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(54) **Improvements to an automatic machine for the continuous packing of articles.**

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Description

The invention belongs to the vast technical field concerned with automatic machines, such as, for example, machines for the continuous packing of articles (e.g. medicines or cosmetics) in containers (e.g. cases), of the kind comprising two coplanar lines, side by side, one line being for the infeeding of the articles and the other for the infeeding of the containers, in the region of a station where the articles are inserted into the containers.

The article infeed line consists of a number of trays, integral with a pair of looped chains moving in a line perpendicular to the axis of the trays. The trays are designed to receive, from a magazine, (for example, of the kind defended in DE—A—3238927) a preset number of articles (for example, 1, 2, 3, etc.). This means that the device which "unlatches" the articles from the magazine has to be adjusted (by the operator on the spot) and a detector provided, between the magazine and the aforementioned station, to detect the height of the pile of products in each tray.

The detector is mounted so that it can be adjusted in height when the number of articles in each pile is varied. The container magazine (for example, located under the aforementioned container infeed line as described in DE—A—3103149) where the containers are housed, in flat tubular state, consists basically of two sloping bars and two angles, on the outside of the bars. When the number of articles in each pile is varied, it is necessary to select a suitable container size and adjust the mutual distance between the said angles, this adjustment being still today carried out manually by the operator.

The container infeed line comprises, amongst other things: a longitudinal track serving both to support the containers and guide the bottoms thereof; means (such as: pegs of at least two chains) for transferring the containers from the insertion station to an outfeed station; two longitudinal bars, located over the aforementioned track and serving to guide the containers moving along underneath.

The height of the said bars above the track is adjusted by suitable means whenever it is necessary to change the size of the parallelepiped containers (or cases) obtained by "erecting" the flat tubular container blanks. In a known solution, the said devices consist of hand-operated mechanical means placed beside and/or above the conveyor: the problem with these is that they obstruct assembly, setup and maintenance operations on the lines.

The need for automatic machines to have centralized controls which can be driven entirely or partly by a microprocessor has compelled machine designers to provide electromechanical means (with centralized drive) for the actuation of the aforementioned bars.

In the known solutions which achieve the above, the electromechanical means just referred to consist of a variety of mechanisms of varying complexity located over the conveyor with the result that the difficulties with the traditional solution (that is, hand-operated mechanical devices) are not alleviated but accentuated.

Thanks to modern automation techniques, tending to reduce dead times and minimize production costs wherever possible, it is already possible to time the containers and articles with respect to each other, with the aforementioned infeed lines moving side by side in a straight line at a uniform speed and zero relative velocity.

Obviously, these peculiarities make it necessary to envisage some means by which to provide the synchronism that is fundamental for all movements to occur with exact timing.

In the presence of all rigid articles, this unavoidable condition is correlated to process tolerances only.

In the aforementioned case, on the other hand, the presence of deformable bodies, such as cases or case-like containers, for instance, makes it necessary to use a series of guides and/or stop plates to prevent the containers from being deformed. Thus, the bottoms of the containers rest on the aforementioned longitudinal track and the grooves in the track serve to seat the aforementioned pegs which hold the containers in place on the sides, while the aforementioned longitudinal bars (serving as top guides) theoretically remove any possibility of movement: "theoretically" because, in practice, it is quite easy for the containers to get jammed, especially at the insertion station.

Whenever a jam occurs, the operator has to intervene to remove the longitudinal bars and restore working conditions. Removing the longitudinal bars means releasing also those containers downstream of the insertion station that already have articles inserted in them and are waiting for the subsequent steps in the process. The problem with this is that it creates the risk of upsetting the delicate timing referred to earlier and, consequently, of causing more jams.

In the machine for packing articles (defended in the aforementioned DE—A—3 103 149), there is located downstream of the insertion station and near one of the longitudinal bars a coding unit designed to stamp a preset combination of letters and/or figures on one side of the containers. When container size is changed, the height of the coding unit must be adjusted, at present manually, by the operator.

The object of this invention is to make available such improvements to an automatic machine for the continuous packing of articles as to centralize the control of the aforementioned hand-operated means, of the aforementioned devices and of the "setting" of the number of articles fed by the magazine to the trays on the article infeed line.

As part of these improvements just referred to, the invention envisages suitable electromechanical means interfaceable with a microprocessor mounted on the machine itself or a microprocessor outside the machine in common with other automatic machines.

The invention also envisages that the devices to operate the longitudinal bars be of such shape and form as not to encumber the area above the bars, which constitutes an improvement in that assembly and maintenance operations on the aforementioned lines are facilitated.

A further improvement envisaged by the invention is the provision of means to enable the operator to handle the containers at the article insertion station without negatively affecting the full containers downstream that have already gone through the station.

The above objects are achieved through an automatic machine for the continuous packing of articles, comprising: two lines, one for the infeeding of the articles and the other for the infeeding of the containers, coplanar and side by side, in the region of a station where the articles are inserted into the containers; a magazine, located upstream of the article infeed line, designed to feed the trays on the article infeed line with a preset number of articles; means, located in between the said magazine and the insertion station, for detecting the number of articles present in each tray, the said means being movable vertically; a second magazine for housing the containers in flat tubular state and located under the container infeed line and upstream thereof; a device between the second magazine and the article infeed line designed to transform the containers from flat tubular blanks into parallelepiped containers; at least two longitudinal bars, placed over the aforementioned container infeed line, for locating and guiding the containers underneath sliding on a longitudinal track under the action of drive means; a device for the linear adjustment of the height of the said longitudinal bars; a coding unit on the container line, downstream of the insertion station, for stamping on the containers with articles already inserted in them, a preset combination of letters and/or figures; the machine being characterized by the fact that it comprises: first electromechanical means for adjusting the height of the said detection devices, wired to sensors which measure the said height; second electromechanical means for adjusting the height of the aforementioned second magazine, wired to sensors which measure the said height; third electromechanical means for adjusting the width of the aforementioned second magazine, wired to sensors which measure the said width; at least two electromechanical units for adjusting the height of each of the said longitudinal bars, wired to sensors which measure the said height; fourth electromechanical means for adjusting the height of the aforementioned coding unit, wired to sensors which measure the said height; one microprocessor to which are wired all the electromechanical means and units just referred to, with their associated sensors, as well as the operating means of the first magazine which discharges a preset number of articles into the trays on the article feed line, the said microprocessor being designed to monitor the said electromechanical means and units through a pre-established programme in accordance with electrical signals received from the aforementioned sensors.

Moreover, each longitudinal bar conisists of two segments, one fixed and one movable, hinged to each other, the said movable segment, which is located at the insertion station, being movable vertically between two extreme points and adjustable when it is at the bottom position so that its alignment in relation to the fixed segment can be adjusted. The characteristics of the invention are emphasized hereinafter with particular reference to the accompanying drawings, namely:

Figure 1 which shows diagrammatically a plan view of an automatic packing machine with the improvements envisaged by this invention;

Figure 2 which shows diagrammatically a perspective view the device for adjusting the height of the longitudinal bars and the coding unit;

Figure 3 which shows a close-up perspective view of the phase preceding the insertion of a pile of articles into a container;

Figure 4 which shows a sectional view of one of the units of the aforementioned device;

Figure 5 which shows diagrammatically a perspective view of the electromechanical means for operating the coding unit and a part of the electromechanical means of the aforementioned device;

Figures 6a and 6b which show perspective views of the electromechanical means for adjusting the height and width, respectively, of the magazine housing the containers in flat tubular state;

Figures 7a and 7b which show perspective views of the electromechanical means for detecting the presence of a pile of articles at the article infeed line;

Figure 8 which shows diagrammatically the centralized wiring of the improvements that are the object of the invention;

Figure 9 which shows a perspective view of the means used for lifting the longitudinal bars at the article insertion station;

Figure 10 which shows a partially sectional view of the hinged articulation joining the fixed segment to the movable segment illustrated in Figure 9.

With reference to Figure 1, means 1 and 2 indicate two infeed lines, the former for the infeeding of the articles to be packed 3 and the latter for the infeeding of the cases (or containers) 4. The two lines are coplanar and side by side in the region of a station S.

Line 1 is made up of a number of trays 5 (translating through H), adjustable in width, into each of which a magazine of known kind (and therefore named generically) discharges a preset quantity (number) of the said articles 3. The means operating the magazine (not illustrated) must therefore be "set" for the required number of articles: the setting is controlled through a centralized microprocessor 100 (Figure 8).

At the station S, the lines 1 and 2 run at the

same speed, which is also the speed at which the push-rods 7 move, the said push-rods being movable also perpendicularly to direction H so as to push the pile of articles 3 into cases 4.

On line 1, between the station S and the magazine 6, there is a sensor 8 (of inductive type, for example) carried by an element 9, rotatably mounted on a slide 10 and able to rotate perpendicularly to direction H.

The vertical translational movement of the slide 10 is achieved through electromechanical means 13 (Figure 7b); the zero point of the slide stroke is detected by a sensor 14, whereas another sensor 15 detects (i.e. "measures" by means of the electrical signals) fractions of revolution of the motor (13a) shaft, the latter being a component of the said means 13.

The vertical translation of the slide 10 allows the setting of the height of the element 9 and sensor 8 in respect of the line 1, according to the size of the articles 3 that are passing under the sensor 8, placed inside the trays 5.

When at rest, the said movable element 9 settles (under its own weight) on a stop stud 11 that is integral with the slide 10 (Figure 7b).

A sensor 12 is attached to the slide 10, in such a manner as to detect the element 9, when this latter is at rest position.

The sensor 12 also detects the rotation of element 9.

Sensors 8, 12, 14 and 15 and motor 13a are controlled by microprocessor 100. Sensor 8 detects the presence of a preset number of articles 3 in trays 5. If the number of articles in a tray is less than the preset number, sensor 8 detects the anomaly. If the number is greater than the preset number, sensor 8 intercepts the top article of the pile and gives an "O.K." signal which is in fact wrong; this is picked up (and the signal cancelled) by sensor 12 when movable element 9 rotates as a result of the lifting of sensor 8 consequent on its having intercepted the top article.

Magazine 16, which houses containers 4 in flat tubular state, is located upstream of the line 2, under station S (Figure 6b). A suitable device 17 (such as defended in DE—A—3 103 149) "erects" the blanks to form cases (of parallel shape, for instance) and transfer them to line 2.

The magazine 16 is carried on a stem 18, driven by a motor, 20, through electromechanical means 19 which impart vertical translational motion through F1 and F2; a limit sensor 21 detects the zero point of the stroke of stem 18, while another sensor, 22, "gauges" the fractions of revolution of the drive shaft 20. Motor 20 and the sensor 21 and 22 depend on microprocessor 100.

The magazine 16 has two oblique bars 23 and two sides 24a and 24b, parallel to the brs and freely supported by a crossbar 25 (Figure 6a). The aforementioned sides are moved in directions K1, K2 by electromechanical means 26 and 27 driven by motors 26a and 27a. Means 26 and 27 are associated to sensor pairs 28a, 28b and 29a, 29b. Sensors 28a and 29a define the "zero" of the slides of the associated slides 24a and 24b, while the remaining sensors 28b and 29b, "gauge" the fractions of a revolution of the drive shafts of motors 26a and 27a respectively.

Sensors 28a and b and 29a and b, as well as motors 26a and 27a, are controlled by microprocessor 100.

The line 2 for the infeeding of cases 4 comprises, amongst other things, a longitudinal track 30 with longitudinal grooves which pegs 31 slide in, the said pegs being fastened to chains 31a and equally spaced to form receptacles 32 for the containers.

Track 30 serves to support and guide the bottoms of cases 4, while the tops thereof are guided by two longitudinal bars 34 (Figure 2).

Bars 34 are cantilevered to four crosspieces, 35a, 35b, 35c and 35d, facing the outside of the line and moved up and down by electromechanical means 36a, b, c, d. With reference to Figure 4 (which illustrates unit 36a), 37 indicates an internally threaded sleeve guided axially by structure 38 of the machine. A threaded stem 39 is screwed coaxially to the said sleeve 37 in such a way as to be prevented from moving vertically but carried in rotation by electromechanical means 79 driven by motor 40 (or manually by means of a knob, 39a).

The "zero" of the stroke of the sleeve is defined by a limit sensor 41, while another sensor, 42, "gauges" the fractions of a revolution of the motor 40.

The assembly of sprocket 43 (splined to stem 39) and toothed belt 44 drives the electromechanical unit 36b which is the same as that described above, is linked to sensors 41 and 42 and driven by the aforementioned motor 40.

The unit 36c is similar to units 36a and b and is provided with a motor, 65, and sensors 46 and 47 (Figure 8). The electromechanical unit 36d, associated arm 35d, has a bracket 48 containing suitable means for transmitting motion, not illustrated, driven as described above by motor 65. The said unit is linked to sensors 46 and 47 and is driven by motor 65.

Motors 40 and 65, as well as sensors 41, 42 and 46, 47 are controlled by microprocessor 100.

It is emphasized that units 36a, b, c and d are located under and to one side of line 2 and that electromechanical means 79, with associated motors 40 and 65 are located in the bottom section of structure 38. Thus, the space over line 1 (and station S) is not encumbered by the said units, with obvious advantages. The longitudinal bars consist each of two segments, 34a and 34b, one fixed and one movable, respectively, hinged together by means 81, the movable segment being located at the insertion station, S.

As stated above, each push rod 7, actuated in synchronism with lines 1 and 2, inserts a preset number of articles 3 into the corresponding case 4 from the open end, 4a, of the case.

With reference to Figure 10, 82c indicates a portion of the aforementioned fixed segment 34a and 82d a space in movable segment 34b.

The top 83 of the said portion 82c matches with a rest of the said space 82d.

An adjusting screw, associated with movable segment 34b, goes up against the aforementioned top 83 of the fixed segment 34a, thus permitting the alignment of the fixed and movable segments to be adjusted. The movable segment has an associated block 86 with a ball 87 pushed out partially from one end by spring 88. When segment 34b is in "lowered" position, the said ball goes into a socket 89 made in the aforementioned portion 82c of the fixed segment 34a. The lifting action exerted on the segment 34b when the insertion station S is called into operation overcomes the resistance of spring 88, thus enabling the ball 87 to come free of the socket 89.

When the "raised" position is reached (the dashed line in the illustration) the ball 87 intercepts the aforementioned top 83 of the fixed segment 34a, exerting, thanks to the action of the aforementioned spring 88, sufficient force to keep the movable segment 34b in "raised" position. The movement of the movable segments from "lowered" to "raised" position, and vice versa, is facilitated, in the case of manual operation, by square elements 90 (shown in a dashed line in Figure 9) attached to the movable segments 34b. In the event of a jam at the insertion station S, the operator can stop the machine associated to lines 1 and 2, and raise the movable segment 34b of the aforementioned bars 34, so as to correct the position of, or remove, the container (or containers) that is causing the jam. After doing this, the operator can move the aforementioned movable segment back to "lowered" position to start the machines up again.

The means just referred to (Figures 9 and 10) make it quick and easy for the operator to set things right at the insertion station S without negatively interfering with the cases already downstream of the station and waiting for subsequent operations. Another notable advantage is that the movable segment 34b is adjustably mounted to be aligned with the fixed segment 34a. This makes it possible to increase or decrease the pressure of the bars on the cases 4, as necessary, which increases or decreases the "stiffness" of the cases only at the most critical point, i.e., in the region of the insertion station, without affecting the smoothness or timing accuracy of the rest of the line.

Besides manual operation, the movable segments 34b may also be operated by electromechanical, pneumatic or other similar means, the said means being controlled by suitable sensors (not illustrated) designed to detect when the movable segments get jammed. The feature just referred to is particularly interesting as it permits the movable segments to be lifted automatically and to control their operating means through the aforementioned microprocessor 100.

With reference to Figures 1 and 2, part number 50 indicates the coding unit, located downstream of the station S and designed to stamp a preset combination of numbers and/or figures on the side of each case 4 (after insertion of the articles 3).

Unit 50 is carried on a mounting block 51 (which rotates about a vertical axis from a work to a rest position, perpendicular to each other), the said unit 50 being moved up and down by electromechanical means 52 driven by an electric motor 53. In this case too there are a limit sensor (defining the "zero" of the stroke of the mounting block 51), and another sensor 55 for measuring fractions of a revolution of the shaft 56, the turning of which—by known means—transmits the vertical translational movement to the said mounting block. Motor 53, as well as sensors 54 and 55, are connected to microprocessor 100.

In short, the improvements to the machine consist of original, machine-mounted mechanisms each operated by an electromechanical means or unit, each of the said electromechanical means or unit having two sensors, one for measuring the fractions of a revolution of the drive shaft—each fraction of a revolution giving rise to a preset displacement of the movable part of the corresponding mechanism—and one stroke limit sensor for defining the "zero" reference point of each shaft used by the microprocessor 100 to locate and monitor the drive shafts of the mechanisms. This has the notable advantage of allowing the said microprocessor 100 to be used to automate either one machine only or several machines at once.

In other words, since the improvements that are the object of this invention envisage both electromechanical operating means and displacement detectors, the microprocessor 100 can be used to control several machines, though there is nothing to prevent its being used only for the one machine which the improvements refer to.

The operation of the improvements is an obvious consequence of what has been described above.

The size setting (i.e. length×breadth×height of the containers) of the microprocessor 100 is correlated to the number and/or size of the articles to be inserted into the containers. In fact, in the programme of the microprocessor 100 are stored the dimensions of the articles and on these depend the height of the sensors 8, magazine 16, bars 34 and coding unit 50 and the spacing of the sides 24a and b (defining the width of magazine 16).

The operator enters in the microprocessor 100 the number of articles to go into each container 4 and the microprocessor accordingly adjusts the aforementioned electromechanical means to suit the size of the corresponding containers. To do this, the microprocessor runs in accordance with a preset programme, using the electrical signals sent to it by the displacement detectors and with reference to the "zero" points defined by the aforementioned limit sensors. Once the microprocessor has been set, it is necessary to "load" the magazine 16, either manually or automatically, which container blanks of corresponding size.

Claims

1. An automatic machine for the continuous packing of articles, the said machine comprising: two lines (1) and (2), the former for infeeding articles (3) and the latter for infeeding containers (4) coplanar and side by side in the region of a station (S) for the insertion of the said articles (3) into corresponding containers (4); a magazine (6) located upstream of the article infeed line (1) and operable to place in trays (5) with which the said line is provided a preset number of articles (3); devices (8), located between the said magazine (6) and the said insertion station (S), for detecting the number of articles present in each tray, the said detection devices (8) being movable vertically; a second magazine (16) in which the containers (4) are housed in a flat tubular state, located beneath the container infeed line (2) and upstream thereof; a device (17) located between the second magazine (16) and the article infeed line and operable to erect the flat container blanks to form parallelepiped containers; at least two longitudinal bars (34), located above the container infeed line (2) to locate and guide the underlying containers that slide over a longitudinal track (30) under the action of drive means (31); a device (35, 36) for linearly adjusting the height of the said longitudinal bars (34); a coding unit (50) connected to the container infeed line, downstream of the aforementioned station (S) and operable to stamp on the containers, with articles inside them already, a preset combination of letters and/or figures; the said machine being characterized by the fact that it comprises: first electromechanical means (13) for adjusting the height of the said detection devices (8), wired to sensors (14 and 15), for measuring the said height; second electromechanical means (19) for adjusting the height of the said second magazine (16), wired to sensors (21 and 22), for measuring the said height; third electromechanical means (26 and 27) for adjusting the width of the said second magazine (16), wired to sensors (28a, 28b, 29a and 29b) for measuring the said width; at least two electromechanical units (36) for each of the said longitudinal bars (34), for the adjustment in height thereof, wired to sensors (41, 42—46, 47), for measuring the said height, fourth electromechanical means (52) for adjusting the height of the said coding unit (50), wired to sensors (54 and 55), for measuring the said height; a microprocessor (100) to which are electrically connected to the said electromechanical means (36) and the sensors wired thereto, as well as the means for operating the first magazine (6) to discharge a preset number of articles (3) into the trays (5) of the article infeed line (1), the said microprocessor being operable to control the operation of the said operating means and of the said electromechanical means in accordance with a pre-established programme and with the aid of electrical signals sent to it by the aforementioned sensors.

2. An automatic machine according to claim 1 characterized by the fact that each longitudinal bar 34 is made up of two segments, 34a and 34b, fixed and movable respectively, joined to each other by a hinge 81, the said movable segment 34b, which is located at the insertion station, being movable vertically between two extreme points, namely, "raised" and "lowered"; and characterized also by means 85 for adjusting alignment of the said movable segment 34b in relation to the fixed segment 34a when the former is at the "lowered" position.

3. An automatic machine according to Claim 1 characterized by the fact that each of the said electromechanical units 36 comprises: a crossbar 35 locked to a corresponding longitudinal bar 34 and turned towards the outside of the container 4 infeed line 2; a sleeve 37 to the upper extremity of which is cantilevered the said crossbar able to slide guided vertically by a housing made in the structure of the automatic machine and extending beneath the said line 2; a stem 39 inserted coaxially in the inside of the sleeve 37 and screw coupled thereto; electromechanical means 79 that are provided with a motor 40 controlled by a microprocessor 100 and exert an effect on the lower end of stem 39 in order to carry this in rotation; a sensor 41 for detecting the stroke limit of the said sleeve 37, wired to the aforementioned microprocessor 100; another sensor 42 for measuring predetermined fractions of a revolution of the stem, wired to microprocessor 100.

4. An automatic machine according to Claim 1 characterized by the fact that the said detection devices comprise: a first sensor 8, wired to the microprocessor 100, located at the side of the trays 5 on the article 3 infeed line 1 and mounted on a movable element 9 carried by a slide 10 able to move vertically and actuated by the said first electromechanical means 13 including motor 13a mounted on the said slide to which are wired a sensor 14 for defining the stroke limit thereof and another sensor 15 for measuring the vertical displacements thereof, the said motor 13a being controlled by the microprocessor 100 and the sensors 8, 14 and 15 wired to this; a second sensor 12 mounted on the said movable element 9 and wired to the microprocessor 100, the said second sensor being designed to detect the rotation of the said movable element 9 consequent to the raising of the first sensor as a result of the interception of this against the stack of articles 3 underneath, in order to cancel, in accordance with predetermined logic the data supplied to the microprocessor 100 by the first sensor 8.

5. An automatic machine according to Claim 1 characterized by the fact that the said means for the defining of the "raised" and "lowered" positions of the said movable segment 34a comprise: a spherical element 87 partially projecting through the action of spring 88, from one end of a block 86 secured to the said movable segment 34b, the said spherical element 87 being designed to both to fit into a socket 89 and to intercept a surface 83 belonging to the fixed segment 34a, in

order to define the said lowered and raised positions of the said movable segment 34b.

6. An automatic machine according to Claim 1 characterized by the fact that the said means 85 for adjusting the alignment of the movable segment 34b, in the said "lowered" position, in relation to the fixed segment 34a, consists of an element that is operated from the outside connected to the said movable element 34b, the said element being designed to go flush up against a surface 83 on the said fixed segment 34a in order to adjust the alignment between the said fixed segment 34a and the said movable segment 34b.

Patentansprüche

1. Automatische Maschine zur kontinuierlichen Verpackung von Artikeln, wobei genannte Maschine folgendes umfasst: zwei Zufuhrbahnen (1, 2) jeweils für Artikel (3) und Behälter (4), die komplanar und nebeneinander zu einer Einführstation (S) dieser Artikel (3) in entsprechende Behälter (4) laufen; ein Magazin (6), das der Zufuhrbahn der Artikel (3) vorgeschaltet ist und zum Einsetzen einer bestimmten Anzahl von Artikeln (3) in die auf letzterer Bahn vorgesehenen Aufnahmekassetten (5) dient; zwischen genanntem Magazin (6) und genannter Einführstation (S) angeordnete Organe (8) zur Erfassung der Anzahl von Artikeln in jeder Kassette, wobei genannte Erfassungsorgane (8) vertikal beweglich sind; ein zweites Magazin (16) zur Aufnahme genannter zusammengeklappter Behälter (4), welche unter und vor der Zufuhrbahn (2) der Behälter angeordnet ist; eine zwischen dem zweiten Magazin (16) und der Artikelzufuhrbahn angeordnete Vorrichtung (17) zum Aufrichten genannter zusammengeklappter Behälter; mindestens zwei, über der genannten Behälterzufuhrbahn (2) angeordnete Längsstäbe (34) zum Anschlag und zur Führung der darunterliegenden Behälter (4), die durch die Wirkung der Mitnehmerorgane (31) auf einer Längsbahn (30) laufen; eine Vorrichtung (35, 36) zur massgerechten Einstellung dieser Längsstäbe (34); eine mit der Behälterzufuhrbahn (2) verbundene und nach der genannten Station (S) angeordnete Prägeeinheit (50), welche zur Kennzeichnung der bereits mit den Artikeln gefüllten Behälter mit einer Buchstaben- und/oder zahlenkombination dient; wobei genannte Maschine dadurch gekennzeichnet ist, dass sie folgende Elemente umfasst: erste elektromechanische Organe (13) zur massgerechten Einstellung der genannten Erfassungsorgane (8), welche mit Sensoren (14, 15) zur Messung dieses Masses versehen sind; zweite elektromechanische Organe (19) zur Höheneinstellung des genannten zweiten Magazins (16), welche mit Sensoren (21, 22) zur Messung genannter Höhe versehen sind; dritte elektromechanische Organe (26, 27) zur Breiteneinstellung des genannten zweiten Magazins (16), welche mit Sensoren (28a, b, 29a, b) zur Messung genannter Breite versehen sind; mindestens zwei elektromechanische Einheiten (36) für jeden der genannten Längsstäbe (34) zur Einstellung des Masses der entsprechenden Stäbe, welche mit Sensoren (41, 42, 46, 47) zur Messung des Masses der genannten Stäbe (34) versehen sind; vierte elektromechanische Organe (52) zur Höheneinstellung der genannten Prägeeinheit (50), welche mit Sensoren (54, 55) zur Messung genannter Höhe versehen sind; eine Mikroprozessoreinheit (100), welche elektrisch verbunden ist mit den genannten elektromechanischen Organen (36) und den entsprechenden Sensoren sowie mit den Arbeitsorganen des ersten Magazins (6), die das Entladen einer vorbestimmten Anzahl von Artikeln (3) in die Kassetten (5) der Artikelzufuhrbahn (1) bestimmen, wobei genannte Mikroprozessoreinheit (100) zur Steuerung genannter Organe und der elektromechanischen Einheiten in bezug auf ein vorgegebenes Programm und mit Hilfe der von genannten Sensoren an die Mikroprozessoreinheit übertragenen elektrischen Informationen dient.

2. Automatische Machine gemäss Patentanspruch 1, dadurch gekennzeichnet, dass jeder Längsstab (34) aus zwei Segmenten (34a, 34b), d.h. einem beweglichen und einem unbeweglichen Segment besteht, die mittels Scharnier (81) aneinander angelenkt sind, wobei das bewegliche Segment (34b) an der genannten Einführstation (S) angeordnet ist und zwischen zwei Endstellungen, d.h. der oberen und unteren, beweglich ist; und ausserdem dadurch gekennzeichnet, dass Organe (85) zur Fluchtung des beweglichen Segments (34b) in genannter unteren Stellung mit dem unbeweglichen Segment (34a) vorgesehen sind.

3. Automatische Maschine gemäss Patentanspruch 1, dadurch gekennzeichnet, dass die genannten elektromechanischen Einheiten (36) jeweils folgende Elemente umfassen: einen an einem entsprechenden Längsstab (34) befestigten Querarm (35), der zur Aussenseite der Zufuhrbahn (2) der Behälter (4) weist; einer Muffe (37), die durch einen Vorsprung am oberen Ende den genannten Arm stützt und durch eine Aussparung in der Maschinenstruktur senkrecht gleitend geführt wird, wobei genannte Aussparung unter der genannten Bahn (2) verläuft; einem Schaft (39), der koaxial in die Muffe (37) eingeführt ist und mit letzterer verschraubt ist; elektromechanische Organe (79), die mit einem durch die Mikroprozessoreinheit (100) gesteuerten Motor (40) versehen sind und auf das untere Ende des Schaftes (39) wirken, um diesen in Drehung zu versetzen; einen Sensor (41) zur Erfassung des Hubendes der genannten Muffe (37), welcher mit genannter Mikroprozessoreinheit (100) verbunden ist; einen weiteren Sensor (42) zur Messung der vorgegebenen Umdrehungsbruchteile des genannten Schafts (39), wobei dieser Sensor (42) mit der Mikroprozessoreinheit (100) verbunden ist.

4. Automatische Maschine gemäss Patentanspruch 1, dadurch gekennzeichnet, dass genannte Erfassungsorgane folgende Elemente umfassen: einen ersten, mit der Einheit (100) verbundenen Sensor (8), der seitlich an den Kas-

setten (5) der Zufuhrbahn (1) der Artikel (3) angeordnet ist und an einem auf einem Schlitten (10) angeordneten beweglichen System (9) montiert ist, wobei der Schlitten senkrecht verstellbar und von genannten ersten elektromechanischen Organen (13) mit einem an dem Schlitten angebrachten Motor (13a) angetrieben wird, wobei der Schlitten mit einem Sensor (14) zur Bestimmung des jeweiligen Hubendes sowie mit einem weiteren Sensor (15) zur Messung der vertikalen Verstellungen versehen ist, wobei genannter Motor (13a) von der Einheit (100) gesteuert wird und genannte Sensoren (8, 14, 15) mit der selben Einheit (100) verbunden sind; einen zweiten Sensor (12), der an genanntem beweglichen System (9) befestigt und mit der Mikroprozessoreinheit (100) verbunden ist, wobei dieser zweite Sensor dazu dient, die Drehung des beweglichen Systems (9) infolge des Hinauffahrens des ersten Sensors zu erfassen, das durch dessen Anschlag am darunterliegenden Stapel von Artikeln (3) bewirkt wird, um die vom ersten Sensor (8) an die Einheit (100) übertragene Information gemäss einer vorgegebenen Logik zu löschen.

5. Automatische Maschine gemäss Patentanspruch 2, dadurch gekennzeichnet, dass die genannten Organe zur Bestimmung der beiden Endstellungen, d.h. der "unteren" bzw. "oberen" Stellung des genannten beweglichen Segments (34a) folgende Elemente umfassen: eine Kugel (87), die durch die Wirkung von elastischen Elementen (88) teilweise aus dem Kopfteil eines mit genanntem Segment (34b) verbundenen Metallstücks (86) vorsteht, wobei genannte Kugel (87) sowohl in einer Aussparung (89) aufgenommen wird als auch an einer Fläche (83) anschlägt, welche zum unbeweglichen Segment (34a) gehören, um genannte "untere" bzw. "obere" Stellung des genannten beweglichen Segments (34b) zu bestimmen.

6. Automatische Maschine gemäss Patentanspruch 2, dadurch gekennzeichnet, dass die genannten Organe (85) zur Fluchtung des beweglichen Segments (34b) mit dem unbeweglichen Segment (34a) in genannter "unterer" Stellung aus einem von aussen betätigbaren und mit genanntem beweglichen Segment (34b) verbundenen Element besteht, wobei genanntes Element zum Anschlag einer Fläche (83) des genannten unbeweglichen Segments (34a) zwecks Fluchtung zwischen genanntem unbeweglichen und beweglichen Segment (34a, 34b) vorgesehen ist.

Revendications

1. Machine automatique pour le conditionnement d'articles en continu, ladite machine comprenant: deux chaînes d'alimentation (1, 2), respectivement d'articles (3) et d'emballages (4), situées sur le même plan et côte à côte au niveau d'une station d'insertion (S) desdits articles (3) dans lesdits emballages (4); un magasin (6), situé en amont de la chaîne d'alimentation des articles (3), destiné à mettre dans des casiers (5), prévus sur cette dernière chaîne (1), une quantité préalablement fixée d'articles (3); des organes (8), situés entre ledit magasin (6) et ladite station d'insertion (S), pour détecter le nombre d'articles se trouvant dans chaque casier, lesdits organes (8) de détection se déplaçant verticalement; un deuxième magasin (16) contenant les emballages (4) de forme tubulaire aplatie, situé endessous, et en amont, de la chaîne d'alimentation (2) des emballages; un dispositif (17), situé entre le deuxième magasin (16) et la chaîne d'alimentation des articles, destiné à transformer les emballages se présentant sous forme tubulaire aplatie en boites parallélépipèdiques correspondantes; au moins deux barres longitudinales (34), situées au-dessus de ladite chaîne (2) d'alimentation des emballages, servant de butée et de guide aux emballages (4) sous-jacents avançant sur une piste longitudinale (30) sous l'action d'organes d'entraînement (31); un dispositif (35, 36) pour le réglage linéaire de la cote desdites barres longitudinales (34); un groupe de chiffrage (50) associé à la chaîne d'alimentation (2) des emballages, situé en aval de ladite station (S) et destiné à estampiller les emballages, dans lesquels sont déjà insérés les articles correspondants, avec une combinaison préalablement fixée de lettres et/ou de chiffres; ladite machine étant caractérisée en ce qu'elle comprend: des premiers organes électro-mécaniques (13) pour le réglage de la cote desdits organes (8) de détection, associés à des capteurs (14, 15) pour la mesure de ladite cote; des seconds organes électro-mécaniques (19) pour le réglage de la hauteur dudit deuxième magasin (16), associés à des capteurs (21, 22) pour mesurer ladite hauteur; des troisièmes organes électro-mécaniques (26, 27) pour le réglage de la largeur dudit deuxième magasin (16), associés à des capteurs (28a, b, 29a, b) pour la mesure de ladite largeur; au moins deux unités électro-mécaniques (36) pour chacune desdites barres longitudinales (34), pour le réglage de la cote desdites barres, associées à des capteurs (41, 42, 46, 47) pour la mesure de la cote desdites barres (34); des quatrièmes organes électro-mécaniques (52) pour le réglage de la hauteur dudit groupe de chiffrage (50), associés à des capteurs (54, 55) pour la mesure de ladite hauteur; une unité à microprocesseur (100) à laquelle sont raccordés électriquement lesdits organes électro-mécaniques (36) et capteurs associés, ainsi que les organes opérationnels du premier magasin (6) destinés à imposer le déchargement d'un nombre prédéterminé d'articles (3) dans les casiers (5) de la chaîne (1) d'alimentation des articles, ladite unité à microprocesseur (100) étant destinée à commander lesdits organes et unités électro-mécaniques par l'intermédiaire d'un programme pré-établi et des informations électriques qui lui ont été envoyées par lesdits capteurs.

2. Machine automatique, selon la revendication 1, caractérisée en ce que chaque barre longitudinale (34) est composée de deux segments (34a, 34b), respectivement fixe et mobile, articulés entre eux par l'intermédiaire d'une charnière (81), ce segment mobile (34b) étant placé face à ladite

station d'insertion (S) et se déplaçant entre deux positions extrêmes respectivement basse et haute; et étant caractérisée en outre par des organes (85) pour le réglage de alignement du segment mobile (34b), en dite position basse, par rapport au segment fixe (34a).

3. Machine automatique, selon la revendication 1, caractérisée en ce que chacune desdites unités électromécaniques (36) comprend: un bras transversal (35) fixé à une barre longitudinale correspondante (34) et tourné vers l'extérieur de la chaîne (2) d'alimentation des emballages (4); un manchon (37) supportant en porte à faux, sur l'extrémité supérieure, ledit bras, et coulissant verticalement dans une glissière réalisée dans la structure de la machine automatique, ladite glissière descendant en-dessous de ladite chaîne (2); une tige (39) insérée coaxialement à l'intérieur du manchon (37) et vissée sur celui-ci; des organes électromécaniques (79), actionnés par un moteur (40) commandé par l'unité à microprocesseur (100), agissant sur l'extrémité inférieure de la tige (39) afin de l'entraîner en rotation; un capteur (41), pour la détection du fin de course dudit manchon (37), raccordé à ladite unité à microprocesseur (100); un autre capteur (42) pour mesurer des fractions prédéterminées du tour de ladite tige (39), ce même capteur (42) étant raccordé à l'unité à microprocesseur (100).

4. Machine automatique, selon la revendication 1, caractérisée en ce que lesdits organes de détection comprennent: un premier capteur (8), relié à l'unité (100), positionné sur le côté des casiers (5) de la chaîne (1) d'alimentation des articles (3) et monté sur un dispositif mobile (9) porté par une coulisse (10), se déplaçant verticalement, qui est actionnée par lesdits premiers organes électromécaniques (13) comprenant un moteur (13a) monté sur ladite coulisse à laquelle sont associés un capteur (14) pour la définition du fin de course correspondant ainsi qu'un autre capteur (15) pour mesurer ses déplacements verticaux, ledit moteur étant commandé par l'unité (100) et lesdits capteurs (8, 14, 15) reliés à la même unité (100); un deuxième capteur (12) monté sur ledit dispositif mobile (9) et relié à l'unité à microprocesseur (100), ledit deuxième capteur étant destiné à détecter la rotation du dispositif mobile (9) à la suite du soulèvement du premier capteur provoqué par sa butée contre la pile d'articles sous-jacente (3), pour annuler, selon une logique préalablement déterminée, l'information fournie à l'unité (100) par le premier capteur (8).

5. Machine automatique, selon la revendication 2, caractérisée en ce que lesdits organes pour la définition des deux positions extrêmes, respectivement "basse", dudit segment mobile (34a), comprennent: une bille (87) dépassant partiellement, sous l'action d'organes élastiques (88), d'une extrémité d'un bloc (86) associé audit segment mobile (34b), ladite bille étant destinée, d'une part à s'engager dans une cavité, d'autre part à intercepter un plan (83), ces derniers appartenant au segment fixe (34a), à définir lesdites positions "basse" et "haute" dudit segment mobile (34b).

6. Machine automatique selon la revendication 2, caractérisée en ce que que lesdits organes (85) pour le réglage de l'alignment du segment mobile (34b), dans ladite position "basse", par rapport au segment fixe (34a), sont constitués d'un élément actionnable de l'extérieur associé audit élément mobile (34b), cet élément étant destiné à venir buter contre un plan (83) dudit segment fixe (34a) pour régler l'alignement auxdits segments fixes et mobiles (34a, 34b).

FIG.1

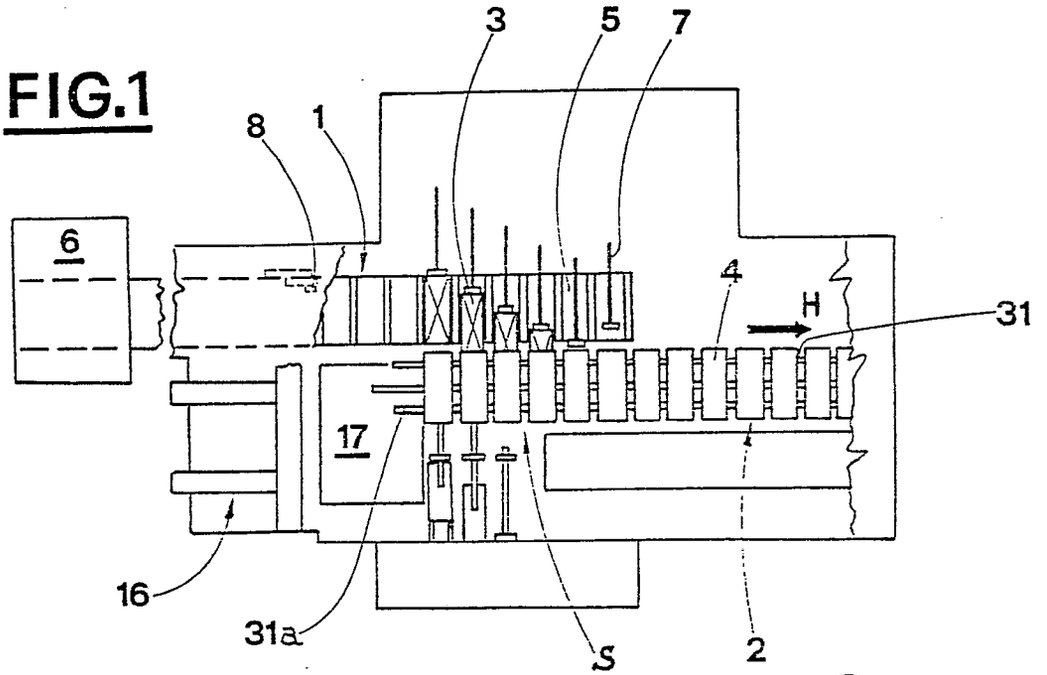
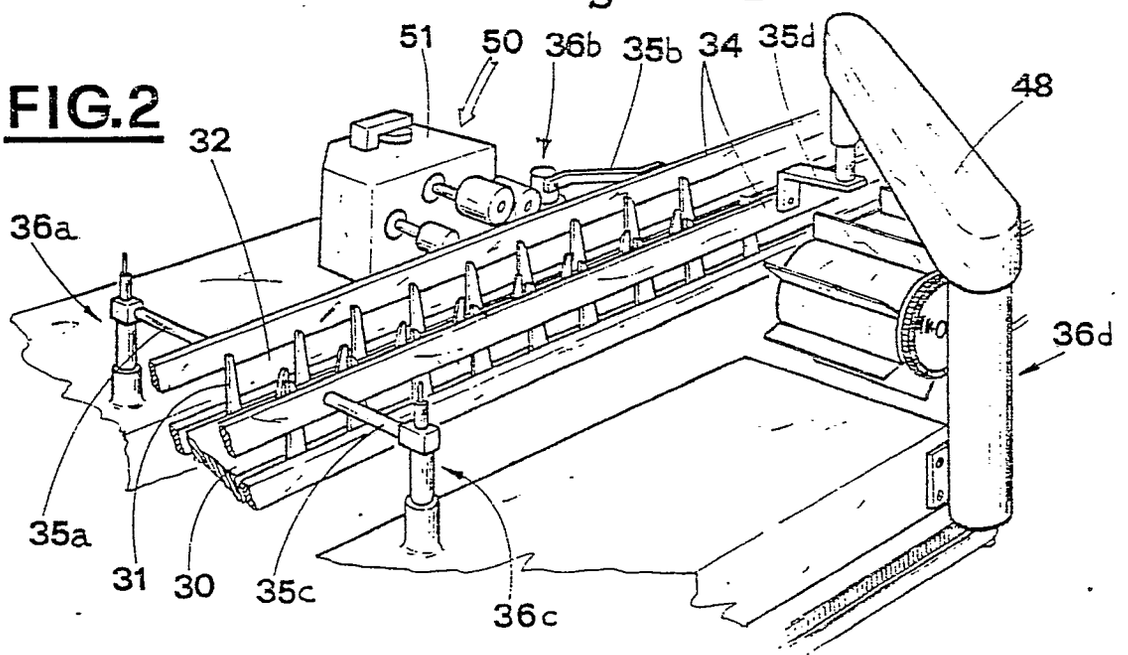


FIG.2



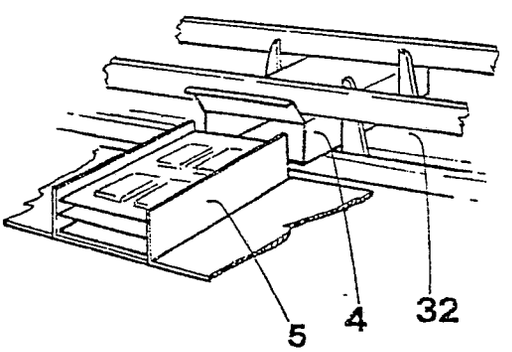
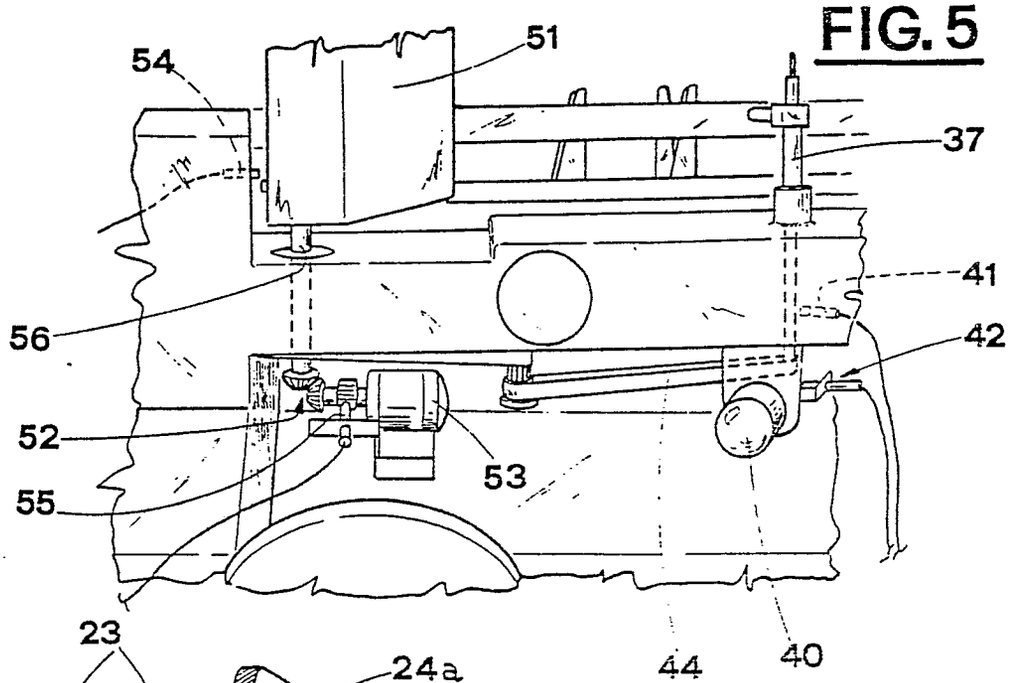


FIG.3

FIG. 5



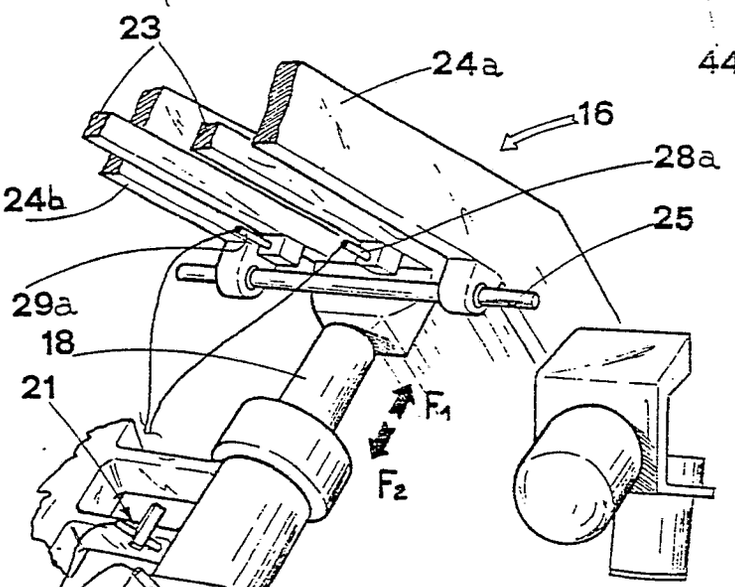


FIG. 6a

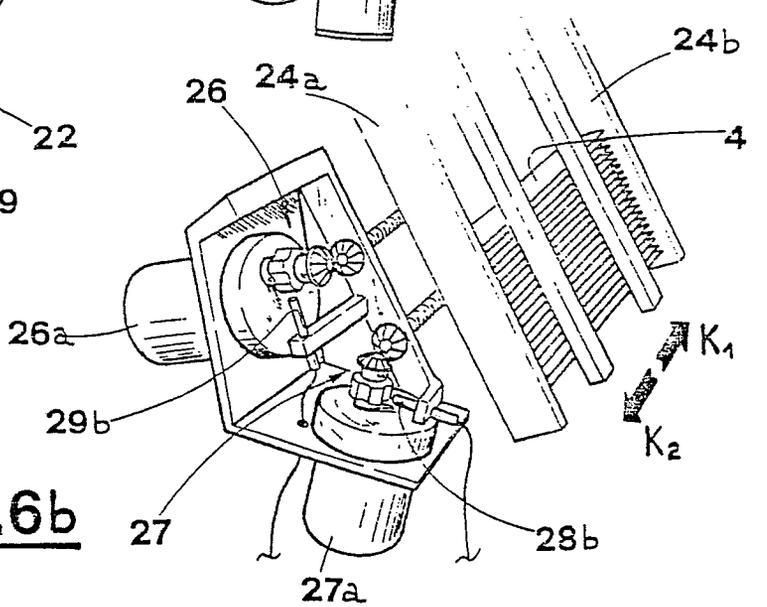


FIG. 6b

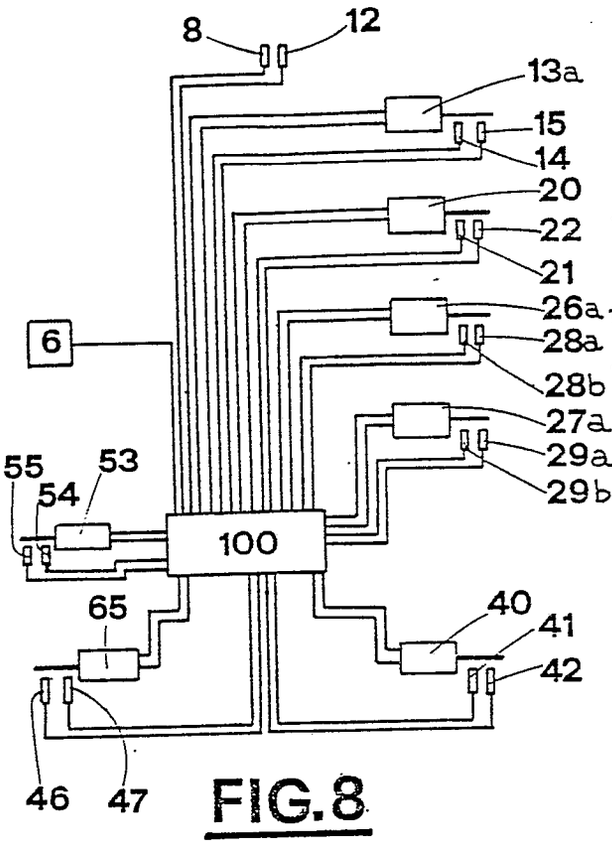


FIG.8

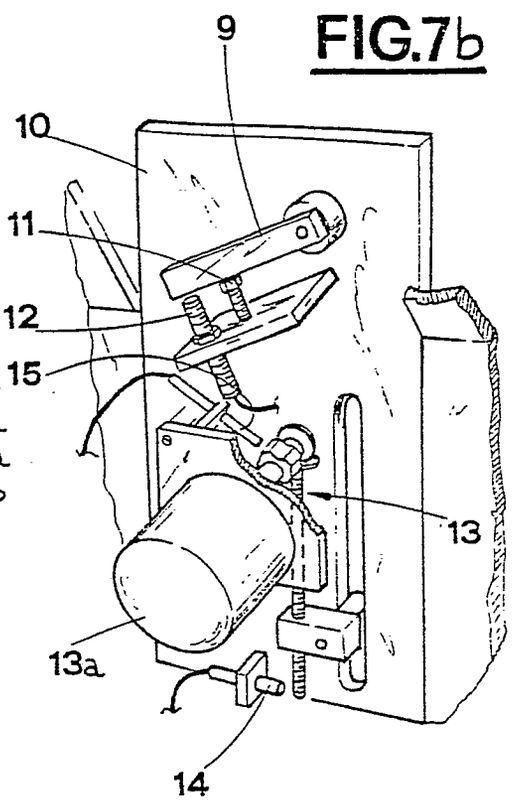
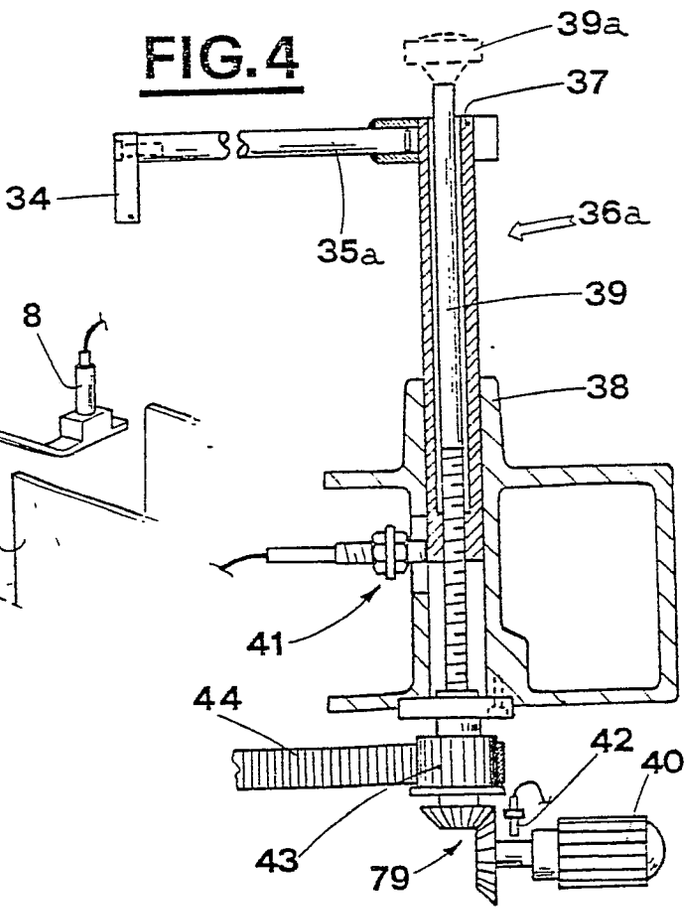


FIG.7b

FIG.4



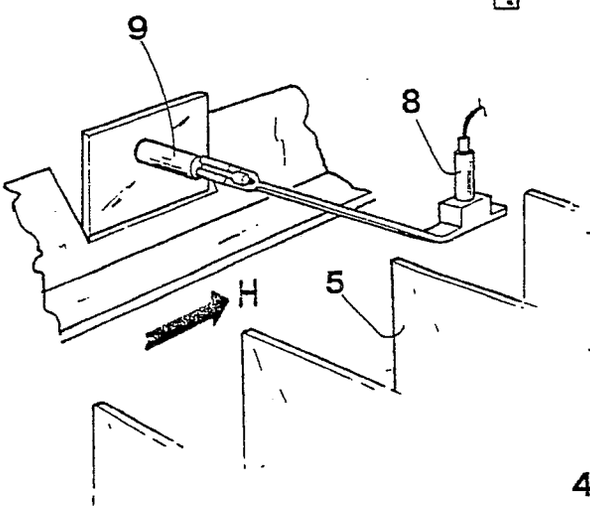
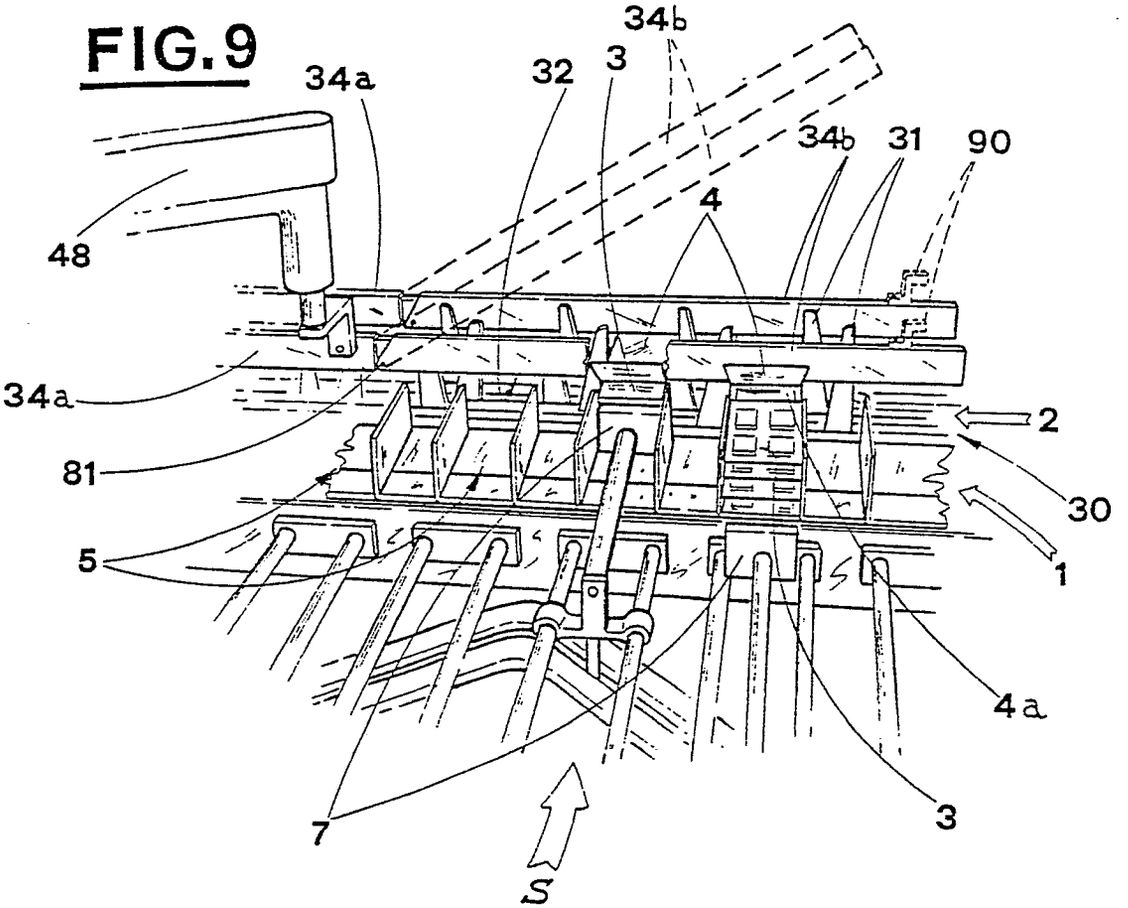


FIG.7a

FIG.9


34b
34a
32
3
34b
31
90
4
48
34a
2
81
30
5
1
4a
3
7
S

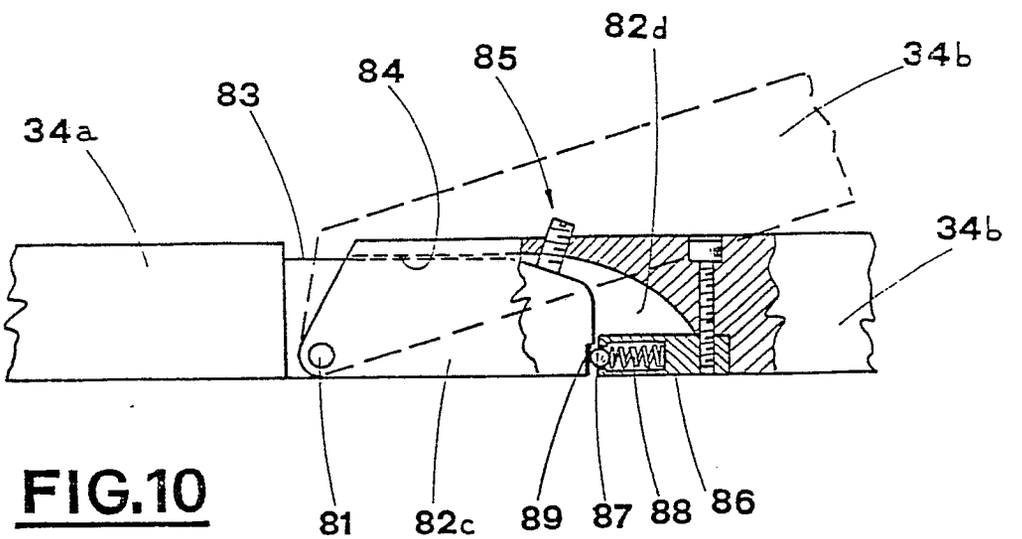

82d
34b
84
85
83
34a
34b
81
82c
89
87
88
86

FIG.10