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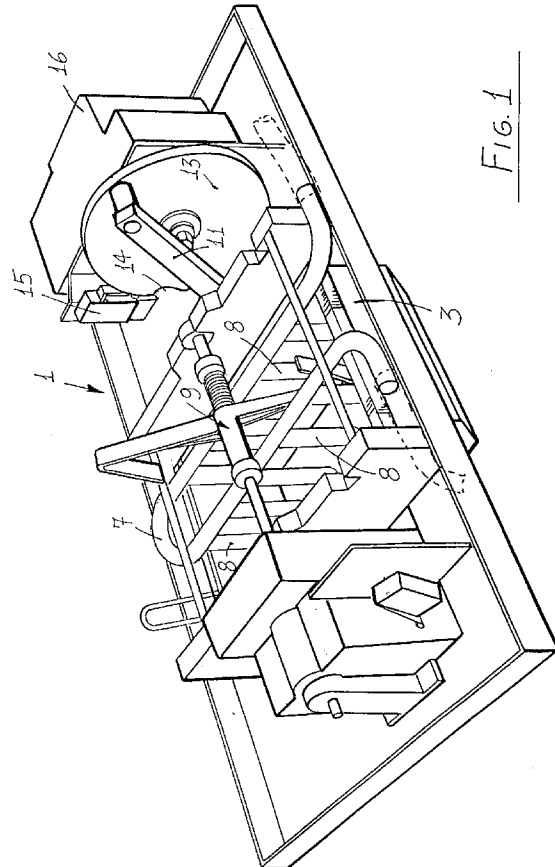
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Machine for making ice cubes, including a safety device against the overload of the tray tilting mechanism.

The present invention relates to a machine (1) for making ice cubes, which comprises a safety device against the overload of the tray tilting mechanism, comprising a water holding tray (3), pivoted to the machine bearing framework (2) and connected, through a rod (11), to a cam (13) which is driven by a geared motor unit (16) for cyclically tilting the water tray (3) or basin.

The main feature of the invention is that there are moreover included clutch means (17,20,21,22), arranged between the cam (13) and geared motor unit (16), for preventing damages during the tilting operation.



BACKGROUND OF THE INVENTION

The present invention relates to a machine for making ice cubes, including a safety device against the overload of the water tray or basin tilting mechanism.

As is known, there are already available on the market machines for making ice cubes, of the so-called blade type, which comprise a tray or water basin into which, through a level control float element, there is supplied water; in the water tray there are engaged the end portions or lugs of an evaporator, which lugs cause ice cubes to be formed around said lugs, and said formed ice cubes being detached, by reversing the thermal cycle, and specifically by introducing a hot fluid into the evaporator.

The formed ice cubes, in particular, are ejected by downward tilting the tray, owing to the provision of a grid allowing the ice cubes to be outwardly ejected.

The tray, in particular, is tilted by a cam, controlled by a connecting rod, which cyclically causes the tray to turn during a lowering step and, then, in a raising step in order to recover it to the starting conditions thereof.

In such an operation, it frequently occurs that one or more ice cubes can not be outwardly ejected, so that said ice cubes will be arranged or jammed between the grid and evaporator, and because of this the operator can be damaged under the stress caused by the jammed ice cubes, or can be damaged the coupling mechanical parts or the driving geared motor unit.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing an ice cube making machine, including a safety device adapted to protect the machine against a possible overload of the tray tilting mechanism thereof.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such a safety device which is also specifically designed for protecting both the mechanical parts of the machine and the geared motor unit thereof from possible overloads.

Yet another object of the present invention is to provide such an ice cube making machine which is adapted to automatically remove any damaging obstacles during the operation thereof.

Yet another object of the present invention is to provide such an ice cube making machine which is very reliable and safe in operation, can be easily made starting from easily available elements and materials and which, moreover, is very competitive from a mere economic standpoint.

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 an ice cube making machine including a safety device for protecting against overloads a tilting mechanism of a water tray thereof, said water tray being pivoted to a machine bearing framework and coupled, through a rod, to a cam, driven by a geared motor unit, for cyclically tilting said water tray, characterized in that said machine further comprises clutch means, arranged between said cam and geared motor unit, for preventing obstacles for damaging said machine during the tilting operation of said water tray.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of an ice cube making machine, including a safety device, against the overload of the tray tilting mechanism, which is illustrated, by way of an indicative, but not limitative, example in the accompanying drawings, where:

Figure 1 is a schematic perspective view of the subject machine for making ice cubes;

Figure 2 is a side elevation view illustrating the coupling of the rod to the water tray and to the cam in turn coupled to the geared motor unit;

Figure 3 illustrates a first embodiment of the clutch or friction means;

Figure 4 is a cross-sectional view illustrating a further embodiment of the clutch or friction means;

Figure 5 illustrates yet another embodiment of resilient means associated with the clutch means; and

Figure 6 schematically illustrates the operation of the cam provided for tilting the water tray.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the number references of the above mentioned drawing figures, the ice cube making machine 1, including a safety device for protecting the machine elements against possible overloads of the water tray tilting mechanism, comprises a bearing framework 2, to which there is pivoted or articulated, at one end portion thereof, a water tray 3 provided for receiving ice forming water, being supplied to a set level, through a water controlling float.

On the bottom of the water tray there is provided a grid 6, also pivoted on the same pivoting axis as the water tray; moreover there is provided an evaporator 7, including lugs 8, immersed in the water tray.

The machine further comprises a bladed shaft 9, associated with a geared motor unit therefor, in order to stir the ice forming water and detect the size of the

ice cubes being formed, so as to stop an ice cube making cycle and start another ice cube making cycle.

The water tray can be tilted, owing to the provision of a rod 11, which is pivoted to a middle point of said tray and, at the other end thereof, to the periphery of a circular cam 13, provided with a notch 14, thereon a microswitch 15 operates, in order to control or drive a geared motor unit 16 for operating the cam.

The main feature of the invention is that the cam 13 is connected to the shaft 17 projecting from the geared motor unit 16 through the interposition of clutch means.

Said clutch or friction means, as is clearly shown in Figure 3, are provided with a conic end piece 20, keyed on the shaft 17, which engages in a conic seat or recess 21, provided on the hub 22 of the cam 13.

The friction contact is performed owing to the provision of one or more cup springs 24, arranged on the shaft 17 and held in a pressed condition by a nut 25, coupled to the threaded end portion 26 of the shaft 17; the cup springs, in particular, affect a washer 27, which axially presses on the hub 22, including the mentioned conic recess.

In the case of an obstacle, which will be conventionally constituted by one or more ice cubes interposed between the grid and lugs, the conic end piece 20 and conic recess 21 will mutually slide, thereby affording a free operation of the geared motor unit, without damaging this latter or other mechanical elements.

As shown in Figure 4, the clutch or friction means can comprise a cylindrical end piece 30, including a flange 31 and keyed on the shaft 17.

In this case, there is moreover provided a hub 22 including a cylindrical recess 33, which is still axially pressed by a washer 27 urged by cup springs 24.

If desired, as clearly shown in Figure 5, the mentioned resilient means, instead of being formed by one or more cup springs, can comprise a coil spring 40 or any suitable resilient means.

Figure 6 is a detail view illustrating the operation cycle of the cam, and clearly shows the locating of the coupling rod which, during the cyclical rotation of the cam, will cause the water tray to be lowered and then raised again.

In the case of jammed ice cubes, the operation of the motor can continue without the rotation of the cam.

During this step, the ice cube, being in contact with the evaporator therethrough a hot fluid is caused to pass, will be dissolved, thereby the obstacle will be automatically removed without causing any damages.

From the above disclosure it should be apparent that the invention fully achieves the intended aim and objects.

In particular, the fact is to be pointed out that there are used clutch or friction means which have been

specifically designed for disengaging the geared motor unit and water tray, by providing two sliding surfaces which are precisely made of materials adapted to allow a continuous type of sliding, for a time which is sufficient to provide a perfect operation of the machine.

In this connection it should be moreover pointed out that the sliding or slipping force can be suitably calibrated, by simply operating the nut or bolt 25, which allows to adjust the load on the springs urging the washer which axially operates on the cam hub.

Moreover, it should be also pointed out that the provided mechanism allows to reduce the weight of the mechanical assembly, since it overcomes the requirements of resisting against high efforts due to the presence of obstacles.

The invention as disclosed is susceptible to several variations and modifications all of which will come within the scope of the invention.

Moreover, all of the details can be replaced by other technically equivalent elements.

In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, according to requirements.

Claims

1. An ice cube making machine including a safety device for protecting against overloads a tilting mechanism of a water tray thereof, said water tray being pivoted to a machine bearing framework and coupled, through a rod, to a cam, driven by a geared motor unit, for cyclically tilting said water tray, characterized in that said machine further comprises clutch means, arranged between said cam and geared motor unit, for preventing obstacles for damaging said machine during the tilting operation of said water tray.
2. A machine, according to Claim 1, characterized in that said clutch means comprise a conic end piece keyed on an output shaft of said geared motor unit and engaging in a conic recess provided on the hub of said cam, at an axial end portion of said hub there being provided resilient urging means.
3. A machine, according to the preceding claims, characterized in that said machine further comprises a cylindrical end piece, with a flange keyed on the output shaft of said geared motor unit and engaging in a cylindrical recess formed on the hub of the cam, at one axial end portion of which is provided a washer urged by resilient means.
4. A machine, according to one or more of the preceding claims, characterized in that said resilient

means comprise one or more cup springs.

- 5. A machine, according to one or more of the preceding claims, characterized in that said resilient means comprise a coil spring. 5

- 6. A machine, according to one or more of the preceding claims, characterized in that said machine comprises calibrating means for calibrating the resilient load on said resilient means, comprising a nut element engaging with a threaded end portion of said output shaft. 10

- 7. A machine, according to one or more of the preceding claims, characterized in that said rod, at one end thereof, is pivoted to a middle portion of said water tray and, at the other end portion thereof, is pivoted to the periphery of said cam, said cam having a circular configuration and being peripherally provided with a notch therein is engaged a geared motor unit controlling micro-switch. 15
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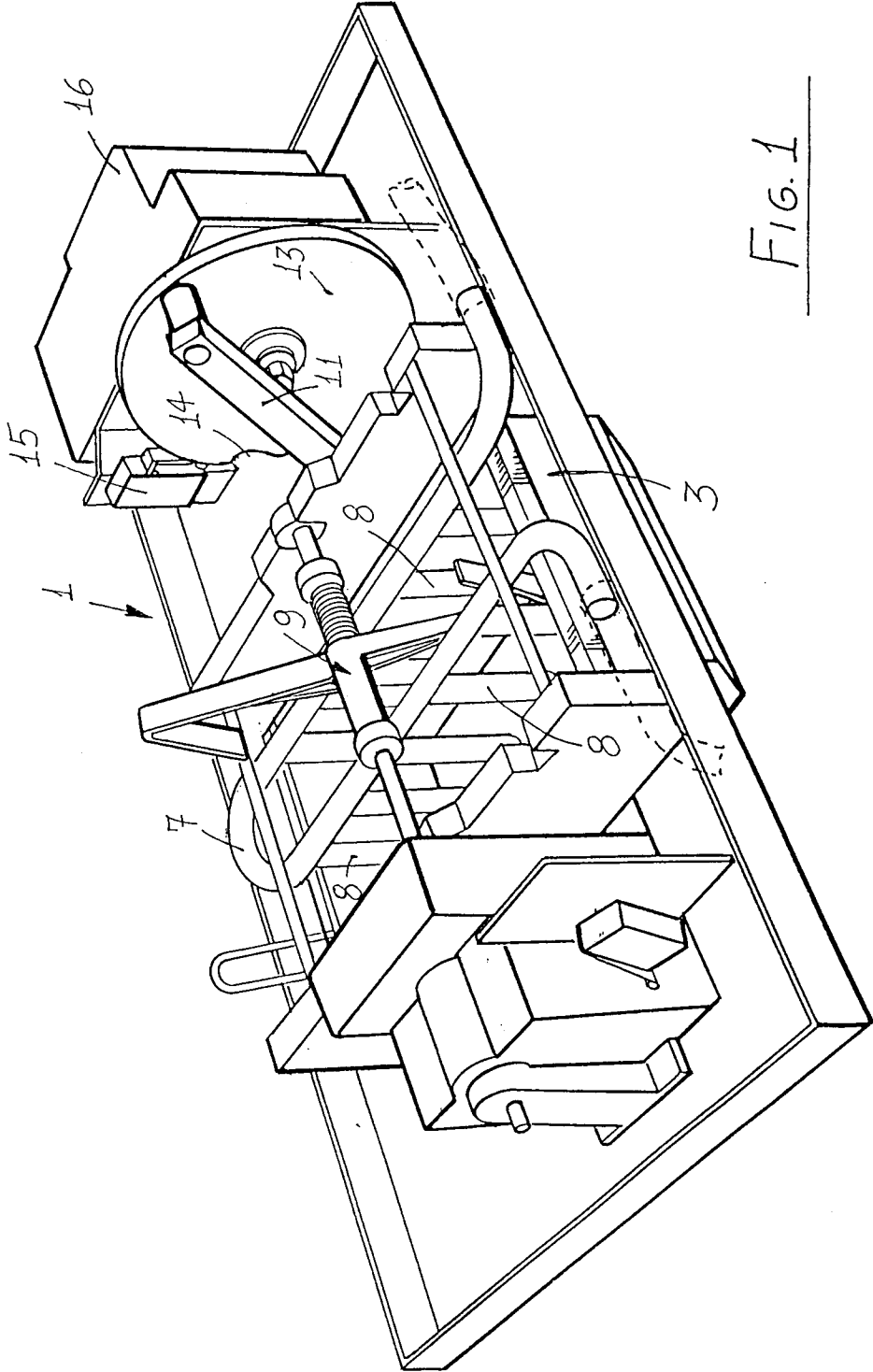


FIG. 1

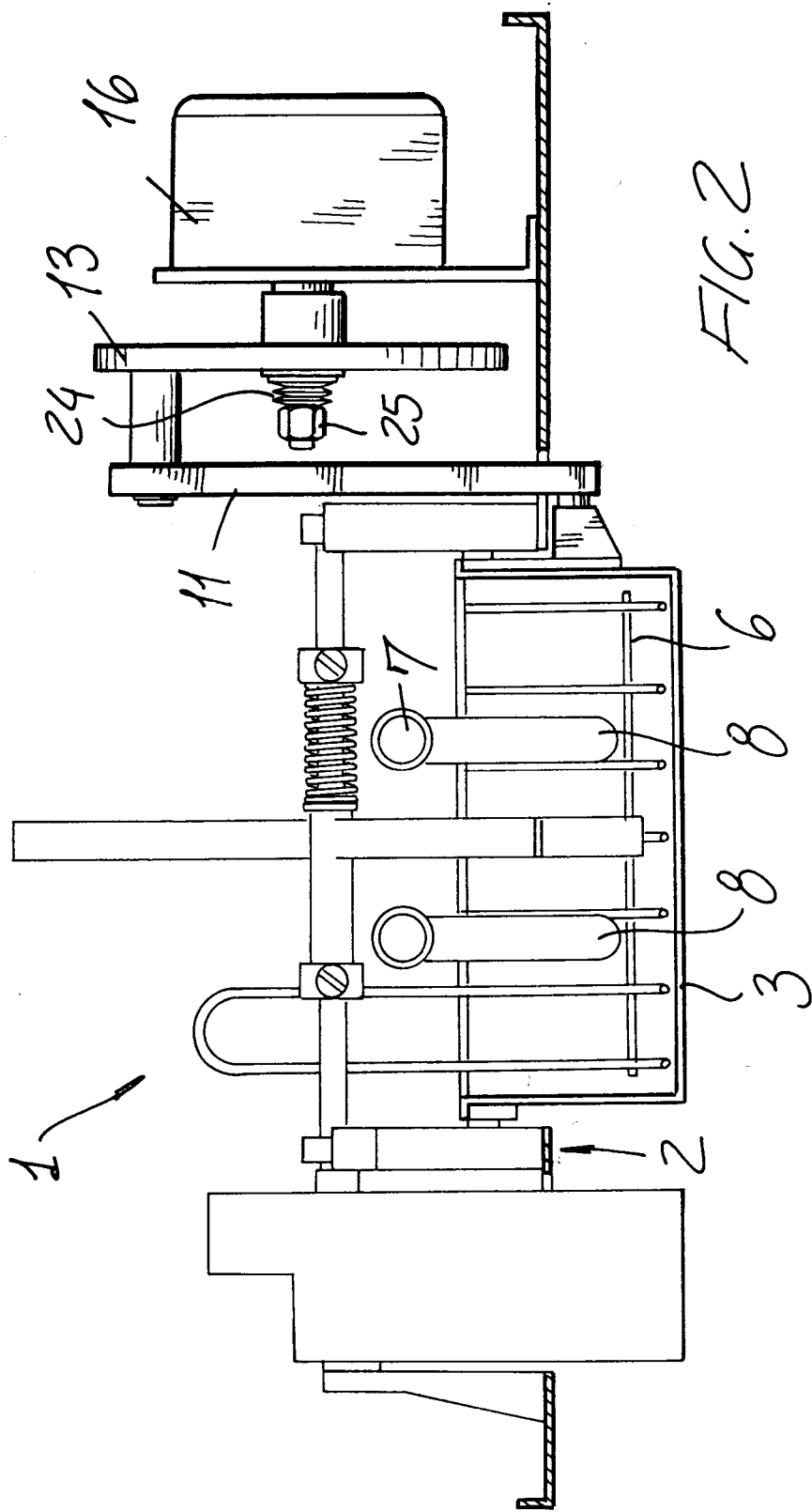
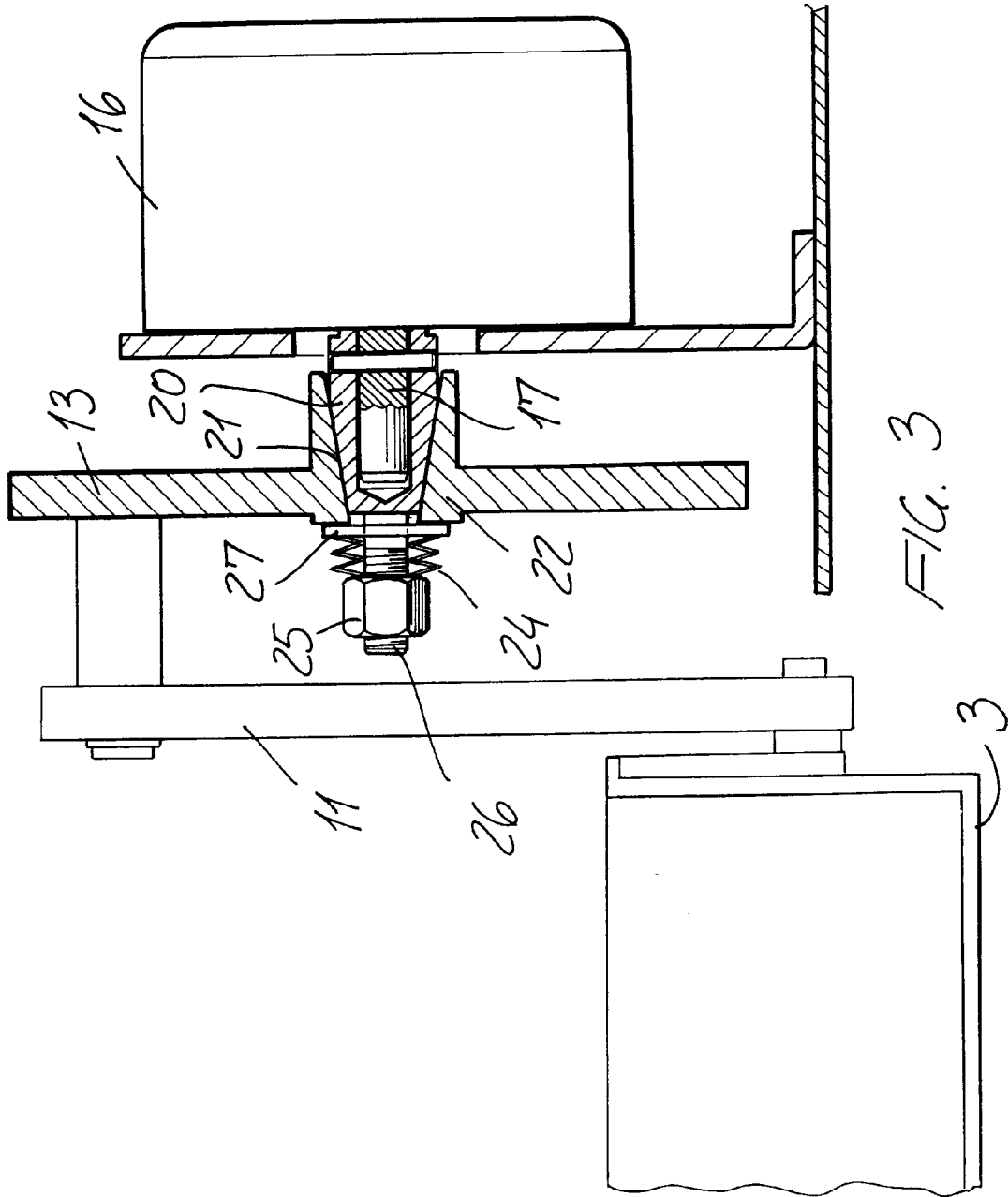


FIG. 2



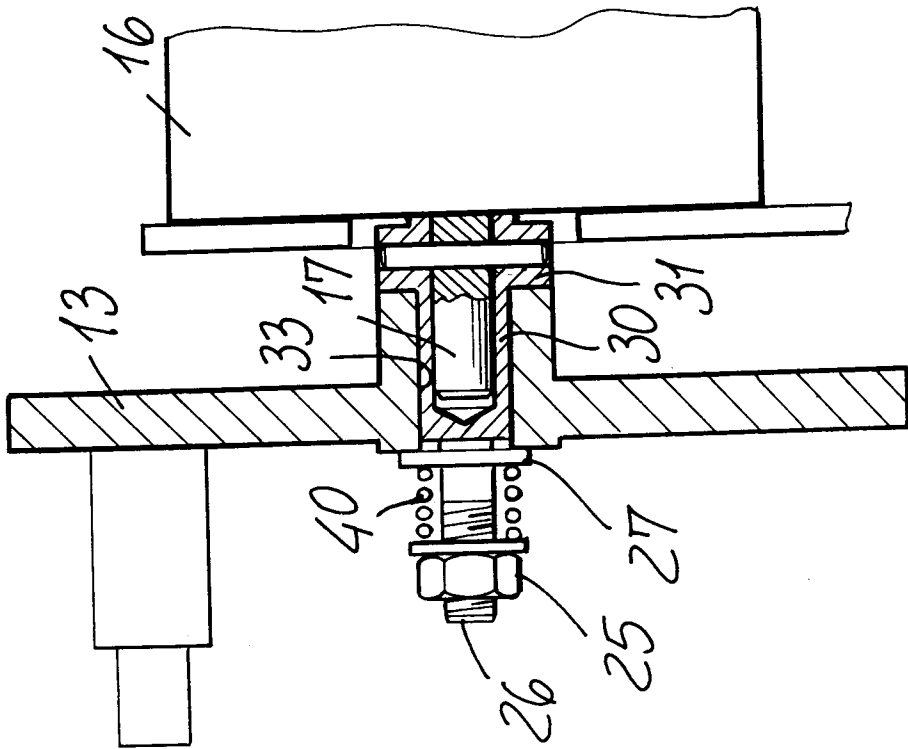


FIG. 5

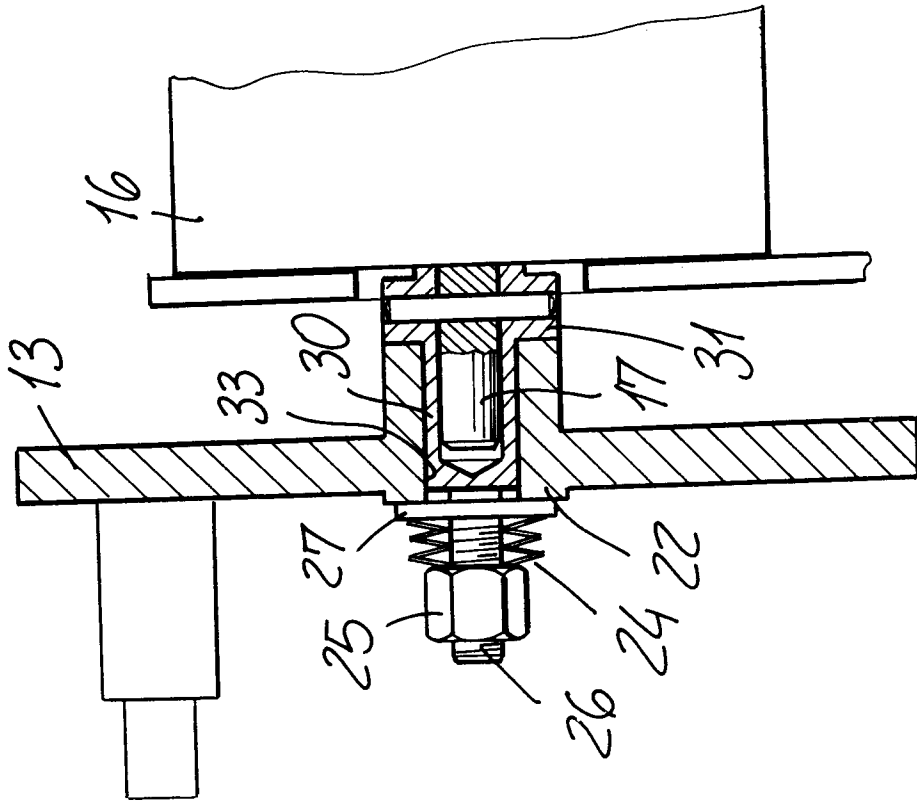


FIG. 4

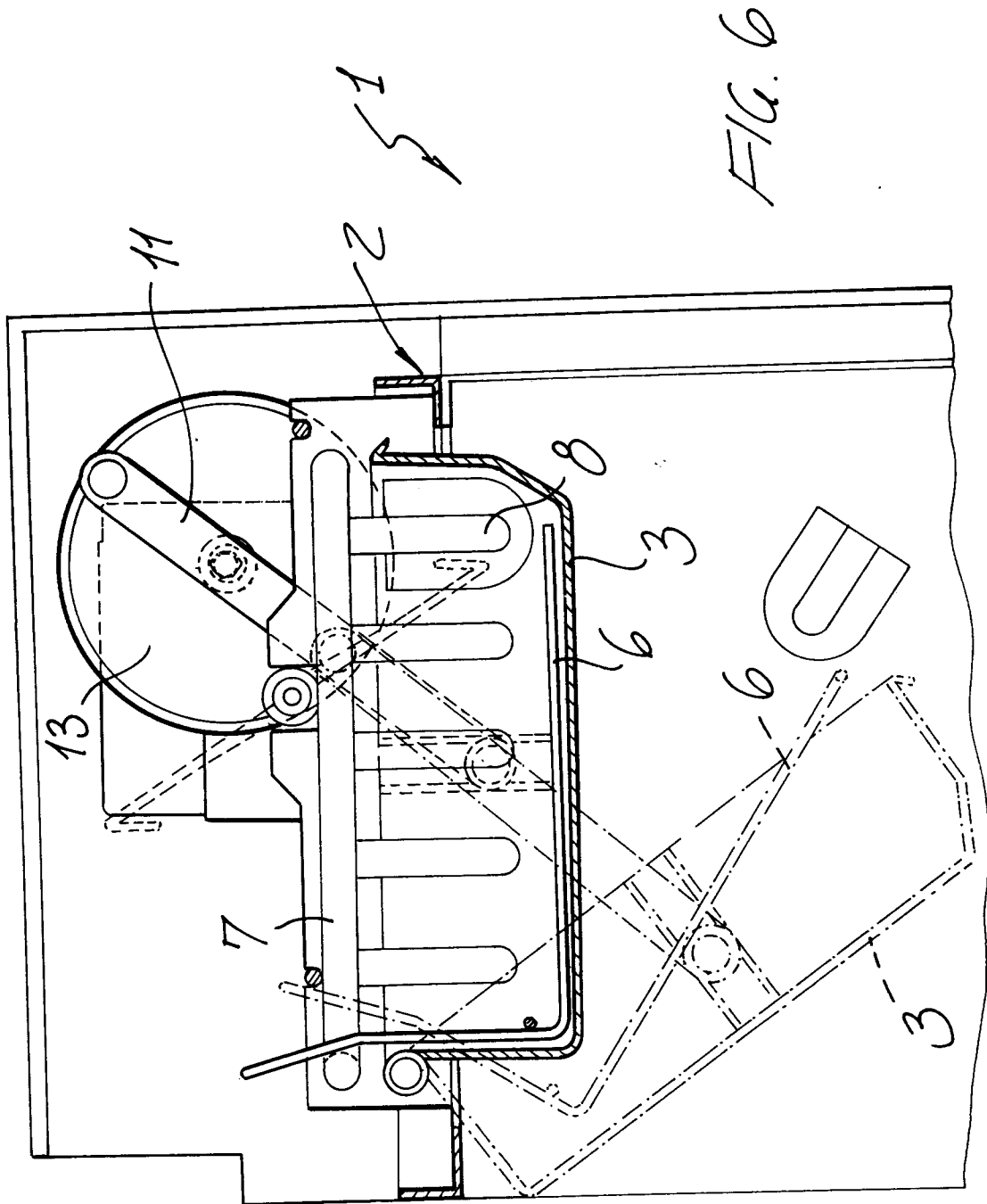


FIG. 6



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | EP 95830001.4 |
|---|---|---|--|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl. 6) |
| A | <u>GB - A - 2 090 955</u> (CASTEL MAC SPA) * Totality * | 1,7 | F 25 C 1/08 |
| P,A | <u>EP - A - 0 580 950</u> (HOSHIZAKI DENKI KABUSHIKI KAISHA) * Column 19, line 40 - column 20, line 40 * | 1,7 | |
| | | | TECHNICAL FIELDS SEARCHED (Int. Cl. 6) |
| | | | F 25 C |
| The present search report has been drawn up for all claims | | | |
| Place of search VIENNA | | Date of completion of the search 07-04-1995 | Examiner WITTMANN |
| CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document | | T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document | |

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