(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 939 272 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
01.09.1999 Bulletin 1999/35

(51) Int. Cl.[6]: **F21P 5/02**

(21) Application number: **98830753.4**

(22) Date of filing: **14.12.1998**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **25.02.1998 IT PR980012**

(71) Applicant: **F.A.L. S.r.l.**
46042 Castel Goffredo (Mantova) (IT)

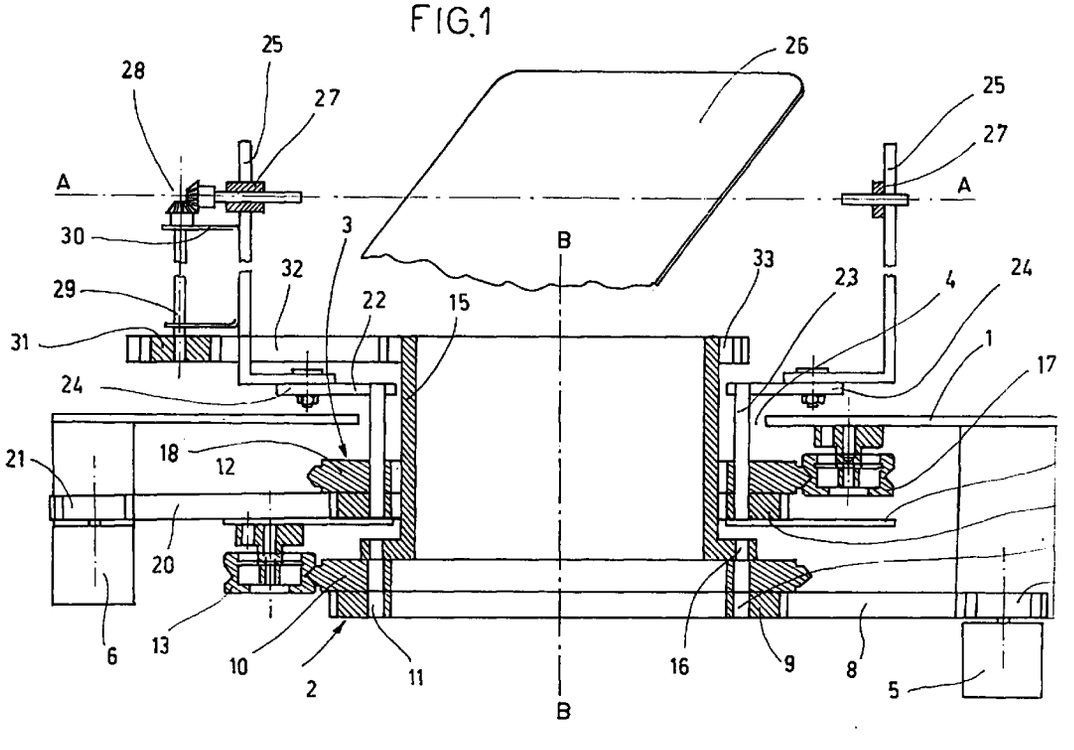
(72) Inventors:
- **Persoi, Mauro**
  46042 Castel Goffredo (Mantova) (IT)
- **Vincelli, Raffaela**
  46041 Asola (Mantova) (IT)

(74) Representative: **Gotra, Stefano**
Bugnion S.p.A.
Via Garibaldi 22
43100 Parma (IT)

(54) Device for creating lighting effects in discotheques

(57) The invention falls within the sector of devices for creating lighting effects in discotheques. Two rotating assemblies (2) and (3) intended to produce two rotational movements, perpendicular to one another, of a mirror (26) are joined to a fixing plate (1).

FIG.1



EP 0 939 272 A2

Description

[0001] The present invention relates to a device for creating lighting effects in discotheques.

[0002] Amusement and entertainment facilities, especially discotheques, are constantly looking for special effects in order to attract a larger clientele.

[0003] Lighting effects, because of their immediate impact, are much sought after, in particular where they provide continuous movement of the light beams.

[0004] A device designed to produce flashes of light which are reflected by a mirror rotating about two axes of rotation which are separate from and perpendicular to one another is known; in this device, rotation of the mirror about its diametral axis is produced by an electric motor keyed onto the said axis, while the other rotation is obtained by a second motor designed to cause rotation of the base supporting the mirror itself: this configuration involves the necessity of supplying electric current to the first of the two motors mentioned by means of a rotating commutator and this results in a few significant drawbacks such as wear, with the consequent need for frequent maintenance, and a notable waste of electric energy.

[0005] In order to overcome the drawbacks arising from rotating commutators, at present a solution which is also adopted is that of rotating the diametral axis of the mirror only through 180 degrees, continuously reversing operation of the associated motor; it is obvious that this is only a compromise solution.

[0006] Another drawback of the device of the known type is the impossibility of independent adjustment of the speed of rotation of the two electric motors.

[0007] The object of the device according to the present invention is that of eliminating the presence of rotating commutators for operation of the electric motor assigned to perform rotation of the mirror about the diametral axis thereof.

[0008] These and other objects are all achieved by the device for creating lighting effects in discotheques according to the present invention, characterized in that it comprises:

- a first rotating assembly designed for rotation of a mirror about a first diametral axis of the mirror itself, said first assembly rotating about a second axis perpendicular to the diametral axis of rotation of the mirror;
- a second rotating assembly, rotation of which occurs about the second axis and which is designed for rotation of the mirror about the said second axis; said first and second rotating assemblies being independent of one another and concentric with respect to the second axis.

[0009] These and other characteristic features will emerge more clearly from the following description of a preferred embodiment illustrated, purely by way of a non-limiting example, in the accompanying plate of drawings in which:

- Figure 1 shows a lateral sectioned view of the device;
- Figure 2 shows an overall perspective view of the device viewed from above;
- Figure 3 shows an overall perspective view of the device viewed from below.

[0010] With reference to the Figures, 26 denotes a mirror rotating about a first diametral axis A-A.

[0011] 1 denotes a fixing plate which forms a support for two rotating assemblies 2 and 3 which are centred with respect to a second axis B-B; said plate is provided, in a substantially central position, with a circular opening 4.

[0012] Both the rotating assemblies 2 and 3 have the function of causing rotation of the mirror about the abovementioned axes A-A and B-B.

[0013] Two motors 5 and 6 are rigidly fixed on a same side of the said plate; said motors are positioned diametrically opposite one another with respect to the circular opening 4.

[0014] The first motor 5 transmits the movement to the first rotating assembly 2 and has a pinion gear 7 keyed onto its output shaft.

[0015] A toothed belt 8 connects the first motor 5 to a crown wheel 9 having toothing along the whole of its external circumference.

[0016] The said crown wheel is coaxial with respect to the axis B-B corresponding to the central perpendicular axis of the circular opening 4.

[0017] A ring 10 is rigidly joined to said crown wheel, coaxially therewith; the diameter of the central hole of said ring substantially coincides with the internal diameter of the crown wheel 9.

[0018] Centring of the ring 10 and crown wheel 9 is ensured by a plurality of pins penetrating into suitable holes 11 formed, along an identical diameter, both through the said ring and through the said crown wheel.

[0019] The section of the external circumference of the ring 10 has a circumferential relief 12 designed to correspond to the circumferential race of a first group of three idle rollers 13 which are arranged at 120 degrees with respect to one another about the axis B-B.

[0020] The stems of the three idle rollers 13 are rigidly joined to a counter-plate 14 which is in turn rigidly joined to the fixing plate 1.

[0021] A substantially cylindrical, internally hollow sleeve 15 is rigidly joined coaxially to the ring 10 on the side thereof directed towards the counter-plate 14; the connection between said sleeve and the said ring 10 and associated crown wheel 9 is ensured by the already mentioned pins which, after passing through the thickness of said elements, are screwed into suitable threaded holes 16 formed at the base of said sleeve.

[0022] A second group of three idle rollers 17 which

are identical to the said three idle rollers 13 are rigidly joined to the fixing plate 1 on the surface thereof directed towards the counter-plate 14.

[0023] The circumferential relief 12 of a ring 18 which is substantially identical to the ring 10 engages into the circumferential race of the said idle rollers, said ring 18 forming part of the second rotating assembly 3.

[0024] A crown wheel 19 which is substantially identical to the crown wheel 9 is fixed to the bottom part of the ring 18; the external surface of said crown wheel is provided with a toothing meshing with a toothed belt 20 which is wound around a pinion 21 keyed onto the shaft of the second motor 6.

[0025] Said second motor transmits the movement to the second rotating assembly 3.

[0026] A circular rim 22 is rigidly joined to the end of a plurality of spacing elements 23 opposite to the end for fixing said elements to the ring 18; said spacing elements also form the connection between said ring and associated crown wheel 19.

[0027] The circular opening 4 of the fixing plate 1 has a diameter which is slightly greater than that of the circumferential dimensions of the plurality of spacing elements 23.

[0028] The circular rim 22 has two external lugs 24 which are positioned diametrically opposite one another.

[0029] An upright 25 is rigidly joined to each of the said lugs.

[0030] The diametral axis A-A of the mirror 26 which is reflective on both its surfaces is positioned so as to pass near the top end of both the said uprights.

[0031] One of the two uprights 25, at the point where the axis of rotation A-A passes through, has a support 27 for one of the two gears forming a bevel gear pair 28 with shafts meeting at a right angle.

[0032] The second of the gears of said bevel gear pair is keyed to the top end of a rotating shaft 29, the said shaft being held in position by a frame 30 rigidly joined to one of the two uprights 25.

[0033] A pinion gear 31 is keyed onto the bottom end of the rotating shaft 29 and has, meshing with it, a toothed belt 32 which is wound around the external toothed profile of a crown wheel 33 keyed onto the external diameter of the end of the sleeve 15 opposite to that for fixing the latter to the ring 10.

[0034] There now follows a description of operation of the device for creating lighting effects in discotheques according to the present invention in connection with the reference numbers shown in the Figures.

[0035] Starting rotation of the first electric motor 5 causes the motor to transmit the rotary movement to the crown wheel 9 of the first rotating assembly 2 by means of the toothed belt 8.

[0036] The axis of rotation of the said crown wheel coincides with the axis B-B.

[0037] The rotary movement of the first motor 5 is then transmitted to the ring 10 which is rigidly joined to and centred with the crown wheel 9 by means of the first group of idle rollers 13 and is also transmitted to the sleeve 15 rigidly joined to the said ring.

[0038] From the said sleeve, rotation passes, via the crown wheel 33, the toothed belt 32 and the drive shaft 29, to the bevel gear pair 28, one pinion of which is keyed onto a diametral axis of the mirror 26 coinciding with the axis A-A.

[0039] Coaxially with the sleeve 15, outside thereof and separate therefrom, the crown wheel 19, forming part of the second motor assembly 3, receives rotary movement from the second motor 6 by means of the toothed belt 20 meshing with the toothed pinion 21 keyed onto the output shaft of the said second motor.

[0040] The toothed wheel 19 transmits the rotary movement to the ring 18, to which it is rigidly joined and with which it is centred by means of the second group of idle rollers 17, as well as to the plurality of spacing elements 23 which support the circular rim 22.

[0041] Since the two uprights 25 supporting the axis A-A coinciding with a diametral axis of the mirror 26 are connected to the two external lugs 24 thereof, the rotary movement produced by the second motor 6 causes rotation of the mirror itself about the axis B-B.

Claims

1. Device for creating lighting effects in discotheques according to the present invention, characterized in that it comprises:

   - a first rotating assembly (2) designed for rotation of a mirror (26) about a first diametral axis of the mirror itself, said first assembly rotating about a second axis perpendicular to the diametral axis of rotation of the mirror (26);
   - a second rotating assembly (3), rotation of which occurs about the second axis and which is designed for rotation of the mirror (26) about the said second axis (B-B); said first and second rotating assemblies being independent of one another and concentric with respect to the second axis.

2. Device according to Claim 1, characterized in that the first rotating assembly (2) comprises:

   - a crown wheel (9) which is internally hollow and which has, meshing with its external toothing, a toothed belt (8) designed to transmit the movement produced by a first motor (5);

   - a coaxial ring (10) which is rigidly joined to the crown wheel (9) and has an internal diameter substantially identical to that of the said crown wheel;

   - a sleeve (15) which is substantially cylindrical,

internally hollow, coaxial and rigidly joined both to the crown wheel (9) and to the associated ring (10), said sleeve passing through the fixing plate (1) in the region of the circular opening (4); said sleeve having a crown wheel (33) keyed onto the external surface of its end opposite to the end for fixing to the ring (10);

- a bevel gear pair (28), one pinion of which being keyed to one end of a rotating shaft (29); said shaft having at its opposite end a pinion gear (29) connected to the crown wheel (33) by means of a toothed belt (32); the second pinion of the said bevel gear pair being keyed to one end of the diametral axis A-A of the mirror (26).

3. Device according to Claims 1 and 2, characterized in that the ring (10) has a circumferential relief (12) designed to mate with a corresponding recess circumferentially formed on the side of a first plurality of idle rollers (13); the positioning of said idle rollers being centred circumferentially with respect to the axis B-B and being designed for positioning and centring both the crown wheel (9) and the sleeve (15).

4. Device according to Claims 1 and 2, characterized in that the second rotating assembly (3) comprises:

- a crown wheel (19) which is internally hollow over a diameter which is slightly greater than the external diameter of the sleeve (15) and the external toothing of which meshes with a toothed belt (20) designed to transmit the movement produced by a second motor (6);
- a ring (18) which is coaxial with and rigidly joined to the crown wheel (19) and has an internal diameter corresponding to that of the said wheel;
- a circular rim (22) which is internally hollow over a diameter slightly greater than the external diameter of the sleeve (15), said circular rim being rigidly joined to the plurality of spacing elements fixed both to the crown wheel (19) and to the associated ring (18); the said circular rim having two lugs (24) which are positioned diametrically opposite one other and support two uprights (25) at the ends of which the supports for a diametral axis of the mirror (26) coinciding with the axis A-A are positioned; a frame (30) supporting the rotating shaft (29) being fixed to one of the said uprights.

5. Device according to Claims 1, 3 and 4, characterized in that the circumferential relief (12) of the ring (18), in an identical manner to the ring (10), is intended to mate with the corresponding recess present on the edge of a second plurality of idle rollers (17); said idle rollers being designed for the positioning and centring of the crown wheel (19), the associated ring (18) and the circular rim (22) with respect to the axis B-B.

6. Device according to Claims 1, 2 and 4, characterized in that the rotations of the two rotating assemblies (2) and (3), being caused by the two motors (5) and (6) respectively, are independent of one another, thus giving rise to the possibility of different rotational speeds.

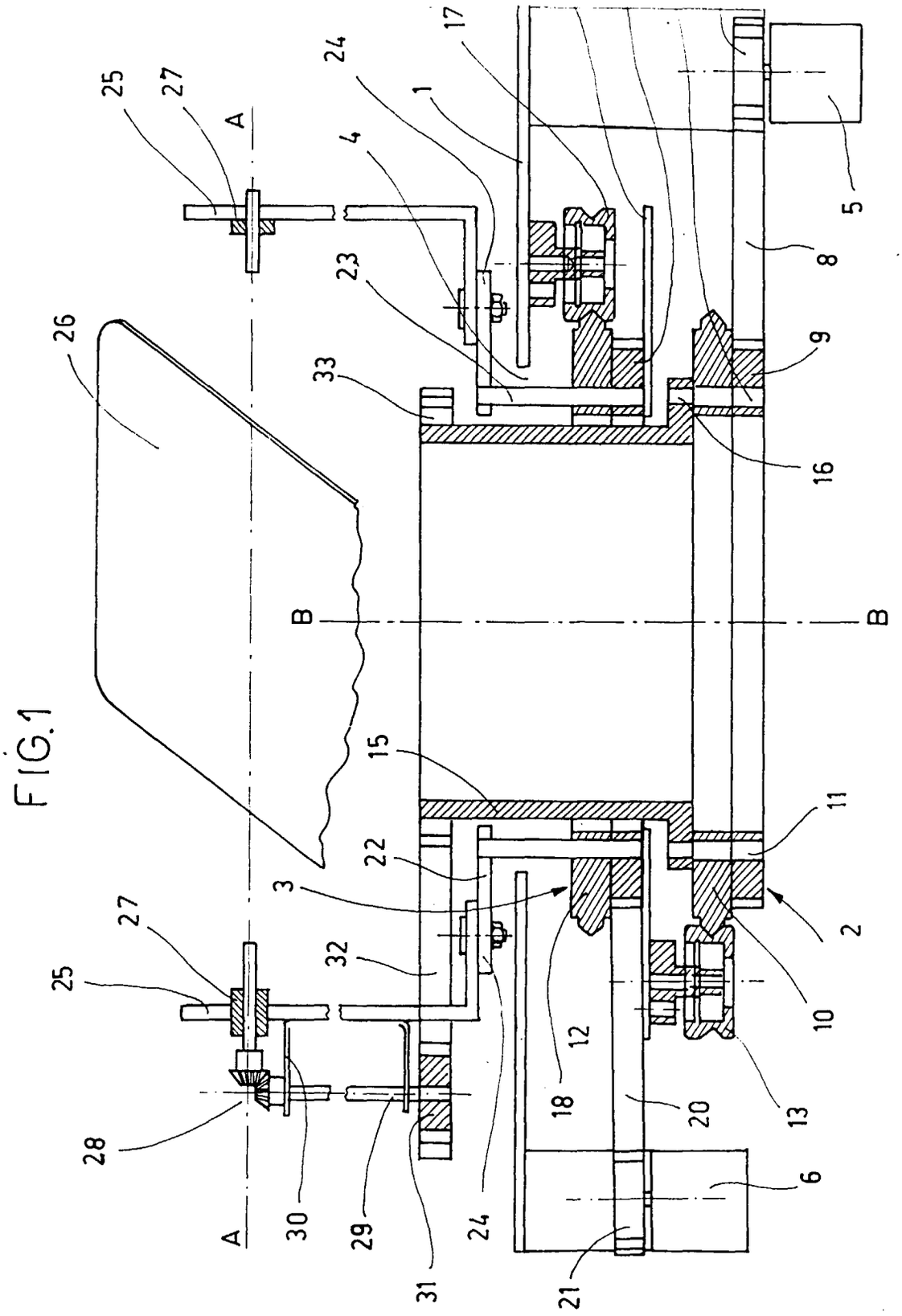

A
A
B
B
1
2
3
4
5
6
8
9
10
11
12
13
15
16
17
18
20
21
22
23
24
24
25
25
26
27
27
28
29
30
31
32
33

FIG.1

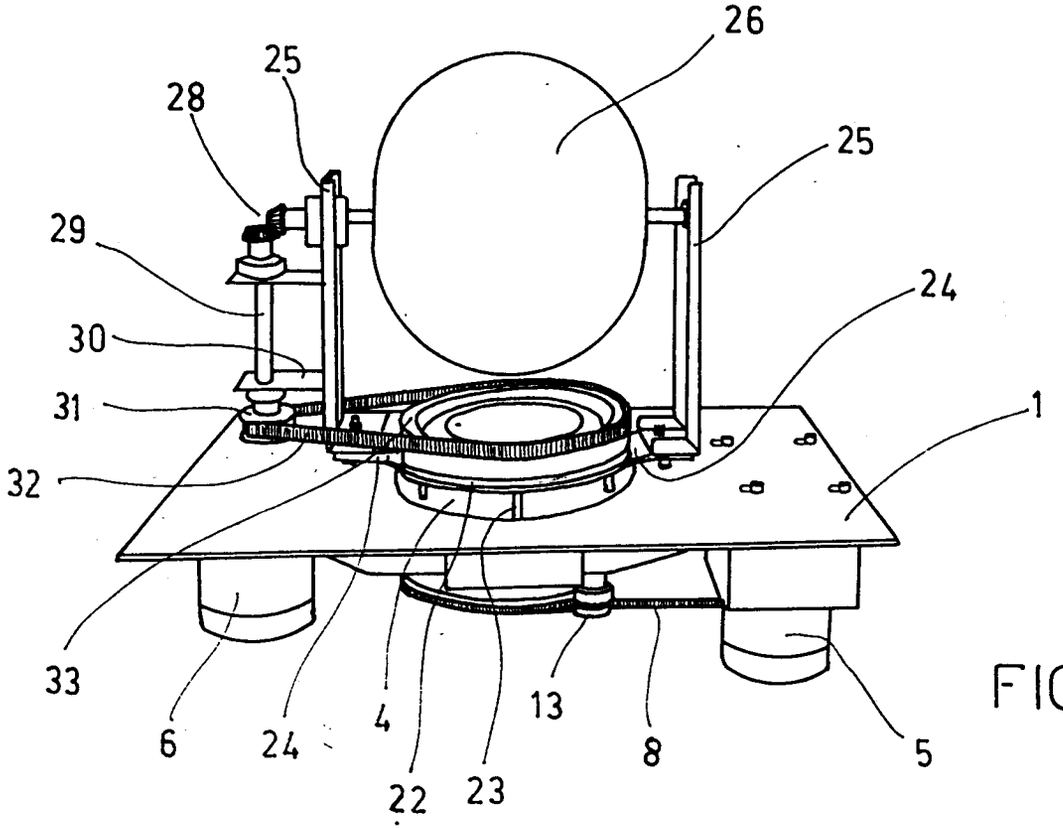

26
25
28
25
29
24
30
1
31
32
33
6
24
4
22
23
13
8
5

FIG. 2

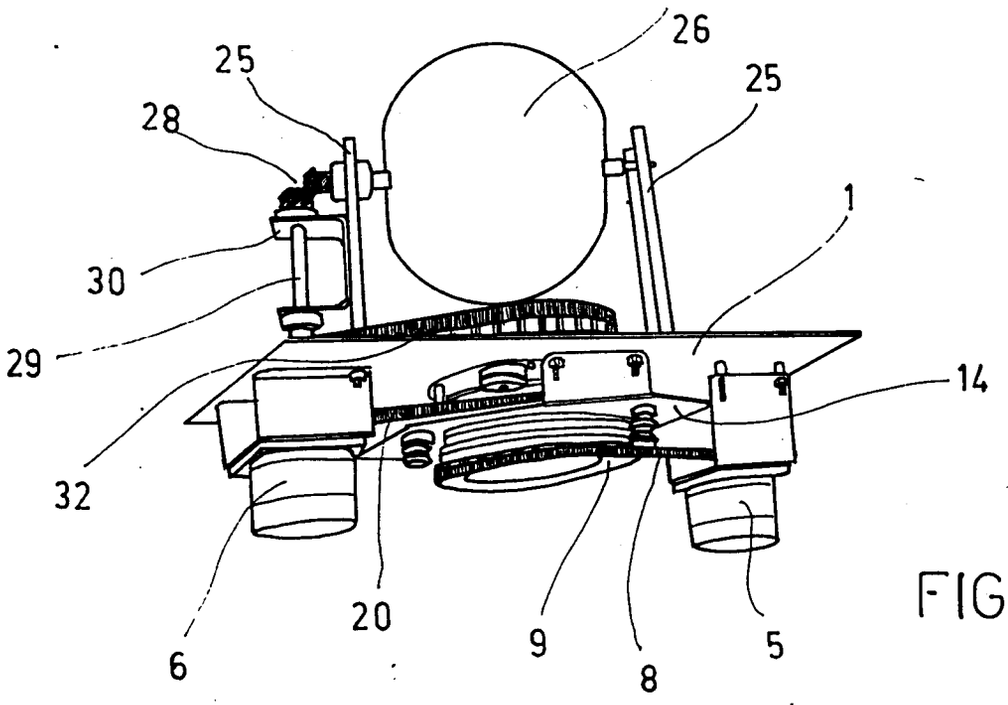

26
25
28
25
1
30
29
14
32
6
20
9
8
5

FIG. 3