Feb. 6, 1940. A. V. ROWE 2,189,020

OVERHEAD DOOR CONSTRUCTION

Filed May 27, 1939 3 Sheets-Sheet 1

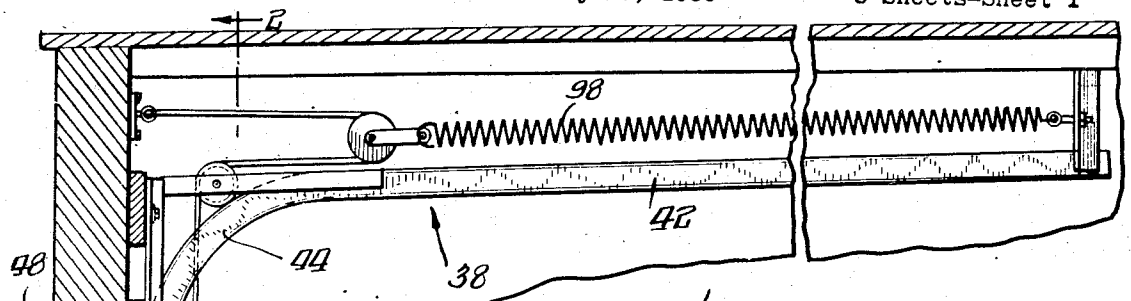
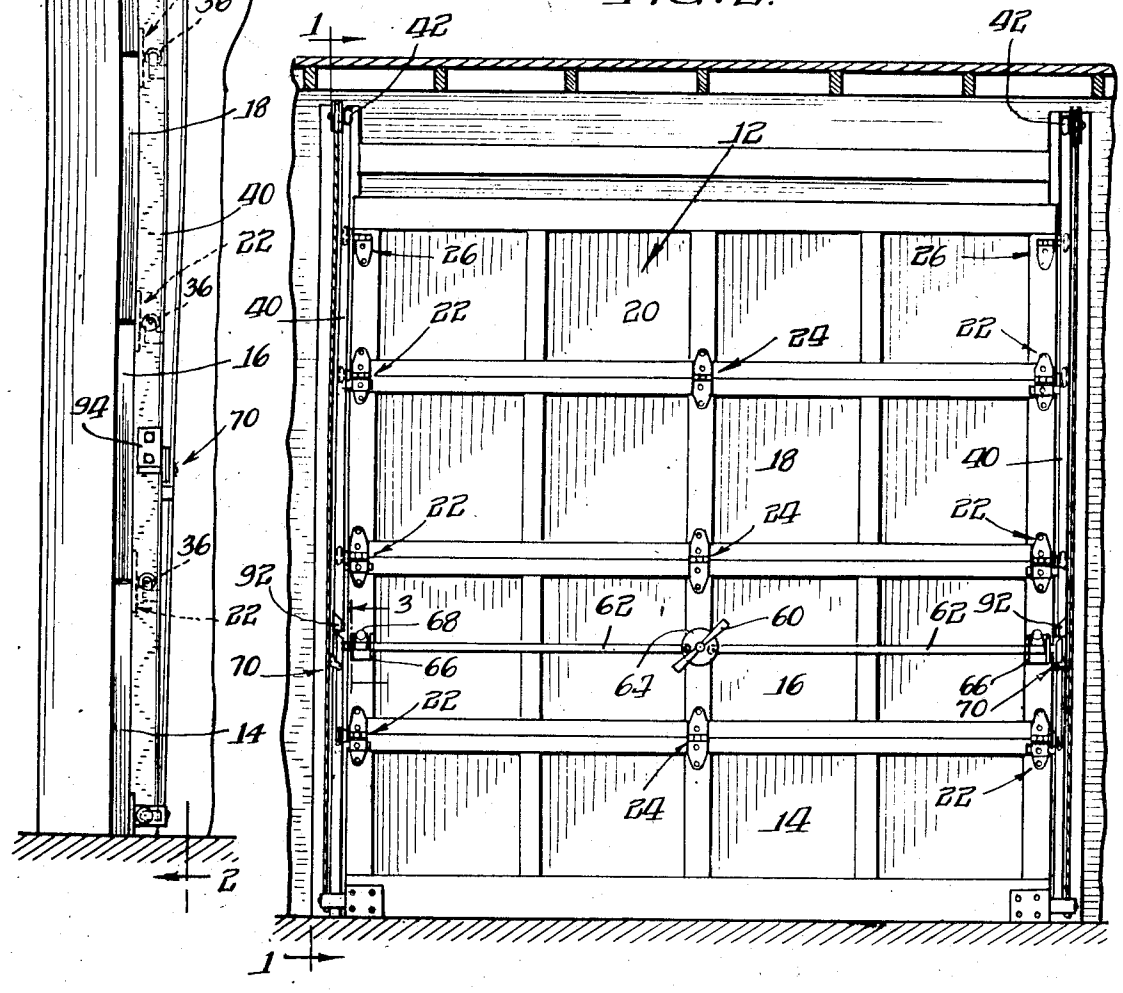


FIG. 1.

FIG. 2.



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Filed May 27, 1939 3 Sheets-Sheet 2

FIG. 3.

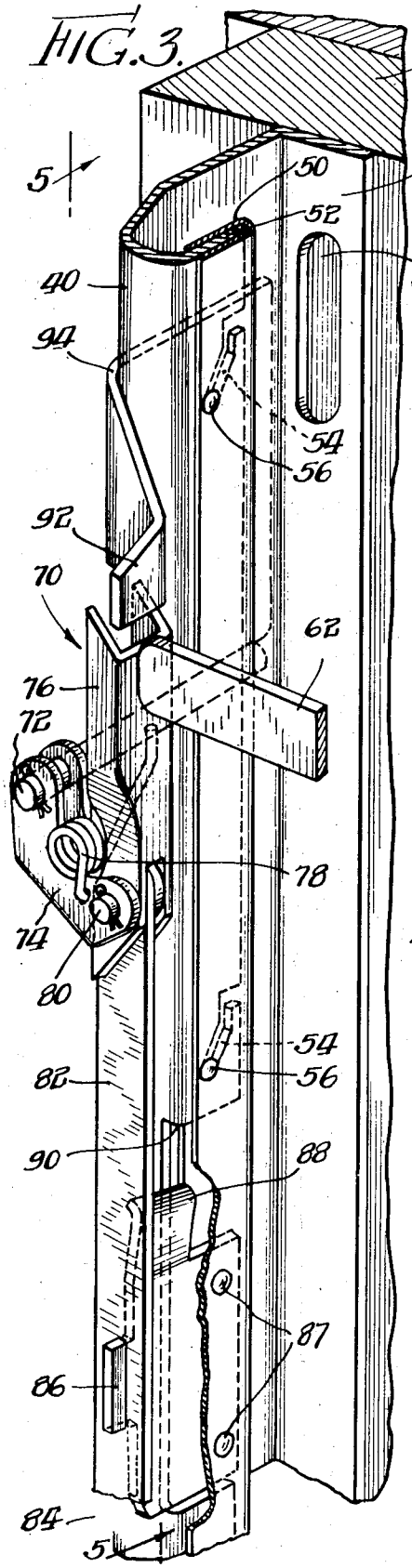


FIG. 4.

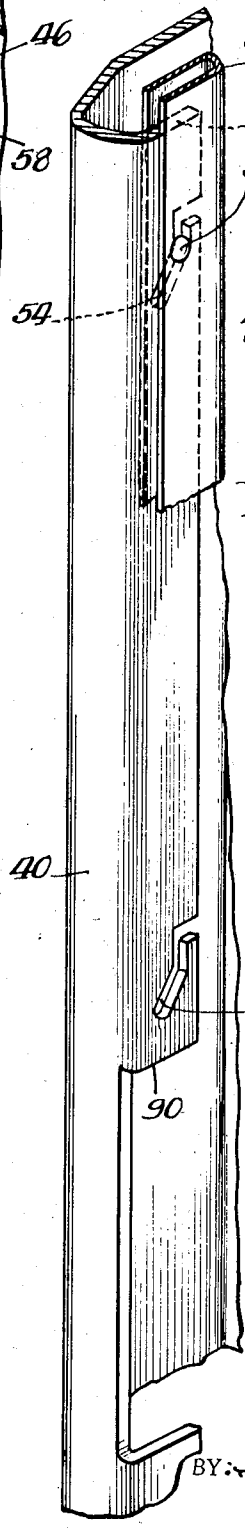


FIG. 5.

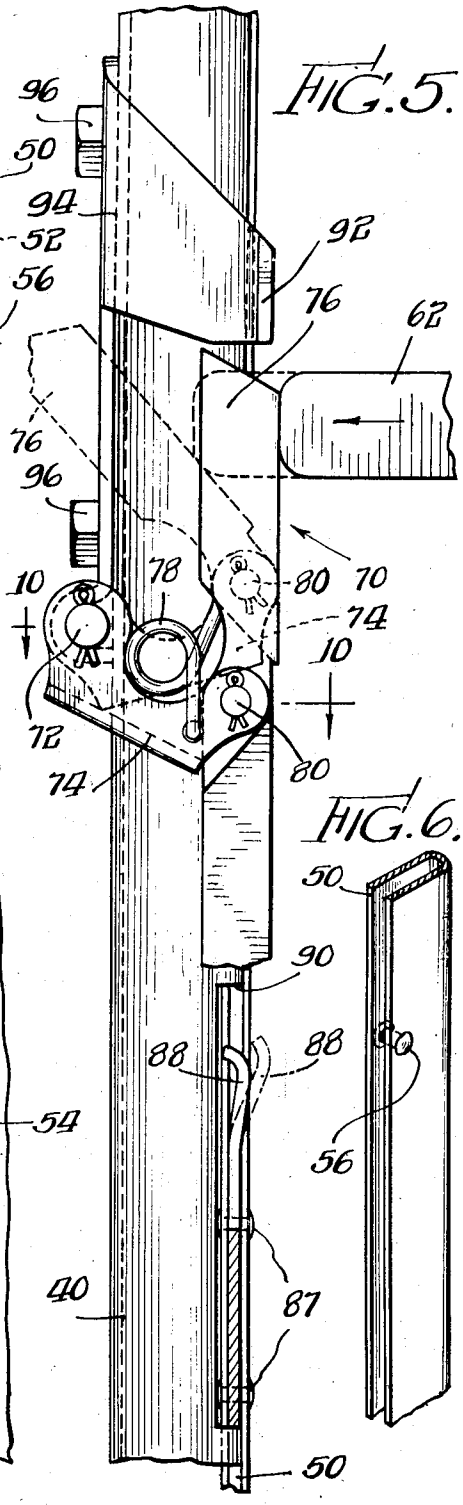


FIG. 6.

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Filed May 27, 1939 3 Sheets-Sheet 3

FIG. 7.

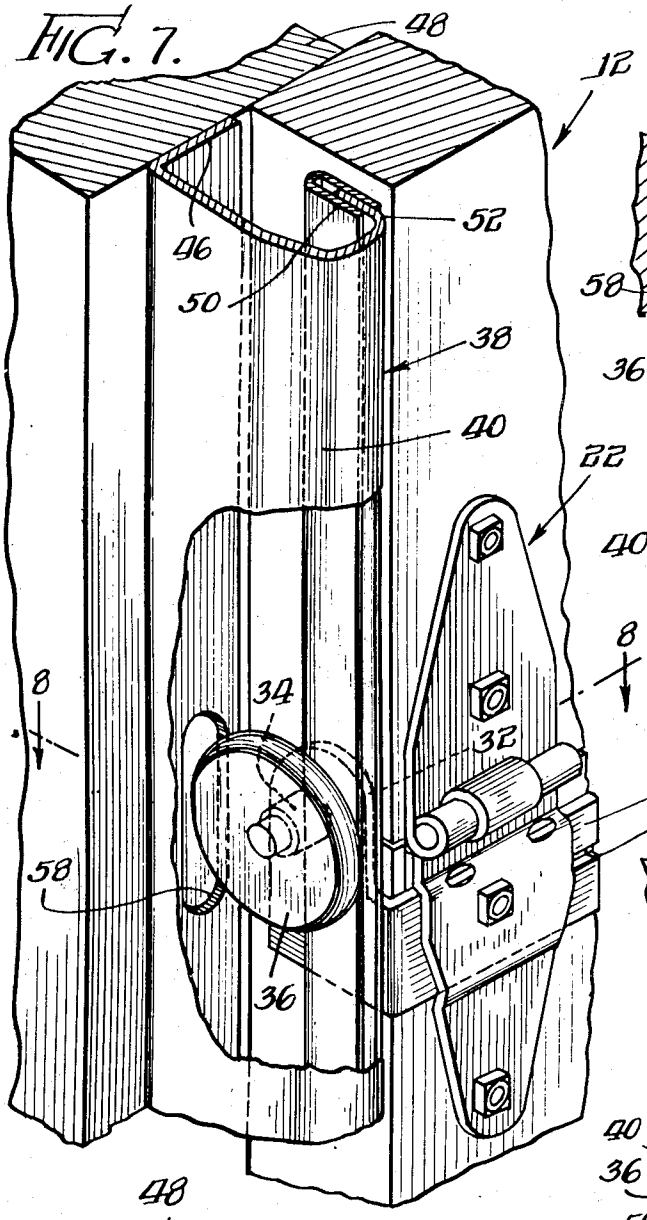


FIG. 8.

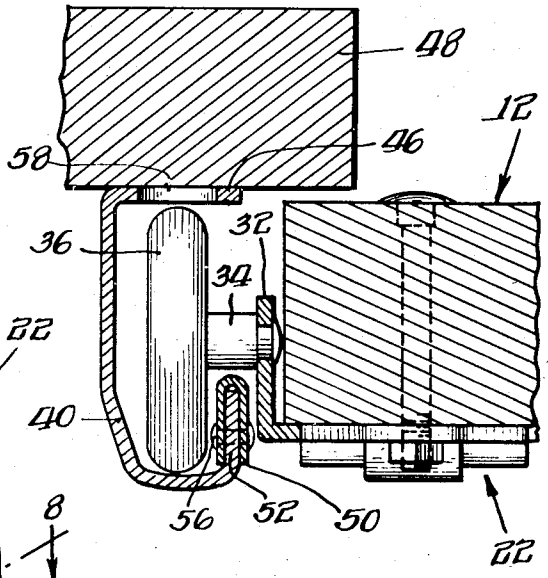
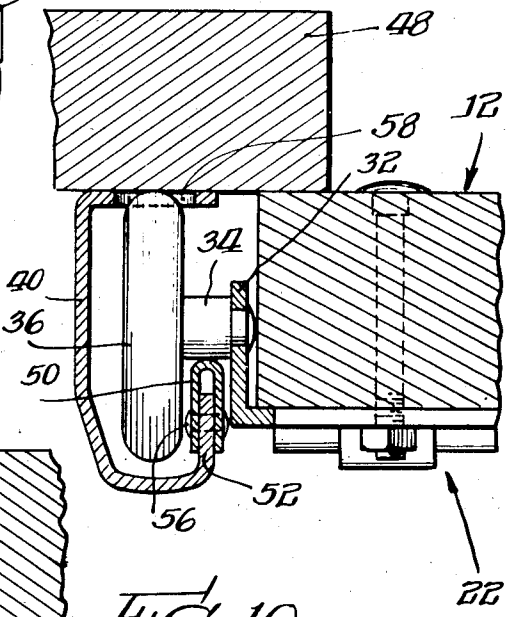


FIG. 9.



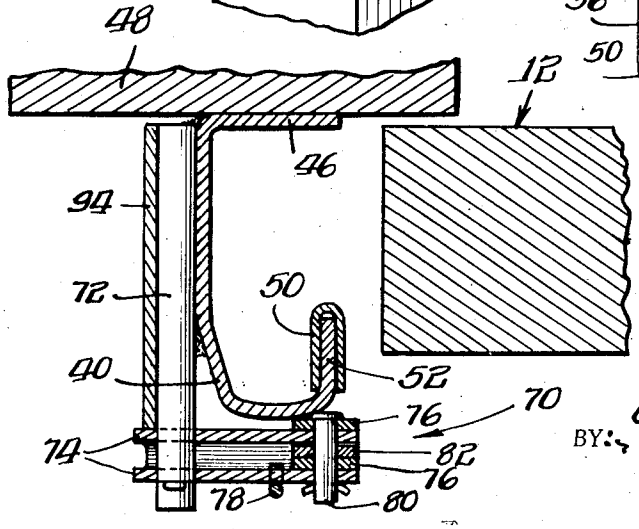


FIG. 10.

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UNITED STATES PATENT OFFICE

2,189,020

OVERHEAD DOOR CONSTRUCTION

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Application May 27, 1939, Serial No. 276,096

10 Claims. (Cl. 20—20)

This invention relates generally to overhead door constructions and, more particularly, to overhead door constructions equipped with door sealing means operable after the door has been shifted to its lowermost closed position.

The present invention contemplates improved mechanism for effecting the simultaneous sealing of a plurality of hingedly connected door panels after said panels have been shifted to their door-closing position, and to this end it is an object of the present invention to provide simple and improved means, manually operable from a convenient location for laterally urging the door panels into sealing relation with respect to a door frame.

The present invention constitutes an improvement of the mechanism disclosed in my co-pending application Serial No. 243,245, filed November 30, 1938, wherein mechanism of less simplified form is disclosed for causing the door panels to be urged into sealing engagement with the door frame.

More specifically, it is an object of the present invention to provide in combination with a plurality of shiftable hingedly connected door panels a durable yet economically constructed mechanism for engaging a plurality of door panels at vertically spaced positions so as to urge said panels into sealing relation with the door frame, said mechanism being manually controllable from a conveniently located position, as, for example, by means of a conventional lock-operating handle centrally disposed with respect to the door panels.

It is a further object of the present invention to provide mechanism as set forth above for laterally urging door panels into sealing relation with a door frame wherein the number of operating parts is reduced to a minimum and wherein most of said parts can be stamped from sheet metal, thereby materially reducing the cost of manufacture without sacrificing strength and durability.

Further objects and advantages will be more apparent from the following detailed description, when considered in connection with the accompanying drawings, wherein

Figure 1 is a vertical sectional view taken along the line 1—1 of Figure 2 showing a door structure including the door frame and a plurality of shiftable hingedly connected door panels equipped with door sealing mechanism embodying features of the present invention;

Figure 2 is also a vertical sectional view taken substantially along the line 2—2 of Figure 1 to more clearly illustrate the general disposition of the door-sealing mechanism disclosed in Figure 1;

Figure 3 is an enlarged fragmentary perspective view taken substantially along the line 3—3 of Figure 2 showing a section of the track or guide rail and the shiftable U bar and operating mechanism therefor;

Figure 4 is a fragmentary perspective view similar to Figure 3 disclosing the U bar shifted to its uppermost position, the bar actuating mechanism being dissociated from the track structure in order to more clearly illustrate the disposition of the inclined guide slots which serve to direct the U bar toward and away from the pintles of the guide rollers;

Figure 5 discloses the structure of Figure 3 as viewed along the line 5—5 of Figure 3;

Figure 6 is a fragmentary perspective view of the shiftable U bar dissociated from the track structure;

Figure 7 is an enlarged fragmentary perspective view disclosing the manner in which the pintle of each guide roller is engaged by the U bar so as to cause the roller to move into a companion registering slot in the track structure and thereby permit sufficient movement of the associated door panel to cause the sealing engagement of said panel with the door jamb;

Figure 8 is a horizontal transverse sectional view taken substantially along the line 8—8 of Figure 7 to more clearly illustrate the position occupied by the guide roller, pintle, door panel, and U bar prior to the shifting of the panel into sealing engagement with the door frame;

Figure 9 is a view similar to Figure 8, showing the door panel shifted into sealing engagement with the door frame as a result of the engagement of the U bar with the roller pintle; and

Figure 10 is an enlarged transverse horizontal sectional view taken substantially along the line 10—10 of Figure 5 to more clearly illustrate the structural features of the pivotally supported arm of the U bar actuating trigger mechanism.

Referring now to the drawings more in detail, it will be seen that one embodiment of my invention is disclosed in operative association with a shiftable door structure designated generally by the numeral 12. This door structure comprises a plurality of panels 14, 16, 18, and 20 which are joined together along their margins by hinge mechanisms designated generally by the numeral 22 and are connected intermediate their margins by suitable hinges 24. The uppermost panel 20 carries toward its upper edge a roller

support 26 which is the equivalent of the lower section of the hinge mechanism 22.

One of the hinge mechanisms 22 is clearly disclosed in Figure 7. It will be seen that the lower section of the hinge 22 slidably carries a bar 28 which is provided with a slot 30 to permit free shifting of the bar 28 within the lowermost hinge flange. The bar 28 is bent forwardly at its outer extremity and is formed with an upwardly extending section 32 which serves as a support for a pintle 34, said pintle carrying a guide roller 36. By having the pintle supporting bar 28 freely slidable within the lower flange of the hinge mechanism 22, the roller 36 is rendered self-adjustable to any track irregularities and the like.

The rollers 36 just described co-operate with track structures designated generally by the numeral 38 in guiding the hingedly connected panels of the door structure 12 between vertical door closing position and open overhead position. The track structure 38 includes a vertical section 40 and a substantially horizontal section 42, said sections being connected by a curved track section 44. One of these track structures 38 is associated with each margin of the door structure. The flat section or flange 46 of the vertical section of the track 38 (Figs. 3 and 7 to 10, incl.) is suitably secured to the door jamb 48. Thus, as the door panels are shifted to their vertical door closing position, as shown in Figure 7, the marginal areas of the door panels overlie a corresponding surface area of the door jamb 48.

The present invention is particularly concerned with the problem of sealing all of the door panels against the door jamb 48 after said panels have been shifted to their lowermost position, as illustrated in Figures 1, 2, and 7. The mechanism for accomplishing this sealing of the door panels will now be described.

The door sealing mechanism includes a pair of shiftable door engaging members or U bars 50, one U bar being associated with each vertical section 40 of the track structure 38 (Figs. 3 to 9, incl.). These door actuating members or U bars 50 embrace the lip portion 52 of the vertical track section 40 and are vertically shiftable with respect thereto. Attention is directed to the fact that the lip portion 52 of the vertical track section 40 is provided at spaced intervals (Figs. 3 and 4) with slots 54 which co-act with pins or rivets 56 in controlling the direction of movement experienced by the bar 50 when said bar is urged upwardly in response to the actuation of mechanism about to be described, and when said bar shifts downwardly by the force of gravity. These slots 54 open at the margin of the lip 52 to permit initial association of the pins 56, and said slots have a short vertical section which serves to prevent dislodgment of the pins from the slots when said pins are shifted to their uppermost position, as indicated in Figure 4. The inclination of the lower section of each slot 54 is such as to insure the required degree of lateral movement of the U bar 50. When the door panels are initially shifted to their door closing vertical position, the U bar 50 occupies the position illustrated in Figures 3 and 8. In this position the outer surface of the U bar is spaced slightly from the pintle 34, thereby permitting free movement of the rollers in the vertical section of the track. However, as the U bar is shifted upwardly, the inclined section of the slots 54 co-acts with the pins 56 to direct the outer vertical edge of the U bar into engagement with the roller pintle 34. A series of slots or openings 58 are provided in the flat section or flange 46 of the vertical track section 40. These slots register with companion guide rollers 36 when the door panels occupy their vertical door-closing position and, therefore, when the U bar is moved into engagement with the roller pintles 34, as illustrated in Fig. 9, the recesses or slots 58 in the track provide sufficient clearance for the rollers 36 to enable the door panels to be urged into sealing engagement with the door frame 48. I prefer to have the slots 54 located in the immediate vicinity of a companion roller so as to insure more positive engagement of the U bar 50 with the roller pintles.

Lateral and upward movement of the sealing bar 50 is controlled from a manually operable lock bar handle 60 (Fig. 2). This handle 60 is pivotally mounted in a convenient position intermediate the margins of the door panels. A pair of lock bars 62 extend in opposite directions from and are pivotally supported by a plate 64 which rotates with the handle 60. The free extremity of each bar 62 is slidably supported within a bracket 66 carried by the panel 16 (Fig. 2). These lock bars 62 are continuously urged inwardly, that is, toward each other, through the action of suitable springs 68 carried by each bracket 66. Thus, the springs 68 serve to expedite unlocking movement of the bars 62 when rotation is imparted to the handle 60.

When the door panels occupy their vertical door closing position, the free extremity of each lock bar 62 is positioned in operative association with a trigger or actuating mechanism designated generally by the numeral 70 (Figs. 3 and 5). Movement of the lock bar 62 in the direction of the arrow shown in Figure 5 causes the pivoting of the trigger mechanism 70 in a counter-clockwise direction, as viewed in Figure 5, about a pin or pivot member 72. The trigger mechanism 70 comprises an arm 74 pivotally supported by the pin 72 at one extremity and pivotally coupled with a U-shaped arm or trigger member 76 at the opposite extremity. This trigger member 76 and the arm 74 normally move together as a unit due to the inter-position of a coil spring 78, one extremity of the coil spring being received by an aperture provided in the arm 74 (Fig. 3) and the other extremity of the coil spring resting within the channel provided by the U-shaped trigger member 76. If the force acting upon the trigger member 76, as, for example, the force exerted by the lock bar 62, exceeds the yielding resistance afforded by the coil spring 78 (as will later appear), relative movement between the trigger member 76 and the arm 74 about the pin or pivot 80 will take place.

The lower extremity of the trigger arm 76 is pivotally connected with the upper end of a link 82, the lower extremity of said link being slotted to receive a tongue 84 of a plate 86. This plate 86 is secured by means of rivets 87, or other suitable fastenings, to the lower extremity of the U bar 50 (see Figs. 3, 4 and 5). The plate 86 is provided with an upwardly extending tongue portion 88 which co-acts with a shoulder 90 presented by a cut-out portion of the vertical track section 40 to limit the degree of upward movement of the U bar 50. When the U bar 50 is initially associated with the lip 52 of the vertical track section 40, the tongue 88 occupies the position indicated by the dot-and-dash lines in Figure 5. This enables the parts to be moved together without interference, and after said parts have been properly associated the tongue 88 is

sprung inwardly by the blow of a hammer or the like and then occupies the solid-line position shown in Figure 8. In this position the upper extremity of the tongue will abut the shoulder 90 when the U bar has been shifted upwardly a given amount. This shoulder 90 comes into play as the lock bars 62 approach the limit of their outward movement. During the initial movement of the bars, the trigger mechanism 70 as a unit pivots about the pin 72 and, when the tongue 88 is stopped by the shoulder 90 so as to prevent further upward movement of the U bar 50, the final continued movement of the lock bars 62 causes the trigger members 76 to pivot about the pin 80 against the yielding force of the spring 78. Should the U bars 50 reach the limit of their clamping movement before the tongue 88 engages the shoulder 90, this same pivoting of the trigger member 76 about the pivot or pin 80 will take place.

It will be apparent from the foregoing description that when the lock handle 60 is shifted to the position shown in Figure 1 after the door panels have been moved to their door-closing position, the lock bars 62 will have moved the trigger mechanism 70 about the pin or pivot 72 and thereby caused the pins 56, carried by the U bar 50, to be guided upwardly and laterally within the inclined section of the slots 54, thereby causing the outer edge of the U bars to be moved into engagement with the door structure or pintles 34. This, as previously described, effects simultaneous sealing engagement of the door panels with the door frame. After the U bars reach their final clamping position, the lock bars 62 continue their outward movement a sufficient distance to cause the pivoting of the trigger member 76 about the pivot 80 against the resilient action of the spring 78. The yielding action of this spring co-operates to prevent rattling of the door panels after the U bars have been moved to their final door-sealing position. It should also be understood, when the lock bars are shifted to their outer locking position, as shown in Figure 2, that upward movement of the door panels is prevented due to the presence of a lug 92 formed integral with a plate 94 which is secured to the web portion of the vertical track section 40 by any suitable means, such as bolts 96 (Fig. 5). This plate 94 also serves as a support for the pin 72. The lower portion of the plate 94 is formed semi-circularly so as to partially encircle the pin 72, and these parts are then welded together. Thus the pin 72 is firmly secured in position along the lower edge of the plate 94 and the arm 74 of the trigger mechanism 70 is pivotally supported by the fixed pin 72.

Summarizing the foregoing description, it should be apparent that when the door panels 14, 16, 18, and 20 of the door structure 12 are shifted from the overhead position within the upper horizontal track section 42 to the door-closing vertical position within the vertical track section 40 against the action of a suitable counter-balancing spring 98 (Fig. 1), these panels are in readiness to be urged laterally into sealing engagement with the door jamb 48. By manually turning the handle 60 so as to shift the lock bars 62 outwardly in opposite directions, the free extremities of these bars move into engagement with the trigger members 76 and thereby cause the trigger mechanism 70 to pivot about the pin 72 in a counter-clockwise direction as viewed in Figure 5. The trigger mechanism 70, being coupled with the U bar 50 through the agency of the link 82 and the plate 86, causes said U bar to be shifted upwardly. The inclined sections of the slots 54 co-operate with the pins 56 to effect lateral movement of the U bars into engagement with the roller mechanism or pintles of the door panels. The presence of the slots or openings 58 provides sufficient clearance for the rollers 36 to permit movement of the door panels into sealing engagement with complementary surface portions of the door jambs. The degree of shifting experienced by the U bars is limited by engagement of the tongues 88 with the companion abutment or shoulder 90. It will, of course, be apparent that the U bar may extend upwardly, as disclosed herein, a distance which is sufficient to cause engagement thereof with the roller pintles carried by the supports 26 (Fig. 2), or, in instances where it is deemed advisable, the U bar may terminate just above the pintle carried by the uppermost hinge mechanism 22, other mechanism being provided to effect the sealing of the uppermost margin of the upper door panel 20. The weight of the U bar 50 is sufficient to carry the bar downwardly after the lock handle 60 has been turned so as to withdraw the lock bars 62 from the trigger mechanism 70. The coil spring 78 of the trigger mechanism 70 also serves to insure against the loosening of the door panels when they are subjected to vibration. In fact, due to the constant tendency of the spring 78 to maintain the trigger arm 76 and the companion arm 74 separated, this action of the spring also tends to maintain the clamping or sealing action of the U bar, should the door panels be subjected to vibration. Thus, the action of the spring 78, after the U bar has been shifted to its door-sealing position, serves to continually maintain said U bars in clamping engagement with the door pintles, even though the panels have a tendency to be subjected to vibration.

By employing my improved actuating bar arrangement,—to-wit, the U-shaped actuating bar 50 and the elements associated therewith,—the necessity of making adjustments to insure proper sealing effect is completely avoided. In other words, the arrangement of the inclined cam slots 54, associated guide pins 56, and the springs 78, together with the mechanism for imparting movement to the actuating bar, is such as to insure a tight fit after the structure has been installed without the necessity of making adjustments. There are no bolts, screws, or the like to work loose. Furthermore, the U bar moves each of the roller pintles the same distance and the amount of travel experienced by the U bar is controlled by the degree of slant or inclination of the cam slots 54. Obviously, these cam slots could be provided in the U bar as well as the lip of the track, in which instance the pins 56 would be mounted within the lip of the track.

I have found that a 20° inclination permits the upward movement of the U bar to effect the proper sealing of the panels. Obviously this inclination may be varied to suit the conditions incident to the particular installation or use. Should one installation require the upward travel of the U bar a greater distance than another in order to effect the proper seal against the jamb, additional movement may be imparted to the U bar.

Obvious changes in the specific structural features described herein may be made without de-

parting from the spirit and scope of the following claims.

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

1. In an overhead door construction, a plurality of hingedly connected shiftable door panels for traversing a door opening, guiding means for directing movements of said door panels between open and closed positions including upright track sections having a web portion and an oppositely disposed lip portion, said sections being positioned in the vicinity of the opposite sides of said door opening, and door sealing means including members on said lip portions shiftable vertically and laterally with respect to the door panels for simultaneously causing a plurality of said panels to be urged laterally at vertically spaced positions into sealing relation with respect to said door opening after said panels reach their door closing position.

2. In an overhead door construction, a plurality of hingedly connected shiftable door panels for traversing a door opening, guiding means for directing the movements of said door panels between open and closed positions, said guiding means including upright track sections, and means shiftable laterally of said panels for simultaneously engaging a plurality of said panels to laterally urge said panels into sealing relation with respect to said door opening after said panels reach their closing position, said upright track sections and laterally shiftable means being provided with an arrangement of inclined open ended cam slots and members cooperating therewith to cause lateral movement of said shiftable means into engagement with said panels.

3. In an overhead door construction, a plurality of hingedly connected shiftable door panels for traversing a door opening, guiding means for directing the movements of said door panels between open and closed positions, said guiding means including upright track sections, and actuating members shiftably supported along one edge of said upright track sections for simultaneously engaging a plurality of said panels to laterally urge said panels into sealing relation with respect to said door opening after said panels reach their closing position.

4. In an overhead door construction, a plurality of hingedly connected shiftable door panels for traversing a door opening, guiding means for directing the movements of said door panels between open and closed positions, said guiding means including upright track sections, and U-shaped actuating members shiftably supported along one edge of said upright track sections for simultaneously engaging a plurality of said panels to laterally urge said panels into sealing relation with respect to said door opening after said panels reach their closing position.

5. In an overhead door construction, a plurality of hingedly connected shiftable door panels for traversing a door opening, guiding means for directing the movements of said door panels between open and closed positions, said guiding means including upright track sections, and an actuating member shiftably mounted upon each upright track section for simultaneously engaging a plurality of said panels to laterally urge said panels into sealing relation with respect to said door opening after said panels reach their closing position, each of said actuating members being U-shaped in horizontal cross-section, the material forming the base of said U-shaped member being constructed and arranged for engaging the structure of said panels.

6. In an overhead door construction, a plurality of hingedly connected door panels for traversing a door opening, guiding means for directing the movements of said door panels between open and closed positions, said guiding means including upright track sections which in horizontal cross-section present oppositely disposed tread portions, a connecting web portion, and a lip portion oppositely disposed from said web portion, and an actuating member embracing the lip portion of each upright track section, each of said actuating members being shiftable laterally of said panels for simultaneously urging said panels laterally into sealing relation with respect to said door opening after said panels reach their closing position.

7. In an overhead door construction, a pair of guide tracks, each track comprising a fixed vertical section adapted to be positioned adjacent the inner surface of a door frame defining a door opening, a horizontal overhead section, and a curved section intermediate said vertical and horizontal sections, a plurality of hingedly connected door panels slidably mounted upon said tracks and adapted to be shifted thereon between door closing vertical position and open overhead position, guide rollers carried by said panels, and shiftable means adapted to engage a plurality of said panels at positions axially spaced from said rollers for simultaneously moving said panels at vertically spaced positions in a lateral direction only into sealing relation with respect to the door opening after the door panels have reached their lowermost position closing the door opening.

8. In an overhead door construction, a pair of guide tracks, each track comprising a fixed vertical section adapted to be positioned adjacent the inner surface of a door frame defining a door opening, a horizontal overhead section, and a curved section intermediate said vertical and horizontal sections, a plurality of hingedly connected door panels slidably mounted upon said tracks and adapted to be shifted thereon between door closing vertical position and open overhead position, guide rollers carried by said panels, and shiftable means adapted to engage a plurality of said panels at positions axially spaced from said rollers for simultaneously moving said panels at vertically spaced positions in a lateral direction into sealing relation with respect to the door opening after the door panels have reached their lowermost position closing the door opening, said shiftable means being manually controllable from a position intermediate the sides of said door panels.

9. In an overhead door construction, a pair of guide tracks, each track comprising a fixed vertical section adapted to be positioned adjacent the inner surface of a door frame defining a door opening, a horizontal overhead section, and a curved section intermediate said vertical and horizontal sections, a plurality of hingedly connected door panels slidably mounted upon said tracks and adapted to be shifted thereon between door closing vertical position and open overhead position, guide rollers carried by said panels, pintles supporting said rollers, and shiftable means adapted to engage a plurality of said pintles for simultaneously moving said panels at vertically spaced positions in a lateral direction into sealing relation with respect to the door

opening after the door panels have reached their lowermost position closing the door opening.

10. In an overhead door construction, a pair of guide tracks, each track comprising a fixed vertical section adapted to be positioned adjacent the inner surface of a door frame defining a door opening, a horizontal overhead section, and a curved section intermediate said vertical and horizontal sections, a plurality of hingedly connected door panels slidably mounted upon said tracks and adapted to be shifted thereon between door closing vertical position and open overhead position, guide rollers carried by said panels, and shiftable means provided with an arrangement of inclined cam slots and adapted to engage a plurality of said panels at positions axially spaced from said rollers for simultaneously moving said panels at vertically spaced positions in a lateral direction into sealing relation with respect to the door opening after the door panels have reached their lowermost position closing the door opening.

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