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(54) **Labelling machine for applying self-adhesive labels on products in general**

(57) A labelling machine (1) for applying self-adhesive labels on products in general comprises a fully independent and interexchangeable supporting element for supporting a siliconized paper coil (3) with self-adhesive labels, which are delivered at a delivering assembly, and being characterized in that said delivering as-

sembly comprises a wheel (10a) including a plurality of sucker elements (10c) which are selectively communicated with a vacuum source and a pressurized air source, to take the labels from the siliconized paper material and transfer them on movable products to be labelled.

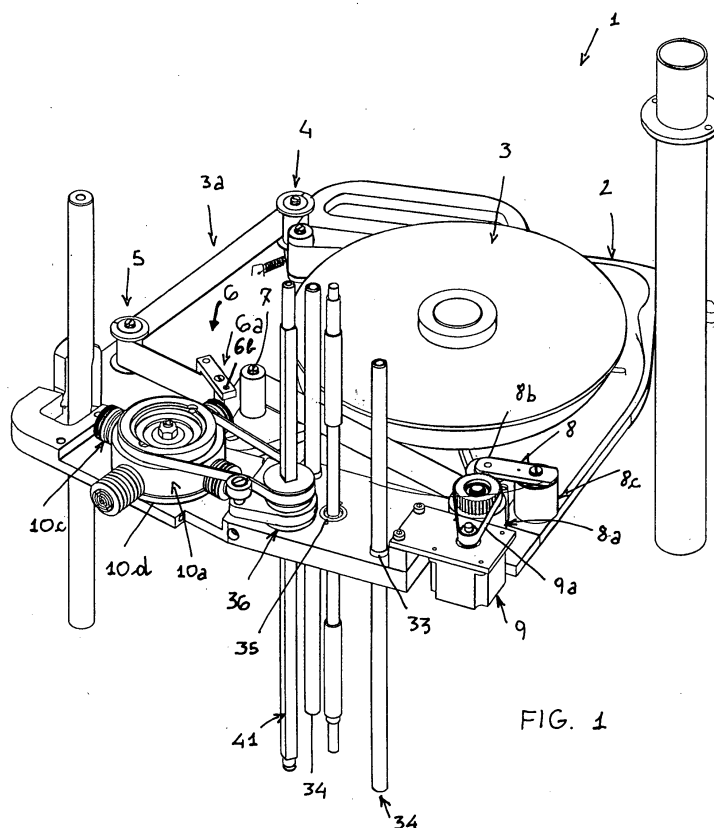


FIG. 1

Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a labelling machine for applying self-adhesive labels on products in general.

[0002] As is known, it is frequently required to arrange self-adhesive labels on products or articles which can be of several types and natures.

[0003] For example, in the fruit labelling field for labelling apples, peaches, kiwis and so on, are at present used labelling systems which are very complex and expensive.

[0004] In particular, the above mentioned labelling systems must use labels supported by suitably contoured siliconized paper material strips, having a preset length, thereby the user is compelled to choose only a limited number of label suppliers.

[0005] Moreover, the above mentioned labelling machines conventionally use sucker elements including a plurality of valves which are rather complex from a mere construction standpoint.

SUMMARY OF THE INVENTION

[0006] Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing a labelling machine for applying self-adhesive labels on products and articles in general, allowing to apply said labels, for example on fruit, by allowing the fruit case to move with a particularly high speed, even of thirty fruit cases per minute.

[0007] Within the scope of the above mentioned aim, a main object of the present invention is to provide such a labelling machine which, owing to its simple construction and flexible operation, can be used for variable size products and articles.

[0008] Another object of the present invention is to provide such a labelling machine which can use commercially available labels, such as labels arranged on conventional contour siliconized paper strips, having a varied width, thereby allowing the labelling machine to operate at a very reduced operation cost, while affording the user the possibility of choosing within a broad range of label supplier.

[0009] Yet another object of the present invention is to provide such a labelling machine which, in addition to being very simple construction-wise, is moreover very competitive from a mere economic standpoint.

[0010] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a labelling machine, for applying self-adhesive labels on products and articles in general, said labelling machine comprising a fully independent and interexchangeable supporting element, for supporting a siliconized paper coil including a plurality

of self-adhesive labels, delivered at a label taking assembly, characterized in that said label taking assembly comprises a wheel including a plurality of sucker elements which are selectively communicated with a vacuum source or a pressurized air source to remove said labels from said siliconized paper material and transfer said label to movable products and articles to be labelled.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of the preferred, though not exclusive, embodiment of a labelling machine for applying self-adhesive labels on products and articles in general, which is illustrated, by way of an indicative, but not limitative, example, in the accompanying drawings, where:

Figure 1 is a schematic perspective view illustrating the labelling machine for applying self-adhesive labels on products and articles in general, according to the present invention;

Figure 2 is a further schematic view illustrating the support casing for supporting the sucker wheel;

Figure 3 is an exploded perspective view illustrating the label taking and transferring assembly;

Figure 4 is a cross-sectional view illustrating a sucker element according to the invention;

Figure 5 is a detail view illustrating a detail of the top portion of said sucker element, on an enlarged scale;

Figure 6 is a top plan view, on an enlarged scale, of the sucker element engaging region;

and

Figure 7 is a bottom view illustrating a typical labelling machine arrangement including five cooperating labelling machines.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] With reference to the number references of the above mentioned figures, the labelling machine for applying self-adhesive labels on products and articles in general, according to the invention, which has been generally indicated (fig. 1) by the reference number 1, comprises a coil support 2, of an independent and interexchangeable type, which is provided with a pivot pin thereon is mounted a siliconized paper coil 3, the paper material of which can have different thicknesses and operating as a support element for supporting a plurality of self-adhesive labels which can have any desired size and shape.

[0013] In particular, the siliconized paper strip 3a, after having passed through the tension or stretching assembly 4 and transmission roller 5, arrives at a detach-

ment or removal assembly 6, comprising a transmission pin 6a and a further pin 6b having a very small diameter (1 - 2 mm), and being supported by bearings, for removing the labels from the paper strips, the siliconized paper strip, after entrainment about the roller 7, being engaged by an entrainment or driving assembly 8, comprising a rubber roller 8a, a knurled counter-roller 8b, pressed on the rubber roller 8a by an adjustable torsion spring 8c.

[0014] The entrainment assembly, in particular, is driven by a step motor 8, through a toothed belt 9a.

[0015] In particular, the step motor 9 is controlled by an electronic control system which, through position sensors, will determine the command to be sent to the motor, to cause the label, as it is removed at the roller 6b, is perfectly arranged to be engaged by the sucker element 10c passing under the label removing or detaching assembly 6 and performing its suction operation.

[0016] More specifically, said label is taken by the sucker element 10c of the rotary label taking and transferring assembly 10, comprising, as shown in figures 1 to 3, a sucker wheel 10a, to which are applied, through attachment elements 10b, a plurality of sucker elements 10c.

[0017] Thus, as the sucker wheel turns about the pin 10f, it will cause the sucker elements to selectively communicate, through a small friction sealing disc 10d, with the suction region (C-shape channel 30a), or with the negative pressure region (hole-slot 31).

[0018] The sealing of this distributing valve is assured by a plurality of cup spring 10e, pre-pressed by a ring element 10g, in turn restrained by a nut fixed on the pin 10f.

[0019] Thus, the sucker elements, upon arriving at the positions thereof facing the products or articles passing under the assembly 10, and being arranged at the pressure region, will extend so as to bring the label on the surface (which is frequently a non-flat surface) of the product or article, thereby to perfectly arrange on the product the label being transported, owing to their resilient properties and the pressure present in their inside.

[0020] In this connection, it should be pointed out that the sucker element 10c and its attachment 10b constitute a peculiar aspect of the present invention, and have a plurality of novel feature.

[0021] Actually, the sucker element (fig.4 - fig.5 - fig. 6) 21 comprises a bellows element 50, having any desired configuration (for example in this case a circular plan, but it can also have any other desired shape to better fit to the label configuration), which, differently from conventional sucker elements, has the top portion thereof substantially fully closed.

[0022] With reference to figure 2, the sucker wheel 10a supporting casing 11 has been schematically herein illustrated.

[0023] More specifically, from figure 2 it should be apparent that to the sucker wheel 10a is coupled a closure seal, including a plurality of holes for selectively com-

municating with the suction sectors 60 and 61 defined on said casing or on sidewall 11, and communicating with a vacuum source, as generally indicated by the reference number 30.

[0024] Between the suction sectors is provided a pressurized air inlet hole 31 which is in turn coupled to a pressurized air inlet duct 32.

[0025] A further single calibrated hole 51 (having a diameter of 1 - 2.5 mm) is moreover provided for generating, under the sucked air load losses, a pressure difference between the outer and inner environment, allowing to contract the bellows element, while providing an air flow on the label sucking sucker surfaces.

[0026] More specifically, the sucker elements 21, as is better clear in figures 4 to 6, comprise a bellows cylindric body, generally indicated by the reference number 50, ending, at an axial end portion thereof, with a passage hole 51 coupled to a cylindric central rim 52, thereabout are provided further cylindric concentric rims 53, delimitating the active region of the sucker element.

[0027] Moreover, at the mentioned central rim or edge portion 52, a plurality of small cylinders 54 are provided for holding the bearing in a flat condition.

[0028] If greater size labels must be applied, then are opened the corresponding rim or edge portions, thereby allowing greater or larger area surfaces to pass there-through, corresponding to the label surfaces.

[0029] In operation, the sucker wheel is so turned that each sucker element is arranged at the detachment assembly 10, while being connected to the suction source, to take the self-adhesive label and to bring the latter, by turning, at the bottom region, where the sucker element will be arranged in a communication relationship with the pressurized air inlet assembly.

[0030] Thus, the latter will cause the sucker element to expand, to apply the label on a movable product or article passing under the sucker wheel.

[0031] In this connection, it should be apparent that the disclosed suction wheel is very simple construction wise, and is so arranged as to selectively communicate with the suction side for taking and transferring the labels, with a small pressurized air outlet region, to apply the label on a movable product or article.

[0032] Said sucker wheel, in particular, is arranged at the front portion of the labelling machine, which can apply with a very high operating speed the labels on the products or articles passing under said sucker wheel.

[0033] In operation, the label being applied will be born on a flat bearing assembly, comprising the four small cylinders, in turn including a pulley 40a, a toothed belt 40b, and a toothed ring gear 40c made rigid with the wheel 10a and a chain tension assembly 40d.

[0034] The pulley 40a, in particular, is driven through a square cross-section hollow, by a driving shaft 41 (fig. 1) also having a square cross-section, and provided with respect to said hollow or cavity with a small clearance, thereby allowing the supporting casing to slide on the shaft.

[0035] Said driving assembly 40 will allow to easily change the arrangement of the machine, and to transmit motion to an assembly of labelling machines (fig. 7) by using a single step motor 42 coupled through a transmission belt 43 to the square cross-section shaft 41.

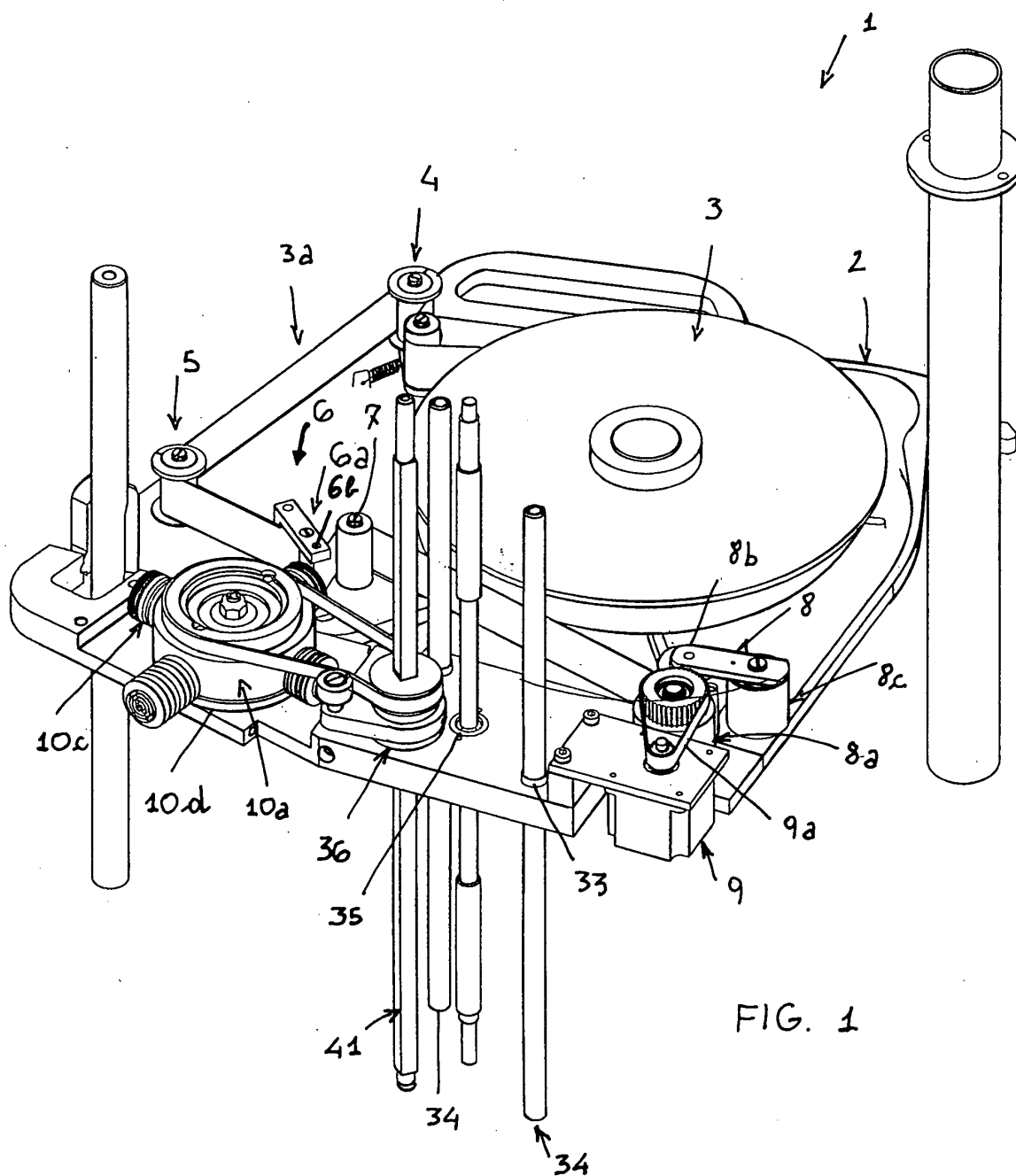
[0036] Furthermore, said shaft further supports a cam 44 for detecting the position of each sucker element of each labelling machine, by using only two sensors for the overall machine battery.

[0037] Such an arrangement allows to achieve a great saving, both due to the fact that a single motor is used, and due to the fact that the control electronic panel will be also greatly simplified independently from the number of labelling machines controlled thereby (in this connection it should be pointed out that a fruit case conventionally holds therein five fruit rows and, accordingly, five battery labelling machines would be required).

[0038] In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, according to requirements and the status of the art.

Claims

1. A labelling machine, for applying self-adhesive labels on products and articles in general, said labelling machine comprising a fully independent and interexchangeable supporting element, for supporting a siliconized paper coil including a plurality of self-adhesive labels, delivered at a label taking assembly, **characterized in that** said label taking assembly comprises a wheel including a plurality of sucker elements which are selectively communicated with a vacuum source or a pressurized air source to remove said labels from said siliconized paper material and transfer said label to movable products and articles to be labelled.
2. A labelling machine, according to claim 1, **characterized in that** each said sucker element comprises a cylindric bellows body having, at one end portion thereof, a central rim or edge portion encompassing a calibrated hole communicating with the suction side and pressurized air inlet side of said labelling machine.
3. A labelling machine, according to one or more of the preceding claims, **characterized in that** each said sucker element has a substantially fully closed top portion thereof.
4. A labelling machine, according to one or more of the preceding claims, **characterized in that** said calibrated hole has a diameter from 1 to 2.5 mm.
5. A labelling machine, according to one or more of the preceding claims, **characterized in that** said calibrated hole, because of the sucked air load losses, generates a pressure difference between the outside and inside, allowing said bellows element to contract, while providing an air flow on a surface of said sucker elements to draw a said label.
6. A labelling machine, according to claim 1, **characterized in that** said label taking assembly comprises a supporting casing rotatably supporting the sucker wheel, said supporting casing defining suction sectors communicating with said vacuum source and a hole communicating with said pressurized air source.
7. A labelling machine, according to one or more of the preceding claims, **characterized in that** said sucker element wheel comprises, evenly distributed on the circumference thereof, a plurality of support elements for applying said sucker elements, said wheel being rigidly coupled to a driven pulley connected, through a transmission belt, to a driving pulley for driving said sucker wheel.
8. A labelling machine, according to one or more of the preceding claims, **characterized in that** said sucker wheel further comprises a closure seal, having a plurality of holes and adapted to be selectively communicated with said suction sectors and said pressurized air inlet hole.
9. A labelling machine, according to one or more of the preceding claims, **characterized in that** said supporting casing supports a step motor, driving a driving roller including a counter-roller, for entraining the waste siliconized paper material of said siliconized paper coil.
10. A labelling machine, according to one or more of the preceding claims, **characterized in that** said labelling machine further comprises, at an end portion of said bellows element or body, a plurality of concentric rim or edge portions encompassing said central rim or edge portion, and that said edge portion can be at least partially removed to adjust and change the surface of the suction region.
11. A labelling machine for applying self-adhesive labels on products in general, according to one or more of the preceding claims, **characterized in that** said labelling machine comprises one or more of the disclosed and/or illustrated characteristics.



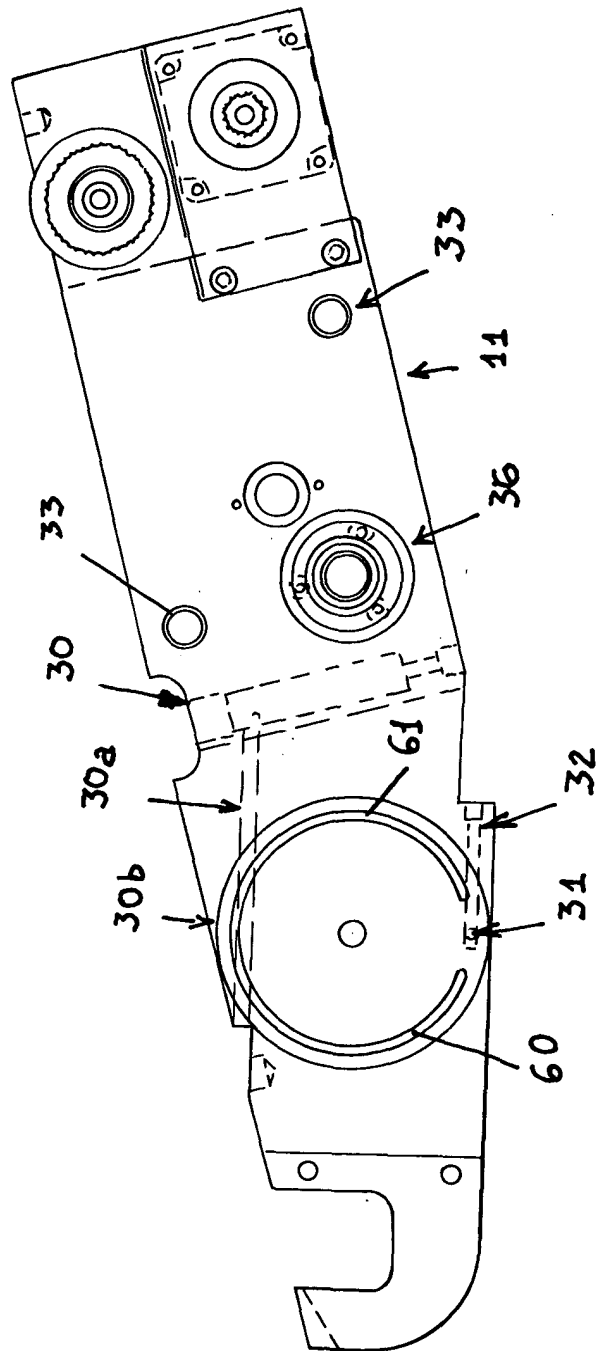
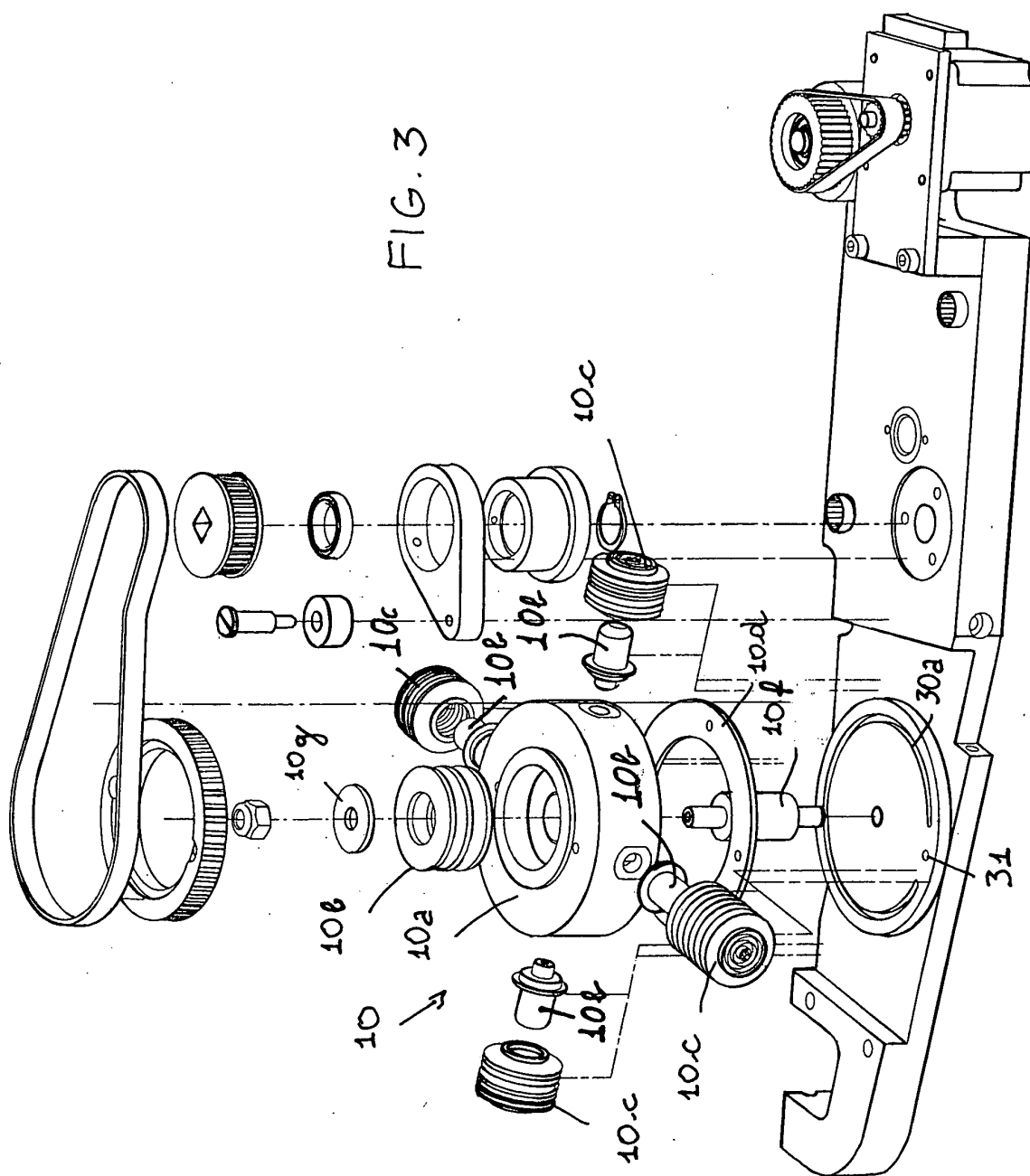


FIG. 2



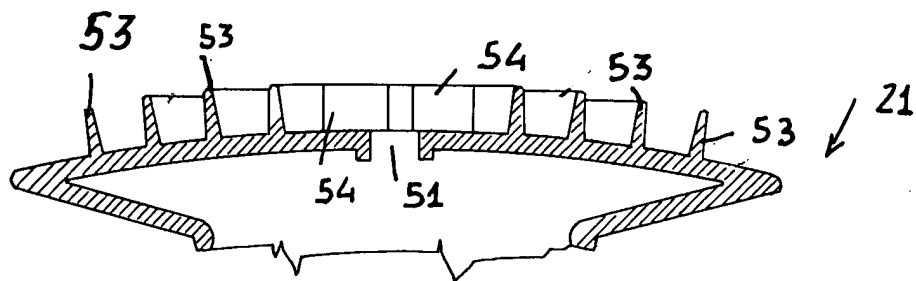


FIG. 5

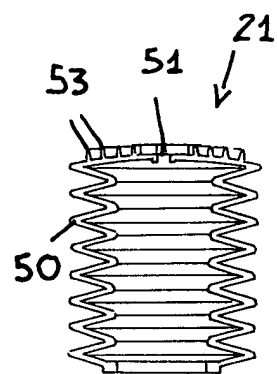


FIG. 4

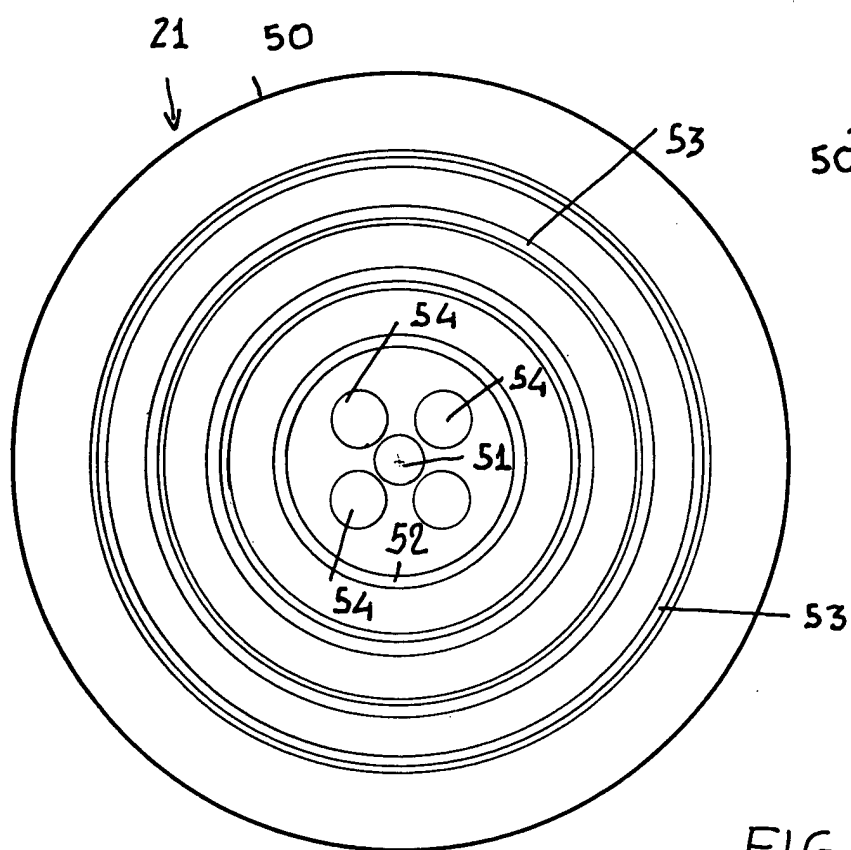


FIG. 6

