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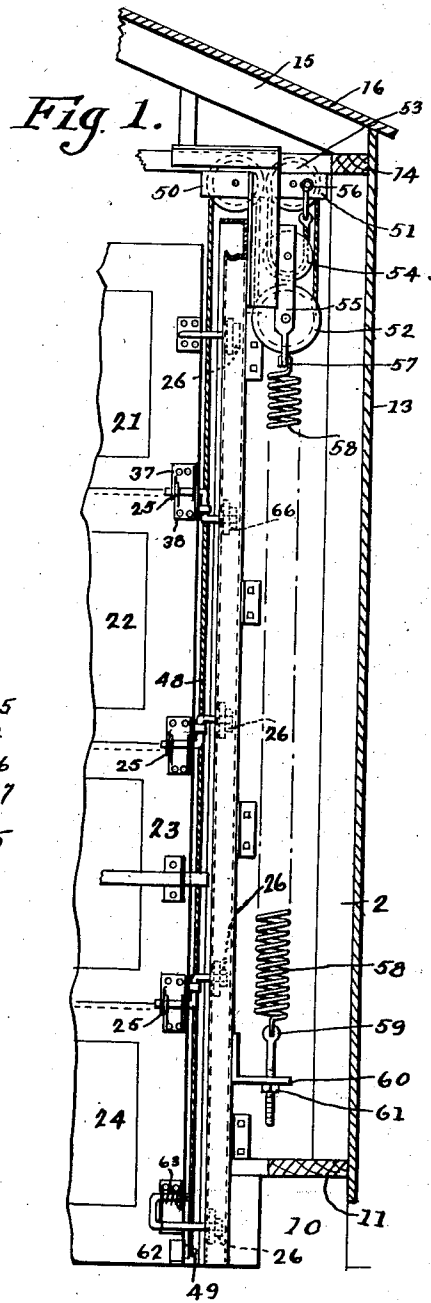
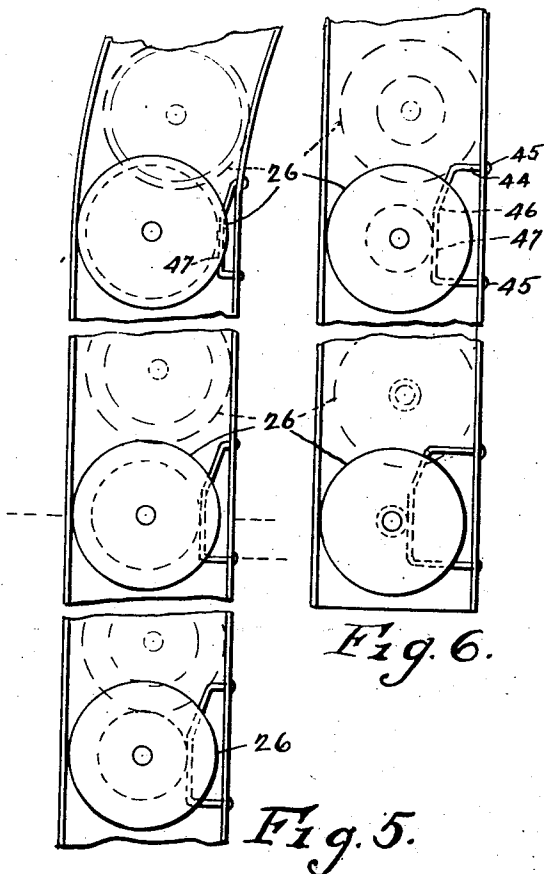
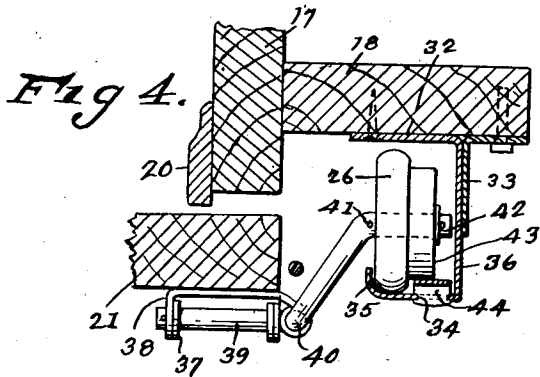
E. W. CLARK

1,948,065

SLIDING DOOR CONSTRUCTION

Filed Aug. 17, 1929

2 Sheets-Sheet 1



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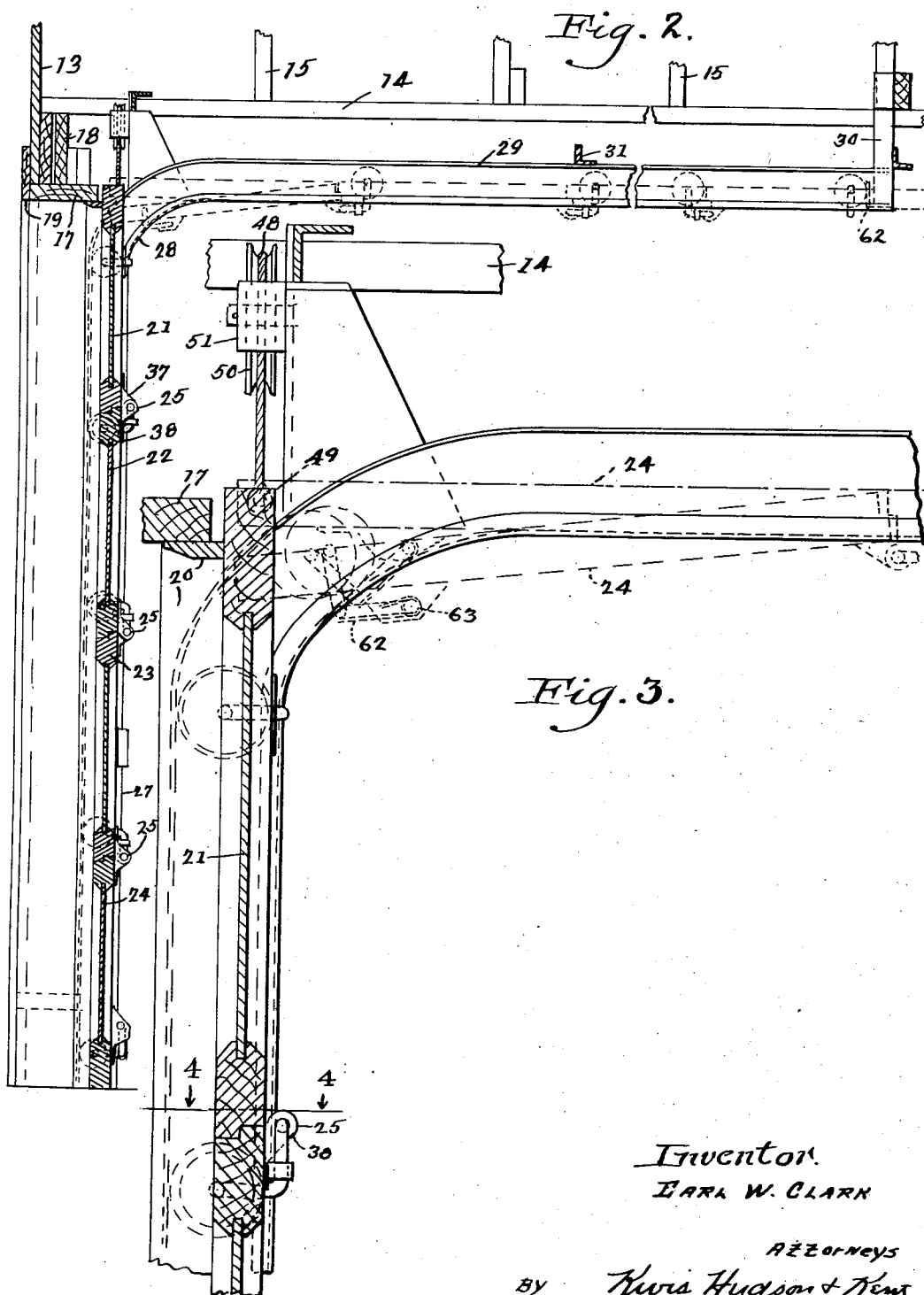
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2 Sheets-Sheet 2



## UNITED STATES PATENT OFFICE

1,948,065

## SLIDING DOOR CONSTRUCTION

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Application August 17, 1929. Serial No. 386,622

26 Claims. (Cl. 20—20)

This invention relates to sliding door constructions, and more particularly to a modification of the type adapted to be moved from an open position to a closed position along a predetermined path, and vice versa, and as disclosed in my copending application filed herewith.

The invention is of general application to sliding doors for furniture, such as cabinets, or larger structures, such as ware-houses, elevators and the like, and it has particular adaptability when applied to garage doors.

The embodiment of the invention described herein has to do with a garage, but it is to be understood at the outset that this description is not intended in any way to limit the scope of the invention including other adaptations.

Considerable difficulty has been heretofore experienced in making sliding doors for garages tight against the weather. Many expedients for sealing the door after it has been moved to closed position require manipulation, in addition to the closing of the door. For these reasons it is an important object of the invention to provide an improved means to seal the door automatically with closing movement thereof.

Other objects and features of novelty will be apparent as the following description proceeds, reference being had to the accompanying drawings, in which

Figure 1 is an interior elevation of the front of a garage provided with a sliding door construction according to the present invention;

Figure 2 is an internal elevation of one side of the garage, showing the door in vertical section;

Figure 3 is an enlarged detail view of a portion of the structure shown in Figure 2, the operation of the device being shown more clearly by illustrating consecutive positions in dotted lines;

Figure 4 is a horizontal section taken along the line 4—4 of Fig. 3;

Figure 5 is a partial elevation of the track member for guiding the door, and

Figure 6 is a view similar to Figure 5, showing the remaining portion of the track.

Referring more particularly to the drawings, the invention is illustrated in connection with a garage of usual construction, having a foundation 10, sill 11, studding 12, siding 13, plate 14, rafters 15 and roof boards 16.

The front of the garage is provided with a door opening having a door jamb 17 fitted in a casing 18 and provided with trim 19 and a door stop or sealing member 20 constituting an abutment for the door.

In the preferred embodiment, the door proper comprises a plurality of sections 21, 22, 23 and 24, flexibly connected in series by means of hinges 25 joining their adjacent edges. A plurality of rollers 26 are associated with the door sections and are adapted to guide them along guide tracks mounted in each side of the door. These tracks comprise substantially vertical portions 27, smoothly curved upper portions 28, and straight horizontal extensions 29. These tracks are supported by hangers 30, and a transverse tie member serves to maintain the horizontal portions 29 parallel to each other.

The details of the track, roller and hinges are shown in Fig. 4. The track is channel shaped in cross section, and comprises a flat or base flange 32, which in the vertical portion 27 is secured to the casing 18 in any desired manner.

For reinforcement a backing angle 33 is secured thereto and also secured to the casing 18. The outer flange 34 of the channel is provided with a retaining rim 35, the flange 34 being spaced from the flange 32 by the web 36 of uniform depth.

Each of the hinges 25 comprises hinge members 37 and 38, respectively, and a pintle member 39 which is rigidly secured to one of the hinge members. The member 39 projects beyond the side of the door section and is bent inwardly as at 40, and outwardly as at 41, whereby the end portion 42 is parallel to but offset from the pintle 39. The portion 42 forms a journal for the rollers 26.

Each of the rollers has associated therewith a sealing flange 43. The flange for the upper roller 26 is of slightly smaller diameter than the associated roller, and the respective flanges for the rollers therebelow are of uniformly decreasing diameter.

Means are provided for engaging the respective flanges for automatically urging the door against the sealing member 20, as the door is lowered into its closed position. The flange 34 is provided with a plurality of wedge members or inclined cams 44, which are spaced along the vertical portion 27 of the track at the positions taken by the rollers when the door is in its closed position. The members 44 comprise metal straps, the two ends of which pass through slots in the flange 34 and are upset outside thereof as at 45. The members 44 are generally U-shaped, but the bridge portion thereof is inclined or tapered, as shown, forming a wedge portion 46 and a retaining portion 47. The members 44 are substantially similar, but the retaining portion 47 thereof is spaced farther from the flange 34, toward

the bottom of the door. Accordingly the member 44 at the bottom of the door has a retaining portion 47 spaced a considerable distance from the flange 34, while the member 44, located near the top of the track portion 27, has a retaining portion 47 fairly close to the flange 34.

With the construction just described, when the door approaches its closed position the respective flanges 43 will engage the respective inclines 46 of the members 44, which will urge the door sections against the sealing member 20 and final movement of the door will ride the flanges 43 along the retaining portions 47 thus holding the door in its sealed position.

Means are provided for counter-balancing the weight of the door and automatically retracting it into horizontal alignment in order to provide maximum head room. A cable 48 has one end secured to a pin 49 carried by the lower section 24 of the door, and extends upward along the edge of the door and passes over a fixed pulley 50 journaled in a block 51 secured to the plate 14. The cable 48 then passes under a movable pulley 52 and then up over a fixed pulley 53, arranged beside the pulley 50 and also journaled in the block 51. Finally the cable 49 passes under a movable pulley 54 journaled in the block 55 in which the pulley 52 is journaled, and has its ends secured to a link 56 carried by the block 51. The block 55 has a depending eye 57 which receives the end of a heavy helical spring 58. The other end of the spring 58 engages an eye bolt 59 which passes through a bracket 60 secured to the casing 18 and adjustable therein by means of a nut 61. With this arrangement a considerable movement of the door will cause a comparatively small movement of the spring 58.

The lowest roller is provided with a yieldable mounting which permits it to move away from the section 24. The lowest hinge pintle is U-shaped, and the roller is mounted on the extended arm 62 thereof. A coil spring 63 urges the arm 62 toward the section 24.

Referring now to Figure 2, it will be noted that as the door is elevated the roller 26 associated with the section 21 will ride around the curved portion 28 of the track and pass on to the horizontal portion 29. The remaining sections and rollers will follow along the track until all of the sections, except section 24, are fully supported by the track section 29. In this position the roller associated with the section 21 will abut against a stop member 62, located near the inner end of the track section 29. As the upper sections are all fully supported by the horizontal track portion 29, the entire force of the spring 58 will be exerted on the pin 59 carrying the lower section 24. The result of this condition is that the spring 58 will overcome the force of the spring 63 and snap the section 29 into substantial horizontal alignment with the remaining sections, thus providing clear head room for the garage door opening.

The preferred embodiment of the invention has been shown and described in considerable detail for the purposes of adequate disclosure, but the broad idea of the invention is not limited to the details described, but includes such embodiments as fall within the scope of the appended claims.

Having thus described my invention, I claim:

1. A sliding door construction comprising in combination, a door, an abutment for said door, means for guiding said door, circular flanges of progressively decreasing diameters carried by said

door, cams in fixed locations along the closed position of the door adapted for engagement by said flanges to urge said door against said abutment as said door is moved into closed position.

2. A sliding door construction, comprising in combination, a door, an abutment for said door, means for guiding said door, circular flanges of progressively decreasing diameters carried by extensions of the hinge pintles, cams in fixed position along the closed position of the door adapted for engagement by said circular flanges to urge said door against said abutment as said door is moved into closed position.

3. A sliding door construction, comprising in combination, a door, an abutment for said door, guiding means consisting of a track and guide rollers, circular flanges of progressively decreasing diameters carried by extensions of the hinge pintles, cams fixed to the said track along the closed position of the door adapted for engagement by said circular flanges to urge said door against said abutment as said door is moved into closed position.

4. A sliding door construction, comprising in combination, a door made up of a plurality of panels hinged together, an abutment for said door, guiding means consisting of a track and guide rollers, said guide rollers being carried by extensions of the hinge pintles, circular flanges carried by said guide rollers, cams fixed to the said track along the closed position of the door adapted for engagement by said circular flanges to urge said door against said abutment as said door is moved into closed position.

5. A sliding door construction, comprising in combination, a door made up of a plurality of panels hinged together, an abutment for said door, guiding means for said door consisting of a track and guide rollers, said guide rollers being carried by extensions of the hinge pintles, circular flanges of progressively decreasing diameters carried by said guide rollers, cams fixed to said track along the closed position of the door adapted for engagement by said circular flanges to urge said door against said abutment as said door is moved into closed position.

6. In a device of the class disclosed, door jambs defining a door opening, track members along said jambs, a door, rollers on the edges thereof to be guided between flanges of said track members, said rollers being smaller in diameter than the distance between said flanges, and cam blocks for wedging the rollers in the track members and for forcing said door against said door jambs, said cam blocks having portions substantially parallel with the door jambs with which said rollers engage when the door is near and at closed position.

7. In a device of the class disclosed, door jambs defining a door opening, track members along said jambs and having spaced roller-confining flanges, a door, roller structures mounted along the edges of the door and including rollers guided between the flanges of said track members, said rollers being of smaller diameter than the distance between said flanges, and cam members along said track members for forcing the door laterally toward said jambs, said cam members having portions substantially parallel with the door jambs and with which said roller structures engage when the door is near and at its closed position.

8. In a device of the class disclosed, door jambs defining a vertical door opening, track members along said jambs and extending away therefrom

in substantially horizontal overhead position, and having spaced roller-confining flanges, a door, roller structures mounted along the opposite side edges of the door and including rollers guided between the flanges of said track members, said rollers being of smaller diameter than the distance between said flanges, and cam members along said track members for forcing the door laterally toward and in sealed relation with respect to said jambs, said cam members having portions substantially parallel with the door jambs and with which said roller structures engage when the door is near and at its closed position, and also having inclined portions leading to said parallel portions and with which said roller structures initially engage.

9. In a device of the class described, door jambs defining a vertical door opening, track members having roller-confining flanges mounted along said doorway, a door adapted to be moved to a vertical position to close said door opening, spaced roller structures mounted along the edges of said door and including rollers guided between said track flanges and of less diameter than the distance between said flanges, and cam members for forcing said door laterally toward said jambs, said cam members having portions substantially parallel with said jambs and with which said roller structures engage respectively as the door is near and at its closed position, said parallel portions being so constructed and arranged that they approach said door jambs progressively closer from the top to the bottom of said door opening.

10. In a device of the class described, door jambs defining a vertical door opening, track members having roller-confining flanges mounted along said doorway, a door adapted to be moved to a vertical position to close said door opening, spaced roller structures mounted along the edges of said door and including rollers guided between said track flanges and of less diameter than the distance between said flanges, and cam members on said track members for forcing said door laterally toward said jambs, said cam members having portions substantially parallel with said jambs and with which said roller structures engage respectively as the door is near and at its closed position, said parallel portions being so constructed and arranged that they approach said door jambs progressively closer from the top to the bottom of said door opening, the parts of said roller structures which engage said parallel portions being progressively sized to accommodate the progressive approach of said parallel portions to shift the door as a whole simultaneously and uniformly toward said door jamb.

11. In a device of the class described, door jambs defining a door opening, track members having roller-confining flanges mounted along said doorway, a door movable from one end to the other of said doorway to open and close the same, roller structure along opposite edges of said door and having rollers engaging said track members and confined between said flanges, and stationary cam members along said track members and having portions substantially parallel with said jambs, said roller structures including circular members adapted to engage said parallel portions when the door is near and at its closed position, said cam members being so constructed that said parallel portions thereof progressively approach closer to said door jambs from one end of said doorway to the other and said circular members progressively and correspondingly

decrease in diameter to cause said door to shift laterally toward said door jambs as a whole and in a plane substantially parallel with said door jambs.

12. In a device of the class disclosed, door jambs defining a vertical door opening, track members having roller-confining flanges mounted along said doorway and extending away therefrom in substantially horizontal overhead position, a door movable vertically and horizontally, and vice versa, to open and close said doorway, roller structure along opposite side edges of said door and having rollers engaging said track members and confined between said flanges, and stationary cam members along the vertical portions of said track members and having portions substantially parallel with said jambs, said roller structures including circular members adapted to engage said parallel portions when the door is near and at its closed position, said cam members being so constructed that said parallel portions thereof progressively increase in length and approach closer to said door jambs from top to bottom of said doorway and said circular members progressively decrease in diameter from top to bottom of said doorway.

13. A sliding door construction comprising a door, an abutment for said door, means for guiding said door, circular members of progressively decreasing diameters carried by said door, cam members in fixed positions along the closed position of said door adapted for engagement by said circular members to urge said door against said abutment as said door is moved into closed position.

14. A sliding door construction comprising a door, an abutment for said door, means for guiding said door, circular members of progressively decreasing diameters carried by said door, cam members in fixed positions along the closed position of said door adapted for engagement by said circular members to urge said door against said abutment as said door is moved into closed position, said cam members progressively increasing in length correspondingly to the decrease in diameter of said circular members.

15. A sliding door construction comprising a door, an abutment for said door, means for guiding said door including shaft members carried by said door, circular members of progressively decreasing diameters carried by said shaft members, and cams in fixed positions along the closed position of the door constructed and arranged for engagement by said circular members to urge said door against said abutment as said door is moved into its closed position.

16. A sliding door construction comprising a door, an abutment for said door, means for guiding said door including shaft members carried by said door, circular members of progressively decreasing diameters carried by said shaft members, and cams of progressively increasing length, correspondingly with the decrease in diameter of said circular members, and in fixed positions along the closed position of the door for engagement by said circular members to urge said door against said abutment as said door is moved into its closed position.

17. A sliding door construction comprising a door, an abutment for said door, means for guiding said door including shaft members carried by said door and fixed track members mounted adjacent said abutment, circular members of progressively decreasing diameters carried by said shaft members, and spaced cams fixed to said

track members along the closed position of the door constructed and arranged for complemental engagement by said circular members to urge said door against said abutment as said door is moved into its closed position.

18. A sliding door construction comprising a door, an abutment for said door, means including track members and shaft members carried by said door and rollers carried by said shaft members, for guiding said door, spaced cam members constituting a fixed part of said track members and projecting progressively closer to said abutment from one end of said abutment to the other, and circular members carried by said shaft members and progressively decreasing in diameter correspondingly to the closeness of approach of said cam members to said abutment, said circular members being adapted to engage said cam members in the closing position of the door to shift and seal the latter against said abutment.

19. A sliding door construction comprising, in combination, a door having a plurality of panels flexibly secured together, a jamb, a trackage system comprising a vertical portion and a horizontal portion, guiding means secured to and movable with the door panels for cooperation with the trackage system, whereby the door may be moved from its horizontal position to its vertical position, and vice versa, and coacting means, movable with the door panels and fixed with respect to the jamb, respectively, operative only when the said plurality of panels are in their aligned positions as they approach their final closed position, and constructed and arranged to simultaneously and uniformly shift said panels as a unit against the door jamb whereby to seal the same.

20. An overhead door construction of the character described comprising, in combination, a jamb, a door having a plurality of panels flexibly connected together, cooperating guiding means associated with the door and the jamb, respectively, for guiding the door from its horizontal to its vertical position, and vice versa, said guiding means being constructed and arranged to uniformly space a plurality of the door panels from the jamb during the vertical movement of the door, and coacting shifting means operative only as the door approaches its final closed position and when a plurality of the panels are in vertical alignment for moving the panels, as a unit, into abutting position with the jamb.

21. An overhead door construction of the character described comprising a door composed of a plurality of flexibly connected panels, a jamb, a channel-shaped track having a straight vertical guiding portion extending substantially throughout the entire height of the door opening and a horizontal guiding portion, rollers attached to the door panels and mounted in said track for guiding the door panels in their different positions of adjustment, said channel-shaped track loosely receiving said rollers during all of the vertical positions of the panels whereby to minimize frictional resistance to the movement of said door panels, and shifting means operative only as the door approaches its final closed position for shifting the door panels into engagement with the jamb whereby to seal the door.

22. A sliding door construction comprising, in combination, a door having a plurality of panels flexibly secured together, a jamb, a trackage system comprising a vertical and a horizontal portion, guiding means associated with the door for cooperation with the trackage system, means

for bodily shifting the door into engagement with the jamb, said means being operative only as the door approaches its final closed position, and comprising a plurality of separated devices secured to the door and carried thereby, of decreasing sizes from the upper portion of the door to the lower portion thereof, and a plurality of coacting shifting devices stationarily disposed with respect to the path of movement of the door and so constructed and arranged that they coact with the first-named devices carried by the door simultaneously whereby to simultaneously and uniformly move all portions of the door, as a unit, toward the jamb, as the same approaches its final closed position.

23. A sliding door construction of the character described comprising a door having a plurality of flexibly connected panels, door jambs defining a door opening, guiding means provided by the door and cooperating with guiding means fixedly disposed with respect to the jamb, said guiding means being adapted to maintain a plurality of the door panels at a uniform distance from the jamb during their vertical movement and coacting shifting means operative only as the door approaches its final closed position and constructed to bodily shift the panels of said door simultaneously into engagement with said jamb to seal the same at the final closed position of the door.

24. In a device of the character described comprising, in combination, a door having a plurality of flexibly connected panels, door jambs defining a door opening, a track having horizontal and vertical portions for guiding said panels, means for shifting the door toward the jamb operative only as the door approaches its final closed position, said means comprising a series of shifting devices carried by the door and a series of complemental shifting devices fixedly secured with respect to the jamb, each device of one series being adapted to contact only with its complemental device of the second series, which contact occurs when the door approaches its final closed position whereby to cause a unitary shifting of the door toward the jamb to seal the same in its final closed position.

25. A sliding door construction comprising, in combination, a door having a plurality of panels flexibly secured together, a jamb defining a door opening, a trackage system including top guiding sections and straight downwardly extending guiding sections for guiding the panels from their horizontal to their vertical positions where they close said door opening, and coacting shifting means movable with the door panels and fixed with respect to the jamb, respectively, operative only as the door panels approach their final closed position and constructed to move said panels as a unit toward the jamb to seal the same.

26. A sliding door construction comprising, in combination, a door having a plurality of panels flexibly secured together, a jamb defining a door opening, tracks including top sections and downwardly extending sections adapted to guide a plurality of the door panels in a straight path during the downward closing movement of the door, coacting shifting means movable with the door panels and fixed with respect to the jamb, respectively, and being constructed and arranged to bodily and unitarily shift said panels only as the door approaches its final closed position and when said panels are in substantially vertical alignment.

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