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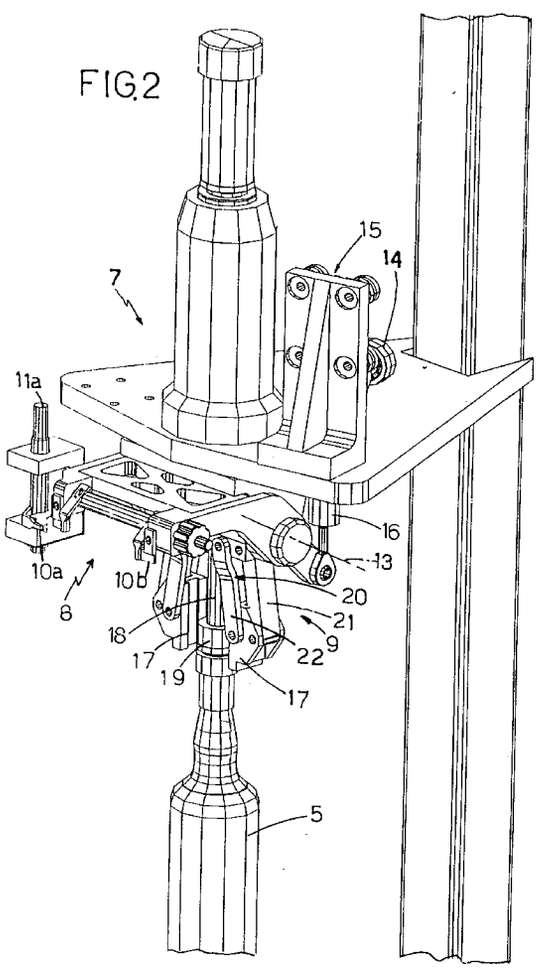
(54) A labelling machine, in particular for the application of a seal label to a container

(57) In a labelling machine serving particularly for the application of a seal label (4) folded to assume an upturned "U" profile and positioned straddling the cap (6) of a bottle (5), each labelling station is equipped with a gripping and positioning assembly (8) comprising a set of grippers (10) arranged in such a way that the label (4) can be taken up at a point on one of its longer sides by at least one gripper (10b) of the set. Consequently, labels are held straight and taut when offered to the bottles, and positioned to best advantage. The machine is also designed to accommodate labels of different length without the need for any major alteration or adjustment of the grippers and associated parts.

FIG.2



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Description

The present invention relates to a labeller, and in particular to a machine for the application of a closure seal label to a container.

The prior art embraces machines capable of affixing a preprinted slip of paper, or seal, to bottles of liqueurs and spirits in general, indicating both that excise has been paid by the manufacturer and that the contents of the bottle are intact.

A seal of the type in question straddles the cap of the bottle and, when in place, exhibits a profile substantially of upturned "U" shape consisting in a central portion glued to the topmost surface of the cap, and two lateral portions or leaves folded down and glued to the bottle neck on either side.

A first drawback betrayed by this type of labelling operation is that certain machines employ different types of glue with which to take up the labels onto the pallets or segments serving each labelling unit and then to affix them to the bottles: for example, the use of both cold and hot melt adhesives leads to difficulties in handling the two types of glue, cleaning problems, and even machine stoppages.

A further drawback arises after the label has been positioned on the cap and before the leaves are folded, smoothed and secured to the sides of the bottle, in that the slip of material is free to bend under the centrifugal force generated by the incoming star wheel conveyor of the machine, the weight of the glue and the moisture on the leaves, assuming a position by which the subsequent step of smoothing and securing the leaves is significantly hampered and in any event made less than precise.

Another drawback is evident in the fact that the labelling unit which applies the seals will tend normally to be located on one side of the machine, relative to the axis of the infeed conveyor belt, whereas the unit by which other labels are applied to the body of the bottle is located on the side opposite.

Accordingly, the operator must pass over or under the belt from side to side in order to fill the magazines of the labelling units, or alternatively, a second operator is required.

Italian patent n° 1069481 discloses a machine for the application of straddle type cap seal labels to containers, in which the drawbacks mentioned above are largely overcome. In effect, the machine in question utilizes one type of glue only, and the labelling units are all positioned on one side in relation to the axis of the infeed conveyer belt, thus requiring the attention of one operator only.

Despite the use also of grippers for the purpose of application, the label remains insufficiently taut and in any event not perfectly positioned, so that the lateral portions or leaves are liable to hamper the subsequent smoothing and securing operation.

This problem stems from the fact that the label is picked up and held vertically in such a manner as to describe an arc to a circle, when seen edgeways on, then rotated and positioned on the cap while continuing to retain the curvature of the arc.

The patent machine comprises a carousel, rotatable in rigid association with a vertical centre shaft, and means by which the labels are positioned on the caps of relative bottles: such means consist in a pair of grippers designed to pick up a label by the ends from a magazine and then offer it to the cap following a rotation of 90°, during which the label is transferred from a position occupying a vertical plane to a position occupying a horizontal plane.

The label is seized by the grippers at points on the two shorter opposite sides.

Also forming part of the patent machine are means, consisting in pads, by which the lateral portions or leaves of the label are bent and flattened.

Nonetheless, such a machine is unable to operate in an easy and practical manner with seal labels of different lengths.

The object of the present invention is to overcome the drawbacks in question, by providing a labelling machine for the application of upturned "U" profile or straddle type seal labels to containers, such as will be capable of maintaining the label suitably tensioned and substantially flat during the step of application to the container.

A further object of the invention is to provide a labelling machine able to apply seals of different lengths, typically 150 to 190 mm or thereabouts, with minimal adjustments of the parts by which the label is gripped and affixed to the container.

The stated objects are comprehensively realized by a labelling machine in accordance with the present invention, which is characterized as in the claims appended, and particularly, in that it incorporates gripping and positioning means comprising gripper elements embodied and arranged in such a way that a label of elongated geometry can be restrained on its longer side by at least one such element.

To advantage, the gripping means will comprise a first gripper element by which the seal label is restrained laterally on one shorter side, for the sole purpose of bringing about its separation from a relative pallet or segment, and at least one pair of gripper elements designed to restrain the label by one longer side, positioned uppermost.

In a preferred embodiment, each gripper element is composed of a first jaw associated with a spindle rotatable in relation to a fixed structure, and a second jaw associated rigidly with the structure.

The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- fig 1 shows the gripping and positioning means of the machine disclosed, viewed in perspective;
- fig 2 is a further perspective illustrating the compo-

nents of a unit by which seal type labels are affixed to the tops of bottles;

- fig 3 shows the gripper elements of the machine, illustrated in a side elevation, partly in section and in two different operating configurations;

- fig 4 illustrates the gripper elements and a part of means by which the seal label is smoothed and secured, viewed in elevation and partly in section;

- fig 5 is an overall plan view of the labelling station in the machine disclosed.

With reference to the drawings, and to fig 5 in particular, 1 denotes a segment or pallet 1 keyed to a rotatable shaft 2 carried by a structure 3 that supports a number of such shafts 2 furnished with relative segments 1, in conventional manner.

Likewise in conventional manner, the segments 1 are designed to enter into contact with a glueing or gumming roller, by which each one in turn is spread with a film of adhesive, and then to pick up single labels 4 from a magazine (not illustrated).

In the application to which the invention relates, the label 4 consists preferably in a slip of paper, or seal, rectangular in shape and measuring between 150 mm and 190 mm in length, such as can be glued and bent to assume an upturned "U" profile over the top or cap 6 of a container, typically a bottle 5, advancing through the labelling machine.

In fig 2 of the drawings, 7 indicates one of a set of labelling heads in the machine, spaced apart at equal distance around a rotatable platform.

Each such head 7 comprises means by which to grip and position the label, denoted 8 in their entirety and illustrated in more detail in figs 1, 3 and 4, also smoothing means denoted 9 in their entirety.

The purpose of the gripping and positioning means 8 is to pick up a single label 4 from the relative segment or pallet 1, then to set it on the cap of a bottle, straight and taut, in such a way that the two projecting leaves 4a are disposed substantially symmetrical in relation to the cap, i.e. ensuring that the label is centred correctly on the cap.

The means 8 in question comprise three grippers or gripper elements 10: a first single element 10a designed to grip the label laterally by one of the shorter sides, and a pair of elements 10b by which the label is gripped from above at points along the longer side positioned uppermost.

In effect, the function of the single gripper 10a is to detach or separate the label from a relative segment 1, whilst that of the paired grippers 10b is to position the label on the cap of the bottle.

In a preferred solution, the paired grippers 10b are disposed symmetrically in relation to the neck of the bottle, in such a manner as to restrain the label at points equidistant from the cap.

Moreover, the grippers 10b operate in a space where there can be no interference with the cap of the bottle, and therefore are positioned advantageously in such a way as to restrain the longer top edge of the label at points near to the respective ends.

The grippers 10a and 10b are mounted to respective spindles 11a and 11b, of which the angular movement causes the jaws of the grippers to open and close: more exactly, each gripper is composed of a movable first jaw 30, associated with the relative spindle and rotatable in relation to a carrying structure or carrier 12, and a fixed second jaw 31 rigidly associated with the carrier 12 and functioning also as a locating element.

The rotation of the spindle 11b carrying the paired grippers is induced by rollers 40 engaging relative cams 41 (fig 3).

The rotation of the spindle 11a carrying the single gripper is induced by a cam and roller arrangement not illustrated in the drawings but similar to that already described.

The carrier 12 is rotatable through 90° about a substantially horizontal axis 13 in such a way as to transfer the label 4 from a vertically disposed position (in which separation from the relative segment occurs) to a horizontally disposed position (in which the label is offered to the cap 6 of the bottle).

The rotation of the carrier 12 is produced by a roller 14 positioned to engage a cam associated with and describing a closed loop trajectory on the rotating carousel part of the labelling machine.

In following the cam, the roller 14 is made to rise and fall alternately within a vertical guide 15.

The roller 14 is connected to the carrier 12 by way of a damper strut 16.

18 denotes the push rod of an alignment mechanism terminating at bottom in a pad 19 and designed to operate from above the bottle, once the label has been offered to the cap through the agency of the grippers 10b, by pressing and glueing the central part of the label down onto the cap.

The label continues to be held taut between the grippers 10b while being affixed to the cap.

The smoothing means 9 come into operation after the label 4 has been secured initially to the cap, and serve to flatten and smooth the leaves 4a against the neck of the bottle, thus favouring a uniform adhesion of the entire label to the bottle with the leaves essentially vertical and mutually parallel.

The smoothing means 9 comprise a pair of pads 17 in resilient material invested by lever linkages 20 with lateral movement toward and away from the neck of the bottle.

Each pad 17 is operated by a relative linkage 20 comprising a pair of connecting rods 21 and 22.

A first connecting rod 21 is pivotably associated at the bottom end with the pad 17 and anchored at the top end to a first support 23 translatable vertically in rigid as-

sociation with a sleeve 42, by which the push rod 18 of the alignment mechanism is coaxially ensheathed; the top extremity of the rod 21 is also free to slide in an angled slot 24 afforded by the first support 23.

A second connecting rod 22 is pivotably associated with the selfsame pad 17 at the bottom end, and with a second support 25 at the top end, the second support 25 being translatable vertically together with the push rod 18 of the alignment mechanism and associated with the movement of the latter by way of a spring 26 seated between the two supports 23 and 25.

The first connecting rod 21 and second support 25 are also articulated about an intermediate fulcrum denoted 27.

With this arrangement, the smoothing pads 17 are lowered initially together with the pad 19 of the alignment mechanism, descending to the point at which the latter pad enters into contact with the cap of the bottle and the second support 25 strikes against a corresponding resilient descent travel limiter 53, whereupon the first support 23 descends further, overcoming the resistance of the spring 26 and causing the first connecting rod 21 to rotate about the intermediate fulcrum 27.

This further movement of the rod is permitted by the angled slot 24.

As a result, the pads 17 are caused to translate horizontally toward the bottle, and the intervening leaves 4a of the label thus flattened and smoothed against the neck.

The single gripper 10a, which lifts the label from the segment 1, is mounted by way of a respective bracket 52 to a plate 50 provided with slots 51, so that a movement of the plate 50 along the line of the slots 51 will suffice to alter the position of all the grippers, adapting them in a highly simple and uniform manner to labels of different length.

In a preferred embodiment, each slot 51 describes a sector to a circle of which the radius of curvature is equal to the distance from the axis of rotation of the revolving platform, of which the plate 50 forms a part.

In operation of the machine, the bottle is raised on a pedestal or baseplate, not illustrated, to the point of entering into contact with a label, which will already have been picked up by the gripping means and rotated through 90° into the horizontal position.

With the label 4 held taut in this same position by the paired grippers 10b, the alignment mechanism descends to the point at which the pad 19 pins the central part of the label against the cap 6 of the bottle.

The grippers reascend in readiness to take up the next label, whilst the smoothing pads 17 descend and close on the neck of the bottle, flattening and sticking the leaves of the label.

With the grippers operating on one of the longer sides of a rectangle in the manner described and illustrated, it becomes possible to keep the label properly taut and avoid the problems of application associated with conventional labelling machines.

A further advantage is provided by the adoption of the slotted plate 50, which allows the same machine to operate with different types of labels or seals varying in nominal length between 150 and 190 mm: indeed, the machine is set up simply by moving the plate 50 to reposition the bracket of the single gripper 10a, which serves to pick up the label, and changing the segments and the label magazine, with no need to carry out any complicated adjustments or replacements of mechanical parts.

Claims

1) A labelling machine, in particular for applying a seal label (4) to a container (5), of the rotary type consisting in a carousel with a plurality of labelling heads (7) equipped with gripping and positioning means (8) by which the single label (4) is restrained and offered correctly to the cap (6) of the container, also with smoothing means (9) by which projecting lateral portions (4a) of the label are pressed laterally against and glued to the neck of the container on either side, characterized in that gripping and positioning means (8) comprise gripper elements (10) embodied in such a way that at least one such element (10b) will restrain the label (4) along a side positioned uppermost and of length greater than other sides.

2) A machine as in claim 1, wherein the gripper elements (10) comprise:

- at least one first gripper element (10a) by which the label (4) is restrained laterally on one side of shorter length and detached thus from a relative conveying pallet or segment (1);

- at least one pair of gripper elements (10b) by which the label (4) is restrained along one side of greater length, positioned uppermost.

3) A machine as in claim 2, wherein each gripper element (10) is composed of a first jaw associated with a spindle (11) rotatable in relation to a supporting structure (12), and a second jaw rigidly associated with the supporting structure.

4) A machine as in claim 2, wherein the gripper elements (10b) are positioned in such a way as to avoid interference with the cap (6) of a container to which the seal label (4) will be affixed.

5) A machine as in claim 2, wherein the gripper elements (10b) are positioned in such a way as to restrain the seal label (4) at points equidistant from the cap (6) of a container to which the label will be affixed.

6) A machine as in claim 1, comprising a gripper element (10a) serving to detach the label (4) from a conveying pallet or segment (1), wherein such an element (10a) is mounted to a relative bracket (52) rigidly associated with a plate (50) affording slots (51), in such a way that the position of the plate (50) in relation to the pallet or segment can be altered according to the length of the label.

7) A machine as in claim 1, comprising alignment means consisting in a rod (18) furnished at the bottom end with a pad (19), by which the seal label (4) is affixed initially to the cap (6) of a container, and connected with linkages operating a pair of further pads (17) by which the projecting lateral portions (4a) of the label are pressed and smoothed laterally against the container (5).

8) A machine as in claim 1, wherein the smoothing means (9) comprise a pair of pads (17) capable of translational movement in a substantially vertical direction and of movement toward and away from the container (5), and are interlocked to container alignment means furnished with a pad (19) by which the label is affixed initially to the cap of the container.

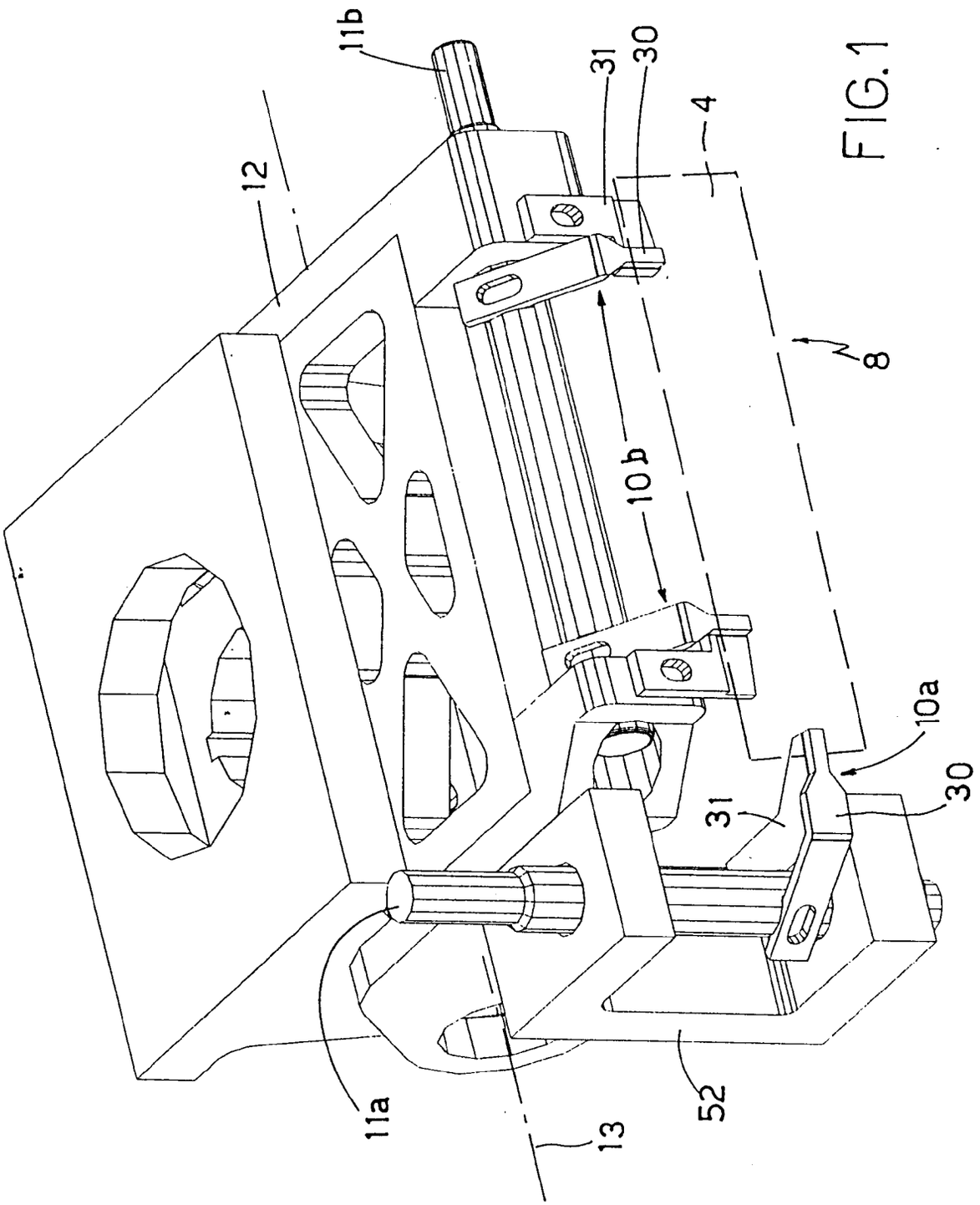


FIG. 1

FIG.2

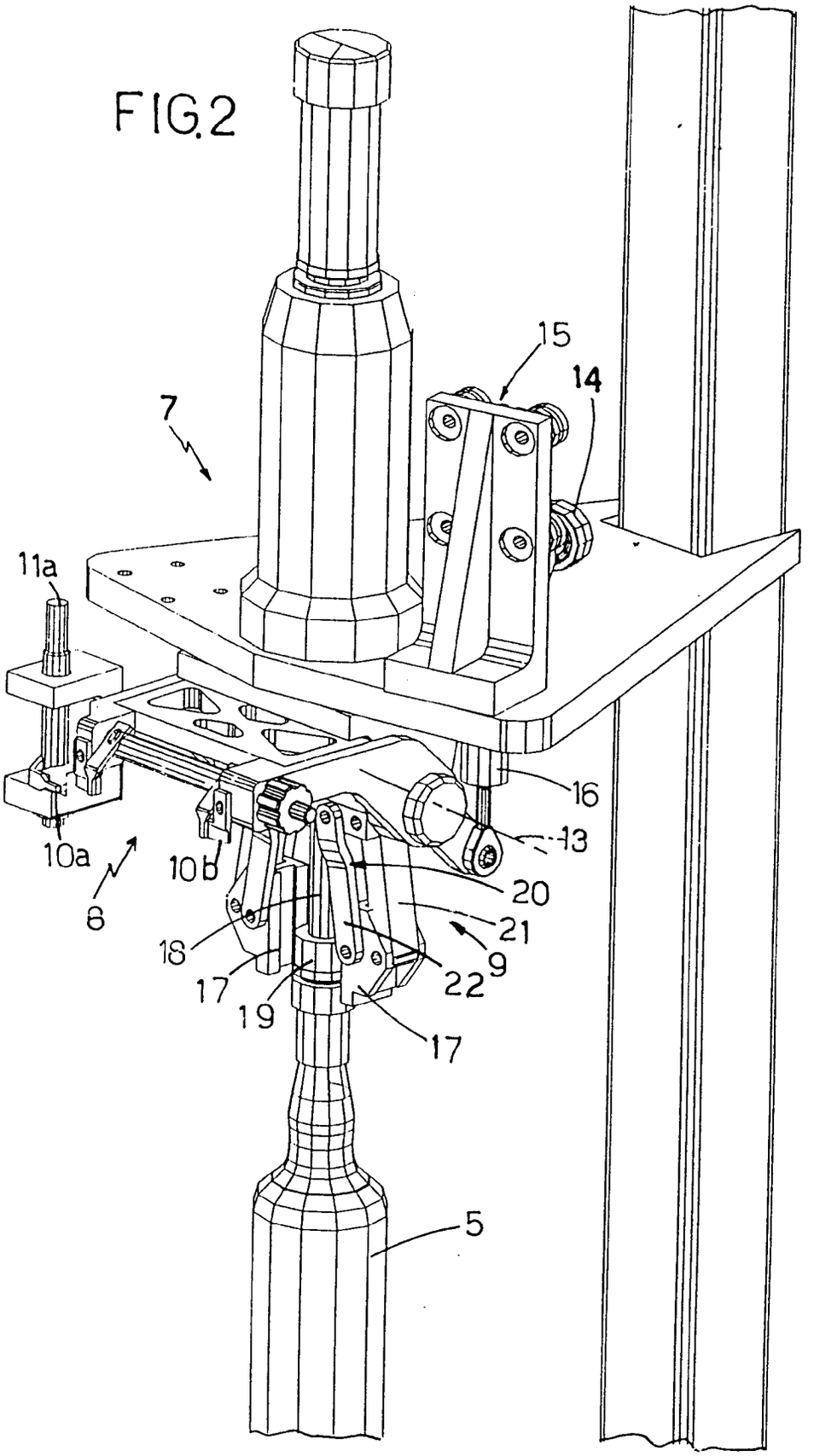
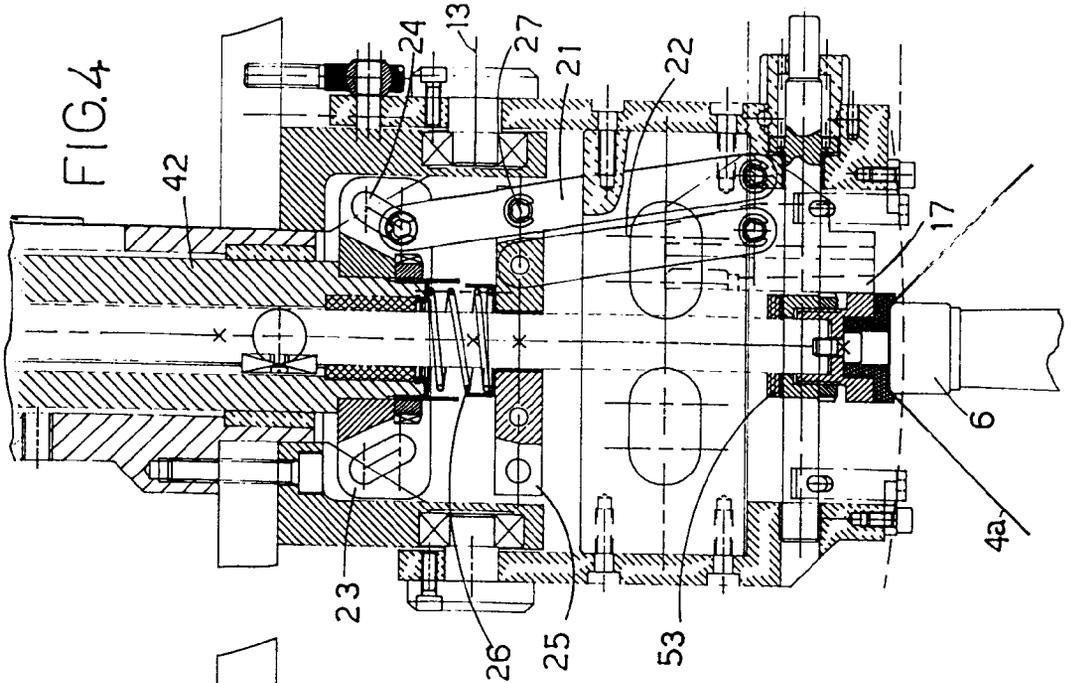


FIG.4


42
24
13
27
21
22
17
6
4a
23
26
25
53

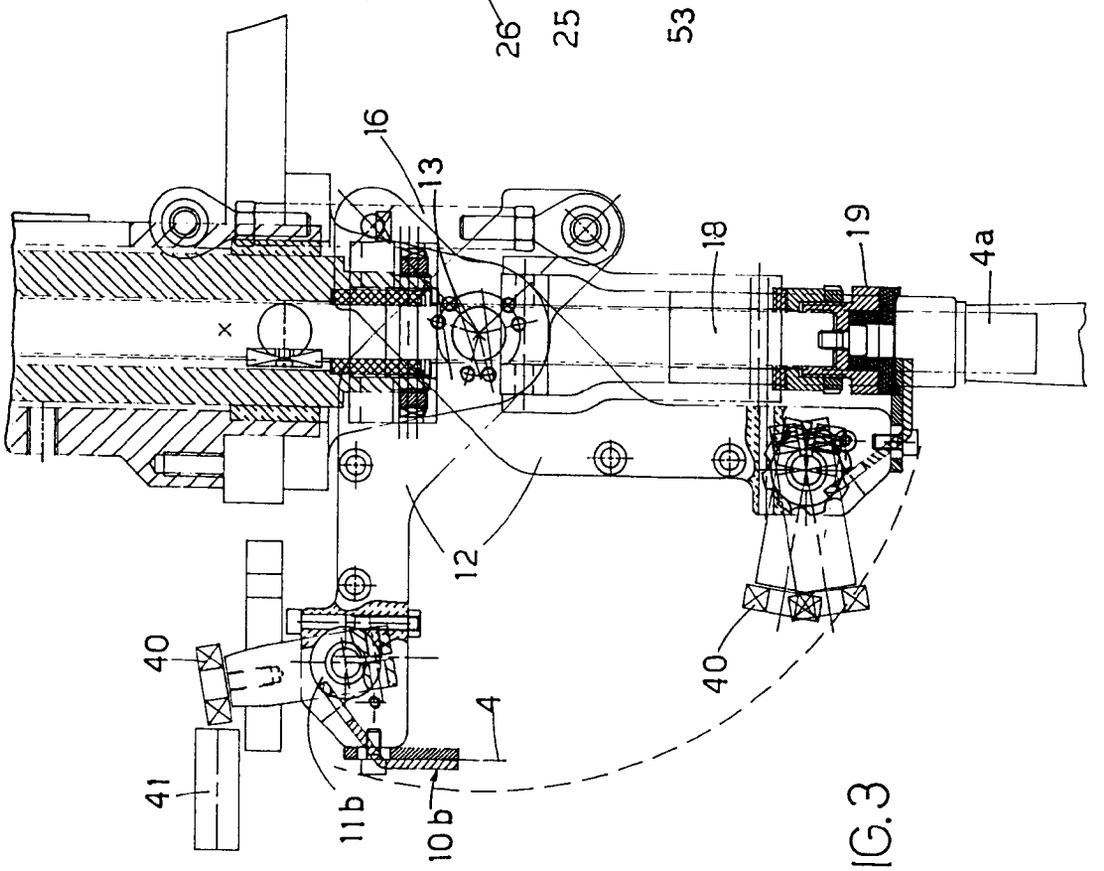

16
13
18
19
4a
12
40
40
4
41
11b
10b

FIG.3

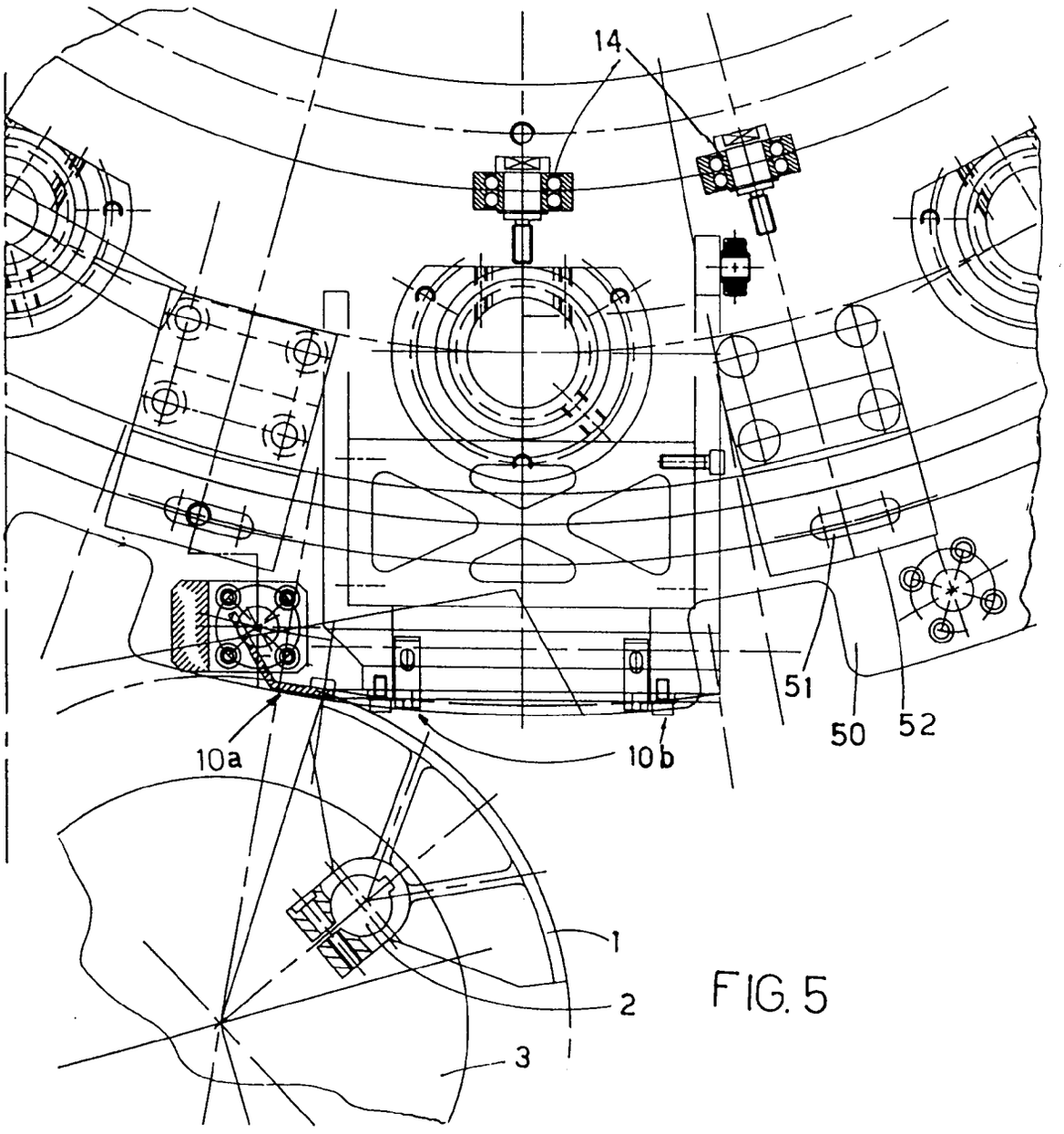


FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 95 83 0330

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)
X	GB-A-414 253 (JAGENBERG-WERKE A.G.) * figures 2,4,7,8 * ---	1	B65C3/24
X	GB-A-779 342 (PURDY MACHINERY COMPANY LIMITED) * page 5, line 63 - line 77; figures 1,2,9 * ---	1	
D,A	FR-A-2 354 247 (MA-CO S.A.S. DI SASO VITTORIO & C.) * page 4, line 10 - line 16 * * page 9, line 15 - line 39 * * figures 2,3,9 * & IT-B-1 069 481 -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 December 1995	Martínez Navarro, A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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