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(54) **Automatic rotating labelling machine**

(57) An automatic rotating labelling machine (1) comprises a rotatable support (3) carrying means (5) for gripping bottles or containers (6) to be labelled. The support (3) is operatively associated to at least one labelling unit (8,9) that applies labels (19) to the bottles or containers (6).

The rotatable support (3) is arranged at an upper end of said machine (1), and, further on, said gripping means (5) grips said bottles or containers (6) at an open or upper portion thereof, and holds them below said support (3).

The support (3) is axially mobile to adjust its height and adapt it to the bottle size.

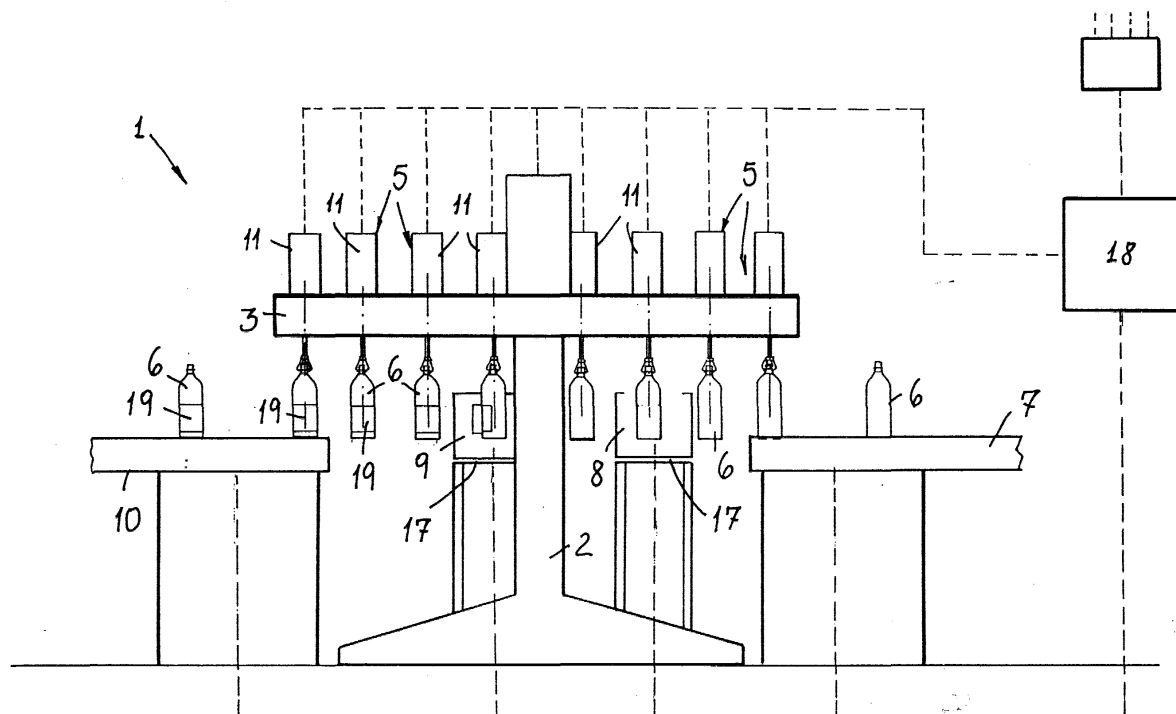


FIG. 1

Description

[0001] The present invention relates to an automatic rotating labelling machine.

[0002] Labelling machines of the known type comprise a circular and rotatable base carrying a plurality of plates for supporting bottles or containers. The support plates can rotate with the base and, moreover, they can rotate around their axis.

[0003] Known machines also exhibit a central column carrying an upper plate which in turn carries a plurality of abutments, each facing one of the support plates.

[0004] Such abutments allow maintaining the bottles centred during processing.

[0005] In a first embodiment, relating to machines adapted to apply labels partly or totally engaging with the perimeter of the bottles, the base supports cams that operate in association with actuation levers integral with the support plates.

[0006] In a second embodiment, the lower support plates are moved by electrical motors.

[0007] However, the operation of traditional machines is not very flexible and the replacement of type of bottles or containers on which the labels must be applied requires much time, with consequent long dead times and reduced production.

[0008] Moreover, due to their structure, traditional machines exhibit large dimensions at their lower portion, difficult accessibility to the component parts of the machine, and difficulty of cleaning.

[0009] Therefore, the technical object of the present invention is that of realising an automatic rotating labelling machine which should allow overcoming the above technical disadvantages.

[0010] Within the scope of this technical object, a purpose of the invention is that of realising a machine whose operation should be very flexible.

[0011] In particular, the machine according to the invention allows applying labels that totally embrace the perimeter of the bottles, or labels only partially embracing the perimeter of the bottles, without the need of adjustments and modifications of the machine that require much time.

[0012] Another purpose of the invention is that of realising a machine exhibiting very reduced dead times and moreover, which should guarantee a very high productivity.

[0013] A further purpose of the invention is that of realising a machine which should exhibit small dimensions at its lower portion.

[0014] This guarantees a better accessibility to the component parts of the machine and at the same time, greatly facilitates its cleaning.

[0015] Last but not least, another purpose of the invention is that of realising an automatic rotating labelling machine which should be substantially simple, safe and reliable.

[0016] The technical object and the purposes accord-

ing to the present invention are achieved by realising an automatic rotating labelling machine according to claim 1.

[0017] Moreover, further features of the present invention are defined in the following claims.

[0018] Advantageously, the machine according to the invention can carry several labelling units on it.

[0019] For example, the machine according to the invention carries a first labelling unit adapted to apply labels that completely embrace the perimeter of the bottle, and a second labelling unit that is adapted to apply labels that only partly embrace the perimeter of the bottle.

[0020] Moreover, the machine is suitably provided with bottle supports that are actuated in rotation around their axis, each one by a dedicated motor.

[0021] The motors are all connected to an electronic calculator that commands them by starting or stopping the rotation.

[0022] The electronic calculator stores the data relating to the commands to be imparted to the supports for each labelling unit. The data stored in the calculator can be accessed both through a special panel on the machine, and remotely, through suitable remote telecommunication systems.

[0023] The labelling units are optionally mounted on extractable platforms so as to be quickly replaced when the type of bottles or containers being processed are to be replaced, or on mobile platforms with respect to the machine support, so as to easily adjust the position of the labelling unit.

[0024] Further features and advantages of an automatic rotating labelling machine according to the present invention will appear more clearly from the following exemplificative and non-limiting description made with reference to the attached schematic drawings. In such drawings:

- Figure 1 shows a schematic front elevation view of a machine according to the invention;
- Figure 2 shows a schematic and enlarged perspective view of a member for gripping the bottles, hooked to a bottle;
- Figure 3 shows a side elevation schematic view of the gripping member of figure 2;
- Figure 4 shows a schematic and enlarged perspective view of a different embodiment of the bottle gripping member, also hooked to a bottle;
- Figure 5 shows an enlarged perspective view of a further embodiment of the bottle clamping member;
- Figure 6 shows another embodiment of the bottle gripping member;
- Figures 7 and 8 show two perspective views of two different embodiments of the machine according to the finding; and
- Figure 9 shows a perspective view of a preferred embodiment of the machine according to the finding.

[0025] With reference to the above figures, there is shown an automatic rotating labelling machine, globally indicated with reference numeral 1.

[0026] Machine 1 comprises a column 2 supporting, at its upper end, a support 3. Support 3 is axially mobile to adjust its height and adapt it to the bottle size.

[0027] In the example shown, support 3 consists of a circular plate and it can be actuated in rotation by a motor 4, also housed at the upper end of machine 1. However, in different examples, motor 4 can also be housed at a lower portion of the machine (such solution is not shown).

[0028] Support 3 carries a plurality of gripping means 5 adapted to grip bottles or containers 6 that are brought to the machine 1 by a first conveyor 7 of the known type.

[0029] The gripping means 5 carries bottles 6 at a labelling unit 8, 9, and finally it lays them down on a second conveyor 1, which moves bottles 6 away from machine 1.

[0030] The gripping means 5 comprises a motor unit 11 consisting of an electrical, hydraulic or pneumatic motor connected to a shaft 12 protruding from support 3 downwards.

[0031] Moreover, a gripping member 13 is placed at the end of each shaft 12, which grips bottles 6 at an open or upper portion thereof and holds them suspended below support 3.

[0032] In a first embodiment, shown in figures 2 and 3, the gripping member 13 comprises a fork, adapted to abut under rings 14 of bottles 6, or under special projecting parts.

[0033] Moreover, on shaft 12 there is inserted an axially sliding bush 15 integral with an abutment plate 16, which keeps bottle 6 in a centred position.

[0034] In a different embodiment, shown in figure 6, the gripping member 13 comprises a fork adapted to abut under special projecting parts 14 of the bottle. On shaft 12 there is inserted an axially sliding bush integral with a fork whose shape is complementary to the conical portion of the bottle, which keeps the bottle in centred position.

[0035] In a different embodiment, shown in figure 4, the gripping member 13 arranged at the end of shaft 12 consists of pliers, for example a three-jaw pliers, to guarantee the centering of bottle 6 that acts on the bottleneck or on its upper conical portion.

[0036] The machine comprises labelling units 8, 9 adapted to engage both partially and totally the periphery of the bottles.

[0037] The labelling units 8, 9 can be mounted on mobile platforms 17 with respect to support 3 so as to operatively adjust their position and have a better access for maintenance and cleaning.

[0038] Machine 1 also comprises an electronic calculator 18 that commands all its functions. In particular, the electronic calculator 18 pilots motors 11 according to a predetermined program, so as to actuate them in rotation according to the rotation of support 3 and with

the operation of the labelling units 8, 9.

[0039] The rotation imparted by motors 11 to the gripping members 13 allows correctly presenting bottles 6 to the labelling units 8, 9 and applying the labels around bottles 6. The machine is equipped so that the control system and the electronic calculator can be remotely accessed using telematic systems or other remote communication systems (modems, dedicated networks, telematic networks, etc.).

[0040] In a further embodiment of machine 1 according to the invention (such solution is not shown), the gripping member 13 comprises a punch, arranged at the end of shaft 12, provided with a head that can expand or enlarge. In this case, the punch inserts into bottles 6 and hooks them by expanding.

[0041] The operation of the automatic rotating labelling machine according to the invention is substantially as follows.

[0042] Support 3 rotates on column 2 actuated by motor 4.

[0043] Conveyor 7 carries bottles 6 below support 3 of machine 1.

[0044] Here, the gripping members 13 hook the bottle at its end close to the aperture.

[0045] In the following description, reference shall be made to members 13 comprising the fork (solution shown in figures 2, 3).

[0046] In this case, as fork 13 rotates with support 3, it arrives at bottle 6 and hooks it.

[0047] The abutment plate 16 thus lowers, locks and centres bottle 6 onto fork 13.

[0048] Afterwards, bottle 6 rotates together with the support 3, thus moving at the labelling units 8, 9.

[0049] The labelling units 8, 9 apply the labels while bottles 6 are made to rotate by motor 11.

[0050] The entity and modes of rotation are a fundamental factor for the good operation of the labelling units 8, 9. The rotation is regulated in function of the packaging to be realised, that is to say, of the type of labels to be applied and of the technology used by the labelling unit 8, 9, and moreover it depends on the rotation of support 3.

[0051] In the machine 1 according to the invention, these parameters are regulated by the electronic calculator 18 and thus, they are optimised not just for the labelling units 8, 9 mounted onto machine 1, but also for others that may be mounted by simply removing the mounted units from platforms 17 and applying other ones, or by moving platform 17.

[0052] Afterwards, it would be sufficient to set the data relating to the new unit on calculator 18, or retrieve the data already stored in calculator 18, or suitably change the settings of the electronic calculator, accessing the same by using suitable telecommunication systems to always obtain an optimum and very flexible overall operation.

[0053] Finally, bottles 6 onto which a label 19 is now applied, are brought at the second conveyor 10, where

they are released and moved away from the labelling machine 1.

[0054] Figures 7 and 8 show two different embodiments of machine 1 according to the invention.

[0055] In these embodiments, machine 1 comprises an upper platform 20, supported by columns 21, which carries motor 4, two rotatable wheels 22 and the rotatable support 3, which in turn carries gripping means 5.

[0056] The rotatable support 3 hangs from platform 20 and is connected to motor 4, which actuates it in rotation.

[0057] The first wheel 22 is adapted to take bottles 6 from the first conveyor (preferably, of the suspended air type, not shown) and present them to the gripping means 5, whereas the second wheel 22 is adapted to take bottles 6 that have been labelled from the gripping means 5, and present them to the second conveyor 10 (preferably, of the suspended air type, not shown).

[0058] Moreover, machine 1 is also provided with an abutment member 23 that allows the correct positioning of a bench 24 with respect to the rotatable support 3.

[0059] Bench 24 carries the labelling unit 8 and all the equipment for the correct operation of system 1.

[0060] In the example shown, the abutment member 23 comprises an elongated member (not rotatable) that extends from a central portion of the rotatable support 3 and ends with a base 25.

[0061] Figure 9 shows a preferred embodiment of the machine according to the finding.

[0062] In particular, figure 9 shows the upper platform 20 supported by four columns 21 arranged at the corners of platform 20.

[0063] Platform 20 supports the rotatable support 3, which carries the gripping means 5, and said two rotatable wheels 22; in particular, the wheels 22 exhibit a plurality of recesses (not shown, with a star-shaped structure) wherein the bottles are housed.

[0064] Reference numeral 7 indicates the air conveyor that carries the bottles to the machine; the other conveyor is arranged at the other side of the machine and thus, it is not visible.

[0065] Machine 1 is associated to the bench 24 that, in the example shown, carries the labelling unit 8.

[0066] In the example shown in figure 9, there is a single labelling unit but in different examples it is possible to associate a bench 24 to the machine, carrying more labelling units, or even a plurality of benches.

[0067] Bench 24 is connected to machine 1 through flanges 26, which guarantee a safe and firm connection.

[0068] In practice, it has turned out that the automatic rotating labelling machine according to the invention is particularly advantageous since it is very flexible and adaptable to several types of bottles and labels.

[0069] This greatly reduces dead times, thereby allowing to reach and/or maintain a very high productivity. In fact, for modern machines having a high productive potential, productivity may also reach 1,000 bottles a minute.

[0070] With such figures, every machine standstill causes a considerable production decrease.

[0071] Of course, other changes and variants are possible besides those already illustrated; so, for example, in a different embodiment support 3 of machine 1 is integral with the column and realises a "mushroom" structure.

[0072] The entire mushroom structure then rotates by the actuation of motor 4.

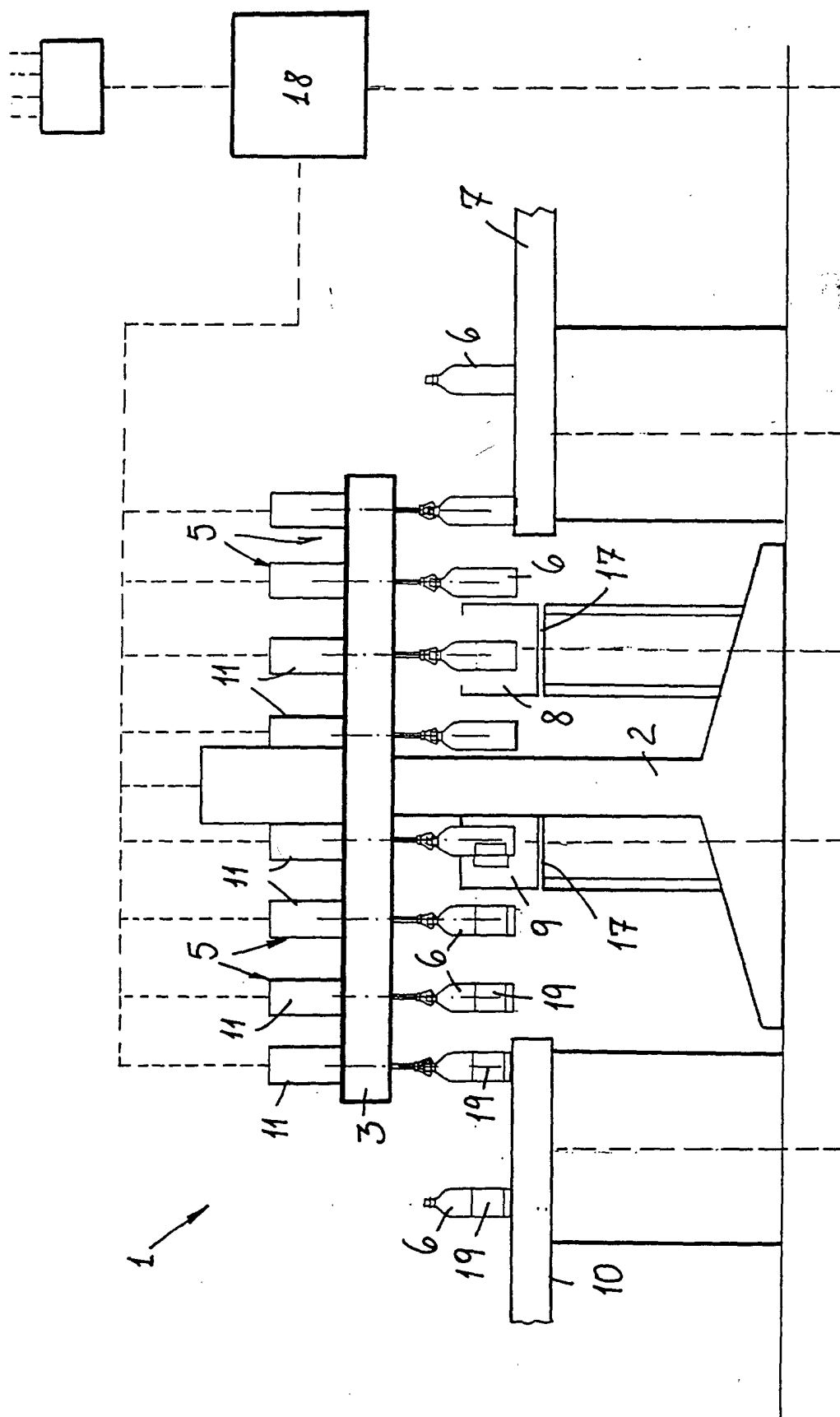
[0073] Further modifications and changes can be made to the automatic rotating labelling machine thus conceived, all falling within the invention scope; moreover, all details can be replaced with technically equivalent elements.

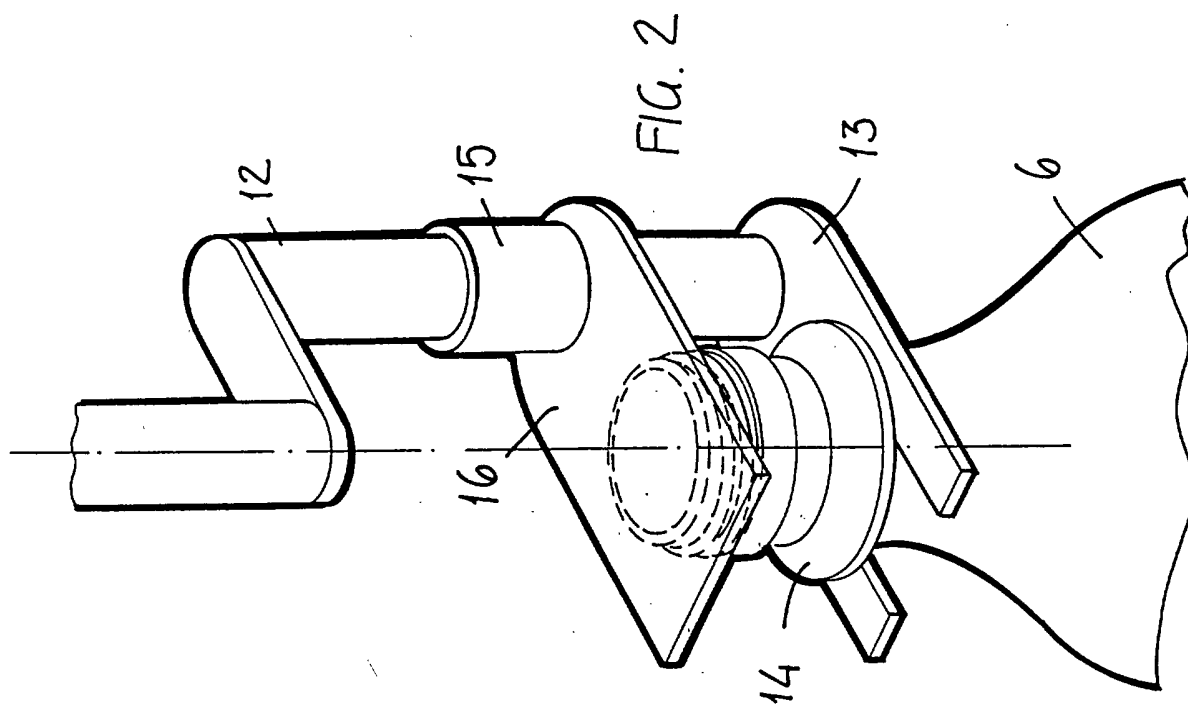
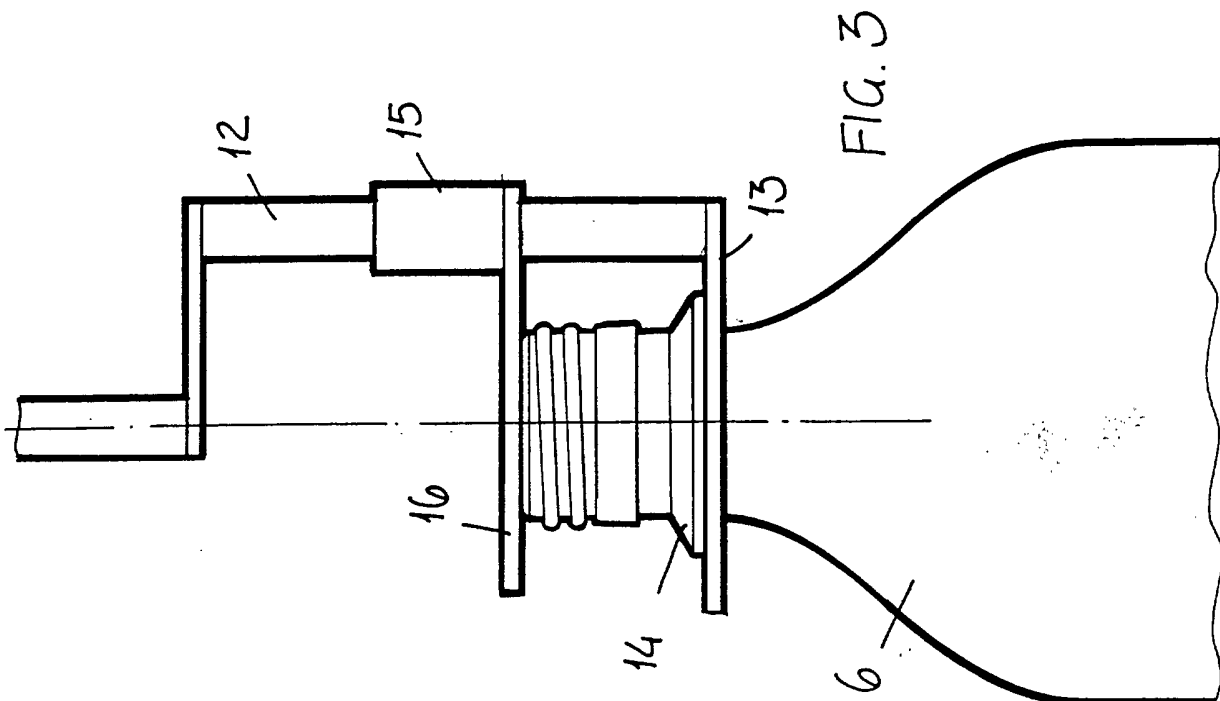
[0074] In practice, the materials used as well as the sizes, can be of any type according to the technical requirements.

Claims

1. Automatic rotating labelling machine (1) comprising a rotatable support (3) carrying means (5) for gripping bottles or containers (6) to be labelled, said support (3) being operatively associated to at least one labelling unit (8, 9) that applies labels (19) to said bottles or containers (6), **characterised in that** said rotatable support (3) is arranged at an upper end of said machine (1), and **in that** said gripping means (5) grips said bottles or containers (6) at an open or upper portion thereof, and holds them below said support (3).
2. Machine (1) according to claim 1, **characterised in that** said gripping means (5) comprises at least one gripping member (13) associated to a motor unit (11), where said motor unit (11) puts said gripping member (13), and therefore, said bottles or containers (6) supported by it into rotation.
3. Machine (1) according to one or more of the previous claims, **characterised in that** said motor unit (11) comprises an electrical brushless motor.
4. Machine (1) according to one or more of the previous claims, **characterised in that** said motor unit comprises an electrical stepping motor, a hydraulic or a pneumatic motor.
5. Machine (1) according to one or more of the previous claims, **characterised in that** said gripping member (13) comprises a fork adapted to engage into rings (14) of said bottles or containers (6).
6. Machine (1) according to one or more of the previous claims, **characterised in that** said gripping member (13) comprises pliers adapted to hook said bottles or containers (6).

7. Machine (1) according to one or more of the previous claims, **characterised in that** said gripping member (13) comprises a fork adapted to abut under special projecting parts (14), and **in that** it comprises a shaft (12) on which there is inserted an axially sliding bush integral with a second fork exhibiting a shape that is substantially complementary to a conical portion of said bottle or container (6) which holds said bottle in a centred position. 5
8. Machine (1) according to one or more of the previous claims, **characterised in that** said gripping member (13) comprises a punch, provided with a head that can expand or enlarge so that, by inserting and expanding into said bottles or containers (6), same hooks them. 10
9. Machine (1) according to one or more of the previous claims, **characterised in that** it comprises an abutment (16) that cooperates with said gripping member and holds said bottle or container (6) centred. 15
10. Machine (1) according to one or more of the previous claims, **characterised in that** it comprises a plurality of labelling units (8) adapted to apply labels embracing the entire periphery of said bottles or containers (6) or embracing only a portion of the periphery of said bottle or container (6). 20
11. Machine (1) according to one or more of the previous claims, **characterised in that** said labelling units (8, 9) are removably mounted above platforms (17). 25
12. Machine (1) according to one or more of the previous claims, **characterised in that** said electronic calculator (18) drives said motor units (11) according to a predetermined program, so as to actuate them in rotation according to the rotation of said support (3) and with the operation of said labelling unit (8, 9). 30
13. Machine (1) according to one or more of the previous claims, **characterised in that** said electronic calculator allows changing the program settings through a suitable remote access actuated through remote communication and telematic systems. 35
14. Machine (1) according to one or more of the previous claims, **characterised in that** said motor units (11) are commanded by an electronic calculator (18) storing different programs relating to different labelling modes, both for labels (19) embracing the entire periphery of said bottle or container (6) and embracing only a portion of the periphery of said bottle or container (6). 40
15. Machine (1) according to one or more of the previous claims, **characterised in that** said support (3) is mounted above a column (2) and is sliding on said column (2) so that the height of said support is adjustable to adapt to the different types of bottles or containers (6) being processed. 45
16. Machine (1) according to one or more of the previous claims, **characterised in that** it comprises an upper platform (20) supported by columns (21) carrying at least said motor (4) and said rotatable support (3). 50
17. Machine (1) according to one or more of the previous claims, **characterised in that** it comprises an abutment member (23) that allows the correct positioning of a bench (24) carrying the labelling unit (8) and all the equipment for the correct operation of said system (1) with respect to said rotatable support (3). 55
18. Machine (1) according to one or more of the previous claims, **characterised in that** said abutment member (23) comprises a non-rotatable elongated member extending from a central portion of said rotatable support (3).
19. Automatic rotating labelling machine (1) as described and claimed.





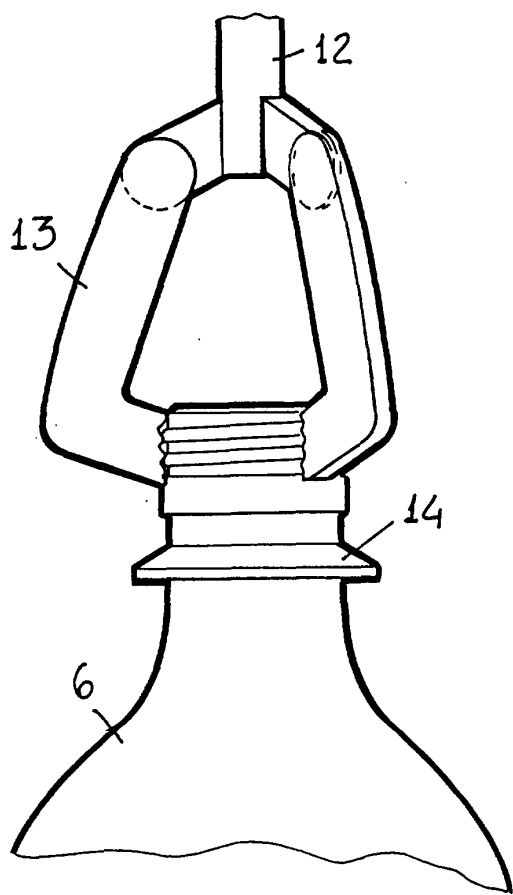


FIG. 4

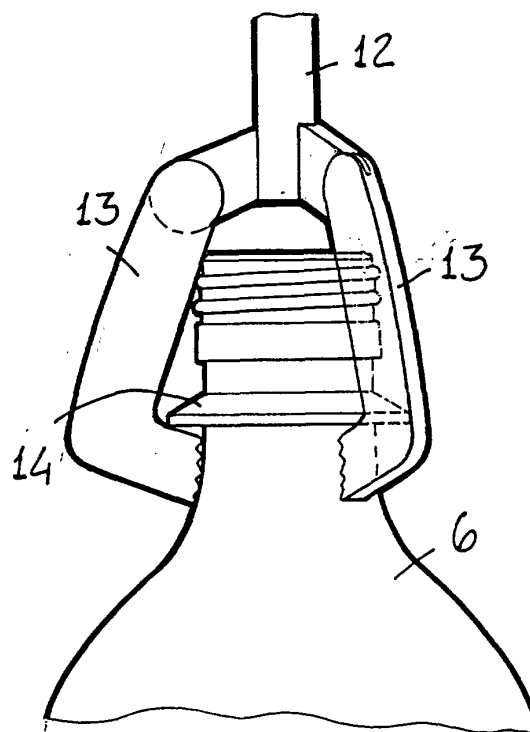


FIG. 5

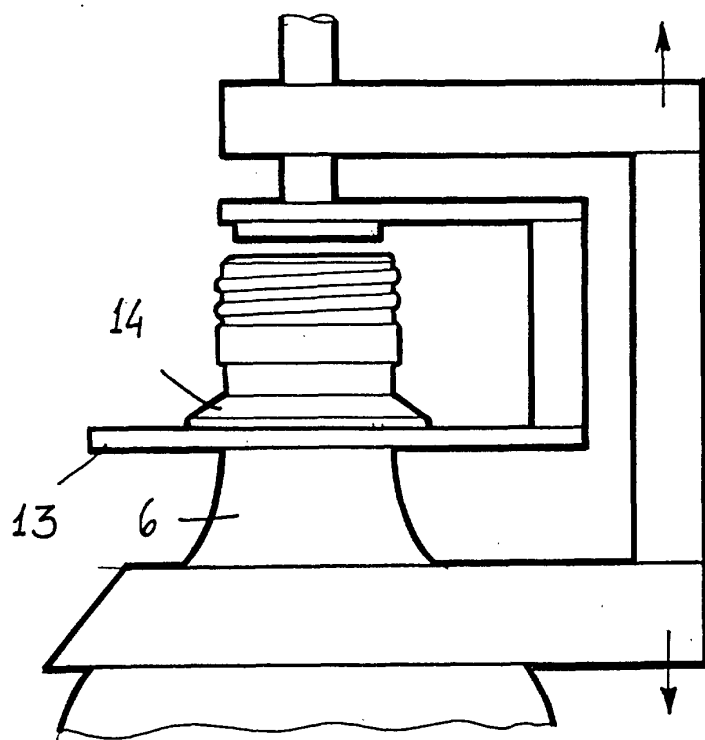
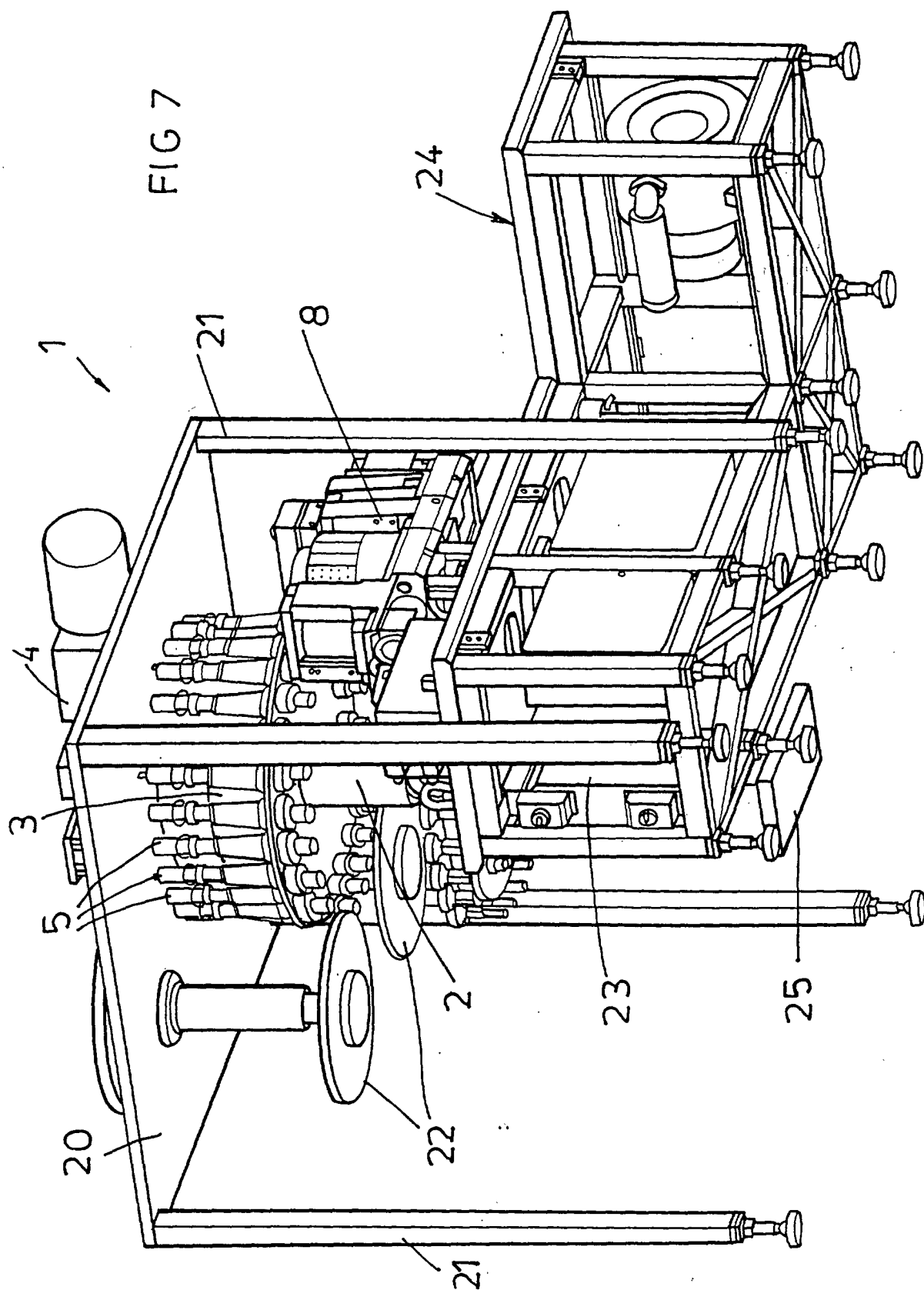


FIG. 6



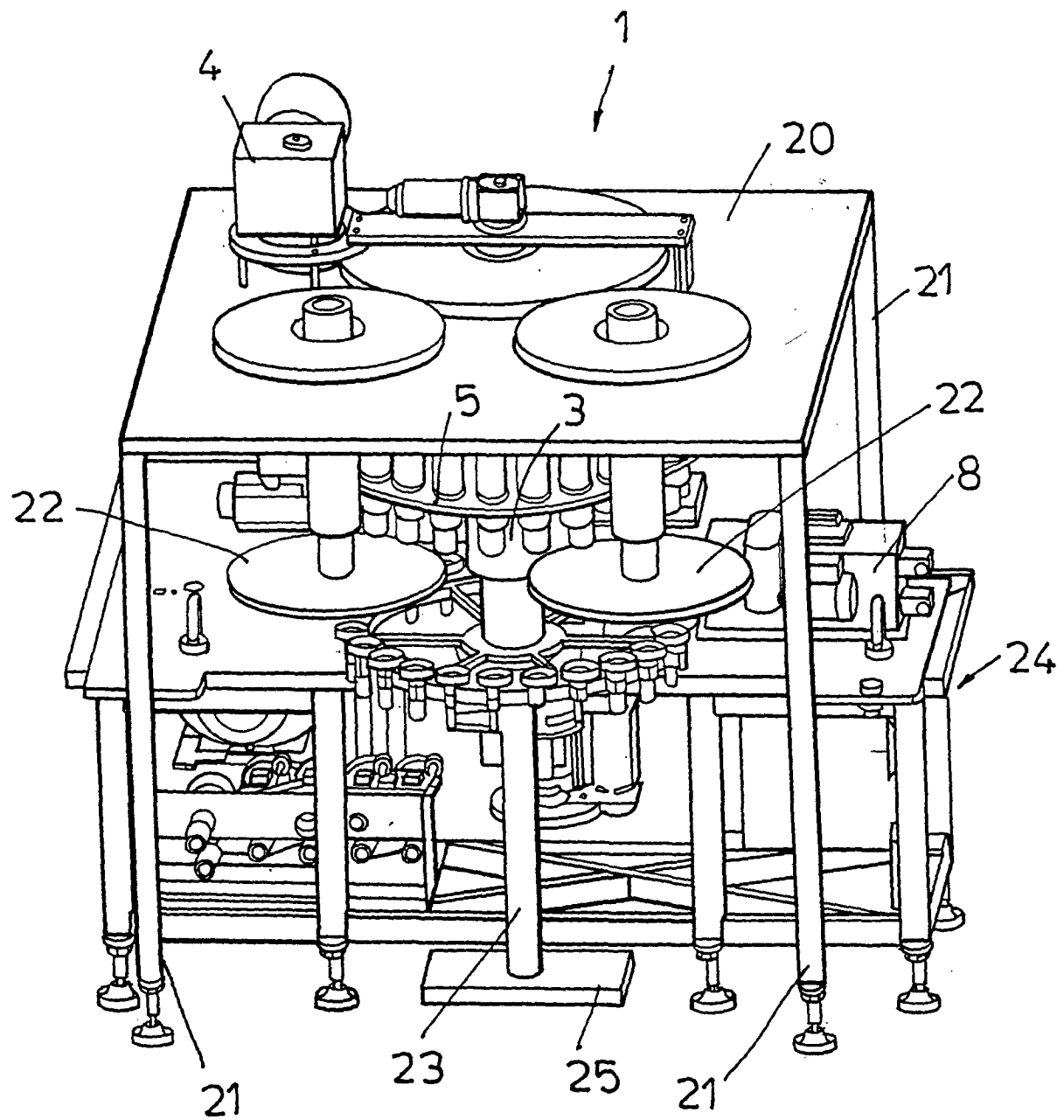
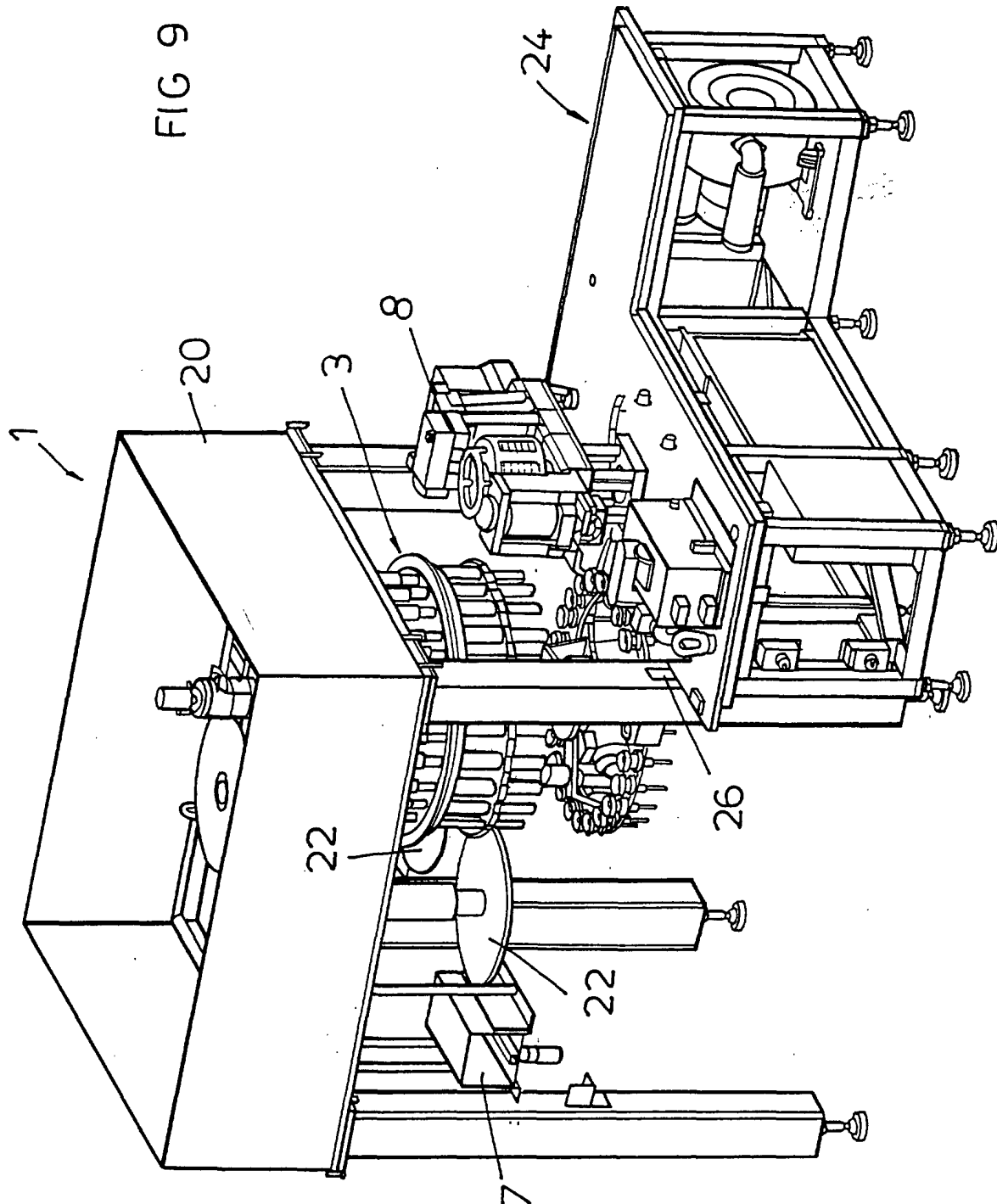


FIG 8





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which under Rule 45 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

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INCOMPLETE SEARCH			
The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims. Claims searched completely : 1-18 Claims searched incompletely : 19 Claims not searched : 19 Reason for the limitation of the search: Rule 29 (6) of EPC.			
Place of search THE HAGUE		Date of completion of the search 2 October 2001	Examiner Wartenhorst, F
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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