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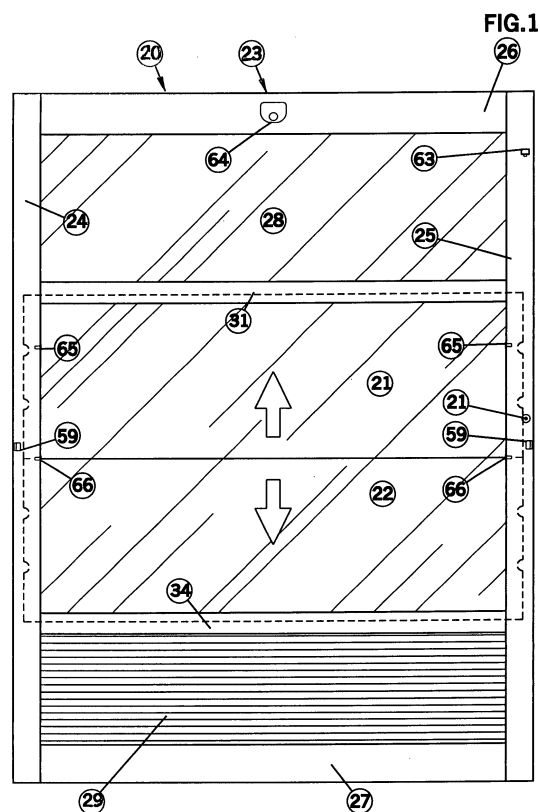
(72) Inventor: **Salamon, Eugenio**
31020 San Vendemiano (TV) (IT)

(74) Representative: **Dalla Rosa, Adriano**
European Patent Attorney
SEBRINT
Via Vettorel 3
31015 Conegliano (TV) (IT)

(71) Applicant: **Salamon, Eugenio**
31020 San Vendemiano (TV) (IT)

(54) **Show window with movable wings displaceable in height on different regulating positions and control device for the displacement thereof**

(57) Transparent show window for different uses, for example for displaying products, approaching checkout stands and the like, comprising a first and a second wing coplanar and which can be overlapped reciprocally and which are supported by a peripheral frame and reciprocally openable and closeable. Show window in which said first and second wing (21, 22) have shape and sizes identical to each other and are joined reciprocally by a toothed belt (37) as well as to side sliding blocks (35, 36), slidable vertically in the peripheral frame (23), so as to be displaced contemporaneously and with sliding directions opposite from each other, from the closed to the opened position thereof, and vice versa. Show window comprising electronic control means (67) connected to the gearmotor unit (40) operating the wings, and sensors (63 ; 64; 65, 66) and selector means (72) provided for setting the different regulations.



Description

[0001] The invention refers to a show window for different uses, for example for displaying products, approaching checkout stands of various kind, etc., made of movable kind which can be open and closed in a quick manner.

[0002] Show windows made of glass or other transparent material for the above mentioned uses are known, which are substantially constituted by a wing supported by a peripheral frame secured to either a building or a support structure and slidable vertically with a determinate stroke into the peripheral frame, by means of per se known driving mechanisms, from an upper position thereof in which it is raised so as to permit the access through the show window, to a lower position thereof in which it is lowered by preventing such access.

[0003] However, this kind of show windows has the drawback that relatively long opening and closing times are required due to the fact that the single wing provided therein has a considerable height in order to comply with the overall dimensions provided by the standards for the peripheral frame, so as it shall move along a considerable stroke for reaching either one of the raised or lowered positions thereof, with a relatively slow movement determined by the driving mechanisms now available on the market, which require to be set each time for any specific use thereof and which have revealed to be inadequate to comply with the standards currently in use, which on the contrary require shorter moving times.

[0004] Furthermore, the pre-established overall dimensions of the peripheral frame limit the wing displacement positions, with consequent possibility of stopping such wing during the raising and lowering thereof on positions in which, in addition to the fact that the view through the wing is prejudiced, such wing can be accessible with difficulty.

[0005] The present invention has the object to overcome the drawbacks and limitations of the current show windows of the kind referred to, by means of the use of a show window with movable wings displaceable in a vertical direction on different regulating positions thereof, in shorter times and with limited overall dimensions.

[0006] This show -window is made with the constructive characteristics substantially described, with particular reference to the attached claims of the present patent.

[0007] The invention will be understood better from the following description, given solely by way of not limitative example and with reference to the accompanying drawings wherein :

- Fig. 1 shows a schematic front view of a show window according to the invention, whose wings are displaced on an operative position thereof;
- Fig. 2 shows a schematic front view of the show window of Fig. 1, whose wings are displaced on another operative position thereof;

- Fig. 3 shows a schematic front view of the show window of Fig. 1, whose wings are displaced on another operative position thereof, which is intermediate between those of both the Figs. 1 and 2 ;
- Fig. 4, 5 and 6 show a schematic side view of the present show window, displaced respectively on the operative positions of Figs. 1, 2 and 3 ;
- Fig. 7 shows a schematic plan view of the show window according to the invention ;
- Fig. 8 shows a schematic bottom view of the show window according to the invention ;
- Fig. 9 shows a front view of a constructive item of the present show window ;
- Fig. 10 shows a side view of the same constructive item of Fig. 9 ;
- Fig. 11 shows a plan view of the same constructive item of Fig. 9 ;
- Fig. 12 shows a side view of another constructive item of the present show window ;
- Fig. 13 shows a front view of the same constructive item of Fig. 12 ;
- Fig. 14 shows a plan view of another constructive item of the present show window ;
- Fig. 15 shows a plan view of another constructive item of the present show window ;
- Fig. 16, 17 and 18 show the show window with the wings displaced on three respective operative positions thereof, and the associated sensor for stroke regulation and for safety operation;
- Fig. 19 shows the electric circuit block diagram of the show window wing control device according to the invention.

[0008] The above mentioned Figures illustrate schematically a show window 20 made of transparent material such as glass, plastic material etc., which is employed for different uses such as for example for displaying products, approaching checkout stands of various kind etc., comprising substantially at least two wings 21 and 22 having shape and sizes identical to each other, which are arranged coplanar and can be overlapped reciprocally as well as are housed slidably on a peripheral frame 23 having parallelepiped shape, secured in position either on a building or an autonomous support structure, and formed by section bars joined together constituting a pair of vertical columns 24 and 25 arranged parallel and spaced away from each other, an upper crosspiece 26 and a lower crosspiece 27 parallel to and spaced away from the crosspiece 26, wherein the show window upper part is covered by a front panel 28 made of glass, plastic material or other transparent material, or it is made dull, and the show window lower part is covered by a dulled front panel 29.

[0009] As visible from Figs. 1-6, the two wings 21 and 22 are slidable with their front and back surfaces between guiding section bars disposed on the show window upper and lower part, the first of which are formed by a back crosspiece 30 and a front crosspiece 31,

which are coinciding and slightly spaced away from each other, in which some bristle brushes (not shown) are housed, between them the wing 21 is slidable, and the second of which are formed by a back crosspiece 33 and a front cross-piece 34, which are coinciding and slightly spaced away from each other, in which some bristle brushes 32 (see Figs. 10 and 11) are housed, between them the wing 22 is slidable.

[0010] Each one of the wings 21 and 22 is supported laterally by respective pairs of extended sliding blocks 35 and 36, identical to each other and fixed to the same wings as it will be described, which are slidable vertically into guiding grooves (not shown) provided internally the corresponding crosspieces 24 and 25 (Figs. 4-6 show the crosspiece 24 only), and the sliding of the sliding blocks together with the associated wings occurs in such a way that both wings are moved contemporaneously and with sliding directions opposite from each other on different operative positions thereof, from a show window lowered closing position (see Figs. 1 and 4) in which the access through the show window is prevented, to a show window raised full opened position (see Figs. 2 and 5), by passing through intermediate partially opened positions (see the position of Figs. 3 and 6), in which the access through the show window is permitted.

[0011] In order to cause the wings to slide on the different operative positions thereof, a control device is provided comprising substantially movement transmission members made of and secured to the wings as it will be described, and formed preferably by a pair of vertically slidable toothed belts 37 housed in the vertical crosspieces 24 and 25 and wound around corresponding toothed pulleys 38 and 39, housed in the upper part of such crosspieces and driven in rotation by a gearmotor unit 40 through corresponding rotation axes 41 and 42, which are housed in the upper crosspiece 26, together with said gearmotor unit, wherein such gearmotor unit is controlled by a control circuit included on an electronic card 43, and represented on Fig. 19. Each one of the toothed belts 37 is fixed at an end portion thereof with the wing 21 and at the other end portion thereof with the other wing 22 and is made with such a length as to permit the same wings to be displaced on the maximum opened position thereof

[0012] The Figs. 9, 10 and 11 show the fixing of one of the end portions of each toothed belt 37 with the associated wing and the joining of this latter with the corresponding sliding block, wherein it is noted that in the first case such fixing is effected (see Figs. 10 and 11) by means of a pair of locking plates 44 and 45 which are arranged against the wing back and front surfaces and by means of at least a locking bracket 46, so bent as to enclose a toothed block 46' which is restrained with the end portion of the belt 37 against one of such plates, in the present example the plate 45, through at least a transverse bolt 47 or the like, which is screwed on a corresponding through hole 48 of the associated plate 45, as well as by employing some additional transverse

bolts 49 inserted through corresponding through holes 50 of the plates and the wing, so as these elements are all locked tightly together.

[0013] In the second case, such joining is effected (see Fig. 9) by shaping the rectilinear edges of both the sliding block and the wing, abutting to each other, with a set of respective circular projections and recesses 51 and 52 (or with other suitable shape) which are coinciding to each other, in such a way that each projection can be joined with a fixed joint with the corresponding recess, and the same can be kept on this restrained condition with the aid of the locking plates 44 and 45 (and the associated bolts 49), which are tightened thereon too in the manner described previously.

[0014] Thus, it appears evident that, thanks to the fact to use the two movable wings identical to each other, which are displaced contemporaneously on the different operative positions thereof with strokes of the same length, corresponding to the half-stroke of the wing of the present show windows, on one hand it is practically halved the time required for the displacement of such wings on the closed position and maximum opened position thereof, and on the other hand the sizes in height of the structural frame housing the lower wing 22 can be reduced, with consequent reduction of the entire show window overall dimensions so as to comply with the current standard and market requirements.

[0015] Turning now to the Figs. 12 and 13, shown therein is an element 53 for regulating the tension of each toothed belt 37, constituted by a tightener 54 fixed at one end portion thereof with the toothed block 46' and the relative belt end portion, and supported at the other threaded end portion 55 thereof by a bent bracket 56 secured to one of the transverse bolts 49, said tightener being provided with regulating nuts 57 and 58 which can be screwed on and off with respect to its threaded end portion 55, so as to position and balance correctly the two wings for the regular sliding thereof.

[0016] Turning now to the Figs. 14 and 15, there are shown the safety systems for the present show window provided respectively for preventing any accidental fall, originated for any reason, of the upper wing 21 when it is displaced on its raised position, and the undesired accidental opening of the wings displaced on their fully closed position.

[0017] Then, in the first case such safety system is constituted (see Fig. 14) by at least a striker plate 59 fixed in the two columns, on a position slightly spaced away above the reciprocal abutment zone of the wings 21 and 22, at such a height as to prevent that, in the case of its accidental fall, the upper wing 21 may come to beat violently against the lower wing 22.

[0018] In the second case, such safety system is constituted (see Fig. 15) by a rectilinear slider or pin 60 operated by an electromagnet 61 electrically and operatively connected with the show window control circuit, and housed in one of the columns, in the example the column 25, as well as operated on the extracted position

thereof so as to enter a corresponding hole 62 provided on at least one of the sliding blocks, when such sliding block is displaced together with the associated wing on the fully closed position thereof, thereby preventing the sliding of both wings, and on the retracted position thereof so as to disengage such hole thereby permitting the wing to be displaced on the opened position thereof.

[0019] Turning now to the Figs. 16, 17 and 18, in which a show window according to the invention is shown, whose wings 21 and 22 are respectively displaced on the closed position, fully opened position and partially opened position thereof (as visible also in the previously described Figs. 4, 5 and 6), it is noted that the upper wing 21 is associated with at least a sensor or limit microswitch 63 of per se known type, arranged on the upper part of one of the vertical columns, near the corresponding toothed pulley, and electrically and operatively connected with both the control circuit of the electronic card 43 and a change-over switch or similar selector switch (not shown), for selecting the different desired show window operation modes, which in the present example is set with five different selection positions, the first of which is provided to determine the fully automatic closing of both wings, the second of which is provided to determine the complete closing and opening of both wings with a manual control (of the push-button type), and the third of which is provided to determine the partial closing and opening of both wings with a manual control (of the push-button type), wherein the excursion of such partial closing and opening movement is adjusted in advance by changing the setting time for operating both the gearmotor unit and the toothed belts of the control device. Moreover, the fourth selecting position of the change-over switch is provided to determine the complete closing or opening of the wings in presence of persons in front of the show window, which are detected by a suitable electronic sensor such as for example an infrared sensor 64 or the like of per se known type, arranged on the front and upper part of the panel 28 and electrically and operatively connected with the control circuit of the electronic card 43, while the fifth position of such change-over switch is provided to determine the partial closing and opening of said wings in presence of persons detected by means of said sensor 64.

[0020] Besides, on the Figures referred to it is noted that the wings 21 and 22 are associated also with additional electronic sensors 65 and 66 of per se known type (for example, constituted by photoelectric cells or photodiodes) electrically and operatively connected with the show window control circuit and applied at different heights in at least one of the columns as well as turned in such a way as to detect the presence of the arms and hands of the persons being passing through the wings, when these latter are displaced on the opened position thereof, and so set as to disconnect in this case the electric supply of the gearmotor unit 40, thereby stopping the wings movement for providing a safety against the danger to squash the arms and hands of the persons by

the same wings.

[0021] Of course, it is also possible to obtain the described safety in a different way, provided that the operation thereof is performed always with the same specified criteria, thus without departing from the protection sphere of the present invention.

[0022] Finally, the show window control circuit is now described, with particular reference to Fig. 19, in which the block diagram of the same circuit is shown.

[0023] Such circuit is substantially composed of a microprocessor electronic control card 67, set to receive coded informations of the movement functions to be performed by the wings, which can be selected through the change-over switch referred to, as well as to receive also the coded informations detected by the different show window sensors, as well as to generate corresponding response coded informations adapted to control the different electric and electronic components of the show window, so as to perform the respectively selected functions through the gearmotor unit 40. Such control card 67 is supplied by an electric d.c. low voltage deriving from the electric a.c. voltage (block 68) through a power supply 69, or also an emergency circuit 70 through a buffer battery 71 in case of lack of electrical supply.

[0024] Moreover, the control card 67 is connected to a block 72 associated with the change-over switch, in which the functions to be performed by the show window are selected, with the manners previously described, to a person detecting block 73 (associated with the sensor 64), to a safety block 74 (associated with the safety sensors 65 and 66), to a manual operated push-button 75 to control directly the wings opened or fully closed condition, to blocks 76 and 77 associated with the gearmotor unit 40 to drive the same in either one of its rotation directions, for pre-established times which may be changed by changing the data stored in the control card 67, in order to change the regulation of wings opening, to a block 78 associated with a feedback encoder and connected with the blocks 76 and 77, so as to supply the control card 67 with the instantaneous coded informations of driving the gearmotor unit 40, for permitting this latter to be driven under the control of the card 67 up to the requested final position thereof, to a block 79 associated with the limit switch sensor 63 for detecting the arrival of the upper wing on the upper position of end of stroke, by setting the control card 67 for returning the wings on the lowered position thereof, to a control circuit 80 which is activated by the safety sensors 65 and 66 for preventing any squashing of the arms and hands of the persons, and to a block 81 associated with the electromagnet 61 and connected with the block 79 through a wings movement control circuit 82, in order to stop the wings on the closed position thereof and return them back on the opened position thereof, by releasing the electromagnet 61.

Claims

1. Transparent show window for different uses, for example for displaying products, approaching check-out stands and the like, comprising at least a first and a second wing coplanar and which can be overlapped to each other, said wings being supported by a peripheral frame secured either on a building or an autonomous support structure and being reciprocally openable and closeable, as well as comprising transmission means driven by powered means and housed in said peripheral frame, **characterized in that** said first and second wing (21, 22) have shape and sizes identical to each other and are connected reciprocally by said transmission means (37), and joined to sliding means (35, 36) slidable vertically into said peripheral frame (23) in such a way as to be displaced contemporaneously and with sliding directions opposite from each other, from the closed to the opened position thereof, and vice versa ; and **characterized by** electronic control means (67) connected to said powered means (40), to limit-switch sensor means (63), to safety sensor means (65, 66), and to persons detecting means (64), respectively adapted to permit the displacement of said first wing (21) from said opened position to said closed position thereof, to stop the sliding of said first and second wing (21, 22) in presence of persons, and to open or close said first and second wing (21, 22) in presence of persons ; and finally **characterized by** selector means (72) connected to said electronic control means (67) and which can be set on different regulating positions to determine the displacement of said first and second wing (21, 22) from the closed to the opened position thereof, and vice versa, with the aid of said sensor means (63; 65, 66 ; 64).
2. Show window according to claim 1, **characterized in that** said transmission means comprise preferably a pair of toothed belts (37) or the like, slidable vertically and laterally into said peripheral frame (23), whose end portions are joined with the associated wing and said sliding means (35, 36) by a corresponding toothed block (46') and a pair of locking plates (44, 45), applied against the back and front surfaces of the same wing, and by at least a locking bracket (46), by employing fixing means (transverse bolts 47, 49) inserted through said plates (44, 45) and the associated wing.
3. Show window according to claim 2, **characterized in that** said sliding means comprise a pair of extended sliding blocks (35, 36), fixed laterally to each wing by restrained joints (projections 51 and recesses 52), through said locking plates (44, 45) and said fixing means (49), and slidable vertically in corresponding guide members of said peripheral frame
- (23).
4. Show window according to claim 3, **characterized by** regulating means (tightener 54) for the tension of said transmission means (37), which are secured to said transmission means (37) and adapted to vary within pre-established limits the tension thereof.
5. Show window according to claim 3, **characterized in that** said electronic control means comprise at least a microprocessor electronic control card (67), set to receive coded informations of the movement functions to be performed by said first and second wing (21, 22), and selected through said selector means (72), and to receive also the coded informations detected by said sensor means (63 ; 65, 66 ; 64) as well as to generate corresponding response coded informations to control the carrying out of the selected functions, through said powered means (40).
6. Show window according to claim 5, **characterized in that** said limit-switch sensor means comprises at least a sensor or limit-microswitch (63), housed into said peripheral frame (23) and associated with said first wing (21) as well as positioned on the upper part thereof.
7. Show window according to claim 5, **characterized in that** said safety sensor means are constituted by per se known electronic sensors (photoelectric cells or photodiodes 65, 66) applied at different heights laterally to said peripheral frame (23), in the sliding path of said first and second wing (21, 22).
8. Show window according to claim 5, **characterized in that** said persons detecting means are constituted by at least a per se known electronic sensor such for example an infrared sensor (64) arranged on the show window upper and front part.
9. Show window according to the previous claims, **characterized** moreover by first protection means (59) against the accidental fall of said first wing (21) and second protection means (60, 61) against the accidental opening of said first and second wing (21, 22) displaced on the closed position thereof, said protection means (59 ; 60, 61) being housed into said peripheral frame (23).
10. Show window according to claim 9, **characterized in that** said first protection means comprise at least a striker plate (59) applied on a position slightly spaced away above the reciprocal abutment zone of said first and second wing (21, 22), at such a height as to prevent that, in the case of its accidental fall, said first wing (21) may come to beat violently

against said second wing (22).

11. Show window according to claim 9, **characterized in that** said second protection means comprise a slider or pin (60) co-operating with said first wing (21) and operated by an electromagnet (61) or the like, from an extracted rest position thereof, on the lowered closing position of said first wing (21), in which it engages the same wing, to a retracted working position thereof in which it is disengaged from said first wing (21), so as to permit the displacement of the same.

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FIG.1

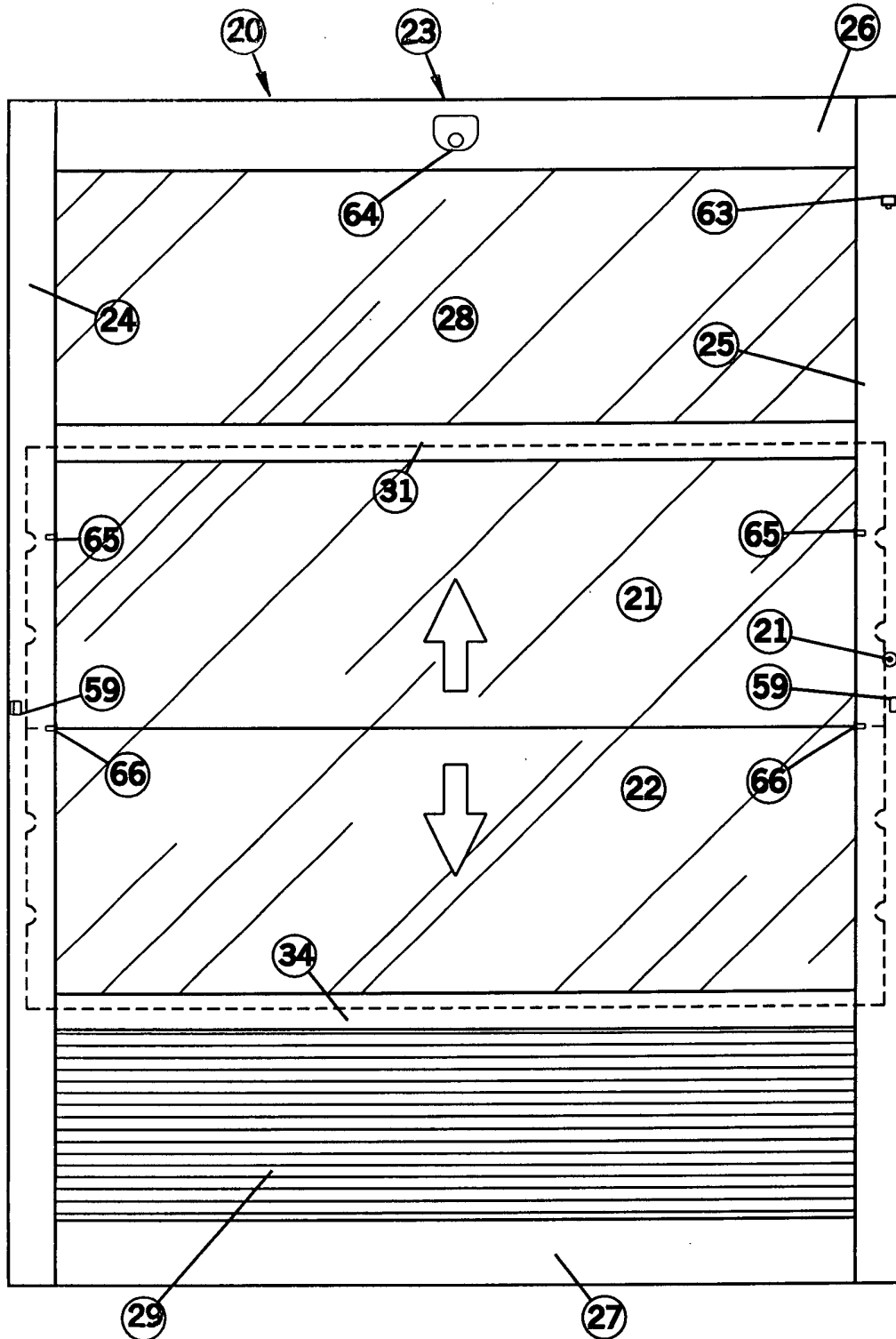


FIG.2

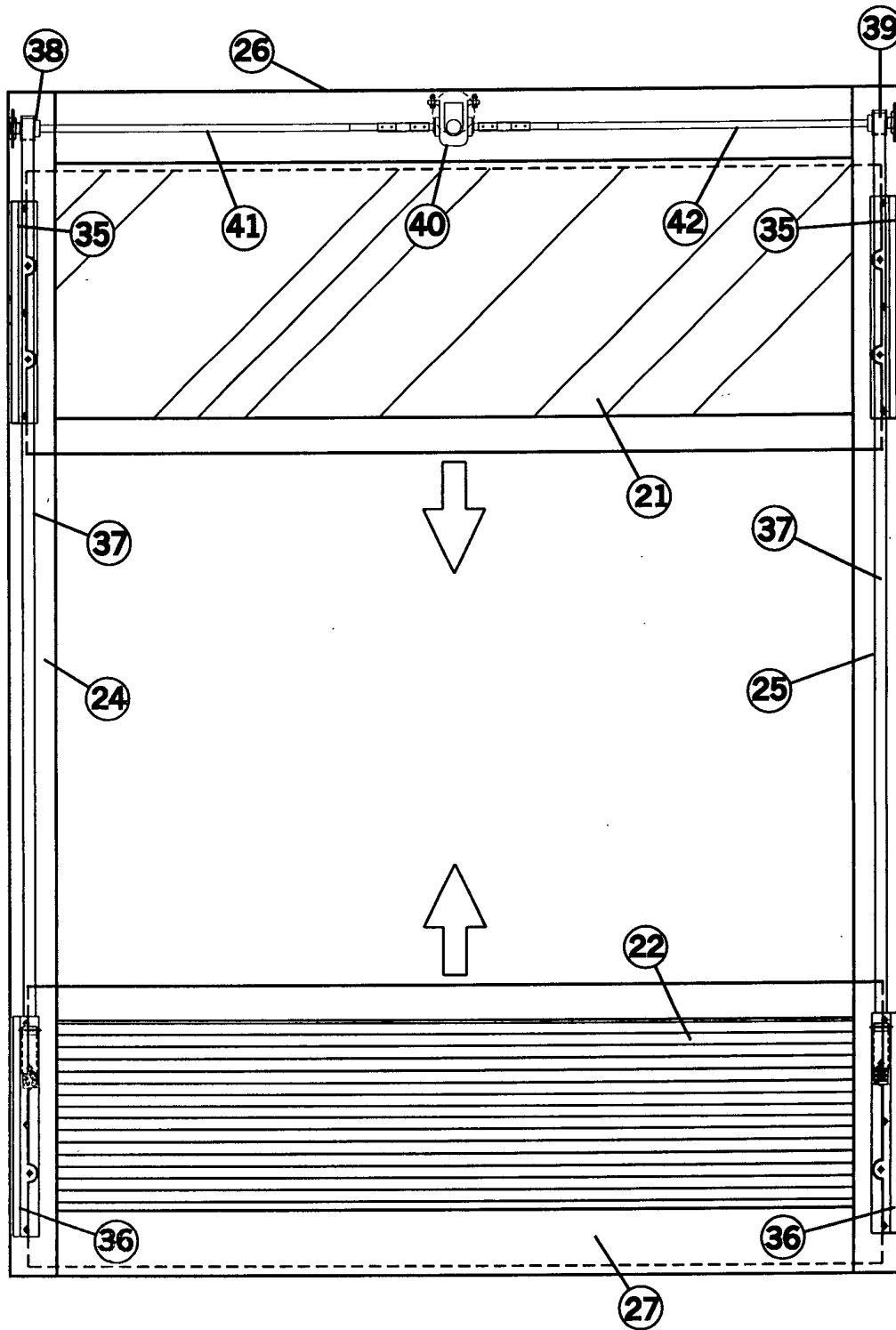


FIG.3

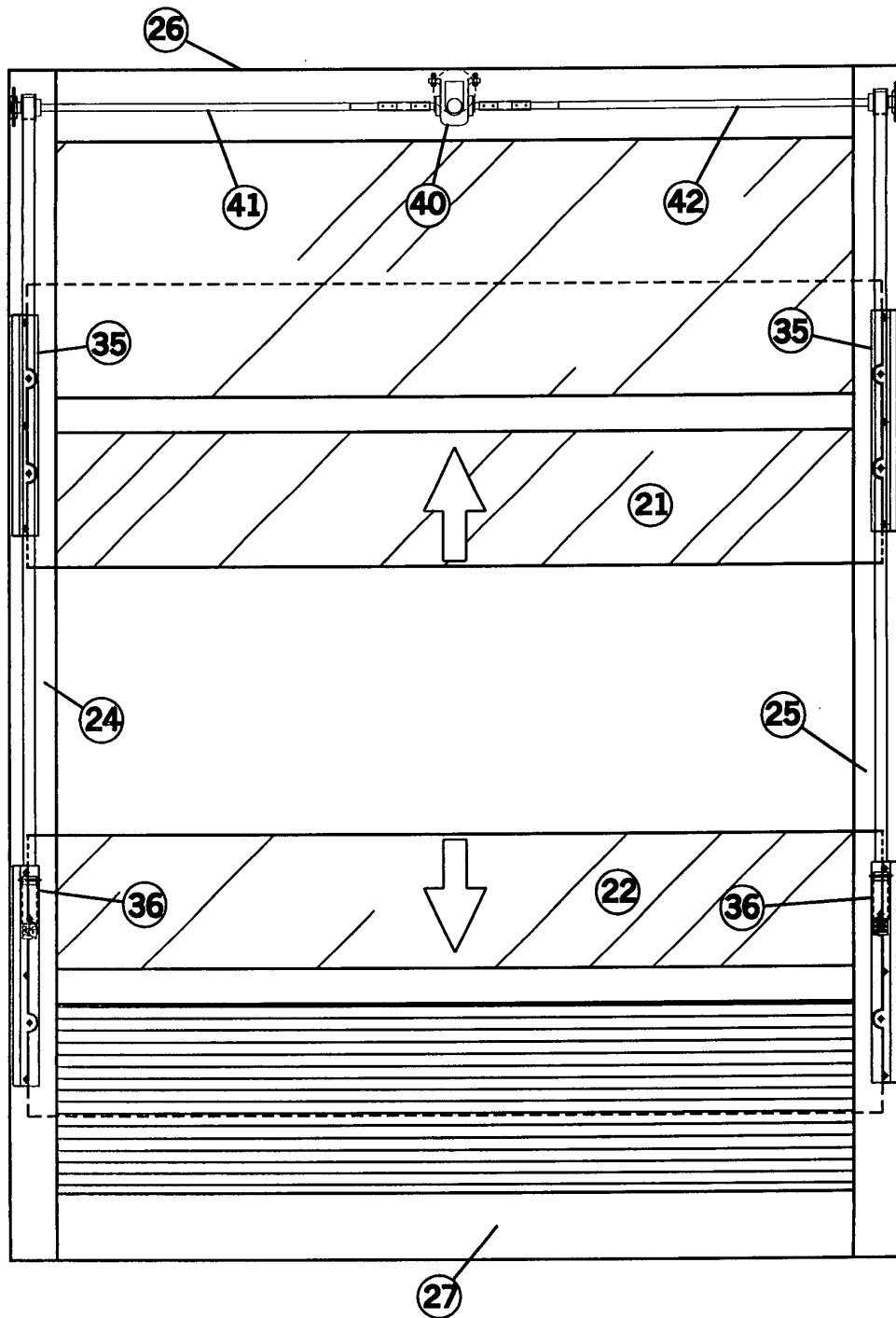


FIG.4

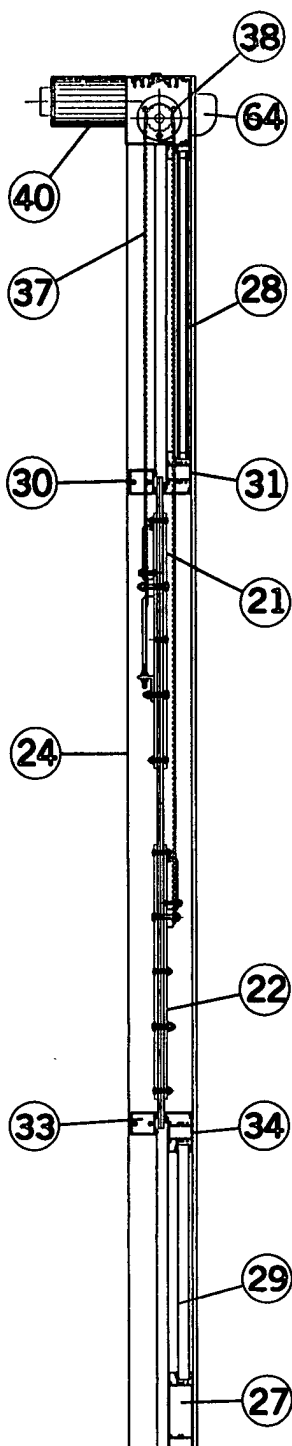


FIG.6

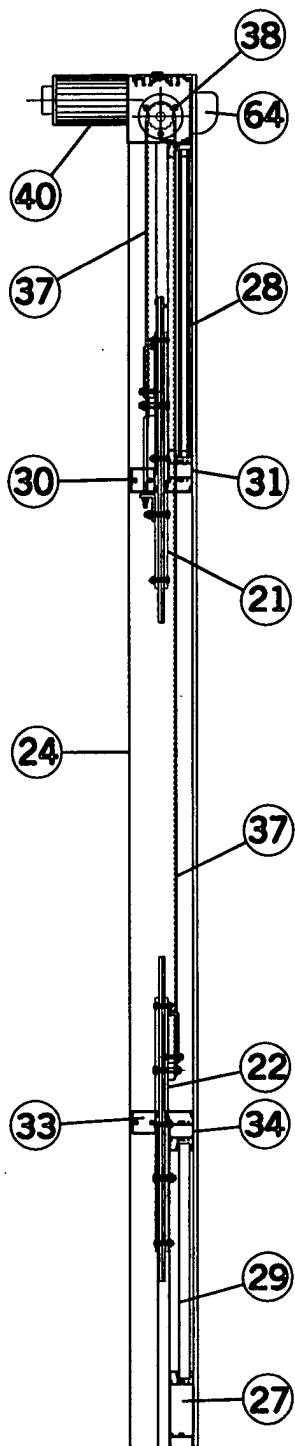


FIG.5

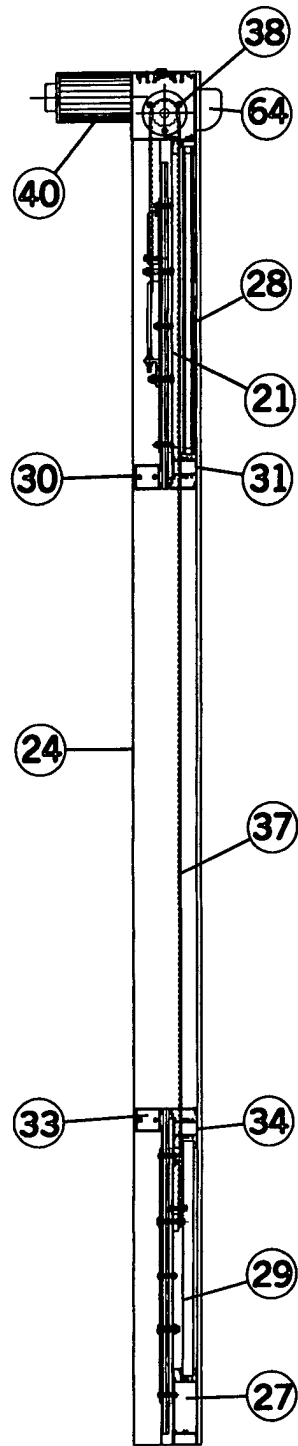


FIG.7

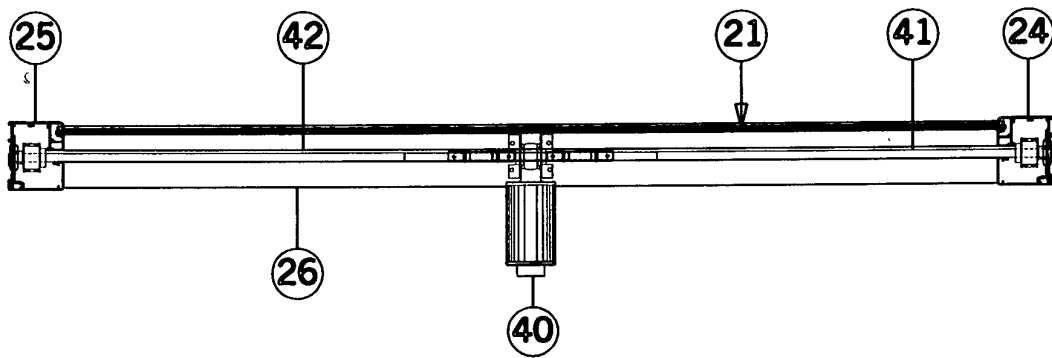
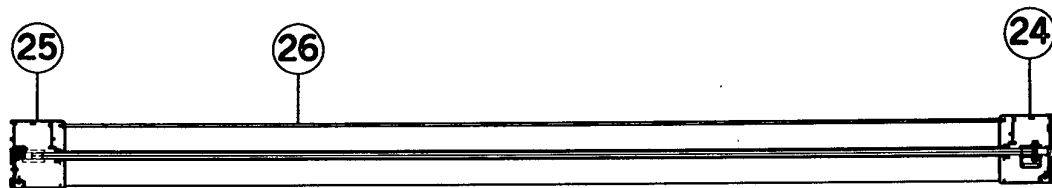


FIG.8



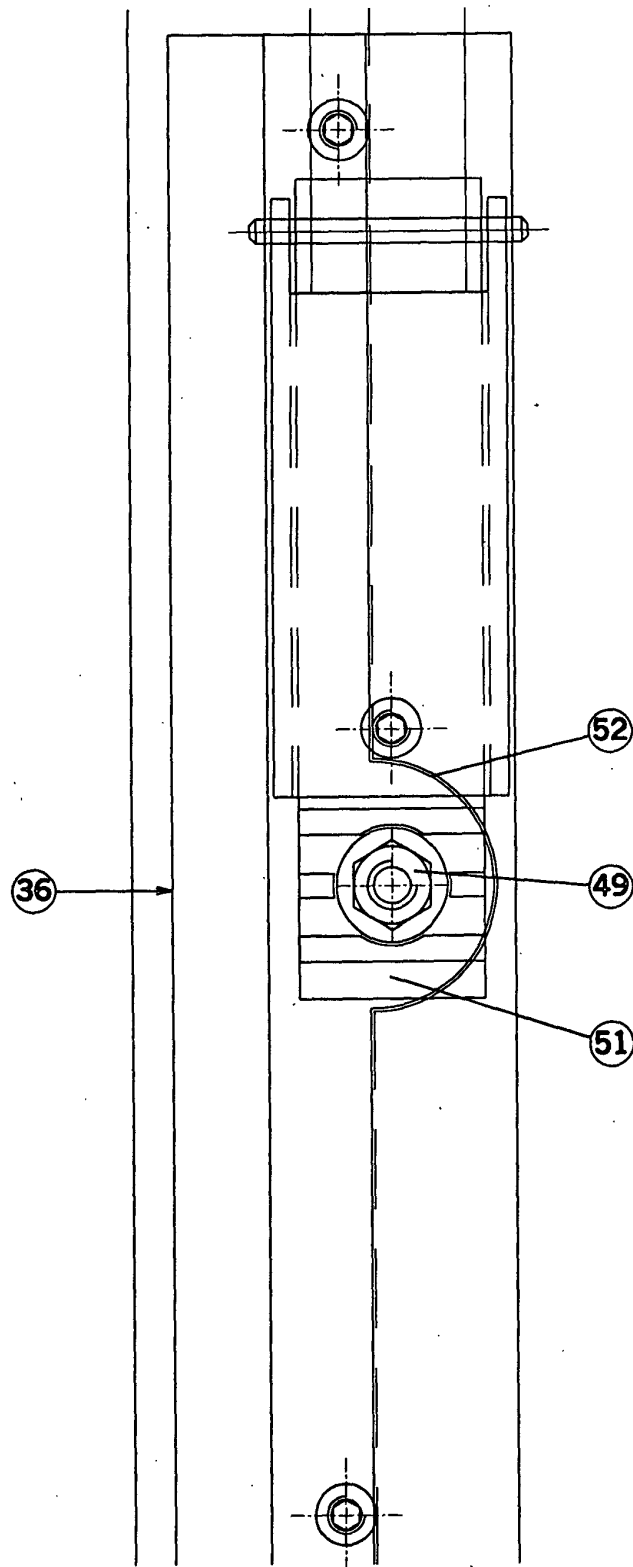


FIG. 9

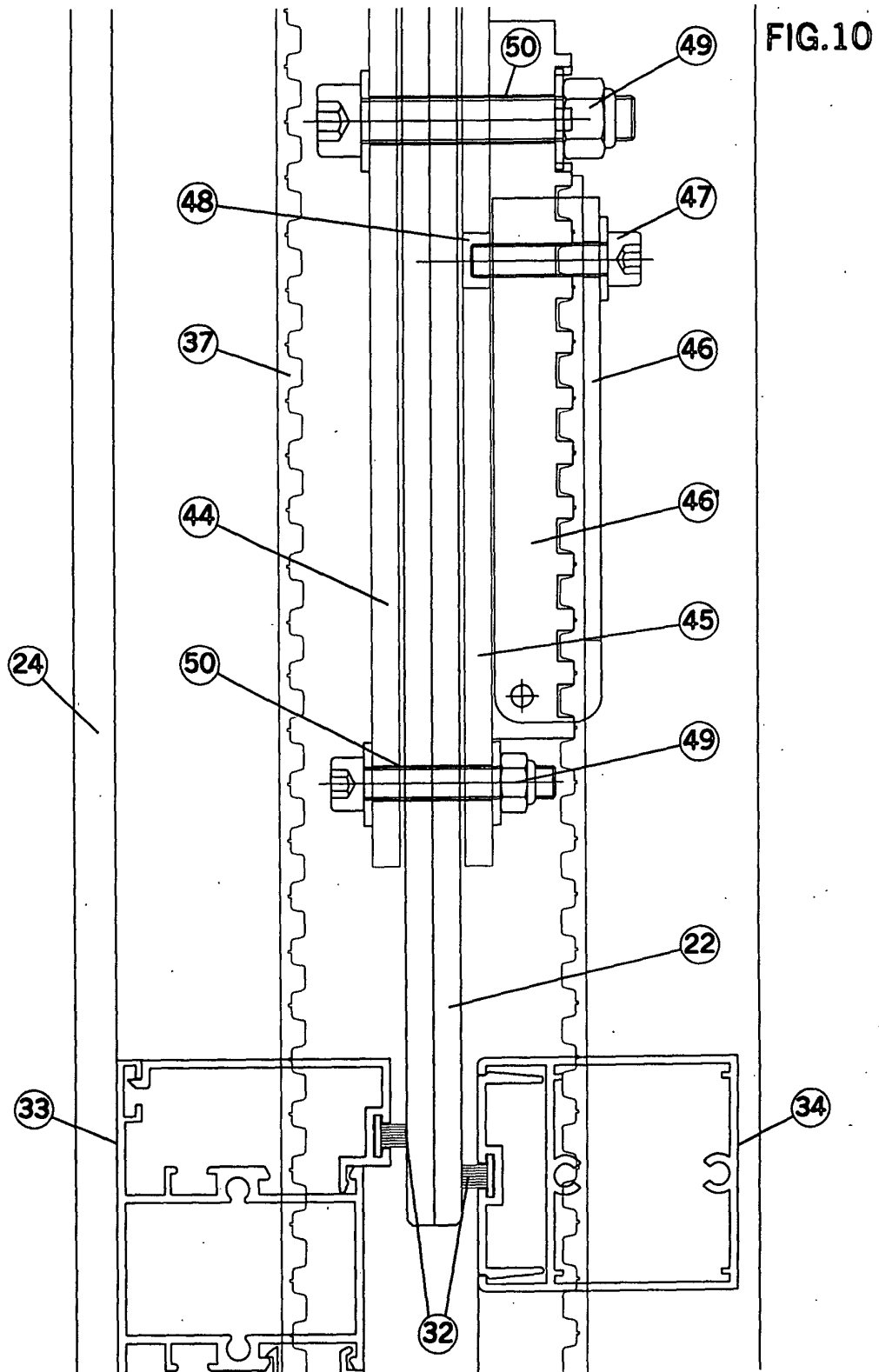


FIG.11

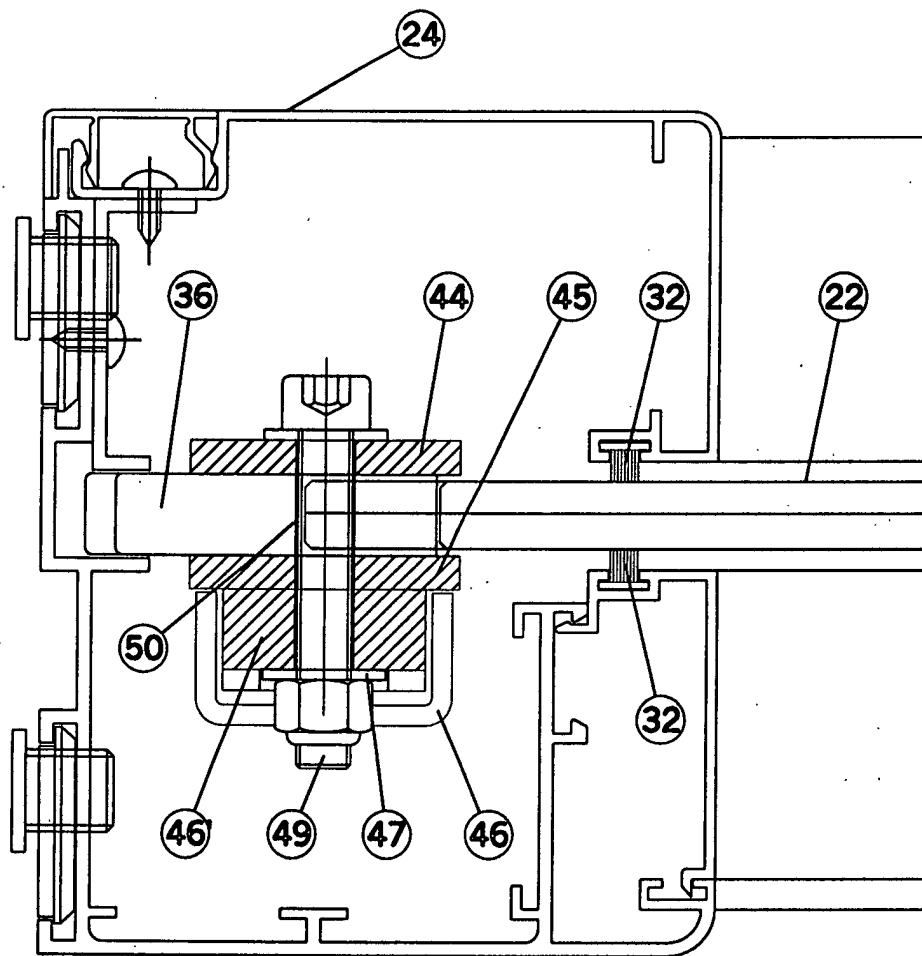


FIG.12

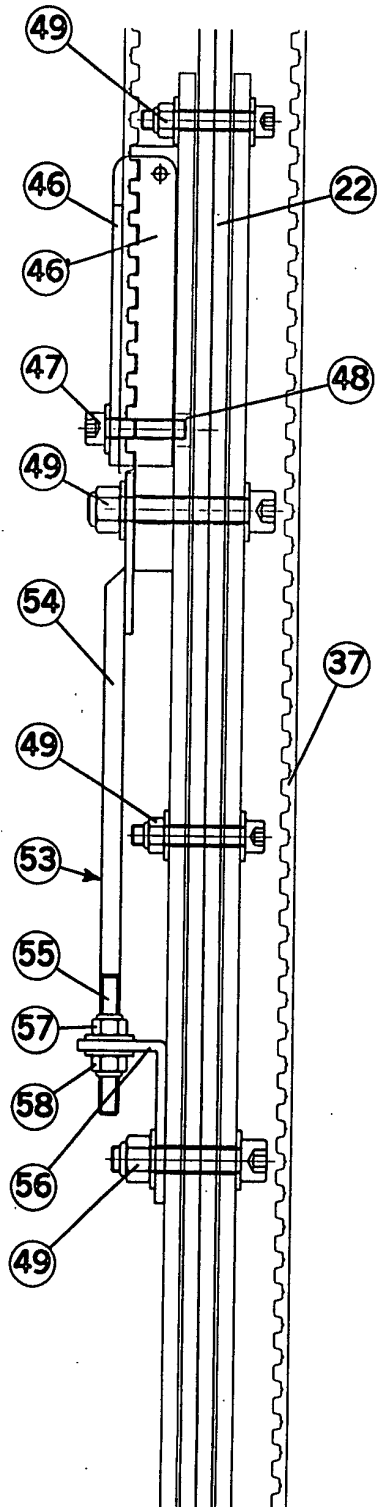


FIG.13

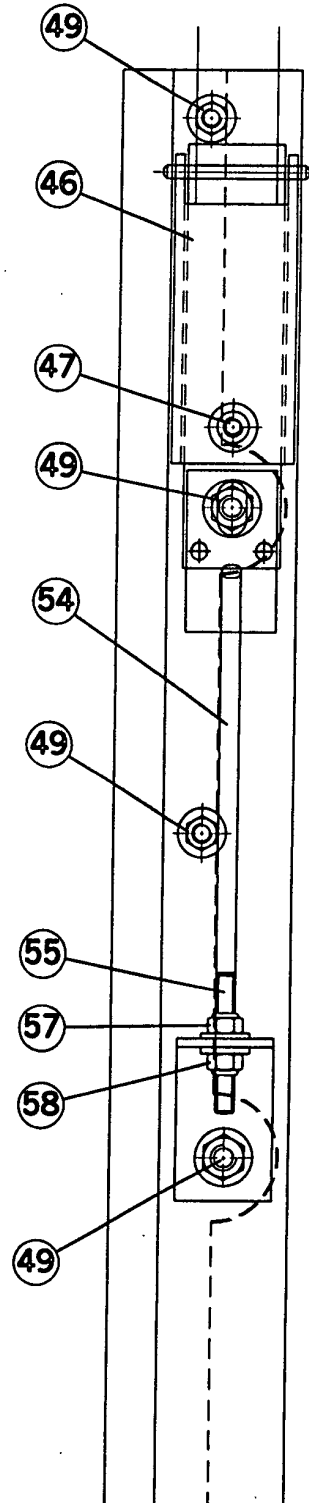


FIG.14

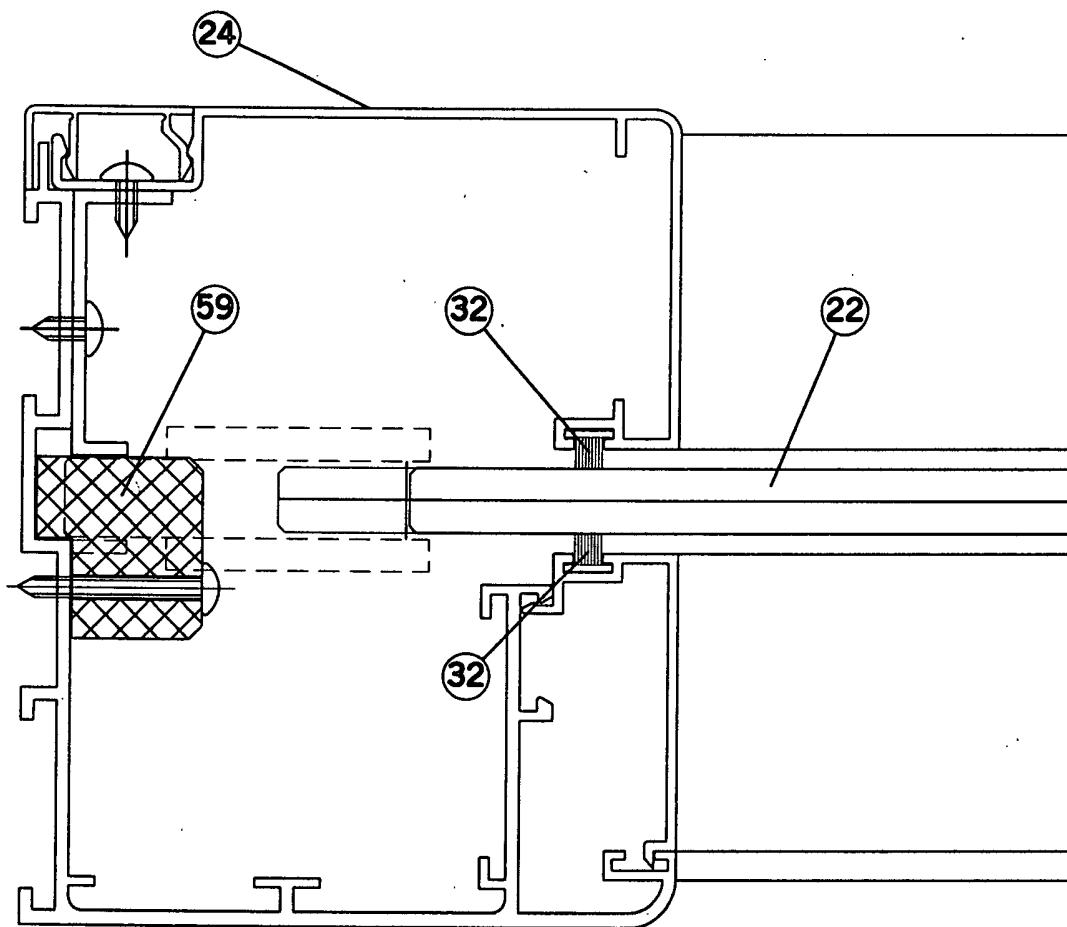


FIG.15

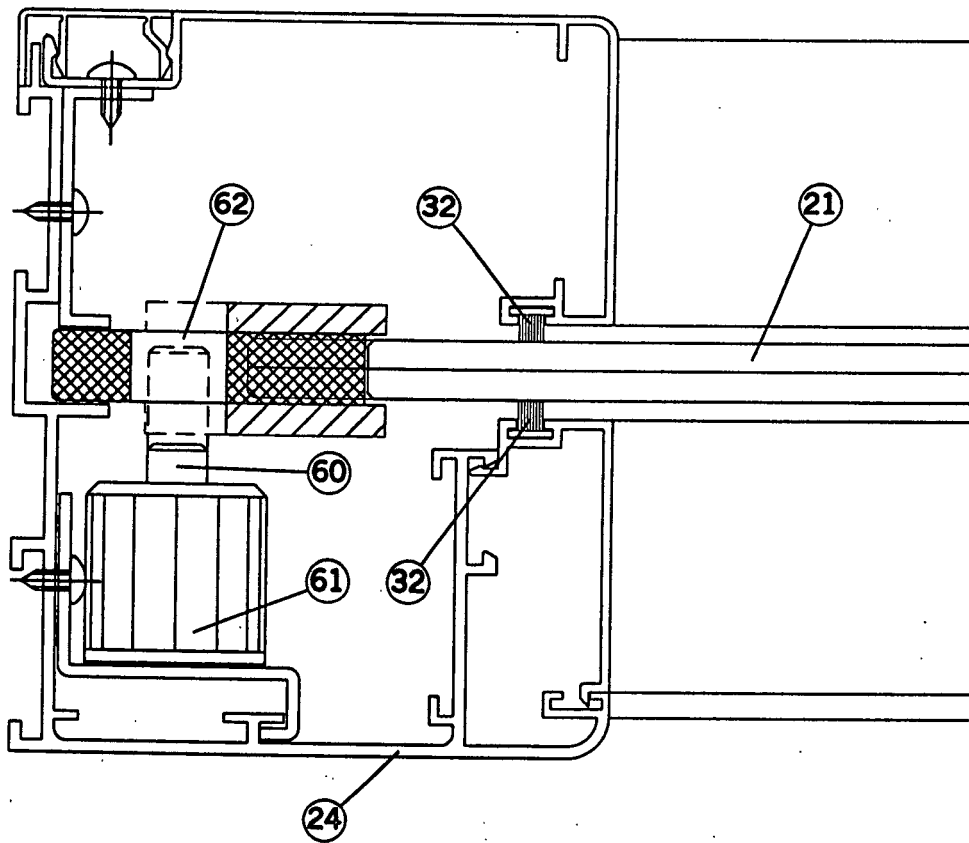


FIG.16

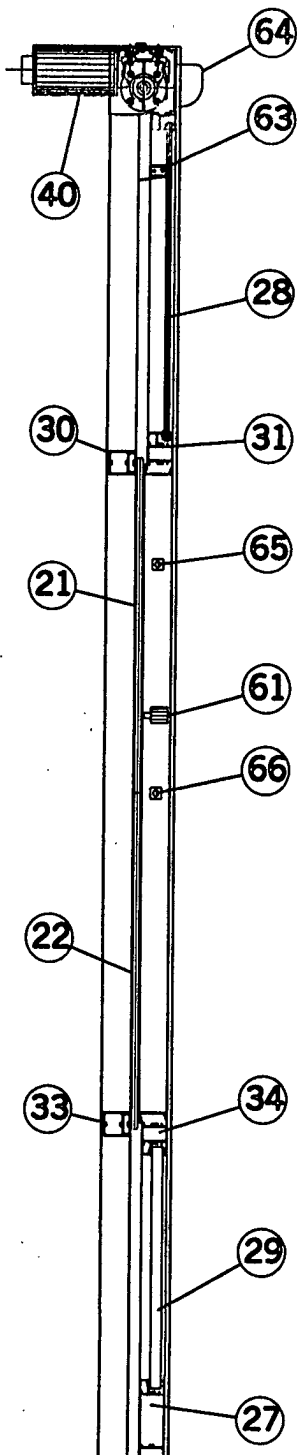


FIG.18

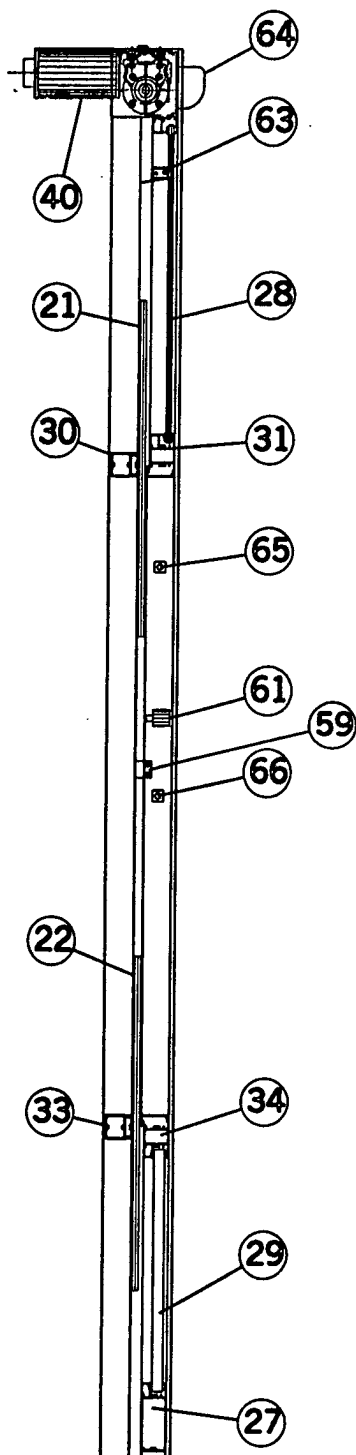


FIG.17

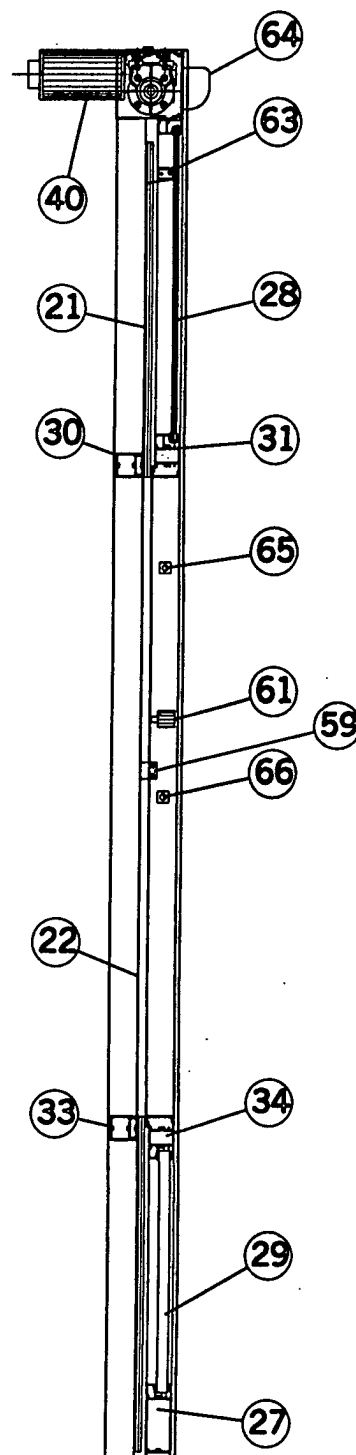
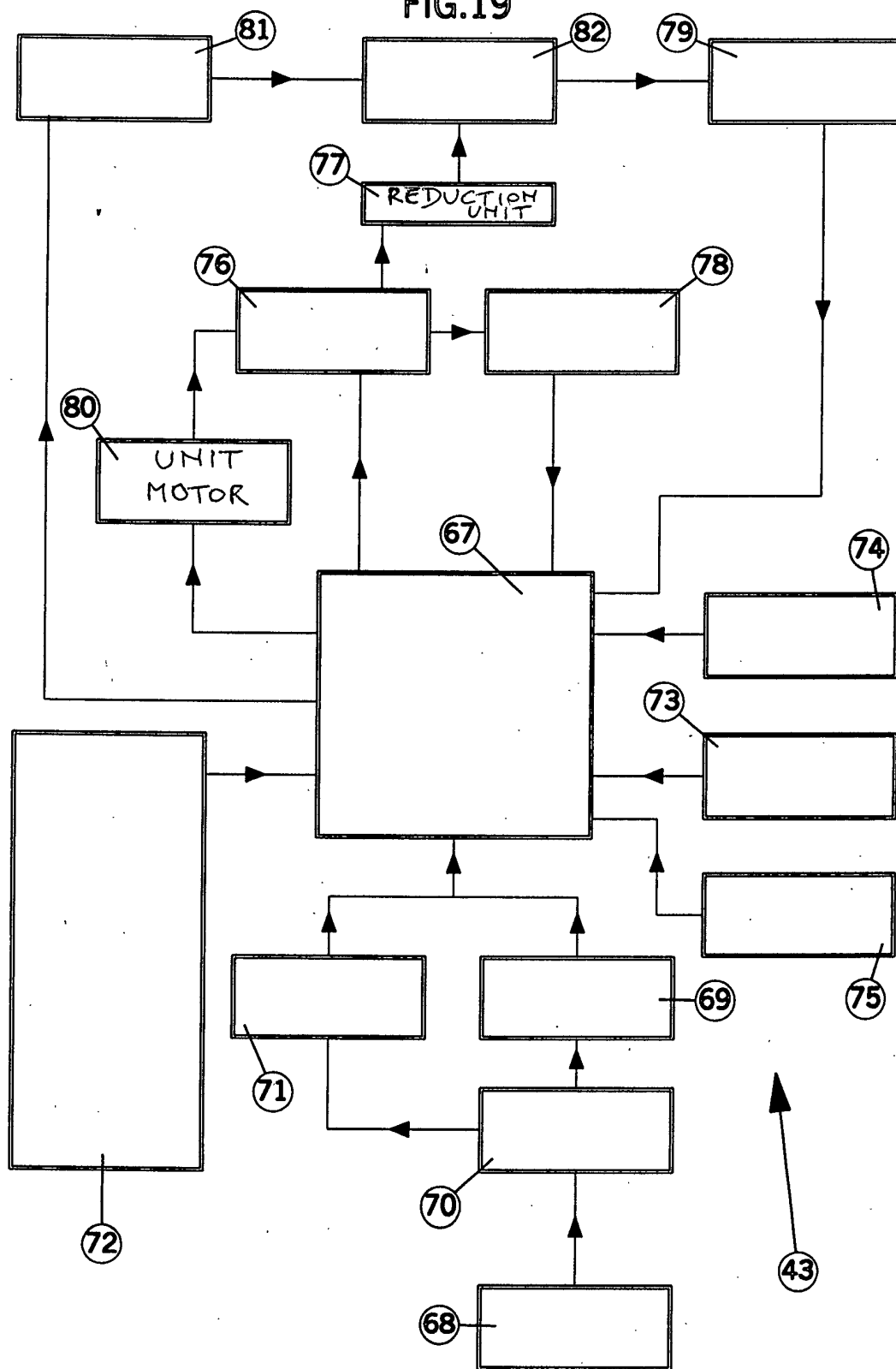


FIG.19





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 10 2659

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.7)
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A	* page 2, last paragraph - page 5; figures *	9,10	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E05F E05G E06B
Place of search	Date of completion of the search	Examiner	
THE HAGUE	25 July 2001	Vijverman, W	
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25-07-2001

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US 5237777	A	24-08-1993	NONE	
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