



(12)

EUROPEAN PATENT APPLICATION

(21) Application number : **94500056.0**

(51) Int. Cl.⁵ : **E06B 9/11, E06B 9/56**

(22) Date of filing : **25.03.94**

(30) Priority : **26.03.93 ES 9300625**

(43) Date of publication of application :
12.10.94 Bulletin 94/41

(84) Designated Contracting States :
DE FR GB IT

(71) Applicant : **Teixido Roca, Jordi**
Comte Borrell 182-184
E-08015 Barcelona (ES)

(72) Inventor : **Teixido Roca, Jordi**
Comte Borrell 182-184
E-08015 Barcelona (ES)

(74) Representative : **Curell Sunol, Jorge et al**
c/o Dr. Ing. M. Curell Sunol I.I. S.L.
Passeig de Gràcia 65 bis
E-08008 Barcelona (ES)

(54) **Reversible blind.**

(57) A reversible blind having slats (2, 2a) which may be rolled up on a drum ; guides (12) for conventional unrolling of the blind and guides (14) for reversed unrolling ; a tile (32) which may rotate and is fixedly attached to fixing discs (34) ; a clutch associating the tile (32) with the drum (6). In one position of the clutch, the tile (32) and drum (6) rotate and the slats are rolled up ; in another position, the tile (32) is locked at the top and the blind moves from the guides (12) to the guides (14), being reversed. The clutch comprises : a ring member (38) attached to the drum (6) and having axial bores (40) ; axial orifices (42) of the fixing disc (34) which may be aligned with the bores (40) ; a free disc (44) having an eye (46) and axial pins (48) passing through the orifices (42) and insertable in the bores (40) ; and a pin (50). Alternatively, the pins (48) are out of or in the bores (40) and the pin (50) is engaged in or disengaged from the eye (46).

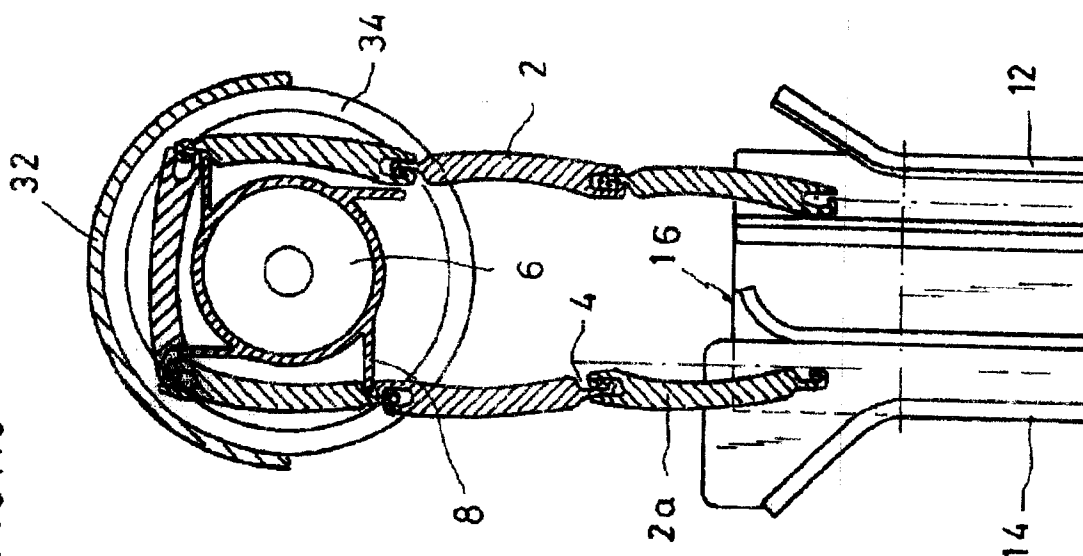


FIG. 10

The invention relates to a reversible blind comprising: a series of hingedly connected slats; a roll-up drum mounted on a shaft for rotation and having slat pulling means; drive means for said drum; a first pair of guides for receiving the side edges of the slats, in a conventional rolled-down position thereof and a second pair of guides for receiving the same edges in a reversed rolled-down position thereof; a rotatable arcuate shell-like casing coaxial with at least the end portions of said drum; two fixing discs fixedly attached peripherally to said shell-like casing; a clutch device adapted to associate said casing to said drum; spring means urging said device; and locking means for said casing.

As is well known, blinds have one side which, in the rolled-down position thereof, is on the inside of the opening receiving the blind, whereby it is perfectly accessible to the user and is easy to clean. On the contrary, the opposite side is either rolled up or is on the outside of the opening in which the blind is located. Therefore, when this opening is not accessible from the outside (as is the different cases of a balcony, terrace or like construction), this opposite side may not be cleaned by the user, unless costly and/or hazardous positions are adopted, either by hanging down from higher levels or climbing up from lower levels.

Several solutions have been proposed for this problem, such as the fixing of brushes whose bristles engage the unaccessible side during the rolling-up and rolling-down movements of the blind.

In Spanish patent application n^o 9100911, which gave priority to EP-A-0 508 931, there is disclosed a blind roll-up system in which, at the user's will, the blind is alternatively operated between a conventional rolled-down position and a rolled-up position; or between the conventional rolled-down position and a reverse rolled-down position. In the latter, the opposite side of the blind, normally inaccessible, is exposed towards the interior of the opening; obviously, a second pair of guides are provided for the said reverse rolled-down position.

Nevertheless, the blind referred to in the foregoing paragraph has certain minor drawbacks, some of which relate to the space, at times excessive, required for installing the roll-up drum, the clutch device and the drive means.

It is an object of the invention to overcome these drawbacks, particularly those related to this device. This object is attained with a blind of the type first mentioned above which is characterized in that said clutch device comprises: a ring member fixedly attached to said drum, situated at one end thereof and provided with axially extending bores; axially extending orifices formed in said fixing disc and which are adapted to be aligned with said bores; a free disc, coaxial with said drum, provided with a eye and axially extending pins passing through said orifices and adapted to be inserted in said bores; and an operative

means, provided with a locking pin and adapted to move said free disc axially between a first position in which said pins are inserted in said bores and said locking pin is not engaged with said eye, and a second position in which said pins are not in said bores and said locking pin is in said eye.

According to a first embodiment, said spring means urge said free disc towards said first position and said operative means is an electromagnet adapted to attract said free disc from said first position to said second position, overcoming the force of said spring means.

According to a second embodiment, said eye of said free disc is a notch; said spring means urge said free disc towards said second position; and said operative means is a coupling wedge (a) having a shoulder, a first rabbetted surface and a second advanced surface, and (b) may slide in a direction transverse to said axial extension between a disengaged state in which said shoulder is inserted in said notch and said first rabbetted surface engages said free disc (directly or with an intermediate washer) causing the latter to be in said second position and an engaged position in which said shoulder is external to said notch and said second advanced surface is engaged with said free disc, causing it to be in said first position.

The invention also contemplates that each of the guides of the second pair of guides should form a space having a vertical bottom wall and opposite thereto a vertical aperture flanked by two narrow flanges, there being in said space a cover plate for covering said aperture and having at the upper end thereof an extension sloping towards said bottom wall, there being at least one spring urging said cover plate against said flanges, said cover plate yielding towards said bottom wall when the blind slats are inserted in the guide.

In a preferred embodiment of the invention one guide of the first pair of guides and one guide of the second pair of guides form part of a single structure having an intermediate separating land.

Further advantages and features of the invention will be appreciated from the following description in which there is disclosed a preferred embodiment of the invention, without any limiting nature, with reference to the accompanying drawings in which:

Figure 1 is a vertical axial cross section of a first embodiment of the clutch device, in the second position thereof, of the reversible blind of the present invention;

Figure 2 is a cross section view, similar to the previous one, corresponding to the first position of the clutch device.

Figures 3 and 4 are respective section views similar to the previous ones, of a second embodiment of the clutch device.

Figure 5 is a cross section view on a horizontal plane of the structure comprising one guide of

each of the pairs of guides.

Figure 6 is a partial elevation view of the blind in the proximity of a guide of the second pair of guides, the latter being shown in section on the line VI-VI of Figure 5.

Figure 7 is a similar view to the previous one, with the blind partly inserted in the guide.

Figure 8 is a fragmentary perspective view of the blind in the proximity of a guide of the second pair of guides.

Figure 9 is a view, partly in cross section, of one embodiment of the blind drive means.

Figure 10 is a schematic elevation view of the blind, partly in cross section, with the guides in the vertical position corresponding to unrolling of the blind slats.

Figure 11 is a similar view to the previous one, with the guides displaced from the vertical axis corresponding to the unrolling of the blind slats.

Figure 12 is a fragmentary schematic view in elevation of the blind drum and of the shell-like casing, the latter being in section.

The blind has a plurality of hingedly connected slats 2 in such a way that a groove 4 (Figures 10 and 11) is defined between each pair of adjacent slats 2. A roll-up drum 6, mounted on a rotation shaft 7, allows the blind to be rolled therearound and the drum is provided, as pulling means for the slats, with ribs 8 which may be inserted in the grooves 4, so that the movement of the drum 6 implies movement of the slats 2. Each of these ribs is normally continuous, although they may be formed by a plurality of aligned ribs.

Various alternative solutions are contemplated for the drive means for the rotation of the drum. In one case, these means are formed by an electric motor (not shown) which is preferably housed within the drum; in another case, the drive means comprise a windlass 10 (Figure 9) driving the shaft 7 and being associated through a joint 12a with a not shown rod. The blind is provided with the first pair of guides 12 (Figures 5, 8, 10 and 11) along which the slats 2 are conventionally rolled down. There is obviously a guide 12 on each side of the opening corresponding to the blind and the guide may be provided with the brush 13 for better guiding of the blind. For the aforementioned reverse unrolling a second pair of guides 14 is required (Figures 5-8, 10 and 11), also with a guide on each side of the opening. Each guide 12, 14 has a vertical bottom wall 15 and a vertical aperture 17, facing the bottom wall 15.

Preferably one guide 12 of the first pair of guides and one guide 14 of the second pair of guides form a single structure 16 (Figures 5, 8, 10 and 11) which may be obtained either by extrusion or from a subsequently formed cold-rolled steel strip. The structure 16 has an intermediate land 18 keeping the two guides 12 and 14 at a suitable distance to facilitate the two ways of rolling the blind down.

The blind is normally frequently rolled down and up in the conventional way from and to the rolled-up position around the drum 6. On the other hand, reverse unrolling only occurs from time to time, whereby the second guides are generally left unused for relatively long periods of time.

To reduce the penetration of dust in the second guides 14, the invention contemplates that the vertical aperture 17 of the inner space 20 of the second guides 14 be flanked by two narrow flanges 22 and that inside the space 20 there is a cover plate 24 which may cover the aperture 17. There are springs 26 urging the cover plate 24 against the flanges 22, closing the aperture 17.

Each cover plate 24 is provided with an upper extension 28 preferably arcuately sloping towards the bottom wall. This extension 28 is pushed by the first slat 2 of the blind (Figures 5-8) when reverse rolling down is started and this push overcomes the force of the springs 26 so that the cover plate recoils to the position shown in phantom lines in Figure 5. To facilitate this recoil, it is contemplated that at least the first slat 2a be provided with a side reinforcement 30. When the space in which the blind is to be installed so allows, the guides 12, 14 are installed as shown in Figure 10, i.e. with the guides disposed substantially vertically along the line of unwinding of the blind slats.

Where this installation is not possible, for example due to the characteristics of the opening where installation is to occur, the guides 12, 14 are located offset from the vertical line of unrolling of the blind slats, as may be seen in Figure 11. Reference is made hereinafter to the way of achieving a good operation of the blind in the non-aligned position.

A very important part of the blind is the arcuate shell-like casing 32. This is preferably a one-piece member and is coextensively coaxial with the drum 6. Nevertheless, the invention also contemplates the possibility of the casing 32 being formed by two aligned portions, each of which is coaxial with the end portions of the drum 6. Herein, this item is sometimes called a tile. The tile is attached to two fixing discs 34, one at each end of the tile 32 and attachment is preferably made by screws, pins or the like which are inserted in some of the bores 36 (Figure 12). Where the casing 32 is two-part, each of them is attached to a corresponding fixing disc 34, extending in overhang over a distance. There is preferably a supplement 37 (Figure 12) substantially diametrically opposed to the casing 32 and of a substantially narrower width. It is also contemplated that the supplement 37 be formed by two aligned portions, each of which is attached to the corresponding fixing disc 34. The presence of this supplement 37 -- in one or two portions -- facilitates the rolling up of the blind, without hindering the reverse unrolling in any way whatsoever.

As described hereinafter, the tile or casing 32 may be drivingly attached to the drum 6 (whereby it

rotates at the same time as the drum), or it may be independent from the movement of the drum. As disclosed in Spanish patent application 9100911, in the first case the blind operates as a conventional blind, i.e., the ribs 8 of the drum 6, on being inserted in the grooves 4 between the slats 2, pull the blind along, moving it between the rolled-up position around the drum (and therefore at least in part around the shell-like casing 32) and the rolled-down position along the first pair of guides 12. The tile 32 itself prevents the blind from being unrolled along the second pair of guides 14 since it closes the access thereto.

When the drum 6 and the tile 32 are drivingly attached, the latter is locked in the position in which it surrounds the upper half of the drum 6 (Figure 10) or a situation not far removed from that position (Figure 8). In both cases, it ceases to be an obstacle to the unrolling of the blind along the second pair of guides 14. Therefore, in this case, the blind moves from a conventional rolled-down position along the first guides 12 to a reverse rolled-down position along the second guides 14.

The passage from one relative position of the drum 6 and the tile 32 to the other as mentioned above is achieved by a clutch device. Thereafter there are described two preferred embodiments of the clutch device of the invention, without it being considered that the invention is limited thereto.

In both embodiments the device comprises a ring member 38, fixedly attached to an end portion of the drum 6 and having, preferably, four axially extending bores, i.e. the centre lines of these bores 40 are generally parallel to the centre line of the drum 6. In turn, the fixing disc 34 located on the same side as the ring member 38 has also axially extending orifices 42. All the bores 40 and all the orifices 42 may be aligned simultaneously. The device comprises furthermore a free disc 44, mounted on the shaft of the drum 6 and which, of itself, is not bound to the rotation of the shaft. The free disc 44 is provided with an eye 46, which in the case illustrated in Figures 3 and 4, must be in the form of a notch, i.e. with one of the sides open to the outside. The free disc 44 is also provided with also axially oriented pins 48 which are inserted in the respective orifices 42 of the fixing disc 34, whereby the free disc 44 is caused to rotate with the fixing disc 34. The pins, as explained hereinafter, may also be inserted in the bores 40 of the ring member 38 and it may be seen in Figures 1 and 3 that the pins 48 have not been inserted in the bores 40, contrary to what is seen in Figures 2 and 4.

The clutch device is provided with an operative means having a locking pin 50 which may be inserted in the eye 46 so that, when it is inserted, it blocks the free disc 44. Bearing in mind that this free disc 44 and the fixing disc are drivingly attached together by the pins 48 and corresponding orifices 42, it is obvious that the blocking of the free disc 44 implies that of the

fixing disc 34 and consequently also implies blocking of the shell-like casing or tile 32.

This operative means is adapted to cause axial movement of the free disc between a first position (Figures 2 and 4) and a second position (Figures 1 and 3). In the first position, the pins 48 are inserted (further to in the orifices 42) also in the bores 40 of the ring member 38, while the pin 50 is not engaged in the eye 46. Contrariwise, in the second position (referred to hereinbefore), the locking pin 50 is in the eye 46 and the pins 48 are only in the orifices 42, but not in the bores 40.

In Figures 1 and 2, the operative means comprises a spring 52 and an electromagnet 54. The spring 52 urges the free disc to be spaced apart from the electromagnet 54 and, therefore, in the first position of Figure 2. In turn, when energized, the electromagnet 54 may overcome the force of the spring 52 and attract the free disc 44 towards the magnet and, therefore, to the second position illustrated in Figure 1. In turn, the locking pin 50 is inserted axially in the eye 46.

In Figures 3 and 4, the operative means is provided with a spring 56 which (unlike the spring 52) urges the free disc 44 to the second position thereof as illustrated in Figure 3, i.e., with the pins 48 removed from the bores 40. In this case, the operative means comprises furthermore a coupling wedge 58, which is provided with the locking pin 50 (which in this case is inserted by way of a transverse movement in the eye 46, which is open along one edge). The spring 56 urges the free disc 44 against the wedge 58 which has a first rabbetted surface 60 and a second advanced surface 62. The surfaces 60, 62 are preferably the result of portions of different thickness of the coupling wedge 58. When the free disc 44 is opposite the first rabbetted surface 60 (Figure 3), the free disc is in the second position. On the contrary, when it is opposite the second surface 62, the free disc 44 is in the first position.

A washer 64 or the like is preferably inserted between the free disc 44 and the wedge 58. This wedge is moved transversely alternately as indicated by the arrows 66 in Figures 3 and 4 and is provided with a sloping plane 66 facilitating the movement thereof and which is limited in both directions by the length of an elongate hole 70.

Reference has been made hereinbefore to the blocking of the casing or tile 32 and mention has also been made of Figures 10 and 11. In the latter, the casing or tile 32 is rotated relative to the position thereof shown in Figure 10. Obviously, in the latter, the slats 2 and 2a follow the vertical line, whereby in the case of the offsetting of the guides 12, 14 shown in Figure 11, it is necessary to rotate the tile 32, with a view to directing the slats 2 correctly towards the second guides 14.

For good operation of the clutch device and, par-

ticularly, so that the free disc 44 may pass from the second position (disengaged) to the first position (engaged), the pins 48 of the free disc 44 must be aligned with the bores 40 of the ring member 38 of the drum 6. This position occurs at least when the blind is fully in its normal rolled-down position and it is usual to start from this regular position to start the blind on its reverse roll-down. Where the clutch device comprises an electromagnet 54, it is de-energized by pressing an appropriate switch. Where the device comprises the coupling wedge 58, the wedge is moved in the conventional rolled-down position in the direction of the arrow 66 of Figure 4, it being possible to use conventional devices to facilitate this movement, as well as the reverse movement.

Where the clutch device comprises the electromagnet 54, in the position shown the electromagnet is de-energized, whereby the spring 52 operates to urge the free disc 44 to the first position thereof. From there, when the blind is operated, it moves to the reverse rolled-down position. Where the clutch device comprises the coupling wedge 58, in the aforementioned conventional fully rolled-down position of the blind, the wedge 58 is moved upwards (arrow 66 in Figure 4) and the desired first position is obtained.

The reference symbols inserted after the technical features mentioned in the claims are solely for facilitating an understanding of the latter and do not limit their scope in any way.

Claims

1.- A reversible blind comprising: a series of hingedly connected slats (2, 2a); a roll-up drum (6) mounted on a shaft for rotation and having slat (2, 2a) pulling means; drive means for said drum (6); a first pair of guides (12) for receiving the side edges of the slats (2, 2a), in a conventional rolled-down position thereof and a second pair of guides (14) for receiving the same edges in a reversed rolled-down position thereof; a rotatable arcuate shell-like casing (32) coaxial with at least the end portions of said drum (6); two fixing discs (34) fixedly attached peripherally to said shell-like casing (32); a clutch device adapted to associate said casing (32) to said drum (6); spring means (52) urging said device; and locking means for said casing, characterized in that said clutch device comprises: a ring member (38) fixedly attached to said drum (6), situated at one end thereof and provided with axially extending bores (40); axially extending orifices (42) formed in said fixing disc (34) and which are adapted to be aligned with said bores (40); a free disc (44), coaxial with said drum (6), provided with an eye (46) and axially extending pins (48) passing through said orifices (42) and adapted to be inserted in said bores (40); and an operative means, provided with a locking pin (50) and adapted to move said free

disc (44) axially between a first position in which said pins (48) are inserted in said bores (40) and said locking pin (50) is not engaged with said eye (46), and a second position in which said pins (48) are not in said bores (40) and said locking pin (50) is in said eye (46).

2.- The reversible blind of claim 1, characterized in that said spring means (52) urge said free disc (44) to said first position and in that said operative means is an electromagnet (54) adapted to attract said free disc (44) from said first position to said second position, overcoming the force of said spring means (52).

3.- The reversible blind of claim 1, characterized in that said eye (46) of said free disc (44) has the form of a notch; in that said spring means (54) urge said free disc (44) to said second position; and in that said operative means is a coupling wedge (58) (a) provided with a shoulder (50), a first rabbetted surface (60) and a second advanced surface (62), and (b) is capable of sliding transversely to said axial direction between a disengaged state in which said shoulder (50) is housed in said notch (46) and said first rabbetted surface (60) engages said free disc (44) causing the latter to be in said second position and an engaged position in which said shoulder (50) is outside said notch and said second advanced surface (62) engages said free disc (44), causing it to be in the said first position.

4.- The reversible blind of claim 3, characterized in that on the side thereof opposite to said drum (6) said free disc (44) is provided with a washer (64) which is engaged alternately by said first surface (60) and said second surface (62) of said engagement wedge (58).

5.- The reversible blind of either of claims 3 and 4, characterized in that said engagement wedge (58) is provided with an elongate hole (70), the length of which determines the amount of said sliding.

6.- The reversible blind of any one of claims 1 to 5, characterized in that each of the guides (14) of the second pair forms a space (20) having a vertical bottom wall (15) and opposite thereto a vertical aperture (17) flanked by two narrow flanges (22), there being located in said space (20) a cover plate (24) adapted to cover said aperture (17) and which is provided at the top end thereof with an extension (28) sloping towards said bottom wall (15), there being at least one spring (26) urging said cover plate (24) against said flanges (22), said cover plate (24) yielding towards said bottom wall (15) when the blind slats (2, 2a) are inserted in the guide (14).

7.- The reversible blind of any one of claims 1 to 6, characterized in that one guide (12) of the first pair of guides and one guide (14) of the second pair of guides form part of a single structure (16) comprising an intermediate separating land (18).

8.- The reversible blind of claim 7, characterized in that said structure (16) is made by extrusion.

9.- The reversible blind of claim 7, characterized

in that said structure (16) is made from subsequently formed cold rolled steel strip.

10.- The reversible blind of any one of claims 1 to 9, characterized in that when said free disc (44) is in said second position, said arcuate shell-like casing (32) may be mounted on said fixing discs (34) notably asymmetrically relative to the vertical plane passing through said shaft of rotation, to facilitate the access of said slats (2, 2a) in the guides (14) of said second pair of guides.

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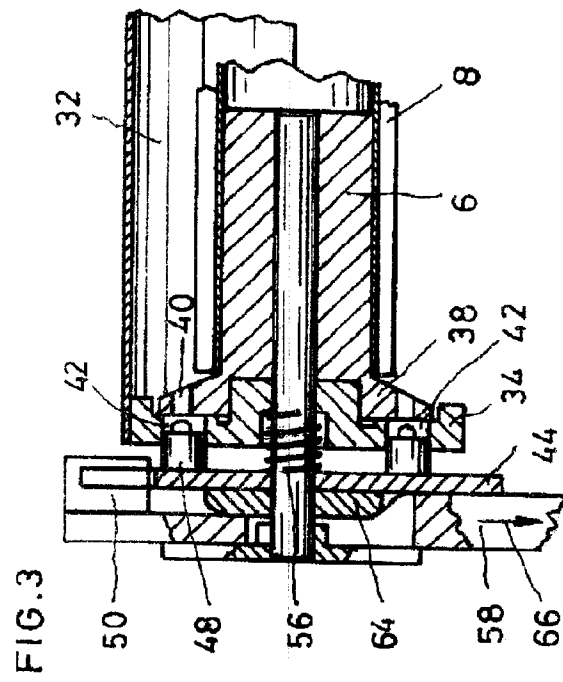
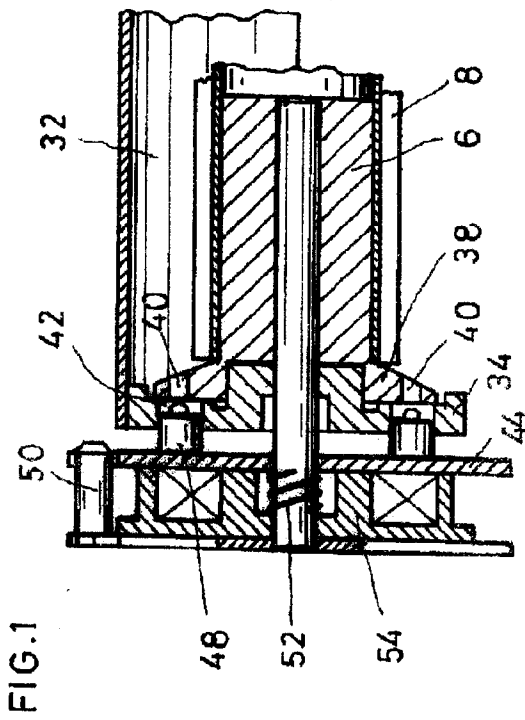
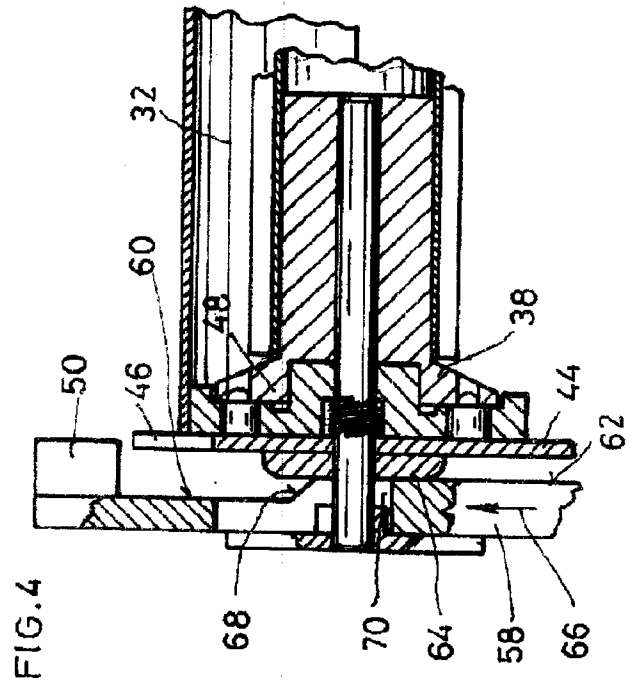
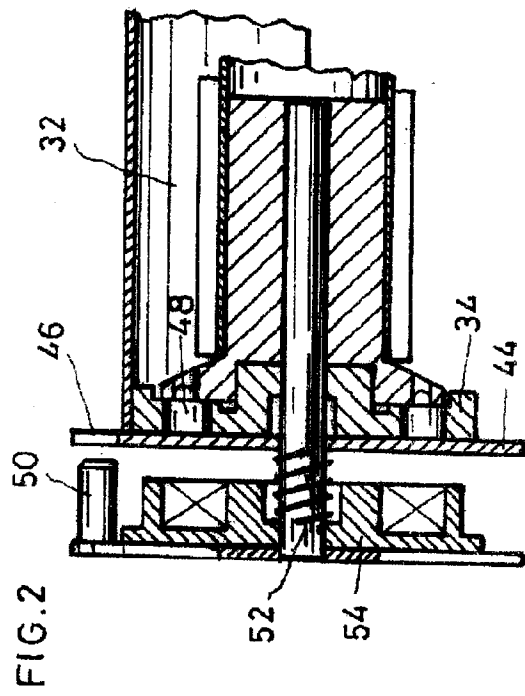


FIG. 5

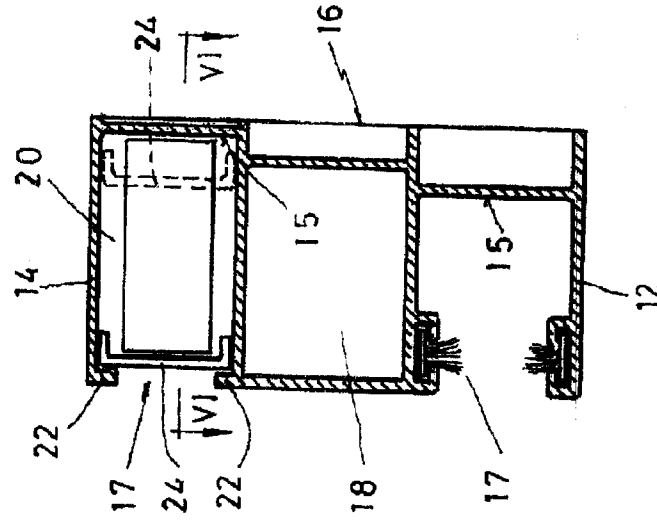


FIG. 12

