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

(11) Publication number: **0 156 142**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **85101453.0**

(22) Date of filing: **11.02.85**

(51) Int. Cl.⁴: **G 09 F 11/12**
G 09 F 11/02

(30) Priority: **21.02.84 IT 6716484**

(43) Date of publication of application:
02.10.85 Bulletin 85/40

(84) Designated Contracting States:
AT BE CH DE FR GB LI LU NL SE

(71) Applicant: **Ruffato, Carlo**
Via Michele Coppino 46
I-10147 Torino(IT)

(72) Inventor: **Ruffato, Carlo**
Via Michele Coppino 46
I-10147 Torino(IT)

(74) Representative: **Prato, Roberto et al,**
c/o Ing. Carlo e Mario Torta Via Viotti 9
I-10121 Torino(IT)

(54) Display panel for changeable advertisements or information, and display unit employing such a panel.

(57) Panel (1) fitted with a casing (2) housing a number of display devices (3) arranged side by side and each fitted with a number of slats (8), the latter bearing on the display face (9) a portion of the graphic display and arranged so as to turn in loop formation, and with operating means (13, 13*a*) for moving the said slats on each display device simultaneously round the said loop in such a manner as to set one slat (8) on each display device selectively in a display position in which the said slat is arranged facing a window (5) on the front face (4) of the panel (1) with its display face (9) exposed and adjacent to that of the matching slats (8) on the other display devices.

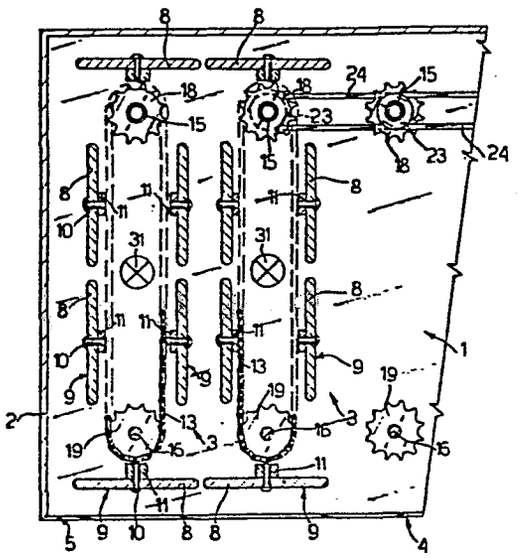

Fig. 2

EP 0 156 142 A1

0156142

DISPLAY PANEL FOR CHANGEABLE ADVERTISEMENTS OR INFORMATION, AND DISPLAY UNIT EMPLOYING SUCH A PANEL

The present invention relates to a display panel for displaying various advertisements or information arranged in automatic sequence, and a display unit employing such a panel.

Changeable display units of the aforementioned type are installed on public premises, particularly round the playing fields in sports stadiums, for displaying information, particularly advertisements. Various types of display panels have been designed for use on such units, each of which, however, invariably comprises a supporting structure and a number of prismatic or cylindrical elements arranged side by side with their axes perpendicular to the horizontal side of the panel, mounted so as to turn round the said supporting element or frame and connected by gears both to one another and to a small electric drive motor. The said prismatic elements, usually triangular-based or cylindrical, bear on their side faces or on por-

tions of the side wall (if cylindrical) portions of a graphic display, e.g. advertisement, which is displayed by turning each element in such a manner as to arrange all the matching faces or side portions on the element bearing the various portions of the said graphic display simultaneously side by side and facing the same side of the panel.

The drawback on display panels of the aforementioned type is that they are designed to contain only a very small number of advertisements or limited information, owing to the small number of portions or faces available on each rotary element. In the case of triangular prismatic elements, the maximum number of displays containable on one panel is obviously three, i.e. one on each side face of each prismatic element, whereas, on cylindrical elements, increasing the number of advertisements on the panel to more than three or four reduces the area of the portions available on each cylinder for each display, with the result that the graphic displays are uneven, due to the fact that the areas bearing the various portions of the display are no longer adjacent, owing to the increased size of the screening required between each pair of adjacent cylinders for preventing the displays on either side of the exposed area from being glimpsed and so impairing the selected graphic display. A further drawback on display panels of the aforementioned type is that the rotary elements forming the panel must be replaced for making temporary changes to the graphic displays stored on the panel, such replacement involving working directly on the mechanical operating part of the display device.

The aim of the present invention is to provide a display panel for changeable advertisements or information involving none of the aforementioned drawbacks, in particular, one that is cheap and easy to produce and, in addition to reliable operation and strength, provides for storing a large number of compact graphic displays and for replacing part or all of the advertisements stored on the panel without involving the mechanical part of the same.

With this aim in view, the present invention relates to a display panel for changeable advertisements or information, the said panel comprising a supporting element supporting a number of display devices arranged side by side and each designed to display, on the front face of the said panel, a portion of the said graphic display, characterised by the fact that each said display device comprises a number of slats, each having a display face bearing the said portion of the graphic display and being arranged side by side so as to be aligned round an elongated loop, and means for moving the said slats simultaneously and by a preset amount round the said loop, while at the same time keeping the display face on each slat facing the outer side of the loop and essentially parallel at all times with the tangent of the said loop passing through the said slat, the longer axis of the loop travelled round by the slats on each said display device being essentially perpendicular to the said front face on the said panel, so as to enable each slat on each display device to move selectively into a display position in which the said slat is parallel with the said front face on the panel and has its display face facing the same.

An arrangement of the present invention will now be described by way of a non-limiting example with reference to the attached drawings in which :

- Fig.1 shows a partial front section of a display panel for graphic displays according to the present invention;
- Fig.2 shows a larger-scale section along line II-II of the Fig.1 panel;
- Fig.3 shows a number of larger-scale details on the Fig.1 panel;
- Fig.4 shows a display unit for graphic displays employing the display panel according to the present invention.

Number 1 in Fig.1 indicates a display panel for changeable advertisements and information, the said panel comprising a supporting element, consisting of an essentially parallelepiped casing 2, and a number of display devices 3 supported on and housed inside element or casing 2. Panel 1 presents a front face on which casing 2 is provided with a window 5, possibly closed in by a known type of transparent screen (not shown for simplicity) designed to enable viewing of the graphic displays formed at the said window inside casing 2 by devices 3. Casing 2 is also fitted with supporting or connecting elements 6, designed to enable it to be set up on the ground or mounted on a raised supporting stand or on a building wall, and is designed to be fitted externally or internally with a motor for powering devices 3, with all the devices for controlling operation of the latter and, consequently, also when and how the required graphic displays are to appear in window 5, and possibly also with means for supplying the motor powering devices 3, the said means consisting, for example, of solar

cells fitted on to face 4 and round window 5 for ensuring the electric current required for supplying panel 1 is generated even when the latter is not connected to the electricity mains.

As shown also in Fig.s 2 and 3, each display device 3 on the present invention comprises a number of slats 8, preferably consisting of flat, elongated rectangular flaps of any suitable material, e.g. metal or synthetic plastic resin, and arranged side by side so as to be aligned round an elongated loop, as shown clearly in Fig.2, and means for moving the said slats 8 simultaneously and by a preset amount round the said loop. In more detail, each slat 8 on each display device 3 has a display face 9, designed for showing a portion of one of the graphic displays, and is secured in removable manner, e.g. by means of screws 10, to a pair of supports, i.e. bottom support 11 and top support 12, located at opposite ends of slat 8 and designed to support the latter with face 9 facing the outer side of the loop round which slats 8 on each device 3 are designed to turn inside casing 2. According to the present invention, the loop round which slats 8 on each display device 3 move is symmetrical, with its longer axis essentially perpendicular to face 4 on panel 1, and is defined by a pair of continuous drive elements consisting, in the non-limiting example shown, of respective articulated roller chains 13 and 13a on the outer side of which are fitted, in projecting manner and at regular intervals, respective supports 11 and 12 on each slat 8. Bottom chain 13 carrying supports 11 is stretched between a drive shaft 15, mounted in idle manner inside casing 2 on the opposite

side to face 4 and with its axis parallel with the longitudinal axis of slats 8, and a corresponding pin 16 fitted inside casing 2 on the same side as face 4, just behind window 5. Top chain 13a carrying supports 12, on the other hand, is stretched between the said drive shaft 15 and a further pin 16a coaxial with pin 16. As also shown in Fig.3, the opposite ends of each drive shaft 15 on each device 3 are connected angularly integral with respective pinions 18, whereas each corresponding pin 16 and 16a is fitted in idle manner with respective pinions 19 arranged projecting inside casing 2. Each chain 13 and 13a engages with each pair of pinions 18 and 19, in such a manner as to transmit to the latter the drive imparted to it by pinion 18, and in such a manner as to be driven by the said pinions round the said loop defined by chains 13 and 13a themselves. Shafts 15 are preferably hollow, for reducing their weight, and are supported by respective pairs of bearings 20 and 21 (Fig.3) the latter 21 being thrust bearings if shafts 15 are to be operated vertically. According to the present invention, each drive shaft 15 is driven, not by its own motor, but by the adjacent drive shaft 15 on the foregoing device 3, via drive means consisting not exclusively, for example, of respective pulleys 23 connected to each other by drive belts 24. Shaft 15 on the first device 3 adjacent to one of the ends on panel 1 is driven in known manner by the said motor driving devices 3, so that only one motor is sufficient for operating all the slats 8 on panel 1. As shown in Fig.4, the said motor, numbered 25, may be fitted to the rear face of panel 1 and connected mechanically to the nearest shaft 15 by means of

known drive 26. Again as shown in Fig.4, each panel 1 on the present invention may be mounted on a supporting structure 27 with its top end hinged to the structure and its bottom end secured in sliding manner between straight rails 28 on structure 27, so as to form, by securing two identical panels 1 facing opposite ways on opposite sides of structure 27, a two-sided display unit 30 comprising a pair of panels 1 according to the present invention, and designed for enabling continuous adjustment of the angle of the said panels 1 in relation to the horizontal plane.

In more detail, two-sided display unit 30 presents the same characteristics described in Italian Utility Model Patent Application N° 53777-B/83 filed by the present Applicant on September 30th, 1983, and entitled "Display unit for changeable advertisements or information", the relevant parts of which are included herein solely for reference purposes, with the sole exception of the display panels described in the said application, which are replaced herein by the display panels according to the present invention. Finally, to enable night-time use of display panel 1 according to the present invention, the latter is fitted inside with one or more lighting devices consisting, for example, of suitably-powered bulbs 31 arranged on front face 4, behind slats 8 which are made of transparent material such as plexiglass.

Display panel 1 according to the present invention operates as follows. As each slat 8, as already described, is fitted on respective supports 11 and 12 which, in turn, are positioned by chains 13 and 13a, clearly, when drive shafts 15 are operated, the slats 8 on each device 3 are

caused to travel round the loop, defined by chains 13 and 13a, between pinions 18 and 19 round which the slats 8 are forced to turn for moving from one branch of the said loop to the other. Consequently, by running motor 25 by a preset amount, each shaft 15 is turned by the same amount, thus causing all the slats 8 on each device 3 to move simultaneously by the same preset amount round the respective loop defined by respective chains 13 and 13a on each device 3, while at the same time keeping the display face 9 on each slat 8 facing the outer side of the said loop and essentially parallel at all times with the tangent of the said loop passing through the slat 8 itself. As the axis of each loop round which the slats 8 on each device 3 travel is essentially perpendicular to face 4, clearly, when each matching slat 8 reaches pinion 19, it will move into a display position in which it is parallel with face 4, with its display face 9 facing the said face 4 and window 5, so as to be clearly visible from outside. For showing different graphic displays, a portion of the said display need only by formed on matching slats 8 on adjacent devices 3, e.g. by sticking on an illustration or painting face 9 on slat 8, and drive shafts 15 on each device 3 operated by means of motor 25, so as to bring all the slats 8 on devices 3 bearing the various portions of the said display simultaneously into the display position. As the drive ratio between devices 3 is equal to 1, to do this, all the portions of a given display need simply be formed on matching slats 8 on devices 3. The display is changed by simply operating motor 25 again, so as to move the slats 8 displayed on pinions 19 round the latter and

bring the next slats 8 up into the display position on pinions 19, and by stopping motor 25 long enough for enabling viewing and comprehension of the display formed, as shown in Fig.1, by matching the various portions of the display formed on faces 9 of adjacent slats 8 on devices 3.

The advantages of the display panel according to the present invention will be clear from the foregoing description. The unique design of the display devices on the panel provides for housing a large number of advertisements in a relatively small space, due to the fact that the number of slats 8 on each device 3 may be increased as required by simply increasing the distance between the axes of shaft 15 and corresponding pins 16 and by increasing the thickness of the panel. Even this may be kept within reasonable limits by reducing the width of slats 8, as more and more are added to each device 3, and by increasing the number of adjacent devices 3 on each single panel 1. Panel 1 according to the present invention also enables displays to be changed rapidly without involving the mechanical part on it, by simply removing some or all of slats 8, by removing screws 10, and replacing them with other slats prepared beforehand with other displays. Finally, the display panel according to the present invention may be set up vertically, horizontally or at any angle, with no noticeable effect on operation and with no alterations required.

To those skilled in the art it will be clear that changes can be made to the panel as described without, however, departing from the scope of the present invention.

For example, chains 13 and 13a may be replaced by belts or fixed rails in which supports 11 and 12 are fitted in sliding manner. Supports 11 and 12 may be operated, for moving slats 8, by means of moving pins, a single chain or any other appropriate means. Drive between shafts 15 may be achieved using any other system, especially worm screws offset by a given amount in relation to each other so that, instead of simultaneously, the slats 8 on devices 3 move into the display position in rapid succession and offset slightly in relation to one another, so as to produce pleasing optical effects. Though slats 8 are obviously preferably arranged coplanar in the display position, with the display faces arranged side by side, by varying the centre distance between the pairs of pinions 18 and 19, however, they may also be offset, again for creating pleasing optical effects. Finally, most of the components on panel 1 according to the present invention may obviously be made of plastic, and the bearings self-lubricating to render panel 1 according to the present invention weather-resistant and rustproof.

CLAIMS

1) - Display panel (1) for changeable advertisements or information, the said panel (1) comprising a supporting element (2) supporting a number of display devices (3) arranged side and side and each designed to display, on the front face (4) of the said panel (1), a portion of the said graphic display, characterised by the fact that each said display device (3) comprises a number of slats (8), each having a display face (9) bearing the said portion of the graphic display and being arranged side by side so as to be aligned round an elongated loop, and means (13, 13a) for moving the said slats (8) simultaneously and by a preset amount round the said loop, while at the same time keeping the display face (9) on each slat (8) facing the outer side of the loop and essentially parallel at all times with the tangent of the said loop passing through the said slat (8), the longer axis of the loop travelled round by the slats (8) on each said display device (3) being essentially perpendicular to the said front face (4) on the said panel (1), so as to enable each slat (8) on each display device (3) to move selectively into a display position in which the said slat (8) is parallel with the said front face (4) on the panel (1) and has its display face (9) facing the same.

2) - Display panel (1) according to Claim 1, characterised by the fact that, in the said display position, the matching slats (8) on the said display devices (3) are arranged essentially coplanar with their display faces (9) side by side, so as to form the said graphic display on the said

front face (4) of the panel.

3) - Display panel (1) according to Claim 1 or 2, characterised by the fact that the said supporting element (12) consists of a casing housing the said display devices (3) and having, on the said front face of the panel (1), a window (5) enabling the said slats (8) to be viewed in the display position.

4) - Display panel (1) according to any one of the foregoing Claims, characterised by the fact that each said slat (8) is secured in removable manner to a pair of supports (11, 12) located at respective opposite ends of the said slat (8) and connected to means (13, 13a) for guiding movement of the said slats (8) round the said loop, the said supports (11, 12) being moved along the said guide means (13, 13a) by the said means for moving the said slats.

5) - Display panel (1) according to Claim 4, characterised by the fact that the said means for moving the said slats and the said guide means comprise, for each said display device (3), a drive element (15), at least one driven element (19) and a pair of continuous drive elements (13, 13a) designed to transmit drive from the drive element (15) to the driven element (19), each of the said continuous drive elements (13, 13a) supporting in integral manner one of the said two supports (11, 12) on each said slat (8), the said supports (11, 12) being arranged at regular intervals and projecting from the outer side of the respective said continuous drive element.

6) - Display panel (1) according to Claim 5, characterised by the fact that each said continuous drive element con-

sists of an articulated roller chain (13, 13a) engaging with a first pinion (18), angularly integral with a drive shaft (15), and with a second pinion (19) mounted in idle manner and projecting inside the said casing (2) on the side of the said front face (4) of the same, the said drive shaft (15) on each display device (3) being driven, via drive means (24), by a single motor (25) powering all the display devices (3).

7) - Display panel (1) according to one of the foregoing Claims, characterised by the fact that the said slats (8) are made of transparent material, the said panel (1) being provided inside with at least one lighting device (31) located on the said front face (4) behind the said slats (8) in the display position.

8) - Display unit (30) for advertisements or information, characterised by the fact that it comprises a pair of display panels (1) according to one of Claims 1 to 7, arranged on opposite sides of a supporting structure (27) to which they are hinged at the top and secured in sliding manner at the bottom between straight rails (28), so as to enable continuous adjustment of the angle of the said panels (1) in relation to the horizontal plane.

0156142

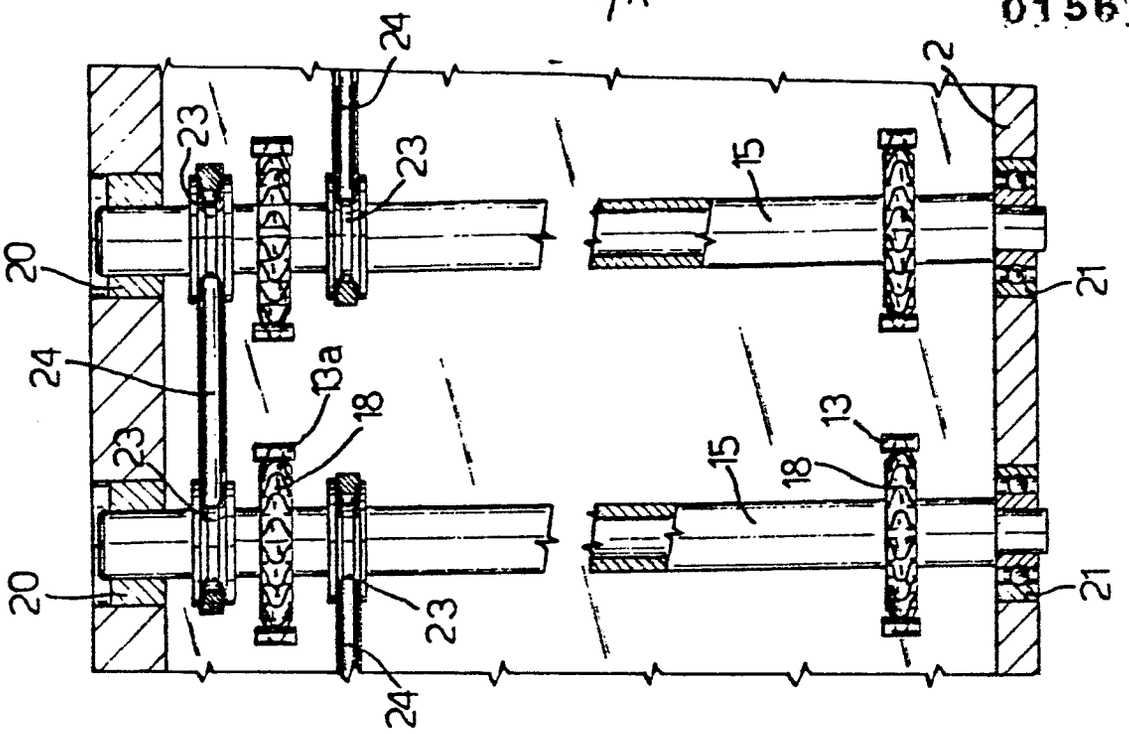

Fig. 3

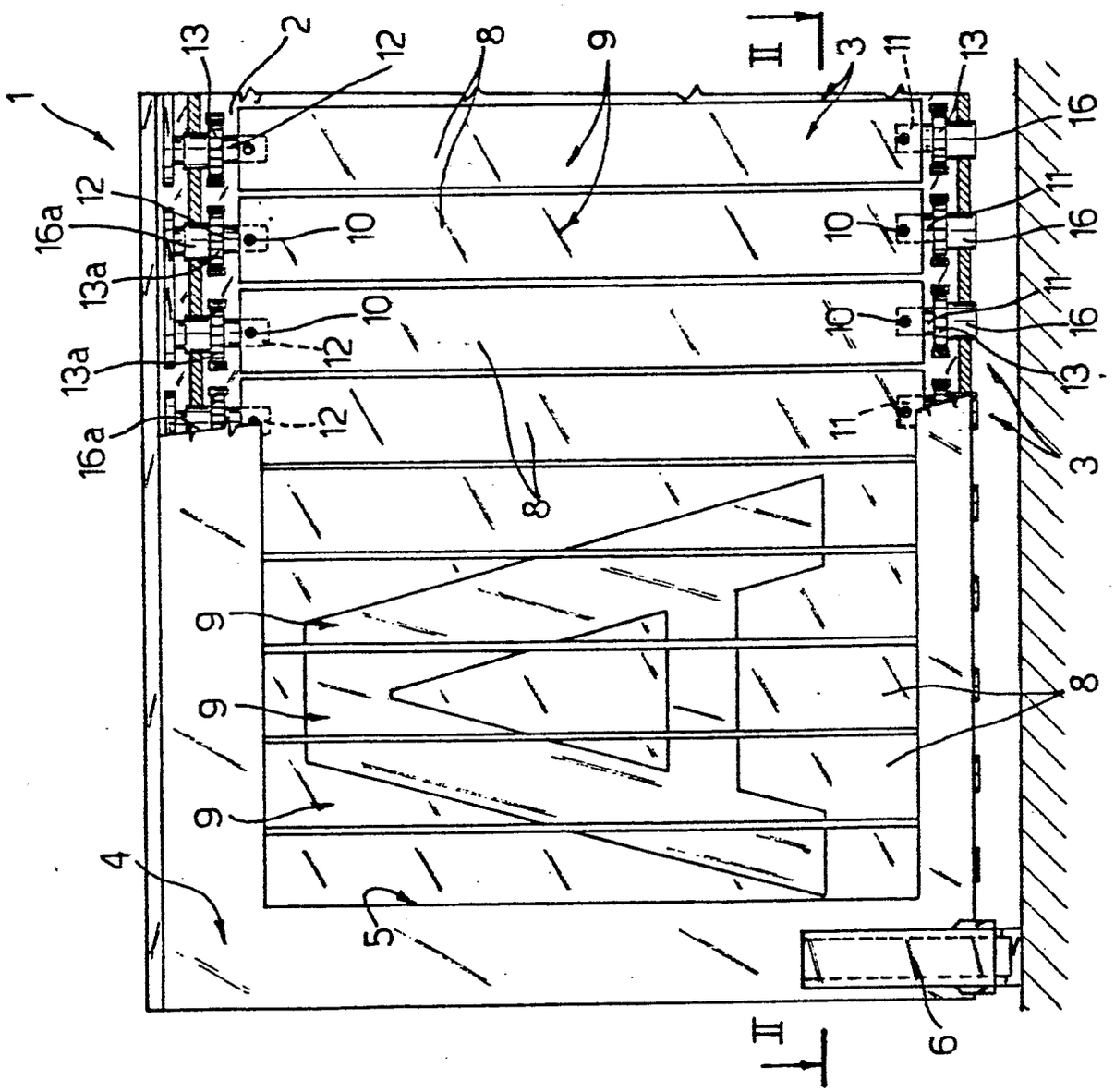

Fig. 1

0156142

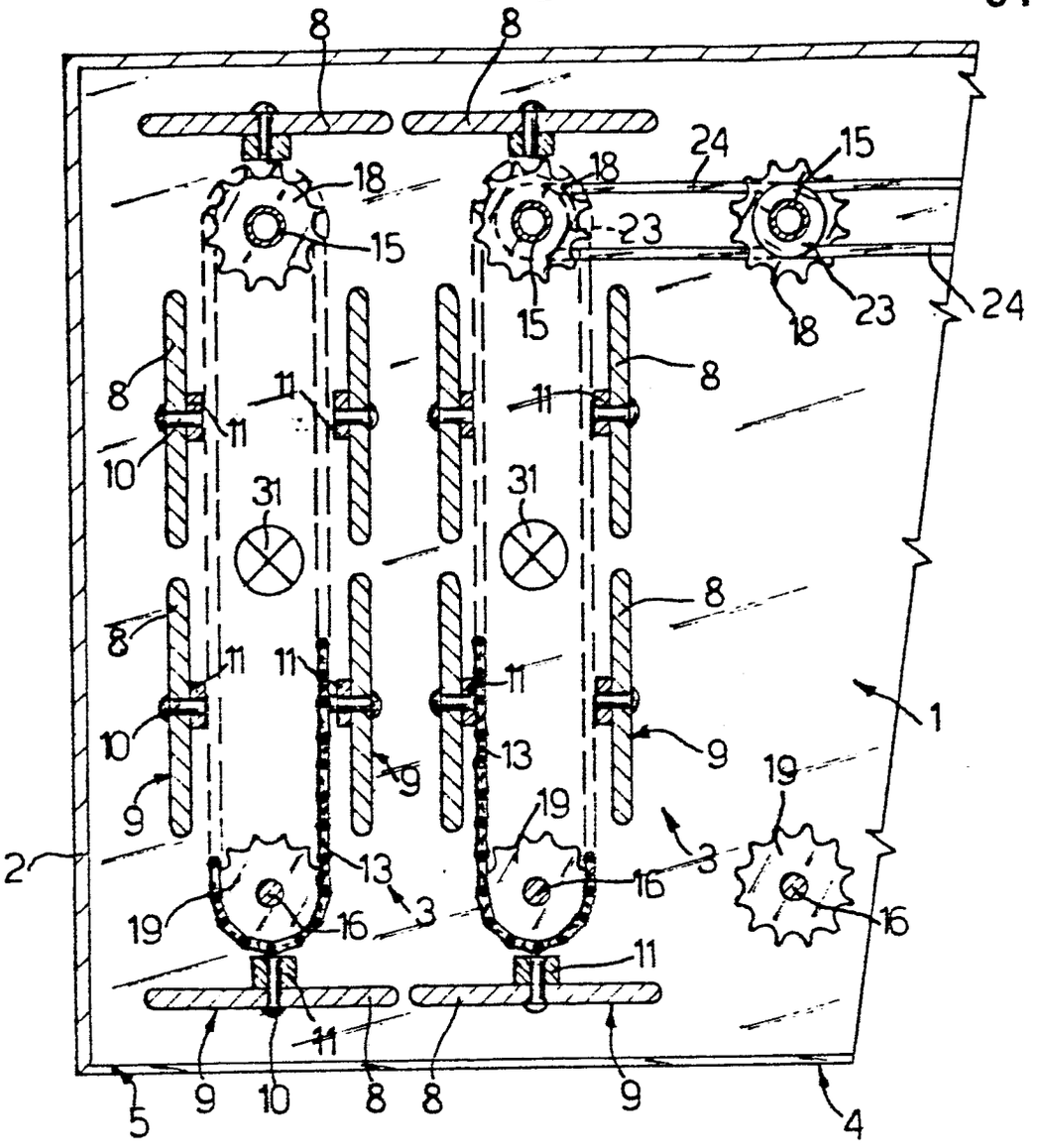

Fig. 2

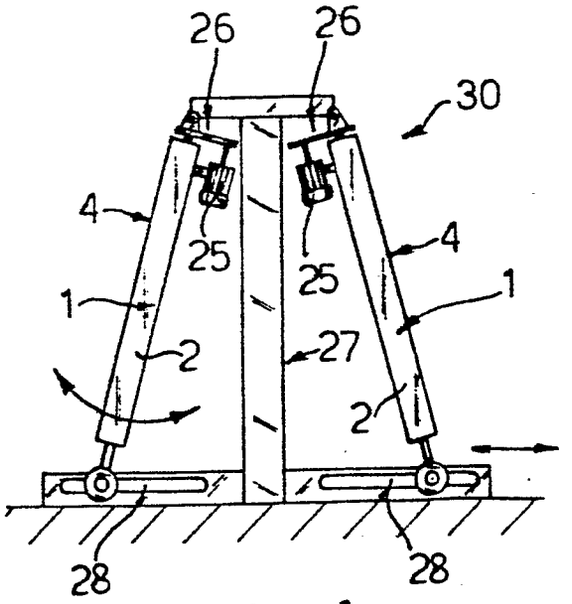

Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

0156142
Application number

EP 85 10 1453

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 4)
X,A	US-A-2 923 079 (J.E. BOUCHARD) * Figures 1, 7, 12; claim 1, column 4, lines 39-49 *	1,2,4-6,8	G 09 F 11/12 G 09 F 11/02
X	US-A-3 229 395 (P. BELISLE) * Figures 1-3 *	1,2,5,6	
X	US-A-1 816 716 (F.L. BEDDISON) * Figures 1-6, claim 1 *	1-6	
X	US-A-2 181 104 (M.J. MOORHOUSE) * Figure 2 *	1,2	
A	US-A-2 231 590 (J.L. PFLÜEGER) * Figures 2, 36; page 8, left-hand column, line 28 *	4,5	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	DE-C- 600 115 (A. WEINBERGER et al.) * Page 2, lines 32-35 *	7	G 09 F 11/02 G 09 F 11/12
A	DE-C- 98 922 (A. KLUMPP) * Claim 1 *		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	12-06-1985	FUCHS R

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

EPO Form 1503. 03.82