

Jan. 21, 1958

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2,820,516

DOOR CONSTRUCTION

Filed May 15, 1953

2 Sheets-Sheet 1

FIG. 1

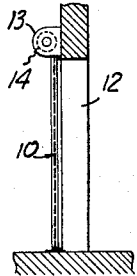


FIG. 2

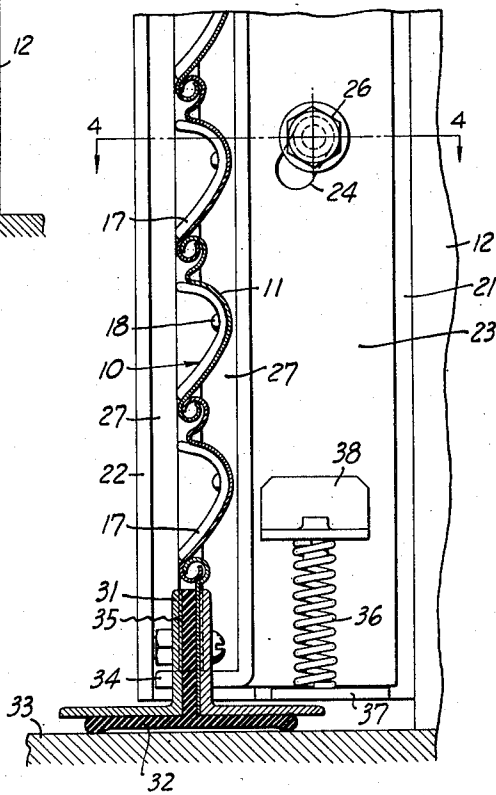


FIG. 3

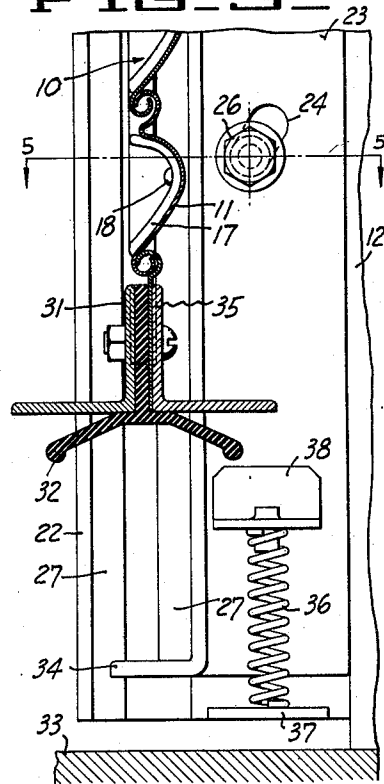


FIG. 4

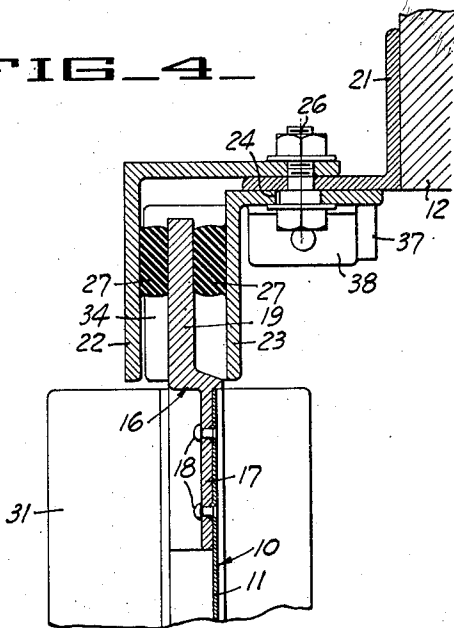
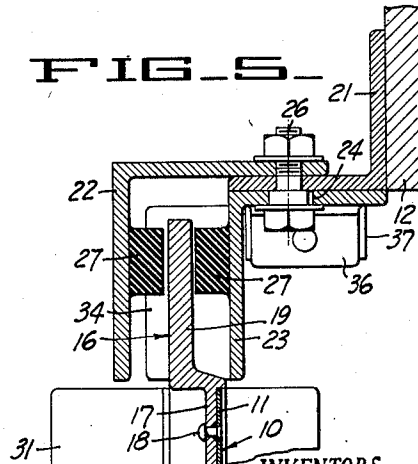


FIG. 5



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2 Sheets-Sheet 2

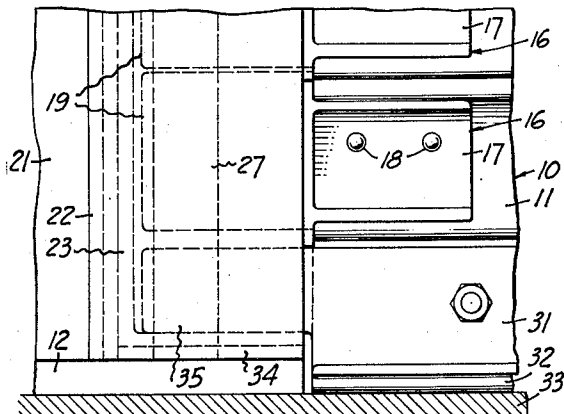


FIG. 6-
FIG. 8-

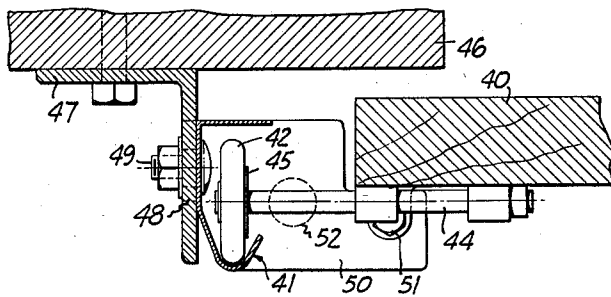


FIG. 9-

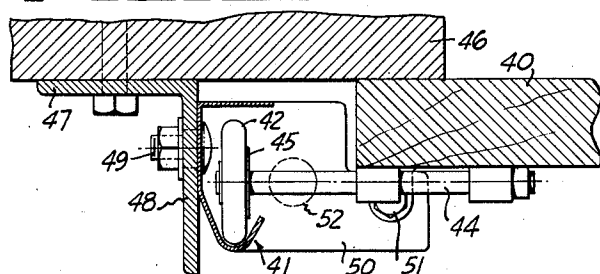


FIG. 10-

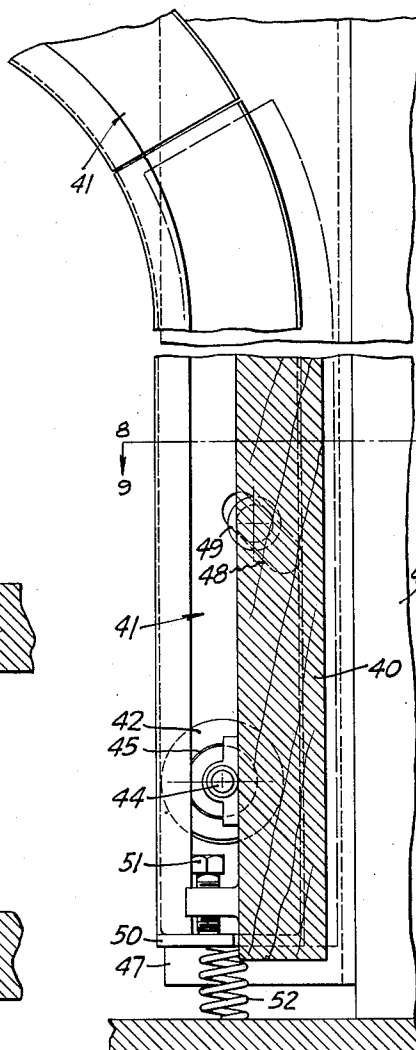


FIG. 7-

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2,820,516

DOOR CONSTRUCTION

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Application May 15, 1953, Serial No. 355,303

2 Claims. (Cl. 160—209)

This invention relates generally to sliding door constructions and particularly to doors of this type which are adapted to provide air and dust tight seals for the structure of which they are a part.

In the past, air and dust seal doors have been utilized but they have been subject to various drawbacks including, among others, the defect that the sealing surface was subjected to severe wear and scuffing which ultimately rendered the door unfit for the purpose for which it was intended. In addition to reducing the effectiveness of the sealing member, the scuffing and wear also created a substantial maintenance problem.

In our copending application Serial No. 355,302 filed May 15, 1953, now Patent 2,763,036 issued September 18, 1956, we show a type of door mounting in which an air and dust tight seal is provided. As indicated in that application the doors are adapted to be moved into and out of position over an opening in the side wall of a building on fixed tracks or guides and are urged into sealing position with respect to the doors by lateral displacement of the door with respect to a fixed track by means of a movably mounted shoe on the side of the door whereby when the door is moved to closed position it is cammed into position adjacent the wall.

It is an object of this invention to provide a sliding door construction which is particularly useful for sealing various enclosures all as previously pointed out in the above identified copending application, but in which the camming or lateral movement of the door is accomplished by movement of a portion or all of the track.

Other objects and advantages of this invention will appear from the following specification taken in conjunction with the accompanying drawings in which:

Figure 1 represents a cross-sectional view of a curtain type door utilizing our invention.

Figure 2 represents a cross-sectional detail of an articulated vertical door of the curtain type showing the same in sealing position;

Figure 3 represents a cross-sectional detail of the same door in non-sealing position;

Figure 4 represents a cross-section of the door taken along the line 4—4 of Figure 2;

Figure 5 represents a cross-section taken along the line 5—5 of Figure 3;

Figure 6 represents a front view of the position of the door as shown in Figure 2;

Figure 7 represents a modification of the device illustrated in Figures 1 to 6 inclusive;

Figure 8 is a cross-sectional detail taken along the line 8—8 of Figure 7 showing the door not in sealed position;

Figure 9 is a cross-sectional detail taken along the line 9—9 of Figure 7 when the door is in sealed position; and

Figure 10 is a side elevational view showing the adaptation of our invention to a conventional door of the

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type supported on rollers mounted in guides and in which the entire track is adapted to be moved.

As illustrated in Figures 1 to 6 inclusive we provide a substantially conventional steel curtain type rolling door 10 which is composed generally of a plurality of articulated slats 11 which are joined along their adjacent edges in a substantially conventional manner. The door is adapted to be raised and lowered to close an opening in a wall 12. The door may be raised or lowered in any conventional manner, that is by the use of any mechanical or electrical means to roll the same within a housing 13 and around a roller 14. The end edges of each slat terminate in a so-called end lock mechanism 16 which is provided with an offset portion 17 which is adapted to cooperate with the ends of the slots 11 and to be secured thereto by means of rivets 18. A substantially flat extension or shoe 19 extends outwardly from the ends of each lock 16 and is adapted to be received within a guide or channel whereby the ends of the slots (and the edges of the door which is formed by the slats) is held in predetermined vertical position. The guide or channel previously referred to consists generally of an angle member 21 which is secured to the building or wall in any suitable manner and which is provided with a stationary angle member 22 which forms one wall of a guide channel to receive the shoes 19. The other wall of the guide channel is formed by a movable angle member 23, one leg of which is provided with a plurality of slots 24. The slots 24 are set at an angle to the perpendicular as indicated generally in Figure 2, and while the angle is not critical we have found that an angle of approximately 30° is satisfactory. A bolt 26 which is rigidly secured to the members 21 and 22 and extends therethrough, also extends through the slots 24 and serves to support the movable member 23. The adjacent walls of the angles 22 and 23 are provided with vertical ribs 27 of resilient flexible material whose adjacent faces are spaced sufficiently far apart to permit the shoes 19 to slide up and down between them when the member 23 is in the position illustrated in Figures 3 and 5, that is, the so-called open position of the door. It is apparent that the members 27 could be dispensed with in certain instances and that the shoes 19 could engage the adjacent inner surfaces of the members 22 and 23. If such a modification were adopted it is apparent that the walls 22 and 23 would have to be shortened but such shortening is contemplated as being within the knowledge of a competent engineer.

The lower end of the door 10 is provided with a foot piece 31 which extends the length of the bottom of the door and whose lower surface is provided with a flexible resilient weather tight dust proof member 32 which is adapted to engage the floor 33 when the door is in fully closed position. A member 35 on the foot piece 31 (which corresponds to the member 19 on the slats 11) is also provided and is adapted to engage a flange 34 on the member 23 when the door is brought to fully lowered position. When the member 35 engages the flange 34 it is apparent that it will serve to draw the member 23 downwardly. Normally the member 23 is held in elevated position by a compression spring 36, the lower end of which is secured to the wall of the building by means of a suitable foot piece 37 and the upper end of which is secured to the member 23 by an angle member 38. The spring 36 is so adjusted that it normally urges the member 23 upwardly. However, when the full weight of the door is transmitted to the member 23 through the members 35 and 34, the effect of the compression spring 36 is overcome and the angle member 23 is urged downwardly. As the member 23 is urged downwardly it moves to the left, as viewed in Figure 3, along the slot 24 with the result that the member 23 is urged toward the member

22, with the further result that the members 27 are urged into engagement with the member 16 thereby serving to seal the same.

Operation of the device may briefly be described as follows: Let it be assumed that the door is in fully opened position. When the door is in this position the members 22 and 23 will be in the position generally illustrated in Figures 3 and 5, since the member 22 is rigidly secured to the building and is not moved either vertically or horizontally and since the member 23 is urged upwardly by virtue of the spring 36 acting against the members 37 and 38. When the member 23 is urged upwardly the angularity of the slots serves to create a camming action against the bolt 26 and urge the member 23 to the position illustrated in Figures 3 and 5. When the door is lowered, however, the member 35 engages the foot piece 34 tending to draw the member 23 downwardly, against the effect of the compression spring 36. This serves to bring the member 23 downwardly and, by virtue of the angularity of the slot 24, the member 23 is cammed to the left as viewed in Figure 3 to the position illustrated in Figures 2 and 4, where the shoes 19 are gripped between the vertical members 27. Since the members 21 and 22 form a dust proof seal with the building, the effect of the engagement of the members 27 with the shoes 19 serves also to create a dust seal between the door and the building.

In the modification illustrated in Figure 7 the guide track is cut and the lower half is designed to move. The door 40 illustrated in Figures 7 to 10 inclusive may be composed of articulated or panel members but it may be of any type of door which is designed to move upwardly and downwardly along suitable tracks 41 and to move generally from a vertical position in which the door is closed to a horizontal or overhead position when the door is opened. The door illustrated in Figures 7 to 10 inclusive is a conventional garage door, but it is to be understood that our invention may be applied to any door in which the door slides in a substantially fixed channel.

Each side edge of the door is provided with a plurality of suitable rollers 42 which run in tracks 41. The rollers 42 are mounted on the door by means of an axle 44 and suitable roller bearings 45. The tracks 41 may be made in any suitable manner as illustrated in Figures 7 and 8 and are mounted with respect to the wall 46 by a fixed member 47 which is in the form of an angle member. That leg of the angle member 47 which extends vertically from the wall 46 is provided with a plurality of slots 48 which are set at an angle as illustrated in Figure 7 and which accommodate bolts 49 secured to the member 41. When the door 40 is raised in the conventional manner along the track 41, a compression spring 52 tends to urge the lower end of the track 41 to the full line position illustrated in Figure 7, so that the two halves form a single track. When the door is moved downwardly, however, the rollers 42 serve to retain the door in the position illustrated in Figure 8 until such time as the adjusting bolt 51

on the door 40 engages the closer plate 50 and urges the same downwardly against the compression spring 52. Downward movement of the compression spring 52 causes a corresponding downward movement of the lower half of the track 41 and cams the same to the right as viewed in Figure 7 by virtue of the camming action of the bolt 49 in the slot 48. The door 40 is maintained in the same relative position with respect to the track 41 with the result that this camming action urges the door to the position illustrated in Figure 9, which, it will be noted, is in fully sealed position. When the door 40 is raised the spring 52 urges the track 41 upwardly and, by the camming effect of the slots 48 and bolts 49, the track 41 returns to the full line position illustrated in Figure 7.

We claim:

1. In a door construction, a door frame, a door slidable over said door frame and movable between open and closed positions, shoe means on the side edges of said door, vertical guide channels adapted to receive said shoe means to guide said door in its movement between open and closed positions, each of said guide channels comprising first and second wall members, the first of said wall members being fixed to said door frame and the second of said wall members being slidably supported on said frame for limited lateral movement relative to the door frame and said first wall member, a vertical rib of resilient material mounted on each of said wall members and adapted to engage the shoes on the sides of said door, means operable by said door for moving said second wall member laterally towards the first wall member to press the resilient ribs of the wall members into sealing engagement with the shoe means when the door comes to a closed position to form a seal between the door and the door frame.

2. A door construction as in claim 1 together with a Y-shaped member of resilient material, one branch of the Y-shaped member being fixed to the lower edge of said door and the other two branches depending freely from the lower edge of said door, a pair of right angle foot pieces fixed to the lower edges of said door, one leg of each of said foot pieces being adapted to engage one of the depending branches of the Y-shaped member whereby when the door is in a closed position the depending branches of the Y-shaped member are urged into engagement with the sill of the doorway to provide a seal between the lower edges of the door and the sill.

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