected to corresponding release devices in the form of pneumatic actuator devices. Conveniently the computerised control means is also connected to each sensor device of the switching means and actuates a selected device as appropriate by passing a signal thereto, the device then actuating the pneumatic actuator devices.

According to a further aspect of the present invention there is provided a method for the sorting of a collection of articles from a series of batched collections of articles, comprising the steps of

attaching each of said articles in a collection sequentially to clip means associated with a transporter device,

attaching adjacent to the sequentially suspended collection of articles means indicating, by use of coded data provided thereupcn, the origin or identity of the collection,

moving the clip means and the articles suspended therefrom along the transporter device,

viewing each article on the transporter device at a data keying station and keying data to a computer to identify the type of article and its sequential position in the collection on the transporter device,

forwarding the articles to a series of switch means and causing selected ones of said switch means to operate to open a clip means in a computer-controlled sequence determined by the keyed-in identifying data so that all articles of any one type are released at a pre-determined position on the transporter device appropriate to that type.

Advantageously, the container, which may be a bag, may receive an identifying tag device, readable by a computer device to record the source of the articles being sorted.

Preferably the step of determining the type and sequential position of the article on the transporter and appropriately actuating the switching means may be carried out using an algorithm which is programmed into a computer.

It will be appreciated that use of the above method and apparatus avoids the tedious identifica-

tion of each article physically by a mark or tag attached thereto but ensures that the total number of any one type of article from any one source is recorded and totalled.

An embodiment of the present invention will now be described by way of example and with reference to the accompanying drawings in which:-

Figure 1 shows a perspective view of an example of apparatus according to the invention;

Figure 2 is a diagrammatic plan view of the apparatus;

Figure 3 is a fragmentary view, to an enlarged scale, of proximity sensor and clip release devices of the apparatus;

Figure 4 is a fragmentary view of a clip means;

Figure 5 is a fragmentary view of a batched collection gating device; and

Figure 6 is a fragmentary view of a clip release sequence initiating sensor means.

With reference to the Figures, there is shown an embodiment of the present invention being apparatus for sorting of soiled articles prior to washing. The origin of the collection or batch of soiled articles may be a ward in a hospital or from a hotel or the like.

A lightweight transporter 10 comprises a first ascending section 12 in the form of a motorised worm-screw adjacent to which a conveyor system 26 is located. The section 12 leads to a second, descending, section 14 in the form of a rail acting to space the articles in a uniform manner, irrespective of their spacing at the loading stage. The rail 14 is connected to a generally horizontal, third section 16, also in the form of a motorised worm-screw. Clip means in the form of clips 20, one of which is shown in Fig. 3, are suspended from the transporter 10 by means of hooks 20A. The clips 20 include a spring-loaded lever 20B which is biased into contact with a further member 20C in order to apply a gripping action to the laundry articles. Reference numeral 15 indicates a pneumatically actuated batch gate designed to allow each clip 20 to be presented singly to the data key station 22. Switching means 18 comprise an arrangement of equally spaced proximity sensors 18A which operate corresponding pneumatic actuator devices 18B to release the clips in a controlled manner as described below. The arrangement of the proximity sensors 18A is disposed on the horizontal third section 16 of the transporter 10, each sensor and the associated actuator being located over release zones comprising baskets 28.

A programmable device 22 comprising a computer is located adjacent the lower part of the descending second section, i.e. the rail 14. The programmable device 22 provides a keyboard for the input of data into the computer. The computer 22 is connected to each sensor 18A. The computer keyboard also comprises a bar code reader device to read and record the coded data on the tag 21 attached to the bag.

In use of the present embodiment, a batched collection 24 of soiled articles, i.e. sheets, pillowcases, towels, nightwear and the like is removed from the hospital ward and deposited on the conveyer system 26, together with its container in the form of a bag. Each article is the attached to a clip 20 from a supply thereof stored above the conveyor system 26.

Means indicating the origin of the collection of articles in the form of a tab 21 having a bar code disposed thereupon has been previously attached to the bag. The clips 20 move up the ascending worm screw 16 which is rotating and are transferred to the descending rail 14 on which they are spaced apart at suitable distances. At the end of the rail 14, an operator keys into a data keying station, information as to the identity of each article in turn. Thus the identity and sequence of the articles forming the collection is input manually into the computer using the keyboard. In the present example, the operator inputs at the keyboard a numeral "1", to identify sheets, numeral "2", towels, and so on. It will be understood that the numerals may instead be used to identify the colour of the articles or size or material as required. The clips 20 now proceed past a sensor 17 which initiates the computerised switching sequence and move onto the worm screw 16, which is also rotating, and are moved along it. The computer is programmed with data relating to the speed of screw 16 and the distance between each pneumatic actuator and the sensor means 17. Each proximity sensor device 18A is operated, in this example, on the arrival thereat of a particular type of article although, it will be appreciated that each sensor could equally have been operated to deal with particular colours or sizes of garments according to an algorithm of the computer programme.

A signal is then passed to the selected sensor from the computer and the sensor then acts on arrival of the article to actuate the device. The device operates downwardly (arrow A in Figures 2 and 4) onto the spring-loaded lever 20B of the passing clip 20, releasing the article and allowing it to drop into the appropriate release zone. A basket 28 in the zone collects the article. When the batched collection has been sorted, the baskets 28 can be removed and articles of a similar type can be washed according to their requirements. The computer having identified the collection from the tag 21 prints out a record of the number of articles in the collection and, after washing, it is then a simple matter to check that the correct number of articles are returned to the ward.

It will be appreciated that although the described embodiment refers to soiled laundry in a hospital it may be used with equal effectiveness to sort articles in other situations.

Various modifications may be made within the scope of the invention as defined in the following claims.

Claims

1. Apparatus for sorting a collection of articles from a series of batched collections (24) comprising a transporter device (10) having a plurality of zones in series therealong, an article receiving station (26) in a first zone thereof, article engagement means (20) for receiving articles from a batched collection on the transporter device in a sequence, means to identify said batched collection as a whole (22,21), means (12,14) to forward said articles in the sequence to an intermediate zone of the apparatus, data input means (22) for the identification of the type of each article in turn in said sequence to be input to a computerised control means, switching means (17,18) controlled by said computerised control means, a plurality of release zones (28) appropriate to the types of articles being sorted, and means (18B) to release said engagement means in a sequence determined by the control means to deposit articles at the appropriate one of said release zones (28).

2. Apparatus as claimed in claim 1, wherein said transporter includes a first horizontal receiving section (26) followed by an ascending section, a descending section (14), means (15) by which the article engagement means (20) are spaced one from another by a desired distance, and a horizontal release zone (28).

3. Apparatus as claimed in either one of claims 1 and 2, wherein the article engagement means comprise spring-biased clips (20).

4. Apparatus as claimed in any one of the preceding claims, wherein the means to indentify the collection as a whole comprises a tag bearing a bar code.

5. Apparatus as claimed in any one of the preceding claims, wherein the switching means comprises an arrangement of variably spaced proximity sensor devices (18A) connected to corresponding release devices (18B) comprising pneumatically operated actuator devices.

6. A method for sorting of a collection of articles from a series of batched collections of articles, comprising the steps of attaching each of said articles in a collection (24) sequentially to clip means (20) associated with a transporter device, attaching, adjacent to the sequentially suspended collection of articles, means (21) indicating, by use of coded data provided thereupon, the origin or identity of the collection, moving the clip means (20) and the articles suspended therefrom along the transporter device (10), viewing each article on the transporter device at a data keying station (22) and keying data to a computer to identify the type of article and its sequential position in the collection on the transporter device, forwarding the articles to a series of switch means (18A) and causing selected ones of said switch means to operate to open a clip means (20) in a computer-controlled sequence determined by the keyed-in identifying data so that all articles of any one type are released at a pre-determined position (28) on the transporter device appropriate to that type.

7. A method as claimed in claim 6, wherein the container is a bag to which an identifying tag device (21) is attached, readable by a computer device to record the source of the articles being sorted.

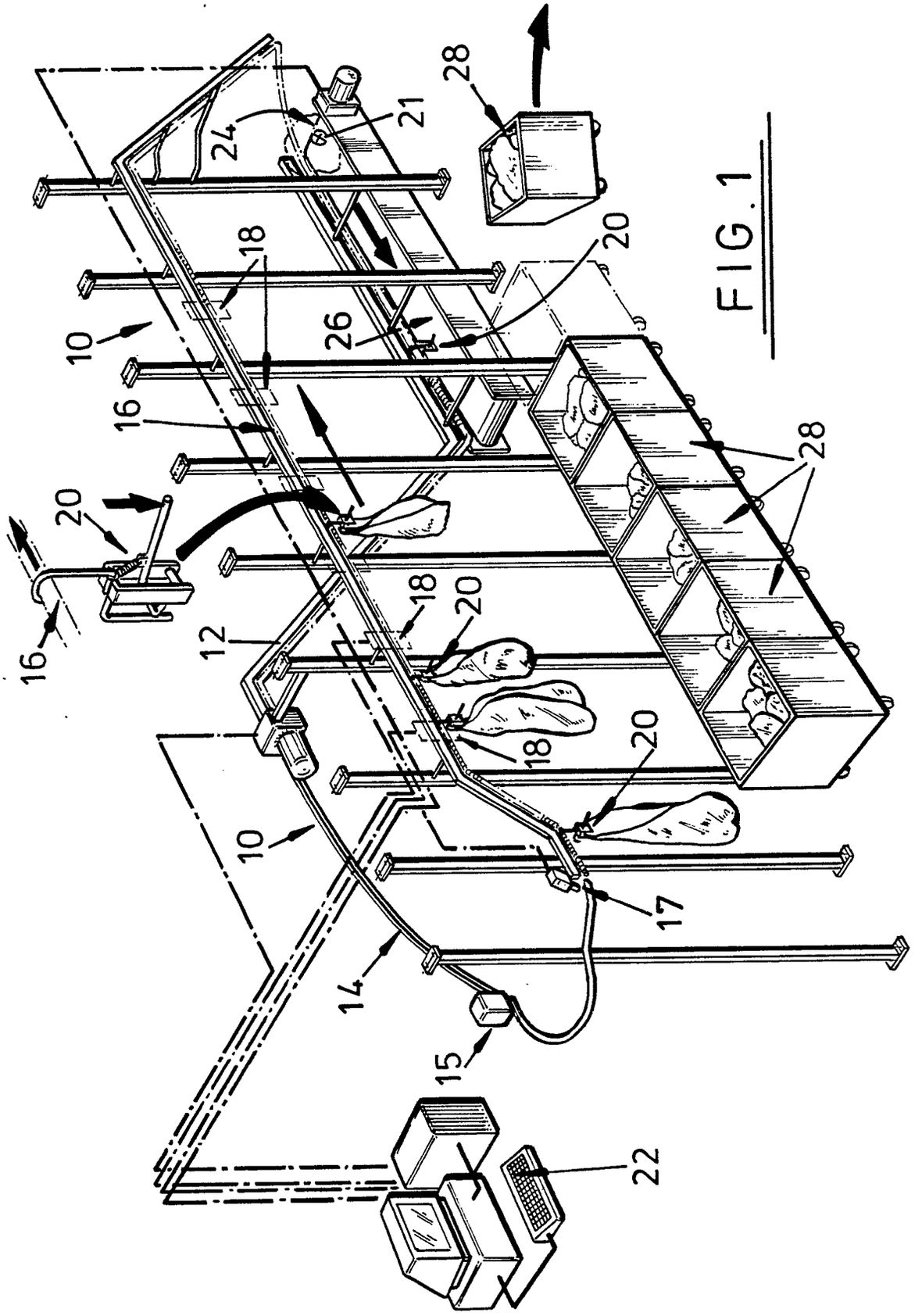


FIG. 1

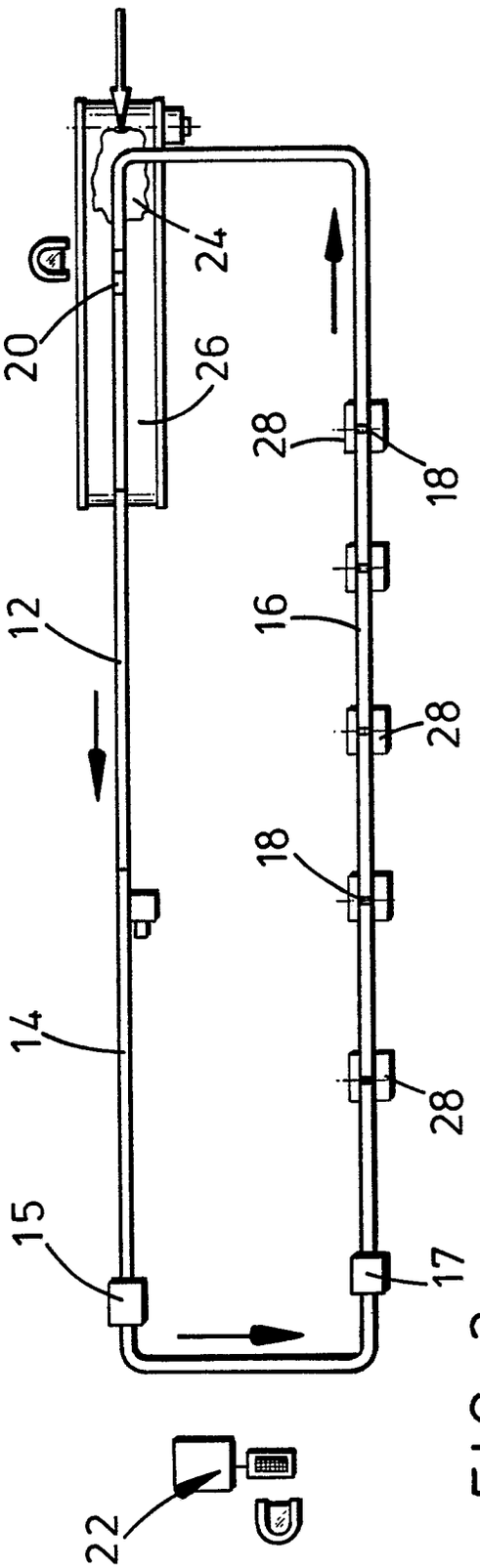


FIG. 2

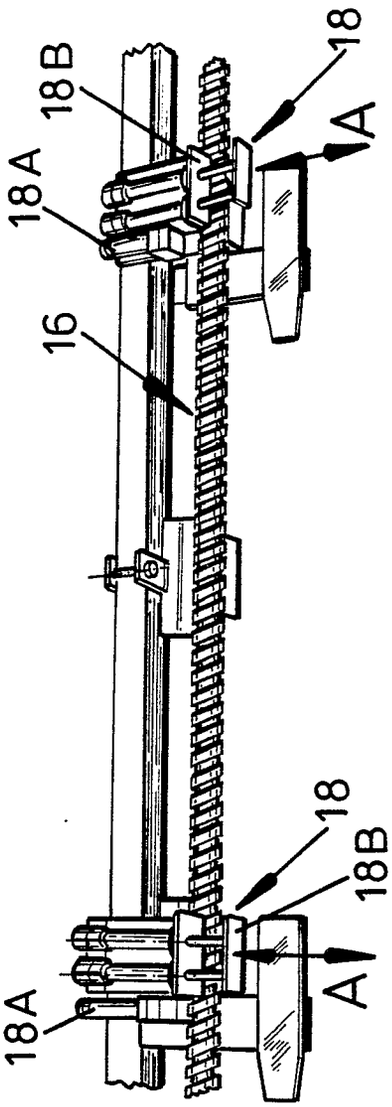


FIG. 3

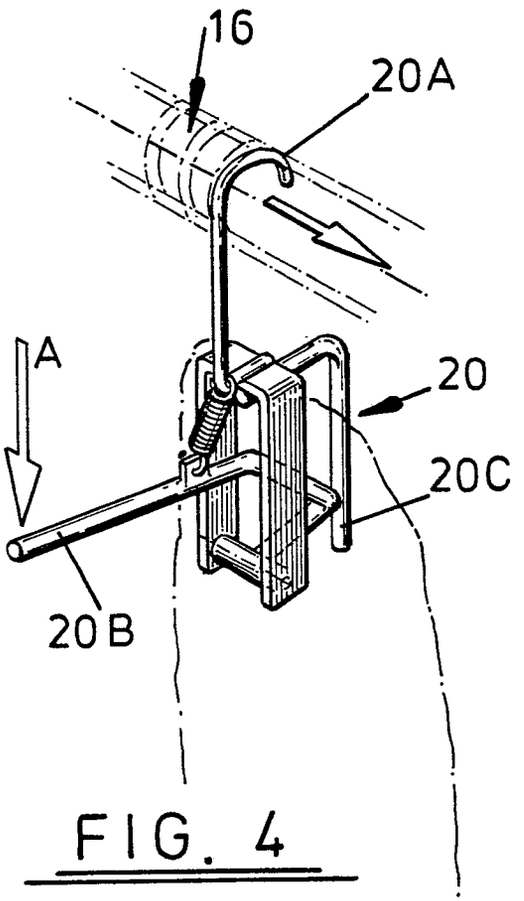


FIG. 4

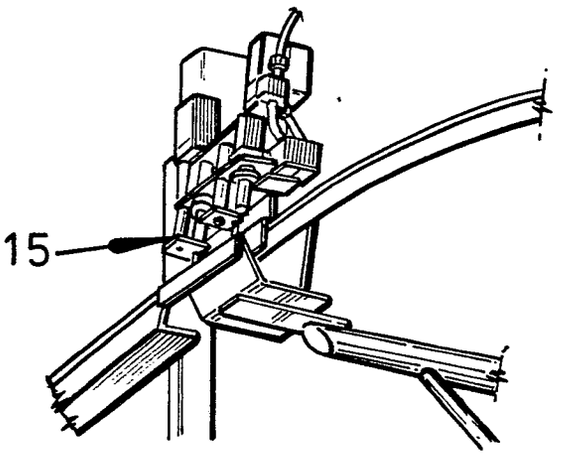


FIG. 5

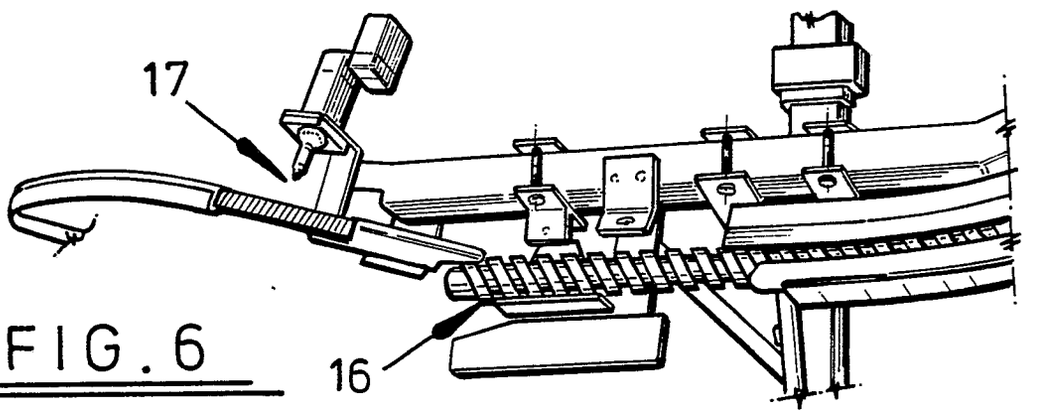


FIG. 6