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(54) Device for winding up and testing a hose for pressure

(57) Device (1) for winding up and testing a hose (2), comprising a winding body (4) that can rotate for winding up said hose spirally, provided with hose guide means (5) to force said hose to wind up spirally. The winding body is powered by a driving device (6-8), arranged to make rotate the winding body and simultaneously move it in the axial direction, whereby for every rotation of the winding body its axial movement corresponds with the distance *(d)* between the hose guide means. With the new device the reliability of the test procedure is enhanced, the ergonomics and safety are improved and the length of time for conducting the test procedure is shortened. Moreover the device takes up relatively little room.

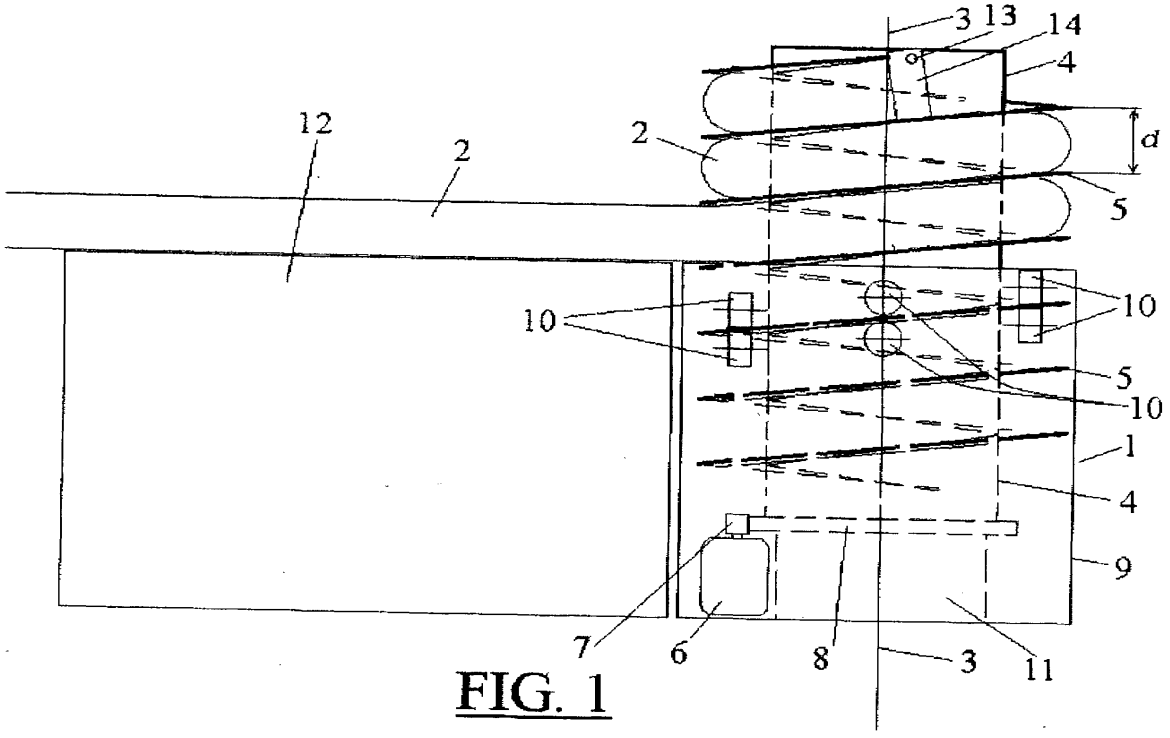

FIG. 1

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Description

[0001] The present invention is related to a device for winding up a hose, especially for the benefit of testing said hose for resistance against pressure.

[0002] In companies that manufacture or assemble hoses more and more of these hoses are tested for pressure in order to check their quality and for reasons of product liability. More and more market segments require that hoses are tested.

[0003] The current situation with the testing of big hoses (diameters between 1 and 8" and lengths up to 20 or 30 metres) is that the testing of these hoses is often carried out in open spaces, which can give rise to dangerous situations. Moreover the assembly process is mostly done manually. Its dimensions and weight make this work heavy.

[0004] A hose under pressure is dangerous because of possible spillage or breakage. In such a situation all stored energy will be released at once. Therefore the pressurized hose ought to be tested in a safe, adequately strong and closed room.

[0005] Hoses are being offered in highly various diameters and lengths, which makes economical investments for parties serving the market difficult. In practice it is difficult to fill the hoses completely with test fluid and remove it completely after the test. This process is time-consuming.

[0006] The present invention aims to offer a solution to these problems and to provide for a device that enhances the reliability of the test procedure, increases the safety and considerably shortens the length of time for conducting the total test procedure.

[0007] According to the present invention there is provided for a device for winding up a hose, in particular for the benefit of testing said hose for resistance against pressure, which device comprises a winding body that can rotate around a substantially vertical axis, and is arranged for winding up said hose spirally. The winding body is preferably cylindrical, and is preferably provided with hose guide means, for example a spiral-shaped partition wall, that is arranged to force the hose to wind up on the winding body spirally.

[0008] The winding body can for example be powered by an electrical driving device, that preferably is arranged to make rotate the winding body and simultaneously move it in the axial direction. In order to achieve - as will become clear from the following figures - that the (heavy) hose can be supplied to the device substantially horizontally, namely at the same height as a work bench, for example by means of a roller conveyor, the driving device is preferably arranged in such a manner that for every rotation of the winding body its axial movement substantially corresponds with either the hose diameter or - in case (for example spiral-shaped) hose guide means are used - the distance between the hose guide means in the axial direction of the winding body, or in other words, with the pitch of the hose guide means.

[0009] The driving device may for example comprise a screw-jack of which the pitch corresponds with either the hose diameter or - in case hose guide means are used - with the pitch of the hose guide means.

[0010] In short the proposed new device comprises a winding body, for example a cylindrical one, that can rotate around a substantially vertical axis, on which the hose is wound, whereby the volume of the hose extends upward.

[0011] The aim of the device is the simple and complete removal of air from the hose, after this the simple emptying of the hose by draining the fluid in it by gravity and the presentation of a compact solution. Another aim is the creation of a safe working environment and in addition the possibility to work in an ergonomical way.

[0012] The hose can only be filled with fluid when it has been wound on the winding body, so that during the filling process the air can escape in upward direction and no air in the hose remains. After testing of the hose for pressure ("pressurizing") the test fluid can be removed again by simply emptying the hose (due to the weight of the fluid).

[0013] Because the hose to be tested is wound compactly on the winding body also connecting and disconnecting appendages and high-pressure pipes will be made easier and ergonomically justified. The device will also facilitate the mounting of large hose flanges by means of quick-connect couplers (fast connector units).

[0014] The application of the configuration proposed according to the present invention means that in practice every desirable (current) hose length and diameter can simply be supplied to the test device and removed from it again after the test. This presents the following advantages:

- The handling of the hose is for the most part taken over by the device.
- The hose is supplied to the device at working height, thus facilitating the inspection and mounting of connections in an ergonomical way.
- Due to the vertical storage in the screw-jack the filling and draining of the hose have become very easy: the air will always flow to the (upper) end and can be released via a ventilation valve during the filling of the hose. After testing the test fluid can be discarded via the lower end of the hose by gravity.
- Testing can be carried out on a relatively small floor area.
- The surroundings are protected against the impact of an off chance breakage of a hose or connection.

[0015] Hereafter the present invention will be discussed in more detail from some examples of embodiments, with reference to a few figures.

Figure 1 shows a scheme of an example of an embodiment of the device according to the present invention in a first stage;

Figure 2 shows the same example of an embodiment in a second stage;

Figure 3 shows the exterior of a similar example of an embodiment in perspective.

[0016] The figures 1-3 show a device 1 for winding up a hose 2, in particular for the benefit of testing said hose 2 - by means of fluid pressure (for example water pressure) - for resistance against pressure. The device 1 comprises a winding body 4 that can rotate around a substantially vertical axis 3, that is arranged for winding up said hose 2 spirally. In the shown embodiment the winding body 4 is cylindrical. In alternative embodiments the winding body 4 can for example be formed by a more or less open frame that can rotate, around which the hose 2 can be wound. The shown winding body 4 is provided with hose guide means 5 that are intended to force the hose to wind up on the winding body 4 spirally.

[0017] The winding body 4 is powered by a driving device, in the shown embodiment formed by an electric motor 6 that via a pinion 7 drives a gear ring 8, that has been fit around the cylindrical winding body 4 and by that can make rotate the winding body around its axis 3. In the scheme it has been indicated that the spiral-shaped guide walls 5 have bearings in the shape of a number of rolls 10 that are connected to the frame 9. Due to this configuration the winding body 4 is simultaneously with the rotation - powered by the motor 6 - moved up or down. It has to be noted that there has been provided for that the electric motor 6, the pinion 7 and the gear ring 7 move up and down with the (rotating) winding body 4 in a manner that is not indicated in the figure in any more detail. In other words the driving device is arranged to make rotate the winding body and simultaneously move it in the axial direction. The schematically depicted mechanism is capable of serving as a driving device that is arranged in such a manner that for every rotation of the winding body 4 the axial movement (up or down, dependent on the direction of rotation) corresponds with the distance d (in the axial direction) between the spiral-shaped hose guide walls 5. If the spiral-shaped hose guide means 5 would not have been provided for then, due to the absence of the spiral-shaped hose guide means 5, the pitch (that is the vertical movement for every rotation of the winding body 4) must correspond with the diameter of the hose 2; only then the windings of the hose 2 will directly - without interposition of the guide means 5 - lie against one another.

[0018] The winding body 4 has a vertical bearing in the shape of a vertical column 11 that is connected to the frame 9 and extends upward inside the winding body 4.

[0019] It is also conceivable that the driving device comprises a rotating screw-jack/column of which the pitch corresponds with the pitch of the hose guide means 5.

[0020] For testing the hose 2 is placed on a work bench or work plateau 12 (for example provided with supporting rolls) and at its front (right) a shut-off valve 14 provided with a ventilation nipple 13 is fitted. The winding body 4 is - by means of the motor 7 - brought in its lowest position, by which only the upper part of the winding body 4 extends above the top surface of the frame 9. Subsequently the front of the hose 2 is placed in the winding body 4 and the motor 7 is activated, whereby the winding body 4 starts to rotate and simultaneously - due to the fixed position of the bearing rolls 10 - moves upward. As a result the hose 2 is wound - due to its friction with the surface of the guide means 5 -around the winding body 4 and simultaneously pulled up. Figure 1 shows this stage.

[0021] Figure 2 shows the stage in which the hose 2 has been wound almost completely around the winding body 4. In this stage a hose coupling piece 15 can be fitted on the still protruding end of the hose 2, on which then an inlet hose 16 is connected, via which the hose 2 to be tested is completely filled with a test fluid, for example water. On top the air escapes, via valve 13, from the hose 2 to be tested.

[0022] After the hose 2 has been filled completely and all air has escaped from it the valve 13 is closed and then the pressure on the test fluid is raised to the desired level. After the test has been conducted as it should be the pressure is reduced again and the fluid drained from the hose 2 via (for example) the inlet hose 16, whereby the valve 13 is opened again, so that during the draining of the fluid (due to its own weight) ambient air can flow in the hose 2.

[0023] Thus is provided for a device that enhances the reliability of the test procedure, increases the safety and considerably shortens the length of time for conducting the total test procedure. In addition the device takes up relatively little room. For improving the safety the device is preferably provided with a (not shown in the figures) protecting coat or housing around the winding body 4, whereby in case of unexpected rupture of the hose 2 during the test the safety of servicing personnel is guaranteed.

[0024] Finally figure 3 shows an additional illustration of an example of an embodiment of the device 1 in perspective.

Claims

1. Device (1) for winding up a hose (2), in particular for the benefit of testing said hose for resistance against pressure, which device comprises a winding body (4) that can rotate around a substantially vertical axis (3), and is arranged for winding up said hose spirally,

2. Device according to claim 1, wherein the winding body is substantially cylindrical.

3. Device according to one of the preceding claims, wherein the winding body is provided with hose guide means (5) that are arranged to force the hose to wind

up on the winding body spirally.

4. Device according to one of the preceding caims, wherein the winding body is powered by a driving device (6-8).

5. Device according to claim 4, wherein the driving device is arranged to make rotate the winding body and simultaneously move it in the axial direction.

6. Device according to claim 5, wherein the driving device is arranged in such a manner that for every rotation of the winding body its axial movement substantially corresponds with either the hose diameter or the distance (d) between the hose guide means.

7. Device according to claim 6, wherein the driving device comprises a screw-jack (11) of which the pitch corresponds with either the hose diameter or the pitch of the hose guide means.

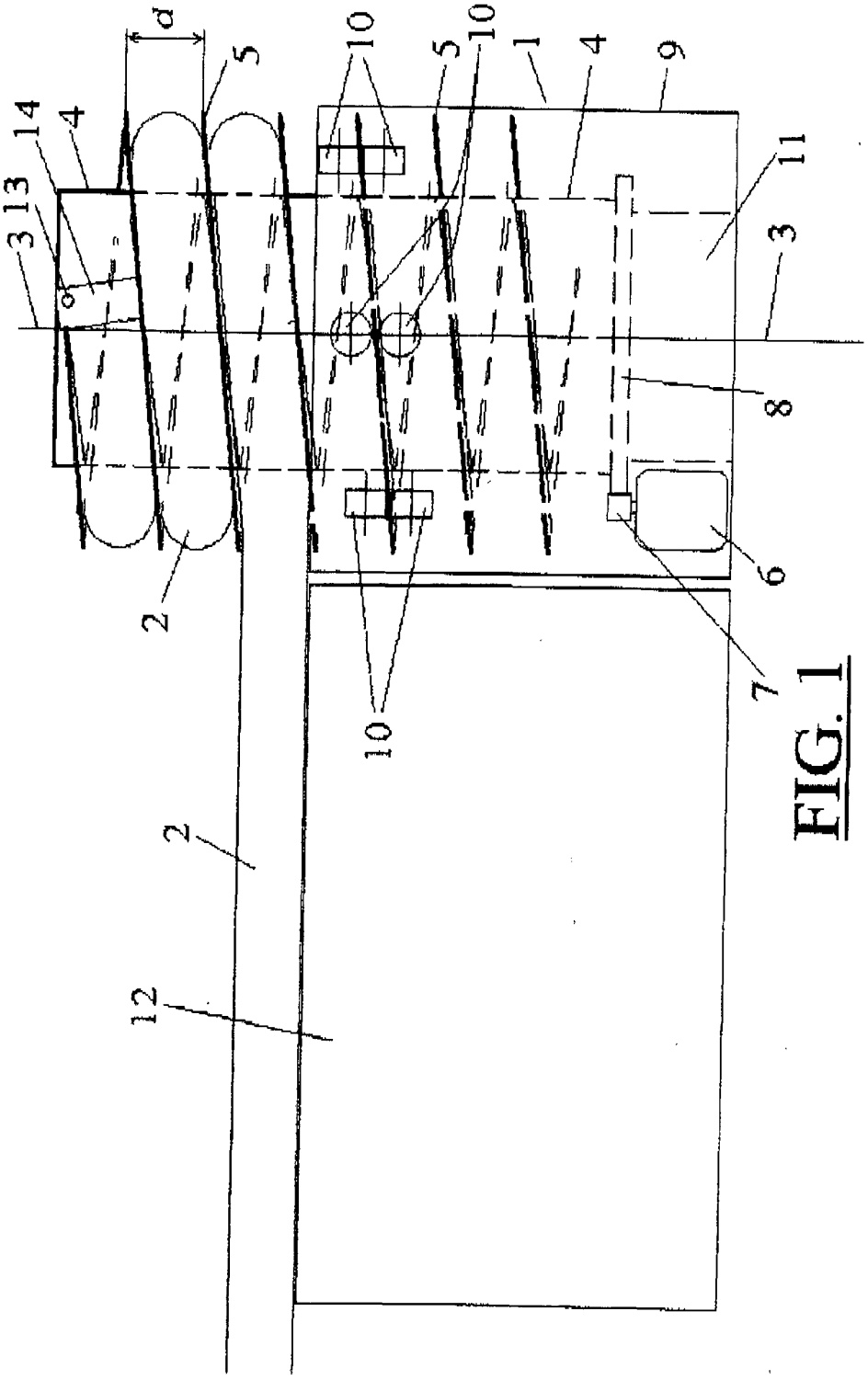

FIG. 1

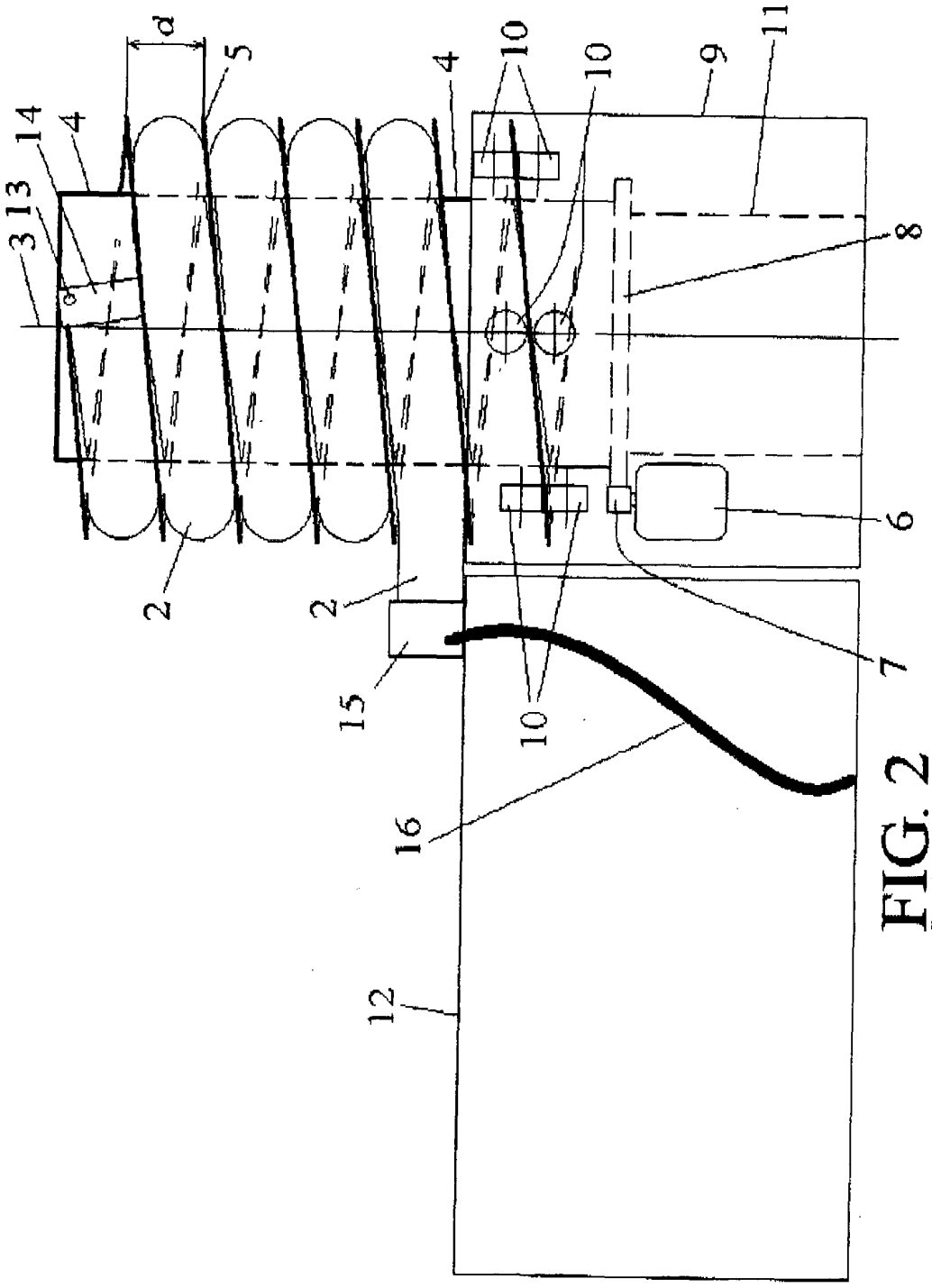

FIG. 2

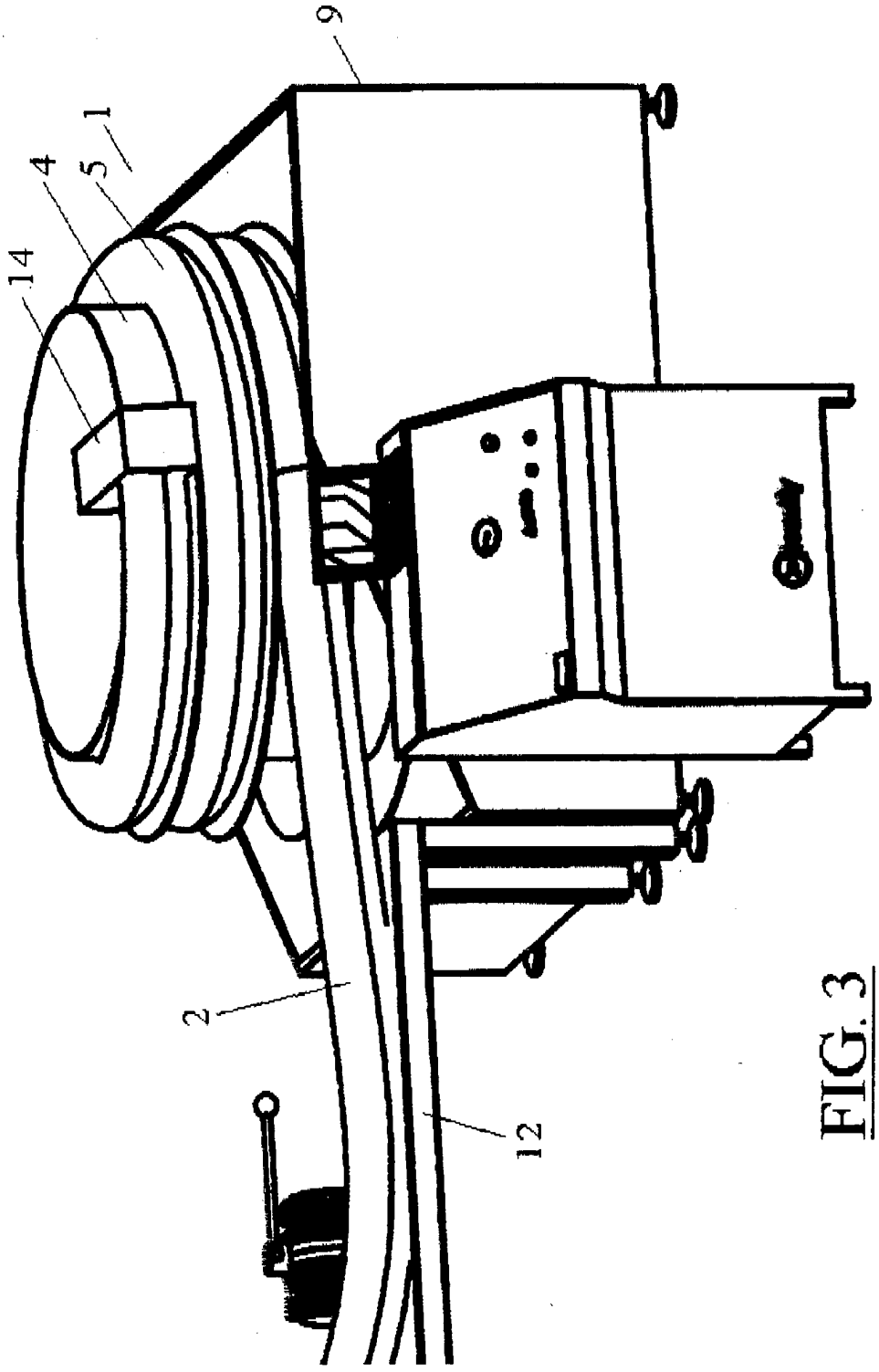

FIG. 3