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(71) Applicant: **COEMAR S.p.A.**
Via Inghilterra 1
I-46042 Castel Goffredo(Mantova)(IT)

(72) Inventor: **Dedoro, Bruno**
Via Monviso, 54
I-46042 Castel Goffredo, Mantova(IT)

(74) Representative: **Modiano, Guido, Dr.-Ing. et al**
Modiano & Associati S.r.l.
Via Meravigli 16
I-20123 Milano (IT)

(54) Device for the variable deflection of a light beam particularly for floodlights.

(57) Device for the variable deflection of a light beam, particularly for floodlights, comprising a frame (1) which can be mounted on a floodlight (2); the frame has a fixed part (3b) and a movable part (3a). The movable part is rotated with respect to the fixed part by first transmission means and supports a first mirror (4) and a second mirror (5). The first mirror crosses the light beam which leaves the floodlight and is inclined with respect to the direction defined by the light beam, whereas the second mirror is spaced from the first mirror and is inclined with respect to the light beam which leaves the first mirror. The second mirror is rotatable with respect to the first mirror.

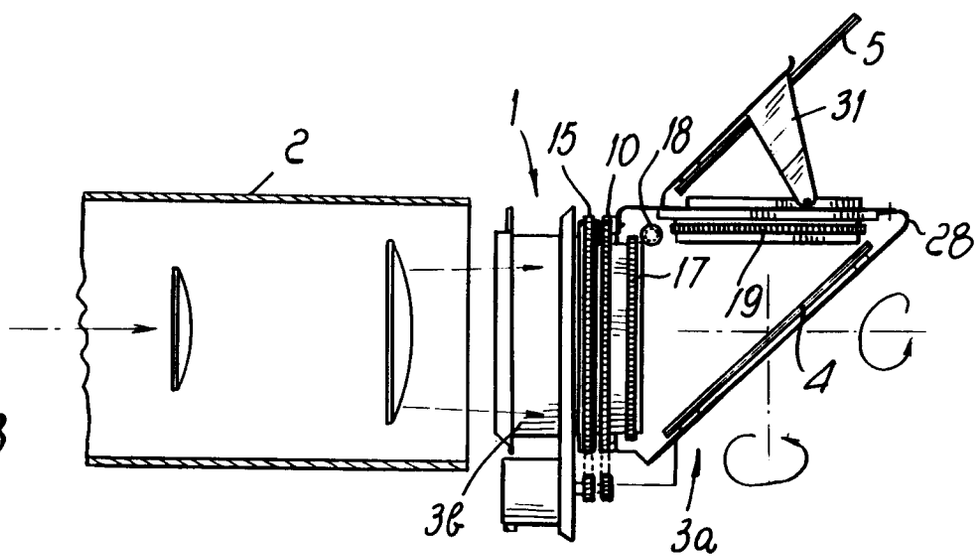

Fig. 3

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The present invention relates to a device for the variable deflection of a light beam particularly for floodlights.

In the field of floodlights used in public meeting-places, such as discotheques and the like, there are various more or less complicated systems for deflecting light so as to create, either on stages or on other structures situated in the meeting-place, particular light tricks or special light effects.

These systems often suffer from drawbacks which are linked to their fragility or constructive complexity, thus causing considerable problems from the point of view of their maintenance and therefore of their running costs.

Furthermore, in order to obtain different light tricks the floodlights themselves are moved, thus entailing the use of larger and more expensive movement motors or the use of small-size floodlights, so-called spotlights, thus having a markedly lower lighting power than required.

The aim of the present invention is to eliminate or substantially reduce the drawbacks described above and others in known types of floodlights by providing a device for the variable deflection of a light beam particularly for floodlights, which eliminates the problems linked to the maintenance of said floodlight.

Within the scope of the above aim, an object of the present invention is to provide a variable deflection device which allows to use floodlights of any size and light power.

Another object of the present invention is to provide a device for the variable deflection of a light beam particularly for floodlights which is relatively easy to manufacture and at competitive costs.

This aim, these objects and others which will become apparent hereinafter are achieved by a device for the variable deflection of a light beam particularly for floodlights, according to the invention, characterized in that it comprises a frame which can be mounted on a floodlight, said frame having a fixed part and a movable part, said movable part being rotated with respect to said fixed part by first transmission means and supporting a first mirror and a second mirror, said first mirror crossing the light beam which leaves said floodlight and being inclined with respect to the direction defined by said light beam, said second mirror being spaced from said first mirror and being inclined with respect to the light beam which leaves said first mirror, said second mirror being rotatable with respect to said first mirror.

Further characteristics and advantages of the present invention will become apparent from the following description of a preferred but not exclusive embodiment of a device for the variable deflection of a light beam particularly for floodlights according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a front elevation view of a device according to the present invention;

figure 2 is a lateral elevation view of the device according to the invention;

figure 3 is a lateral elevation view of the device according to the invention, with a floodlight; and

figure 4 is a partially sectional enlarged-scale lateral elevation view of the device according to the invention.

With reference to the above figures, a device for the variable deflection of a light beam particularly for floodlights comprises a frame 1 which can be mounted on a floodlight, designated by the reference numeral 2. The frame 1 has a fixed part 3b and a movable part 3a. The movable part is rotated with respect to the fixed part by first transmission means and supports a first mirror 4 and a second mirror 5.

The first mirror 4 crosses the light beam, designated by the lines with arrows in the above figures, which leaves the floodlight 2, and is inclined with respect to the direction defined by said light beam.

The second mirror 5 is spaced from the first mirror 4 and is inclined with respect to the light beam which leaves the first mirror 4. The second mirror 5 is rotatable with respect to the first mirror 4 by virtue of second transmission means.

The first transmission means comprise a first motor 6 which is supported by the fixed part 3b; a first sprocket 8 is rigidly coupled on the shaft 7 of said motor 6; a first toothed belt 9 engages on the first sprocket 8 and on a first ring gear 10 rigidly coupled to the movable part 3a.

The second transmission means comprise a second motor 11 which is supported by the fixed part 3b; a second sprocket 13 is rigidly coupled, on the shaft 12 of said motor 11. A second toothed belt 14 engages the second sprocket 13 and a second ring gear 15 which is rigidly coupled to the movable flange 21 of the movable part 3a. A third toothed belt 35 engages a third ring gear 17 defined on the movable flange 21 of the movable part 3a and engages, by being driven by transmission and angular redirection sprockets 18, a fourth ring gear 19 defined on the tubular element 30 which is rigidly coupled to the second mirror 5; the tubular element 30 is rotatable with respect to the movable part 3a.

The movable part 3a comprises a movable flange 21 for coupling to the fixed part 3b. The movable flange 21 has, on its external surface, an accommodation seat for a first bearing 22 for coupling to the fixed part 3b. The first bearing 22 is

fixed to the fixed part 3b by means of a plate 23, a bearing seating ring 24 and fixing means such as for example screws 40 and the like.

A ridge 36 also rises from the external lateral surface of the movable flange 21, and the second ring gear 15 is defined thereon. Adjacent to the ridge 36 there is a second bearing 25 on which a ring 27, for the coupling of a frame 28 for supporting the first mirror 4, is engaged.

Locking rings 26 are arranged externally and adjacent to the bearings 22 and 25 and prevent unwanted longitudinal movements of the movable part 3a with respect to the fixed part 3b. The third ring gear 17 is also defined on the external surface of the movable flange 21 and externally with respect to the second bearing 25, whereas the sprockets 18 are rotatably anchored to the frame 28.

The supporting frame of the first mirror 4 comprises a shaped frame 28 within which said mirror 4 is fixed. The frame 28 is connected, by means of screws 37 or the like, to the coupling ring 27 on which the first ring gear 10 is defined, as more clearly shown in figure 4.

The frame 28 is provided with a hole 29 in which a support for the second mirror 5 is accommodated. Said support comprises a tubular element 30 and a yoke 31. The tubular element 30 fits inside the hole 29 and is coupled to a third bearing 32, which is fixed to a bearing seating ring 33 fixed to the frame 28. Locking rings 34 are provided in order to prevent unwanted longitudinal movements of the tubular element 30 with respect to the frame 28.

The fourth ring gear 19 is defined on the external surface of the tubular element 30. The yoke 31 is fixed to the tubular element 30 externally with respect to the frame 28 and supports the second mirror 5.

Operation is as follows: if only the first motor 6 is activated, then the frame 28 is rotated with respect to the axis defined by the direction of the light beam and entrains both mirrors 4 and 5 in its rotation. In this case, however, the second mirror 5 moves with respect to the first mirror 4.

If only the second motor 11 is activated, then the movable flange 21 is rotated and transmits its rotary motion to the tubular element 30 by means of the kinematic train constituted by the third ring gear 17, by the third toothed belt 35, by the sprockets 18 and by the fourth ring gear 19, i.e. it rotates the yoke 31 and thus the second mirror 5. The choice of the kinematic train is advantageously made in the described manner in order to avoid turning a motor and thus causing a mechanical imbalance of the moving parts.

If both motors 6 and 11 are activated, the motion assumed by the mirrors is given by the composition of the two above described motions, thus providing a particularly interesting and simple light trick without in any way moving the heaviest part to move, i.e. the floodlight 2, but by moving relatively lighter parts, i.e. mirrors and their supporting and motion transmission structures.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept. All the details may furthermore be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the dimensions, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Device for the variable deflection of a light beam particularly for floodlights, characterized in that it comprises a frame (1) which can be mounted on a floodlight (2), said frame having a fixed part (3b) and a movable part (3a), said movable part being rotated with respect to said fixed part by first transmission means (6-10) and supporting a first mirror (4) and a second mirror (5), said first mirror crossing the light beam which leaves said floodlight and being inclined with respect to the direction defined by said light beam, said second mirror being spaced from said first mirror and being inclined with respect to the light beam which leaves said first mirror, said second mirror being rotatable with respect to said first mirror.

2. Device according to claim 1, characterized in that said second mirror is rotated with respect to said first mirror by virtue of second transmission means (11-15, 17-19, 21, 35).

3. Device according to the preceding claims, characterized in that said first transmission means comprise a first motor (6) which is supported by said fixed part, a first sprocket (8) being rigidly coupled on the shaft (7) of said motor, a first toothed belt (9) engaging said first sprocket and a first ring gear (10) which is rigidly coupled to the movable part.

4. Device according to one or more of the preceding claims, characterized in that said sec-

ond transmission means comprise a second motor (11) which is supported by said fixed part, a second toothed sprocket (13) being rigidly coupled on the shaft (12) of said second motor (11), a second toothed belt (14) engaging said second sprocket and a second ring gear (15) which is rigidly coupled to a movable flange (21) of said movable part, a third toothed belt (35) engaging on a third ring gear (17) defined on said movable flange of said movable part and engaging, by being guided by transmission and angular redirection sprockets (18), a fourth ring gear (19) provided on a cylindrical supporting element (30) of said second mirror which rotates with respect to said movable part.

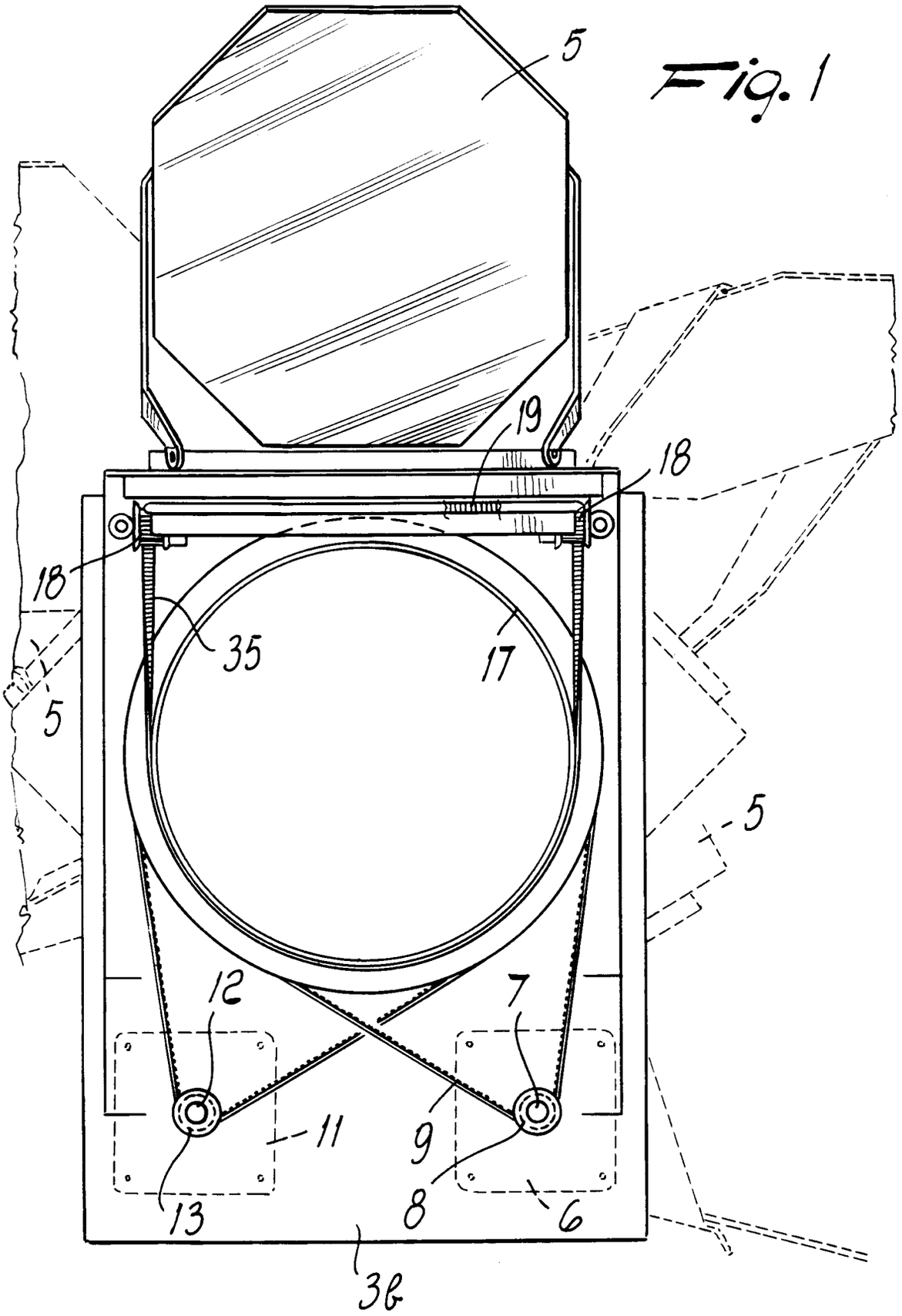


Fig. 1

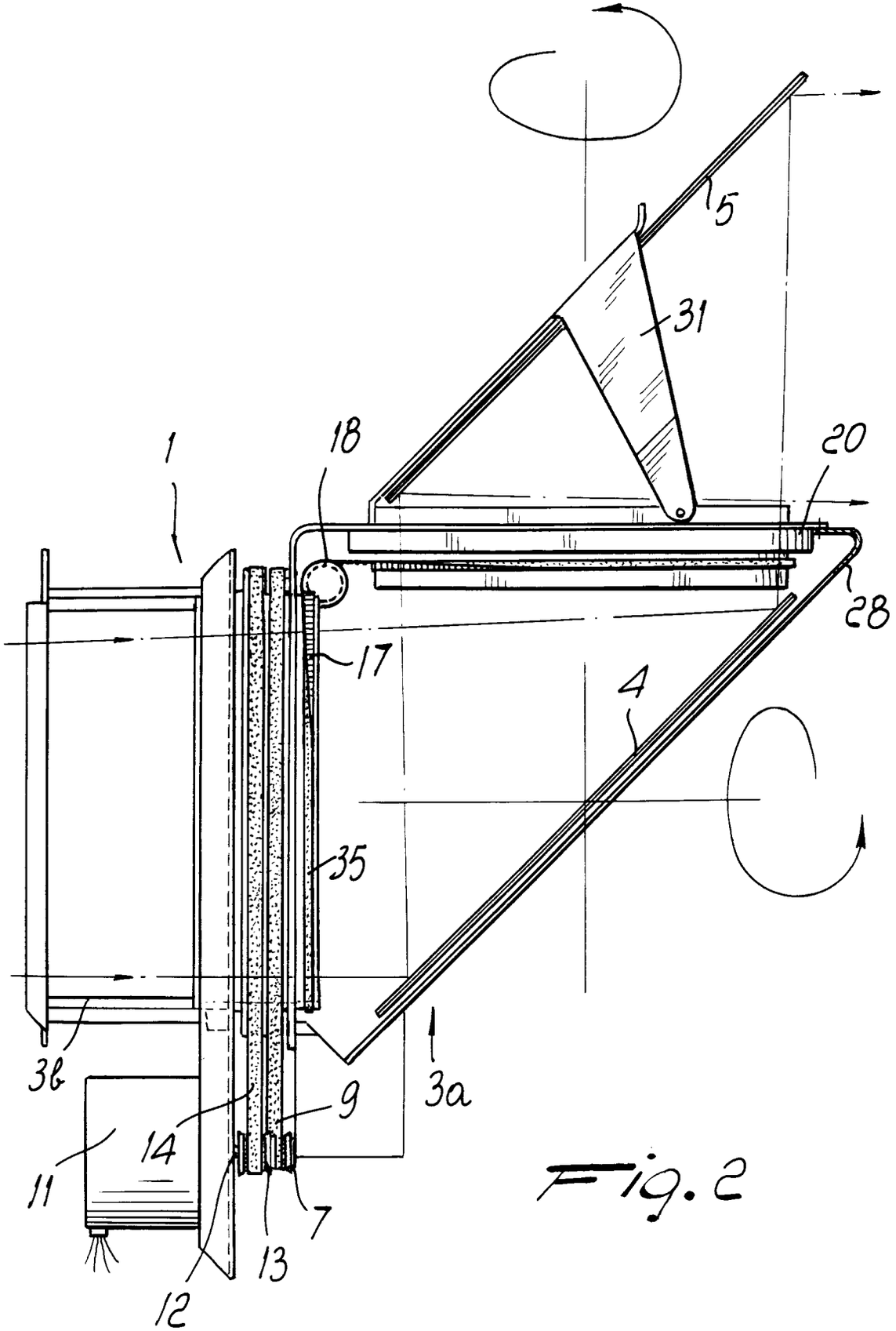
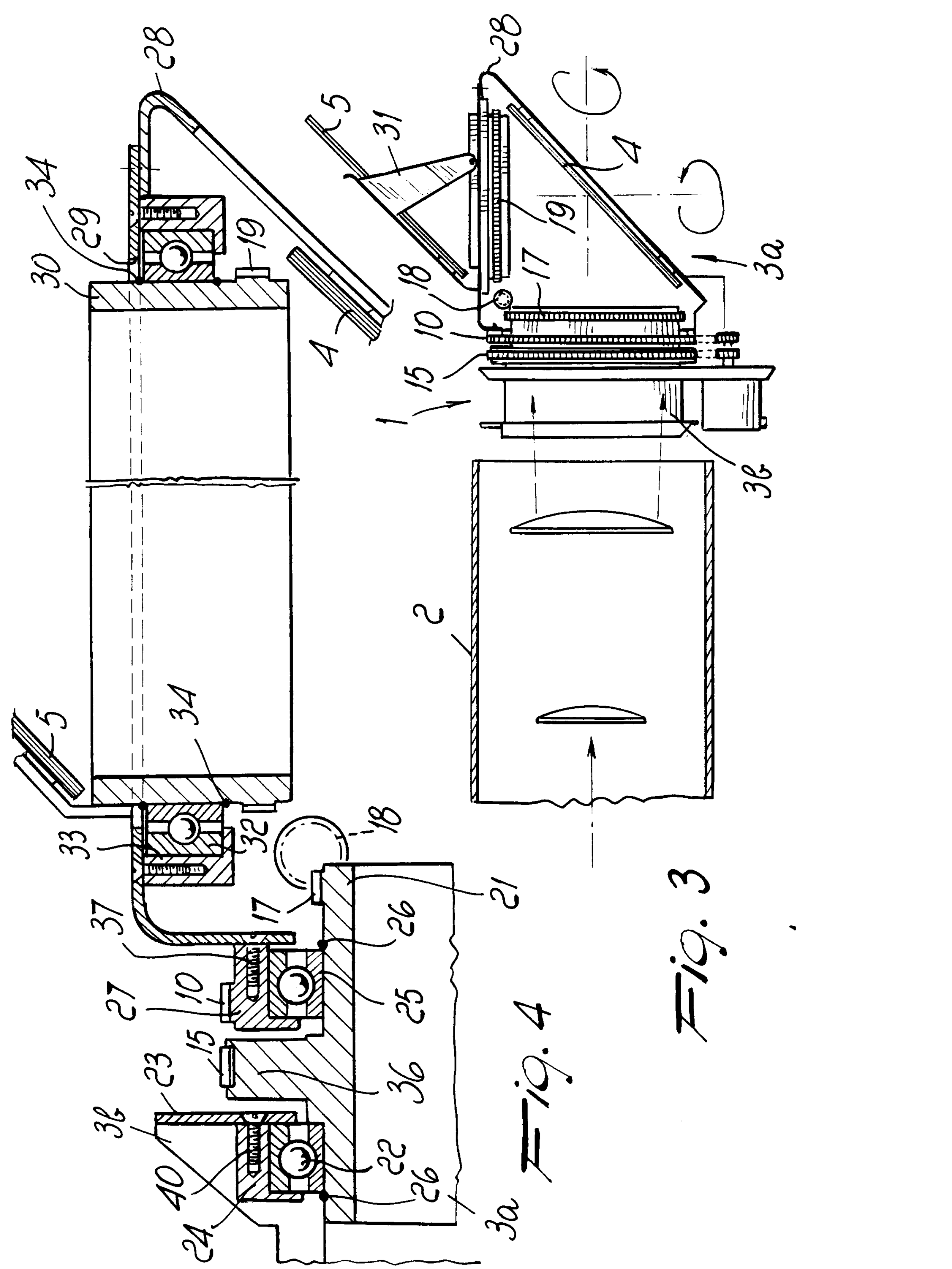


Fig. 2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3a

Fig. 3

Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 10 3654

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 345 030 (STRAND LIGHTING INC) * column 3, line 46 - column 6, line 19 * * column 7, line 28 - line 45; figures 1-4,6,7 *	1-4	F21P5/00 F21V21/30
X	EP-A-0 266 484 (ALTMAN STAGE LIGHTING CO,.INC.) *abstract; figures 1-5 *	1-3	
X	EP-A-0 226 428 (ECONOMAIR PANCAN LIMITED) * column 2, line 18 - column 3, line 26; figures 1,2 *	1,2	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

F21P
F21V

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23 JULY 1993	MARTIN C.P.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

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