

PATENT SPECIFICATION

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(54) ROLLER DEVICES

(71) We, YOSHIDA KOGYO K.K., a corporation duly organized under the laws of Japan and existing at No. 1, Kanda Izumi-cho, Choyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to roller devices, particularly but not solely for horizontally moving windows and doors. More specifically, the invention relates to roller devices of a type in which the position of a roller is adjustable vertically relative to a mounting frame by means of an adjusting screw.

An adjustable roller device is known in which a roller holder rotatably carrying a roller is displaceably supported by a mounting frame and in which an adjusting screw is turned to press the roller holder and hence to cause the roller to descend to a desired degree relative to the mounting frame. With this type of adjustable roller device, it is necessary to prevent the detachment of the adjusting screw by some means or other as the screw is easy to loosen.

Heretofore, in order to accomplish this objective, the tip of the adjusting screw has been flattened, or the end face of the adjusting screw has been pressed into an expanding flange, after the screw has been mounted in position. According to these well known measures, the adjusting screw tends to bend, and the pitch of its threads to become impaired, while pressure is being exerted thereon for the flattening or expanding of its tip. The smooth and precise adjustment of the roller position cannot of course be effected by use of such deformed adjusting screw. Furthermore, the flattening or expanding of the adjusting screw tip must be carried out within a narrow spacing delimited by the mounting frame and the roller holder, at the expense of substantial time and labour.

According to the invention, there is provided a roller device comprising a roller, a roller holder rotatably supporting said roller, a mounting frame supporting said roller holder adjustably displaceable outwardly relative to said mounting frame, an inclined surface on said roller holder disposed for sliding engagement with an inclined surface on said mounting frame to guide said roller holder for movement outwardly relative to the mounting frame upon application to said roller holder of a pressure in a predetermined direction, an adjusting screw adapted to apply pressure to said roller holder in said predetermined direction to permit the outward displacement of said roller holder relative to said mounting frame, said adjusting screw having a flange fixedly mounted thereon near its head, and stop means on said mounting frame positioned to limit the movement of said adjusting screw in its loosening direction by engaging said flange thereon.

The invention will be described by way of examples with reference to the accompanying drawings which illustrate, by way of example only, some preferred embodiments of the invention and wherein like reference characters denote corresponding parts of the several views, and wherein;

Figure 1 is a side elevational view of a roller construction which represents one of the specific adaptations of this invention; and

Figure 2 is an exploded perspective view of the roller construction shown in Figure 1.

The preferred embodiment of the invention will now be described in detail with reference to Figures 1 and 2. A roller 10 is rotatably supported by a roller holder 11 which in turn is supported by a mounting frame 12 so as to be vertically adjustable within predetermined limits relative to the latter, as hereinafter described in more detail. The mounting frame 12 includes a pair of vertical side walls 13 arranged in parallel spaced relationship to each other.

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The reference numeral 14 generally designates an adjusting screw. The adjusting screw 14 comprises a slotted head 15, a threaded shank 16, and a flange 17 projecting laterally from the threaded shank just below the slotted head. The flange 17 may be circular in shape and is significantly greater in diameter than the slotted screw head 15. In one form of construction, the blank shank of the adjusting screw 14 may first be inserted fully into and through a central opening in a disc member which is to become the flange 17, and then the screw threads may be formed on the blank shank by rolling operation. In this manner the crests of the screw threads, being greater in diameter than the original blank shank, can be utilized to restrain the flange in position upon the shank. The adjusting screw of the foregoing construction is further inserted into a tapped hole of a supporting plate 18 which is shown to be rectangular in shape.

The adjusting screw 14 together with the supporting plate 18 is installed in position between the opposed side walls 13 of the mounting frame 12 adjacent one end thereof. These side walls of the mounting frame have identical apertures 19 therethrough in exactly registered relationship. The adjusting screw 14 together with the supporting plate 18 is inserted into position between the opposed side walls 13 through one of the apertures 19 formed therethrough. With the adjusting screw thus installed within the mounting frame 12, both side portions of each of the flange 17 and the supporting plate 18 project into the respective apertures 19 in the side walls 13. A retainer 20 best illustrated in Figure 2 is then inserted into the mounting frame 12 through its open top. This retainer is so shaped as to hold therein the supporting plate 18 and part of the threaded shank 16 of the adjusting screw 14 and is adapted to connect the supporting plate to the mounting frame 12. The adjusting screw including the flange 17 is thus operatively mounted in position within the mounting frame 12.

Each of the apertures 19 in the mounting frame side walls 13 is symmetrical with respect to its horizontal axis, including a portion 21 having a vertical dimension sufficient to permit the flange 17 on the adjusting screw 14 to pass therethrough and a horizontal dimension less than the length of the threaded shank 16 of the adjusting screw. Formed on the right hand side, as viewed in Figures 1 and 2, is a portion 22 having a greater vertical dimension than the portion 21 to permit the supporting plate 18 to pass therethrough. The portion 22 is further open to a portion 23 through which the end portion of the threaded shank 16, remote from the slotted head 15, will pass

when the adjusting screw is being inserted into position within the mounting frame 12. The first mentioned portion 21 of the aperture 19 is open on its left hand side to a portion 24 having a suitably less vertical dimension than the portion 21 to permit the slotted head 15 of the adjusting screw 14 to pass therethrough.

As will be seen from Figure 1 in particular, shoulders or steps 25 defined between the portions 21 and 24 of each aperture 19 are designed to serve as stop means engageable with the flange 17 on the adjusting screw 14. The stop means 25 will function to limit the movement of the adjusting screw in its loosening or retracting direction.

In the construction illustrated in Figures 1 and 2, the tip of the threaded shank 16 of the adjusting screw 14 away from the head 15 is held in abutting relationship to the roller holder 11 within the mounting frame 12. The rotation of the adjusting screw in its advancing direction is to be translated into outward (i.e. downward as shown) motion of the roller holder 11, and therefore of the roller 10, relative to the mounting frame 12. The position of the roller 10 is thus adjustable vertically with respect to the mounting frame 12. Such movement of the roller 10 and the roller holder 11 can be accomplished, for example, by the provision of slanting guides 26 and grooves 27 at or adjacent the ends of the mounting frame 12 and the roller holder 11, respectively, away from the adjusting screw 14. The guides 26, of course, are slidably received in the grooves 27, so that the roller holder 11 together with the roller 10 is caused to slide downwardly of the mounting frame 12 upon rotation of the adjusting screw 14 in its advancing direction.

WHAT WE CLAIM IS:—

1. A roller device comprising a roller, a roller holder rotatably supporting said roller, a mounting frame supporting said roller holder adjustably displaceable outwardly relative to said mounting frame, an inclined surface on said roller holder disposed for sliding engagement with an inclined surface on said mounting frame to guide said roller holder for movement outwardly relative to the mounting frame upon application to said roller holder of a pressure in a predetermined direction, an adjusting screw adapted to apply pressure to said roller holder in said predetermined direction to permit the outward displacement of said roller holder relative to said mounting frame, said adjusting screw having a flange fixedly mounted thereon near its head, and stop means on said mounting frame positioned to limit the movement of said adjusting screw in its



The reference numeral 14 generally designates an adjusting screw. The adjusting screw 14 comprises a slotted head 15, a threaded shank 16, and a flange 17 projecting laterally from the threaded shank just below the slotted head. The flange 17 may be circular in shape and is significantly greater in diameter than the slotted screw head 15. In one form of construction, the blank shank of the adjusting screw 14 may first be inserted fully into and through a central opening in a disc member which is to become the flange 17, and then the screw threads may be formed on the blank shank by rolling operation. In this manner the crests of the screw threads, being greater in diameter than the original blank shank, can be utilized to restrain the flange in position upon the shank. The adjusting screw of the foregoing construction is further inserted into a tapped hole of a supporting plate 18 which is shown to be rectangular in shape.

The adjusting screw 14 together with the supporting plate 18 is installed in position between the opposed side walls 13 of the mounting frame 12 adjacent one end thereof. These side walls of the mounting frame have identical apertures 19 therethrough in exactly registered relationship. The adjusting screw 14 together with the supporting plate 18 is inserted into position between the opposed side walls 13 through one of the apertures 19 formed therethrough. With the adjusting screw thus installed within the mounting frame 12, both side portions of each of the flange 17 and the supporting plate 18 project into the respective apertures 19 in the side walls 13. A retainer 20 best illustrated in Figure 2 is then inserted into the mounting frame 12 through its open top. This retainer is so shaped as to hold therein the supporting plate 18 and part of the threaded shank 16 of the adjusting screw 14 and is adapted to connect the supporting plate to the mounting frame 12. The adjusting screw including the flange 17 is thus operatively mounted in position within the mounting frame 12.

Each of the apertures 19 in the mounting frame side walls 13 is symmetrical with respect to its horizontal axis, including a portion 21 having a vertical dimension sufficient to permit the flange 17 on the adjusting screw 14 to pass therethrough and a horizontal dimension less than the length of the threaded shank 16 of the adjusting screw. Formed on the right hand side, as viewed in Figures 1 and 2, is a portion 22 having a greater vertical dimension than the portion 21 to permit the supporting plate 18 to pass therethrough. The portion 22 is further open to a portion 23 through which the end portion of the threaded shank 16, remote from the slotted head 15, will pass

when the adjusting screw is being inserted into position within the mounting frame 12. The first mentioned portion 21 of the aperture 19 is open on its left hand side to a portion 24 having a suitably less vertical dimension than the portion 21 to permit the slotted head 15 of the adjusting screw 14 to pass therethrough.

As will be seen from Figure 1 in particular, shoulders or steps 25 defined between the portions 21 and 24 of each aperture 19 are designed to serve as stop means engageable with the flange 17 on the adjusting screw 14. The stop means 25 will function to limit the movement of the adjusting screw in its loosening or retracting direction.

In the construction illustrated in Figures 1 and 2, the tip of the threaded shank 16 of the adjusting screw 14 away from the head 15 is held in abutting relationship to the roller holder 11 within the mounting frame 12. The rotation of the adjusting screw in its advancing direction is to be translated into outward (i.e. downward as shown) motion of the roller holder 11, and therefore of the roller 10, relative to the mounting frame 12. The position of the roller 10 is thus adjustable vertically with respect to the mounting frame 12. Such movement of the roller 10 and the roller holder 11 can be accomplished, for example, by the provision of slanting guides 26 and grooves 27 at or adjacent the ends of the mounting frame 12 and the roller holder 11, respectively, away from the adjusting screw 14. The guides 26, of course, are slidably received in the grooves 27, so that the roller holder 11 together with the roller 10 is caused to slide downwardly of the mounting frame 12 upon rotation of the adjusting screw 14 in its advancing direction.

WHAT WE CLAIM IS:—

1. A roller device comprising a roller, a roller holder rotatably supporting said roller, a mounting frame supporting said roller holder adjustably displaceable outwardly relative to said mounting frame, an inclined surface on said roller holder disposed for sliding engagement with an inclined surface on said mounting frame to guide said roller holder for movement outwardly relative to the mounting frame upon application to said roller holder of a pressure in a predetermined direction, an adjusting screw adapted to apply pressure to said roller holder in said predetermined direction to permit the outward displacement of said roller holder relative to said mounting frame, said adjusting screw having a flange fixedly mounted thereon near its head, and stop means on said mounting frame positioned to limit the movement of said adjusting screw in its



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- loosening direction by engaging said flange thereon.
2. A roller device as claimed in claim 1, wherein said mounting frame includes a pair of opposed side walls adapted to accommodate said adjusting screw therebetween, and wherein a pair of substantially identical apertures are formed through the respective side walls of said mounting frame to permit said adjusting screw to pass

therethrough into position between said side walls, said apertures having stepped portions adapted to function as said stop means.

3. A roller device substantially as herein described with reference to and as illustrated in the accompanying drawings.

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