July 22, 1947. P. E. BAMBERG 2,424,429

LOCKING DEVICE

Filed June 4, 1946 3 Sheets-Sheet 1

Fig. 1.

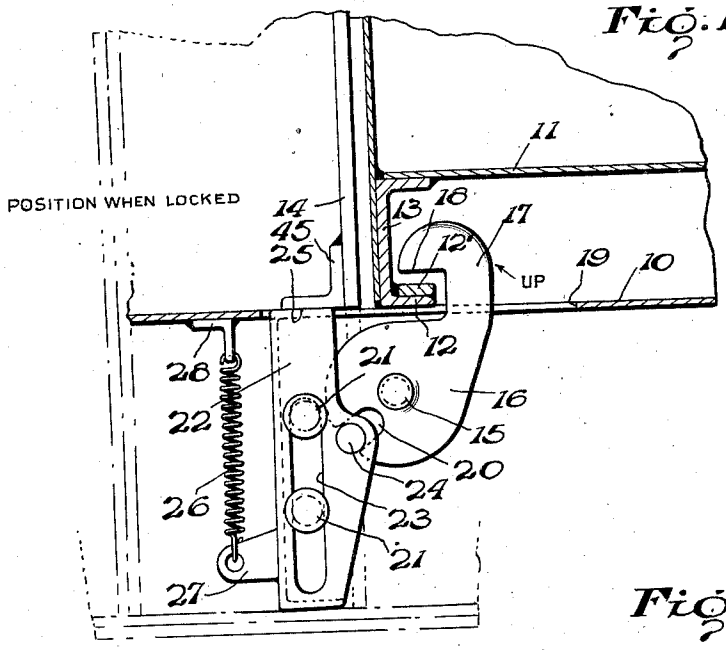
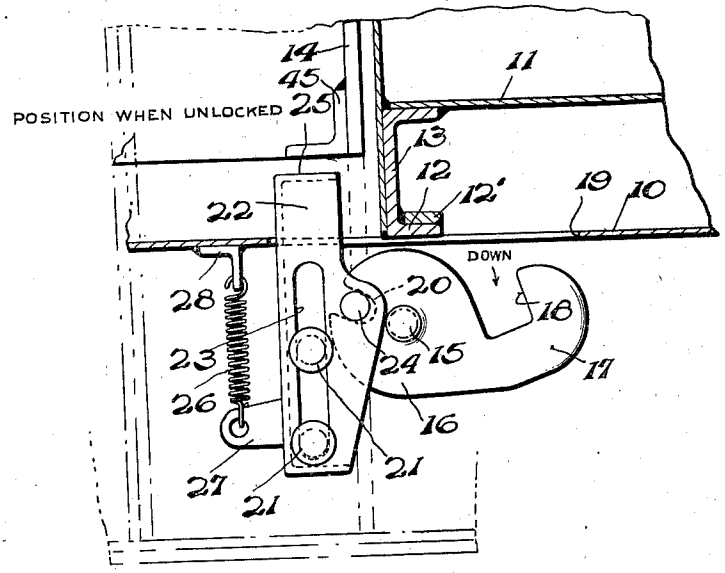


Fig. 2.



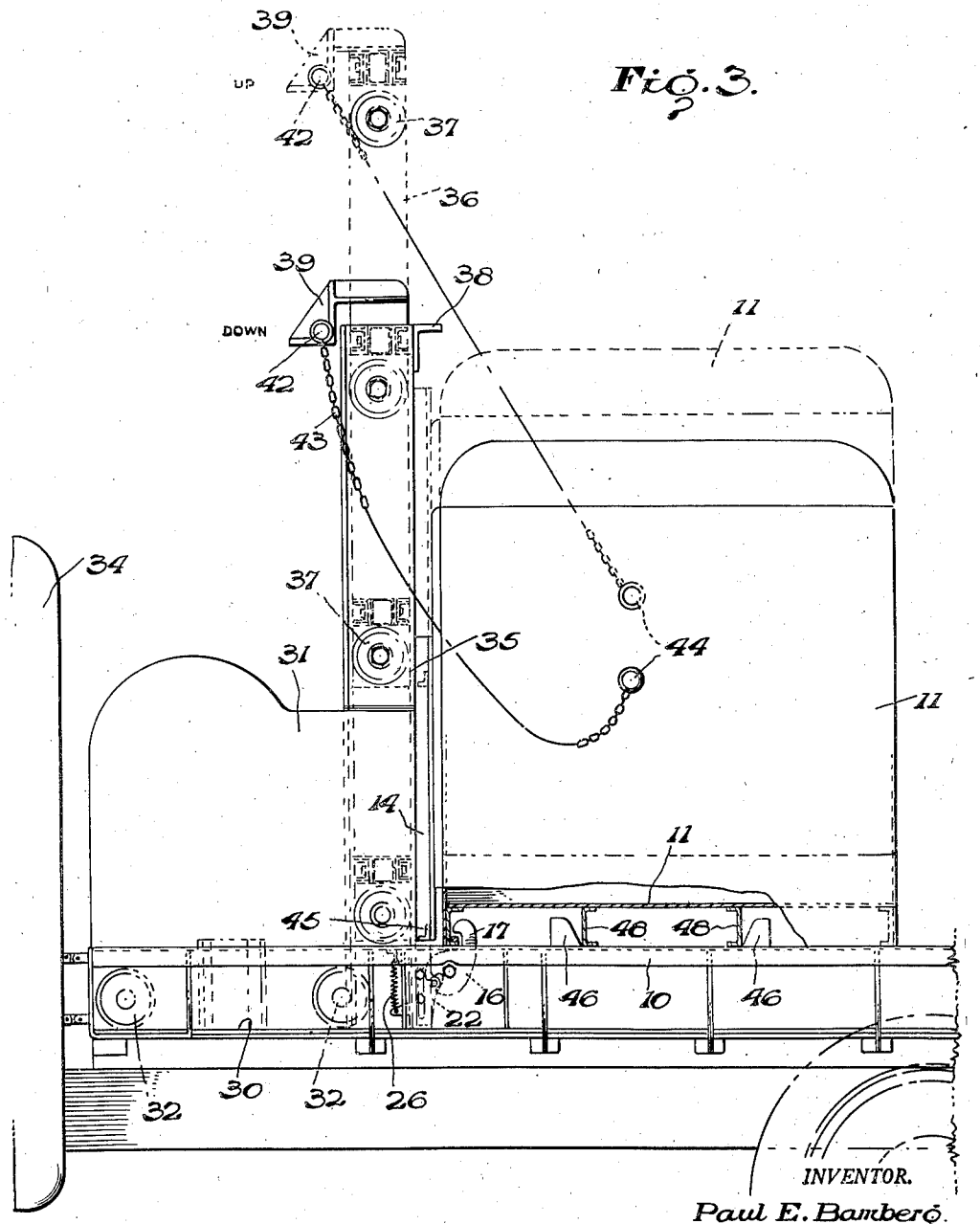
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Filed June 4, 1946 3 Sheets-Sheet 2

Fig. 3.



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July 22, 1947. P. E. BAMBERG 2,424,429

LOCKING DEVICE

Filed June 4, 1946 3 Sheets-Sheet 3

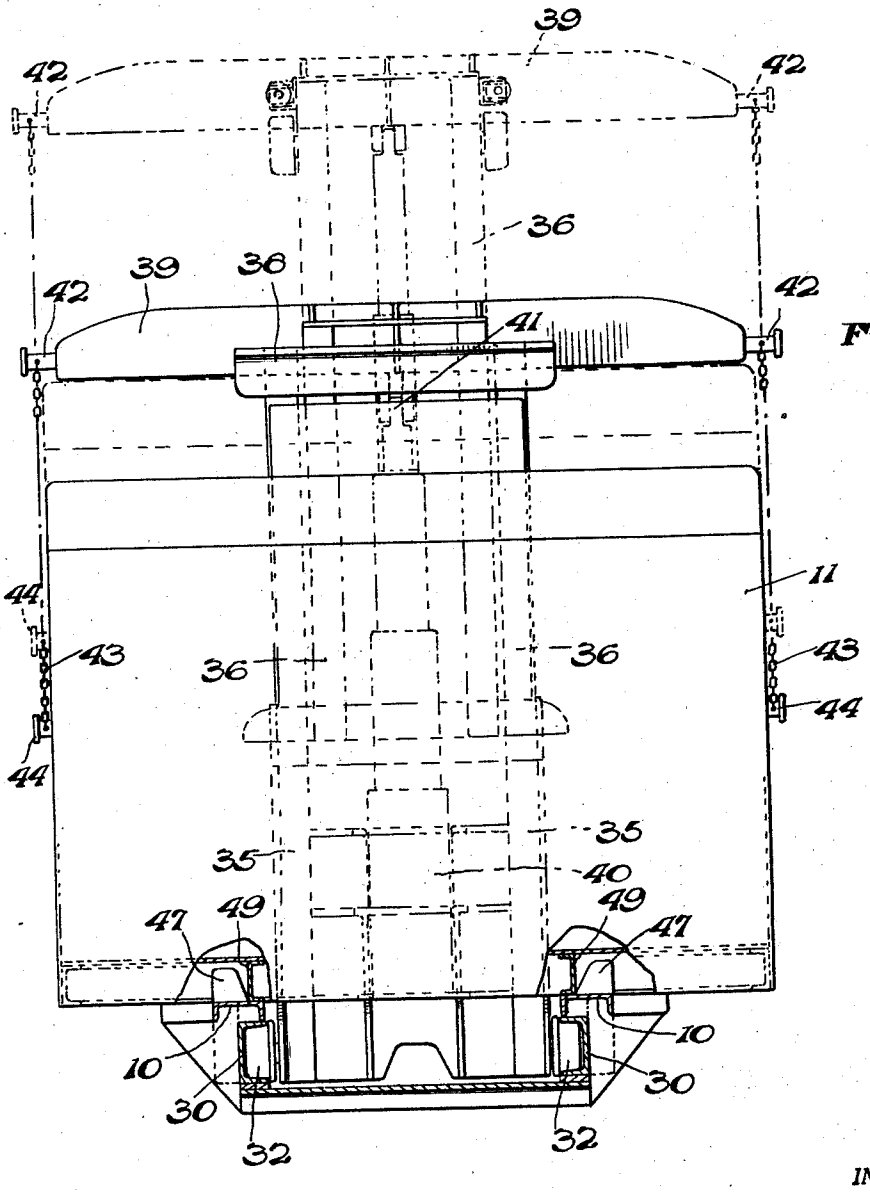


Fig. 4.

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UNITED STATES PATENT OFFICE

2,424,429

LOCKING DEVICE

Paul E. Bamberg, Knoxville, Tenn., assignor to Dempster Brothers, Incorporated, Knoxville, Tenn., a corporation of Tennessee

Application June 4, 1946, Serial No. 674,365
In Canada August 16, 1945

5 Claims. (Cl. 214—75)

1

This invention relates to locking means for releasably retaining a removable body, container or other similar element, and which will herein be referred to generically by the term "body," on the frame, platform or other support provided by a vehicle by which it is to be transported, the term "support" being used herein generically to designate any proper means for receiving the body on the vehicle for transport. The present application is a continuation in part of my application Serial No. 563,781, filed November 16, 1944.

It has heretofore been proposed to provide a vehicle with mechanism for lifting a body and, after movement over the support provided on the vehicle, lowering it into position for transportation. Similarly, this mechanism for lifting and lowering the body, and which mechanism is hereinafter referred to as the elevating mechanism, is designed to lift the body and move it off of the vehicle when the point of delivery is reached.

It is an object of this invention to provide means which are automatically operable by the action of the elevating mechanism when moving the body into and out of its position for transportation to effect the locking and releasing of the body.

Another object of this invention is to provide a device of the type characterized which is operable from the elevating mechanism so that without manual intervention the body to be transported is locked in a stabilized position on its support during transportation and then released for delivery when the elevating mechanism is operated preliminary to moving the body out of its position for transport on the support provided by the vehicle.

Another object of this invention is to provide a device of the type characterized which is simple in construction, strong and durable, and certain in operation.

Other objects will appear as the description of the invention proceeds.

The invention is capable of being embodied in a variety of ways, only one of which is illustrated on the accompanying drawing, but it is to be expressly understood that the drawing is for purposes of illustration only and is not to be construed as a definition of the limits of the invention, reference being had to the appended claims for that purpose.

2

Referring in detail to the drawing,

Figs. 1 and 2 illustrate in elevation, and somewhat schematically, an embodiment of the present invention in locking and releasing positions; and

Figs. 3 and 4 are somewhat diagrammatic side and rear elevations respectively of one form of elevating mechanism with which the present invention may be used.

Referring first to the locking mechanism per se as shown in Figs. 1 and 2, 10 indicates diagrammatically a support provided in any suitable way on any appropriate vehicle for transporting the removable body diagrammatically indicated at 11. Said body is provided at or adjacent its base and in any suitable way with a horizontally extending flange 12 which is adapted to be seated on the support 10. As shown, said flange may be provided by attaching a channel iron 13 permanently to the underside of the body 11, and if desired said flange may carry a wear plate 12' suitably attached thereto as illustrated. The elevating mechanism for lifting and lowering the body 11 with respect to the support 10 is indicated by the vertically reciprocable apron 14 and one suitable elevating mechanism that may be used is described hereinafter.

Rotatably mounted at 15 on the underside of the support 10, as by means of lugs projecting downwardly therefrom, is a member 16 from which projects a hook-like extension 17 having a locking face 18 for cooperation with the flange 12 or the wear plate 12' thereon when used. The support 10 is slotted at 19 so that member 16 may rotate from its position shown in Fig. 1 to the position shown in Fig. 2 wherein the hook-like projection is withdrawn through the slot 19 to a position below the level of the support 10. Opposite the hook-like extension 17, member 16 is slotted at 20 for a purpose to be explained.

Also mounted beneath the support 10 in any suitable way as by downwardly projecting members thereon are a pair of vertically aligned headed studs 21 on which is slidingly mounted for vertical movement a member 22 having a slot 23 for receiving said studs 21 and guiding the movements of said member. Member 22 also has a pin 24 for engagement in the slot 20 of the member 16. Member 22 projects upwardly through a slot in the support 10, which may be

an extension of the slot 19, so that its upper end 25 is in position for engagement by the lower extremity of the apron 14 on the elevating mechanism. Member 22 is normally urged upwardly to the limit determined by the engagement of the lower stud 21 with the lower extremity of slot 23, as shown in Fig. 2, by a coil spring 26 attached to the member 22 in any suitable way at one end, as by a pin or lug 27, and having its opposite end suitably attached to a fixed member 28 associated with the support 10.

As the elevating mechanism lowers the movable body 11 onto the support 10, as described in greater detail hereinafter, the lower extremity of the apron 14 engages the upper end 25 of the member 22 and moves the latter downwardly against the tension of the spring 26 from the position shown in Fig. 2 to the position shown in Fig. 1. This movement of the member 22, through the cooperation of the pin 24 with the slot 20, causes the member 16 to rotate in an anticlockwise direction around its axis 15 from the position shown in Fig. 2 so that the hook-like extension 17 passes upwardly through the slot 19 after the flange 12 engages the support 10 whereby the locking surface 18 moves over said flange or, when used, the wear plate 12', to the position shown in Fig. 1, so as to lock said body in position. When the elevating mechanism 14 is operated to lift the body 11, the movement of its lower extremity upwardly permits the member 22 to follow the upward movement of the apron 14 on the elevating mechanism under the action of the tensioned spring 26, and this movement of the member 22, through the cooperation of the pin 24 with the slot 20, causes the member 16 to rotate in a clockwise direction, tilting and withdrawing the locking face 18 away from the flange 12, or wear plate 12' when used, as rapidly as said apron 14 moves upwardly, until the hook-like extension is withdrawn through the slot 19 to the position shown in Fig. 2. Therefore, the movement of the locking device 17 into and out of locking position is effected and controlled solely by the action of the elevating mechanism through its cooperation with the spring pressed member 22, whereby without any manual intervention the elevating mechanism after lowering the removable body into position for transportation effects the movement of the locking device into locking position and the elevation of the elevating mechanism, on the other hand, releases the locking device and frees the body for such movement as is required to move it off of the vehicle.

Referring now to Figs. 3 and 4 there is shown, somewhat diagrammatically, a body-transporting mechanism including an elevating mechanism such as may be used with embodiments of the present invention, and which is of the general construction disclosed and claimed in the application of George R. Dempster, Serial No. 565,837, filed November 30, 1944, but it to be expressly understood that the present invention is not limited to use with the particular transporting mechanism or elevating mechanism so shown. As here illustrated, the support 10 has suitably associated therewith a pair of tracks 30, which may be in the form of a pair of inwardly facing channel irons, and on said tracks is mounted a carriage generally indicated at 31 and provided with suitable wheels or rollers 32 for traveling in said tracks 30. Carriage 31 may be provided with any suitable mechanism for effecting movement thereof forwardly and rearwardly on the

tracks 30, such mechanism preferably being controlled by suitable connections from the cab 34 of the truck.

Mounted on said carriage for movement therewith are a pair of uprights 35, which may also take the form of inwardly facing channel irons so as to provide tracks for the elevating mechanism to be described, and mounted for up and down movement on said tracks 35 is an elevating mechanism including vertically extending side members 36 provided with a suitable number of rollers 37 for traveling in said tracks 35. At least the upper ends of said members 35 are connected by a transverse member 38 which prevents spreading of the track formed by members 35. On side members 36 is suitably attached a load-sustaining cross bar 39. Any suitable mechanism for raising and lowering the elevating mechanism 36, 36, 39 may be provided, that shown being composed of a four-sleeve hydraulic jack 40 suitably mounted on the carriage at its lower end and having its uppermost section connected at 41 to the transverse member 39. Suitable connections, omitted for the sake of clearness, lead from said hydraulic jack to appropriate control means, also preferably disposed in the cab 34.

The opposite extremities of the load-sustaining cross bar 39 are provided with suitable means for connecting the body 11 thereto, that shown comprising a pair of pins 42 from which depend chains or cables 43 for detachable attachment to pins, lugs or the like 44 projecting from the sides of the body 11. The elevating mechanism 36, 36, 39 also includes the before referred to downwardly extending apron 14, and at its lower extremity said apron 14 is provided with a suitable foot piece 45 which is adapted to engage and operate the upper end of the member 22 as heretofore described. In order to assure that in lowering the body 11 it shall be properly centered and positioned for the foot piece 45 to actuate the member 22, and also to retain the body against shifting on the support 10 during transportation, the support 10 is preferably provided with pairs of lugs 46 and 47 having opposed inner surface inclined toward each other and adapted to cooperate with members 48 and 49 projecting downwardly from the bottom of the body 11.

In operation, the carriage 31 may be moved to the rear of the tracks 30 until the elevating mechanism is disposed at the rear extremity of said tracks. If the hydraulic jack 40 has not already lowered the elevating mechanism to its lower position, it may be operated to lower said elevating mechanism to a position wherein the extremities of the chains or cables 43 may be attached to the pins 44 at the sides of the body 11, whereupon said elevating mechanism may be actuated by the jack 40 to lift the body 11 until its base is above the horizontal plane of the support 10. The carriage 31 may then be moved forwardly to the position shown in Fig. 3, in which position the elevating mechanism is holding the body 11 in the dotted line position of Fig. 3. Fluid may thereupon be released from said hydraulic jack, whereupon the elevating mechanism will move downwardly to the solid line position, as shown at Figs. 3 and 4, lowering the body 11 to the solid line position of Fig. 3. During this movement it will be noted that the body 11 will engage the support 10 before the elevating mechanism reaches its lowermost position to slacken the chains or cables 43. Hence in lowering the body 11 to transporting position said body will first engage the support 10, being

properly centered by the lugs 46 and 47, with the foot piece 45 on the apron 14 engaging the member 22 as heretofore described, after which, in order to take the tautness out of the chains or cables 43, as indicated by the dotted and the solid lines in Fig. 3, the elevating mechanism including the apron 14 with its foot piece 45 moves downwardly an additional distance, and the latter movement actuates the member 22 to rotate the locking mechanism heretofore described into its locking position with respect to the flange 12 or the wear piece 12' when used.

Similarly, when the body 11 is to be moved from the truck, the elevating mechanism is first moved upwardly to take the slack out of the chains or cables 43, during which movement the member 22 may follow upwardly the foot piece 45 under the action of the spring 26, so as to withdraw the locking mechanism from its locking position shown in Fig. 1, before further upward movement of the elevating mechanism initiates the upward movement of the body 11. As soon as the body 11 is lifted clear of the support 10 the carriage 31 may be moved rearwardly to its rearmost position, whereupon the elevating mechanism may again be lowered to deposit the body 11 on the ground or any other suitable support.

While only one locking device has been illustrated, depending upon the size of the removable body more than a single locking device may be used, in which event they may be disposed in transverse alignment with respect to the support on the vehicle so that all may be simultaneously actuated by the apron 14 of the elevating mechanism. In this event a single flange 12 may be provided transversely of the removable body for cooperation with all of the locking members or separate flanges individual to the locking devices may be provided for cooperation therewith. If it is desired that additional locking members be provided in a fore and aft direction suitable projections on the elevating mechanism may be provided for simultaneously operating them in the manner above described.

It will therefore be perceived that by the present invention a simple automatic locking device has been provided which requires no manual intervention but through the movement of the elevating mechanism to install or remove the removable body the locking mechanism is automatically operated to lock said body or release the same, respectively.

While the embodiment of the invention illustrated on the drawing has been described with considerable particularity, it is to be expressly understood that the invention is not limited thereto, as the same may take a variety of mechanical expressions some of which will now readily suggest themselves to those skilled in the art while changes may be made in the details, proportions and construction of the component parts without departing from the present invention. It is also to be understood that while one elevating mechanism has been shown as suitable for use with the present invention any other appropriate means for raising and lowering the body may be used. Reference is therefore to be had to the claims hereto appended for a definition of said invention.

What is claimed is:

1. A device for locking a removable body to a support on a vehicle of the type provided with elevating mechanism for moving said body into and out of position for transportation on said vehicle, comprising a member mounted to move into and out of locking engagement with a surface on said body, means operated solely by the elevating mechanism in one direction for effecting movement of said member into locking position after said elevating mechanism moves said body into its position on the support and spring means tensioned by said movement of said last named means and operable upon movement of said elevating mechanism in the opposite direction but before said elevating mechanism moves said body out of its position on the support for effecting movement of said member out of said locking position.

2. A device for locking a removable body to a support on a vehicle of the type provided with elevating mechanism for moving said body into and out of position for transportation on said vehicle, comprising a rotatable member mounted to move into and out of locking engagement with a surface on said body, means controlled by the elevating mechanism for effecting rotation of said member into locking position after said body is moved into its position on the support and spring means for effecting rotation of said member out of said locking engagement upon movement of said elevating mechanism in a direction to move said body out of transporting position.

3. A device for locking a removable body to a support on a vehicle of the type provided with elevating mechanism for moving said body into and out of position for transportation on said vehicle, comprising a member mounted to move into and out of locking engagement with a surface on said body, and means for effecting movement of said member into and out of locking position after and before said elevating mechanism respectively moves said body into and out of its position on the support, said means including a second member adapted to be engaged and moved by the elevating mechanism in one direction, a spring cooperating with said second member and tensioned by the movement of said second member after the elevating mechanism lowers said body onto the support, and means between said first and second members for moving the former into and out of locking position as said second member is moved by the elevating mechanism and said spring respectively.

4. A device for locking a removable body to a support on a vehicle of the type provided with elevating mechanism for moving said body into and out of position for transportation on said vehicle, comprising a rotatable member mounted to move into and out of locking engagement with a surface on said body, and means for rotating said member into and out of locking position after and before said body is respectively moved into and out of its position on the support, said last named means including a second member movable by the elevating mechanism in one direction after it lowers said body onto the support, means between said first and second members whereby said movement of said second member rotates said first member into locking position, and a spring tensioned by said movement of said second member and operable to move both said members in the opposite direction when said elevating mechanism is raised.

5. A device for locking a removable body to a support on a vehicle of the type provided with elevating mechanism for moving said body into and out of position for transportation on said vehicle, comprising a member rotatably mounted on said support and having a locking extension

for movement into and out of locking engagement with a surface on said body, a second member having operative engagement with said first member for rotating the latter in one direction or the other, said second member being movably mounted on the support in the path of said elevating mechanism and engageable by said elevating mechanism to move said first member into locking engagement with said surface, and a spring normally urging said second member into a position for engagement by said elevating mechanism after it lowers said body onto the

support and tensioned to move said second member in the opposite direction when said elevating mechanism is raised.

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