

March 24, 1959

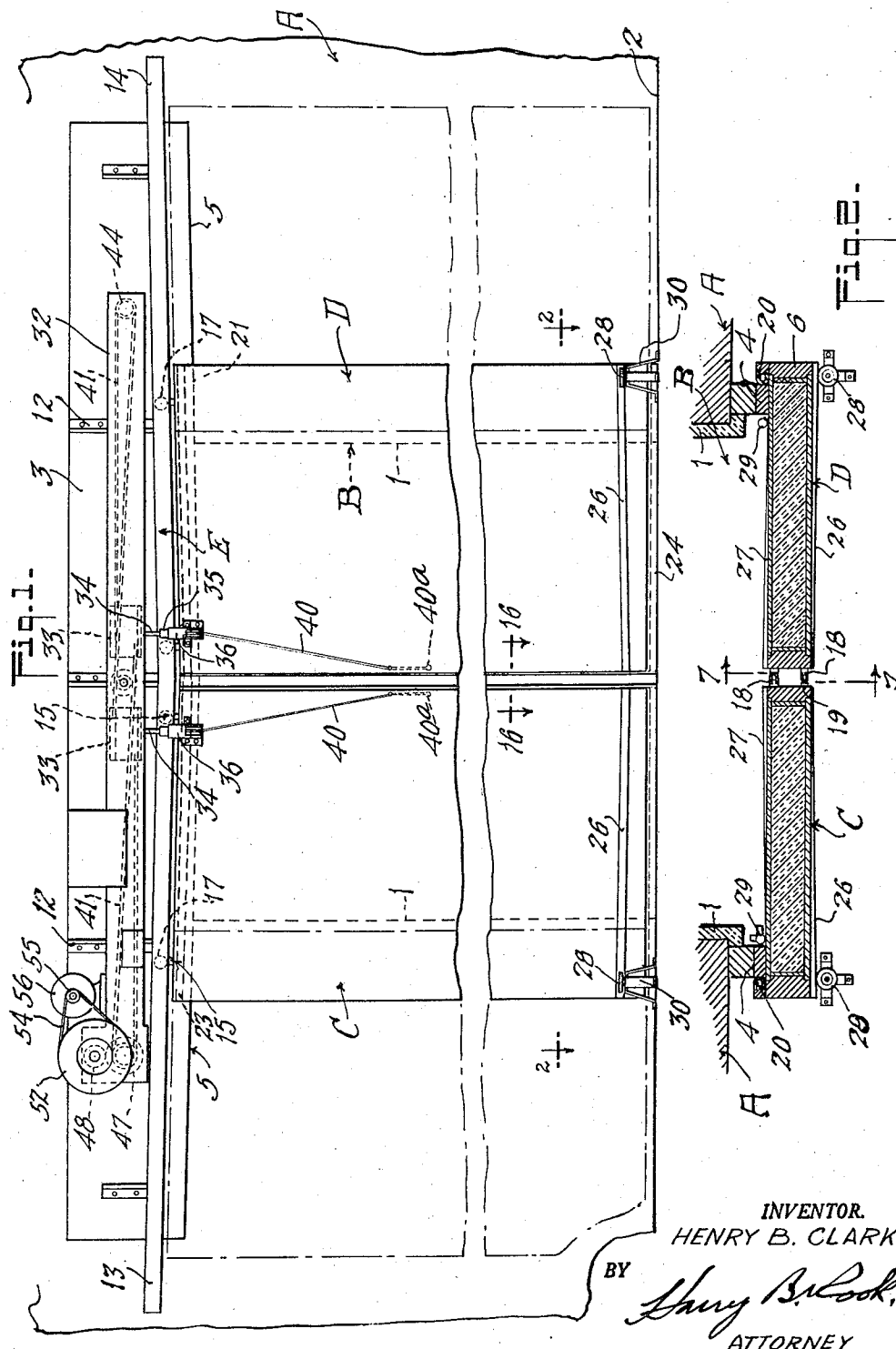
H. B. CLARK

2,878,532

SLIDING AND SEALING DOOR FOR COLD STORAGE AND THE LIKE

Filed Nov. 7, 1955

7 Sheets-Sheet 1



March 24, 1959

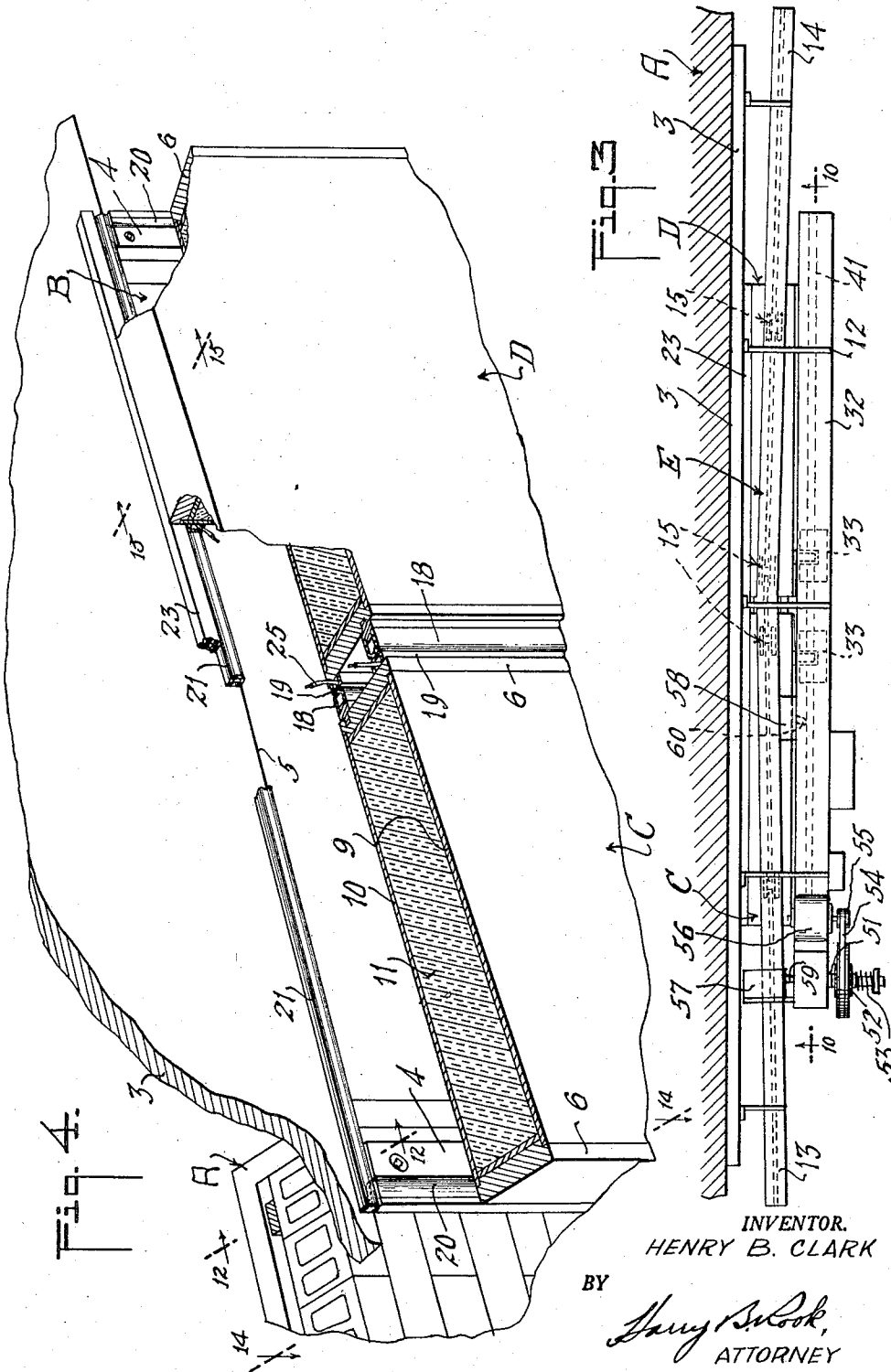
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SLIDING AND SEALING DOOR FOR COLD STORAGE AND THE LIKE

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7 Sheets-Sheet 2



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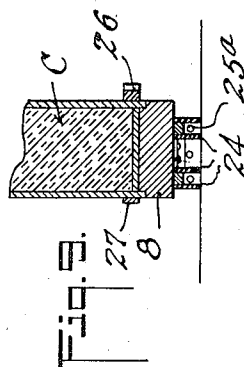
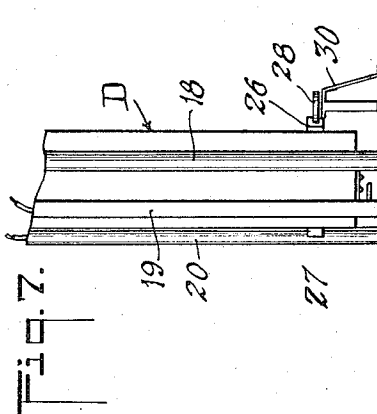
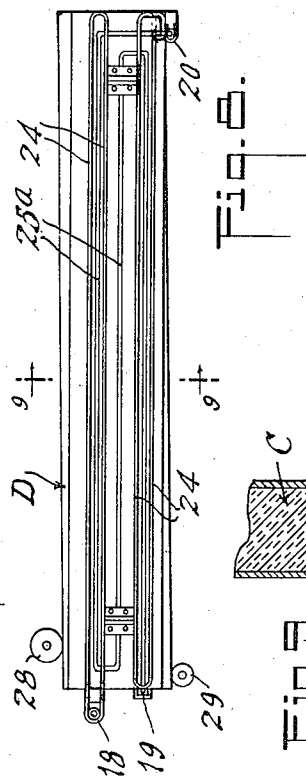
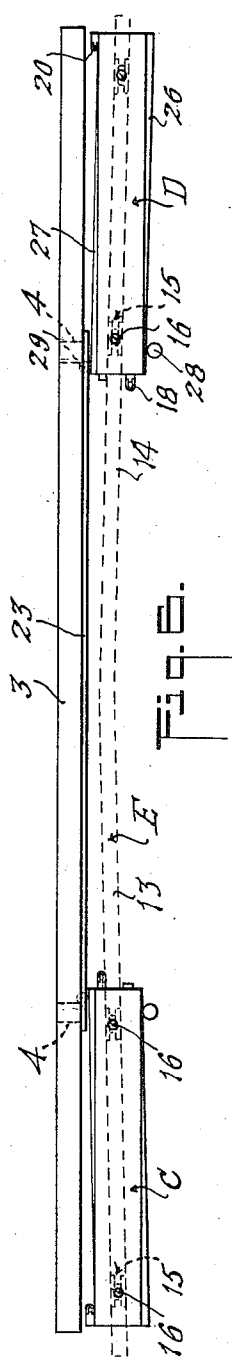
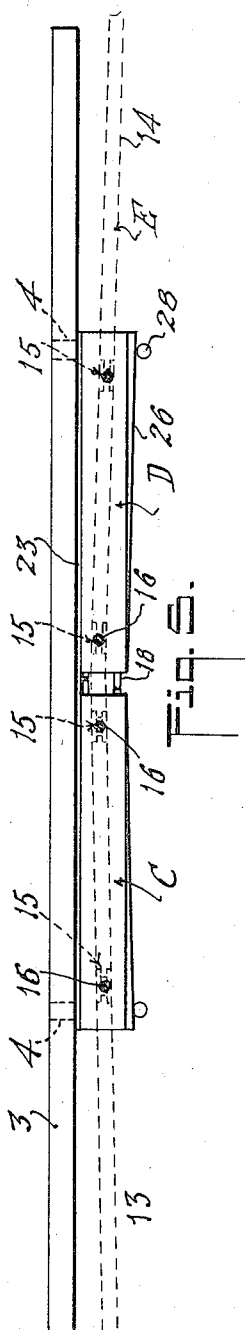
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SLIDING AND SEALING DOOR FOR COLD STORAGE AND THE LIKE

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7 Sheets-Sheet 3



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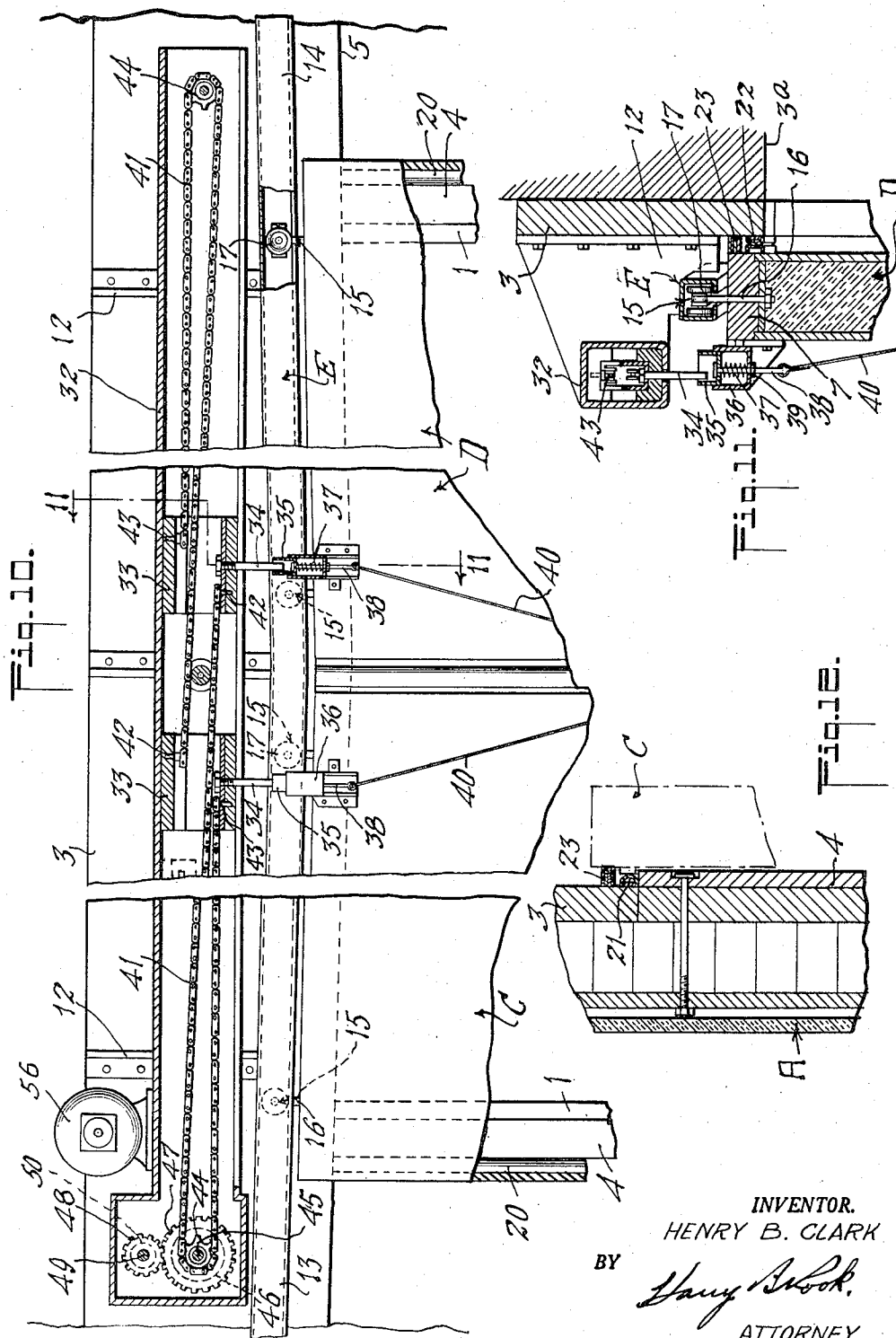
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SLIDING AND SEALING DOOR FOR COLD STORAGE AND THE LIKE

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7 Sheets-Sheet 4



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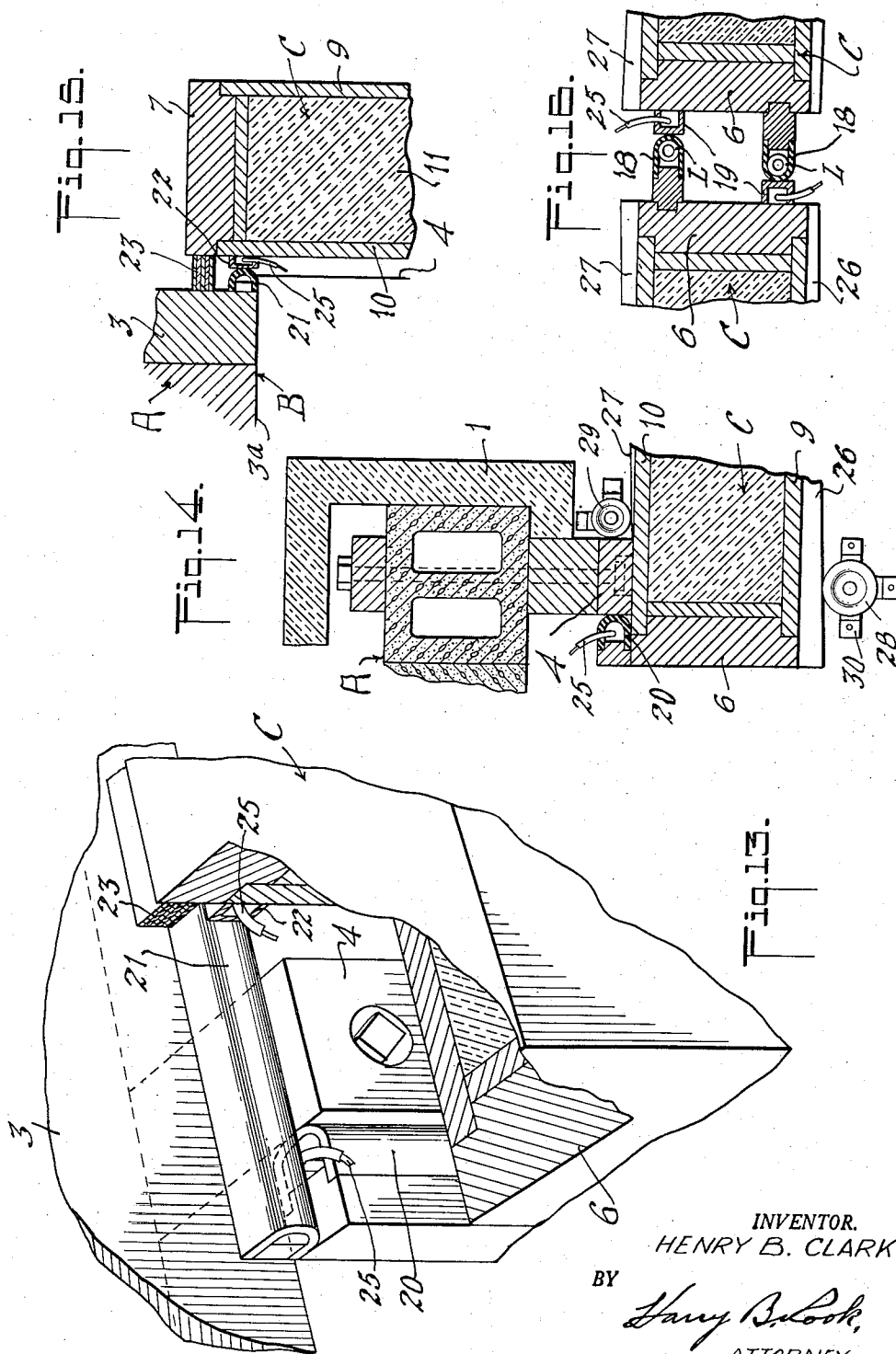
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SLIDING AND SEALING DOOR FOR COLD STORAGE AND THE LIKE

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7 Sheets-Sheet 5



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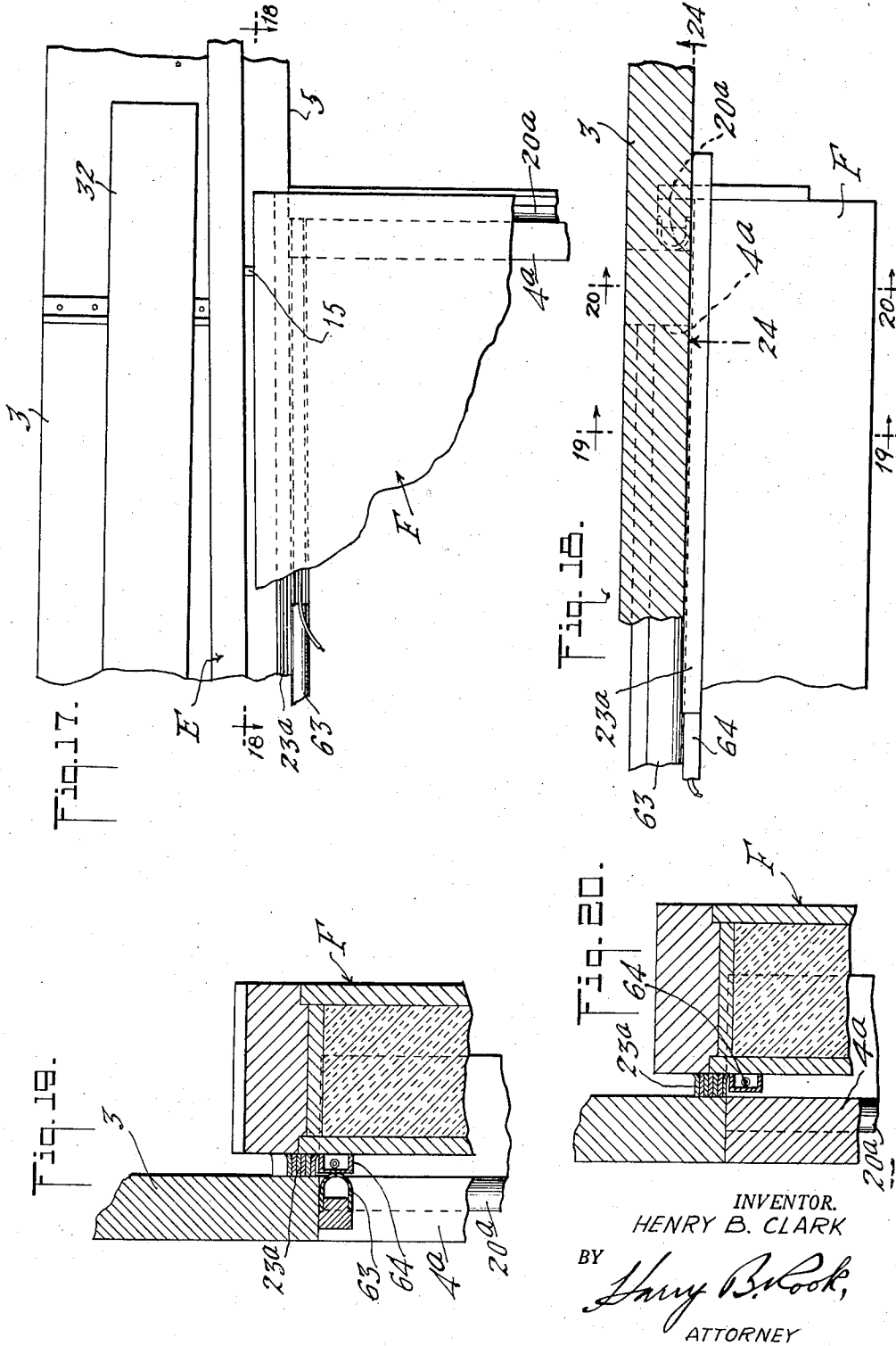
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SLIDING AND SEALING DOOR FOR COLD STORAGE AND THE LIKE

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7 Sheets-Sheet 6



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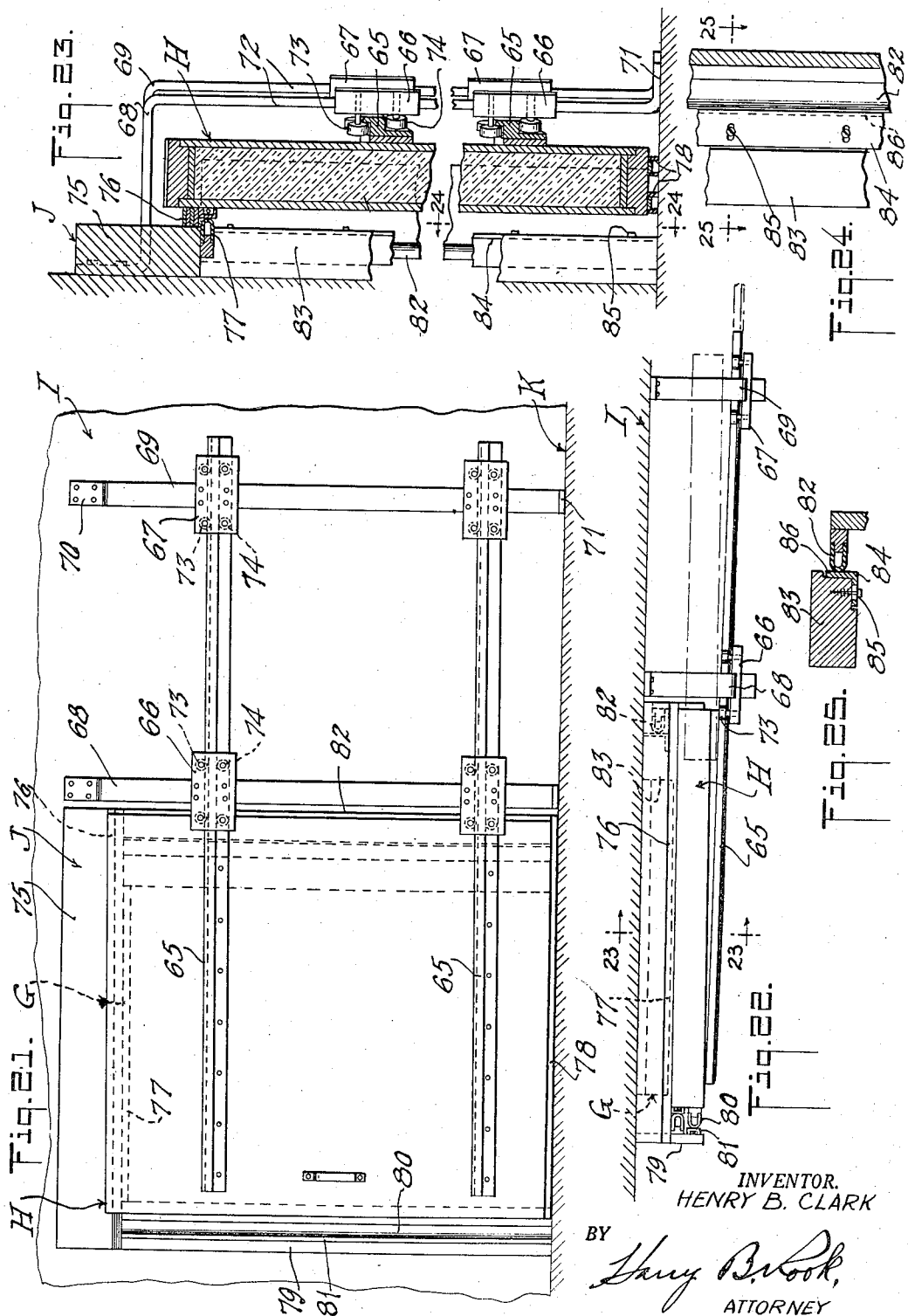
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SLIDING AND SEALING DOOR FOR COLD STORAGE AND THE LIKE

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7 Sheets-Sheet 7



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2,878,532

SLIDING AND SEALING DOOR FOR COLD STORAGE AND THE LIKE

Henry B. Clark, Elizabeth, N.J.

Application November 7, 1955, Serial No. 545,289

14 Claims. (Cl. 20—19)

This invention relates in general to sliding doors and more particularly to sliding doors adapted for cold storage, refrigerator and cooler rooms or compartments.

A prime object of the invention is to provide a novel and improved construction and combination of a sliding door and the portions of the side of a room or compartment around a door opening therein, and means to seal the opening and prevent passage of air into and out of the room or compartment through the door opening when the door is in closed position.

Another object of the invention is to provide a novel and improved construction and combination of a sliding door, the portion of the wall of a compartment around a door opening therein, sealing means for preventing passage of air through the door opening between the door and the wall of the room or compartment, and mounting means for the door to provide for movements of the door edgewise horizontally and vertically in planes parallel to the general plane of the margins of the door opening, and laterally toward said margins or said portion of the wall, simultaneously or in one continuous operation of the door, whereby the door opening can be simultaneously sealed at both vertical margins thereof and at both the top and bottom margins thereof.

A further object is to provide a sliding door, sealing means for the top margin of the door and means for mounting said door for movement simultaneously horizontally parallel to the plane of the margins of the door opening and laterally in a direction perpendicular to said plane to cause coaction of the door and said sealing means to seal the opening at the top of the door.

Still another object is to provide a novel combination of a door, sealing means for the bottom of the door and means for mounting the door for movement edgewise simultaneously horizontally and vertically with its bottom edge parallel to the bottom margin to cause coaction of the door and said sealing means for sealing the door opening at the bottom or sill of the door.

A further object of the invention is to provide a pair of sliding doors for a rectangular door opening in a wall of a room or compartment, means mounting said doors for movement horizontally toward and away from each other edgewise in a direction parallel to the general plane of the margins of the door opening and for moving the doors vertically up and down and laterally toward and from said plane, and sealing means, whereby when the doors are moved horizontally toward each other, downwardly, and laterally toward the plane of the margin, said opening and the abutting edges of the doors are tightly sealed against passage of air there-through, while when the doors are moved away from each other horizontally, the seal is broken and the door is opened.

Another object is to provide novel and improved mounting means for both a single door and a pair of doors of the general character described, whereby the doors are firmly supported and accurately guided in their movements horizontally and vertically in directions paral-

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lel to the plane of the margins of the door opening, and laterally toward and from said plane.

Another object is to provide novel and improved sealing elements including means for preventing such freezing of said elements as would cause sticking thereof in door-sealing position.

Other objects of the invention will be brought out by the following description in conjunction with the accompanying drawings in which—

Figure 1 is an elevation of the outside of a wall having a door opening and a pair of cold storage doors and sealing means constructed in accordance with the invention, showing the doors in closed position and sealing the door opening;

Figure 2 is a horizontal sectional view approximately on the plane of the line 2—2 of Figure 1;

Figure 3 is a top plan of the doors illustrated in Figure 1;

Figure 4 is an enlarged fragmentary perspective view of the upper portion of the door and the top, lintel or header and sides or jambs of the door opening, with portions broken away and shown in section;

Figure 5 is a schematic plan view of the doors and the door frame with portions of the mounting means omitted and other portions shown in dot and dash lines, illustrating the doors in their closed position;

Figure 6 is a similar view illustrating the doors in their open position;

Figure 7 is an enlarged fragmentary elevation of the edge of one of the doors that meets the other door approximately on the plane of the line 7—7 of Figure 2;

Figure 8 is a plan view of the bottom edge of one of the doors;

Figure 9 is a fragmentary transverse vertical sectional view approximately on the plane of the line 9—9 of Figure 8;

Figure 10 is an enlarged fragmentary front elevation of the doors illustrated in Figure 1 with portions broken away and shown in section;

Figure 11 is a fragmentary transverse vertical section on the plane of the line 11—11 of Figure 10;

Figure 12 is a fragmentary transverse vertical sectional view approximately on the plane of the line 12—12 of Figure 4 with the door illustrated by dot and dash lines;

Figure 13 is a greatly enlarged fragmentary sectional perspective view of the upper left hand corner of the door and door opening as illustrated in Figure 10;

Figure 14 is an enlarged fragmentary horizontal sectional view approximately on the plane of the line 14—14 of Figure 4;

Figure 15 is an enlarged transverse vertical sectional view on the plane of the line 15—15 of Figure 4;

Figure 16 is an enlarged fragmentary horizontal sectional view on the plane of the line 16—16 of Figure 1;

Figure 17 is a fragmentary front outside elevation of the upper corner of a door, illustrating a modification of the invention with the door closed;

Figure 18 is a horizontal sectional view on the plane of the line 18—18 of Figure 17;

Figure 19 is a transverse vertical sectional view on the plane of the line 19—19 of Figure 18;

Figure 20 is a similar view on the plane of the line 20—20 of Figure 18;

Figure 21 is an outside front elevation of another door embodying a modification of the invention;

Figure 22 is a top plan of the door shown in Figure 21;

Figure 23 is an enlarged transverse vertical sectional view on the plane of the line 23—23 of Figure 22, with portions broken away;

Figure 24 is a fragmentary partial elevation and partial

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sectional view approximately on the plane of the line 24—24 of Figure 18; and

Figure 25 is a fragmentary horizontal sectional view on the plane of the line 25—25 of Figure 24.

Specifically describing the embodiment of the invention illustrated in Figures 1—20 inclusive, the reference character A designates a portion of a side or wall of a cold storage room or compartment that may be of any suitable construction and insulated in any desired manner and has a door opening B the sides and top of which are formed by suitable jamb pieces 1 and a lintel 3a, respectively, and the lower end or bottom of which is shown as flush with the surface of the floor 2.

On the outer surface of the wall A is a door frame that is shown as comprising a head piece 3 and jamb posts 4. The lower edge of the head piece 3 is approximately coincident with the top of the door opening and inclines upwardly from the vertical median plane of the door opening toward opposite ends of the head piece as indicated at 5, and each jamb post 4 extends from the lower edge of the head piece to the bottom of the door opening or floor 2.

Two doors C and D are provided for normally closing the door opening B, each door being suitably constructed and insulated and being shown as comprising side pieces or stiles 6, top and bottom pieces or rails 7 and 8, respectively, and front and rear panels 9 and 10, respectively, providing a space inside the door that is filled with suitable insulating material 11. In accordance with the invention, the doors are mounted to roll or slide edgewise toward each other and simultaneously laterally or in a direction perpendicular to the general plane of the door frame with the adjacent edges of the two doors meeting in approximately the vertical median plane of the door opening to close the door; and the doors are rollably or slidably mounted to move away from each other edgewise and simultaneously outwardly or away from the general plane of the door opening or door frame, to open the door. The mounting means also provides for vertical movement of the doors downwardly as they approach each other and upwardly as they separate. The invention also contemplates means for sealing the door opening at the top thereof as the doors move toward the general plane of the door opening, means for sealing the door opening at the leading or meeting edges of the doors and at the trailing edges of the doors as the doors move edgewise toward each other, and means for sealing the bottom of the door opening as the doors move downwardly. The invention provides for the sealing of all top, side and bottom margins of the door opening approximately simultaneously and during one continuous composite sliding or rolling movement of the doors edgewise toward each other and downwardly toward the bottom margin and laterally toward the common plane of all of said margins from an open position to the closed position.

As shown, this mounting means comprises a split tubular track E secured by suitable brackets 12 on the head piece of the door frame with the slot facing downwardly as best shown in Figures 10 and 11. The track has two sections 13 and 14 each of which inclines upwardly and outwardly from the general plane of the margins of the door opening or the wall A from approximately the vertical median plane of the door opening to its outer end as shown in Figures 1 and 3. Each door is suspended by two hangers 15 each of which includes a shank 16 secured to the upper rail 7 of the door and having rollers 17 connected to its upper end and rollable along the corresponding track section 13 or 14. Either the shanks 16 are rotatable about their axes in the rails of the doors, or the rollers 17 may be journaled to swing about the axes of the shanks 16, and the shanks are spaced apart in the direction of the width of the door and are disposed in different imaginary planes parallel to the plane of the door or in a common plane extending diagonal-

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ly of the thickness of the door, so that the doors will always hang in planes parallel to the general plane of the door opening or door frame as shown in Figure 3 and as schematically illustrated in Figures 5 and 6. Obviously the extent of offset of the hangers will depend upon the angular relation of the track sections to the plane of the door opening which in turn will be just sufficient to provide for clearance of the doors from the door frame during opening of the doors.

The leading or meeting edges of the doors have sealing means that extend throughout the heights of the doors and cooperate when the doors are closed to seal the joint between the doors, while other sealing means are provided for sealing the joints or spaces between the trailing edges of the doors and the jamb posts 4 in the closed position of the doors. The sealing means at the leading edges of the doors comprises an elongate hollow resilient sealing element 18 on each door cooperative with a rigid, preferably metallic, elongate hollow metal sealing element 19 on the other door. The sealing means for the trailing edges of the doors comprises an elongate hollow resilient sealing element 20 secured to and projecting from the rear face of each door and cooperative with the corresponding jamb post 4. Each sealing element 20 extends from the bottom edge of the corresponding door to a point short of the top edge of the door as shown in Figures 4 and 13 to provide clearance for sealing means at the top of the door hereinafter described. Preferably the sealing elements 18 and 20 are formed of rubber or rubberized or plasticized fabric which is resistant to high and low temperatures and moisture proof. When the doors are in closed position as shown in Figures 1, 2, 4, 10, 14 and 16, each sealing element 18 abuts the corresponding element 19, and each sealing element 20 abuts the corresponding jamb post.

Sealing means for the top of the door is shown as comprising an elongated hollow flexible sealing element 21 similar to the elements 18 secured to the head piece 3 adjacent the lower edge thereof as shown in Figures 4, 13 and 15 which extends throughout the combined width of the two doors when they are closed, said sealing element 21, when the doors are closed, being cooperative with a hollow metallic sealing element 22 secured to each of the doors below the top edge thereof. An auxiliary sealing element 23 shown as comprising a plurality of superposed layers of felt is secured in edgewise relation to the head piece 3 above the sealing element 22 for engagement with the rear faces of the doors.

The sealing means for the bottom of the doors is shown as comprising a plurality of elongate resilient strips 24 secured to the bottom rail of each door in spaced relation in the direction of the width of the door and projecting edgewise from the bottom edge of the door to engage the floor or a door sill, where such is used, when the doors are in closed position as shown in Figures 1, 7 and 9.

With this construction when the doors are moved apart into open position as indicated by the dot and dash lines in Figure 1 and by solid lines in Figure 6 both doors are spaced from the door frame and are approximately parallel thereto, all of the cooperative sealing elements being disengaged. Upon movement of the doors toward each other into closed position, the doors simultaneously move in their own planes downwardly to cause snug contact of the sealing elements 24 at the bottom edges of the doors with the floor or sill, and at the same time the doors are moved toward the door frame to cause sealing engagement of the rear faces of the doors with the felt sealing elements 23 and engagement of the metal sealing elements 22 with the resilient sealing elements 21. As the doors reach the fully closed position the sealing elements 18 snugly abut the corresponding sealing elements 19, and the sealing elements 20 snugly abut their corresponding jamb posts 4. In this way the door opening B is tightly sealed against passage of air therethrough around the doors. Preferably electrical or heating wires

25 extend through the sealing elements 19, 20 and 22 and are adapted to be connected in an electrical circuit so as to heat the sealing elements and prevent such freezing together thereof as might interfere with opening of the doors. Other electrical wires or heaters 25a are provided at the lower edges of the doors and between the sealing strips 24 for the same purpose.

To hold the lower ends of the doors against movement outwardly away from the door frame and to guide the doors in movements parallel to the plane of the door frame, the outer and inner sides of each door, adjacent the lower edge thereof are provided with wedge shaped bearing strips 26 and 27 which are engaged by the respective rollers 28 and 29 that are journaled in brackets 30 secured to the floor, the wedge strips compensating for the movement of the doors toward and away from the plane of the door frame.

Any suitable mechanism may be provide for actuating the doors but for the purpose of illustration, I have shown mechanism like that described in my patent No. 2,412,871. This mechanism comprises a guide track 32 comprising a horizontal split tube of rectangular cross section slotted in its bottom wall. Slidable within the guide track and movable toward and from each other are two guide blocks 33 similar to those shown in my said patent. Each block has connected thereto a stud 34 which extends through the slot in the track and loosely into a socket 35 that is slidably mounted in a bracket housing 36 secured to one of the doors and is normally influenced upwardly around the end of the corresponding stud 34 by a compression spring 37 that is interposed between the socket member and the bracket. A pull rod 38 is connected to the lower end of the socket member 35 and passes through an opening in the bottom of the bracket 36, and the spring preferably surrounds this pull rod between the socket and the bracket as best shown in Figure 11. Upward movement of the socket under the influence of the spring is limited by the engagement of a nut 39 on the rod with the bottom wall of the socket. A flexible connector such as a cord or chain 40 has one end connected to the pull rod and its other end extending through an opening in the door and provided with a suitable handle 40a on the inside of the door (Figure 1) so that a person locked inside the cold storage compartment, by simply pulling upon the handle 40a could disengage the socket member 35 from the stud 34 and thus release or disconnect the door from the operating mechanism.

For simultaneously moving the guide blocks 33 toward and from each other, I utilize two flexible connectors 41, preferably chains, each of which has one end connected to one of the guide blocks 33 as at 42, and its other end connected to the other guide block 33 as at 43. Adjacent each end of the track 32 and preferably within the track is a guide 44 over which passes the intermediate portion of one of the chains 41. Preferably the guides 44 are sprockets and one of them is driven so as to move the chains longitudinally upon rotation of the sprocket. With this construction, it will be seen that upon longitudinal movement of one of the chains 41 in opposite directions, the guide blocks 33 will be moved toward and from each other respectively so as to close and open the doors. Additional guide rollers may be placed along the track for guiding the longer reaches of the chains when the guide blocks 33 are adjacent the ends of the guide track 32.

As shown the driven sprocket 44 is keyed on a shaft 45 journaled in bearings 46 on the track 32 and upon which is also fastened a gear 47 which meshes with a pinion 48 that is fixed to a driving shaft 49. The shaft 49 is journaled in bearings 50 on the track and has thereon a friction clutch which comprises a body section 51 keyed on the shaft 49 and a pulley section 52 rotatably mounted on the shaft and normally held in frictional contact with the body 51 by a compression spring 53. The pulley section 52 is connected by a belt 54 to a

smaller pulley 55 on the shaft of an electric motor 56 which for convenience is mounted on the top of the track 32.

The motor 56 is reversible and its operation to open and close the doors is controlled by a single simple switch (not shown) that may be manually operated or might be automatically operated, such as a pneumatic switch in the floor to be operated upon passage thereon of a truck. Connected in circuit with the motor and switch may be a magnetic controller (not shown) for the motor, a gear limit switch 57 and a selector switch 58. The controller, gear limit switch and selector switch may be of any suitable construction such as shown in my Patent 2,412,871. The gear limit switch includes a driving spindle 59 connected to the shaft 45 on which the driving sprocket 44 for the chains 41 is mounted.

The selector switch 58 includes an operating lever 60 extending into the guide track 32 and into the path of movement of one of the guide blocks 33. The guide block 33 and the lever 60 are so related that just prior to closing of the doors the block 33 will swing the lever 60 in one direction to close one set of contacts of the switch 58, while when the block moves in the other direction during opening of the doors the lever 60 will be actuated in the opposite direction for closing the other set of contacts of the switch 58.

All of the foregoing described mechanism is more fully described and shown in my Patent 2,412,871.

In operation of the apparatus, assuming the doors to be closed as shown in Figures 1 and 2, the manually operable switch will be open. To open the doors the operator closes the switch to operate the motor in one direction and drive the chains 41 so as to move the guide blocks 33 away from each other and open the doors. During this operation, the selector switch 58 will be operated by the guide block 33 so that upon the next closing of the circuit by the manually operable switch, the motor will be operated in the other direction. The spindle 59 of the gear limit switch 57 will be driven during the opening movement of the doors and will have been set in known manner so that when the doors approach their full open position the contacts of the manually operable switch will be opened so as to stop the motor and at the same time set the switch for reverse operation of the motor.

When it is desired to close the doors, the manually operable switch will again be closed, whereupon the motor will be started in the direction opposite to that in which it moved during opening of the doors. During the closing movement of the doors, the selector switch 58 again will be actuated and when the doors approach their closed position the contacts of the gear limit switch 57 will be operated to stop the motor and set the switch for operation of the motor in the direction to open the doors upon the next closing of the manually operable switch.

A modification of the invention is shown in Figures 17-20 inclusive where the flexible sealing element 63 at the top of the door opening is secured to the lower edge of the head piece 3 instead of on the front face of said head piece as is the sealing element 21, and the sealing element 63 is disposed between the jamb posts as shown in Figures 18 and 19. This construction makes it possible to locate the doors in their closed position in closer relation to the door frame than is possible with the construction shown in Figures 1-16 inclusive, and also the sealing element 63 is easily adjustable to ensure proper contact thereof by the cooperative sealing element 64 on the door F.

Another modification of the invention is shown in Figures 21-23 inclusive where a door opening G has a single door H to which is connected one end of each of two parallel rails 65 that are Z-shaped in cross-section. Each rail is supported and guided in two horizontally spaced roller brackets 66 and 67 that are rigidly carried by the respective stanchions or standards 68 and 69 which have their upper and lower ends fastened to the wall I and to

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the floor K as indicated at 70 and 71 respectively. The stanchions have vertical portions 72 in spaced approximately parallel relation to the wall I so that the door may move edgewise from its closed position shown in Figure 1 to its open position between the vertical portions 72 of the stanchions and the wall I as shown by dot and dash lines in Figure 22. Each of the roller brackets 66 and 67 has an upper pair of rollers 73 engaging the central web portion 65 and the inner side of the upstanding flange of the corresponding rail, and another pair of rollers 74 engaging the under side of said web and the front surface of the downwardly extending flange. The rails and the rollers are inclined to the general plane of the door frame J in approximately the same manner and for the same reason that the track sections 13 and 14 are inclined to the plane of the door frame, that is, so that the door will always be parallel to the general plane of the door frame as best shown by the solid lines and dot and dash lines of Figure 22. The door frame has a head piece 75 on which is mounted sealing elements 76 and 77 corresponding to the sealing elements 21 and 23, and the bottom edge of the door has resilient sealing elements 78 to engage the floor or sill in the same manner as do the sealing elements 24. The leading edge of the door and the jamb post 79 have sealing elements 80 and 81 corresponding approximately to the sealing elements 18 and 19 of the door construction shown in Figures 1 and 3, while the trailing edge of the door has a sealing element 82 corresponding to the sealing element 20 to abuttingly engage the jamb post 83 when the door is in closed position. The rails 65 and roller brackets are also mounted so that the rails are normally disposed in an inclined relation to the horizontal in about the same way and for the same purpose as the track sections 13 and 14 are inclined, that is, to cause the door to move downwardly simultaneously with its edgewise movement into closed position and simultaneously with the edgewise movement of the door and the movement of the door laterally toward the door frame into closed position.

While the door has been shown as manually openable and closable, obviously any suitable automatic operating means for the door could be utilized.

Preferably the portion of the jamb post that is engaged by the sealing elements 20 or 82 will have a surface that is adjustable to ensure accurate contact of the sealing element with the jamb post throughout the length of the sealing element. As shown in Figures 24 and 25, an angle bar 84 is mounted with screw and slot connections 85 on the edge of the jamb post 83 or 4 so that the angle bar can be adjusted on the jamb post to cause its flange 86 to accurately contact the sealing element 82 or 20.

While the now preferred embodiments of the invention have been illustrated and described, it will be understood by those skilled in the art that the structural details of the door and sealing means may be widely modified and changed within the spirit and scope of the invention. Also, automatic means may be provided for stopping the closing of the doors in case of abutment of the doors with a person or object moving through the door opening. For example pneumatic means L might be inserted in the compressible sealing elements 18 and connected to suitable control mechanism for the motor to stop the motors upon impression of said elements.

In the claims appended hereto the term "cold storage room" is intended to include refrigerators, coolers and other structures wherein the invention may be embodied.

What I claim is:

1. The combination with a cold-storage room wall in which there is a rectangular door opening having top, bottom and side margins in approximately a common plane, of a door, mounting means providing for one continuous composite movement of the door relatively to said wall edgewise parallel to said plane and laterally parallel to said plane toward said wall into closed position relative to said door opening, sealing means for the

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top margin of said door opening brought into sealing condition by said lateral movement of the door toward said wall, and sealing means for the side margins of the door opening brought into door sealing condition by said edgewise movement of the door.

2. The combination with a wall of a cold storage room having a rectangular door opening therein having top, bottom and side margins in approximately a common plane, of a door, mounting means providing for one continuous composite movement of the door relatively to said wall parallel to said plane edgewise horizontally and downwardly and laterally toward said wall into closed position relative to said door opening, sealing means for the top margin of the door opening, sealing means for the side margins of the door opening, and sealing means for the bottom margin of the door opening, all brought into door-sealing condition by said composite movement of the door.

3. The combination with a wall of a cold storage room having a rectangular door opening therein having top, bottom and side margins in approximately in a common plane, of a door, mounting means providing for one continuous composite movement of the door relatively to said wall parallel to said plane edgewise horizontally and downwardly and laterally toward said wall into closed position relative to said door opening, cooperative sealing elements on the door and the wall for the top margin of said door opening brought into door sealing condition by said lateral movement of said door toward said wall, cooperative sealing elements on said door and said wall for the side margins of the door opening brought into door-sealing condition by said edgewise movement of the door, and sealing means for said bottom margin brought into door-sealing condition by said downward movement of the door.

4. The combination as defined in claim 3 wherein said sealing elements for each of the side margins of the door opening includes a resiliently compressible member extending along said margin when the door is closed, said elements being pressed together by said edgewise movement of the door into closed position.

5. The combination as defined in claim 3 wherein said sealing means at the bottom margin of the door opening include at least one resiliently compressible member compressed between the bottom of the door and said bottom margin by said downward movement of the door when the door is closed.

6. The combination as defined in claim 1 with the addition of complementary wedge-shaped bearing strips on opposite sides of the door adjacent the lower edge thereof, and guide rollers journaled on fixed supports disposed adjacent the side margins of the door opening and continuously engaged by said bearing strips and positively guiding the lower edge of the door in its said edgewise and lateral movement.

7. The combination as defined in claim 1 wherein said mounting means comprises a track inclined outwardly from said wall above the top margin of the door opening, and hangers movable along said track and connected to said door at points spaced apart in the direction of the width of the door and disposed in different planes that are parallel to the plane of the door.

8. The combination as defined in claim 2 wherein said mounting means comprises a track inclined outwardly from said wall above the top margin of the door opening, and hangers movable along said track and connected to said door at points spaced apart in the direction of the width of the door and disposed in different planes that are parallel to the plane of the door.

9. The combination as defined in claim 3 wherein said mounting means includes a track above said door opening inclined outwardly from said wall and upwardly from said door opening to a point beyond one side margin of the opening, and hangers movable along said track and connected to said door at points spaced apart in the direc-

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tion of the width of the door and disposed in different planes that are parallel to the plane of the door.

10. The combination as defined in claim 1 wherein said mounting means includes a pair of parallel rails each having one end rigidly connected to the door and its other end extending beyond one stile of the door, guide members in which each rail is slidably mounted, and stanchions at one side of one side margin of the door opening having vertical positions in spaced relation to said wall and on which said guides are mounted.

11. The combination as defined in claim 2 wherein said mounting means includes a pair of parallel rails inclined upwardly and outwardly with respect to said common plane of said margins of the door opening, each having one end rigidly connected to the door and its other end extending beyond one stile of the door, guide members in which each rail is slidably mounted, and stanchions at one side of one side margin of the door opening having vertical portions in spaced relation to said wall and on which said guides are mounted, said rails and guide members being related to each other and to said door to provide for said edgewise and lateral movement of the door.

12. The combination as defined in claim 11 wherein said rails and guides are also related to each other and to the door to provide for movement of the door in its

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own plane simultaneously with said edgewise and lateral movements.

13. The combination as defined in claim 1 with the addition of power-operated mechanism for moving said door edgewise into and from the closed position including a movable member, and means separably connecting said member to said door including two normally connected and manually disconnectible parts one on each of said member and said door.

14. The combination as defined in claim 1 with the addition of power-operated mechanism for moving said door edgewise into and from the closed position including a movable member, and means separably connecting said member to said door including two elements separably connectible upon relative movement, means normally urging said elements into connected relation, and manually operable means for pulling said elements apart.

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FOREIGN PATENTS

624,907	Germany	Jan. 30, 1936
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