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(54) AUTOMATED WHEELING MECHANISM COMPRISING A CLEANING SYSTEM AND AN INTERCHANGEABLE WHEEL MOUNT FOR SLIDING DOORS AND SIMILAR

(57) The invention relates to an automated wheeling mechanism comprising a cleaning system and an interchangeable wheel mount for sliding doors and similar. The inventive mechanism is fixed to a moving panel 5 and comprises a height-adjustment screw 1 which is fixed to an upper flange 6 with the aid of a position-anchoring nut 2 and which serves as a support for a spring 11 that presses against a wheel mount 8. The wheel mount 8 is guided along inverted-L-shaped guides 10 and the lower part of said mount is equipped with a cleaning brush 19 that is in contact with the wheel 22. The wheel 22 is provided with a tread 23, to which a transformer ring 33 can be coupled in order to adapt same to any type of guide track. The inventive mechanism can be used in the construction of wardrobes and similar.

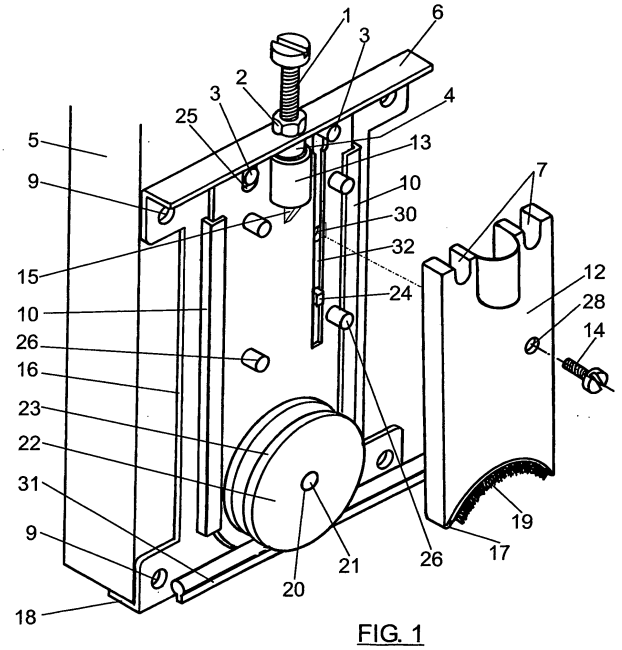

FIG. 1

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Description

Field of the Invention

[0001] This invention is applicable within the industry dedicated to the manufacture and marketing of auxiliary elements, devices and apparatuses for manufacturing sliding doors especially sliding doors in wardrobes, intended for the sector of wood, furniture and suppliers of these components.

Background of the Invention

[0002] Sliding carriages or devices for sliding doors are already well known. Some of them belong to public use technologies, and are generally described as a casing which is fixed to the rear part of the door by means for that end, a wheel mount which slides vertically by means of side flanges coupled to said casing, an elastic interposition spring driving the wheel towards the outside of the door, providing an anti-derailment effect, a maximum and minimum coupling adjustment screw traversing such spring internally and a position-anchoring nut. Mechanisms with this configuration could be described for example in US 3,030,654, dated February 23, 1960, US 3,698,036 (Sliding structure roller assembly), dated October 17, 1972 or US 4,064,593 (Sliding door roller assembly), dated November 1, 1976, or in ES 2013033 dated February 20, 1989 and finally ES 20026771, dated November 7, 1990.

[0003] Said mechanisms have the drawback of lacking means for securing the wheel mount in a certain position for facilitating the installation of the doors in the wardrobe by the operators.

[0004] Another drawback of the mechanisms of the type described is that they do not incorporate any wheel cleaning system allowing and ensuring a smooth rolling while moving along the tracks where it is guided, and preventing the anti-derailment effect of the spring from becoming a shock-absorbing effect such as that of a car due to accumulation of dirt in the wheel. Said accumulation of dirt would provide the eccentricity of the wheeling path, causing jumps in the sliding action due to the effect of the expansion of the spring. Accordingly, the wheel will lose contact with the track with the subsequent possibility of its derailment and subsequent risks for the user.

[0005] Another further drawback of traditional mechanisms is derived from the possibilities of deterioration, wearing and breaking of the wheel, making it necessary to discard the entire mechanism, not allowing the disassembly of the wheel mount for replacement.

[0006] A further drawback of traditional mechanisms is derived from the wheeling path. The wheeling path always has the same shape adapted to the track along which it slides. If the track is damaged due to a blow as a result of an object falling on it and needs replacement, it would necessarily have to be a track adapted to the wheeling path of the wheel since there is no possibility of changing the shape of the wheeling path by means of a transformation ring.

[0007] Before and after placing the door, in conventional mechanisms the devices for securing the wheel mount demand certain elements or devices to be manually actuated with the use of tools, which elements or devices allow releasing the wheel mount plate, such that by the action of the spring said plate is driven towards the outside of the frame and door respectively so as to be supported on the guide track, providing the anti-derailment effect. All of this requires operations that may unnecessarily harm the operators.

[0008] Since no system for automatically securing and releasing the wheel mount is incorporated, such wheel mount would be locked due to oversight or carelessness, thus overcoming the resistance of the spring, preventing the latter from driving such wheel mount towards the outside of the door, making the anti-derailment system ineffective, taking into account that the sliding doors of wardrobes are increasingly larger, heavier and therefore more dangerous, and therefore their handling and operation increasingly require more safety. Traditional mechanisms also do not incorporate means which allow disassembling the wheel mount plate in order to replace it, being necessary to discard the entire mechanism due to the wearing or breaking thereof with the subsequent economic repercussions involved.

[0009] Due to the above, the need has been detected to provide a new technology ending these risks and drawbacks.

[0010] The object of the present invention is to eliminate the described risks and drawbacks by means of a mechanism incorporating an automatic system for securing and releasing the wheel mount which ensures the effective actuation of the anti-derailment effect once it has been assembled, without needing manual operations.

[0011] Another object of the invention is to provide the mechanism with a system which allows permanently cleaning the wheels, means that can be easily replaced, without needing to disassemble the door or wheeling mechanism.

[0012] A further object of the invention is to achieve a wheeling mechanism which allows easily disassembling the wheel mount plate in order to replace it, for example due to the wearing or breaking of the wheel. All of this without needing to use specialized personnel with subsequent savings for the final user.

[0013] A further advantage of the invention lies in the possibility of easily transforming the wheeling path by means of a ring achieving the adaptation thereof to any track shape available in the market.

[0014] According to the invention, the indicated objects and advantages are achieved by means of a wheeling mechanism having means for automatically securing and releasing the wheel mount plate, incorporating a permanent and replaceable cleaning system, and which furthermore allows fast and simple disassembly of the wheel

mount plate from the frame in order to replace the worn elements. The wheeling mechanism can further be adapted to any type of guide track for sliding doors.

[0015] The wheeling mechanism of the invention is of the type described, formed from a casing which is placed in the inner and lower part of each end of the door supporting it with holes for the securing means. It has a threaded hole at the upper part intended to house a height-leveling screw located at the center of the upper flange of the casing. On both sides and at the lower part thereof, it incorporates rounded projections finished in a straight tie whereby it is joined to such casing, providing a gap between the flange and the rounded part, which gap will be useful for housing clamps for securing the wheel mount. At the central part of the casing there is a small stop which will determine the minimum coupling and inverted L-shaped side flanges, all of this forming the structure of the casing.

[0016] The wheel mount plate slides vertically overlapped and guided by the inverted L-shaped side flanges. It is provided with a support cup with a supporting bevel at the lower part thereof for the height-adjustment screw and with an inner diameter that is sufficient to house an elastic interposition element or spring which is in turn traversed by the adjustment screw, ensuring the position and support of both in the normal operation of the door while sliding along the guide track. The spring continually drives the wheel mount towards the outside of the perimeter of the door, thus obtaining an anti-derailment effect because even if the door is lifted, the wheel will continue to be placed on the track along which it is guided. On both sides of the cup supporting the adjustment screw it has two U-shaped notches coinciding with the projections located at the lower part of the upper flange of the casing, a threaded hole intended to house the screw determining the minimum coupling and which, upon being unscrewed and surpassing the projection of the casing, would allow uncoupling the wheel mount from the latter in order to replace it, without having to discard the entire mechanism and without disassembling such casing from the door.

[0017] The wheel mount plate is provided with a shaft with a rib having a larger diameter and at certain height along the entire contour to ensure the resistance thereof, intended to house the wheel regardless of its diameter and of its tread. It also has for round projections perpendicular to the wheel mount plate at a certain height, which projections are intended to receive a plastic or nylon part which is secured by the same screw determining the minimum threaded coupling on the previously described threaded hole, traversing the wheel mount but without pressing against the casing so as to not hinder its operation. The nylon part is multifunctional because at its lower part it has a semicircular groove closed at both ends which is intended to house the cleaning brush, ensuring the lack of mobility thereof while carrying out its function and favoring a greater sweeping of the dirt upon cleaning the wheel. Said brush is replaceable when it is worn by releasing said part without disassembling, or misadjusting or varying any position acquired by definitely fixing the height adjustment, only with the door placed and the wheeling pressed against the track in its maximum coupling position, in this case determined through the height-adjustment screw, without the need for the notches thereof to be engaged with the rounded projections of the lower part of the upper flange of the casing. The screw determining the minimum coupling would be released in order to remove it, and the cleaning brush band would be manually replaced, which task does not require specialized labor, the user himself or herself being able to carry out this operation without any cost for him or her.

[0018] At the upper part of said multifunctional part there are two notches, rounded at the bottom and slightly narrower at the opening, forming a small clamp, coinciding with the notches of the wheel mount plate and coinciding in turn with the rounded projections so as to be housed in the gap provided by the straight ties joining it to the lower part of the upper flange of the casing. The projections are located on both sides of the threaded hole for the height-adjustment screw. When the wheel mount plate is located in its maximum coupling the small clamps described in the notches of the nylon part are engaged with the projections of the lower part of the upper flange of the casing thanks to the gap provided by the straight ties joining it to said flange, with the sufficient resistance to automatically overcome the expansion action of the spring or elastic interposition element without having to carry out this operation manually with the subsequent risk of unnecessary injuries due to the fact that no type of tool has to be used to that end, thus making it easier for the operator to place the door on the guide track along which it slides, forcing such operator installing such door to adjust a minimum operation height, favoring the release of the wheel mount secured to the casing in the first complete turns of the adjustment screw because since it is supported in the cup intended to house it, when the adjustment action is carried out by moving the wheel mount part from its maximum coupling, surpassing the thickness of the rounded projections secured with a tie to the lower part of the upper flange of the casing, being released to its minimum coupling by the action of the elastic interposition element or spring, thus automatically carrying out the anti-derailment effect, with no option of oversights, hurries or malicious negligence, ensuring the operation of the anti-derailment system to the user, when for any reason the door must be removed from the track along which it is guided, the nut fixing its position will have to be unlocked and the height-adjustment screw will have to be unscrewed so that the wheel mount acquires its maximum coupling position, favoring, by the weight itself of the door, that the notches of the latter are automatically re-fitted in the projections of the lower part of the upper flange of the casing, again overcoming the resistance of the spring, being fixed to facilitate the removal of the door from the tracks along which it is guided without needing to use any type of tools in this case either, thus making it easier for the operator to disassemble the

door, only one person being necessary for this task as well as for replacing it, repeating the initial operation whereby the maintenance costs, personnel and vehicle travel expenses, risks of injuries to persons who are either operators or users, complaints in hotels with the subsequent reduction in tourism quality service which causes so much damage, care in public or private health centers etc. would be reduced. The wheel has a tread in an inner semicircular arrangement, where a transformation ring of the tread is housed in an inverted-T shape, providing the necessary change for making the wheel in its tread a universal arrangement that is adapted to the different guide tracks along which this type of doors or panels existing on the market slide, and obtaining an advantageous circumstance because if the guide receives a blow from any object or by the door or panel itself and the same wheeling shape was not available, by placing the transformation ring of the tread, another guide arrangement existing on the market adapted to the new inverted T-shaped tread could be placed without having to discard the automated wheeling mechanism comprising a cleaning system and an interchangeable wheel mount, preventing the cost involved in changing the entire wheeling system, including upper and lower guide tracks plus mechanisms for sliding the door or panel with the subsequent savings for the user.

[0019] All the features set forth and others characteristic of the invention, as well as the advantages derived therefrom will be better understood from the following description, made with reference to the attached drawings, in which a non-limiting exemplary embodiment is shown.

[0020] In the drawings:

Figure 1 shows a perspective view of a mechanism formed according to the invention, assembled on a door and with the cover separated therefrom.

Figure 2 shows a rear perspective view of the cover.

Figure 3 shows a perspective view of the wheel mount plate.

Figure 4 shows a view similar to Figure 1, with the wheel mount plate in the maximum coupling position on the frame.

Figure 5 shows a view similar to Figure 4, with the wheel mount plate in the minimum coupling position in the frame.

Figure 6 shows a view similar to Figure 5, with the wheel mount plate completely removed from the frame.

Figure 7 shows a perspective view of a possible way of implementing the wheel of the invention.

Figure 8 shows a perspective view similar to Figure 4, showing an implementation variant.

Description of a Preferred Embodiment of the Invention

[0021] According to Figures 1 to 8, the automated wheeling mechanism comprising a cleaning system and an interchangeable wheel mount for sliding doors and similar is formed by a casing 16 with holes 9 at each end located in the lower inner face of the panel 5 supported on the lower flange or support 18, said casing incorporating a threaded hole 4 so as to allow being traversed by the height-adjustment screw 1 and the position-fixing nut 2 located at the center of the upper flange 6 of the casing 16 having two rounded projections finished in a straight tie 3 secured to the lower part of the upper flange 6, a small projection 24 at the central right part of the casing 16 at a smaller height than the inverted L-shaped guides 10 for allowing the overlapped and vertical sliding of the wheel mount 8 incorporating two notches 25 for surpassing the rounded projections finished in a straight tie 3 located at the lower part of the upper flange 6 to achieve its maximum coupling, the shaft 21 has a reinforcement with a larger diameter and at a certain height 27 for hardening its resistance, intended to house the wheel 22 by means of the hole 20 for that purpose regardless of its tread 23, a support cup 13 for the height-adjustment screw 1 and with a diameter sufficient for housing the spring 11 traversed by the adjustment screw 1 and placed between the casing 16 and the wheel mount 8, making its position unmovable in the operation of the door when it slides along the guide track 31 with a tie in the form of a bevel 15 at its lower part for reinforcing the support of the door or panel 5, a groove in the inner face projecting through the outer face 32 to an extent that is sufficient to avoid the small projection 24 which will serve as a stop to determine the minimum coupling in its vertical and overlapped sliding in the casing 16, a threaded hole 30 for housing the screw 14, intended to secure the nylon part 12 to a sufficient extent so that it does not collide with the outer face of the wheel mount 8, thus preventing its manual locking only by means of a through hole 28 to an extent suitable for fixing it in the latter, plus holes 29 in its inner face coinciding with the perpendicular projections 26 of the wheel mount 8, facilitating its positioning and preventing mobility therein, the nylon or plastic part 12 is multifunctional because at the lower part thereof it has a groove 17 closed at both sides in the form of the radius of the wheel 22 for incorporating a cleaning brush 19, such brush being interchangeable when it is worn by unscrewing the screw 14 of the threaded hole 30 facilitating its replacement, U-shaped notches 7 closed at their upper part and coinciding with the notches 25 of the wheel mount 8, which when it slides overlapped by the flanges 10 of the casing 16, such notches are fitted in the rounded projections with a straight tie 3, thus overcoming the resistance of the spring 11, fixing its maximum coupling position when such coupling occurs. In its assembly process, in the placement on the inner face of the panel 5 and at each lower end thereof, it will be secured by means of the holes 9 located at each end of the casing 16 with fixing means for that purpose, the wheel mount 8 being placed in its maximum coupling position for facilitating the assembly of the door or panel 5 by the operator, upon

starting to adjust the compulsory minimum operation height by means of the screw 1 in the first turns thereof and achieving the desired height, the height position-fixing nut 2 will be anchored, the screw 1 will have moved the wheel mount 8 supported on the cup 15 thereof for that purpose by accidentally removing the notches 7 from the rounded projections finished in a straight tie 3 located at the lower part of the upper flange 6, releasing the compression of the spring 11, the anti-derailment effect occurring automatically, without any possibility of oversights, hurries in the job or negligence therein, thus preventing the hazard involved when the door or panel 5 falls, necessarily ensuring the correct operation to the user. According to Figure 3, the screw 14 prevents the wheel mount 8 from leaving the side guides 10 of the casing 16 because when it is driven by the expansion of the spring 11, it has the sufficient size to collide with the stop 24 located the casing 16 for that purpose. When for any reason, the wheel is broken or worn, the door or panel 5 has to be removed, the process will be reversed, the position-fixing nut 2 will be unanchored, and the height-adjustment screw 1 will be unscrewed so that the weight itself of the door will overcome the expansion of the spring 11 to again place the notches 7 of the plastic nylon part 12 in the rounded projections finished in a straight tie 3 and located at the lower part of the upper flange 6 of the casing 16, automatically fixing its maximum coupling position, facilitating the removal or derailing of the door or panel 5 at will, being able to substitute the wheel mount 8 by only partially unscrewing the screw 14 threaded in the threaded hole 30 until surpassing the stop 24 determining the minimum coupling for facilitating its removal from the flanges 10 of the casing 16 along which it slides vertically overlapped in order to replace it, according to Figure 4. According to Figure 5, the wheeling path 23 of the wheel 22 would allow changing the shape from half round or inner semicircular to an inverted T shape by just coupling a transformer ring 33 thereto. At the inner part thereof, it has a shape opposite to half round or semicircular, being secured thereto by both the elastic coupling and the pressure of the weight itself of the door, this ring being located between the guide track (not specified with this shape) and the wheel 22, making its deformation or exit from both parts unlikely, and at the outer part, it has an inverted T shape that can be easily coupled because it would be made of a malleable material with the sufficient elasticity for its mentioned coupling and securing, thus forming a solution for the different guide tracks available on the market without changing the roller or the wheel mount, preventing the cost involved in changing the entire wheeling system, including upper and lower guide tracks plus mechanisms for sliding the door or panel 5, with the subsequent savings for the user.

Claims

1. An automated wheeling mechanism with a cleaning system and an interchangeable wheel mount for sliding doors, especially for wardrobes and similar, comprising a height-adjustment screw 1, a position-anchoring nut 2, an elastic interposition spring 11, inverted L-shaped flanges 10 for the overlapped coupling with vertical sliding of a wheel mount plate 8 and holes 9 at each end of the casing 16 for being traversed by means for securing to the panel or door 5, **characterized in that** the casing 16 comprises two rounded projections finished in a straight tie 3 on each side of the threaded through hole 4 located at the lower part of the upper flange 6, serving to house the notches 25 of the wheel mount part 8 with perpendicular projections 26 to house a multifunctional nylon part 12 with a closed housing 17 in the form of the radius of the wheel 22 which allows incorporating and fixing the brush 19 so that it is more effective in cleaning the wheel 22, a part 12 secured by means of a screw 14, which, when it is unscrewed to surpass the stop 24 determining the minimum coupling, allows uncoupling the wheel mount 8 and coincides with threaded hole 30 located in a projection 32 leaving an inner cavity for housing the stop 24 without pressing the casing 16 to the overlapped sliding by means of side flanges 10 of the wheel mount 8 which upon reaching its maximum coupling is fixed in place by means of notches 7 of the part 12, which notches coincide with the rounded projections finished in a straight tie 3 located at the lower part of the upper flange 6 of the casing 16, overcoming the expansion of the spring 11, facilitating its assembly in the guide 31 along which it moves, receiving the weight of the panel or door 5 through the height-adjustment screw 1 which in turn traverses the spring 11, both are housed in the cup 13, preventing movements in the operation of the panel or door 5 moving the wheel mount 8 downwards when it is adjusted at minimum operation height by means of the screw 1, necessarily and automatically releasing the notches 7 from the rounded projections finished in a straight tie towards its minimum coupling, reversing the process to return to the maximum coupling, provided with a shaft 21 with perimetric reinforcement 27 for housing the wheel 22 by means of the hole 20.

2. A wheeling mechanism according to claim 1, **characterized in that** the tread 23 has the suitable configuration for receiving the transformer ring 33, making it universal for the shapes of all the guide tracks available on the market.

3. A wheeling mechanism according to claims 1 and 2, **characterized in that** the casing 16 and the wheel mount 8 with the defined configuration are made by means of a process for injecting liquid metal known as Zamak 5.

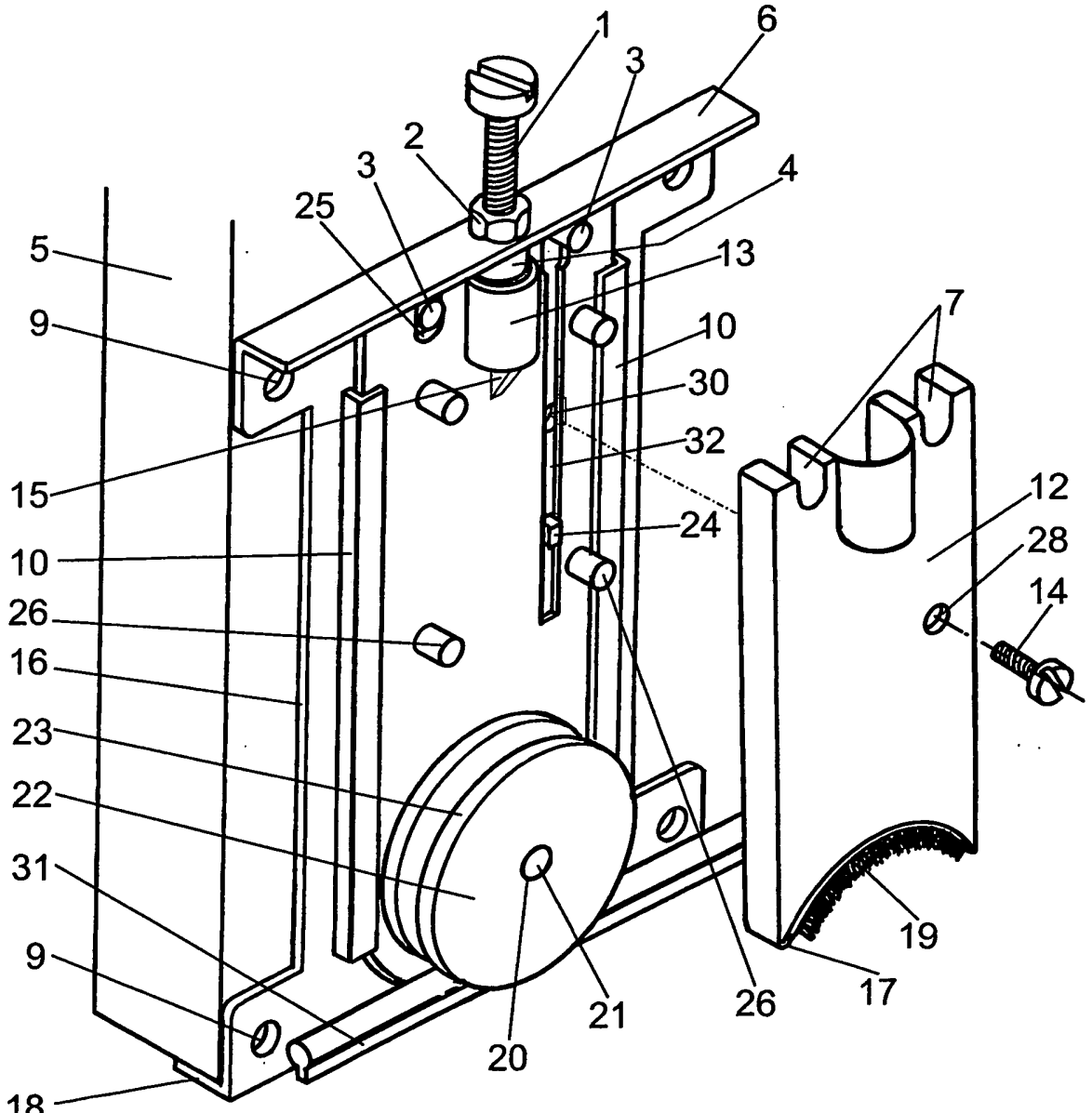
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FIG. 1

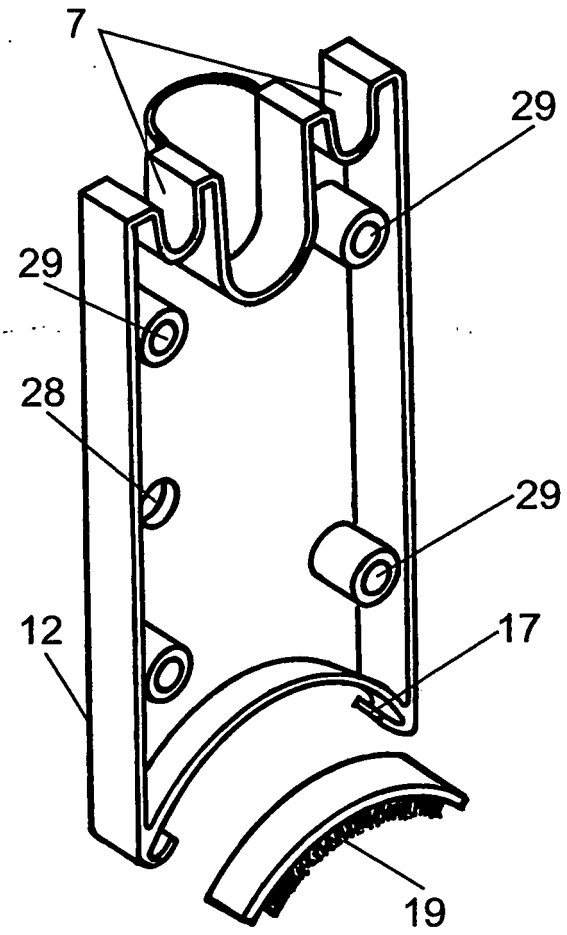

FIG. 2

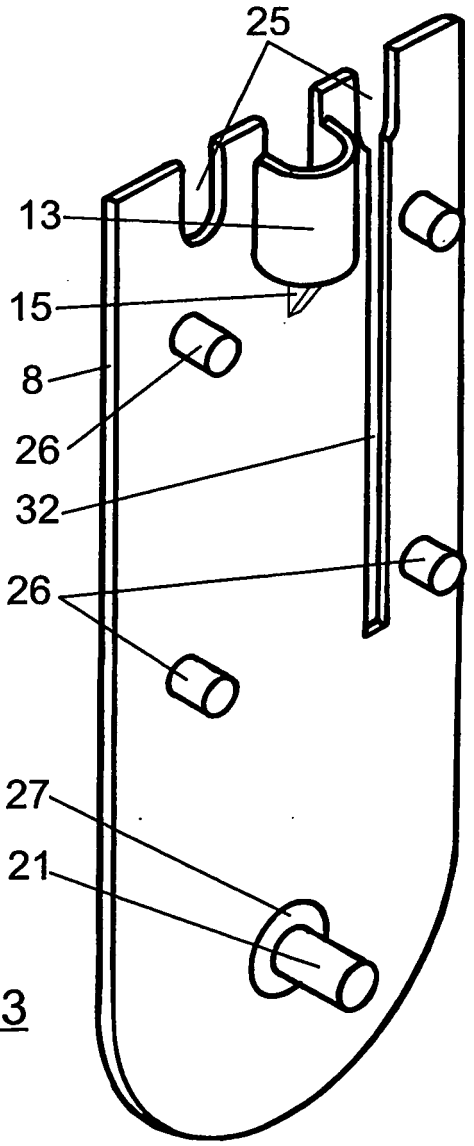

FIG. 3

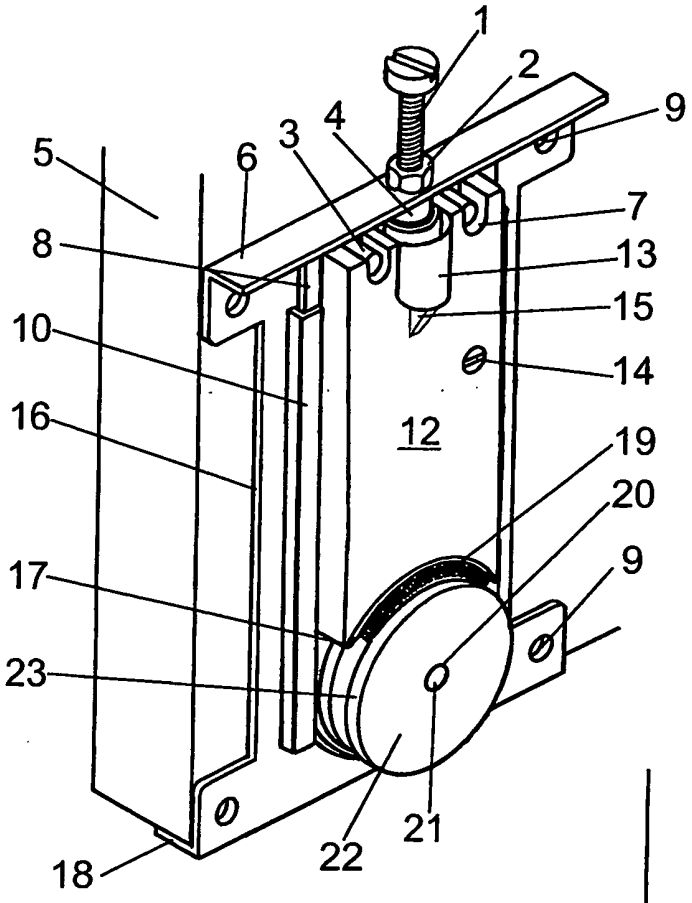
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FIG. 4

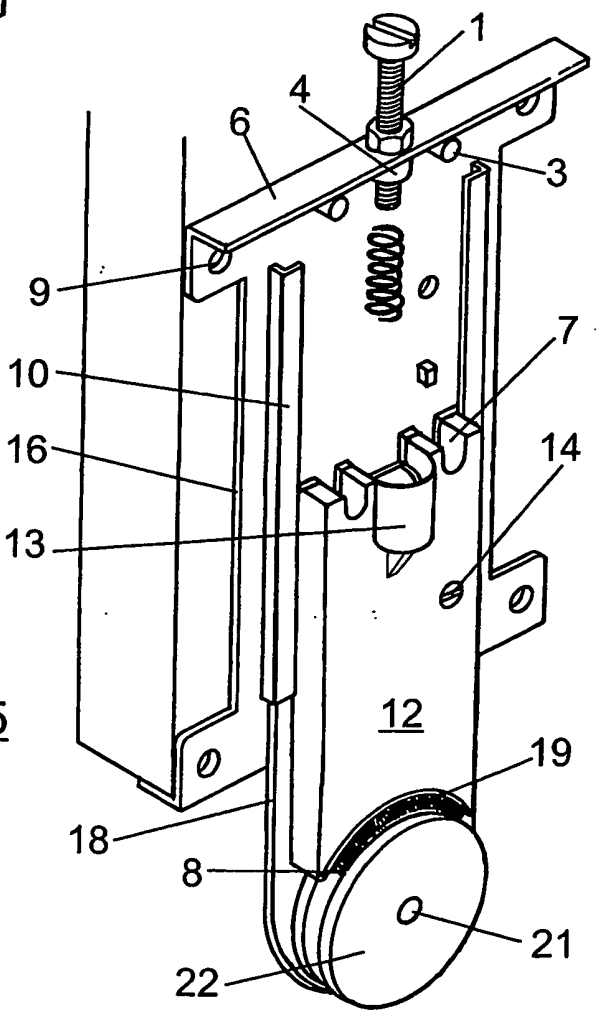
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FIG. 5

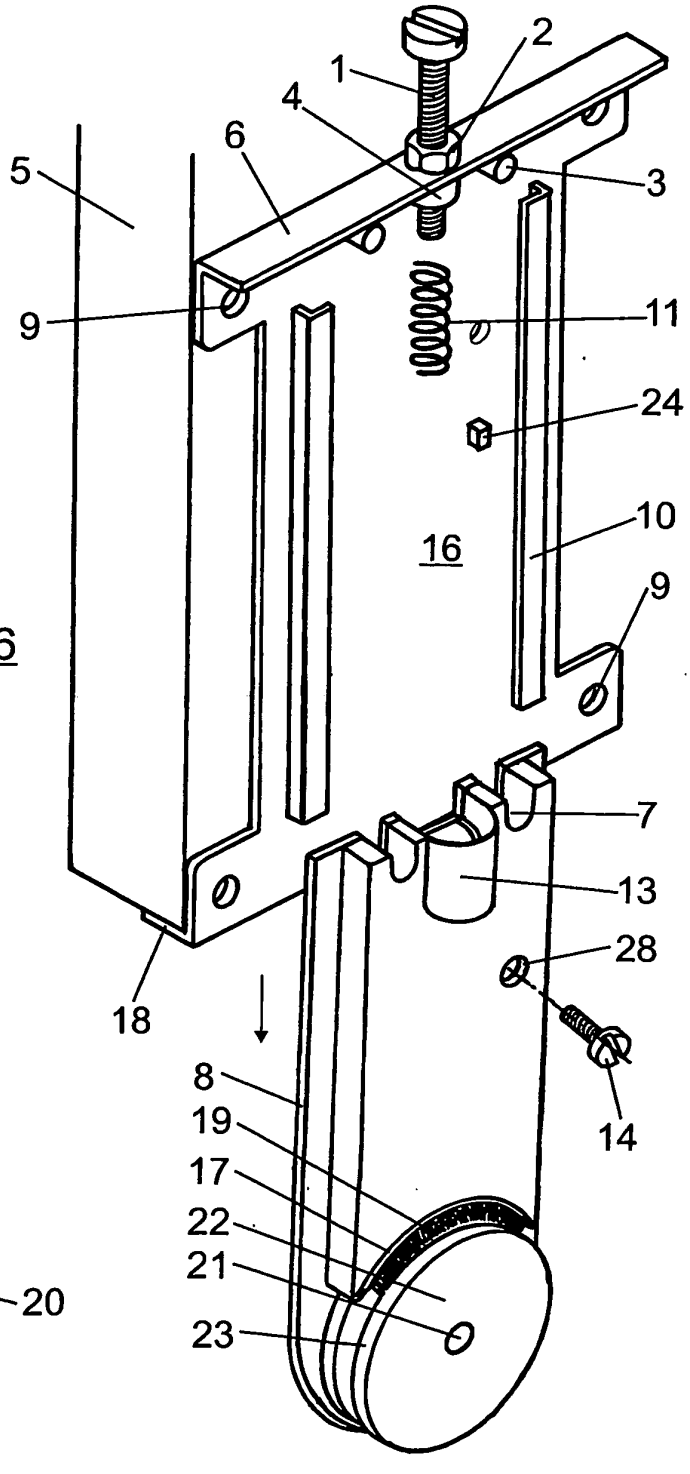

FIG. 6

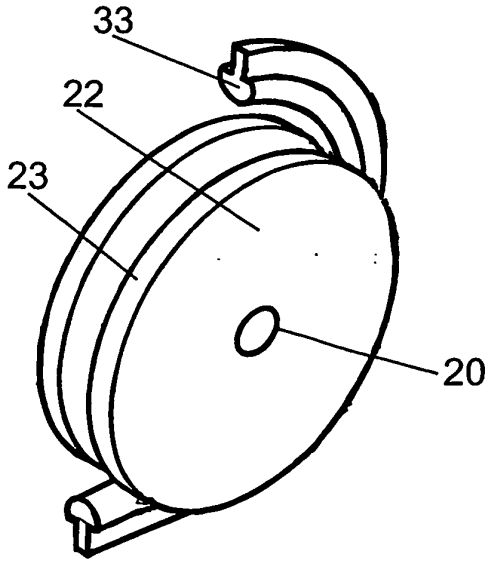

FIG. 7

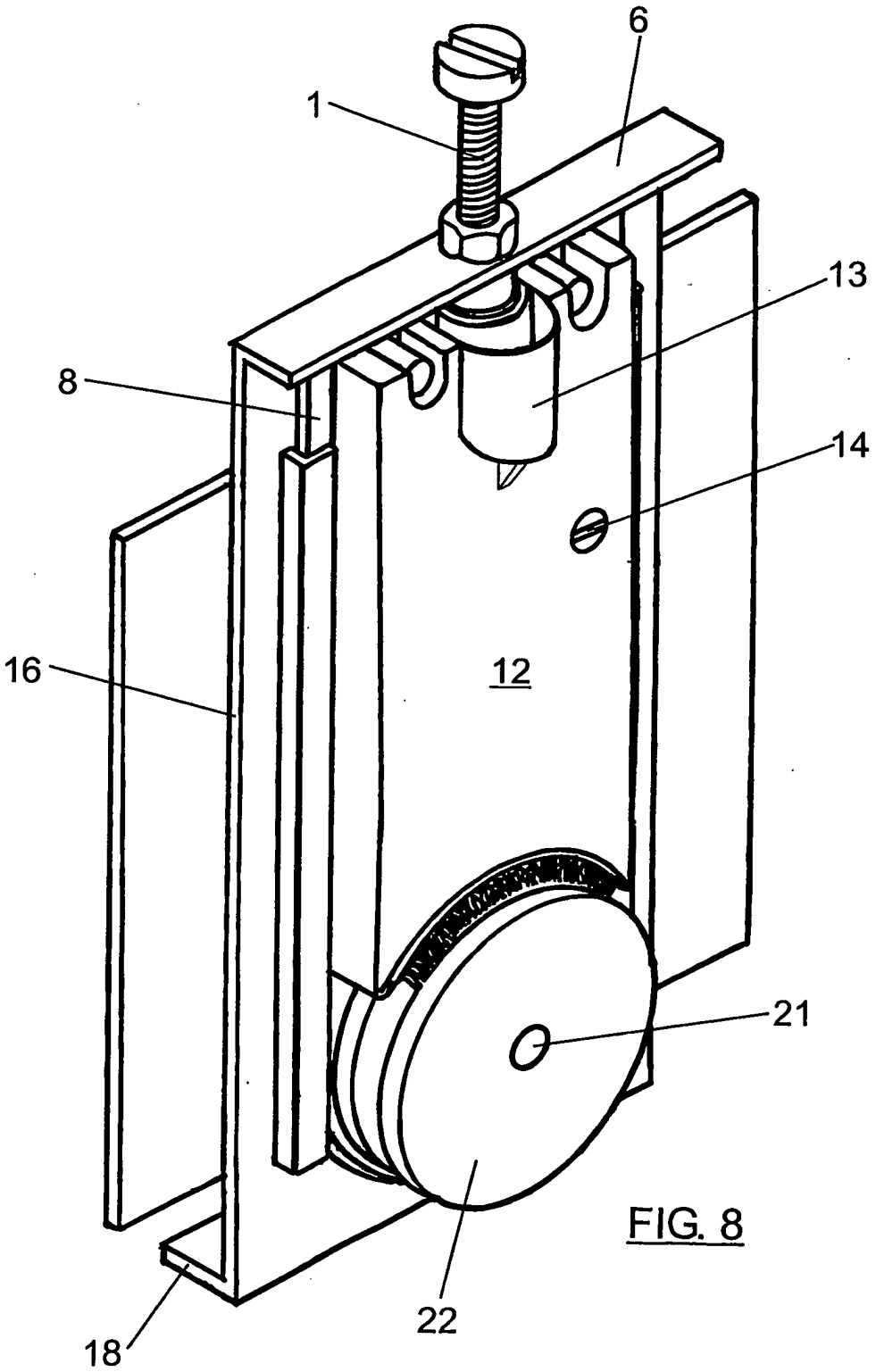

FIG. 8

REFERENCES CITED IN THE DESCRIPTION

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