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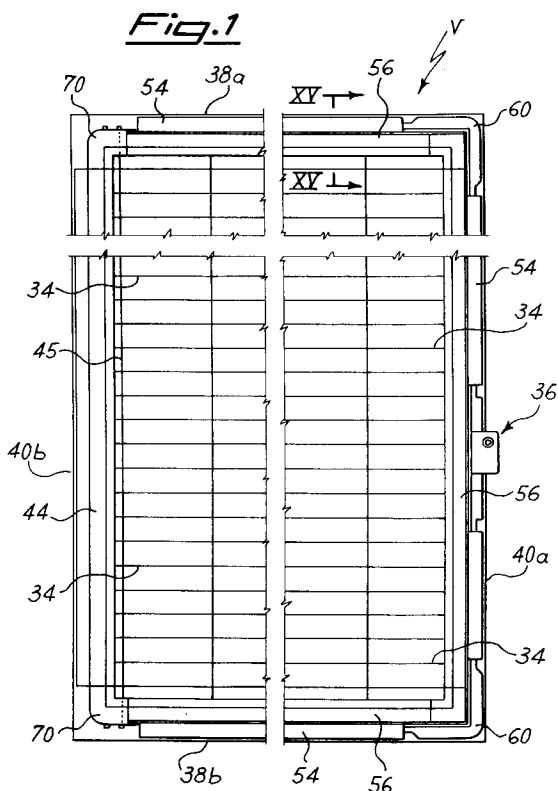
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I-31100 Treviso (IT)(54) **Double-glazed windows with venetian blinds.**

(57) In a double glazed (v) window containing the Venetian blind with horizontal slats (34) which can be oriented between a horizontal position allowing unimpeded vision and a near-vertical screening position, rotation of the slats (34) between the two said positions is controlled and obtained by means of a control mechanism (36) which can be manually and mechanically operated from the outside and which causes operation of two transmissions arranged symmetrically at the two ends of the control mechanism, said transmissions (58) comprising shafts and connecting elements situated inside a profiled member arranged in the width of the window frame and having horizontal shafts to which spools are rigidly fixed, said spools being arranged at the two ends, i.e. the upper and lower ends respectively, of pairs of cables (45) connected by ladder elements on which the slats rest. In each pair of cables (45), operation of the corresponding spools causes vertical translation of a first cable in one direction and vertical translation of the other cable in the opposite direction.



The present invention relates to cavity windows containing screening means of the type called "Venetian" and more specifically to a device for operating said screening means. In the description which follows below, the cavity windows in question will more simply be referred to using the term "Venetian glass chambers", meaning a manufactured item comprising two parallel glass panes forming between them a cavity inside which there is mounted such a blind of the Venetian type, namely with parallel slats which may be rotated about a horizontal axis between a position in which the slats lie in a horizontal plane so that they do not prevent substantially the passage of light and a substantially vertical or near-vertical end position in which they prevent the passage of light and hence function as a screening curtain.

As is known, conventional Venetian blinds are equipped with an upper box container which houses the mechanism for operating the slats, a mechanism which in some cases is merely able to vary (in the manner already indicated) the orientation of the individual slats, while in other cases it is also able to displace the slats in the vertical direction until they are bunched together near the top end of the blind.

Conventional Venetian glass chambers have in turn been manufactured in such a way as to miniaturize as far as possible the conventional Venetian blind designed to be accommodated inside the associated cavity.

However, the solutions proposed and realized hitherto have given rise and still give rise to various problems and drawbacks which result in the products currently available on the market being substantially unsatisfactory.

These problems and drawbacks may be summarised briefly as follows:

1) The cavity of the Venetian glass chamber must be sealed in a leaktight manner to ensure the desired thermal and acoustic insulation; this means that operation of the slats must be performed externally without this allowing the entry of air and in particular moisture which the latter inevitably contains.

For this purpose, magnetic-type operating systems have been proposed in the past, but have proved to be imprecise and bulky.

An electric-type operating system, in addition to the not insignificant size of the drive motor, in turn results in an increased cost which is often unacceptable compared to the commercial value of the product and in particular in view of the enormous meterage which must be taken into account when all of the openings (windows and doors) of a building must be fitted with Venetian glass chambers.

2) Since even a minimum amount of moisture inside the cavity of the Venetian glass chamber results in rapid misting-up, with a clearly detrimental effect on the visibility which is an obvious necessity for a glass surface, a supply of salts or other substances must be provided inside the cavity in order to absorb any traces of moisture both immediately following installation and afterwards for the entire working life of the window.

3) The Venetian glass chambers proposed and realized hitherto have involved the use of delimiting glass panes which are very thin, but which nevertheless still exceed the maximum dimensions of conventional fixtures, with the result that Venetian glass chambers cannot be used for windows with panes which are very thick or also reinforced or impact-proof.

The main aim of the present invention is to provide a Venetian glass chamber provided with a Venetian blind accommodated inside the associated cavity, which does not give rise to the problems and drawbacks briefly mentioned above and in particular enables cavities with a width of 20-22 mm to be achieved, with the delimiting glass panes having a thickness of the order of 4-5 mm, so that the Venetian glass chamber is compatible with all of the window and door frames which are conventionally used, and in which operation of the blind is performed mechanically from the outside without the possibility of infiltration of air and atmospheric moisture and with an operating life which is very long, even if not of the same order as that of conventional window and door frames, and in which furthermore the mechanism for operating the Venetian blind contained inside the Venetian glass chamber can be replaced easily at very low cost.

These and other aims are achieved with the Venetian glass chamber according to the present invention, of the type comprising two parallel and spaced panes forming a cavity accommodating internally a controllable Venetian-blind screening device, the slats of which are operated so as to rotate about a horizontal axis between a first end position where they lie horizontally and a second end position where the slats are arranged in a near-vertical position with their adjacent edges substantially in mutual contact, said slats being operated by means of at least two pairs of vertical cables, the two cables of each pair being connected by bridges oriented transversely with respect to the longitudinal axis of each slat which therefore rests on the corresponding adjacent underlying bridge of each pair of cables, characterized in that said cavity is bounded perimetally by a profiled element made of light material forming a perimetral channel, said perimetral channel being used on three sides - two of which are the horizontal upper and lower ones -

of the installed window, for accommodating components for mechanical and manual operation of the slats between the two said end positions, while the fourth side is at least partially intended to form a recess communicating with said cavity and intended to contain drying substances, said mechanical and manual operating components comprising a control mechanism mounted on said third vertical side and communicating in an airtight manner with means for operation from the outside, two movement transmissions extending on either side of said control device along said third side and along said two horizontal upper and lower sides which are kinematically connected to at least two pairs of spools on each horizontal side, each spool comprising two half-spools mounted rotatably about a horizontal axis independently of one another, said kinematic connection comprising coupling means with an escapement mechanism, each spool forming a double-groove pulley inside which the ends of each pair of cables pass and are anchored, such that operation of said control mechanism causes, via said transmissions and said kinematic connection, the controlled rotation of one of the two half-spools of each spool, in such a way that a first cable of each pair is pulled vertically in either direction depending on the direction of rotation of the driving half-spool, while the other cable of the same pair is pulled vertically in the opposite direction.

In the preferred embodiment of the Venetian glass chamber according to the present invention, the external mechanical or manual operating mechanism transmits the movement to the two transmissions via a chamber filled with a fluid, in particular silicone oil, which prevents any infiltration of air into the cavity and hence any penetration of external moisture.

Furthermore, the use of the spools which operate the pairs of cables at the two ends enables the effect to be distributed over both the upper slats and lower slats, thus avoiding the drawback, much cited in conventional solutions, where the bottom slats are rotated to a lesser extent, to the detriment of the screening quality.

The particular advantages of the present invention will appear more clearly from the detailed description which follows, with reference to the accompanying drawings illustrating an embodiment by way of a non-limiting example, in which:

Fig. 1 is a side elevation view, in schematic form for illustrative reasons, of the Venetian glass chamber according to the present invention;

Fig. 2 is a view similar to Fig. 1, showing in exploded form the individual components forming part of the Venetian glass chamber according to Fig. 1;

Fig. 3 is an axial cross-section of the group for operating the Venetian blind contained inside the cavity of the Venetian glass chamber;

Figs. 4, 5, 6, 7 and 8 are cross-sectional views along the planes IV-IV, V-V, VI-VI, VII-VII and VIII-VIII of Fig. 3;

Figs. 9 and 10 are side and front views, respectively, in the direction of the arrow IX shown in Fig. 9, of the protective casing for the angular movement transmission;

Figs. 11, 12, 13 and 14 are views of a coupling for the movement transmission shafts in the open condition (Figs. 11 and 13) and closed condition (Figs. 12 and 14), respectively;

Fig. 15 is a partial cross-section, along the plane XV-XV of Fig. 1, of the assembly for displacing the slats of the Venetian blind between the two end operating positions;

Figs. 16, 17 and 18 are side and end elevation views, respectively, in the direction of the arrows XVII and XVIII, of the spool operating the cords or cables for the slats;

Fig. 19 is a side view of an intermediate element for coupling movement transmission shafts and spools;

Figs. 20, 21 and 22 are side and end views, in the directions indicated by the arrows XXI and XXII of Fig. 20, of one of the two components of the spool shown in Fig. 16;

Fig. 23 is a cross-section along the plane XXIII-XXIII of Fig. 21;

Figs. 24 and 25 are front side and bottom plan views of the angular bracket shown in the following Fig. 26;

Fig. 26 is a side view of the angular bracket connecting the horizontal sides of the perimetral channel containing the components operating the Venetian blind and the remaining vertical side intended to contain the drying salts or substances;

Figs. 27 and 28 are schematic views, in vertical cross-section, of the assembled Venetian glass chamber in two operating conditions, i.e. with the slats of the Venetian blind open and in the partially screened position; and

Figs. 29, 30 and 31 are side elevation and end views, respectively, in the directions XXX and XXXI, of the angular transmission shown in Fig. 29.

With reference now to the drawings and in particular Figs. 1 and 2, Fig. 1 shows the Venetian glass chamber V, while, for the sake of clarity of the drawing, the window or door frame in which it is seated is not shown.

In the Venetian glass chamber according to the present invention it is possible to distinguish two parallel and spaced glass panes (shown in Figs. 4 to 8), indicated generally by the reference numbers

30a and 30b, which define a cavity 32 accommodating the slats 34 which, in Fig. 1, are shown in the horizontally lying position where they allow the maximum amount of light to pass through the glass surfaces 30a and 30b and hence from one environment to the other separated by the Venetian glass chamber V.

The slats 34 are of the conventional type, i.e. slightly curved and convex with respect to a horizontal axis, and therefore a detailed description thereof is not necessary.

A conventional method is used for operation of the slats, consisting in resting, without any other constraint, the slats on transverse bridges connecting two or more pairs of vertical and parallel cables mounted on the outside of the ends of the slats, the cables being made of plastic (for example nylon) so that relative vertical sliding of the two cables of each pair with respect to each other causes rotation of each connecting bridge and, in view of the abutting engagement with the overlying slat, the latter is forced to rotate at a predetermined angle which, to achieve the maximum screening effect possible, must be about 90 degrees.

From Fig. 1 it can also be understood, as will be explained in greater detail below, that all the perimetral edges of the Venetian glass chamber have accommodated along them the components for operating the slats 34, of which components a device, generally denoted by the reference number 36, and a perimetral channel which extends along the entire perimeter of the cavity 32 can be seen. This perimetral channel has a first type of profiled member 42 (with the cross-section visible in the section of Fig. 4 and at the right-hand end of Fig. 26) which extends along the two horizontal sides 38a and 38b of the Venetian glass chamber and along the right-hand vertical side 40a, while the second type of profiled member 44 (visible at the bottom end of Fig. 26) extends along the entire left-hand vertical side 40b of the Venetian glass chamber with a function totally different from that of the profiled member 42.

More specifically the profiled member or channel 42 has the function of housing all the members for operating the slats 34 between their end operating positions, while the channel 44 acts as a container and store for the substances (normally adsorbent salts) intended to absorb the moisture initially present in the cavity of the Venetian glass chamber and that which subsequently may penetrate into the cavity.

With reference now to Fig. 2, but obviously still with reference to Fig. 1, the components of the slat operating mechanism comprise the already mentioned device 36, a pair of shafts with a polygonal (for example hexagonal) cross-section 46 and 48 which extend from the two ends of the device 36

and are made to rotate in opposite directions in the manner described below.

The reference numbers 50 indicate couplings for joining the shafts 46 and 48 to the respective ends of the device 36, while the reference numbers 52 indicate supports for the shafts comprising internal ball bearings keyed onto the shafts in order to prevent possible jamming of the shafts as a result of slight bending due to operating stresses of the device 36.

As can be seen in Fig. 4, the channel 42 comprises a rounded cover 54 and an-H shaped base 56, the top ends of which are suitably curved inwards so as to be inserted into corresponding incisions formed in the bottom ends of the cover 54 so as to avoid stepped or continuous arrangements in the external surface of the channel and hence eliminate areas which are difficult to seal during installation and finishing of the window or door frames. In particular, in Fig. 4, it can be seen that the two bottom legs of the H-shape of the base 56 are located at a distance so as to be sealingly positioned between two glass panes 30a and 30b, to which they are fixed by means of a suitable sealant applied beforehand to the external surfaces of the said bottom legs.

In the region of the corners formed between the vertical side 40a and the horizontal sides 38a and 38b there are provided angular transmissions indicated by the reference number 58, which will be described in detail below and which are equipped with a suitably shaped right-angled hood or cover having ends which are designed to engage with the profiled member or channel 42 to ensure sealing of the cavity 32 of the Venetian glass chamber V.

The transmissions 58 are designed to transmit rotation of the shafts 46 and 48 to corresponding horizontal shafts 62 and 64 mounted in the region of the horizontal sides 38a and 38b, respectively.

Each shaft 62 and 64 has associated with it two or more operating spools, denoted generally by the reference number 66, which will be described in more detail below and whose number depends on the width of the Venetian glass chamber and hence on the longitudinal extension of the slats 34; it is obvious that the greater the length or extension of the slats, the greater the number of spools 66 must be in order to ensure balanced operation of the slats and prevent the latter from becoming curved and no longer assuming the desired position.

Preferably, in order to prevent the slats leaving the mutually parallel position, a vertical cable 45 is provided, said cable passing through a hole formed in each slat and being positioned in the region of the vertical channel 44 so as to remain concealed over its entire dimensions, this cable being fixed at its top end to the angular profiled member 70,

described below, while its bottom end is anchored to a necked tightening element, also referred to by the nautical term "sheet tightener".

In this case also ball bearing supports 52 and 68 are provided, the latter being of the simpler type, whereas the bearings denoted by the reference number 52, have a lateral lug for locking with respect to the base 56 of the channel or profiled housing member 42.

In the region of the corners formed between the horizontal sides 38a and 38b and the vertical side 40b there are provided angular members 70 shaped so that the ends 72 directed towards the horizontal sides 38a and 38b are coupled in a sealed manner with the H-shaped bases of the channels 42, while the ends 74 directed towards the vertical side 40b form a sealed connection with the channel 44.

The latter, as can be clearly seen in Fig. 26, is shaped as a single piece, albeit closely resembling the channel 42, except for the external curvature and the presence in the bottom side 76 of at least one continuous slit 78 which allows free communication between the internal recess of the channel 44 and the cavity 32 bounded between the two glass surfaces 30a and 30b. Obviously, in place of the said slit, other arrangements may be provided, which allow free communication between the adsorbent salts contained inside the recess of the channel 44 and the cavity 32.

As already mentioned, when the Venetian glass chamber is assembled, the adsorbent substances which ensure the total absence of moisture, or any traces thereof, inside the cavity are loaded inside the channel 44. If one takes account of the usual dimensions of window or door frames and hence the length of the side 40b, it can be easily understood that the channel 44 is able to contain a sufficient amount of adsorbent substance to ensure the desired function.

If we now consider Figures 3 to 8, these show the operating device 36 which comprises a housing or box, the interior of which is divided into three chambers indicated by the reference numbers 82, 84a and 84b, respectively, the latter two chambers being identical and symmetrical, while the central chamber 82 is normally filled in a sealed manner with a fluid, in particular silicone oil, which ensures that operation from the outside of the parts accommodated inside this chamber cannot cause infiltration of atmospheric air inside the cavity 32, with the obvious problems and drawbacks which this may give rise to.

The chamber 82 accommodates internally two pinions 86a and 86b, the toothing of which meshes with the toothing of a pinion 88 mounted on a horizontal shaft 90, the opposite end of which is situated inside a lateral cavity 92 accommodating

the gearing 94 from which there projects outside the housing 80 the hexagonal rod 95, on the free end of which an operating pommel is fitted.

The two pinions 86a and 86b are mounted on the ends of two stems or shafts 96a and 96b which extend through the chambers 84a and 84b with suitable sealing components to prevent the oil which fills the chamber 82 from flowing into the adjacent chambers. For this purpose, seats 98 for suitable seals allowing free rotation of the said shafts are formed in the width of the walls which divide the chambers.

The said shafts protrude from the respective chambers 84a and 84b and are protected externally by shaped metal tubes, 100a and 100b, respectively, which are coupled with the corresponding portion of the rounded cover 54 of the channel 42 (as shown in Fig. 5) and the external ends 102a and 102b of which, as can be seen in Fig. 4, are shaped so as to ensure a leakproof seal with respect to the walls of the channel 42.

The shafts 96a and 96b terminate, respectively, on the outside of the tubes 100a and 100b in a portion 104a and 104b with a polygonal (in particular hexagonal) cross-section, to which the free end of the shaft or polygonal rod 46 and 48, respectively, is connected in the manner described below.

Since the length of the shaft 46 and 48 varies according to the height of the Venetian glass chamber, namely the length of the vertical side 40a, a coupling 50, shown in detail in Figures 11 to 14, is provided downstream of the end portions 104a and 104b, said coupling comprising two cylindrical half-shells 106a and 106b, joined at a generatrix by a flexible strip 108 which allows rotation thereof about the said generatrix.

Axial recesses 110a and 110b, 112a and 112b, are formed in the two half-shells, being aligned axially, but separated by a dividing wall 114, so that, when the two half-shells are closed to form the cylindrical body shown from one end in Fig. 14, the abovementioned axial recesses define two blind-bottomed holes with a polygonal cross-section, inside which the ends of the respective shafts 46 (48) are accommodated, rotation of the portion 104a (104b) causing rotation of the coupling 50 and of the corresponding shaft 46 (48) therewith.

A snap-engagement pin connection 116 and hole 118 ensure closure of the two half-shells 106a and 106b.

In the remainder of this description, reference will be made to the shaft 46 alone and hence to the upper part of the vertical side 40a as well as to the horizontal side 38a, it being understood that the same remarks are also applicable to the shaft 48, except that rotation thereof occurs in the opposite direction to that of the shaft 46.

The upper end of the polygonal rod or shaft 46 engages inside a blind hole formed in the bottom end of a stem 120, mounted on an angular bracket 122 by means of supports provided with suitable ball bearings which allow free rotation of the stem 120 when it is made to rotate by rotation of the shaft 46. The end of the stem 120 is provided with a pinion 126 having toothing inclined at 45 degrees so as to be constantly meshed with a corresponding pinion 128 integral with the end of a stem 130 also supported by the angular bracket 122 so as to be able to rotate freely about its axis owing to the bearing supports 124.

The free end of the stem 130 has formed in it a blind-bottomed hole inside which the end of the polygonal shaft 62 engages, thus being rotated each time the vertical shaft 46 rotates.

Figures 9 and 10 show the hood 60 which also has a right-angled profile and which forms the continuation of the cover portion of the channel 42 in the region of the angular transmission 58, thus also ensuring at the same time a leakproof seal for the cavity 32.

If we now consider Figures 15 to 23, these show one of the spool operating assemblies 66 which each comprise two identical and opposing half-spools 132a and 132b.

Each spool 66 is mounted on the shaft 62 by means of a sleeve 134 having at its two ends toothing 136 and 138 with teeth which are inclined relative to the radial direction, the inclination of the teeth of the toothing 136 being opposite to that of the toothing 138, said inclination being considered with respect to the radial direction.

In the central position the sleeve 134 has three annular projections 140, 142a and 142b, the latter two being symmetrical with respect to the transverse plane passing through the annular projection 140 (ideally speaking).

Each half-spool 132 is mounted on the sleeve 134 and comprises a main cylindrical body 144 terminating at one end in a pulley groove 146 bounded externally by a slightly concave disc 148. At the opposite end the cylindrical body 144 has two substantially radial fork-shaped arms 150 and 152, the radially internal ends of which are shaped like teeth shaped and inclined so as to engage releasably (via an escapement mechanism) with the abovementioned toothing formed at the ends of the sleeve 134.

For this purpose the teeth 154 project adequately and in the radial direction inside the axial hole 156 which passes through the entire cylindrical body 144.

Coupling of the two half-spools 144 on the sleeve 134 is effected in the manner shown in Fig. 16, namely so that the internal groove 158 formed in the wall of the through-hole 156 is coupled with

the corresponding projection 142, while the concave parts of the disc 148 enclose the central projection 140.

From Fig. 16 it can be clearly seen that in this way each spool 66 has a double pulley groove accommodating the two cables 160a and 160b which form the combined cable assembly for operating the slats 34.

Finally, Figs. 24, 25 and 26 clearly show the configuration of the angular piece 70 with the function described above.

In particular it can be seen that the angular piece 70 is provided with end projections 162 and 164 which are respectively coupled, by means of insertion, with the end of the channel 42 terminating in the vicinity of the corresponding end of the vertical side 40b and with the adjacent end of the channel 44, this ensuring the necessary hermetic seal for the cavity 32.

As already mentioned above, a particular characteristic feature of the Venetian glass chamber according to the present invention consists in the fact that the movement of the slats is effected by means of two or more spools 66 arranged both above and below the set of slats, so that it is more precise and controlled and in particular so that the slats located towards the bottom of the Venetian glass chamber are also rotated efficiently in either direction, whereas, in the assemblies according to the prior art, comprising solely a box-type housing arranged at the top of the Venetian glass chamber, operation of the lower slats is always imprecise and often partial, in particular to the detriment of the screening action of the Venetian glass chamber.

Another aspect attributable to this arrangement is that it is possible, according to the present invention, to reduce the dimensions of the operating components of the Venetian blind such that the latter can be positioned in a lateral housing, i.e. the channel 42, which does not encroach upon the adjacent glass part of the Venetian glass chamber, as is the case in the Venetian glass chambers known hitherto, and which has a width within the limits of conventional window and door frames, i.e. approximately 20 mm, whereas in the Venetian glass chambers known hitherto the cavity usually has a width of the order of 35 to 40 mm, together with the abovementioned drawbacks and problems.

As regards the mode of operation of the device 36 for operating the slats, it must be pointed out first of all that it permits not only total closure of the Venetian blind, by an amount as much as 97%, and total opening of the blind, but also positioning of the slats in intermediate inclined positions since it is also possible to rotate the slats only partially.

Operation of the handle or pommel connected to the gearing 94 causes, via the shaft 90 and the pinion 88, rotation of the two pinions 86a and 86b

and also the corresponding stems or spindles 96a and 96b in opposite directions.

The rotational movement of the latter is transmitted to the couplings 50 and hence to the shafts 46 and 48 which, via the angular transmissions 58 and the shafts 64 and 66, cause rotation of the spools 66.

Depending on the direction of rotation, one of the two half-spools 144 will be placed in active rotation, subjecting the cable 160a or 160b adjacent thereto to a pulling force, while the other half-spool releases the cable adjacent thereto. A similar situation occurs for the corresponding spool situated at the bottom end of the said pair of cables, except that in this case the half-spool aligned with that driven in the top part is active, so that it exerts a downward pulling force on the cable released by the upper half-spool, while the other bottom half-spool merely releases the cable which is instead pulled upwards by the active half-spool at the top.

The outcome is that the two cables 160a and 160b are displaced with respect to each other in the vertical direction, such that the slats are operated in the corresponding direction of rotation as far as the inclined position determined, as already mentioned, by the degree of rotation of the control handle.

The above description clearly illustrates the main feature of the present invention, namely the creation of a Venetian glass chamber containing a Venetian blind, the slats of which are operated by means of a device which is only partly mechanical, consisting of mouldable components made mainly of plastic and provided with the necessary applicational flexibility such that they can be used in all types and sizes of door and window frames.

Of particular importance is the fact that, with the present invention, it is possible to keep the width of the cavity within the limits of the seats for the windows of conventional frames, thus making special designs unnecessary and at the same time enabling the Venetian glass chamber to be used in the case of reinforced or impact-proof glass windows.

The invention has been described with respect to a preferred embodiment, it being understood that conceptually and mechanically equivalent variations and modifications are possible and may be envisaged without departing from the scope of the said invention.

This applies, for example, both to the control mechanism and to the angular transmissions for which mechanically similar solutions are possible, the basic principle still being that of arranging between the external control handle and the perimetral shafts transmitting the rotational movement a chamber filled with a fluid which forms a perfect seal preventing the infiltration of external air and

moisture contained therein into the cavity of the Venetian glass chamber.

Claims

1. Cavity window of the type comprising two parallel and spaced glass panes (30a, 30b) forming a cavity (32) accommodating internally a controllable Venetian-blind screening device, the slats (34) of which are operated so as to rotate about a horizontal axis between a first horizontally lying end position and a second end position in which the slats are arranged in a near-vertical position with their adjacent edges substantially in mutual contact, said slats being operated by means of at least two pairs of vertical cables (160a, 160b), the two cables of each pair being connected by bridges (35) oriented transversely with respect to the longitudinal axis of each slat which therefore rests on the corresponding adjacent underlying bridge of each pair of cables, characterized in that said cavity (32) is bounded perimetally by a profiled member made of light material forming a perimetral channel (42, 44), said perimetral channel being used on three sides (40a, 38a, 38b) - two of which are the horizontal upper (38a) and lower (38b) ones - of the installed window, for accommodating components for mechanical and manual operation of the slats between the two said end positions, while the fourth side (40b) is at least partially intended to form a recess communicating with said cavity and intended to contain drying substances, said mechanical and manual operating components comprising a control mechanism (36) mounted on said third vertical side and communicating in an airtight manner with means for operation from the outside, two movement transmissions (50, 46, 48, 58, 62, 64, 66) extending on either side of said control device along said third side (40a) and along said two horizontal upper and lower sides (38a, 38b) which are kinematically connected to at least two pairs of spools (66) on each horizontal side (38a, 38b), each spool comprising two half-spools (132a, 132b) mounted rotatably about a horizontal axis independently of one another, said kinematic connection comprising coupling means with an escapement mechanism (150, 152, 154, 136, 138), each spool forming a double-groove pulley (146) inside which the ends of each pair of cables (160a, 160b) pass and are anchored, such that operation of said control mechanism causes, via said transmissions and said kinematic connection, the controlled rotation of one of the two half-spools of each spool, in such a

way that a first cable of each pair is pulled vertically in either direction depending on the direction of rotation of the driving half-spool, while the other cable of the same pair is pulled vertically in the opposite direction.

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2. Window according to Claim 1, characterized in that said profiled member (42) forming said channel in the region of said three sides comprises a rounded cover (54) and an H-shaped base (56), the upper ends of which are curved inwards so as to be connected to corresponding incisions formed in the bottom ends of said cover, while the bottom ends of said H are anchored to adjacent internal surfaces of said boundary panes (30a and 30b) by means of a seal.

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3. Window according to Claim 1, characterized in that the profiled member (44) forming said perimetral channel of said fourth side is formed as a single piece having a shape corresponding to that of the profiled member (42), except that the transverse wall (76) of the H has formed in it an opening for communication between the internal recess of said profiled member (44) and the cavity (32) formed by the said two glass panes (30a and 30b).

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4. Window according to Claim 3, characterized in that said communication opening is a continuous slit (78) extending along the entire height of the channel (44).

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5. Window according to Claim 1, characterized in that said control mechanism comprises a housing or box (80), the interior of which is divided into three chambers (82, 84a and 84b), the chambers (84a and 84b) being identical to each other and symmetrical with respect to the central chamber (82), two pinions (86a and 86b) accommodated inside said chamber (82) meshing with a third pinion (88) mounted on a horizontal shaft (90), the opposite end of which emerges inside a lateral cavity (92) containing a gearing (94) from which the externally operated polygonal rod (95) extends, the said pinions (86a and 86b) being mounted rigidly on the ends of two coaxial stems (96a, 96b) extending in a sealed manner through the chambers (84a and 84b) until they emerge from the latter, projecting a predetermined distance in the form of portions with a polygonal section (104a and 104b).

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6. Window according to Claim 5, characterized in that said chamber (82) is filled with a sealing fluid, in particular silicone oil.

7. Window according to Claims 1 and 5, characterized in that said transmission comprises on either side of said control mechanism a vertically extending polygonal shaft (46, 48), the end adjacent to said mechanism operating said shaft being rigidly connected to said respective polygonal portion (104a, 104b) by a coupling (50) and the other end of said shaft (46, 48) being connected via an angular transmission (58) to a horizontal shaft (62, 64) on which said spools (66) are mounted.

8. Window according to Claim 7, characterized in that said coupling (50) comprises two cylindrical half-shells (106a, 106b) joined in the region of a generatrix by a flexible strip (108), there being formed inside each half-shell two axial cavities (110a, 110b, 112a and 112b) separated by a dividing wall 114, so as to define two coaxial blind-bottomed holes with a polygonal section, said half-shells being snap-closed by means of a pin connection (116) and hole (118).

9. Window according to Claim 7, characterized in that said angular transmission (58) comprises a pair of pinions (126, 128) having teeth inclined at 45 degrees mutually meshing in the region of the corners formed between the vertical side (40a) and the horizontal sides (38a, 38b) and rigidly connected to the ends of respective stems (120), to the other ends of which are rigidly fixed the free ends of the shafts (46, 48) and (62, 64), said stems being supported for rotation by bearing supports (124) mounted on an angular supporting bracket (122).

10. Window according to Claim 1, characterized in that each spool (66) comprises two identical and opposing half-spools (132a, 132b), each half-spool in turn consisting of a main cylindrical body (144) having an axial cylindrical hole (156) and terminating at one end in a pulley groove (146) bounded externally by a slightly concave disc (148) with its concave surface directed outwards, at the opposite end of the said main cylindrical body (144) there being provided two substantially radial forked arms (150 and 152) with their radially internal ends shaped with inclined teeth (154), said teeth projecting a predetermined distance radially inside said axial hole (156), the spool (66) comprising moreover a cylindrical sleeve (134) designed to be mounted on the respective shaft (62, 64) and terminating at the two ends in toothed zones, the toothing of which (136, 138) have teeth inclined with respect to the radial direction, the inclination of the teeth

(136) with reference to the radial direction being opposite to that of the teeth (138), said sleeve (134) having an axial length greater than the sum of the axial lengths of the half-spools (132a, 132b) when coupled, bringing into contact the respective concave discs (148) so that the end sets of tothing (136, 138) of the sleeve project and are engaged by the teeth (154) of the forked arms (150, 152) which are correspondingly inclined, so as to form an escapement mechanism, the two pulley grooves (146) of the two coupled half-spools forming a double pulley groove accommodating the two cables (160a, 160b) of the corresponding pair of cables operating the slats.

11. Window according to Claim 1, characterized in that angular pieces (70) connecting the horizontal channels (42) and the vertical channel (44) are provided in the region of the corners formed between the vertical side (40b) and the two horizontal sides (38a, 38b).

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Fig.1

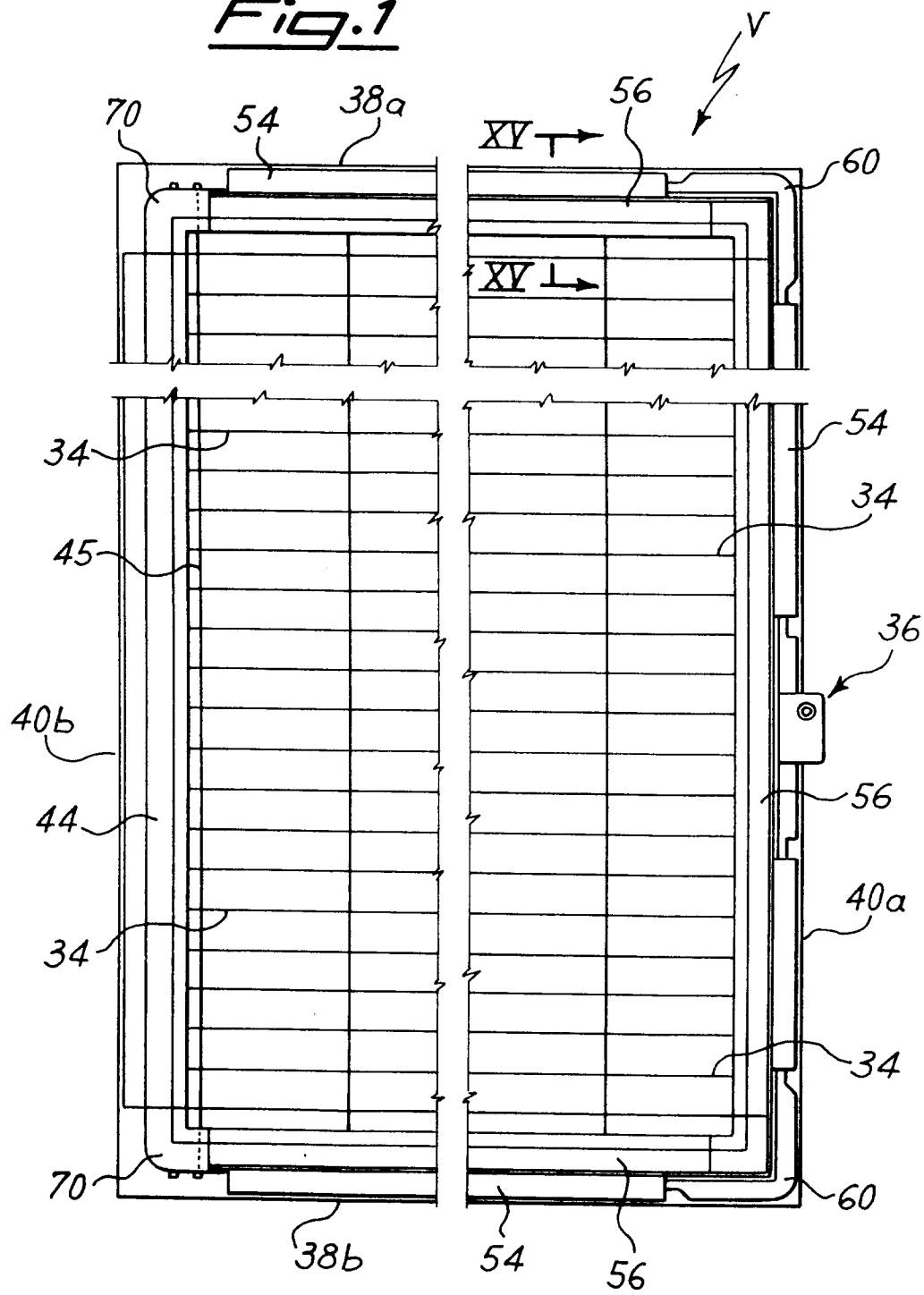
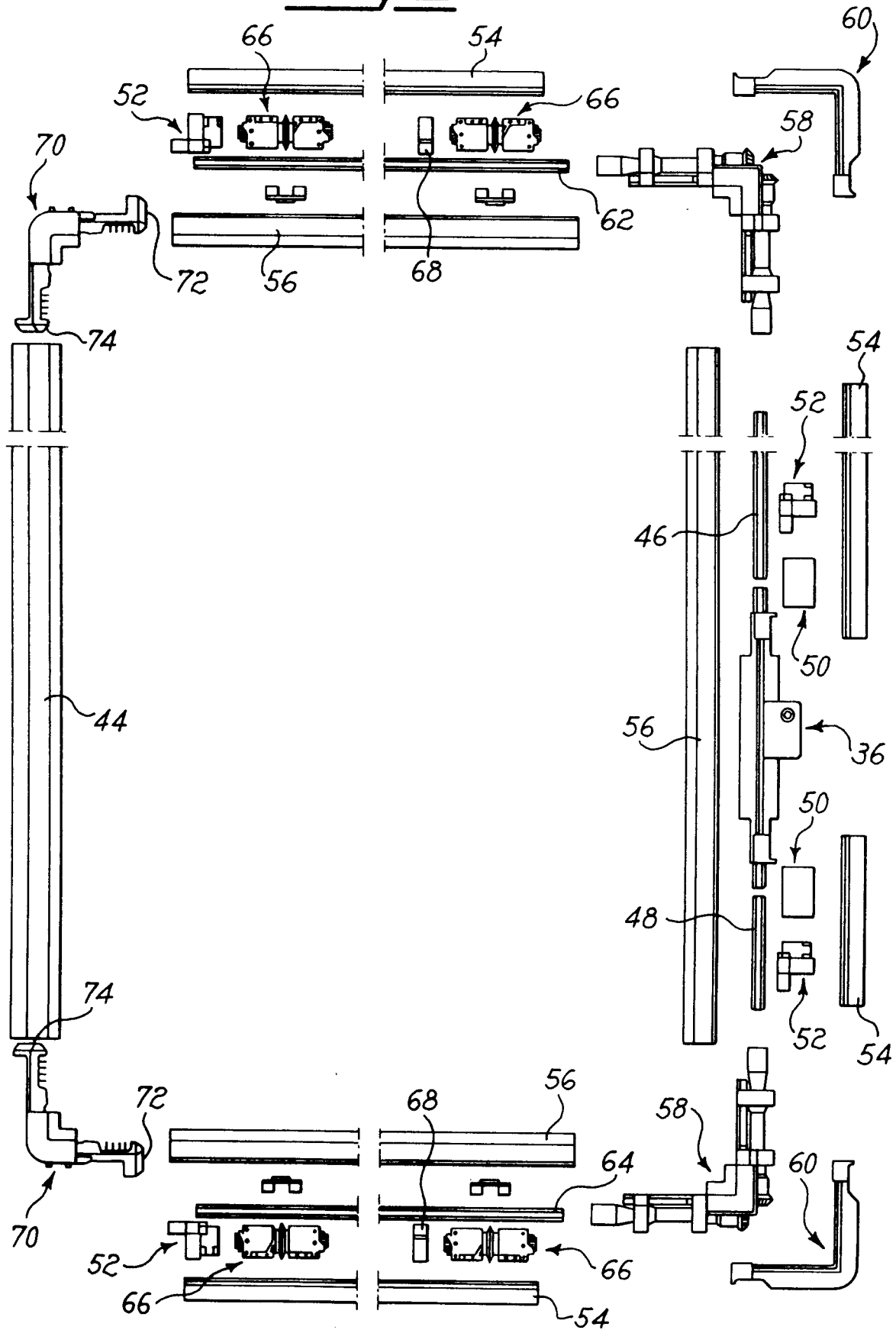


Fig. 2



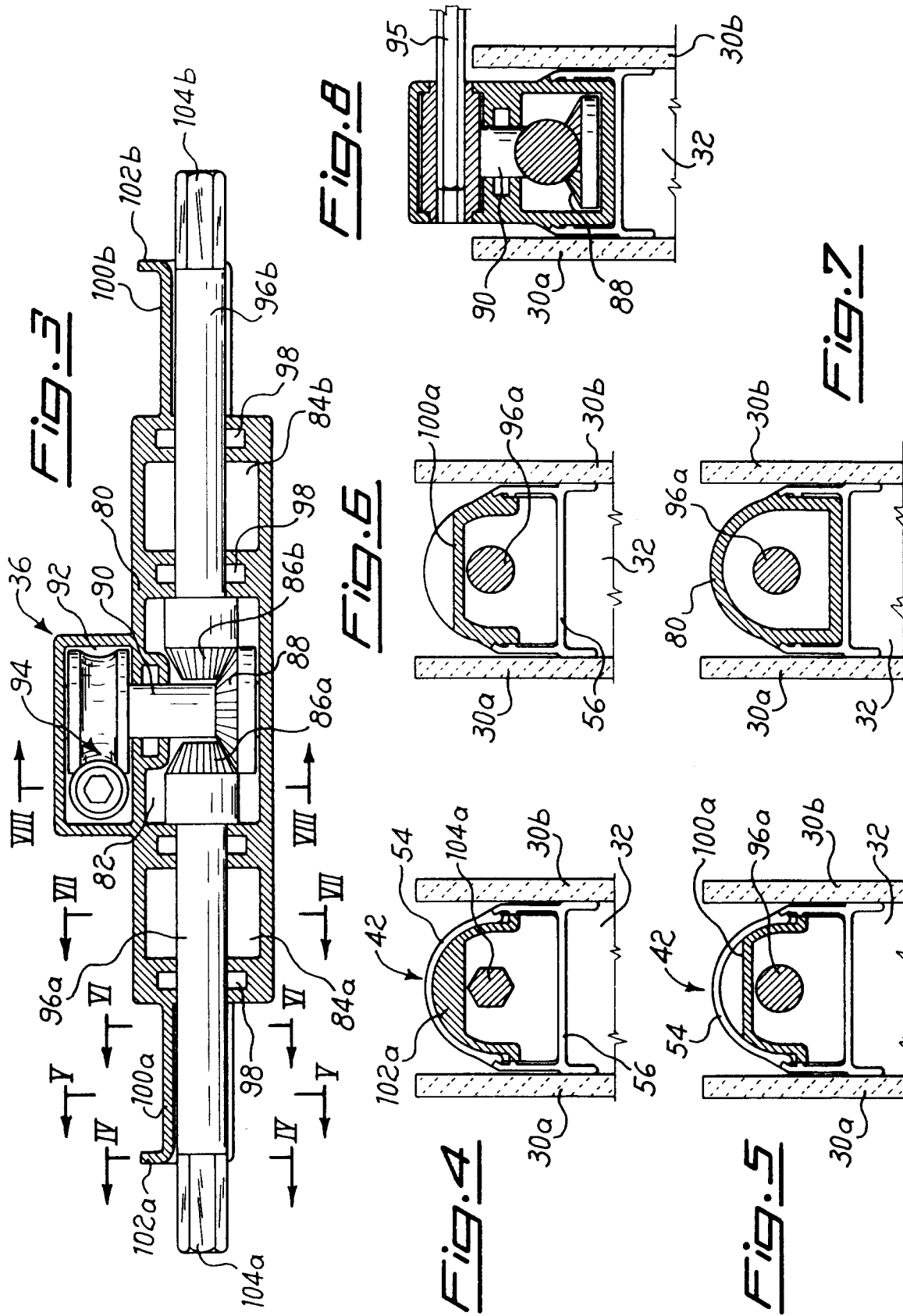


Fig. 9

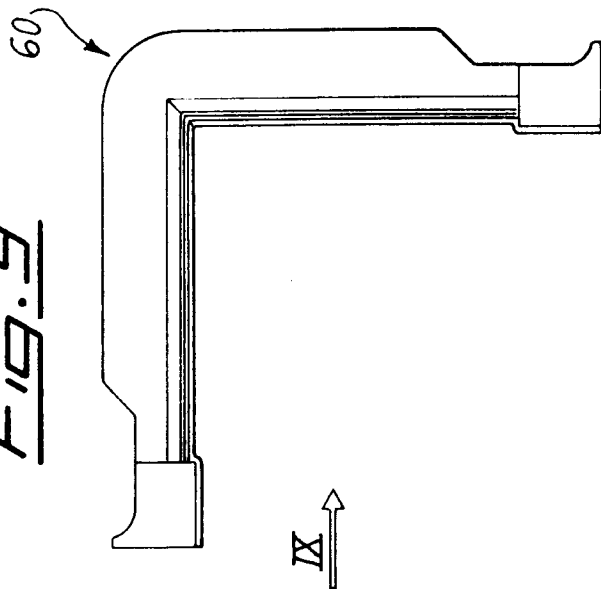


Fig. 10

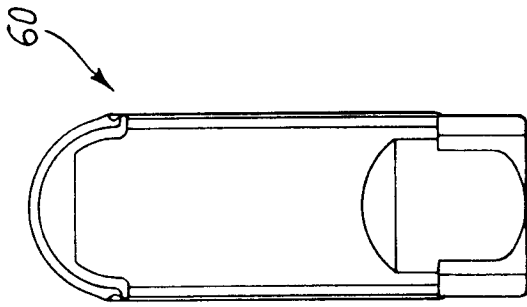


Fig. 12

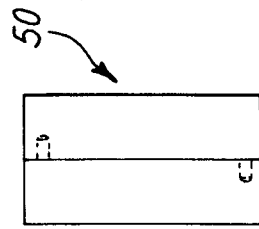


Fig. 13

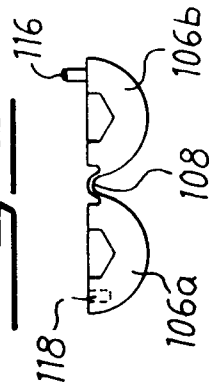


Fig. 14

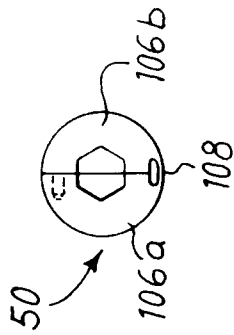


Fig. 24

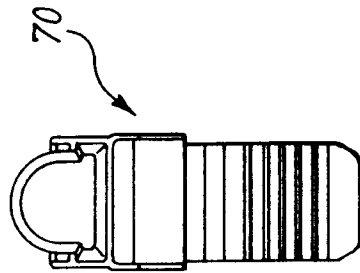


Fig. 25

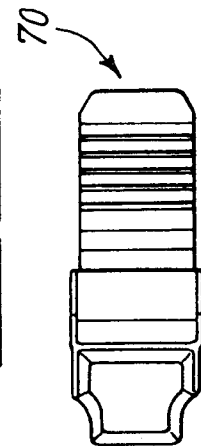


Fig. 15

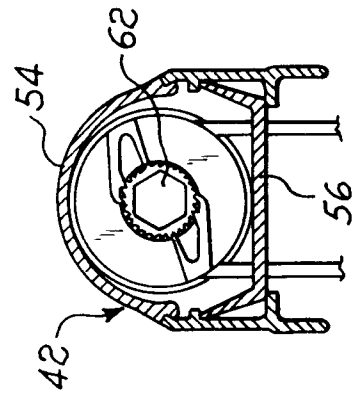
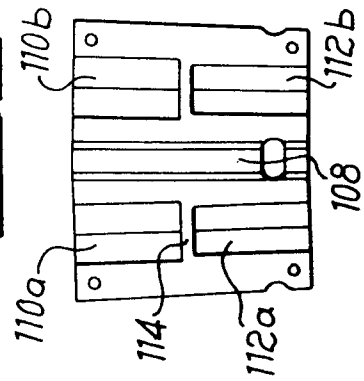


Fig. 11



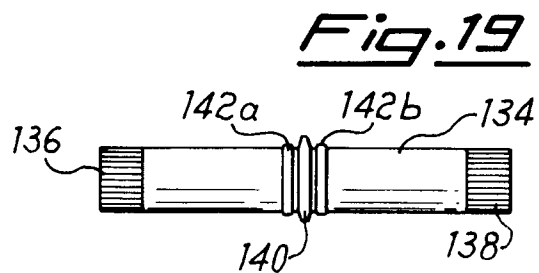
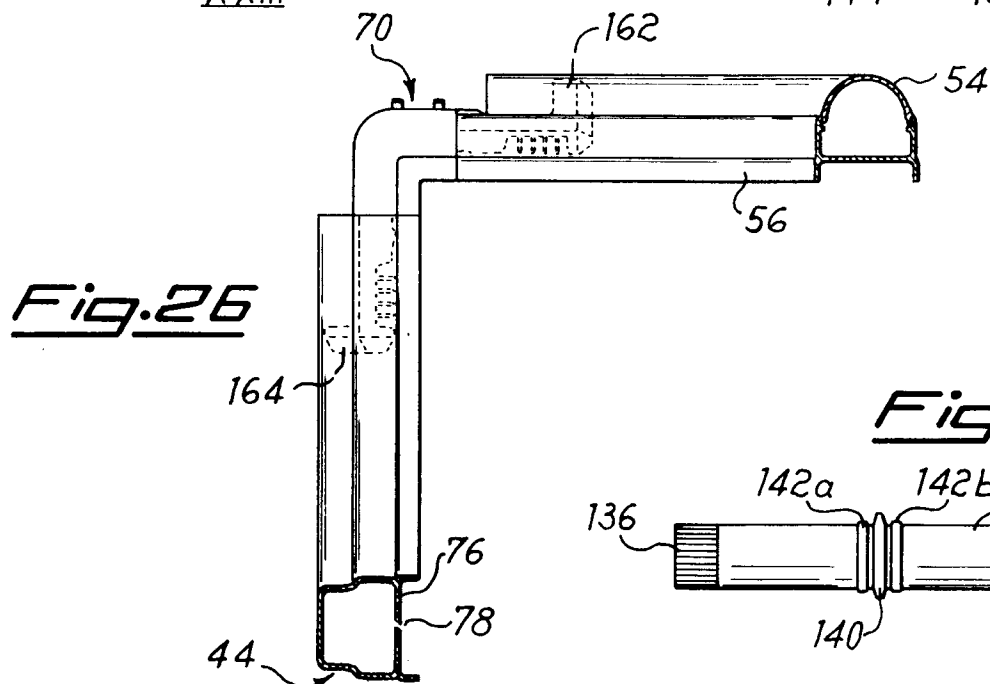
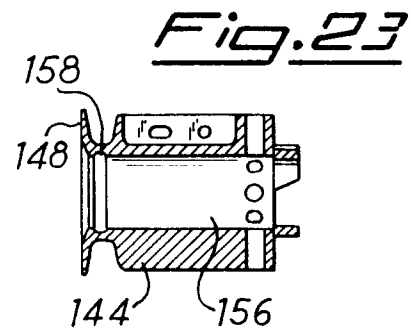
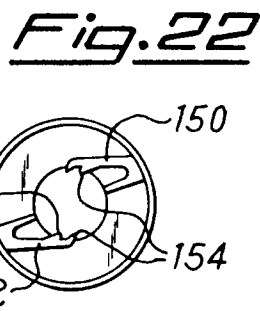
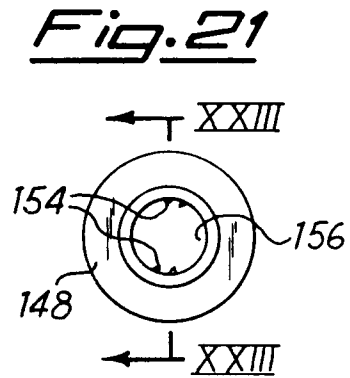
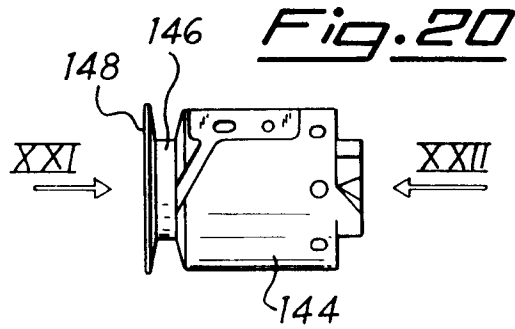
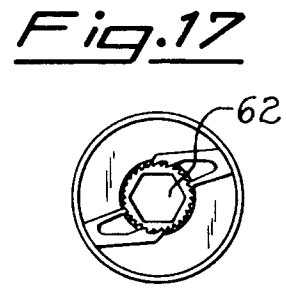
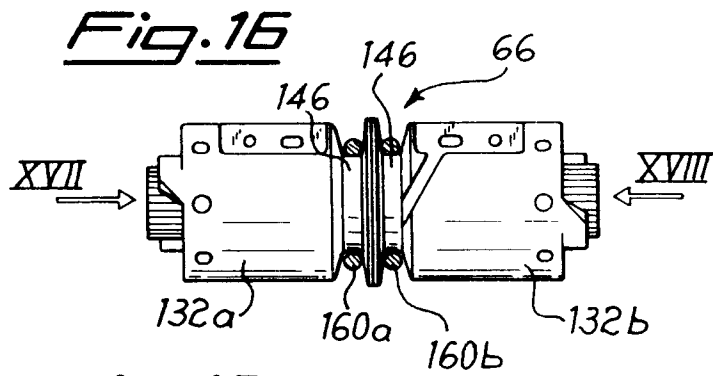


Fig. 27

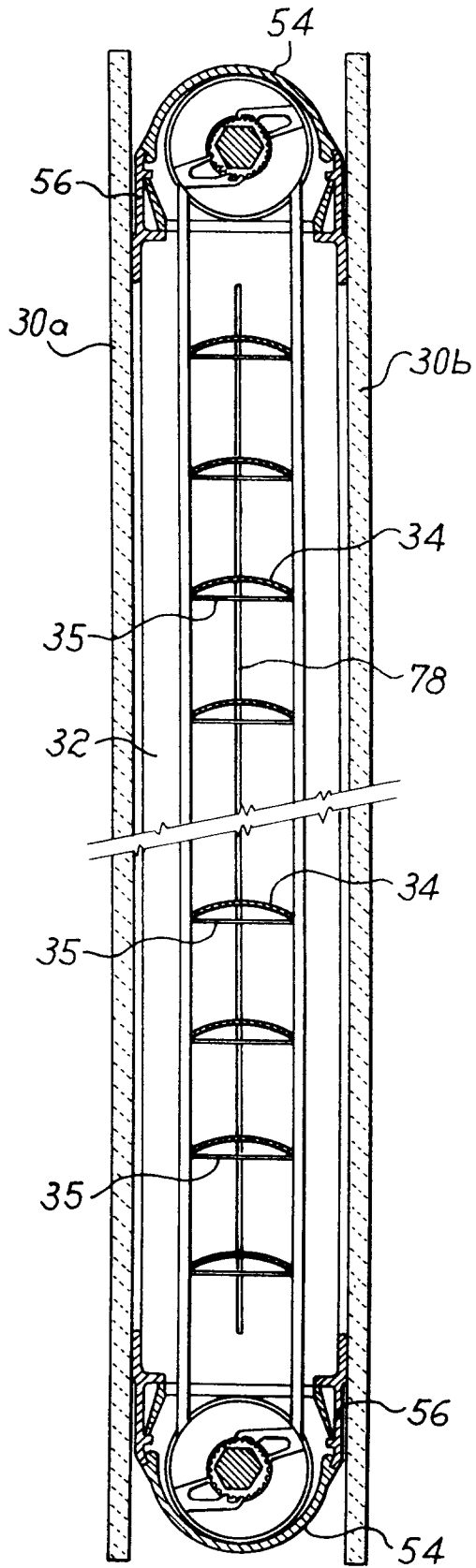


Fig. 28

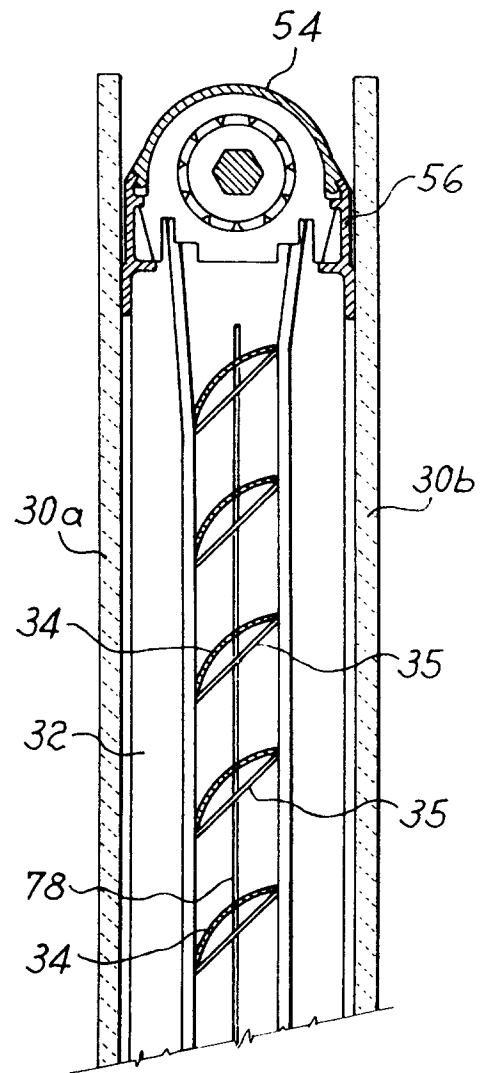


Fig. 31

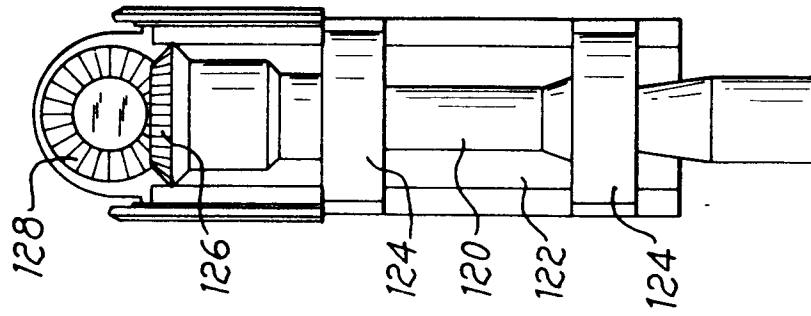


Fig. 30

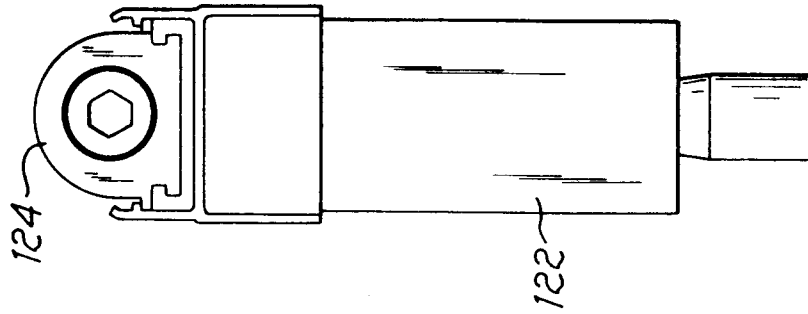
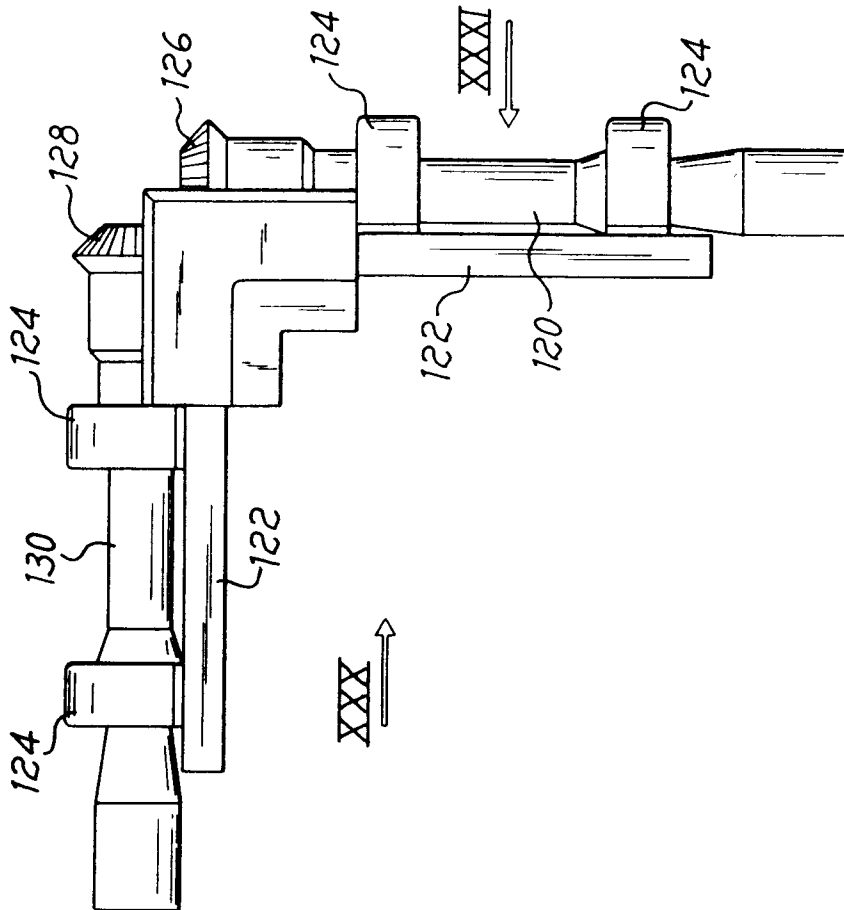


Fig. 29





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 93 20 2309

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.5)
Y	CA-A-889 129 (ROY) * the whole document *	1,3-6	E06B9/264 E06B3/66
A	---	10	
Y	FR-A-2 423 599 (HEVES MEGYEI TANACSI EPITOIPARI VALLALAT) * page 4, line 1 - line 9; figure 2 *	1,3-6	
A	DE-A-32 25 371 (HUNTER DOUGLAS INDUSTRIES B.V.) * page 8, last paragraph - page 11, last paragraph; figures *	7-9	
A	GB-A-1 145 104 (HADRICH & CO) * the whole document *	7-9	
A	GB-A-2 208 675 (YOSHIDA KOGYO K.K.) * page 10, line 15 - line 21; figure 6 *	11	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			E06B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 3 January 1994	Examiner Kukidis, S
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