

Nov. 4, 1941.

R. DOW

2,261,147

DOUBLE HUNG DOOR MOUNTING AND LATCHING MEANS

Filed May 1, 1939

5 Sheets-Sheet 1

Fig. 1

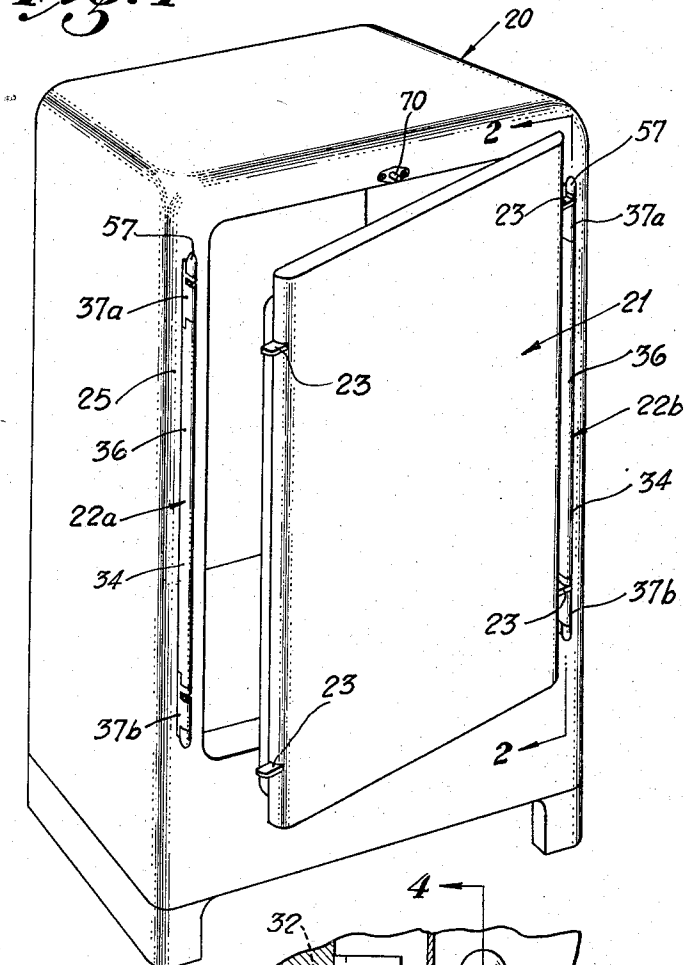


Fig. 2

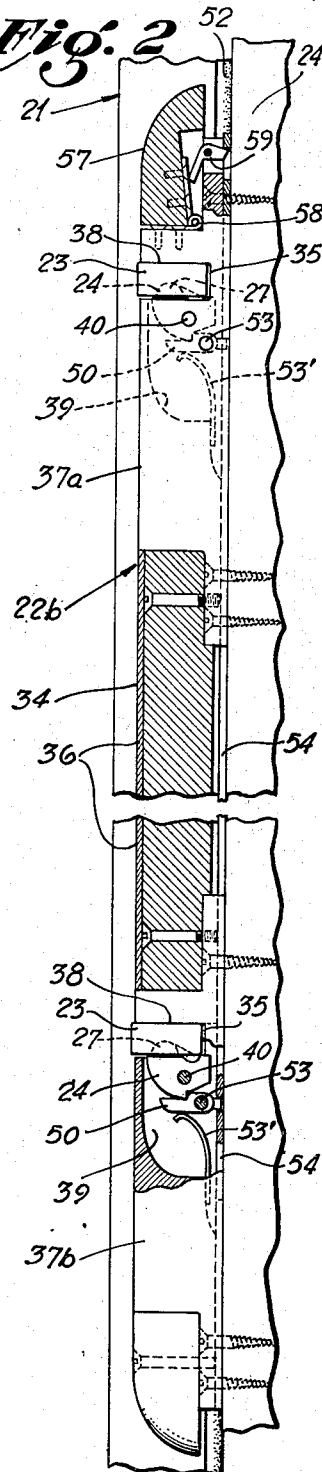
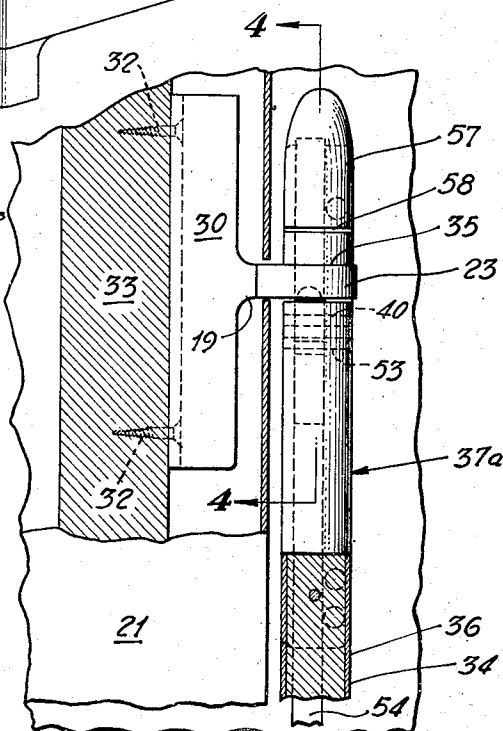


Fig. 3



INVENTOR:
ROBERT DOW,
BY *Robert Dow*
ATTORNEY.

Nov. 4, 1941.

R. DOW

2,261,147

DOUBLE HUNG DOOR MOUNTING AND LATCHING MEANS

Filed May 1, 1939

5 Sheets-Sheet 2

Fig. 4

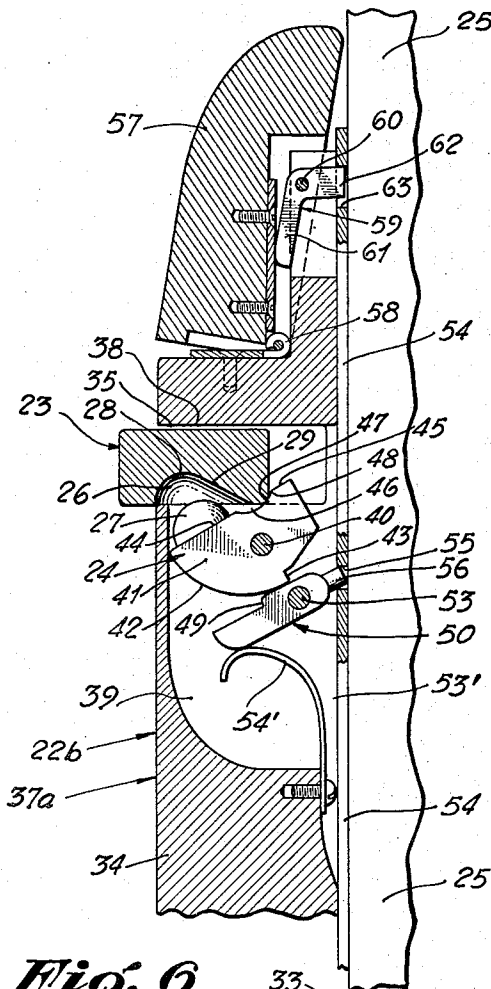


Fig. 5

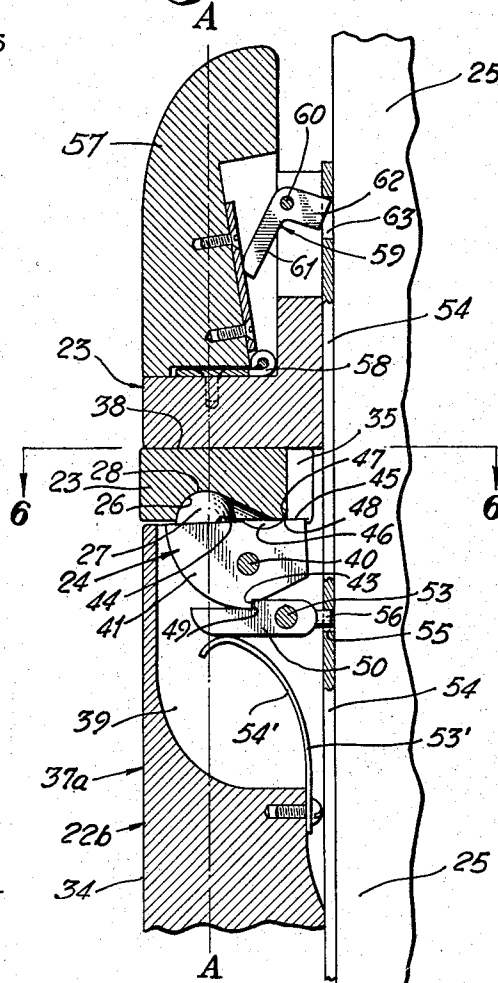


Fig. 6

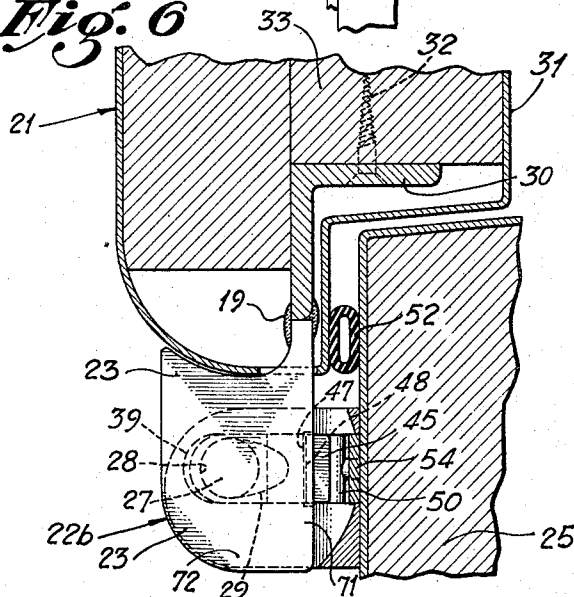
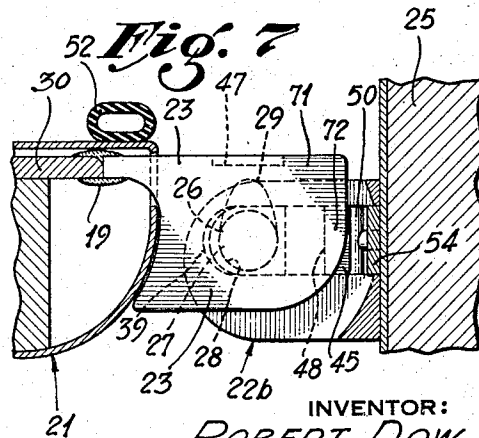


Fig. 7



INVENTOR:
ROBERT DOW,
BY *Shelton*
ATTORNEY.

Nov. 4, 1941.

R. DOW

2,261,147

DOUBLE HUNG DOOR MOUNTING AND LATCHING MEANS

Filed May 1, 1939

5 Sheets-Sheet 3

Fig. 8

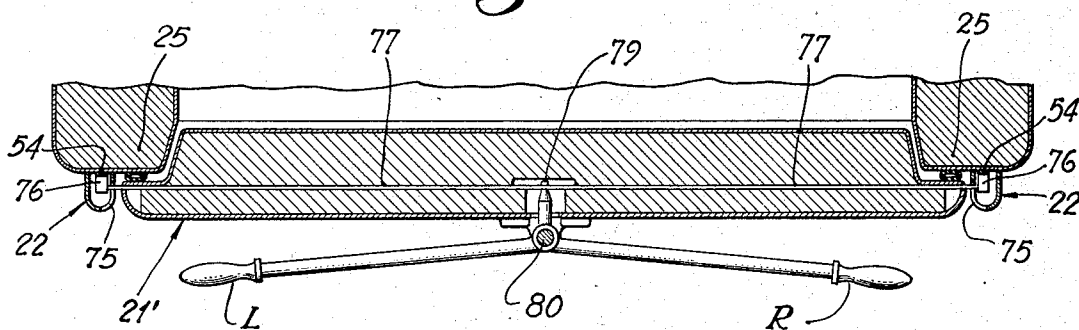
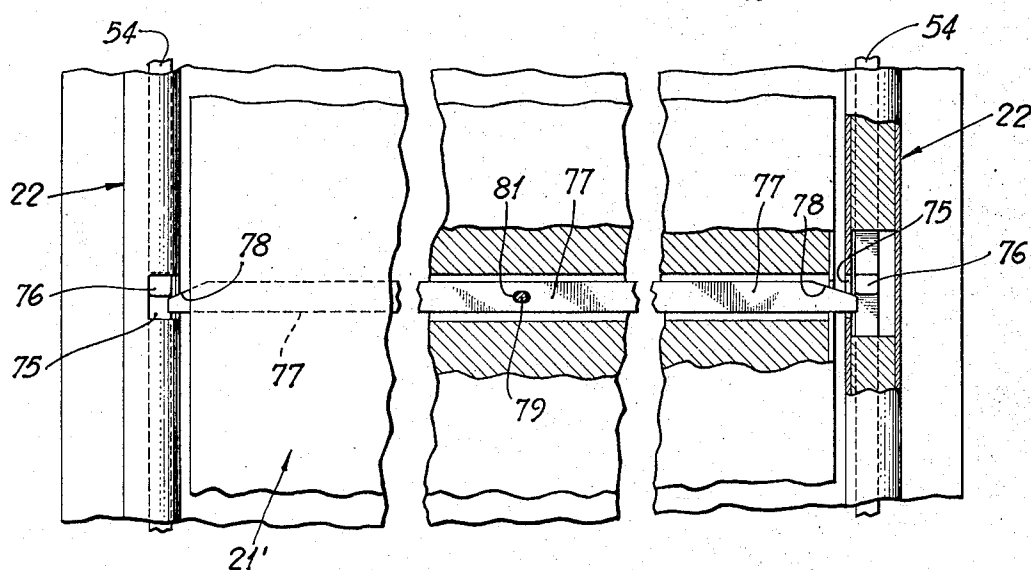


Fig. 9

INVENTOR:
ROBERT DOW,
BY *Sheldon L. Hann*
ATTORNEY.

Nov. 4, 1941.

R. DOW

2,261,147

DOUBLE HUNG DOOR MOUNTING AND LATCHING MEANS

Filed May 1, 1939

5 Sheets-Sheet 4

Fig. 10

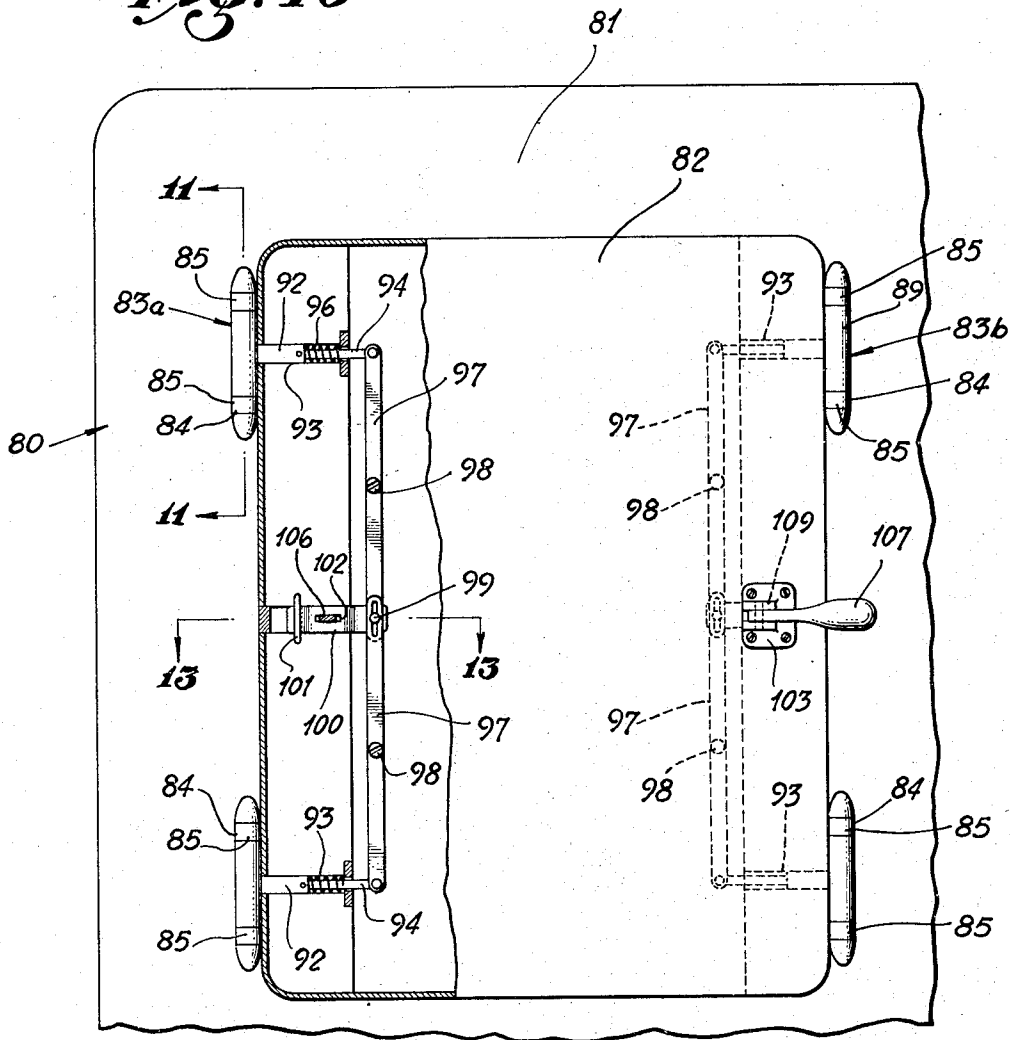
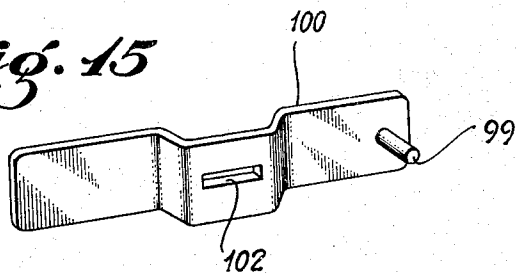


Fig. 15



INVENTOR:
ROBERT DOW,
BY *Robert Dow*
ATTORNEY.

Nov. 4, 1941.

R. DOW

2,261,147

DOUBLE HUNG DOOR MOUNTING AND LATCHING MEANS

Filed May 1, 1939

5 Sheets-Sheet 5

Fig. 14

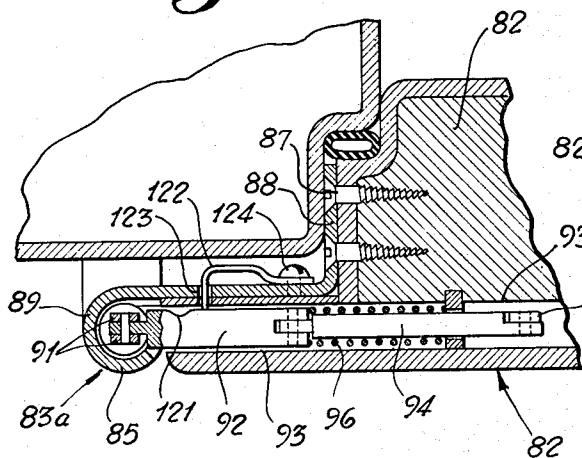
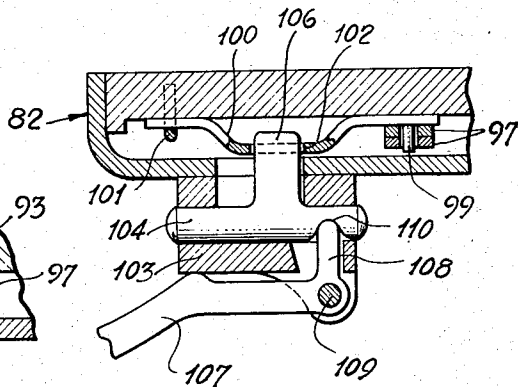


Fig. 13



UNITED STATES PATENT OFFICE

2,261,147

DOUBLE HUNG DOOR MOUNTING AND
LATCHING MEANS

Robert Dow, Los Angeles, Calif.

Application May 1, 1939, Serial No. 271,032

14 Claims. (Cl. 16—147)

This application is a continuation-in-part of my copending application for Double hung door mounting and latching means, Serial No. 232,787, filed October 1, 1938.

My invention relates to means for securing a door relative to an opening so that it may be selectively swung into open position from either side, and relates in particular to a novel disconnectible hinge structure which contributes to the desired effect of supporting the door so that it may be opened from either side.

It is an object of the invention to provide means for mounting a door, or other member to be swingably supported, so that the same may be latched in closed position by hinge elements disposed at opposite sides, these hinge elements being selectively disconnectible by release of the associated latch means so that the door may be swung into open position either to the right or to the left. Although the invention may be employed for various types of swingably supported members and, for example, closures associated with various types of openings, the present principal use conceived for the same is in conjunction with refrigerator doors. Standard practice is to provide refrigerators and cabinets with doors which swing open toward the right, and many instances are encountered where this is not suitable. My invention has the advantage of providing a refrigerator which may be placed in any desired position without regard to hinging the door, for the reason that the door is universally hinged so that it may be swung to open position from either side. Likewise, there are many instances in the use of the door where it will not be necessary to open the same to the full extent to gain access to a selected side. For example, if an article is to be removed from the right side of the refrigerator, the door may be swung into partly opened position on the left hinge structure, and if access to the leftward portion of the refrigerator is desired the door may be swung open on the right hinge structure, with the same ease and facility as found in the operation of refrigerator doors hinging in the ordinary manner.

It is an object of the invention to provide a door mounting and latching means of the above character which will support the door so that it will not sag when swung open on either right or left hinge structure, which is sturdy and dependable, which is positive in operation and latching function, which may be readily released from either side by simple pressure against a selected latch control element, and which does not de-

tract from the appearance of the door or refrigerator to which it is applied.

A further object of the invention is to provide a disconnectible hinge structure embodying a pair of hinge elements which may be moved into cooperating position on a hinge axis and which have thrust and radial bearing means engageable at this time to support the load of the supported door.

A further object of the invention is to provide a disconnectible hinge structure having hinge elements which are brought into cooperating position on a hinge axis when the door is swung from open to closed position, these hinge elements being relatively movable when in cooperating position into engagement so that a recess formed in one of them will receive a projection formed in the other, thereby producing a pin and socket interengagement on which the door may be swung from closed to open position, together with releasable latch means for holding the hinge elements in interengagement and also means separate from the latch for holding the hinge elements in interengagement when the opposite side of the door is swung outward from closed position relative to the door frame.

A further object of the invention is to provide a disconnectible hinge having cooperating hinge elements formed so as to interengage in the manner of a pin and socket, with means for automatically swinging these hinge elements into engagement as the door is swung into closed position.

It is a further object to provide a disconnectible hinge of the character set forth in the preceding paragraph wherein the hinge elements are engaged in response to closing of the door and wherein the weight of the door is supported entirely on these hinge elements so that the door will be supported without sagging.

A further object of the invention is to provide a disconnectible hinge of the character set forth in the preceding paragraphs wherein one of the hinge elements is carried by a support in spaced relation to an abutment so that the cooperating hinge element, as it moves into the space adjacent the abutment, will be forcibly lifted into engagement with the abutment, thereby positively positioning the supported door in both opened and closed positions.

Further objects and advantages of my invention will be pointed out in the course of the following detailed description of those forms of my invention which I have chosen for the purpose of illustrating the principles thereof.

Referring to the accompanying drawings in which my invention is illustrated:

Fig. 1 is a perspective view of a refrigerator having a door equipped with a double hung hinge structure in accordance with my invention, the door being shown partly open.

Fig. 2 is an enlarged fragmentary section taken substantially as indicated by the line 2—2 of Fig. 1.

Fig. 3 is an enlarged fragmentary partly sectioned view of the upper right hand hinge structure shown in Figs. 1 and 2.

Fig. 4 is an enlarged fragmentary cross-section taken as indicated by the line 4—4 of Fig. 3 with the cooperating parts occupying the positions which they assume as the hinge elements are brought into initial engagement.

Fig. 5 is an enlarged fragmentary section similar to Fig. 4 showing the hinge elements fully engaged.

Fig. 6 is an enlarged fragmentary section on a plane represented by the line 6—6 of Fig. 5, showing the hinge elements in engagement, with the supported door in closed position.

Fig. 7 is an enlarged fragmentary section on the line 6—6 of Fig. 5, but showing the positions of the hinge elements when the door is swung thereon into an opened position.

Fig. 8 is a partly sectional view showing the manner in which a handle may be applied to a door to selectively operate the latch means of the disconnectible hinges.

Fig. 9 is an enlarged fragmentary partly sectioned view, drawn to enlarged scale, and showing the latch operating bar of Fig. 8 in elevation.

Fig. 10 is a front elevational view of a door and door frame showing an alternative form of the invention.

Fig. 11 is an enlarged fragmentary sectional view taken as indicated by the line 11—11 of Fig. 10.

Fig. 12 is an enlarged fragmentary sectional view taken as indicated by the line 12—12 of Fig. 11.

Fig. 13 is an enlarged fragmentary sectional view taken on the line 13—13 of Fig. 10.

Fig. 14 is an enlarged fragmentary sectional view taken as indicated by the line 14—14 of Fig. 12.

Fig. 15 is a perspective view of the sliding plate employed to connect the operating lever with the hinge means.

In Fig. 1 of the drawings I show a refrigerator 20 having a door 21, equipped with left and right disconnectible hinges 22 individually identified as 22a and 22b, either of which will serve as a pivot on which the door 21 may be swung between opened and closed positions. In Fig. 1 the door 21 is shown supported in partly open position by the right hinge 22b. It will be understood from the following description that the right hand portion of the door 21 may be swung outward on the hinge 22a.

The invention employs, as best shown in Figs. 4 and 5, cooperating hinge elements 23 and 24, which may be respectively mounted on two relatively movable members which are to be swung on an axis or which are to be moved together and apart. In the preferred practice of the invention the hinge elements 23 are secured to the edges of the door 21 and the hinge elements 24 are connected by suitable supports with the door frame 25, provided by the refrigerator 20. When relative movement brings these hinge elements 23 and 24 into cooperating position on the hinge

axis A—A, as shown in Fig. 5, the hinge elements move relatively toward each other in the direction of the axis A—A, and these hinge elements are so formed that a portion of one will project into a portion of the other so as to provide an interengagement of the character of a pin and socket. The recess or socket of such pin and socket arrangement may be in either of the hinge elements, and the projection may be in the other. Likewise, the pin and socket may be of different forms, for example, spherical, conical, or frusto-conical.

In the preferred practice, the hinge element 23 is provided with a recess 26 in the lower face thereof, and the hinge element 24 is provided with a semi-spherical projection on the upper portion thereof. The recess 26 has a semi-spherical portion 28 to receive the projection 27 and leading rearward, or rightward, as in Figs. 4 and 5, the recess 26 has an approaching or sloping channel 29 to provide clearance for the projection 27 as it moves in and out of the recess 26. For example, the projection 27 starts to move into the semi-spherical portion 28 of the recess 26 when the element 23 is in a position such as shown in Fig. 4, and makes complete engagement with the recess 28 when the element 23 reaches the cooperating position on the axis A—A, as shown in Fig. 5.

In the practice of the invention two sets of cooperating hinge elements 23 and 24 are used at each side of the door. The hinge elements 23 are formed by flat bodies or blocks supported so as to project laterally from the edges of the door 21. As shown in Figs. 3 and 6, these hinge elements 23 may be secured as by welds 19 to short metal angles 30, which are secured within the metal cover 31 of the door by means of screws 32 which pass into the wood frame 33 of the door 21. Each side of the door frame 25 may carry a hinge bar 34 disposed in right hand and left hand relation and providing upper and lower openings 35 to receive the hinge elements 23. Each bar 34 may be of sectional type, with an intermediate section 36 disposed between the upper and lower end blocks 37, individually identified as 37a and 37b, the length of the intermediate section 36 being variable in accordance with the difference in heights of the doors to which the hinge may be applied, or, in other words, in accordance with the vertical spacing of the hinge elements 23. It will be noted that the recesses 35 are formed in the end blocks 37 and that each recess 35 has an upper horizontal wall referred to as an abutment 38 which is spaced above the position of a cooperating hinge element 24. Also, each block 37 has an internal chamber 39 leading downward from its recess 35, in the upper portion of which chamber a hinge element 24 is rockably supported by a transverse pin 40 which is offset from the hinge axis A—A rearwardly or toward the door frame 25.

As best shown in Figs. 4 and 5, each hinge element 24 has a body portion 41 which carries the projection 27, this body portion having a curved front edge wall leading downwardly and rearwardly from a position ahead of the projection 27 to a shoulder 43 disposed substantially on an axis which passes through the point of pivot defined by the pin 40. The body portion 41 extends rearward so as to provide an upper face 44 lying inward or to the right of the projection 27 and also projecting inward or rightward beyond the position of the pivot or pin 40 to such an extent that the inner end 45 of the upper face 44 will

swing downward as the projection 27 swings upward from retracted position, as shown in Fig. 4, to fully engaged position, as shown in Fig. 5. The upper face 44 preferably has a cylindrical depression 46 between the projection 27 and the inner end 45 to be engaged by the lower rearward corner 47 of the hinge element 23, as shown in Fig. 4, so that as the element 23 moves rearward from its position of Fig. 4 toward its position of Fig. 5, the hinge element 24 will be rotated on the pin 40 so as to cause the projection 27 to enter the recess 26. As the element 23 reaches the position in which it is shown in Fig. 5, the upper face of the projection 27 will bear against the wall of the semispherical portion 28 of the recess 26 so as to exert a lifting action on the element 23, and at the same time the reaction of the corner 47 against the corner 48 along the inner edge of the cylindrical depression will exert a lifting force on the element 23, these two lifting effects carrying the element 23 into tight engagement with the abutment 38, and at this time the element 23 will be supported by two points of engagement with the element 24, namely, the top of the projection 27 and the corner or shoulder 48. Also, at this time a shoulder 49 of a latch 50 will move into overlapping or latching position relative to the shoulder 43 of the element 24, as shown in Fig. 5.

When the element 24 is in the position shown in Fig. 5, the element 23 is wholly supported by the element 24. In the form of my invention illustrated there are upper and lower elements 23 and 24 and therefore both of the elements 23 are wholly supported by the elements 24 at this time and consequently the door or other member is supported by the elements 24. It will be seen that the projection 27 fitting in the semi-spherical portion 28 of the recess 26 accurately aligns the element 23 on the axis of rotation A—A. It will further be seen that the element 23, when in a raised position as shown in Fig. 5, is in working contact with the abutment 38. By reason of this construction the hinge elements, when the latch is in latching position, will be retained in proper working position so that the element 23 is free to rotate but cannot move in any other plane. This results in a structure which is non-sagging and which is highly desirable if not necessary in a double hinge door arrangement as illustrated herein.

This actuation of the latch takes place as the door moves into closed position and compresses the rubber seals 52 which may be carried on the edge portions of the door 21 so as to engage the frame 25, and the actuation of the latch will serve to prevent anti-clockwise rotation of the hinge element 24 from its position of Fig. 5, thereby preventing the movement of the hinge element 23 out of the recess or opening 35. Each latch 50 comprises a lever mounted in the chamber 39 on a transverse pin 53, and a spring 53' is provided in each chamber 39 to urge the latch 50 toward the hinge element 24. To release the latches 50 on either side of the door, I provide a pair of latch releasing bars 54, each of which extends vertically behind a side bar 34 and is supported so as to have a limited vertical sliding movement. Each bar 54 has a pair of openings 55 therein, each of these openings receiving a lug 56 which projects rearward from a latch 50, whereby upward movement of the bar 54 will move the pair of latches 50 into retracted position such as shown in Fig. 4. To lift the bar 54, I provide at the upper end of each bar 34 a manually engage-

able member 57 comprising a rounded body supported by means of a hinge 58 at the upper end of the associated block 37a in a position to cover a bell crank 59 which is secured at the upper end of the associated bar 34 by means of a pin 60. One arm 61 of the bell crank 59 is in a position to be moved by the member 57, and the other arm 62 of the bell crank projects into an opening 63 in the upper end of the bar 54.

When the refrigerator door is closed, the operating members 57 on each side of the door will be in the position thereof indicated in Fig. 5. Should it now be desired to open the door, the member 57 on the selected side of the door will be depressed into a position such as shown in Fig. 4, the anti-clockwise rotation of the bell crank 59 resulting in the lifting of the bar 54 and the rotation of the latches 50 into retracted position so that the associated hinge elements 24 will be free to rotate from the position thereof shown in Fig. 5 to the position thereof shown in Fig. 4. The compressed sealing member 52 will exert a force tending to move the door outward, but in addition to this, auxiliary means may be employed, such as a spring mounted plunger 70 carried in the center of the frame 25, as shown in Fig. 1. This plunger will exert a force sufficient to move the door into open position should the hinge means at either side thereof be released.

The invention provides means for locking the hinge elements at either side of the door when the hinge elements at the opposite side of the door are disconnected, as by the moving of the door toward or into open position. Accordingly, when the door is partly opened, the hinge elements by which the door is supported can not be released so as to cause the door to fall from operative position relative to the frame 25. The construction of this auxiliary locking means will be clearly understood from Figs. 6 and 7. As shown in Fig. 6, the corner or shoulder 47 of the swingable hinge element 23 is parallel to the shoulder 48 of the hinge element 24, when the hinge elements 23 and 24 are in cooperative engagement, as shown in Fig. 5. Should the door 21 be rotated from the closed position thereof in Fig. 6 toward the position as shown in Fig. 7, the shoulder 47 of the swingable element 23 will be moved from parallel relation to the shoulder 48 to an angular relation so that the side portion 71 of the element 23 will swing in anti-clockwise direction from its position of Fig. 6 into overlapping relation to the outer end 45 of the upper face 44 of the body portion 41 thereby positively preventing retraction of the hinge element 23 out of the position in which it is shown in Fig. 5. This automatic locking action comes into effect when the door 21 is opened at a small angle and continues in effect throughout the time the door is opened. For example, as shown in Fig. 7, the rear end face 45 is substantially covered by the end 72 of the element 23 when the door 21 is in a position perpendicular to adjacent face of the frame 25.

In Figs. 1 to 7, I have shown a form of my invention wherein the latches for the separate hinge means at the sides of the door are operated by individual members 57 which may be selectively depressed. The latches, however, may be actuated by use of a handle, or handles, secured on the door. Accordingly, in Figs. 8 and 9, I have shown a door 21', having hinge means 22 at the sides thereof made substantially in accordance with the disclosure of Figs. 1 to 7, and differing therefrom only in the provision of

openings 75 in the intermediate bar sections 33, and the mounting of lugs 76 on the latch releasing bars 54 in positions to lie in the upper portions of the openings 75. The door 21' has a laterally extending bar 77 with cams 78 at the ends thereof to selectively engage and lift the lugs 76 when the bar 77 is shifted laterally. To shift the bar 77 I provide a lever 79 which projects into the door 21' from a pivot 80, and engages an opening 81 in the bar. Handles L and R are connected to the lever 79 in laterally extending position. When the handle R is pulled outward away from the face of the door 21', the bar 77 will be shifted in rightward direction by the lever 79, and the cam 78 at the right end of the bar 77 will lift the lug 76 of the right hand hinge means 22, raising the latch releasing bar 54 associated therewith so as to release the right hand hinge means so that the pull on the handle arm will then accomplish an outward swinging of the right side of the door 21' around the left hand hinge means 22. An outward pull on the handle L will accomplish an opening of the left side of the door 21' on the right hand hinge means 22.

In Figs. 1 to 7, inclusive, I have shown a form of the invention wherein the load of the door is supported on cooperating hinge elements 23 and 24 which interengage in a manner to provide both thrust and radial bearings. For example, when the hinge elements 23 and 24 are in complete engagement, as shown in Fig. 5, a portion of the downward thrust of the hinge element 23 will be supported on the upper end face of the projection 27, and the radial force due to the eccentric position of the door relative to the hinge will be transmitted from the hinge element 23 to the side portions of the projection 27. This feature of supporting the load of the door solely on the inter-engaging hinge elements is also present in the form of the invention shown in the Figs. 10 to 15, inclusive. In Fig. 10 I show a structure 80 having a door frame 81 to which a door 82 is secured by right hand and left hand hinge means 83a and 83b. Each of these hinge means include hinge butts 84 having outwardly projecting and vertically spaced lugs 85 which, as best shown in Fig. 11, are provided with depressions or sockets 86, preferably semi-spherical in form. As shown in Fig. 14, angle plates 88 are secured to the edge portions of the door 82 by means such as screws 87, there being four of these angle plates 88 in positions directly opposite the butts 84. The ends of the angle plates are rolled to form vertically disposed tubes 89 which are of such lengths that when the door 82 is closed each of the tubes 89 will rest between a pair of lugs of a butt 84. Pins 90, as shown in Figs. 11 and 12, are placed so as to slide vertically in the upper and lower ends of the tubes 89, the inner ends of these pins 90 being connected to the outer ends of toggle links 91 which are positioned centrally within the tubes 89. The inner ends of each pair of toggle links are pivotally connected to the outer end of a horizontal bar 92, which is mounted for horizontal sliding movement in openings 93, formed in the edges of the door 82. The inner end of each bar 92 is pivotally connected through a link 94 with the outer end of a fulcrumed bar 97. Expansive springs 96 are placed around the links 94 in such position that they will urge the bars 92 outward so as to straighten the toggle links 91 associated with each bar 92. The levers 97 are mounted on centrally disposed pivots 98 and the slotted inner

ends of each pair of levers 97 make connection with a pin 99 which projects from the inner end of a plate 100. There are two of these plates 100, one each being mounted for horizontal sliding movement within an intermediate edge portion of the door 82. The end of each plate 100 opposite its pin 99 is slidable within a keeper 101, and the central portion of each plate 100 is offset forward, and in this forwardly offset portion is provided a slot 102 which will receive a projection 106 which extends inward from a rod 104 slidably disposed in a block 103. Each block 103 supports an operating lever or handle 107 on a pivot 108, and from each handle 107 a lug 108 projects into engagement with a notch 110 in the associated sliding rod 104.

When the door 82 is closed, the springs 96 will act to move the bars 92 outward so as to hold the toggles 91 in aligned or extended positions so that the outer rounded ends 111 of the pins 90 will be forcibly pressed into the sockets 86, whereby the thrust and radial loads from the door will be transmitted directly from the hinge elements represented by the pins 90 to the hinge elements represented by the lugs 85. When it is desired to open the door 82 from either side, the corresponding handle 107 is pulled outward. This will transmit movement through the corresponding plate 100 to a pair of fulcrumed levers 97, swinging these levers in a direction to pull the bars 92 in against the expansive force of the springs 96, thereby swinging the associated toggle links 91 into angular or retracted positions to withdraw the pins 90 along one side of the door, from engagement with the cooperating sockets 111, thereby permitting disengagement of the cooperating hinge elements at the desired side of the door so that such side of the door may be swung outward.

A notch 121 is formed in each bar or plunger 92 near its outer end which may receive the end of a detent spring 122 which projects through an opening 123, such spring being secured to the angle plate 88 by means of a screw 124. When a pair of the bars 92 are moved into retracted position by the operation of the associated operating handle 107, the detents 122 associated therewith will engage the notches 121 of the bars 92 for the purpose of holding the pins 90 in partially retracted position during the time the associated side of the door is open. It is found that when the door is closed, the slight shock resulting from the contact of the rounded end of the pintle pins 90 with the lugs 85 of the hinge butt 84 is sufficient to disengage the spring detents 122 from the notches 121, so that the springs 96 will straighten the toggle links 91 and seat the associated pins 90 in the sockets 86.

I claim as my invention:

1. In a disconnectible hinge structure of the character described, the combination of: cooperating hinge elements relatively movable on a transverse plane to the hinge axis into cooperating position on a hinge axis, one of said hinge elements having a projection and the other having a recess to receive said projection; means operating as said elements move into said cooperating position to move the same relatively together in the direction of said hinge axis, whereby said projection will enter said recess to form a pivoting coengagement of said elements so that they may have relative swinging movement on said hinge axis; and automatic means operating in consequence of said relative swinging

movement of said elements to hold said projection in said recess.

2. In a disconnectible hinge structure of the character described, the combination of: cooperating hinge elements relatively movable on a transverse plane to the hinge axis into cooperating position on a hinge axis, one of said hinge elements having a projection and the other having a recess to receive said projection; means operating as said elements move into said cooperating position to move the same relatively together in the direction of said hinge axis whereby said projection will enter said recess to form a pivoting coengagement of said elements so that they may have relative swinging movement on said hinge axis; a latch to hold said elements together so as to maintain said projection and said recess in coengagement; means for releasing said latch; and automatic means operating in consequence of said relative swinging movement of said elements to hold said projection in said recess.

3. In a disconnectible hinge structure of the character described, the combination of: a pair of cooperating hinge elements relatively movable on a transverse plane to the hinge axis into cooperating position on a hinge axis and being movable when in said cooperating position relatively toward each other into coengagement, said elements having radial and thrust bearing faces cooperating when said elements are in said coengagement to support the load transmitted between said hinge elements; means to move said elements into said coengagement; a latch to hold said elements in said coengagement; means for releasing said latch; and means operating automatically in consequence of the relative angular displacement of said elements from their initial position of cooperation to hold said radial and thrust bearing faces in said coengagement independently of said latch.

4. In a disconnectible hinge structure of the character described, the combination of: a pair of cooperating hinge elements relatively movable on a transverse plane to the hinge axis into cooperating position on a hinge axis and being movable when in said cooperating position relatively toward each other into coengagement, said elements having radial and thrust bearing faces cooperating when said elements are in said coengagement to support the load transmitted between said hinge elements; means operating in consequence of the movement of said elements into said cooperating position to move said elements into said coengagement; a latch to hold said elements in said coengagement; means for releasing said latch; and means operating automatically in consequence of the relative angular displacement of said elements from their initial position of cooperation to hold said radial and thrust bearing faces in said coengagement independently of said latch.

5. In a disconnectible hinge structure of the character described, the combination of: supporting means relatively movable in a plane transverse to a hinge axis; a pair of cooperating hinge elements mounted respectively on said supporting means so as to be carried by the relative movement of said supporting means into cooperating position on said hinge axis, one of said hinge elements being rockably mounted on its support and being swingable from an angular position to an aligned position relative to the other of said hinge elements when said hinge elements are in said cooperating position, said elements having co-

operating radial and thrust bearing faces which come into engagement on said hinge axis when said elements are in alignment; releasable means for holding said rockable hinge element in alignment with the other hinge element; and means operating when said supporting means are relatively swung on said hinge axis from their position of initial engagement to hold said rockably mounted element in engagement with the other of said hinge elements.

6. In a disconnectible hinge structure of the character described, the combination of: a support having an abutment and a movable part spaced from said abutment; a body adapted to be moved into the space between said abutment and said movable part, said body having a hinge-forming means of interengagement with said movable part; means for moving said movable part into engagement with said body and to force said body against said abutment; latch means for holding said movable part in said engagement with said body; and means operating in response to the swinging of said body from an initial position of cooperation with said abutment to hold said movable part in said engagement with said body.

7. In a door latching and hinging means for connecting a door part to a frame part, the combination of: a member projecting from one of said parts so as to lie on a hinge axis when said door and frame parts are in closed relation; a lever connected to the other of said parts so as to swing from a position substantially parallel to said hinge axis to a position sloping outward from said hinge axis, said lever having means at its upper end making interengagement with said projecting member when it is in said position substantially parallel to said hinge axis whereby to support the static load transmitted from one of said parts to the other of said parts and to form a hinge on which said parts may have relative swinging movement; releasable means to hold said lever in said position substantially parallel to said hinge axis; and auxiliary means operating in consequence of swinging of said door and frame parts relatively around said hinge axis to hold said projecting member on said hinge axis independently of the action of said lever.

8. In a door latching and hinging means for connecting a door part and a frame part, the combination of: a member projecting from one of said parts so as to lie on a hinge axis when said door and frame parts are in closed relation; an abutment on the other of said parts disposed above said projecting member when it is on said hinge axis; a lever pivotally connected to said other of said parts so that its upper end will swing, in engagement with said projecting member, from an angular position relative to said hinge axis to a position parallel to said hinge axis, as said projecting member is moved into position on said hinge axis, said lever being so formed as to make hinging interengagement with said projecting member when said projecting member is on said hinge axis and to force said projecting member toward said abutment; and auxiliary means operating in consequence of the swinging of said door and frame parts relatively around said hinge axis to hold said projecting member on said hinge axis independently of the action of said lever.

9. In a disconnectible hinge structure of the character described, the combination of: a first hinge element having an abutment disposed in a plane substantially perpendicular to the hinge

axis of the hinge structure and a movable part spaced from but movable toward said abutment; a second hinge element having a body adapted to be moved into said space, said body and said movable part having interengageable hinge forming means; and means for moving said movable part into engagement with said body and to hold said body against said abutment.

10. In a disconnectible hinge structure of the character described the combination of: a first hinge element having an abutment disposed in a plane substantially perpendicular to the hinge axis of the hinge structure and a movable part spaced from but movable toward said abutment; a second hinge element having a body adapted to be moved into said space; means for moving said movable part into engagement with said body and to hold said body against said abutment; and hinge-forming means on said body and said first hinge element, said hinge-forming means cooperating when said body is engaged by said movable part to permit relative swinging movement of said hinge elements on said hinge axis.

11. In a latching and hinging means for connecting relatively movable parts, the combination of: a body on one of said parts adapted to lie on a hinge axis when said parts are in connected relation; a relatively stationary abutment on the other of said parts disposed above said body when it is on said hinge axis; a lever pivotally connected to said other of said parts so that its upper end will swing in engagement with said body, from an angular position relative to said hinge axis to a position substantially parallel to said hinge axis as said body is moved into position on said hinge axis, said lever being so formed as to make hinging interengagement with said body when said body is on said hinge axis and to hold said body in pressural engagement with said abutment; and means for holding said lever in said last-named position.

12. In a latching and hinging means for connecting relatively movable parts, the combination of: a body on one of said parts adapted to lie on a hinge axis when said parts are in connected relation; a relatively stationary abutment on the other of said parts disposed above said body when

it is on said hinge axis; a lever pivotally connected to said other of said parts so that its upper end will swing in engagement with said body, from an angular position relative to said hinge axis to a position substantially parallel to said hinge axis as said body is moved into position on said hinge axis, said lever being so formed as to make hinging interengagement with said body when said body is on said hinge axis and during the movement of said lever into said last named position to engage said body and raise same into contact with said abutment and to hold said body in pressural engagement with said abutment; and means for holding said lever in said last-named position.

13. In a latching and hinging means for connecting relatively movable parts, the combination of: a body on one of said parts adapted to lie on a hinge axis when said parts are in connected relation; a lever pivotally connected to said other of said parts so that its upper end will swing in engagement with said body, from an angular position relative to said hinge axis to a position substantially parallel to said hinge axis as said body is moved into position on said hinge axis, said lever being so formed as to make hinging interengagement with said body when said body is on said hinge axis, said hinging engagement being made on one side of the pivot of said lever, and said lever also having body engagement means on the opposite side of said pivot, whereby there is supporting engagement between said body and lever on opposite sides of said pivot.

14. In a disconnectible hinge structure for latching or hinging relatively movable parts, the combination of: a pair of hinge elements adapted to lie on a hinge axis when said parts are in connected relation, one of said hinge elements being pivoted and having two places of supporting engagement with the other of said hinge elements on opposite sides of the pivot of said pivoted element, one of said places of engagement being located on said hinge axis and cooperating with said other hinge element to form a hinge means whereby said hinge elements are relatively hinged on said hinge axis.

ROBERT DOW.