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(54) **APPARATUS FOR SUSPENDING LAMELLAR SUN-BLINDS OR THE LIKE**

VORRICHTUNG FÜR HÄNGENDE LAMELLENARTIGE MARKISEN ODER ÄHNLICHES

SYSTEME DE SUSPENSION POUR STORES A LAMELLES OU AUTRES EQUIPEMENTS SEMBLABLES

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(73) Proprietor: **SCHÖN B.V.**  
**NL-4817 ZB Breda (NL)**

(72) Inventor: **SCHÖN, Siegfried, Joachim**  
**B-2321 Meer (BE)**

(74) Representative: **Hoorweg, Petrus Nicolaas et al**  
**Arnold & Siedsma,**  
**Advocaten en Octrooigemachtigden,**  
**Sweelinckplein 1**  
**2517 GK Den Haag (NL)**

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## Description

The invention relates to an apparatus according to the preamble of claim 1.

Such an apparatus is disclosed in EP-A-0 242 071 and is often used for closing off openings, for example window openings, to which end the slats are disposed regularly over the surface of the opening and brought into a more or less overlapping position by being rotated about a vertical axis. The disposing movement and the rotation movement can be performed individually of one another.

The slats are automatically disposed over the surface of the opening by placing one carrier at an interval from another carrier, this interval being determined by a stop on the spacer strip. As the carrier moves further each following carrier is taken along with it, this movement again being defined by the following spacer strip. The drawback to the known apparatus is that the profile in which the carriers are guided is relatively high, which does not improve the appearance of the whole curtain. The series of spacer strips stacked onto each other in any case requires a particular thickness, the dimension of which is added to the height of the carrier.

The invention has for its object to obviate the above stated drawback and to provide a profile size which is aesthetically well-considered, requires small dimensions and is therefore easy to combine with other profiles for additional applications.

The apparatus according to the invention is distinguished from the prior art by the characterising features of claim 1.

Owing to the vertical placing of the blade of the strip, the series of spacer strips pushed onto each other is no longer formed in the height, but in the breadth, wherein thinner strips can be used because of the more favourable self-supporting effect of the vertical position of the spacer strip, which likewise reduces the thickness of the series. The advantage of the standing vertical strip is moreover that the guiding rail of the lamellar sun-blind can be arranged at an angle diverging from the horizontal, wherein the carriers are nonetheless held in the correct position by the spacer strips without breakage occurring.

It is recommended to provide the profile embodied as a rectangular tube with a continuous, inward pointing ridge on each side wall between the top and bottom wall in order to provide on the one side a chamber formed with the top or bottom wall for receiving the standing profile strips and on the other side a guiding for the carriers.

In this latter case the distance between the ridge and the top or bottom wall is at least equal to the diameter of a travel wheel arranged on the carrier.

The total height of the profile virtually corresponds therein with the height of the carrier, so that the profile can practically enclose the carrier in close-fitting manner. In the preferred embodiment, a guiding is arranged in the top wall of the profile to receive the end of an arm

fixed to the carrier. This arm likewise serves to maintain the correct position of the carrier in the profile, whereby this does not become jammed, even in the case of an uneven load on the slat for instance. According to a further development of the invention, the profile is provided with a recessed wall adjacent to the carrier guiding, whereby space is formed for arranging additional profiles. The depth measurement of the additional profile need not therein exceed that of the guiding rail profile.

Above stated and other characteristics of the invention will be further elucidated in the figure description hereinbelow of a number of embodiments which are shown in the annexed drawings. In the drawing:

Fig. 1 shows a perspective top view of a sun-blind according to the invention, wherein parts of the guiding profile are broken away for the sake of clarity,

fig. 2 shows a perspective view of a detail of the apparatus, namely the carrier and components co-acting therewith from fig. 1,

fig. 3 shows a perspective view corresponding with fig. 2 of another detail of the apparatus from fig. 1, fig. 4 shows a section of the apparatus of fig. 1 provided with an additional profile,

fig. 5 shows a view corresponding with fig. 2 of an alternative embodiment of the carrier,

fig. 6 and 7 each show a perspective view of a possible gear transmission embodiment in the carrier provided with an overrun clutch.

The apparatus shown in fig. 1 consists of a hollow profile 1, which is preferably tubular and has a longitudinal slit 2 in the bottom wall, through which the depending members 3 of each slat 4 can move. The profile 1 is fixed to the ceiling or other fixed construction part in a manner not shown further but such that the continuous groove 2 lies on the underside of the profile.

Carriers 5 are received in the profile, wherein each carrier is provided on either side with a travel wheel 6. This travel wheel is freely rotatable around a fixed pin 7 on the carrier 5. The carrier 5 with pin 7 is preferably formed as a single moulding of suitable material, for instance plastic.

Arranged in the carrier is a gear transmission 8 consisting of a worm gear 9 and a pinion 10. The worm gear 9 has a central opening, through which is carried a control rod 11 extending parallel in the profile. The control rod 11 is non-round, this such that when the rod 11 is turned the worm gear 9 can rotate therewith. The worm gear 9 therein sets the pinion 10 in rotation. A spindle 12 of the depending member 3 is inserted into the hollow core of the pinion 10.

Each carrier 5 is subsequently provided with a spacer 66 which is embodied as a strip of suitable material, and which according to the invention is mounted fixedly with one end in a recess 13 in the side of the carrier 5. The recess is further provided with a standing strip 14

at an interval from the bottom of the recess 13, this such that not only can the one end of the strip 66 be carried into the space between element 14 and the bottom of recess 13 but also the other end of the standing strip 66 of an adjacent carrier, see at 17 in fig. 1. The other end of the strip 66 is provided with a stop 18, which prevents the other end being pulled out between the recess 13 of the adjacent carrier.

According to a characteristic of the invention the profile 1 is provided on the inside with a rib 20 oriented parallel to the top and bottom wall, which forms with the bottom wall 21 and the side wall 22 a chamber 23 extending to the side of the travel path of the carriers 5. This chamber 23 serves to receive the strips 66 pushed on top of each other when the carriers are pulled against each other. The rib 20 also serves to support the travel wheels 7 of the carriers 5 since with the top wall 24 of the profile 1 this rib 20 forms a rail-like guiding, see also fig. 4.

Also arranged in the top wall 24 are outward protruding grooves 25 in which the end 26 of an arm 27 can slide. This arm 27 serves to prevent the carriers 5 from tilting and going out of square in the profile 1 and thus to facilitate the sliding of the carriers 5 along the rod 11 and the sliding of the strip 66 in the recess 13. If necessary, an arm 27' with a similar function can likewise be arranged on the underside of the carrier 5, see fig. 3.

The carriers 5 can slide in the profile 1 in the direction of the arrow P1 by means of a control member in the form of a pull cord 30. Shown at bottom left in fig. 1 are two parts of the pull cord 30 which is guided around a reversing wheel at the end (not shown) of profile 1. A part of the pull cord 30 is fixed to the last carrier in the row, which is likewise not shown. The last carrier is therefore moved reciprocally by the pull cords 30, which last carrier pulls the following carrier along with it by means of the strips 66 each time the maximum distance between the carriers is reached. When the cord 30 is pulled in the opposite direction the last carrier will push the preceding carriers onward until they lie against each other.

The pull cord 30 can be trained through the profile 1 in a head end element 32 via guide wheels 31, wherein the cords move through an opening 33 of each carrier 5.

The head end element 32 is also an end bearing for the rod 11, in which bearing the rod 11 is received for free rotation. The end of the rod 11 protruding outside the bearing is provided with a gear wheel 34 which is in engagement with a pinion 35 of a drive wheel 36. The drive wheel 36 is provided with a peripheral ring 37 with recesses for receiving a ball chain 38 which, when one of the parts of the chain 38 is pulled, causes the ring wheel 37 to turn in the direction of the arrow P2 whereby the gear wheel 34 is also set into rotation according to arrow P3 via the gear wheel 35. The gear wheel 34 carries the rod 11 with it and therewith all the worm gears 9 in each carrier 5.

The head end element 32 is embodied like the car-

riers as a single injection moulding in which the various components are mounted for free rotation. The guide wheel 31 for the cord 30 is for instance provided at either end with a stub 40 which is received in a recess 42 of a wall of the moulding 32. The cord guiding is ensured by a cap-like insert piece 41 with arcuate recess 42 which can be pushed into the injection moulded piece 32 according to arrow P4. A circular rear wall 43 of the insert piece 41 is provided with through-holes 44 for passage of the cord parts 30.

Recessed into a bridge piece 45 of the injection moulding 32 is an opening 46 for receiving a shaft stub 47 of the ring wheel 37. The other end of the shaft stub 47 is received rotatably in a head end cover 48 which can be connected to the injection moulded piece 32 by means of screws 49 via a side wall 50 of the injection moulding 32 formed in alignment with the profile 1. In this way the entire mounting of the cord drive system and the rotation setting system of the slats 4 is achieved with only two screws 49 on either side of the head end cover 48.

Fig. 5 shows an embodiment of the carrier 5 wherein a vertical standing spacer strip 66 is arranged on either side of the carrier. The spacer strips can be received in a like chamber 23 on the other side of the profile 1, see fig. 4, such that hardly any increase in the dimensions of the profile 1 is necessary.

The spindle 12, which is carried through the pinion 10, carries as one piece on its underside a depending member 3 which has a pincer-shaped form. The two oppositely located parts of the pincer are somewhat flexible relative to one another because of the use of plastic, so that a slat strip 60 arranged on the slat and provided with a suspension bracket 61 can be placed through the slit between the pincer parts 3 in the direction of the arrow P6. The bracket 61 therein has a thickened upper portion 62, which prevents the slat being pulled out of the pincer-shaped depending member 3 unexpectedly. If the slat needs to be replaced, then the bracket 62 only needs to be pushed out of the pincer-shaped depending member 3 in the direction of the arrow P7.

There now follows a description, with reference to figures 6 and 7 of two different embodiments of a friction clutch between the transmission and the rod 11 on the one hand and the spindle 12 of the depending member 3 on the other.

In the embodiment according to fig. 6 the central opening of the worm gear 9 is embodied with a longitudinal key 50 which fits into the longitudinal groove 51 of the rod 11. This makes possible sliding of the worm gear 9 and therefore sliding of the carriers 5 relative to the rod 11 but when the rod 11 is rotated the worm gear 9 can also be rotated. When the worm gear 9 which has one screw thread 52 is rotated, the pinion 10 which is received in the carrier 5 for free rotation will be rotated. By passing the spindle 12 through the central opening of the pinion 10 the top end of the spindle comes to lie beyond the top end of the pinion 10, which fits in the

bearing-like opening of the carrier 5. In this way the pinion 10 is automatically bearing mounted in the carrier 5. The pinion 10 is embodied on the top side with inward pointing flanges 53 which rest resiliently against a slanting surface 54 of the spindle 12. This resilient action ensures a friction between the spindle 12 and the pinion 10, so that when the spindle 12 becomes jammed as a result of an obstruction on the slat 4 the rod 11 can still be rotated further since the pinion 10 can be rotated freely relative to the spindle 12.

In the embodiment according to fig. 7 the spindle 12 is embodied in similar manner with a slanting surface 54 which co-acts with the friction flanges 53 of pinion 10. The spindle 12 is further provided with a protrusion 55 which falls into the slit between the flanges 53 of pinion 10, thus effecting a non-rotatable connection between spindle 12 and pinion 10.

The rod 11 is provided here with three grooves 51' which co-act with the ridges 50' of a friction sleeve 56. This friction sleeve is embodied with an outward protruding resilient ridge 57 which co-acts with an axial toothing 58 on the inner wall of the central opening of the worm gear 9. In this embodiment, when the rod 11 is rotated a rotation of the rod 11 relative to the worm gear 9 is possible, wherein the ridge 57 will fall into the following recess between the toothings 58. A friction clutch is therefore also obtained here which enables a relative movement between the rotation of the rod 11 and of the spindle 12.

In both embodiments the thickened head of the spindle 12 lies against the end edge of the flanges 53 in order to be able to lock the spindle 12 in the pinion 10 in axial direction. This is the second function of the flanges 53. The spindle can herein be removed from the pinion without having to slide the carriers out of the guiding.

Finally, it is pointed out that the profile 4 is embodied at the top surface 24 with outward protruding flange edges 60 which can serve for arranging additional profiles 61. These additional profiles 61 can be embodied hollow with forms of a continuous chamber 62 in which lines of a random nature can be accommodated. The profile 61 can be fixed to a ceiling strip 65 with a snap connection at 64. This greatly facilitates assembly. Other assembly systems for arranging the profile 1 on the ceiling can of course be applied.

## Claims

1. Apparatus for suspending lamellar sun-blinds or the like, which apparatus comprises:

a rail (1) having a rectangular profile, comprising a top wall (24), two side walls (22) and a bottom wall (21), said bottom wall (21) being provided with a longitudinal slit (2), said rail (1) further comprising means (20) defining a guideway for a number of carriers (5), said guideway

means (20) is in the form of an inwardly directed rib on each side wall (22) between the bottom wall (21) and the top wall (24) such that a chamber (23) is formed between said guideway means (20), said bottom wall (21) and said side walls (22);

said number of carriers (5) each having a gear transmission (8), said carriers (5) being movable along the rail (1) by a control means (30); a rotatable control rod (11) arranged in and parallel to the rail (1), said control rod (11) extending through a gear member of the transmission (8) of each carrier (5);

a vertically rotatable spindle (12) supported by each of the carriers (5) and connected to another member of said gear transmission (8), each said spindle (12) comprising a depending member (3) for receiving said lamellar sun-blind or the like; and

a spacer strip (66) connected to each of the carriers (5) and being guided slidably in a recess (13) of the adjacent carrier,

**characterized in that** each of the spacer strips (66) is fixed to the side of a respective one of the carriers (5) such that the blade of the strip is vertically oriented and in that the spacer strips (66) are received in said chamber (23) of the rail (1) below the ribs (20).

2. Apparatus as claimed in claim 1, further comprising a pair of wheels (6), the wheels (6) of each pair being rotatably mounted on opposite sides of each of the carriers (5).
3. Apparatus as claimed in claim 2, **characterized in that** the distance between the ribs (20) and the top wall (24) is only slightly in excess of the diameter of the carrier wheels (6) and wherein the distance between the ribs (20) and the bottom wall (21) is only slightly in excess of the vertical heights of the spacer strips (66).
4. Apparatus as claimed in claim 1, **characterized in that** a groove (25) is arranged in the top wall (24) for receiving an end (26) of an arm (27) attached to the carrier (5).
5. Apparatus as claimed in claim 1, **characterized in that** the spacer strips (66) are arranged on both sides of the carriers (5).
6. Apparatus as claimed in claim 1, **characterized in that** the gear transmission includes a worm gear (9) and a pinion (10) co-operating therewith and wherein a friction clutch is interposed between the worm gear (9) and the control rod (11).

7. Apparatus as claimed in claim 1, **characterized in that** the gear transmission includes a worm gear (9) and a pinion (10) co-operating therewith and wherein a friction clutch is interposed between the pinion (10) and the spindle (12).
8. Apparatus as claimed in claim 1, **characterized in that** the control means (30) comprises a pull cord extending alongside the control rod (11) through openings (33) in the carriers (5) and wherein a head end element (32) is provided on at least one longitudinal end of the rail (1), said head end element (32) comprising a pair of side-by-side openings, one of said openings forming a bearing for the control rod (11) while the other of said openings receives a cord guiding insert (41) for guiding said pull cord (30).

### Patentansprüche

1. Vorrichtung zum Aufhängen lamellenartiger Markisen oder ähnlichem, mit:

einer Schiene (10) mit einem rechteckigen Profil mit einer oberen Wand (24), zwei Seitenwänden (22) und einer Bodenwand (21), die mit einem Längsschlitz (2) versehen ist, wobei die Schiene (1) ein Mittel (20) aufweist, das einen Führungsweg für eine Zahl von Trägern (5) definiert, das Führungsmittel (20) in der Form einer nach innen gerichteten Rippe auf jeder Seitenwand (22) zwischen der Bodenwand (21) und der oberen Wand (24) so gebildet ist, daß eine Kammer (23) zwischen dem Führungswegmittel (20) der Bodenwand (21) und den Seitenwänden (22) gebildet ist; wobei die Zahl der Träger (5) je ein Zahnradgetriebe (8) aufweist, die Träger (5) bewegbar entlang der Schiene (1) durch ein Steuermittel (30) sind; einer drehbaren Steuerstange (11), die in und parallel zu der Schiene (1) angeordnet ist, wobei die Steuerstangen (1) sich durch ein Zahnradteil des Getriebes (8) eines jeden Trägers (5) erstreckt; einer vertikal drehbaren Spindel (12), die von jedem der Träger (5) gelagert ist und mit dem anderen Teil des Zahnradgetriebes (8) verbunden ist, wobei jede Spindel (12) ein herabweisendes Teil zum Aufnehmen der lamellenartigen Markisen oder ähnlichem aufweist; und einem Abstandsstreifen (66), der mit jedem der Träger (5) verbunden ist und gleitend verschiebbar in einer Ausnehmung (13) des benachbarten Trägers geführt ist;

dadurch gekennzeichnet,

daß jeder der Abstandsstreifen (66) an der Seite eines entsprechenden der Träger (5) derart befestigt ist, daß das Blatt des Streifens vertikal orientiert ist, und daß die Abstandsstreifen (66) in der Kammer (23) der Schiene (1) unterhalb der Rippe (20) aufgenommen sind.

2. Vorrichtung nach Anspruch 1, weiter mit einem Paar von Rädern (6) wobei die Räder (6) eines jeden Paares drehbar auf gegenüberliegenden Seiten eines jeden der Träger (5) angebracht sind.
3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß der Abstand zwischen den Rippen (20) und der oberen Wand (24) nur wenig den Durchmesser der Trägerräder (6) überschreitet und wobei der Abstand zwischen den Rippen (20) und der Bodenwand (21) nur wenig die vertikale Höhe der Abstandsstreifen (66) überschreitet.
4. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß eine Rille in der oberen Wand (24) zum Aufnehmen eines Endes (26) eines Armes (27) angeordnet ist, der an dem Träger (5) angebracht ist.
5. Gerät nach Anspruch 1, dadurch gekennzeichnet, daß die Abstandsstreifen (66) auf beiden Seiten der Träger (5) angeordnet sind.
6. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Zahnradgetriebe ein Schneckenrad (9) und ein Ritzel (10), das damit zusammenwirkt, aufweist und wobei eine Reibungskupplung zwischen das Schneckenrad (9) und die Steuerstange (11) gesetzt ist.
7. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Zahnradgetriebe ein Schneckenrad (9) und ein Ritzel (10), das damit zusammenwirkt, aufweist und wobei eine Reibungskupplung zwischen das Ritzel (10) und die Spindel (12) gesetzt ist.
8. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Steuermittel (30) eine Zugschnur aufweist, die sich entlang der Steuerstange (11) durch Öffnungen (33) in den Trägern (5) erstreckt, und wobei ein Kopfelement (32) auf mindestens einem Längsende der Schienen (1) vorgesehen ist, das Kopfelement (32) ein Paar von nebeneinander angeordneten Öffnungen aufweist, eine der Öffnungen ein Lager für die Steuerstange (11) bildet, während die andere der Öffnungen einen Schnurführungseinsatz (41) zum Führen der Zugschnur (30) aufnimmt.

## Revendications

1. Dispositif de suspension de stores à lames, ou analogues, le dispositif comprenant :

un rail (1) ayant un profil rectangulaire, comprenant une paroi supérieure (24), deux parois latérales (22) et une paroi inférieure (21), ladite paroi inférieure (21) étant pourvue d'une fente longitudinale (2), ledit rail (1) comprenant en outre un moyen de guidage (20) pour un certain nombre de chariots (5), ledit moyen de guidage (20) se présentant sous la forme d'une nervure, orientée vers l'intérieur, sur chaque paroi latérale (22) entre la paroi inférieure (21) et la paroi supérieure (24), de manière à former une chambre (23) entre ledit moyen de guidage (20), ladite paroi inférieure (21) et lesdites parois latérales (22) ;

lesdits chariots (5) ayant chacun une transmission à engrenage (8), et pouvant être déplacés, le long du rail (1), par un moyen de commande (30) ;

une tige rotative de commande (11), placée dans le rail (1) parallèlement à celui-ci, ladite tige de commande (11) traversant dans un élément d'engrenage de la transmission (8) de chaque chariot (5) ;

un arbre (12), tournant verticalement, soutenu par chacun des chariots (5) et relié à un autre élément de ladite transmission à engrenage (8), chacun desdits arbres (12) comportant un élément suspendu (3), destiné à recevoir ledit store à lames ou analogue ; et

une bande d'écartement (66) reliée à chacun des chariots (5) et guidée, en mouvement coulissant, dans un évidement (13) du chariot adjacent,

caractérisé en ce que chacune des bandes d'écartement (66) est fixée sur le côté d'un des chariots respectif (5), de telle manière que la bande soit orientée verticalement, et en ce que les bandes d'écartement (66) sont reçues dans ladite chambre (23) du rail (1) au-dessous des nervures (20).

2. Dispositif selon la revendication 1, caractérisé en ce qu'il comprend en outre une paire de galets (7), les galets (7) de chaque paire étant montés, de manière à tourner, sur les côtés opposés de chacun des chariots (5).

3. Dispositif selon la revendication 2, caractérisé en ce que la distance entre les nervures (20) et la paroi supérieure (24) n'est que légèrement supérieure au diamètre des galets de chariot (7), la distance entre les nervures (20) et la paroi inférieure (21) n'étant que légèrement supérieure aux hauteurs verticales

des bandes d'écartement (66).

4. Dispositif selon la revendication 1, caractérisé en ce qu'il est prévu une rainure (25) dans la paroi supérieure (24), destinée à recevoir une extrémité (26) d'un bras (27) fixé au chariot (5).

5. Dispositif selon la revendication 1, caractérisé en ce que les bandes d'écartement (66) sont disposées des deux côtés des chariots (5).

6. Dispositif selon la revendication 1, caractérisé en ce que la transmission à engrenage comprend un engrenage à vis sans fin (9) et un pignon (10), qui coopère avec celui-ci, tandis qu'un embrayage à friction est intercalé entre l'engrenage à vis sans fin (9) et la tige de commande (11).

7. Dispositif selon la revendication 1, caractérisé en ce que la transmission à engrenage comprend un engrenage à vis sans fin (9) et un pignon (10), qui coopère avec celui-ci, tandis qu'un embrayage à friction est intercalé entre le pignon (10) et l'arbre (12).

8. Dispositif selon la revendication 1, caractérisé en ce que le moyen de commande (30) comprend un cordon de traction, qui s'étend selon le même trajet que la tige de commande (11), en passant dans des ouvertures (33) ménagées dans les chariots (5), et en ce qu'il est prévu un élément d'extrémité de tête (32) à au moins une extrémité longitudinale du rail (1), ledit élément d'extrémité de tête (32) comprenant une paire d'ouvertures côte à côte, l'une desdites ouvertures constituant un palier pour la tige de commande (11), tandis que l'autre desdites ouvertures reçoit un insert de guidage de cordon (41), destiné au guidage dudit cordon de traction (30).

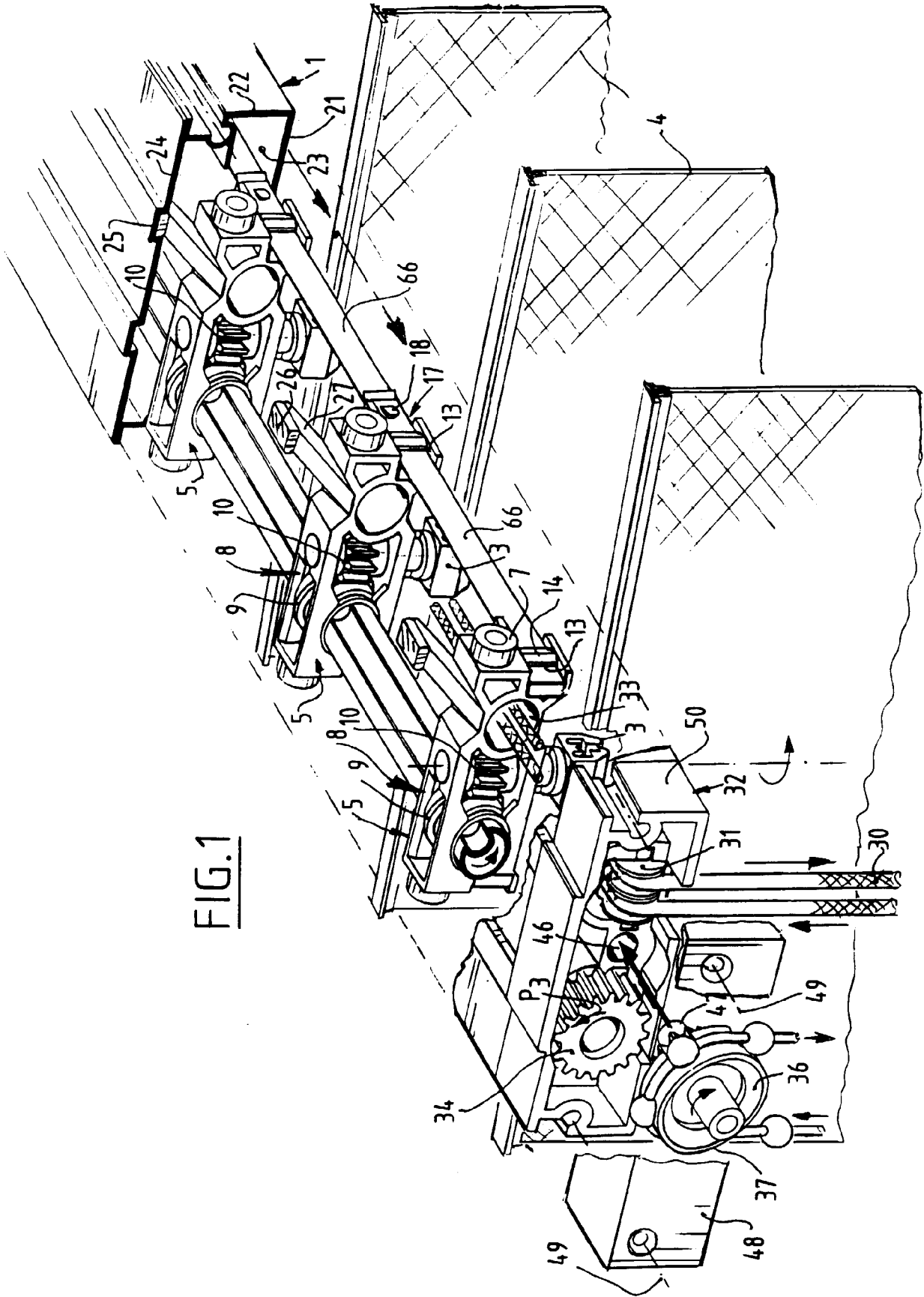
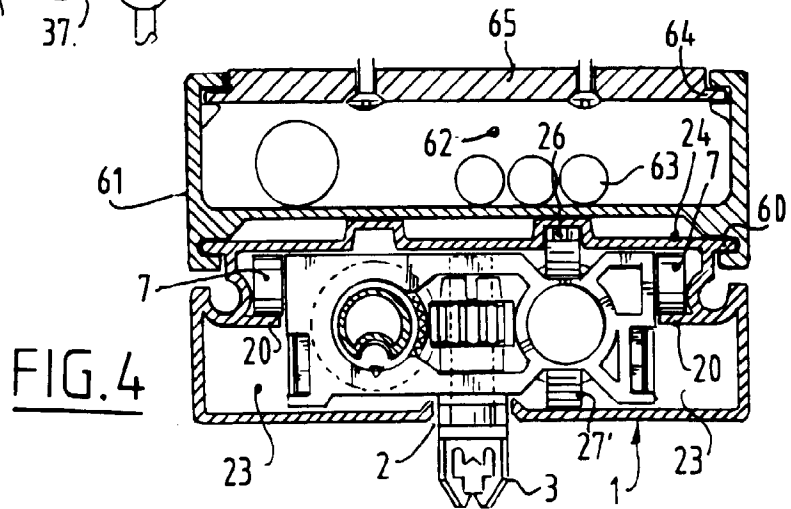
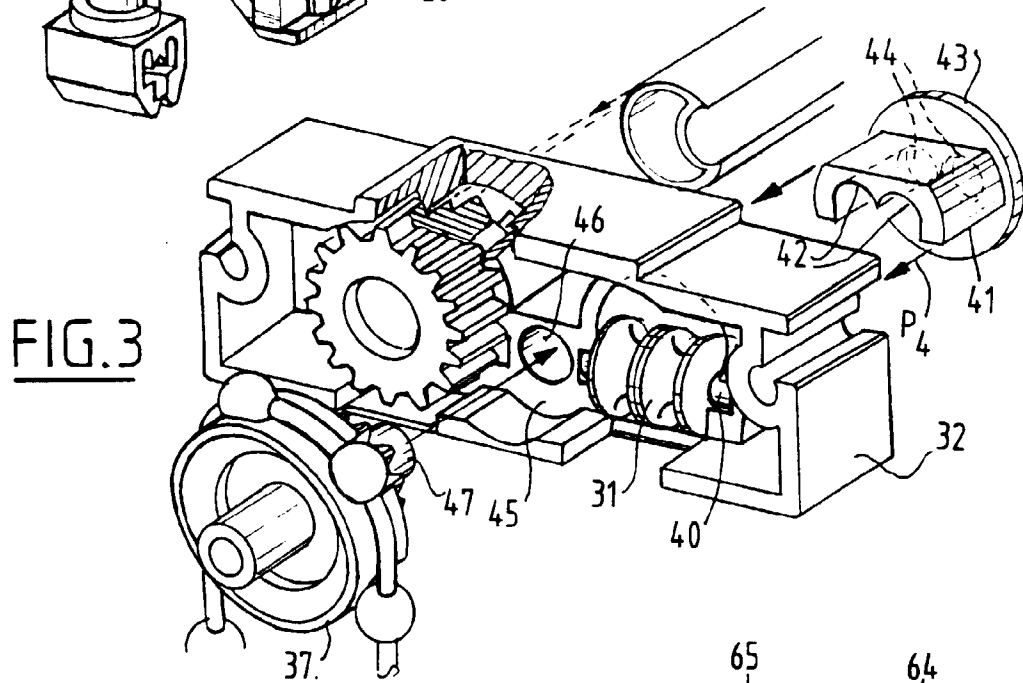
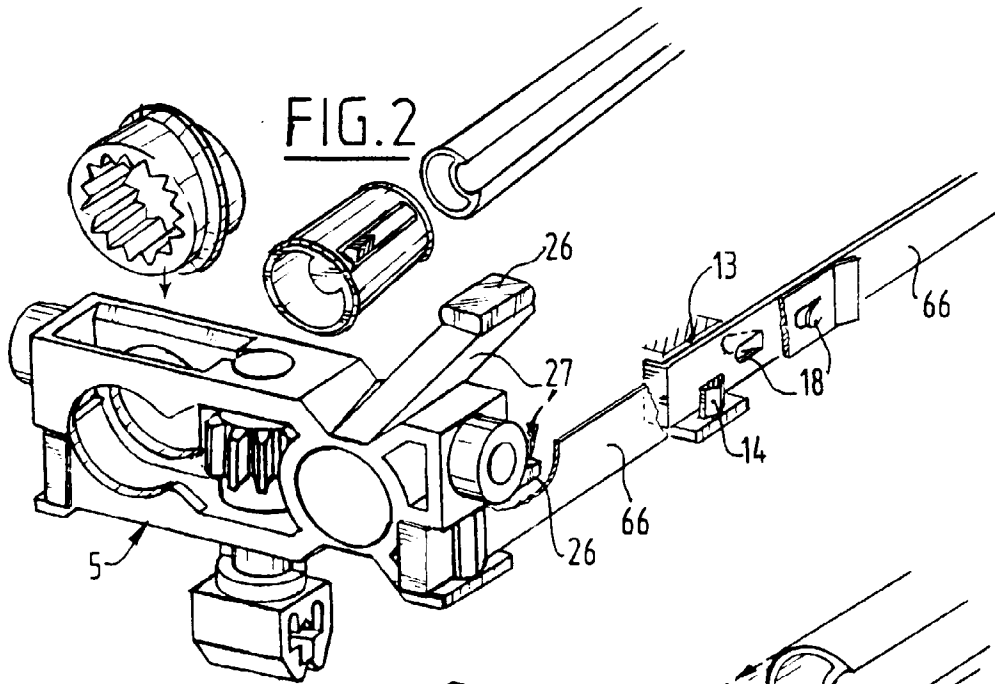


FIG. 1



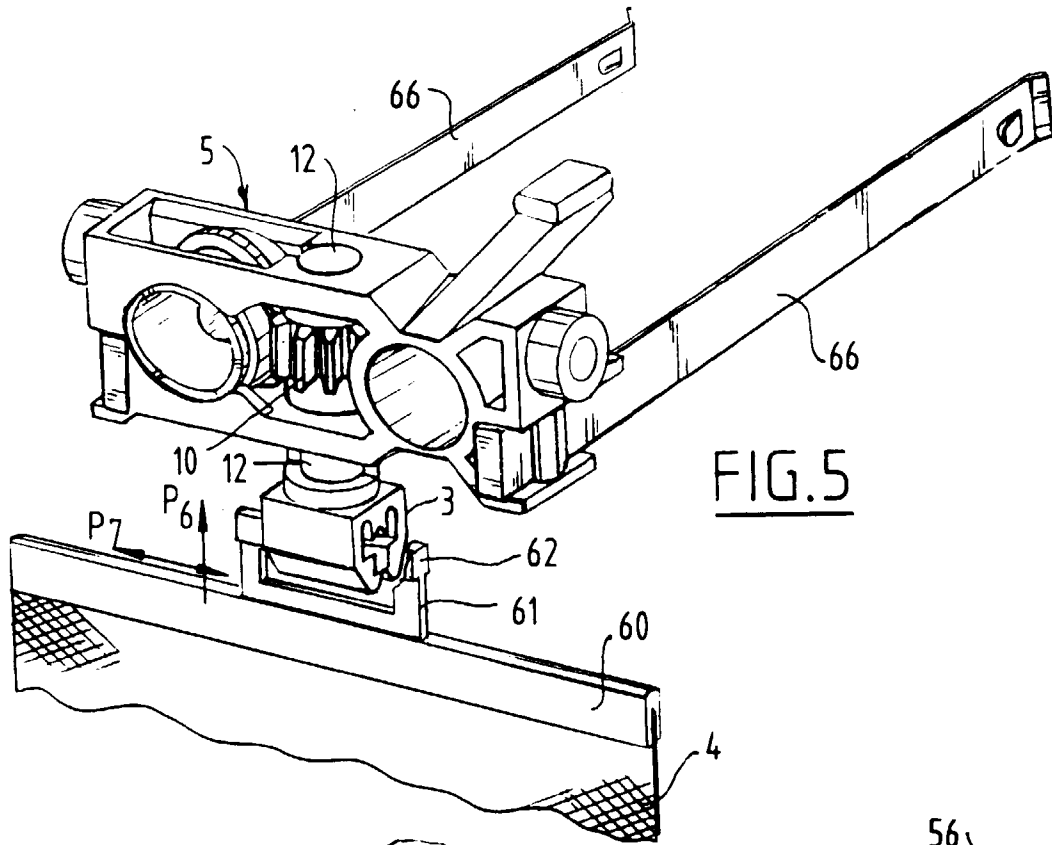


FIG. 5

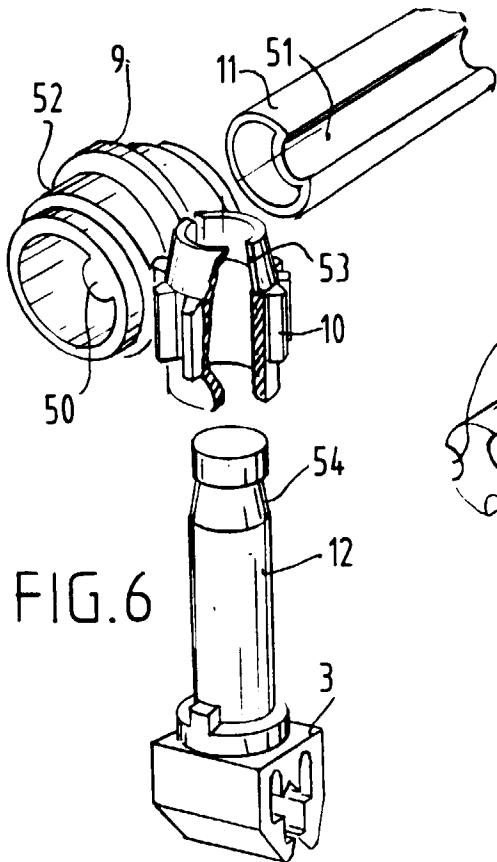


FIG. 6

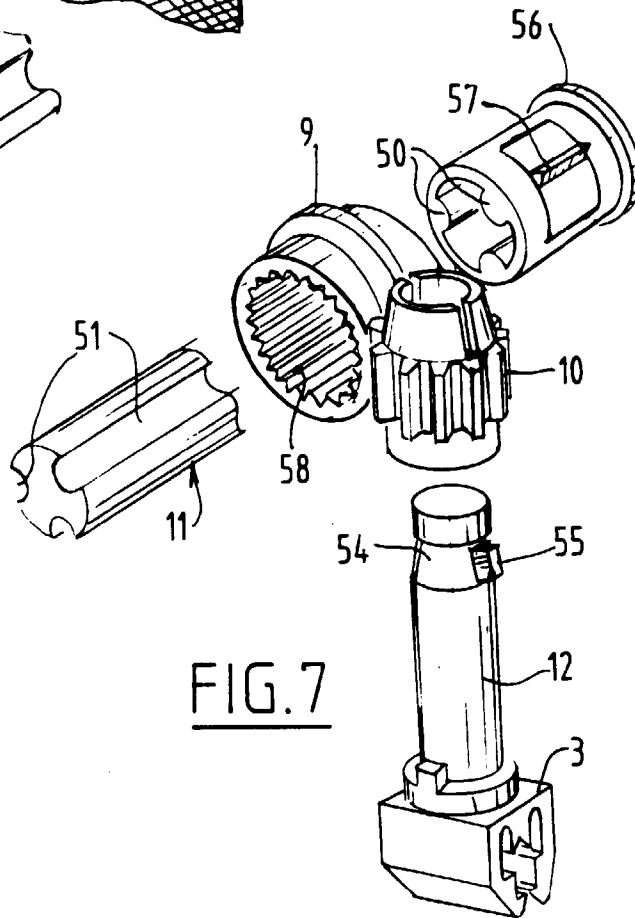


FIG. 7