United States Patent

[11] 3,595,556

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[21] Appl No. **844,866**
[22] Filed **July 25, 1969**
[45] Patented **July 27, 1971**

[54] **HOLDING DEVICE**
4 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** ..... **269/21,** 269/71, 214/1 SW
[51] **Int. Cl.** **B25b 11/00**
[50] **Field of Search** ..... 269/21, 71; 214/1 S, 1 SW

[56] **References Cited**

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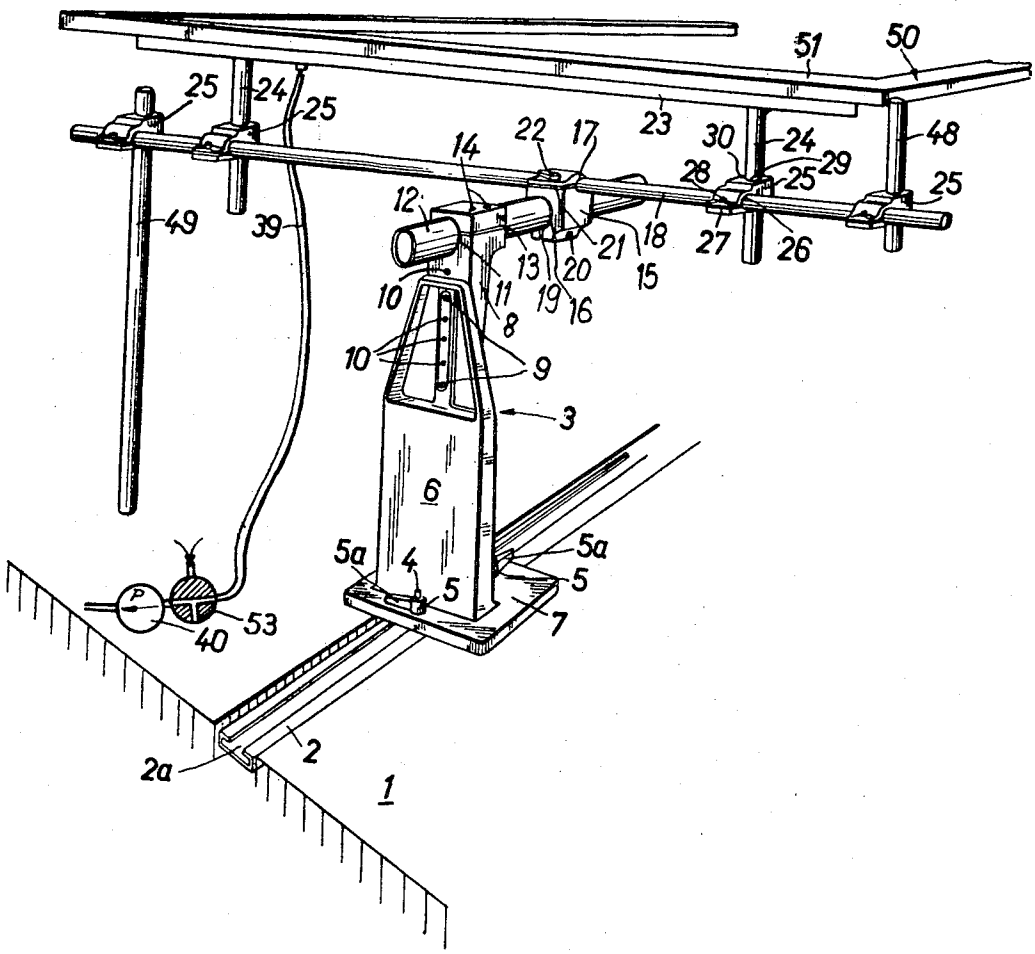
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ABSTRACT: This is a device for receiving e.g. window frames in an approximately vertical position, tilting them and maintaining them fixed in a desired horizontal or inclined position for working thereon. The device comprises a pair of vertical supports provided with aligned bearing means in which a horizontal shaft connecting them to each other is clamped for longitudinal and axial adjustment. On the shaft are in turn adjustably clamped two transverse beams each carrying an elongated suction member having in its upper face a recess connected to a suction pump. Each transverse beam further had adjustably clamped thereon at one end an abutment tube extending beyond the upper surface of the respective suction member, and at its opposite end a leg by which the transverse beam is rested on the floor when in a horizontal position.



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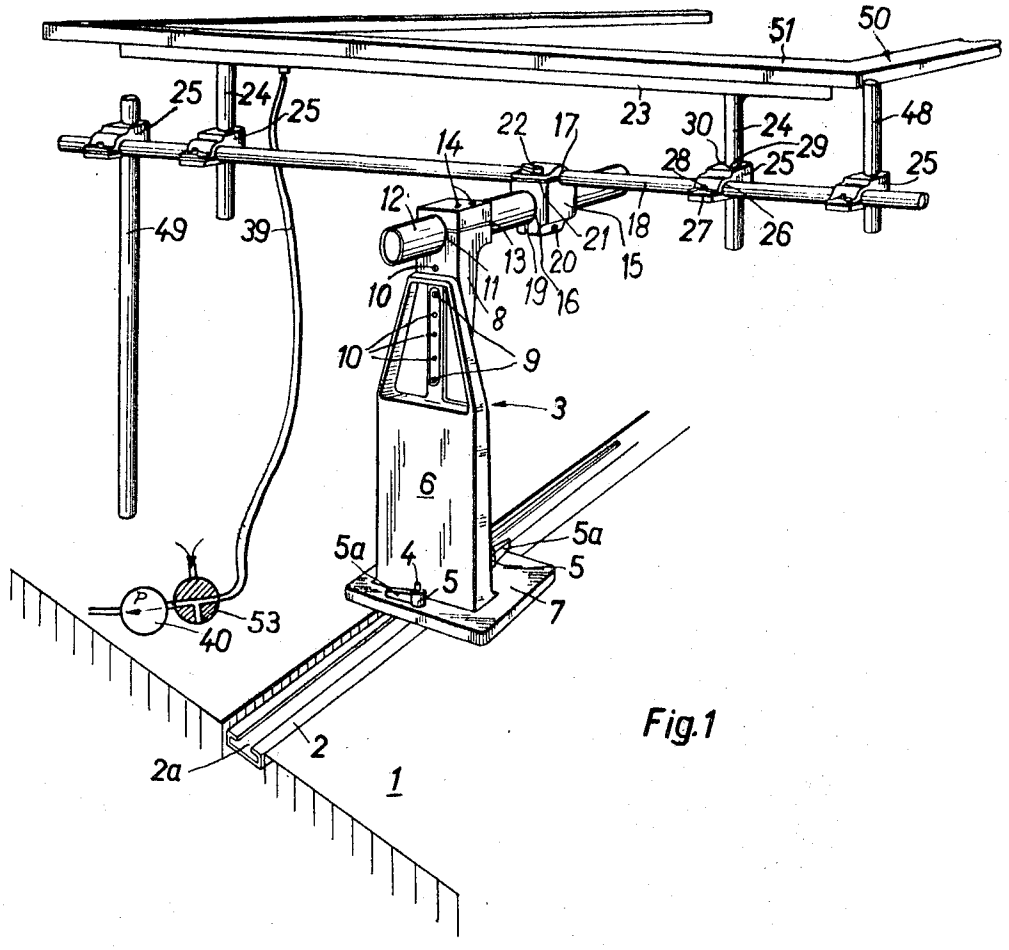


Fig.1

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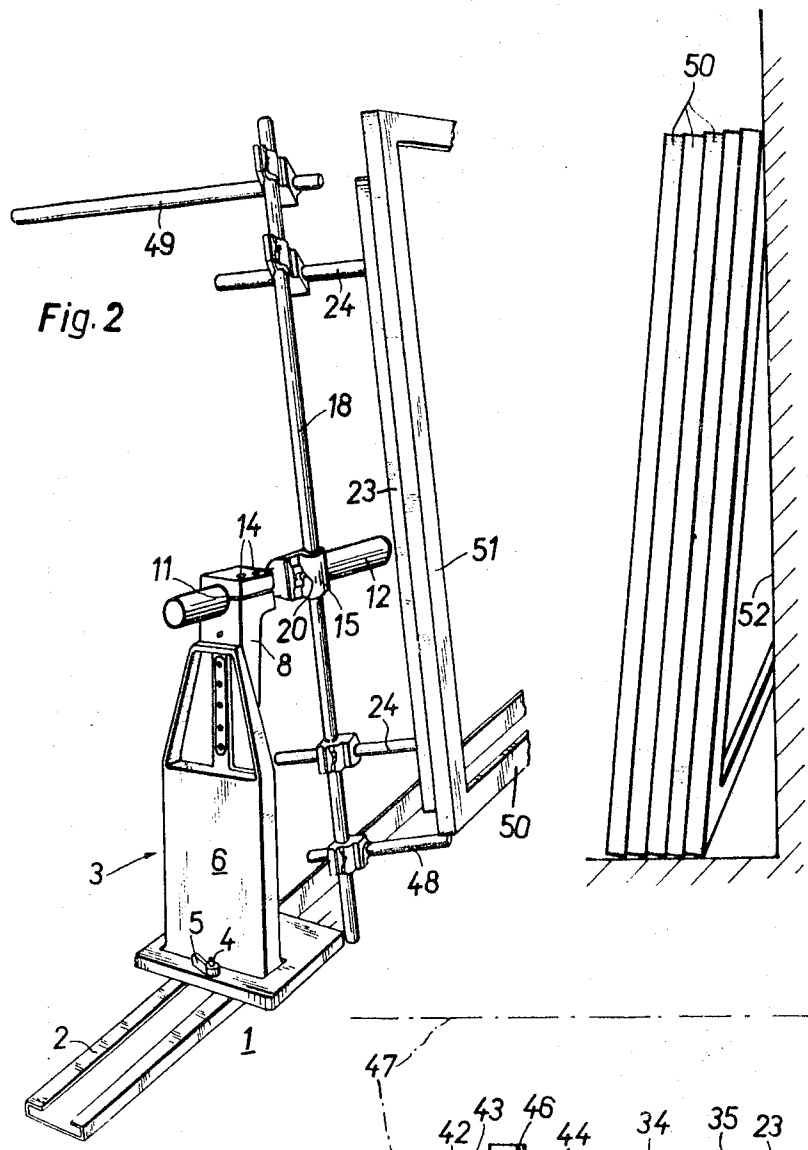


Fig. 2

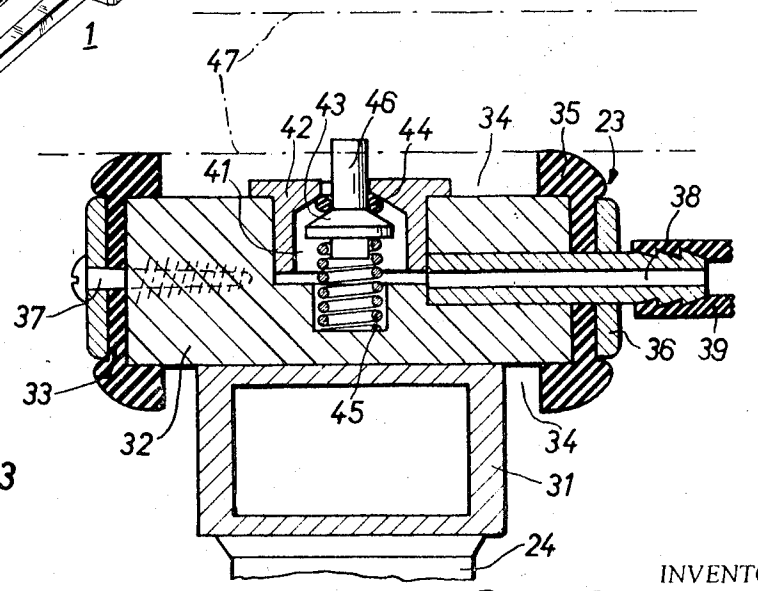


Fig. 3

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HOLDING DEVICE

The present invention relates to a device for handling and supporting plate, panel or frame shaped articles such as windows, doors, wall panels, table boards and the like as well as their components, including glass panes.

Articles of such shape and of a certain size and weight preferably are handled, transported and stored in upright position since in that position they are less exposed to bending stresses caused by their weight, they take less floor area and they can more easily be displaced than in horizontal position. On the other hand, there are many operations to which such articles may have to be subjected which require them to be supported in a horizontal position at a proper level above the ground. These operations in themselves could be effected by a single man and it would also be possible for a single man to move the articles about and lift them somewhat at one end at a time as long as they are in a vertical position.

However, for simultaneously lifting the articles at both ends and tilting them into a horizontal working position on a support, e.g. a pair of trestles, two men are mostly required.

One of the objects of the present invention is to provide a device by which such panel or frame shaped articles can be held and supported while in a vertical position.

Another object of the invention is to provide a device of this kind whereby the panel or frame shaped articles can be tilted from an upright position into a horizontal position while being firmly supported all the time.

Still another object of the invention is to provide a device of this kind by which the plate panel or frame shaped articles are maintained in said horizontal position against undesired lateral displacement.

A further object of the invention is to provide a device of the said kind in which the level at which the article is supported in its said horizontal position can be varied to suit working conditions.

In the accompanying drawing, an embodiment of the invention is shown by way of example.

In this drawing:

FIG. 1 is a perspective partial view of the device shown while supporting a window frame in horizontal position;

FIG. 2 is a similar view of the device shown while maintaining the said window frame in an approximately vertical position.

In the floor 1 on which the device is to stand, a clamping rail 2 having a longitudinal T-section slot 2*a* is fixed. To this clamping rail 2, a pair of supporting members generally designated by 3, only one of which is shown in the drawing since the other is exactly the same, are secured each by means of two T-headed foundation bolts 4 the heads of which are engaged in the slot 2*a* of the clamping rail 2, and of nuts 5 having handles 5*a* for their tightening and release.

Each of the supporting members 3 is made up of two main parts, the lower 6 of which is provided with an integral footplate 7 through which the T-headed foundation bolts 4 extend upwards and which is bolted down by means of the nuts 5. The upper part 8 of the supporting member 3 is screwed to the lower part 6 by two or more bolts 9 for which a vertical row of equally spaced boltholes 10 is provided in each of the parts 6 and 8 so that the upper part 8 can be fastened at the desired one of several heights.

At its upper end, part 8 of each support 3 is provided with a horizontal bore 11 and these bores of the two supports 3 are in mutual alignment for receiving a hollow shaft 12 which extends parallel to the guiding rail 2. A slot 13 extends laterally from the bore 11 to the outside of part 8 to permit clamping of the shaft 12 in the bore 11; this is done by means of two screws 14 which are screwed across the slot 13.

Similarly clamped to the shaft 12 are two clamping brackets 15 each having a larger bore 16 into which the shaft 12 fits and at right angles thereto a smaller bore 17 into which a tubular crossbeam 18 fits. A vertical slot 19 extending downward from the bore 16 and across which a screw 20 is screwed enables the bracket 15 to be clamped on the shaft 12. A similar but horizontal slot 21 which can be narrowed by means of a screw 22 extending across it and provided with a handle 22*a*, makes it possible to clamp each crossbeam 18 firmly in the bracket 15 where by it is maintained at right angles to the shaft 12 and can be fixed in a position in which it is parallel to the other similar crossbeam 18 not shown in the drawing.

On each crossbeam 18, an elongated suction member 23 is mounted parallel thereto by means of two short vertical tubes 24 each clamped to the crossbeam 18 by means of a clamping bracket 25 of a similar kind as the clamping bracket 15, with a horizontal bore 26, a slot 27 extending therefrom in a horizontal axial plane and a tightening bolt 28, and a vertical bore 29 with a slot 30 extending therefrom in a vertical axial plane; the corresponding tightening bolt is not visible in the drawing.

The elongated suction device generally designated by 23 is shown in cross section in FIG. 3. It comprises a tubular box-shaped steel base 31 welded to the upper ends of the two vertical tubes 24. Screwed to that steel base is the suction element proper; this is formed by an elongated piece of wood 32 of rectangular cross section, having rounded ends in plan view, and around which runs a resilient rubber band 33 of channel-like cross section closely fitting the wooden member 32 on all its lateral surfaces and on the margins of both its top and bottom faces so as to form a raised marginal ledge 35 enclosing a shallow recess 34 on each face. The rubberband 33 is maintained in its place by a more rigid band 36 of synthetic resin fixed by screws 37 extending through both bands 36 and 33 into the wooden member 32.

The upper of the recesses 34 can be evacuated through a plug 38 tightly fitted into the member 32 and connected by an evacuating pipe 39 to a vacuum pump symbolically indicated at 40 (FIG. 1). The plug 38 communicates with a recess 41 formed in the member 32 and closed by a cap 42 in which an inwardly opening valve 43 is seated with a rubber ring 44 interposed between the valve 43 and its seat in the cap 42. A compression spring 45 lodged in the recess 41 acts on the valve 43 and is strong enough to keep the latter in closed position even though a vacuum exists in the recess 41.

However, the valve 43 has an upward extension 46 which reaches beyond the top level of the upper ledge 35 of the rubber band 33 so that a plane object such as a panel, when laid on the suction member as indicated by the dash-and-dot lines 47, will by its weight overcome the closing force of the spring 45 and thereby connect the upper recess 34 to the recess 41 evacuated through the plug 38 and pipe 39.

Two further vertical tubes 48 and 49 are mounted on each of the crossbeams 18 by means of further clamping brackets 25 in the same manner as the vertical tubes 24. The tube 48 extends upwardly from the crossbeam 18 past the right-hand end of the suction member 23 up to somewhat beyond the top level of the upper ledges 35, while the tube 49 is mounted near the left-hand or rear end of the crossbeam 18 and extends downwards to the level of the floor 1 when the crossbeam 18 is horizontal.

In operation of the device, be it assumed that some work is to be done on a series of rectangular window frames 50 which have been placed in readiness in a nearly vertical position, e.g. against a wall 52, parallel to each other and to the clamping rail 2.

For this purpose, the device is prepared as follows:

The two supporting members 3 are placed on the clamping rail 2 at a distance from each other slightly greater than the overall length of each window frame 50 and they are fixed on that rail by tightening the nuts 5 on the foundation bolts 4. The upper parts 8 of the two members 3 are bolted to the lower parts 6 at such a level that the hollow shaft 12 is at a convenient level above the floor 1; if possible, the distance from the floor should be less than one-half the length of the widthwise running members 51 of the window frames 50 but not too short. The hollow shaft 12 then can be at least temporarily clamped in the bores 11 of the two supporting mem-

bers 3 by tightening the screws 14 but under certain conditions, this clamping can be omitted or effected at a later stage of the rigging.

Thereupon, one chooses a pair of suction members 23 the length of which corresponds to the length of the aforesaid widthwise running members 51 of the window frames 50. By means of the tubes 24 welded thereto, one mounts these suction members one on each of the crossbeams 18. In doing so, the following should be attended to:

The two crossbeams 18 should be spaced from each other on the hollow shaft 12 exactly by such a distance that the two suction members 23 and more particularly their upper recesses 34 (FIG. 3) simultaneously can be entirely covered each by one of the widthwise running members 51 of the window frames 50. While in an approximately vertical position as shown in FIG. 2, the crossbeams 18 should reach down nearly to the floor 1.

Care should be taken also that the two crossbeams 18 are strictly parallel to each other if the window frames 50 are plane as they usually should be. However, if a window frame has, and may be permitted to have, some twist, it would be appropriate to finally adjust the two crossbeams 18 so that they make a corresponding small angle with each other.

By tightening the screws 20 while leaving the shaft 12 some angular mobility in the bores 11 of the supporting members 3, one can make sure that the two crossbeams 18 will retain their mutual position. However, as an alternative which can be desirable in certain instances, one could have the shaft 12 firmly clamped in the supporting members 3 by means of the screws 14 while leaving the clamping members 15 some mobility on the shaft 12 by not fully tightening the screws 20. In that case, the window frames 50 themselves will have to be relied upon for coordinating the movements of the two crossbeams 18 and maintaining them at the proper distance from each other.

The suction members 23 must be fixed in a position parallel to the respective crossbeams 18 and at such a distance therefrom that when the crossbeams 18 are horizontal (FIG. 1), the window frame 50 resting on the two suction members 23 is at a convenient level for working thereon, e.g. between shoulder and eye level of the worker.

As already mentioned, each of the two tubes 49 should be clamped on the respective crossbeam 18 in such a position as to maintain it horizontal when the lower end of that tube 49 rests on the floor 1.

The tubes 48 should be clamped quite near the lower end of the respective crossbeam 18 when the latter is in the approximately vertical position shown in FIG. 2; in this position, they will serve as rests for the window frame 50.

After the device has been adjusted in that way, the vacuum pump 40 is started and creates a vacuum in the recess 41 of the suction member 23. The valve 43, however, is maintained closed by its spring 45. Then, with the crossbeams 18 and the suction members 23 in their approximately vertical position as shown in FIG. 2, one of the window frames 50 is lifted onto the two tubes 48 serving as rests therefor. Even with frames measuring, for example, 6 by 12 feet, this can be done by a single man if the supply of frames has been placed in front of the device with each frame in a substantially vertical position. The worker can easily move one end of the frame onto the first resting tube 48 and thereafter the other end onto the other such tube.

The widthwise running members 51 then will come into contact with the ledge 35 of the rubber band 33 (FIG. 3) along the whole periphery of the recess 34 of the suction member. In doing so, it will depress the extension 46 of the valve 43, thereby connecting the recess 34 to the suction side of the vacuum pump 40. By the partial vacuum thus created in the recess 34, the respective members 51 of the window frame 50 are drawn against the suction members 23 and become firmly attached thereto.

The window frame can now be swung from the approximately vertical position as shown in FIG. 2 into the horizontal position as shown in FIG. 1. Depending on whether the shaft 12 is more firmly clamped in the bore 11 of the supporting members 3 by the screws 14 or in the clamping brackets 15 by the screw 20, the crossbeams 18 rotate on the shaft 12, or the latter rotates in the bore 11 of members 3, respectively. In either case, the screws 20 or 14, respectively, which control the clamping at the place where relative rotation occurs, should be tightened sufficiently to provide a braking effect and permit the frame 50 to remain under control while being swung into the horizontal position.

This horizontal position is defined by the corresponding end of the tubes 49 reaching the floor 1. Preferably, the remaining ones of the screws 14 and 20 are also tightened after the frame 50 has reached this position. The frame is then ready for being worked upon. Preferably, the worker will stand inside the frame so as to have all portions of the window frame 50 within easy reach.

After the work has been completed, the window frame 50 together with the crossbeams 18 and the suction members 23 is swung back into the vertical position after the appropriate ones of the screws 14 and 20 have been untightened sufficiently to permit slow of the frame. Finally, the valve 53 is actuated to permit the access of atmospheric air into the evacuating pipe 39. Thereby, the vacuum in that pipe and in the recesses 41 and 34 is filled up and the frame 50 is no longer retained by the suction members 23. The frame then is supported by the resting tubes 48 and can be lifted therefrom and put back on the ground in a substantially vertical position first at one end and then at the other.

What I claim is:

1. A device for supporting and handling panel or frame shaped articles comprising in combination a pair of supports, means for positioning said supports in mutual alignment at an adjustable distance from each other, a shaft horizontally supported by said supports, a pair of beams each extending across said shaft at right angles thereto and mounted thereon for rotation about the axis of said shaft, for transverse displacement along said shaft and for lengthwise displacement across said shaft and arrestable in their position relative to said shaft, a pair of elongated suction members each supported by one of said beams and having a supporting surface for said panel or frame shaped objects and a recess in said surface, a source of vacuum and means for connecting thereto said recess of each of said suction members, said supports having each a horizontal bearing formed therein, the said bearings formed in the two supports being in alignment with each other, said shaft being rotatably supported in said bearings, and means for clamping said shaft in each of said bearings against rotation and axial displacement therein.

2. A device as claimed in claim 1 comprising on each of said beams an abutment member adjustably fixed thereto and extending therefrom beyond said supporting surface of the respective suction member for laterally positioning said objects thereon.

3. A device as claimed in claim 1 comprising on each of said beams a leg adjustably fixed thereto and extending therefrom away from the respective suction member.

4. A device as claimed in claim 1 wherein a lateral slot is formed in said support extending outwards from said bearing, said means for clamping said shaft comprising a screw-threaded element extending across said slot.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,595,556 Dated July 27, 1971

Inventor(s) Paul Schonauer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 28, after "slow" insert --rotation--.

Signed and sealed this 7th day of March 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334