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## (54) Adjustable light fittings.

(57) An adjustable light fitting, such as an angle-poise lamp, includes a support arm (2, 4) having two parallel members (30, 31) which slide longitudinally relative to each other during adjustment of the arm to change the position of a lamp holder (6). The two members, and hence the arm, are retained in the adjusted position due to an elongate magnet (38) fixed to one member and into contact with which the other member is urged by the magnetic attraction.

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# Adjustable Light Fittings

This invention relates to adjustable light fittings. More particularly, the invention is concerned with a form of light fitting comprising a support assembly carrying a lamp holder and including an adjustable arm enabling the spatial position of the lamp holder to be varied relative to a structure on which the light fitting is supported.

Known light fittings of the above mentioned form include lamps with pivotally adjustable support arms. A traditional form of anglepoise lamp, for example, has a base adapted to rest on a table top or to be clamped to a suitable structure, a first arm pivoted by one end to the base and by the other end to one end of a second arm, and a lamp holder pivoted to the other end of the second arm. The axes of the pivots are parallel, ensuring a wide range of adjustment of the lamp holder position with respect to the base. In order to retain the lamp holder in its adjusted position various devices have been used, such as counterweights or springs for balancing out the forces on the arms, and friction increasing arrangements associated with the pivots to oppose unwanted pivotal movement of the arms, e.g. systems which can be tightened manually. Springs and counterweights have the disadvantage of detracting from the visual appearance and, because they rely on friction to a certain extent, not entirely

satisfactory, especially over long term use. The known friction systems tend to suffer from wear so that the friction forces diminish and the lamp holder is unstable in the adjusted position or frequent attention is required to adjust the friction at the pivots.

More recently attempts have been made to avoid these drawbacks by mounting the lamp holder on a flexible metal tube. However, lamps of this form have only a limited range of positional adjustment.

In accordance with the present invention there is provided an adjustable light fitting as initially described, and characterised in that the support arm comprises two substantially parallel elongate members arranged to move relative to each other in the lengthwise direction of the arm during adjustment of the support arm, one member comprising permanently magnetic means disposed over a substantial lengthwise portion thereof, and the other member comprising an elongate part magnetically attracted by the magnetic means to urge the two members into frictional contact for retaining the support arm in its adjusted position.

With a light fitting according to the invention the friction surfaces are urged together by the magnetic forces so that wear at these surfaces is not a problem and the arm will remain held securely in its adjusted position even after the fitting has been in use for a long time. With the magnetic means spread along one of the members a strong magnetic force is possible so that additional devices, such as counterweights or springs, to hold the arm in the adjusted position are unnecessary.

Most conveniently the magnetic means comprises a continuous elongate permanent magnet, although a series of individual magnets distributed along the member could be used.

In a preferred construction the part attracted by

the magnetic means is urged into direct contact with the magnetic means, so that the frictional forces opposing relative movement of the two members are determined mainly by the magnetic forces. This facilitates control of the frictional forces during manufacture, and their stability over long term use of the fitting.

The support arm may be extensible, the two members moving relative to each other in a telescopic arrangement. Alternatively, the support arm may be pivotally adjustable, the two members of the support arm being connected to a further part of the support assembly by respective pivots having parallel axes. A distance separating the pivot axes ensures that the two members move with respect to each other in the longitudinal direction when the arm is pivoted to change the lamp holder position. In a preferred construction embodying a pivotal arm, the pivots are adapted to preclude movement of the members towards and away from each other in a lateral direction, thus maintaining the members in frictional contact.

The support arm of the invention can be employed with advantage in an anglepoise lamp and in a preferred embodiment of a lamp of this type two such arms are provided. The arms are connected end-to-end by a coupling member, and one arm is pivoted to a base while the other arm carries the lamp holder.

A full understanding of the invention will be had from the following description which is given with reference to the accompanying drawings, in which:

Figure 1 is a side elevation of an anglepoise lamp according to the invention;

Figure 2 is a vertical section through the lamp;

Figure 3 is a cross-section taken along the line III-III of Figure 1;

Figure 4 is a side view of a modified anglepoise lamp embodying the invention;

Figure 5 is a perspective view, shown partly cut away, of the lamp of Figure 4;

Figure 6 is an enlarged section taken along the line VI-VI of Figure 4; and

Figure 7 is a side view showing another form of lamp according to the invention.

The lamp depicted in Figures 1 to 3 of the drawings comprises: a base 1 which is adapted to rest on a support surface although it could be fashioned in the form of a clamp in a manner known per se; a lower arm 2 pivoted by one end to the base 1; a coupling member 3 connected pivotally to the other end of the lower arm 2; an upper arm 4 having one end connected pivotally to the member 3 and the other end connected pivotally to a second coupling member 5; and, a lamp holder 6 including a bulb holder, shade and push button switch, pivoted on the member 5. The axes of the pivots are parallel to each other and perpendicular to the plane of the arms 2, 4 enabling position of the lamp holder 6 to be adjustable within a wide range of positions in said plane. The lamp holder may include a rotational coupling to allow angular adjustment about an axis perpendicular to the axis of its pivotal connection to member 5.

The lower arm 2 is defined by two elongate members 10, 11 of channel shaped cross-section, the internal width of the first channel member 10 matching the external width of the second channel member 11 and the two members being nested together with their side walls lapping as seen in Figure 3. At their lower ends, the channel members 10, 11 are pivoted by respective pins 12, 13 between a pair of upstanding brackets 14 provided on the base. The axes of the pins 12, 13 are parallel and in the same horizontal plane. The upper ends of the channel members are similarly

pivoted to the coupling member 3 by respective pins 15, 16 whose axes are also parallel and located in the same horizontal plane. The distance separating pins 15, 16 is equal to that between pins 12, 13, so that the two channel members, the brackets 14 and the coupling member 3 constitute a parallelogram and as a consequence the channel members 10, 11 always remain parallel throughout the pivotal adjustment of the arm 2 relative to base 1. During such movement of the arm the channel members are displaced longitudinally with respect to each other and also undergo some slight relative lateral movement.

Firmly attached to the inside of channel member 11 is an elongate permanent magnet 20 which extends over a major part of the length of the arm 2. The other channel member 10 carries a metal bar 22 which is attracted into frictional engagement with the magnet 20 under the influence of the magnetic force. The ends of the bar 22 are bent through 90° and extend through holes provided in the channel member 10, whereby the bar is free to move laterally towards and away from the magnet, but is held fast for longitudinal movement with the channel member 10. Thus, as the arm 2 is pivoted relative to the base 1, e.g. between the positions illustrated in full and broken lines in Figure 1, the bar 22 slides along the magnet 20. Furthermore, due to the substantial area of contact between the bar and magnet and the magnetic force produced by the long magnet urging them into contact, sufficient friction is produced between the bar and magnet to ensure that the arm is retained securely in its adjusted position. It should also be mentioned that the frictional restraint does not suffer through wear because the bar is free to move and maintain contact under the magnetic force.

The upper arm 4 of the lamp is of the same construction as the lower arm and further detailed des-

cription is unnecessary. The pivot pins 24, 25 attaching its channel members to the coupling member 3 are located in a vertical plane, and so are the pivot pins 26, 27 connecting the channel members to the coupling member 5.

The described anglepoise lamp has the advantage that the lamp holder will always be maintained in the adjusted position, even after substantial use over a long time period. Additionally, it is improved aesthetically compared with traditional lamps equipped with counterweights and/or springs. In the latter connection it should be noted that the electric cable can be passed through the hollow arms 2, 4 and the coupling members 3, 5 so that it is hidden from view. For reasons of clarity the cable has been omitted in Figures 2 and 3.

Modifications are of course possible without departing from the invention and the broad concept embodied in the support arms of the lamp. For example, the magnet 20 could also be supported on the channel member 11 for movement in the lateral direction towards the channel member 10. By making the channel member 10 of suitable material, e.g. ferrous metal, the need for the bar 22 would be eliminated since the magnet could contact the channel member 10 direct. In addition, relative lateral movement between the channel members 10, 11 during pivotal adjustment of the arms 2, 4 could be avoided if required by arranging for the pivot pins of one channel member to be movable, e.g. in slots, in a direction aligned with the pivot pins of the other member. For instance the pins 13 and 16 in the case of the lower arm 2 could be guided in slots aligned with pins 12 and 15 respectively. In such a modified construction the members 10, 11 would be interconnected in a manner permitting only linear displacement between them.

The anglepoise lamp shown in Figures 4 to 6 is of generally similar construction to that of the first embodiment insofar as it includes a base 1, in this case fashioned as a block, a lower arm 2 having one end pivoted to the base and the other end pivoted to a coupling member 3, an upper arm 4 pivoted by one end to the coupling member 3 and by its other end to a second coupling member 5, and a lamp holder 6 including a shade and bulb holder attached to the member 5. Furthermore, the two arms 2, 4 are of identical construction and each comprises a pair of elongate parallel members 30, 31. The member 30 is a metal or plastics extrusion and includes a central groove or channel 32 flanked on either side by narrower grooves 33. The ends of member 30 are hinged to the base 1 and to the coupling member 3 by respective pivot pins 35, 36. Fixed to the extrusion within the channel 32 and extending over a medial portion of the member 30 is an elongate permanent magnet 38 having continuous pole faces projecting from the channel. The second member 31 consists of a channel of ferromagnetic material having connecting tongues 39 fixed to each end. The side walls of the channel are received in the grooves 33 of member 30 so that the bottom wall of the channel contacts the pole faces of the magnet 38. The tongues 39 are connected to the base 1 and to the coupling member 3 by pivot pins 40, 41, the pivots 35, 36, 40, 41 all being parallel so that as the arm 2 is pivoted relative to the base 1 the members 30, 31 are displaced with respect to each other in the longitudinal direction. To ensure that the magnet and ferromagnetic channel remain in contact during this displacement the tongues 39 have slots (not shown) through which the pins 40, 41 pass and along which these pins may travel. The magnet and ferromagnetic channel ensure that the members are maintained in firm frictional contact and with sufficient

force to retain the arm 2 securely in position between adjustments of the lamp.

The members 30, 31 of the arm 4 are connected by pivot pins 42 - 45 to the coupling members 3 and 5, the axes of these pins 42 - 45 being parallel to the axes of the pins 35, 36, 40, 41 of the arm 2 so that the arms 2, 4 are adjustable in the same plane.

The light fitting shown in Figure 7 is of different type to those previously described. The lamp holder 60 is carried on a support arm 61 of essentially telescopic construction. The arm consists of a first member 62, which is intended to be fixed in any suitable way to a support structure, and a second member 63 consisting of a bar or tube of ferrous metal. The lamp holder 61 is attached to one end of member 63 which is somewhat longer than the first member 62. Fastened to the member 62 and extending over a major part of its length is a continuous permanent magnet 64 having laterally directed pole pieces against which the member 63 is held by the magnetic forces acting between them. The member 63, and hence lamp holder 61, are adjustable in the longitudinal direction of the arm, and the member is held firmly in the adjusted position by the magnetic and friction forces acting between member 63 and the magnet 64. If preferred, guide means such as a tube or the like surrounding the two arm members 62, 63 could be provided to guide the member 63 for longitudinal displacement and to prevent it being pulled away from the magnet 64. Also, the members 62, 63 could be formed as channels arranged with their side walls over-lapping and accommodating the magnet between them.

CLAIMS:

1. An adjustable light fitting comprising a support assembly (1 - 5) carrying a lamp holder (6; 60) and including an adjustable arm (2, 4; 61) enabling the spatial position of the lamp holder to be varied relative to a structure on which the light fitting is supported, characterised in that the support arm (2, 4; 61) comprises two substantially parallel elongate members (10, 11; 30, 31; 62, 63) arranged to move relative to each other in the lengthwise direction of the arm during adjustment of the arm, one member (11; 30; 62) comprising permanently magnetic means (20; 38; 64) disposed over a substantial lengthwise portion thereof, and the other member (10; 31; 63) comprising an elongate part (22; 31; 63) attracted magnetically by the magnetic means to urge the two members into frictional contact for retaining the support arm in its adjusted position.

2. A light fitting as claimed in claim 1, wherein the magnetic means comprises an elongate permanent magnet (20; 38; 64).

3. A light fitting as claimed in claim 2, wherein the magnet has pole faces extending continuously therealong.

4. A light fitting as claimed in claim 1, 2 or 3, wherein said part (22; 32; 63) of the other member is urged into direct contact with the magnetic means (20; 38; 64) by the magnetic forces acting therebetween.

5. A light fitting as claimed in any one of claims 1 to 4, wherein the members (10, 11; 30, 31; 62, 63) comprise channels positioned together with the side walls

overlapping, the magnetic means being received within the channels.

6. A light fitting as claimed in any one of the preceding claims, wherein the support arm (61) is extensible longitudinally, the arm members (62, 63) sliding with respect to each other during adjustment of the arm length.

7. A light fitting as claimed in any one of claims 1 to 5, wherein the support arm (2, 4) is pivotally adjustable relative to a further part (1, 3, 5) of the support assembly, the two members (10, 11; 30, 31) being connected to the further part (1, 3, 5) by respective pivots (12, 13, 15, 16, 24 - 27; 35, 36, 40, 41, 42 - 45) having spaced apart, parallel axes.

8. A light fitting as claimed in claim 7, wherein the pivots are so arranged that the members (30, 31) move only longitudinally relative to each other during pivotal adjustment of the arms.

9. A light fitting as claimed in claim 7, wherein the said part (22) of the other member (10) is supported thereon for lateral movement relative thereto in the direction towards and away from the magnetic means (20), and/or the magnetic means is supported on said one member for lateral movement in the direction towards and away from said part attracted thereby.

10. A light fitting as claimed in any one of claims 1 to 8, wherein said other member (31, 63) is made of ferromagnetic material and is magnetically attracted into contact with the magnetic means.

11. A light fitting as claimed in claim 7, 8 or 9, wherein the support assembly includes first and second support arms (2, 4) of substantially identical construction, the first arm (2) having one end connected by pivots (12, 13; 35, 40) to a base (1) and the other end thereof connected by pivots (15, 16; 36, 41) to a first coupling member (3), and the second arm (4) having one end connected by pivots (24, 25; 42, 44) to the first coupling member (3) and the other end thereof connected by pivots (26, 27; 43, 45) to a second coupling member (5), the lamp holder (6) being carried by the second coupling member.

12. A light fitting as claimed in claim 11, wherein the pivots at the opposite ends of each arm (2, 4) lie in parallel planes, and the pivot planes of the first arm are perpendicular to those of the second arm.

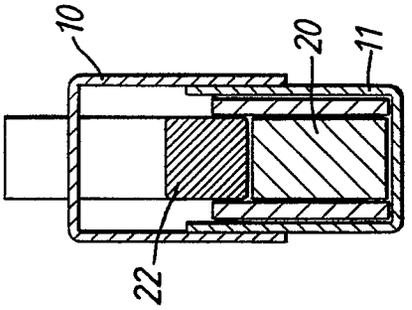


FIG.3.

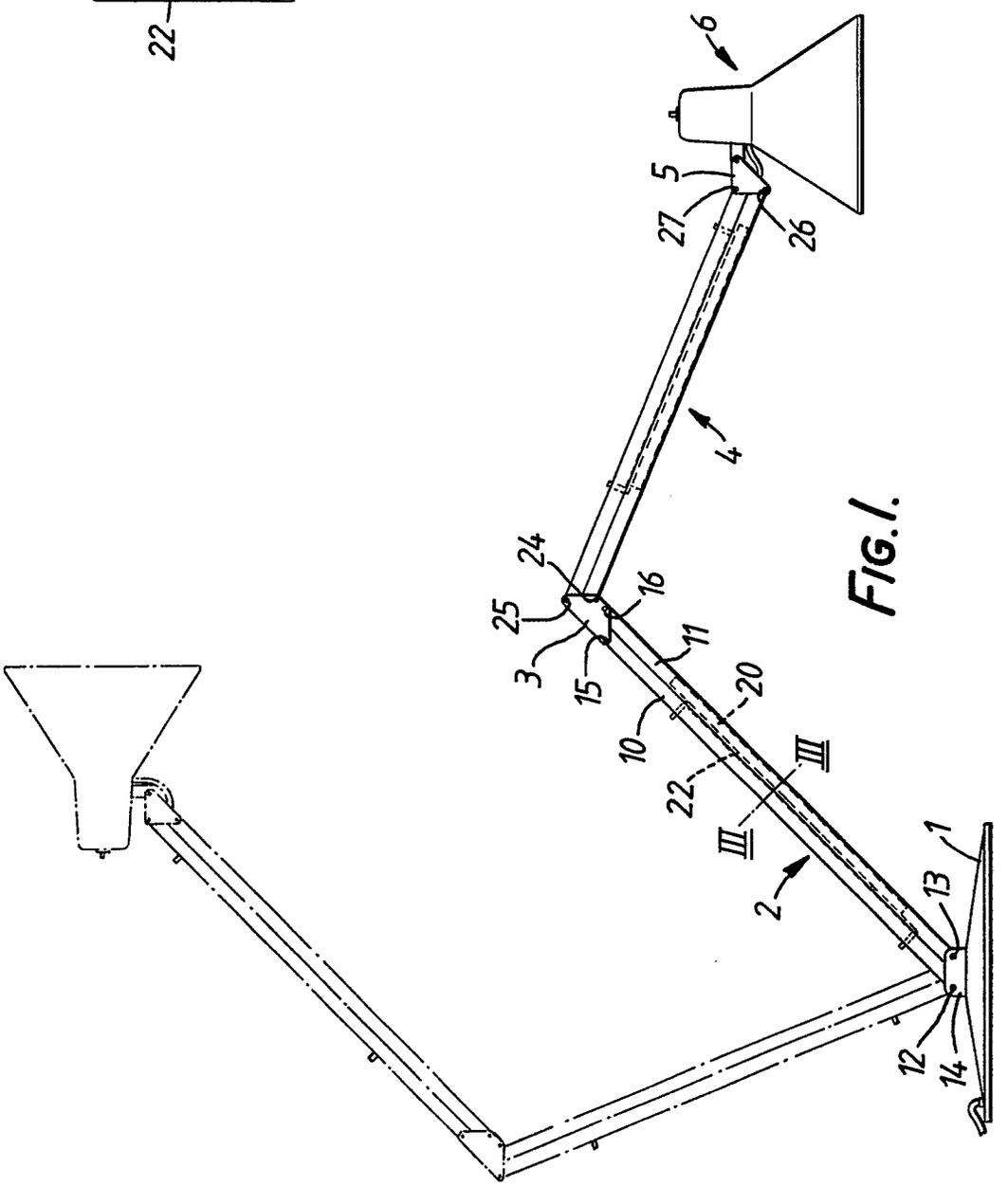


FIG.1.

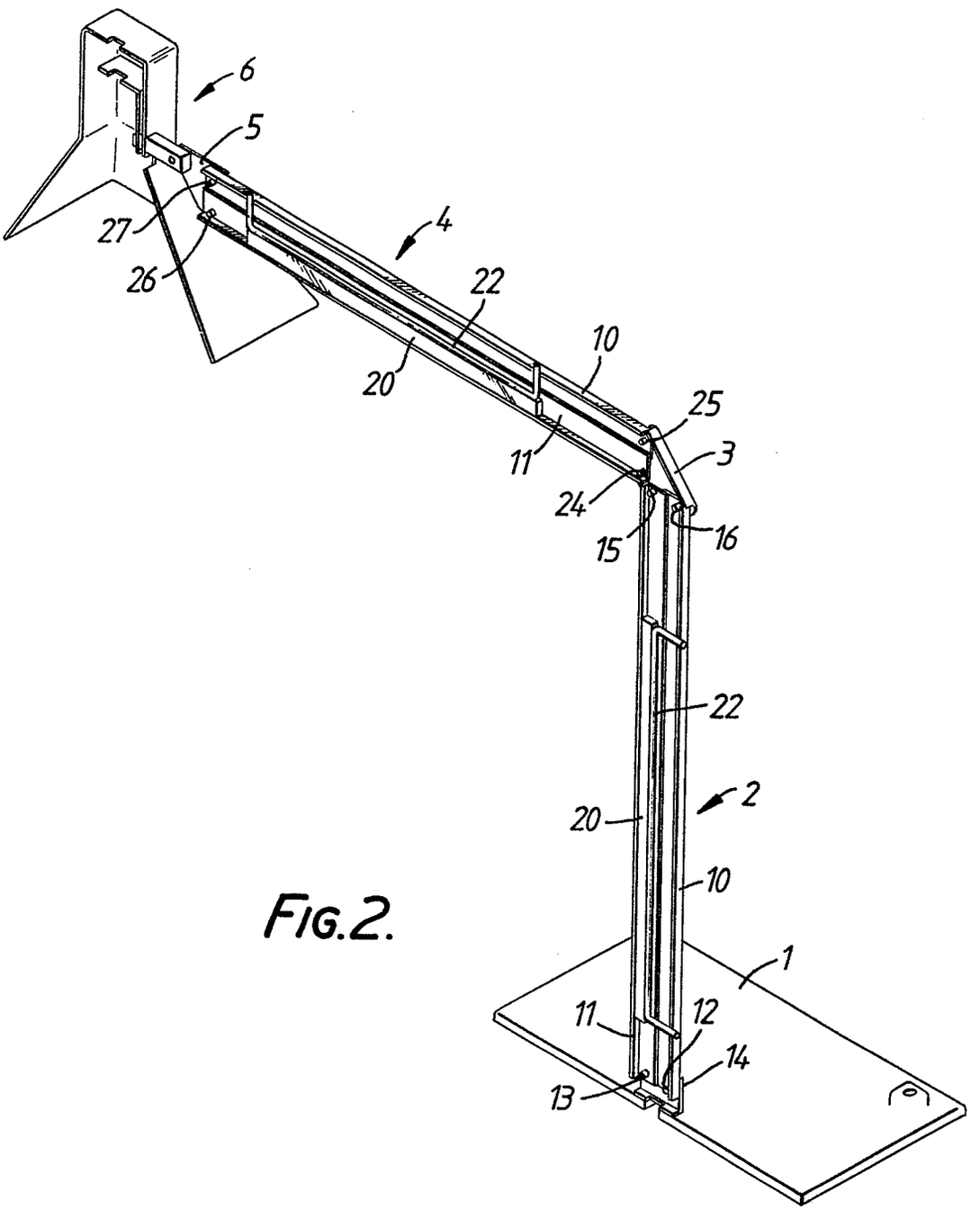


FIG.2.

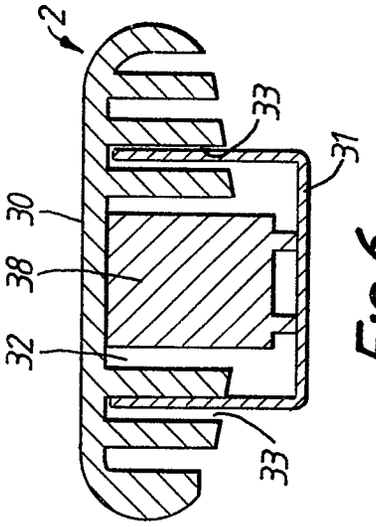
2
33
31
30
38
32
33

FIG.6.

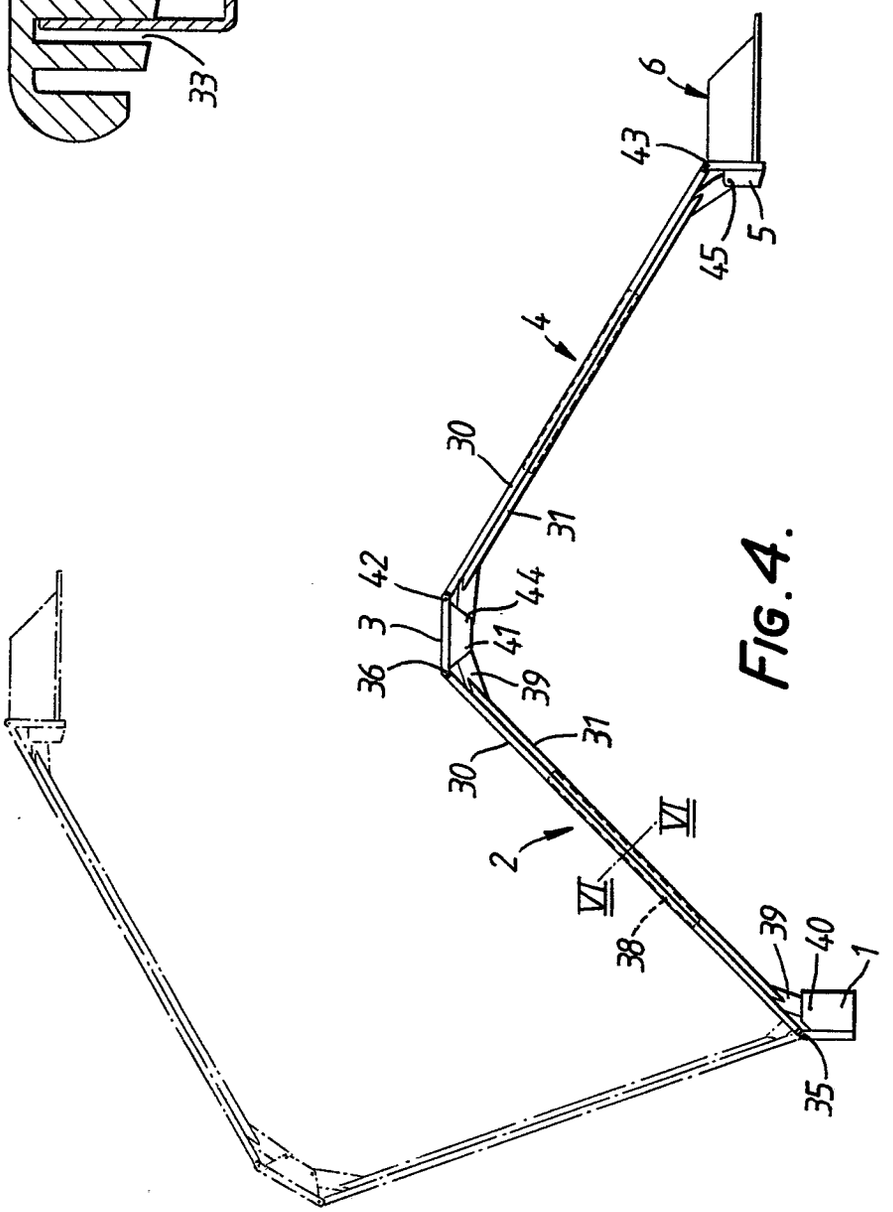
6
43
45
5
4
30
31
42
44
3
41
36
39
30
31
2
VI
VI
38
39
40
1
35

FIG.4.

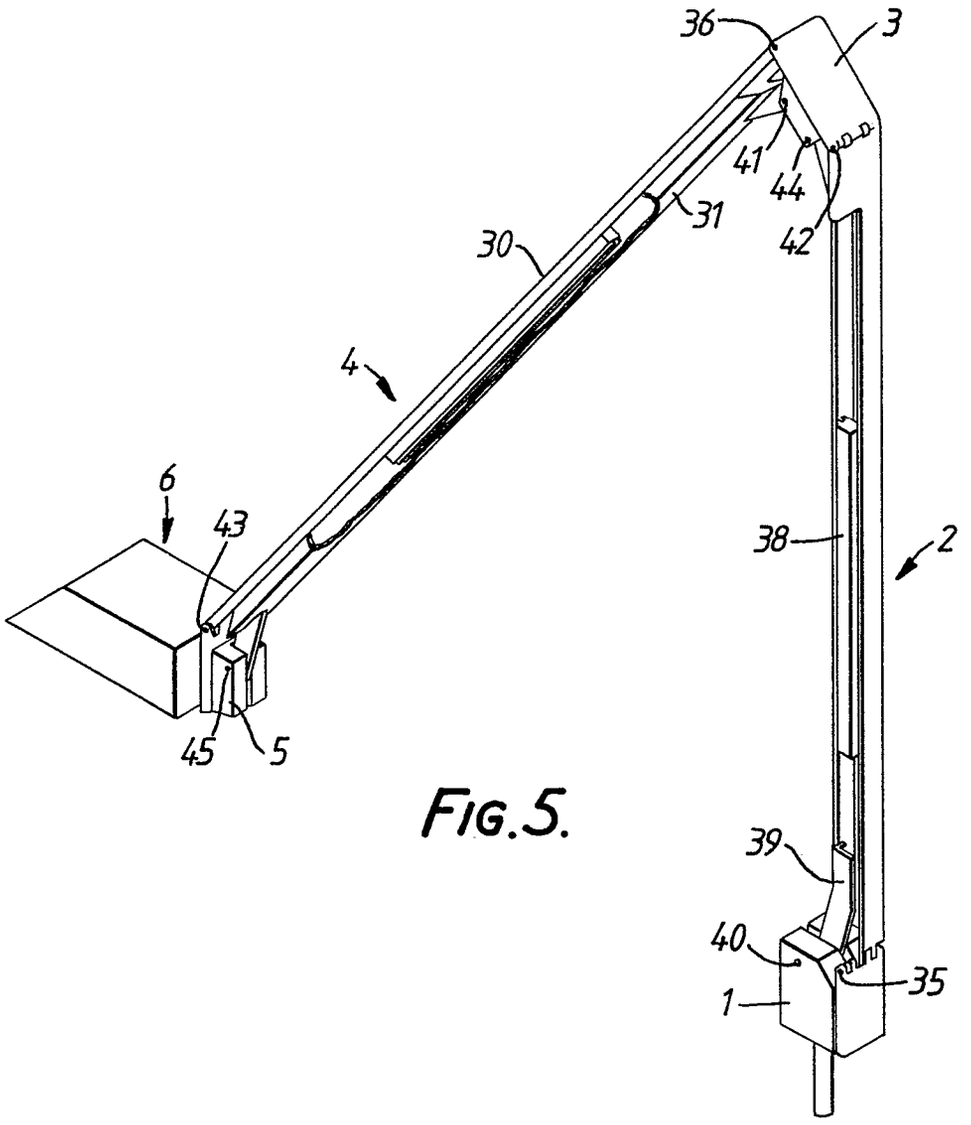


FIG.5.

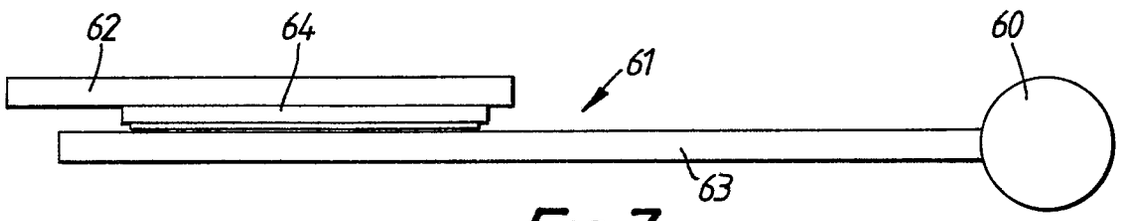


FIG.7.