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(71) Applicant: **Sacchet, Marco**
32013 Longarone (IT)

(72) Inventor: **Sacchet, Marco**
32013 Longarone (IT)

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(74) Representative: **Dini, Roberto, Dr. Ing.**
Via Castagnole, 59
10060 None (Torino) (IT)

(54) **System for actuating and blocking in closed position of shutters, doors, windows and the like**

(57) A system for blocking in closed position of shutters, doors, windows and the like, comprising at least a shutter (A1) capable of movement, where said shutter (A1) is positioned substantially in line with an opening, said opening being defined in a wall of a room and/or

delimited by a frame, said shutter (A1) having associated means (30,31) for its blocking in a closed position. According to the invention, means (1,2,3,4,12,13,) are provided for actuating said blocking means (30,31) from inside the room and from a remote position with respect to said shutter (A1).

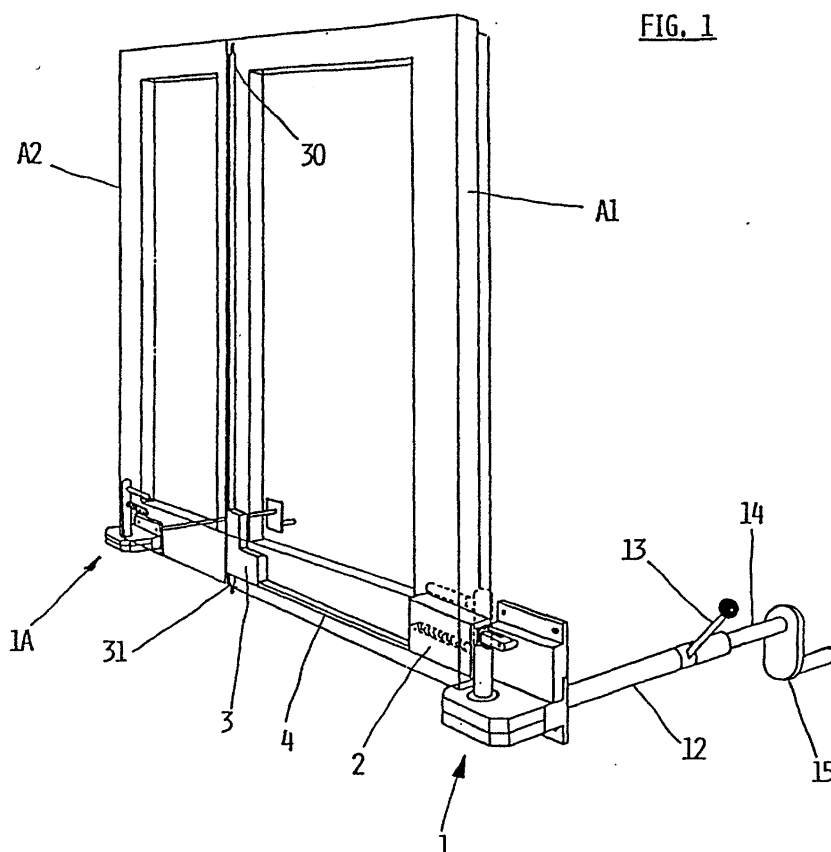


FIG. 1

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Description

[0001] The present invention relates to a system for blocking in closed position of shutters, doors, windows and the like.

[0002] As it is known, in most instances both the opening and closure of window shutters is performed manually; to this purpose, in fact, the user has to push the shutters outside for opening them or pull them back to the window for their closure.

[0003] The rotary movement of a shutter, in order to obtain the above movements, is obtained by virtue of at least a couple of hinges, where the movable part of each hinge is assembled on the shutter and its relevant fixed parts is mounted on the window frame or on the wall of the recess containing it.

[0004] The above opening and/or closure operations of the shutters, and their relevant blocking, usually by means of a latch, obviously need to be performed with an open window, so as to reach both the shutters themselves and said latch.

[0005] This conventional technique involves some drawbacks, such as having to expose oneself to weathering agents, i.e. rain and/or wind, or having to expose oneself to the sight of the neighbourhood even when not desired; in some instances, the opening and closure operations of the shutters may even be dangerous should one lose his/her balance, with the risk of falling out of the window when leaning out for releasing and approaching the shutters, specifically in case of small people (such as a child), and also when external walls are of consistent thickness.

[0006] Moreover, the opening of the window for actuating the shutters, in particular during the cold season, causes a thermal dispersion between the room and the environment outside, entailing consequent higher heating costs.

[0007] Another problem related to the common technique and associated to the drawbacks exhibited above, is also due to some people being practically prevented from operating the shutters directly for their opening, closure and blocking/release; let us think for example of disabled people, forced to live on a wheelchair, or not very tall people, for whom both the opening handle of the window, shutters and relevant latch are out of reach.

[0008] In order to remove the above drawbacks, devices have been suggested to ensure both the opening and/or closure of the shutters without having to open the window, i.e. from inside a household environment.

[0009] These devices usually consist of a mechanism for the angular motion of the shutters, which operates on a lever fastened to every shutter by means of a gear and worm screw.

[0010] This lever is applied to the shutter, generally in an intermediate position between the two hinges of the latter (i.e. substantially at about half the height of the shutter), and is actuated by means of the above gear; the worm screw, on the contrary, is connected to a rod

with a length extending inside the household environment, which bears a crank handle on its end; therefore, in order to obtain rotation of the worm screw and consequent motion of the shutters in the desired direction it will be enough to operate the above crank handle.

[0011] Even if such known "remote operated" devices have been improved against a more conventional common technique, they still have several drawbacks.

[0012] A first drawback for such devices is that blocking of the shutters in their closed position can only take place with an open window; in fact, according to the above technique, the shutters must anyway be fitted with a usual latch, which is actuated by the user directly.

[0013] This derives from the fact that the transmission ratio from the gear to the worm screw of the above "remote operated" devices is not sufficient on its own to warrant a blocking of the shutters in their closed position, in particular in the instance of house-breaking attempts; for this reason, therefore, the shutters need to be fitted with said latch.

[0014] Obviously, in the event such "remote operating" devices are used, the problems previously mentioned with reference to the more conventional common technique will be less; however, this does not prevent that the opening and closing operation of the shutters will require the opening of the window to actuate the latch, which is an uncomfortable operation in its whole; this operation is anyway out of reach or extremely difficult for people forced to live on a wheelchair or for small people.

[0015] Another problem related to the above common technique is that the casing or window frame need to be pierced to let the worm screw control rod go through.

[0016] Moreover, due to the position of the device, its control crank handle is positioned directly near the window or one of its two wings; therefore, this handle would be a hindrance for a complete opening of the window.

[0017] For this reason, the possibility of disconnecting the handle and relevant rod should be provided; therefore, in the practice, the handle will be coupled to the rod whenever the opening and/or closure of the shutters takes place and subsequently removed in order to allow a complete opening of the window.

[0018] Another drawback of the common technique derives from said "remote operated" devices, which are unable on their own to perform the function of a lower hinge pivot of a shutter; therefore, the latter shall always be fitted with at least a lower hinge and an upper hinge with the actuating device mounted between the two, i.e. with consequent cost and cosmetic drawbacks.

[0019] It is the object of the present invention to solve the above drawbacks with a simple, cost-effective and reliable solution.

[0020] In this frame, it is a first object of the present invention to provide a system for blocking in closed position of shutters, doors, windows and the like, which has means for its comfortable actuation from inside a household environment, and which in its particular utilization

for the shutters allows both blocking and release of the shutters also with the relevant window in its closed condition.

[0021] A second object of the present invention is to provide such a system, which also allows the opening and closure movements of shutters, doors, windows and the like from inside a household environment.

[0022] A third object of the present invention is to provide such a system, which can be easily assembled without performing any operations on the frames.

[0023] A fourth object of the present invention is to provide such a system, whose manual actuation device, if provided, does not cause a hindrance to the opening movement of windows.

[0024] A fifth object of the present invention is to provide such a system, which also performs hinge pivot functions.

[0025] One or more of such aims are achieved, according to the present invention, by a system for blocking in closed position of shutters, doors, windows and the like incorporating the features of the annexed claims, which form an integral part of the description herein.

[0026] Further objects, features and advantages of the present invention will become apparent from the following detailed description and annexed drawings, which are supplied by way of non limiting example, wherein:

- Figure 1 shows a perspective view of a couple of shutters incorporating the blocking system in its closed position, according to the present invention;
- Figure 2 shows schematically a partial perspective view of the system, according to the present invention;
- Figure 3 shows schematically a view of a portion of the system according to the present invention, in its open condition;
- Figure 4 shows a section view of a transmission unit pertaining to the system, according to the present invention;
- Figure 5 shows schematically a section view of a movement inverter unit pertaining to the system according to the present invention;
- Figure 6 shows schematically a perspective view of a portion of the system according to the present invention;
- Figures 7 and 7A show schematically a partial view and a perspective view of a first embodiment of the system according to the present invention;
- Figures 8 and 8A show schematically a perspective partial view of a second embodiment of the system according to the present invention.

[0027] In Figure 1 the system for blocking in closed position according to the present invention is illustrated applied to a couple of shutters A1 and A2.

[0028] In the above example, the system comprises

a couple of actuating devices, indicated in their whole with 1 and 1A, each one of them associated to a shutter; as it will be seen later, the device 1 has means for activating a specific safety block for the shutter movement, whereas the device 1A is lacking of it.

[0029] With 2 is indicated as a whole a transmission unit of the movement generated by the above safety block present in the device 1; the transmission unit 2 is located in span to the inner milling of the shutter A1, hinged side.

[0030] With 3 is indicated a motion inverter unit (horizontal/vertical direction) of the safety block of the device 1, which is transmitted by means of the transmission unit 2; the inverter unit 3 is positioned on the closure side of the shutter A1, i.e. opposite to the side where the transmission unit 2 is positioned, in span of the inner milling of the shutter.

[0031] With 4 is indicated a steel plate rod connecting the transmission unit 2 to the inverter unit 3; the rod 4 is located in a special milled seat, obtained in the lower ledge of the shutter A1, and is kept in position by appropriate covers made in a steel plate and/or in plastic material (not described here as being commonly known), allowing anyway its horizontal sliding.

[0032] With 30 is indicated a rod for the safety blocking of the shutter upper side, with 31 is indicated a second slide element for the safety blocking of the shutter lower side.

[0033] Figure 1 does not show the upper hinge pivots of the shutters A1 and A2, which are of common type.

[0034] In figure 2 the device 1 is showed separated from the relevant shutter A1; as it can be noticed, the device 1 has a body 7 obtained from a boxed profile, which has two sides substantially perpendicular to each other, namely one vertical portion 7A and a horizontal portion 7B departing from said vertical portion 7A.

[0035] The horizontal portion 7B houses inside a gearmotor M, which is obtained from a worm screw with a relevant toothed wheel or pinion, not described in detail being of a known type and operation; it should be noticed, in the preferred embodiment of the invention, that the transmission ratio from worm screw to pinion is at least 8:1.

[0036] A hinge pivot 8 departing vertically from the horizontal portion 7B of the body 7, which is integral with the toothed wheel or pinion of the gearmotor M; to this purpose, the portion 7B has an opening for the hinge pivot 8 to go through.

[0037] With 9 is indicated a pin departing perpendicularly with reference to the main axis of the hinge pivot 8; with 10 is indicated a hole through the hinge pivot 8 going in a parallel direction to the pin 9.

[0038] The pin 9 is provided for insertion in a special hole on the side edge of the shutter A1 (see Figure 1), so as to have any rotary movement of the hinge pivot 8 transmitted to the shutter itself.

[0039] The shutter A1 and hinge pivot 8 are made integral to each other by means of a screw going through

the hole 10 on the hinge pivot 8 and screwed on the side edge of the shutter itself.

[0040] Thus, the hinge pivot 8 performs the function of a lower hinge and support of the shutter A1, supporting a portion of its weight.

[0041] According to the invention, the above minimum ratio 8:1 is provided for ensuring actuation of the gear-motor M through the sole worm screw, i.e. not through a movement impressed to the pinion, which may be theoretically obtained shifting the shutter A1 connected to the hinge pivot 8 integral with the pinion itself.

[0042] In other words, if a high value reduction ratio is used, the position of the shutter A1 cannot be changed other than with the help of the worm screw; as a result, since no direct displacement of the shutter is possible, the stop means normally utilized for maintaining the latter in its maximum opening position are no longer required. This function, in fact, is now obtained directly by the gearmotor M, thanks to its special ratio; moreover, for the same reasons, an intermediate closure and/or opening position of the shutter is also possible, without the risk of a sudden closure or opening as caused e.g. by weathering agents, such as the wind.

[0043] Going back to Figure 2, with 11 is indicated a thrust pin connected to a relevant control unit inside of the vertical portion 7A of the body 7; in a preferred embodiment of the invention, the pin 11 exhibits two portions substantially perpendicular to each other, i.e. a first portion 11 A, entering in the vertical portion 7A of the body 7, and a second portion 11B extending out of the same vertical portion 7A, through a special slot F; thus, the portion 11B is aligned to the transmission unit 2, for the purposes to be further explained in the following.

[0044] The height of the portion 11A, for maintaining the alignment with the transmission unit 2, changes in function of the thickness of the shutter on which the system is applied.

[0045] The above control unit inside of the vertical portion 7A of the body 7 will be described later with reference to the Figure 3, where it is indicated with number 16 as a whole.

[0046] The function of the thrust pin 11 is to transmit the movement to the transmission unit 2 as required for obtaining the safety block of the shutter A1 provided by the device 1 (see Figure 1).

[0047] Always in Figure 2, with 12 is indicated a tubular element for actuating of the safety block; as it will be seen later, one end of the tubular element 12 is connected to the above control unit 16 inside of the portion 7A of the body 7.

[0048] Actuation of the safety block is obtained through an angular movement imparted to the tubular element 12 on its axis; to this purpose, the tubular element 12 has a special lever or knob 13, integrally connected outside the tubular element itself; the above angular movement is decidedly below 360°, in particular between 120° and 180°.

[0049] With 14 is indicated a round section rod, one

end of which is connected to the worm screw of the gear-motor M, whereas, on the opposite end of the rod 14 a crank handle 15 is connected by common means or any other appropriate means for transmitting a rotating movement to the rod 14 around its longitudinal axis.

[0050] In order to make the crank handle 15 integral with the rod 14, the latter may have e.g. a milling over its length, so as to fasten the crank handle by means of a grub screw engaging said milling.

[0051] The rod 14 goes coaxially through the inside of the tubular element 12 and is independent from it, i.e. it can rotate within the tubular element itself.

[0052] With reference to Figure 3, with the number 7A is indicated the vertical portion of the body 7 already mentioned above, which is illustrated open on its front; the above tubular actuation element is indicated with 12 and the control unit with 16.

[0053] As it can be noticed, on its end the tubular element 12 has a projection or flanging 12A, with an articulated lever 17 connected to it.

[0054] The lever 17 is connected articulated to a second lever 18, substantially shaped like an upturned L; with 11 is indicated the above thrust pin, whose portion 11A is fastened to the lever 18 with common means, such as screws; as said above, the portion 11B of the pin 11 is outside to the body 7, aligned to the transmission unit 2.

[0055] With 19 is indicated an elastic element, such as a spring, which is apt for maintaining the lever 18 in its rest position against a striker or plate 20.

[0056] Operation of the control unit 16 is as follows.

[0057] The tubular element 12 is submitted to an angular anti-clockwise movement (with reference to Figure 3), e.g. about 120°, by means of the lever 13; due to the projection 12A, this angular movement corresponds to a substantially horizontal movement of the lever 17 to the left; this movement is transferred to the second lever 18, which causes the pin 11 to perform a horizontal displacement always to the left, towards the transmission unit 2 (see Figure 1).

[0058] Upon exceeding its upper dead point, the joining point P between the lever 17 and the flanging 12A of the tubular element 12 is unable to go back to its initial position, unless it will operate again in a reverse sense on the tubular element 12. Vice-versa, causing the tubular element 12 to perform a reverse rotating movement, the spring 19 will take the lever 18 back to its rest position against the striker 20 as soon as the dead point is exceeded.

[0059] The Figure 4 represents as a whole the transmission unit 2, which has the function to transmit the movement from the control unit 16 to the inverter unit 3 (see Figure 1), as described above.

[0060] With 21 is indicated the body of the transmission unit, manufactured as a boxed profile, whereas reference 22 indicates a small sliding piston inside the body 21 and reference 23 indicates a return spring of the piston 22.

[0061] An extension 26 departing perpendicularly from the piston 22, which is inserted in a guide 25 and projects out of the body 21.

[0062] The body 21 has a side opening 24 to let the portion 11B of the pin 11 in (connected as said to the lever 18 of the unit 16 of Figure 3).

[0063] The extension 26 has common means, such as a C-shaped small block 27 with inner notches for connection to the rod 4, operating between the transmission unit 2 and the inverter unit 3 (see Figure 1).

[0064] Figure 5 represents the inverter unit 3; as it can be noticed, this unit has a body 28, with a substantially L-boxed shape; with 29 is indicated a first vertical sliding element, to which is connected as commonly known the steel plate rod 30, which has the function to realize the safety blocking of the upper part of the shutter A1 (see Figure 1). As it can be noticed in Figure 1, the upper end of the rod 30 is appropriately shaped for entering an upper blocking seat, obtained in the upper portion of the shutters frame, or in the upper wall of the recess containing the shutters, if the latter are lacking of an own frame.

[0065] The rod 30 is located in a special milled seat in the inner ledge of the shutter, and is maintained in position by appropriate common steel plate and/or plastic covers, which ensure its vertical sliding.

[0066] As it can be noticed in Figure 5, the first sliding element 29 partially protrudes from the body 28 of the inverter unit 3, through a slot 33.

[0067] With 31 is indicated the second vertical sliding element for safety blocking of the shutter lower portion; also the lower end of the sliding element 31 is appropriately shaped for entering a lower blocking seat, obtained in the lower portion of the shutters frame or in the lower wall of the recess containing the shutters, if the latter are lacking of an own frame.

[0068] The second sliding element 31 protrudes partially from the body 28 through a slot 33A.

[0069] The ends of both sliding elements 29 and 31, inside the body 28, are appropriately shaped for complementing each other and ensure a longer sliding stroke of both sliding elements.

[0070] With 32 is indicated a joining element, such as a steel plate having a substantially rectangular section, to which is connected by common means with the rod 4 for connecting the inverter unit 3 to the transmission unit 2.

[0071] The joining element 32 slides linearly within the body 28, wherefrom it partially protrudes through a slot 33B.

[0072] A small block 34 is integrally fastened on the joining element 32; with 35 and 36 are indicated two elastic elements, such as rods made from harmonic steel, which rods are fastened to the upper end of the small block 34.

[0073] The second ends of both elastic elements 35 and 36 are fastened one to the first sliding element 29 and the other to the second sliding element 31, respec-

tively.

[0074] The elastic element 35 is inserted in a substantially semicircular guide 37, whereas the elastic element 36 is inserted in substantially semicircular guide 38, having a bending opposite to the bending of the guide 37.

[0075] Insertion of both elastic elements 35 and 36 in the relevant guides 37 and 38 causes their end connected to the relevant sliding element, to be vertically oriented either upwards or downwards.

[0076] The horizontal movement of the small block 34, caused by the movement of the rod 4 connected to the joining element 32, pushes the elastic elements 35 and 36 towards the sliding elements 29 and 31.

[0077] This horizontal movement of the small block 34, depending on the bending imposed by the relevant guide in which they are inserted, is converted to a vertical movement, upwards of the elastic element 35 and downwards of the elastic element 36, respectively.

[0078] Therefore, this vertical movement is transmitted by the elastic elements 35 and 36 to the relevant sliding element, i.e. upwards to the sliding element 29 and downwards to the sliding element 31.

[0079] The vertical upward shifting of the sliding element 29 causes the rod 30 connected to it, to protrude from the shutter upper portion and engage in the above upper blocking seat; the downward shifting of the sliding element 31 causes its end to protrude from the shutter and engage in the above lower blocking seat.

[0080] The safety block of the shutter A1 (see Figure 1) and consequently also of the shutter A2 is obtained inserting the end of the rod 30 and sliding element 31 in the relevant upper and lower blocking seats.

[0081] The reverse movement of the small block 34 will obviously cause a reverse vertical sliding of the elastic elements 35 and 36 connected to it; such a contrasting vertical movement of the elastic elements 35 and 36 transmitted to the relevant sliding element causes the ends of the rod 30 and sliding element 31 to be released from their relevant blocking seats, so as to ensure the opening of the shutters by means of the system according to the invention.

[0082] With reference to Figure 6, the actuation device 1A is represented to such a purpose; substantially, the device 1A is similar to the device 1 previously described, but is not associated to the means required for obtaining the blocking of the shutters (i.e.: the transmission unit 2, inverter unit 3, rod 4, elements 30 and 31).

[0083] With 39 is indicated the body of the actuation device 1A, consisting of a boxed profile with a vertical base 39A for its setup.

[0084] The body 39 contains inside a gearmotor similar to the one fitted in the device 1, i.e. comprising a worm screw with relevant toothed wheel or pinion. Similarly, a hinge pivot 8A departing vertically from the upper portion of the body 39 is integral with the toothed wheel or pinion of the gearmotor and has the same functions of the hinge pivot 8 of figure 2.

[0085] With 9A is indicated a pin departing perpendic-

ularly and integrally from the hinge pivot 8A, but in the opposite sense of the pin 9 of the hinge pivot 8 of figure 2, where 10A indicates a through hole in the hinge pivot 8A parallel to the pin 9A.

[0086] The pin 9A will be inserted in a special hole on the side edge of the shutter A2 (Figure 1), so that any rotating movement of the hinge pivot 8A is transmitted to the shutter itself; the shutter A2 and hinge pivot 8A are integral with each other by means of a screw screwed in the shutter side edge and going through the hole 10A on the hinge pivot 8A.

[0087] Therefore, as a result, the hinge pivot 8A performs also the function of a lower hinge and support to the shutter A2.

[0088] With 14A is indicated a rod of circular section, which is connected on one end to the worm screw of the gearmotor; on its opposite end a crank handle 15 or handwheel or other means (not represented) suitable for rotating the bar 14A is connected with common means.

[0089] The bar 14A goes coaxially inside a tubular element 12A from which is it independent, i.e. it can rotate within the tubular element itself. The tubular element 14A is fastened to the base 39A and is used as a protection for the bar 14A.

[0090] Set up of the system according to the invention is performed as follows.

[0091] As regards the actuation device 1, the tubular element 12, with its relevant bar 14, is inserted in a hole crossing the external wall of the window provides of the shutters, below the lower ledge profile and its threshold level: thus, the integrity of the relevant jamb of the window recess or wall casing is not jeopardized.

[0092] It should be noticed how in order to protect the tubular element 12 and bar 14 from dust and/or slag from the hole pierced in the external wall, the tubular element 12 is inserted in a plastic tubular element.

[0093] It is quite obvious that both the tubular element 12 and bar 14 must have a length exceeding the thickness of the external wall, and protrude inside the apartment to such an extent ensuring application of a common ring or washer for the closure of the hole and assembly of the crank handle 15; moreover, the lever 13 is associated to tubular element 12.

[0094] The body 7 of the device 1 is then fastened according to common procedures (such as with screws and dowels) to the outer side of the wall or shutter frame.

[0095] The shutter A1, previously fitted with its upper hinge (not represented in the figures), transmission unit 2, inverter unit 3, rod 4 and blocking means 30 and 31, is then associated to the device 1, as previously described (i.e. by means of the pin 9 and hole 10 of the hinge pivot 8).

[0096] As explained above, the relevant position between the transmission unit 2 and the portion 7A of the body 7 of the device 1 is such that the portion 11 B of the pin 11 is aligned to the body 21 of the unit 2, namely to the opening 24 of the latter (see figures 1 and 4).

[0097] The device 1A for operating the second shutter A2, is applied according to the same procedures.

[0098] It should be noticed that by virtue of the special assembly arrangement, both the crank handles 15 and the lever 13 are positioned during their use below the lower ledge profile and window threshold level; thus, the crank handles 15 and the lever 13 never cause any hindrance to the opening movement of the window shutters.

[0099] The system according to the present invention operates as follows.

[0100] Closure of the shutters is performed starting from the shutter associated to the actuation device 1A, i.e. shutter A2 of figure 1.

[0101] By means of the crank handle 15 a rotary movement is transmitted to the bar 14A which, through the worm screw on its end, transmits a movement to the relevant toothed wheel or pinion. In its turn, the toothed wheel or pinion transmits the rotary movement to the hinge pivot 8A integral with it; the hinge pivot 8A being connected to the shutter A2 will start its closing movement until it is completely closed.

[0102] The same operation is then performed also for the shutter exhibiting the actuation device 1, i.e. shutter A1 of Figure 1, until it is completely closed.

[0103] Blocking the shutters in their closed position is obtained operating on the lever 13 and transmitting, as said, a partial rotation to the tubular element 12.

[0104] As previously explained with reference to the Figure 3, this movement of the tubular element 12 causes operation of the control unit contained inside the body 7 of the device 1, whose aim is to produce a linear sliding of the pin 11 (to the left, with reference to Figure 2), through the relevant slot F.

[0105] Therefore, the pin 11 entering the transmission unit 2 through the slot 24 will shift the piston 22 and relevant extension 25 connected to it, so it is submitted to a horizontal movement to the left (with reference to Figure 4), with a consequent shifting of the rod 4 connected to it, in the same direction.

[0106] The rod 4 transmits the movement to the joining element 32, and consequently to the small block 34 available inside the inverter unit 3 (Figure 5).

[0107] The small block 34, in its turn, transmits this horizontal movement to the left to the elastic elements 35 and 36 connected to it, which will then move upwards or downwards, respectively.

[0108] This vertical movement of the elastic elements 35 and 36 in opposite directions is transmitted to the respective sliding elements, i.e. upwards to the sliding element 29 and downwards to the sliding element 31.

[0109] The vertical shifting upwards of the sliding element 29 causes the rod 30 connected to it to protrude out of the shutter A1 and engage the relevant upper blocking seat, whereas the shifting downwards of the sliding element 31 causes its end to protrude out of the shutter A1 and engage the relevant lower blocking seat.

[0110] Thus, the safety blocking of the shutter A1 and

consequently also of the shutter A2 is obtained thanks to the known effect exerted by the closing swing on the receiving swing: i.e. shutter A1 on shutter A2.

[0111] As previously cleared with reference to the Figure 3, this blocking position can only be changed from inside of the apartment, operating on the lever 13 in a reverse sense to the one just described.

[0112] In fact, to realize the unblocking and the following opening of the shutters A1 and A2 operation will be in a reverse sense to the previous one; the tubular element 12, by means of the lever 13, is rotated in an opposite sense to the previous one, so as to take the pin 11 back by means of the control unit 16 to its initial position.

[0113] The consequent backing of the pin 11 causes the piston 22 of the unit 2 to go back to its initial position, by means of the return spring 23 (Figure 4); so doing, the piston 22 takes the rod 4 with it.

[0114] Thus, also the small block 34 of the unit 3, connected to the rod 4, goes back to its initial position; such a reverse movement of the small block 34 causes the elastic elements 35 and 36 connected to it, to go back to their original positions and so the relevant sliding elements 29 and 31.

[0115] As a result, the end of the rod 30 connected to the sliding element 29 and the end of the sliding element 31 will be released from their respective blocking seats and ensure opening of the shutters by means of the crank handles 15 of the devices 1 and 1A.

[0116] The features of the system for blocking in closed position of shutters, doors, windows and the like according to the present invention are clear from the above description and annexed drawings as well as from the annexed claims.

[0117] From the above description also the relevant advantages of the system object of the invention are clear. In particular, the system described above:

- allows the blocking in closed position of shutters, door, windows and the like in a simple comfortable manner, operating from inside a household environment;
- allows, in particular when used for shutters, both the blocking and release of the shutters also with the relevant window in closed condition;
- can be easily fitted with means ensuring also the opening and closing movements of shutters, doors, windows and the like from inside a household environment;
- can be easily assembled without operating on the casings and without jeopardizing the integrity of the recess jamb of the wall or casing fastened to it;
- prevents its manual actuating devices (crank handle 15 and/or lever 13) from causing a hindrance to the opening movement of the window wings;
- allows also a direct function of the hinge pivot or lower hinge for shutters, doors, windows and the like;

- removes the need of special stop means for keeping the shutters or windows, etc., in their maximum opening position or intermediate positions.

[0118] It is obvious that many changes and applications are possible to the blocking system described above by way of example.

[0119] According to a possible embodiment, for example, a telescopic tubular element may be used instead of a tubular element 12 to adapt to the different thickness of the external wall wherein it should be inserted.

[0120] This embodiment is illustrated in Figure 7, where the reference 40 indicates the tubular element, with 40A and 40B two parts forming the tubular element itself.

[0121] Both tubular parts 40A and 40B exhibit, for a certain portion of their length, two millings, which divide the circular crown of the section of the tubular element 40 in four circular segments, substantially equal to each other.

[0122] Thus, the resulting section will have two full circular segments and two empty circular segments; Figure 7A illustrates to this purpose a perspective view of the end of one of the two tubular parts, the end of the other part is similar and symmetric.

[0123] Approaching the ends of the two tubular parts 40A and 40B, rotated between them by 90°, the respective full circular segments can be inserted in the respective empty circular segments so as to obtain a coupling between the two tubular elements.

[0124] Inserting both tubular parts more or less between them, the total length of the tubular element 40 resulting from this can be changed, adapting it to the thickness of the external wall.

[0125] It is obvious that one of the two tubular parts will bring the projection 12A to its other end for connection to the lever 17 of the safety block control unit (Figure 3), whereas the other tubular part is provided for receiving the lever 13.

[0126] Should the system according to the present invention be used in areas where during the winter season the temperature outside reaches several degrees below zero, then the problem arises to avoid the transmission of such a temperature from outside getting inside the apartment, as the humidity therein would condense on the metal parts of the device located inside.

[0127] To obviate to this problem, the tubular element 12 or one of the two tubular parts 40A-40B of the tubular element 40 can be made from an appropriate plastic material; since the plastic material is a bad thermal conductor, transmission of the external temperature into the apartment will be hindered, avoiding a consequent condensation of the existing humidity.

[0128] Another possible embodiment is represented in Figure 8, where with the number 1B is indicated an actuation device similar to the device 1 of Figure 1, but differing from the latter due to the presence of an addi-

tional element 43, inserted on a hinge pivot 8B; the remaining components of the device 1B are indicated with the same reference numbers utilized in Figure 1.

[0129] The hinge pivot 8B of the device 1B is integral with the toothed wheel or pinion of the gearmotor M; the additional element 43 consists of a second hinge pivot inserted on the hinge pivot 8B.

[0130] Both hinge pivots 8B and 43 are integral to each other by common means, such as a key. With 44 is indicated a pin departing perpendicularly and integrally from the hinge pivot 43, with 45 is indicated a screw parallel to the pin 44; the screw 45 is assembled, with common means, on the hinge pivot 43 and is unable to shift longitudinally, though being free to rotate.

[0131] The pin 44 will be inserted in a special hole present on the side edge of the shutter A1, so that the rotary movements of the hinge pivot 43, received from the hinge pivot 8B, are transmitted to the shutter. The shutter and hinge pivot 43 are integral with each other by screwing of the screw 45 in the shutter edge.

[0132] The screw 45, which cannot shift longitudinally, allows adjusting of the shutter position with respect to the axis of the hinge pivot 43; to this purpose the screw 45 should be screwed to a more or less in the shutter, to approach it more or less to the hinge pivot 43; thus, the device can be adapted to the various sizes and positions of the shutters available on the market.

[0133] Finally, Figure 8A illustrates the same embodiment as described above, but applied to an actuation device similar to the device of Figure 6; this device is indicated as a whole with 1C; with 8C is indicated the hinge pivot integral with the gearmotor M of the device 1 C, whereas with 43 is indicated the additional hinge pivot inserted on the hinge pivot 8C.

[0134] Of course, for the assembly of the shutter to the hinge pivot 43 and its prerogatives, reference can be made to the above description with reference to the Figure 8 and device 1B.

[0135] A subsequent implementation is to have the shutter adjustable also in its height with respect to the actuation device. In order to obtain this adjustment, the hinge pivot is connected to the gearmotor by means of a key or other common means, which make them integral with each other for transmitting the rotary movement from the gearmotor to the hinge pivot, letting anyway the hinge pivot slide in the vertical direction.

[0136] Height adjustment is obtained by means of a screw, positioned in the lower portion of the body containing the gearmotor, in line with the vertical axis of the hinge pivot; between the screw end and the lower base of the hinge pivot a ball is interposed for improving the rotary movement of the hinge pivot and reduce frictions.

[0137] Screwing the screw in the body containing the gearmotor, it will operate, through the ball, on the lower base of the hinge pivot and cause a vertical shifting, obtaining a height adjustment of the shutter with respect to the actuation device.

[0138] Another possible implementation is to employ

the system according the invention on existing shutters, i.e. which have not the millings required for assembling the various components 2, 3, 4, etc., and whose execution would be too expensive.

[0139] In this instance the various components, such as the transmission unit 2, inverter unit 3, connection rod 4 and closure rod 30, are located directly on the surface of the shutter inner side.

[0140] According to this application, the connecting bar 4 and closure rod 30 may be a cylindrical bar instead of a steel plate, so as to possibly occupy less space and have an improved aesthetic sight.

[0141] The bars may be covered and kept in position by a tube made from plastic material to be fastened to the shutter with common means and through which the bars can slide; alternatively, a tube or covering profile of a suitable section available on the market can be utilized for covering the bars; the colour of the tube or covering profile will conform to the colour of the shutters or be chosen by the user.

[0142] A further implementation is to power the system function performing the opening/closure of the shutters, by means of an electric motor replacing the crank handle 15, fitted with an appropriate reducer, controlled by a simple electric button; the same applies for the blocking system.

[0143] Finally, it is also clear that the system according the invention, as previously described with reference to its utilization for shutters, can also be applied to other types of door and window frames.

[0144] Also, the blocking system according the invention can be provided for replacing the usual handle used for blocking windows in closed position.

[0145] It should finally be noticed that the blocking system described above may also be obtained independently from the availability of means for controlling the opening/closure movements of the linked window frames from inside a room; in other words, the system described may not have the bar 14, its relevant crank handle 15, of the gearmotor M and of the hinge pivot 8, in which case the window frames will be fitted with usual hinges.

[0146] Finally, it is clear that many other changes and implementations are possible for the man skilled in the art to the system for blocking in closed position of shutters, doors, windows and the like, without departing from the novelty spirit of the invention.

Claims

1. System for blocking in closed position of shutters, doors, windows and the like, comprising at least a shutter (A1) capable of movement, where said shutter (A1) is positioned substantially in line with an opening, said opening being defined in a wall of a room and/or delimited by a frame, to said shutter (A1) being associated means (30,31) for its me-

chanical blocking in a closed position, characterized in that are provides means (1,2,3,4,12,13;40) for actuating said blocking means (30,31) from inside of said room, controllable from a remote position with respect to said shutter (A1).

2. System, according to claim 1, characterized in that said means comprise:

- first actuating means (12,13;40) to be actuated from inside the room and arranged in a remote position with respect to the shutter (A1);
- first driving means (1) associated to said wall and/or said window frame and actuated by said first actuating means (12,13;40);
- transmission means (2,3,4) associated to said shutter (A1) and actuated by said first driving means (1), and operative for controlling said blocking means (30,31).

3. System, according to claim 2, characterized in that said first actuating means (12,13;40) comprising a first movable element (12;40) going at least partially through said wall and capable of performing a first type of movements, in particular of angular type.

4. System, according to claim 3, characterized in that said first driving means (1) comprise a first kinematic motion (16) mechanically connected to said first movable element (12;40) and capable of converting the movements of the latter in a second type of movements, in particular of linear type, of a second movable element (11).

5. System, according to claim 2, characterized in that are provided safety means (16) to ensure the maintaining of the working position of said first driving means (1), i.e. the blocking position of said shutter (A1) in closed position.

6. System, according to claims 4 and 5, characterized in that said safety means comprise said first kinematic motion (16).

7. System, according to claim 4, characterized in that said transmission means (2,3,4) comprise a third movable element (22), capable of motion by means of said second movable element (11), said third movable element (22) and said second movable element (11) being mechanically independent from each other.

8. System, according to the previous claim, characterized in that said transmission means (2,3,4) comprise a second kinematic motion (3,4) mechanically connected to said third movable element (22) and capable to transmit the movements of the latter into movements of said blocking means (30,31).

9. System, according to the previous claim, characterized in that said second kinematic motion (3,4) is apt to convert a linear movement of said third movable element (22) into a movement of said blocking means (30,31) according to a direction substantially perpendicular respect to said linear movement.

10. System, according to the previous claim, characterized in that said blocking means comprise two sliding elements in opposite directions (30,31), following the movement of respective elastic elements, in particular metal rods (35,36), pertaining to said second kinematic motion (3).

11. System, according to the previous claim, characterized in that said elastic elements (35,36) are capable of movement inside of respective guides (37,38), said guides in particular being at least partially bent.

12. System, according to claim 1, characterized in that are further provided means (M,8,14,15;43) for controlling the opening and/or closure motion of said shutter (A1) from inside said environment and from a remote position with respect to said shutter (A1).

13. System, according to claim 12 characterized in that at least some of said means (M,8,14,15;43) perform the function of a hinge pivot or hinge for said shutter (A1).

14. System, according to claim 12 or 13, characterized in that said means (M,8,14,15;43) comprise:

- second actuating means (14,15) to be actuated from inside the room, arranged in a remote position with respect to the shutter (A1);
- second driving means (M) associated to said wall and/or said window frame and actuated by means of said second actuating means (14,15);
- transmission means (8,43) associated to said shutter (A1) and actuated by means of said second transmission means (M), and operative to obtain the motion of said shutter (A1).

15. System, according to claim 14, characterized in that said second actuating means (14,15) comprise a movable component (14) going at least partially through said wall and capable to perform a first type of movements, in particular angular movements.

16. System, according to the previous claim, characterized in that said second driving means (M) comprise a gearmotor (M), comprising in particular a worm screw, mechanically associated to said movable component (14) and a pinion or toothed wheel.

17. System, according to the previous claim, character-

ized in that to said gearmotor (M), and in particular to said pinion, is associated a hinge pivot (8;43) integral with said shutter (A1) and capable to perform angular movements.

18. System, according to at least one of the previous claims, characterized in that are provided means (M) to ensure the maintaining of the maximum opening position of said shutter (A1) or intermediate positions between its maximum opening and closure positions. 10
19. System, according to the previous claim, characterized in that said means comprise said gearmotor (M), whose transmission ratio is at least 8 : 1. 15
20. System, according to claims 3 and 15, characterized in that said first movable element (12;40) and said movable component (14) are at least partially coaxial to each other, said first movable element (12;40) being in particular a tubular type and said movable component (14) being inserted at least partially in it. 20
21. System, according to at least one of the previous claims, characterized in that said first movable element (40) is a telescopic element. 25
22. System, according to at least one of the previous claims, characterized in that said first movable element (12;40) is at least in part manufactured from a material having a low thermal conductivity degree, such as a plastic material. 30
23. System, according to claim 17, characterized in that said hinge pivot (43) comprises adjusting means (45) of the relevant position between said shutter (A1) and the rotary axis of the hinge pivot itself, said adjusting means comprising in particular a screw (45) associated to said hinge pivot (43), which is capable of rotation but not of a longitudinally shifting. 35 40
24. System, according to claim 1, characterized in that at least a part (2,3,4) of said means (1,2,3,4,12,13) are inserted in seats or millings delimited directly in said shutter (A1). 45
25. System, according to claim 1, characterized in that at least a part (2,3,4) of said means (1,2,3,4,12,13) are associated to the shutter surface (A1) directed to said environment in its closed position, and externally to it. 50
26. System, according to at least one of the previous claims, characterized in that said part (2,3,4) of said means (1,2,3,4,12,13) are associated to covering elements fastened to said shutter (A1). 55

27. System, according to at least one of the previous claims, characterized in that the force required for operation of said first actuating means (12,13;40) and/or said second actuating means (14,15) is exerted manually. 5

28. System, according to at least one of the previous claims, characterized in that the force required for operation of said first actuating means (12,13;40) and/or said second actuating means (14,15) is exerted by means of a motor, in particular an electric motor.

29. System, according to at least one of the previous claims, characterized in that said first movable element (12,13;40) and/or said movable component (14,15) are positioned outside the motional dimensions of said shutter (A1).

30. System, according to the previous claim, characterized in that said first movable element (12,13;40) and/or said movable component (14,15) are positioned below said opening of said wall and/or said window frame.

31. System, according to one or more of the previous claims, characterized in that said driving means (1; 1A) comprise height adjusting means of said hinge pivot (43) for changing the relevant position between said shutter (A1;A2) and said driving means (1;1A).

32. System for controlling the opening and/or closure motion of shutters, doors, windows and the like, comprising at least a shutter (A1;A2) capable of movement, where said shutter (A1;A2) is positioned substantially in line with an opening, said opening being defined in a wall of a room and/or delimited by a window frame, said system comprising:

- actuating means (14,15) to be actuated from inside the room, arranged in a remote position with respect to the shutter (A1;A2);
- driving means (M), associated to said wall and/or said window frame, actuated by said second actuating means (14,15);
- transmission means (8;8A;43), associated to said shutter (A1;A2) and actuated by means said second driving means (M), and operative for obtaining the motion of said (A1;A2);

characterized in that said driving means (M) and said transmission means (8;8A;43) perform the function of hinge pivot, or hinge, or support, for said shutter (A1;A2).

33. System, according to the previous claim, characterized in that to said shutter (A1) are associated

means (30,31) for its mechanical blocking in a closed position, and that said system comprises means (1,2,3,4,12,13) for actuation of said blocking means (30,31) from inside said environment, controllable from a remote position with respect to said shutter (A1). 5

34. System for controlling the opening and/or closure motion of shutters, doors, windows and the like, comprising at least a shutter (A1,A2) capable of movement, where said shutter (A1,A2) is positioned substantially in line with an opening, said opening being defined on a wall of a room and/or delimited by a frame, to said shutter (A1) being associated means (30,31) for its mechanical blocking in a closed position, where said system comprises mechanical means (M,8,14,15) for controlling the opening and/or closure motion of said shutter (A1) from inside of said environment and from a remote position with respect to said shutter (A1), characterized in that are further provided means (1,2,3,4,12,13) for actuation of said blocking means (30,31) from inside of said environment, controllable from a remote position with respect to said shutter (A1). 10 15 20 25

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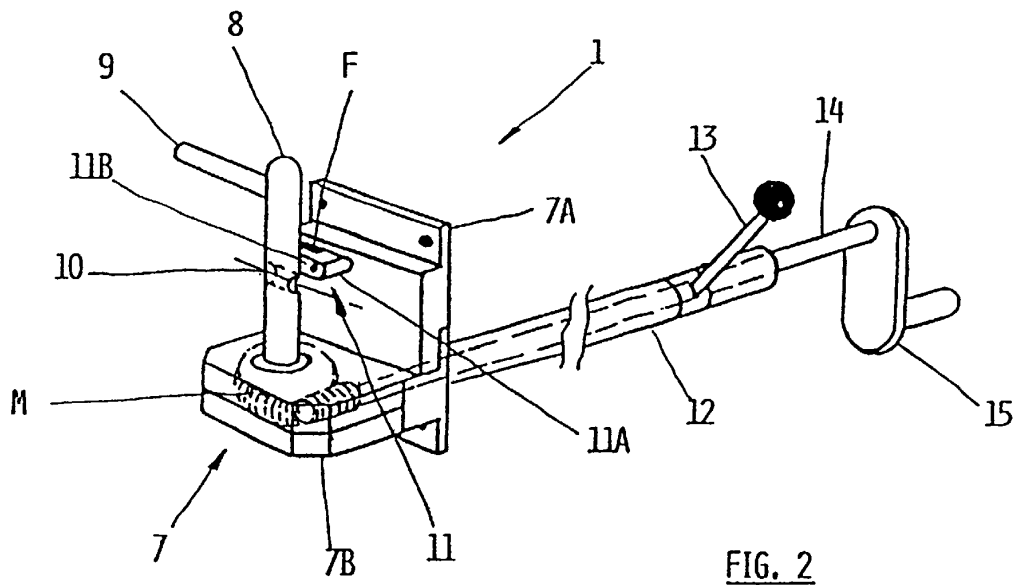
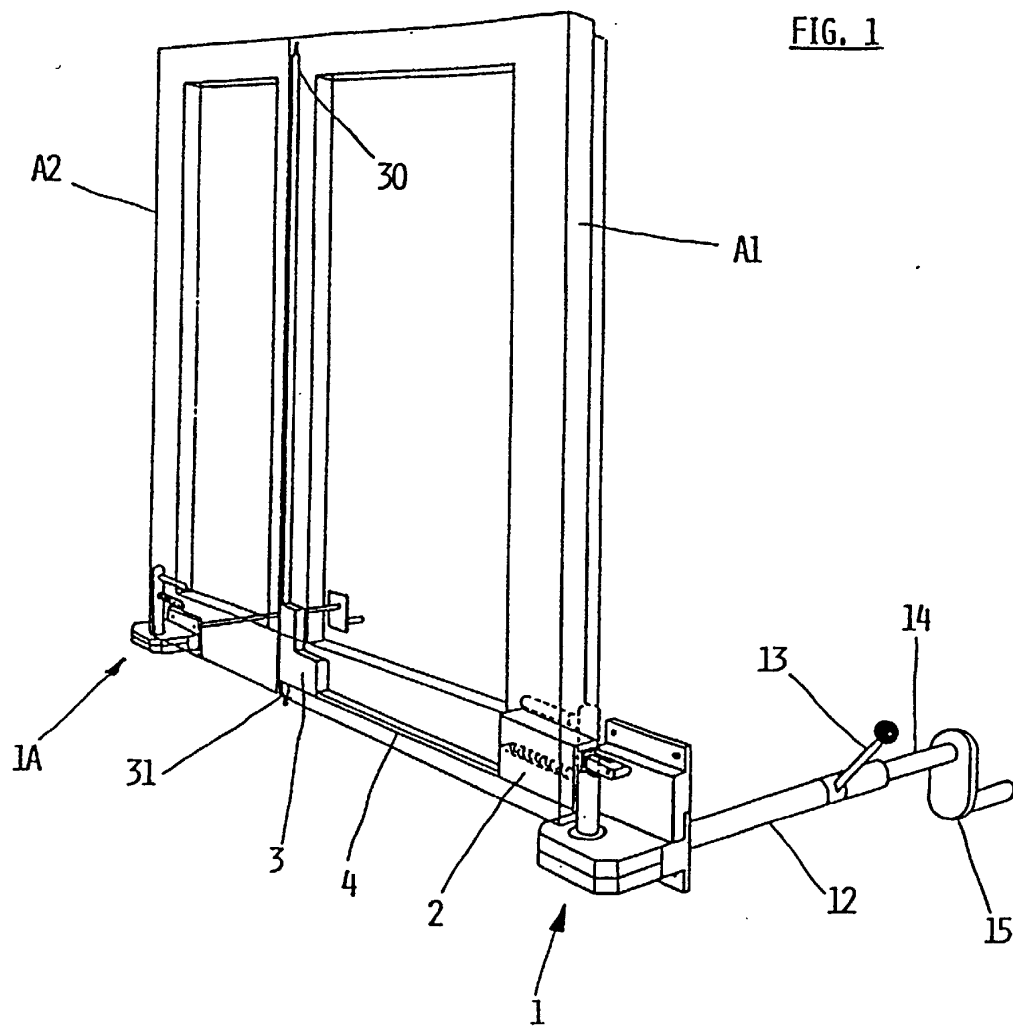
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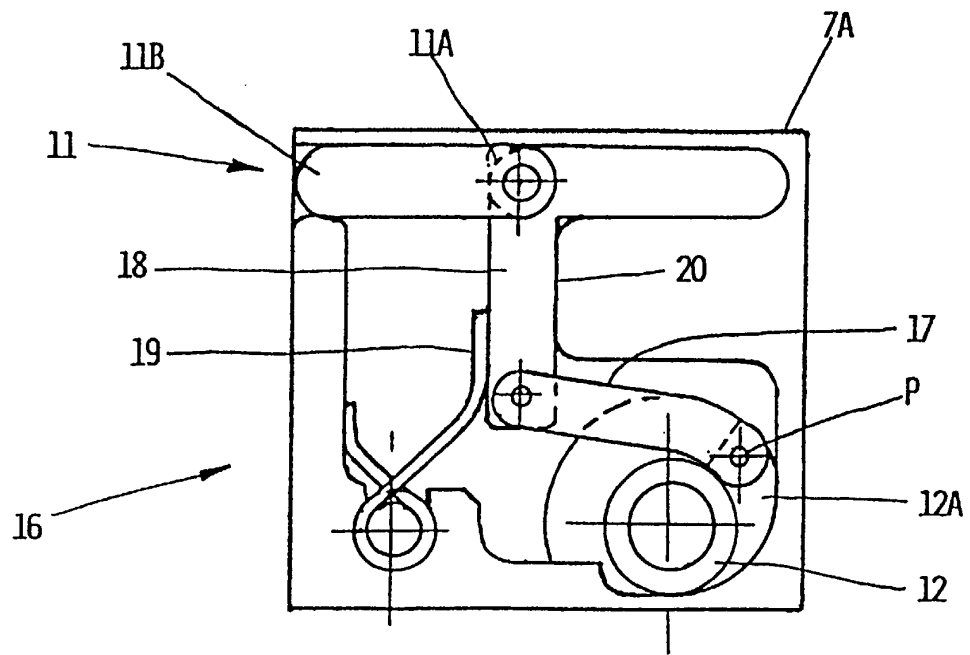


FIG. 3

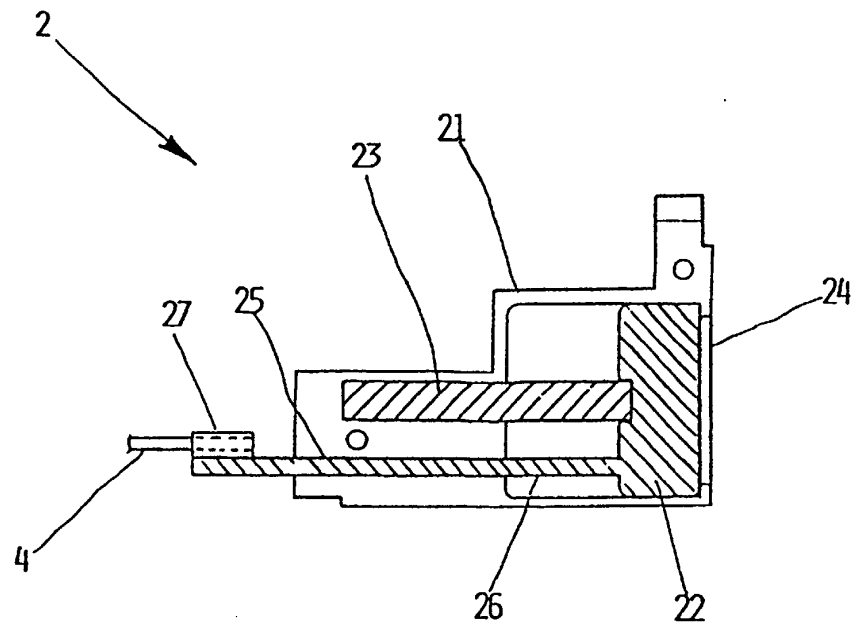
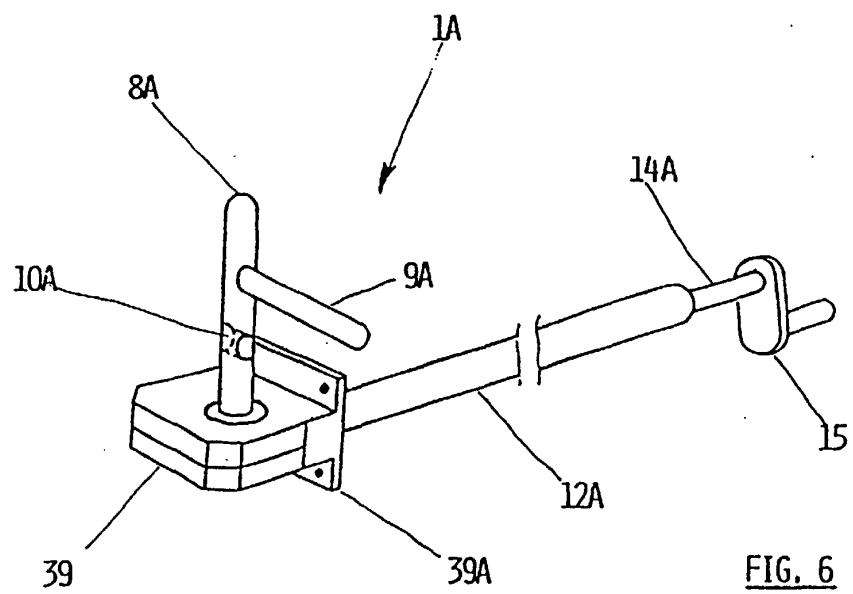
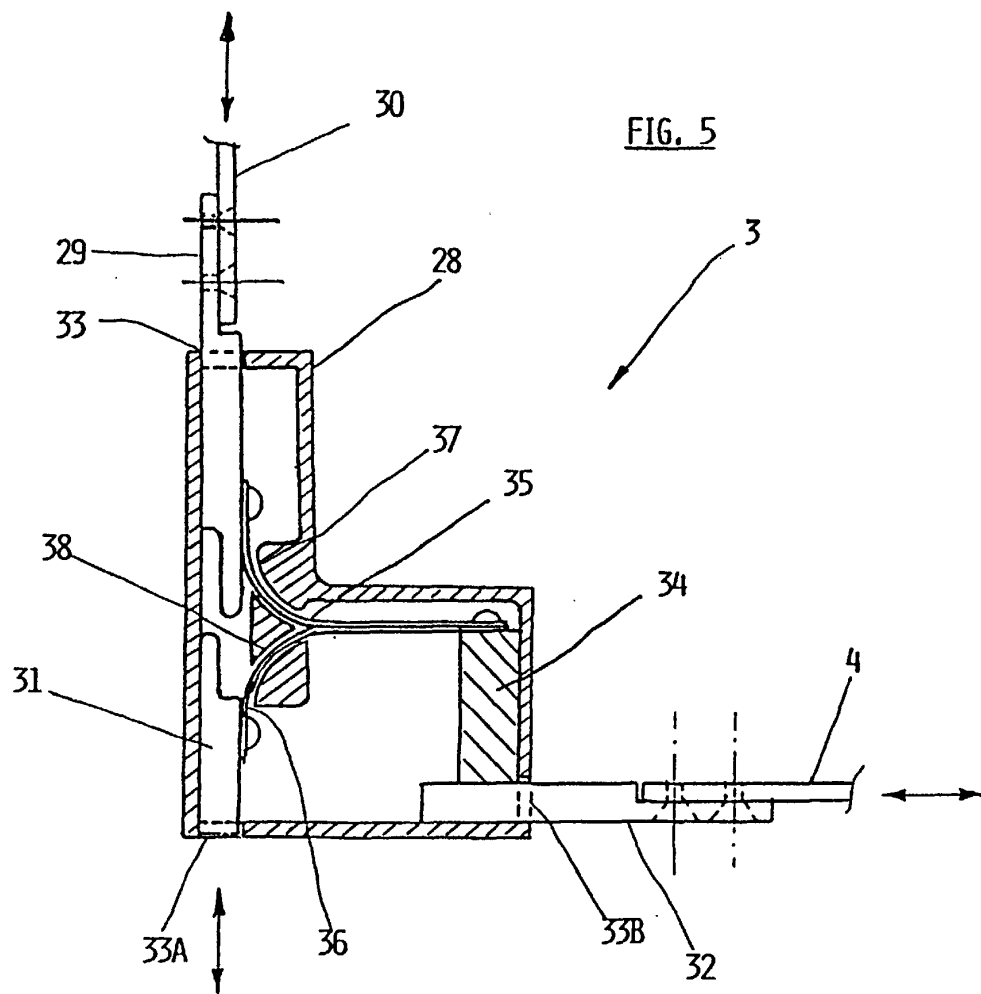


FIG. 4



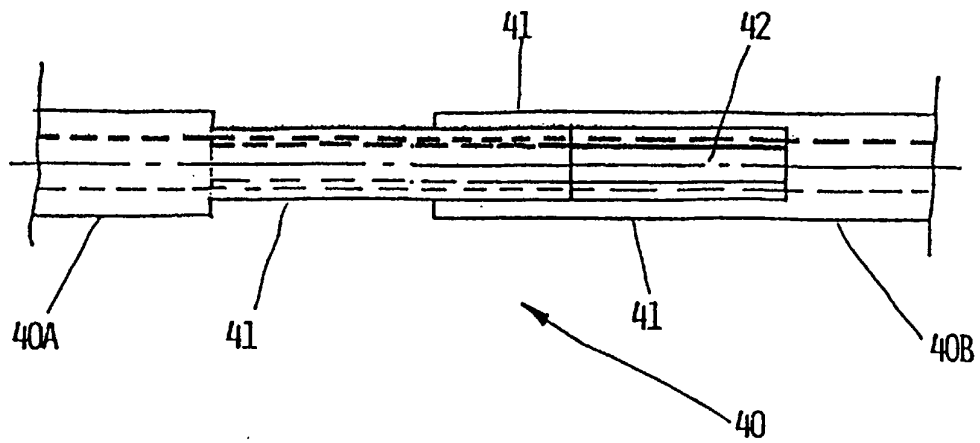


FIG. 7

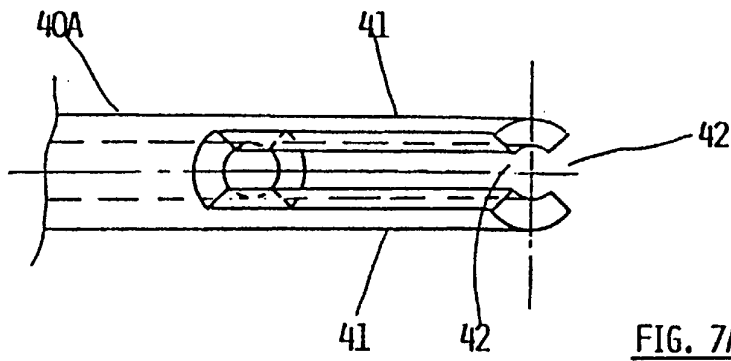


FIG. 7A

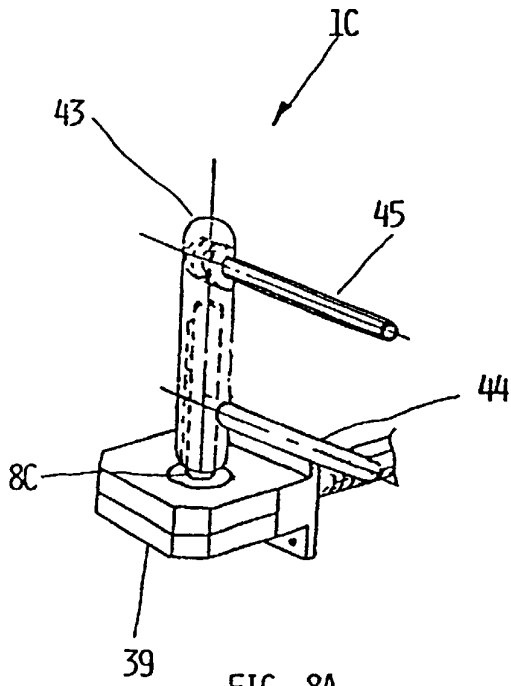


FIG. 8A

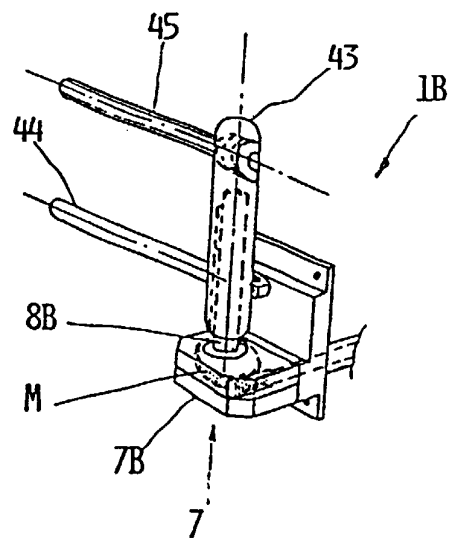


FIG. 8