

Aug. 23, 1932.

A. V. ROWE

1,873,485

DOORLOCK

Filed Oct. 10, 1930

3 Sheets-Sheet 1

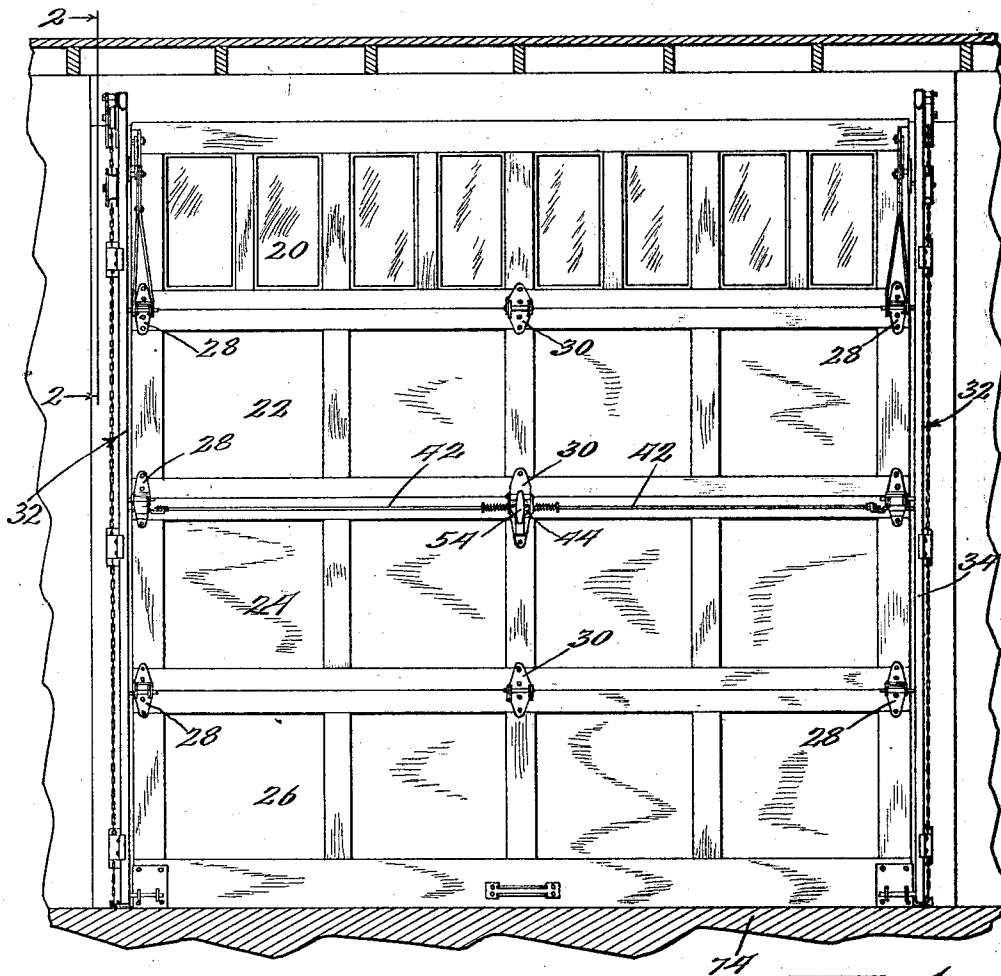


FIG. 1.

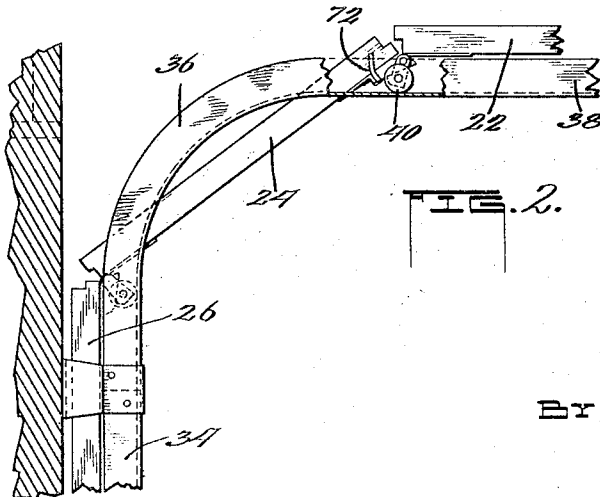


FIG. 2.

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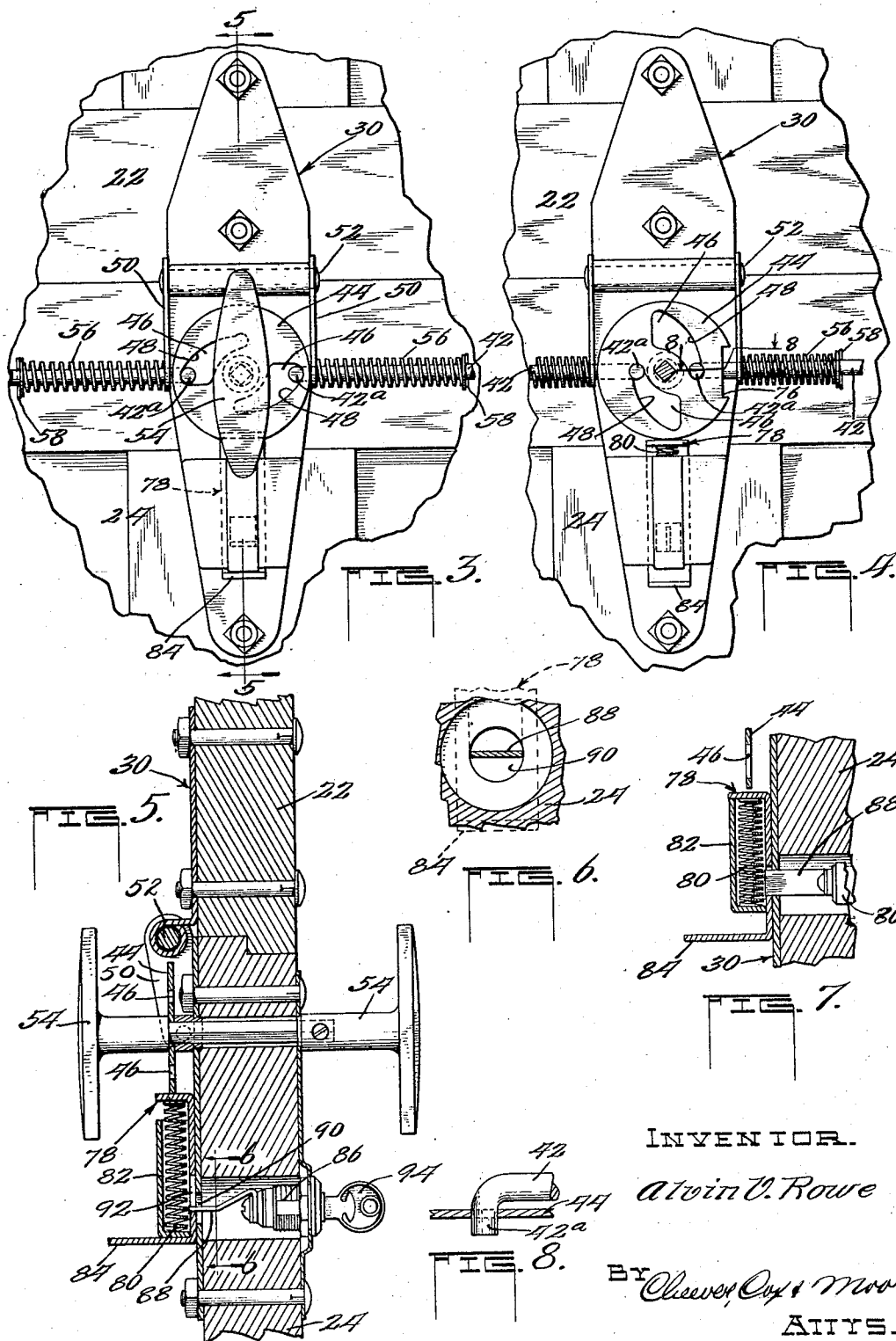
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3 Sheets-Sheet 2



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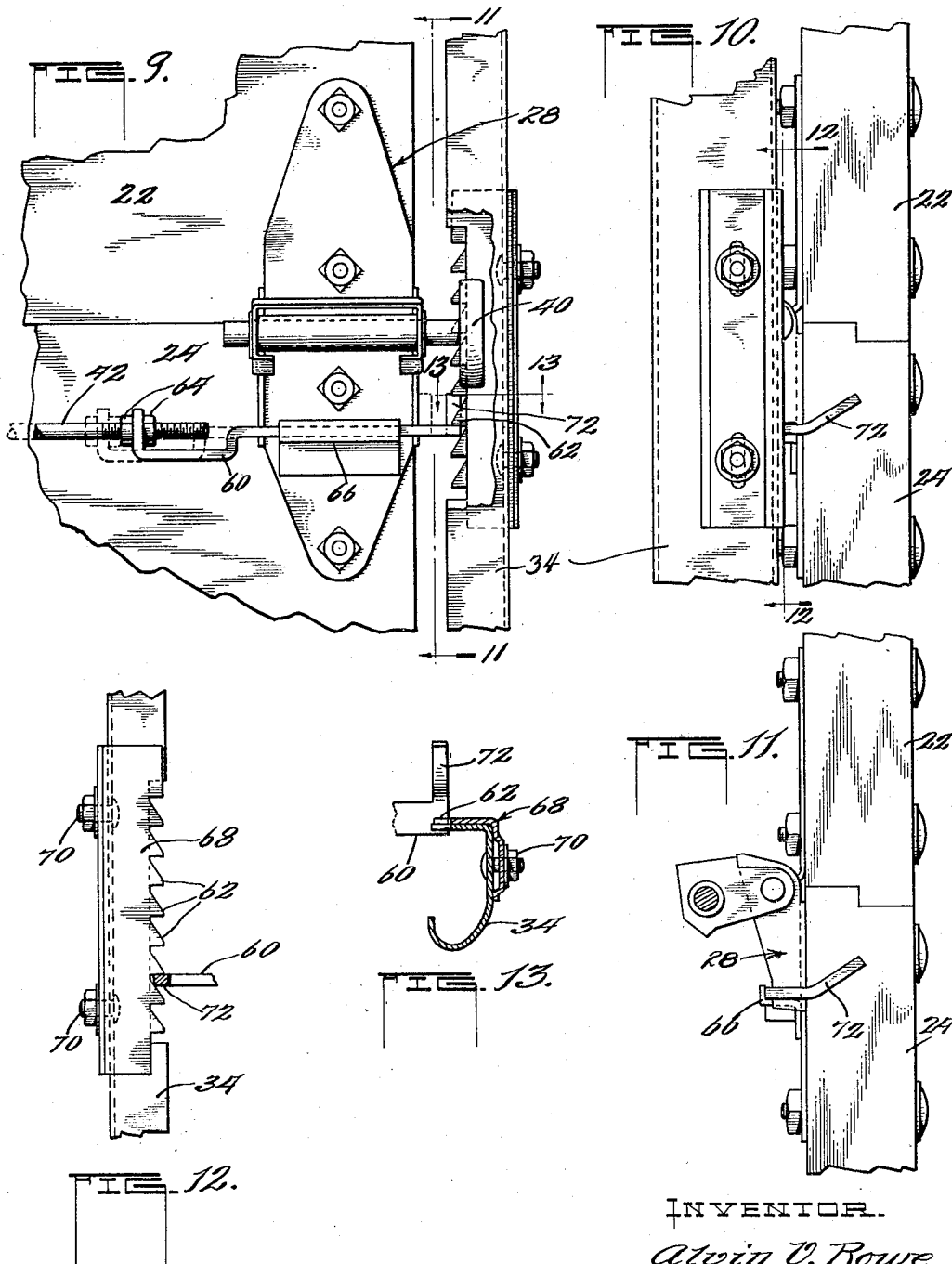
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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DOORLOCK

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My invention relates generally to locking devices for use on shiftable doors and particularly for shiftable doors of the overhead type.

5 Due to changes in climatic conditions, garage doors, as well as the garage structures immediately adjacent thereto, are subjected to structural variations such as expansion and contraction. These structural changes
10 often result in misalignment of the door sections, and this is particularly true in connection with garage doors made up of a plurality of hingedly connected door sections. Another problem resulting from weather
15 conditions is that of the accumulation on the garage floor or sill of snow and ice, which frequently prevents doors of the overhead type from being completely sealed against the floor. The sills or floors of garages immediately adjacent the door sections sometimes become elevated due to expansion, thereby preventing the door from being
20 shifted to its original lowermost position. Obviously, when the door sections are subjected to these conditions, adjustment must be made in order to render the conventional latching or locking device on the door functionally operative. In other words, it becomes necessary to re-align the complementary locking elements. Locking devices employed heretofore in connection with shiftable doors as, for example, garage doors of the overhead type, have not been readily adjustable to meet the conditions presented by
25 the above mentioned climatic changes.

It is one of the primary objects of my invention to overcome the above mentioned and other disadvantages experienced heretofore, and to this end I propose to provide
30 a simple and efficiently operable locking device of improved practical construction.

More specifically, my invention contemplates the provision of a locking device for use with vertically shiftable door sections, which is so designed as to effect the positive locking of the sections when the lowermost section is positioned adjacent the floor, or when said lowermost section is positioned away from the floor, whereby to permit the
35 positive locking of the door, even though

the lowermost section does not abut the floor or sill.

Still more specifically, my invention contemplates the provision of a locking means, as above set forth, having a plurality of notches or recesses, which cooperate with a locking element in securing the door sections in various positions with respect to the floor.

Another object of my invention is to provide a locking device for hingedly connected door sections of the overhead type, which is designed so as to positively prevent the bending or breakage of the projecting portions of the locking device adjacent the guide rails as said device is shifted along the curved section of said rail.

Still another object of my invention is to provide a locking device with self-adjusting locking elements projecting on opposite sides of the door sections, that is, to provide means which will permit such shiftable locking elements to automatically seat themselves within a complementary notch or recess regardless of the vertical alinement of the panels.

In addition to the above mentioned self-aligning feature of my improved locking device, my invention contemplates the provision of shiftable locking elements adapted to project on opposite sides of the door panels, which are equipped at their outer extremities with adjustable sections, whereby the length of the locking element may be adjusted to meet the particular needs incident to its use.

The foregoing and numerous other objects and advantages will be more apparent from the following detailed description when considered in connection with the accompanying drawings, wherein—

Figure 1 is an elevational view of an overhead door which is equipped with a locking device incorporating features of my invention;

Figure 2 is an enlarged detail sectional view of the upper portion of the guide rail taken substantially along the line 2—2 of Figure 1, said view disclosing the door panels occupying a shifted position in order to show how my improved locking element is free from interference with the guide rail as it is

shifted between vertical and horizontal sections thereof;

Figure 3 is an enlarged elevational view of the portion of the locking device associated with the central hinge of the door, said device being shown in its locking position;

Figure 4 is a view similar to Figure 3, disclosing the locking device in its unlocked position;

Figure 5 is a vertical sectional view taken substantially along the line 5—5 of Figure 3;

Figure 6 is an enlarged detail sectional view of the key controlled locking element and its associated parts, said view being taken substantially along the line 6—6 of Figure 5;

Figure 7 is a detail sectional view of the key controlled locking mechanism and its associated parts as shown in Figure 5, said locking element being disclosed in its unlocking position;

Figure 8 is a fragmentary detail sectional view taken substantially along the line 8—8 of Figure 4;

Figure 9 is an enlarged elevational view of the hinge and associated locking elements positioned on the right side of the door as viewed in Figure 1, a portion of the vertical section of the guide rail being broken away to expose parts otherwise hidden;

Figure 10 is an elevational view taken from the right of Figure 9;

Figure 11 is a sectional view taken substantially along the line 11—11 of Figure 9;

Figure 12 is also a vertical sectional view taken substantially along the line 12—12 of Figure 10; and

Figure 13 is a horizontal sectional view of the guide rail taken substantially along the line 13—13 of Figure 9.

Referring now to the drawings more in detail wherein like numerals have been employed to designate similar parts throughout the various figures, it will be seen that, for the purpose of disclosing one practical application of my invention, I have shown the same in operative association with the garage door of the overhead type, which includes a plurality of door sections 20, 22, 24, and 26. These sections are connected at their outer extremities by means of suitable hinges 28, while the central portions thereof are connected by similar hinges 30. The hinge 30 which joins the central portions of the door sections 22 and 24 is slightly larger than the other hinges for the purpose of providing a mounting for a door locking mechanism, about to be described. The structural characteristics of the door panels and the mechanism for shifting said sections between vertical and overhead horizontal positions are not necessary to a clear understanding of my present invention, and therefore it will suffice to state that these sections are adapted to be shifted between closed and opened overhead positions by shifting the same along guide rails 32. These

guide rails are positioned at each side of the door sections and include an upright vertical section 34, a curved section 36, Figure 2, and a substantially horizontal section 38. Rollers 40 of the type shown in Figure 9 are mounted adjacent each of the outer hinges 28 and are guided within the rails 32.

The door locking means referred to above includes a pair of horizontally disposed shiftable rods 42, which are connected at their inner extremities with a cam disk or member 44. This cam member 44 is provided with cut-outs or apertures 46, and these apertures are bounded along one side by cam surfaces 48. Each of the rods 42 are supported at their inner extremities at the lower end of arms 50 which depend from a hinge pin 52 of the hinge member 30. The portion of each of the rods 42 extending inwardly from these depending supports 50 is bent so as to present a follower member or section 42a, which extends into the recess 46 and is adapted to co-act with the cam surfaces 48 when rotation is imparted thereto in response to the manual manipulation of the control handle 54, Figures 3 and 5.

Coiled springs 56 interposed between the depending support members 50 and a suitable abutment 58 on each of the rods 42, serve to continuously urge said rods outwardly away from the axis of the cam member or disk 44. The reason for construction will be apparent when it is observed that the outer extremity of each of the rods 42 carries a locking element 40, which forms an extension of said rod and is adapted, when urged to its outermost position through the action of the spring 56, to interlock with abutments or teeth 62, as clearly shown in Figure 9. Each of these locking elements 60 is adapted to be longitudinally adjusted with respect to its companion rod 42 through the agency of suitable lock nuts 64, and the reason for this construction will be more apparent as the description progresses. A bracket 66 carried by the lower section of the hinge 28, Figure 9, provides a slidable support for the locking element 60.

The teeth 62 are formed along the outer margin of a suitable angle plate 68, Figures 12 and 13, which plate is adapted to be longitudinally adjusted and secured in position upon its complementary rail section 34 by means of suitable tightening bolts 70. In this connection it should be noted that the outer extremity of the locking elements 60 are formed with a tip or fender 72, which extends at substantially right angles and is inclined upwardly from the elongated portion of the locking element 60. The portion of the guide rail sections 34 immediately adjacent the locking teeth or abutments 62 is recessed so as to enable the locking element 60 to traverse the stock of the rail section, as well as the stock of the angle plate 68,

as clearly shown in Figure 13. The function of the fender 72 will be more apparent as the description progresses.

Referring to Figure 3, it will be seen that when the cam member or disk 44 occupies the position shown, the springs 56 urge their companion locking rods 42 to the outermost position so as to bring the outer extremity of the locking element 60 into operative engagement with the abutments or teeth 62 when the door sections have been shifted to their closed position as shown in Figure 1. At this point it should be noted that the length of the angle plate 68, which is formed with the teeth 62, permits the door panels to be secured against upward displacement, when the lower margin of the door sections 26 is spaced above the floor or sill 74 of the structure in which the doors are installed. In other words, the door sections may be secured against upward displacement at various positions of elevation within, of course, predetermined limits as determined by the length of the angle plate 68.

In Figure 1 I have shown the door sections occupying their closed position with the lowermost section 26 abutting the floor or sill 74. When the sections occupy this position and the elements 60 lockingly engage complementary teeth 62, the cam member or plate is positioned as shown in Figure 3, and in this position a peripheral notch 76 in the plate 44 cooperates with a vertically shiftable latch 78, Figures 5 and 7. This latch 78 is continuously urged upwardly by means of a coiled spring 80 housed within a casing 82, and the lower portion of the latch 78 is provided with a laterally extending arm 84, which permits of the manual shifting of the latch 78 from the inside of the door panels. The shifting of the latch 78 is controlled from the outside of the door sections by means of a suitable key controlled locking mechanism which I have designated generally by the numeral 86. The inner extremity of this mechanism 86 carries a rotatable locking strip 88, which is adapted to be rotated between the horizontal position shown in Figures 5 and 6 and the vertical position shown in Figure 7. The outer extremity of the locking strip 88 extends through a circular opening 90 provided in the lower section of the hinge 30 and into an elongated aperture 92 provided in the shiftable latch member 78. Thus, when the locking strip 88 occupies the position shown in Figures 5 and 6, the latch member 78 will be urged upwardly into locking engagement with the peripheral notch 76 of the cam plate, thereby preventing rotation of the cam plate by manual manipulation of the control handle 54. However, when the locking strip 88 is rotated 90 degrees in response to the manual manipulation of a suitable key 94, Figure 5, to the position shown in Figure 7, the latch member 78 will

be urged downwardly away from the notch or recess 76, thereby enabling the cam member 44 to be actuated by manual manipulation of either of the control handles 54. If the control handles are rotated in a counter-clockwise direction as viewed in Figure 3, so as to shift the cam member 44 to the position shown in Figure 4, the cam surfaces 48 cooperate with the follower section 42a of each of the rods 42 so as to move the locking elements 60 out of engagement with the teeth or abutments 62. These locking elements will be maintained in this disengaged position as long as the cam member or plate 44 is positioned as shown in Figure 4, and the door panels will be free to be shifted along the guide rails 32.

By providing the fenders 72, I am able to positively prevent the bending or breakage of the outwardly projecting portions of the locking elements 60, which might otherwise result when said elements are being moved between vertical and horizontal sections of the guide rail along the curved portion 36. In other words, if the control handles were inadvertently shifted to their locking position so as to cause the springs 56 to urge the rods 42 outwardly into locking position, the fenders 72 would be moved into engagement with the inner margin of the guide rail, thereby preventing the outer extremities of the locking elements 60 from ever passing beyond the plane which includes the inner edges of said rail sections. It will be apparent, however, that if some means were not provided to prevent the movement of the locking elements beyond this plane, and said elements were shifted along the curved sections of the rails, the projecting portions of the elements would be forced against the rail section, thereby either bending or breaking the same and rendering the locking device inoperative.

By providing the saw tooth notches or teeth 62, I am able to adjustably position the lower margin of the door panel 26 at various distances from the floor or sill 74 and still render the locking device functionally operative. Thus, if during the winter months the floor of the building in which the doors are used, is elevated by frost so that the panels cannot be lowered to their original closing position the teeth 62 enable the door panels to be locked in this elevated position without the necessity of re-arranging or in any way changing the original position of the locking elements. In other words, by having a plurality of adjacently positioned teeth or abutments, I am able to effect the locking of the door panels, even though the position of the floor has been changed or an accumulation of snow and ice under the door has rendered it impossible to lower the door panels to their original position. Furthermore, it is often desirable for purposes of ventilation and the like to have the lower panel spaced from the

floor, and this can be accomplished by merely bringing the locking elements 60 into operative association with one of the uppermost teeth 62. By having the angle plate 68, which carries the teeth 62, longitudinally adjustable upon the rail section, I am able to position the teeth on one side of the door panels in proper relation with respect to the teeth on the opposite side so as to effect the proper closing of the panels. Due to climatic changes and the like, the door panels and adjacent building structures are shifted, and this adjustable feature enables the teeth to be positioned so as to compensate for any structural changes.

By having the coiled springs 56 constantly urging the bars 42 outwardly, I am able to effect the self-alinement of these elements. That is to say, if the door sections become slightly misaligned with respect to a central vertical line of the door, one vertical edge of the sections would be positioned further to one side of the door opening than the other. Under these circumstances, the space provided by the openings 46 in the plate 44 and the springs 56 serve to automatically take up this variation in vertical alinement without impairing the functioning of the locking elements 60. In other words, if the door sections when shifted to their closed position, do not occupy an exact central position with respect to the door opening, the relatively wide opening or slot in the cam permits the locking elements to automatically seat themselves within the saw tooth notches of the plates 68, and thus insures the locking engagement of the members with said notches each time the door panels are closed.

Attention is also directed to the fact that the cam member or plate 44 and its associated parts are located on the hinge member, thus making it unnecessary to provide a separate base. This presents a very practical construction. By having the doors 42 and their associated locking elements or plungers 60 extending along a line adjacent the axis of the hinges which connect the sections 22 and 24, I am able to prevent the necessity of moving the outer extremities of the elements 60 across the arc presented by the curved section 36 of the guide rails. In other words, the extremities of the locking elements move along an arcuate path substantially coincident with the path of the rail sections. By having the locking elements or plungers 60 adjustably positioned upon the rods 42, I am able to further adjust the over-all length of these combined elements. In this way the combined length of the rod 42 and its associated member or plunger 60 may be conveniently adjusted to suit the particular needs incident to its use.

While I have disclosed a particular door construction and have described specific structural features of a locking device represent-

ing one embodiment of my invention, it should be clearly understood that said invention is by no means limited to the specific structure shown in the drawings, but is capable of numerous modifications and variations without departing from the spirit and scope thereof.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a door structure including a plurality of hingedly connected door sections shiftable along vertical, horizontal and connecting curved rail sections, a locking device including a shiftable locking element adapted to project beyond a vertical margin of one of said door sections and movable with said sections, an abutment adapted to be lockingly engaged by said locking element to secure said sections against upward displacement, and a guard on the outer extremity of said locking element for preventing the interlocking of said element with said rail sections during the shifting of the sections there-along.

2. In combination with a door structure including a plurality of hingedly connected door sections shiftable along vertical, horizontal, and connecting curved rail sections, a locking device including a shiftable locking element adapted to project beyond a vertical margin of one of said door sections and movable with said sections, an abutment adapted to be lockingly engaged by said locking element to secure said sections against upward displacement, and a projection extending laterally of the outer end of said locking element and adapted to engage an inner surface of said guide rail to prevent the interlocking of said locking element with said guide rail.

In witness whereof, I have hereunto subscribed my name.

ALVIN V. ROWE.