

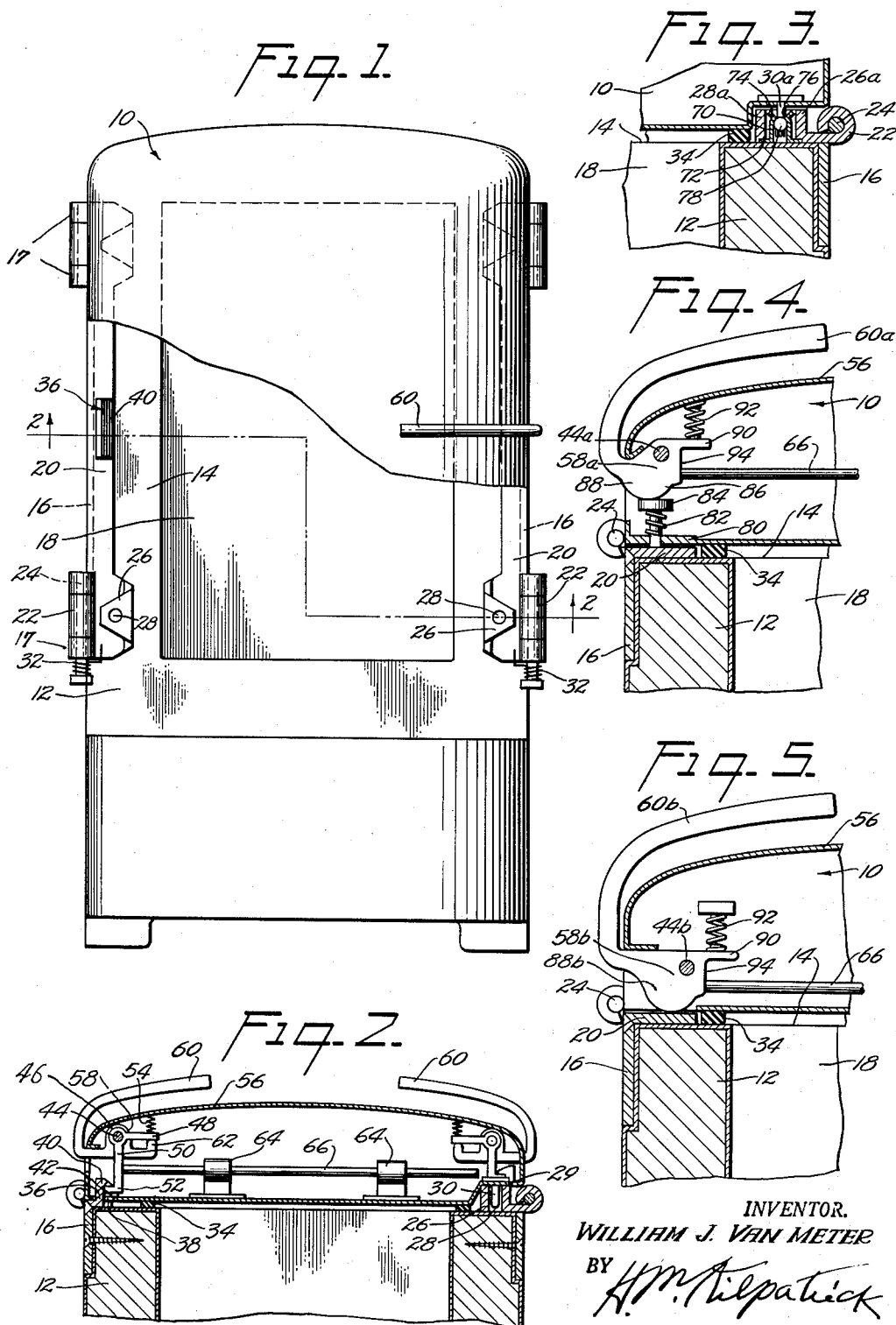
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W. J. VAN METER

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DOUBLE HINGED DOOR

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INVENTOR.
WILLIAM J. VAN METER

BY *H. M. Tilpatrick*
ATTORNEY.

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DOUBLE HINGED DOOR

William J. Van Meter, Sante Fe, N. Mex.

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This invention relates to doors and other closures and to means for hingedly supporting the closures and to locking means and more particularly to mechanisms whereby a door may be opened from either side.

This invention is particularly suitable for refrigerators, cabinets and other articles of furniture for which the most convenient location in a room may be against a wall which may make it inconvenient to have the door open at the side next to the wall. Circumstances may require that the furniture be moved to another location requiring the door to be opened from the other side. An object of the invention is to provide furniture and hinges therefor suitable for all such locations.

Also this invention is suitable for doors of buildings where arrangement of furniture or other conditions may require that the door be opened at one side or the other.

An important object of the invention is to provide improved hinges for this purpose having a minimum of parts of a kind that will be very economical to manufacture.

Other objects of the invention are to provide a simple combination and arrangement of parts in the hinge structures of a door which will facilitate and make very easy the opening or closing of the door at either side of the door.

A further object of the invention is the provision of a simple control mechanism to prevent the door from being opened at one side when it is open at the other side.

A further object of the invention is to provide an arrangement which will not cause resistance to the closing and opening of the door.

Additional objects of the invention are to effect simplicity and efficiency in such locking mechanism and to provide an extremely simple mechanism of this kind which is easy, durable, and reliable in operation, and economical to manufacture and install.

Still other objects of the invention will appear as the description proceeds; and while herein details of the invention are described in the specification and some of the claims, the invention as described in the broader claims is not limited to these, and many and various changes may be made without departing from the scope of the invention as claimed in the broader claims.

The inventive features for the accomplishment of these and other objects are shown herein in connection with a door assembly for movably mounting and holding a door on a door frame, comprising upper and lower hinge brackets secured to each side edge of the door frame to which is hinged an upright hinge leaf bar disposable flat against said frame at each side of the door frame for pivotal movement on a vertical axis, each end part of each bar having a bore therethrough, said door being disposable in a position substantially flat against said bars and having pins mounted thereon disposable in said bores. Holding and releasing means are provided for holding said pins in the bores and releasing said pins from the bores at one side of the door, while the pins at the other side of the door are held in the bore to cause the bar to act as a hinge member as the door opens.

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Other objects are to provide hinging and latching bars adapted for a very great number of door shapes and sizes, and to provide parts interchangeable for right or left parts for use on opposite sides of the door opening.

5 The door itself contains the releasing means and handles. The locating and locking pins are extremely simple.

In the accompanying drawing showing, by way of example, several of many possible embodiments of the invention,

10 Fig. 1 is a front elevation of one form of the assembly parts being broken away;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1 and showing one form of holding and releasing means;

15 Fig. 3 is a sectional view showing another form of holding means; and

Figs. 4 and 5 are sectional views partly in elevation showing additional forms of releasing means.

My invention is shown embodied in an assembly for movably mounting and holding a door 10 on a door frame 12 having an exposed front flat face 14. Said assembly includes hinge leaf brackets 16 secured to the outer side edge of each side of the door frame remote from the door opening 18 and having upper and lower axially vertically aligned hinge ears 17. An upright hinge leaf bar 20 at each side of the door frame has hinge parts 22 pivotally mounted on a hinge pin or spindle 24 on the associated bracket for pivotal movement on said spindle on a vertical axis, said leaf bar being disposable flat against said flat face 14 and pivotally movable to positions remote therefrom.

A boss or lug 26 adjacent to each hinge part is provided on the front face of the bar when flat against the door frame, the boss having a bore or socket 28 therethrough. The door 10 is disposable in a position flat against said bosses and has locating pins or bolts 30 mounted fast thereon disposable in said sockets 28 to locate the door relative to the hinge bars. Holding means, later to be described, are provided for holding said pins 30 in the sockets and said door in said position; and releasing means are provided for releasing said pins 30 from the sockets 28 and the door from said position at one side of the door, while the pins 30 at the other side of the door are held in the sockets 28 to cause the leaf bar to act as a hinge member and allow the door to open.

A coil spring 32 coiled around a hinge spindle 24 at each side of the door and anchored at its opposite ends on the respective hinge leaves, yieldably holds the leaf bars on said lugs 26.

The marginal parts of the inner face of the door are provided with a gasket 34 in sealing engagement with the front face of the door frame.

Said holding and releasing means as shown in Figs. 1 and 2 will now be described. A keeper bracket 36 mounted on the mid-part of each leaf 20 and projecting into the door through a cutout 38 in the door has an overhanging part 40 extended toward the other side of the door to provide an inner face 42 facing the bar and disposed substantially parallel to the plane of the door. A fulcrum pin 44 mounted in the door parallel to the bar between said overhanging part and the outer face of the door carries a bellcrank latch 46 fulcrumed at its elbow part on said pin 44 and having a motive arm 48 disposed toward the other side of the door and an active arm 50 substantially perpendicular to the bar 20 having a hook 52 engaging said inner face 42 of the overhanging part. A spring 54 compressed between the motive arm 48 and the front wall 56 of the door holds the hook on said face.

An actuating lever 58 fulcrumed on said fulcrum pin is formed with a handle 60 curved around the side edge

of the door and extended toward the center of the door a distance greater than the distance of said fulcrum pin 44 from the side edge of the door. The fulcrum end of the lever 58 is extended to form an active arm 62 engaging the front face of the free end of said motive arm 48 of the bellcrank, whereby when the free end of a handle is pulled frontwardly, the associated hook is pulled from the overhanging part 40 and the door is released from engagement with the bosses 26 and the pins 30 are released from the bores 28, leaving the pins 30 at the opposite side of the door still held in the bores, causing the bar at said opposite side to act as a hinge member to support the door while the door is being opened.

Brackets 64 in the door carry a control bar 66 frictionally slidable in the brackets transverse to the door between the active arms 50 of said latches and engageable by said active arms, and of such a length that only one hook 52 may leave the overhanging part at a time, thus to prevent both sides of the door from being released at the same time.

Another form of holding means as shown in Fig. 3 comprises a bushing 70 disposed in the bore 28a of the boss 26a and provided with an end flange 72 inset in the boss and longitudinal fingers 74 in the bore intermediately bent toward the axis of the bore to form humps 76 forming a contraction in the bushing. A ball 78 on the end of the pin 30a mounted on the door is adapted to pass through said contraction and to be engaged by the fingers 74 to hold the ball in the bore to hold the door against the bosses 26a.

The releasing means of Fig. 4 is adapted for use with the holding means of Fig. 3 and includes a plate 80 on the inner wall of the door adjacent to the bar 20 having a guide aperture perpendicular to the plane of the door and receiving a bolt 82 slidable in said aperture and engaging the leaf bar 20 and having a flat head 84 remote from the bar. A fulcrum pin 44a mounted in the door near said bolt transverse to the axis of the bolt and parallel to the bar carries a cam lever 58a fulcrumed on the fulcrum pin and having a cam 86 engaging said flat head 84 and a handle 60a curved around the side edge of the door and disposed in front of the door and extending toward the other side of the door a distance from said side edge to a distance greater than the distance of said fulcrum pin from the side edge of the door, the fulcrum end of the lever 58a having a cam part 88 of greater radius near the outer edge of the door, whereby when the free end of a handle 60a is pulled frontward, said part 88 engages the flat head 84 of the adjacent bolt and causes such bolt to push against the leaf bar 20 and push the adjacent side of the door from the lugs and draw the pins 30a from the bores 28a leaving the pins of the opposite side of the door still held in the associated bores, causing the leaf bar at said opposite side to act as a hinge member to support the door while the door is being opened.

In Fig. 5 another form of the releasing means is shown for use with bore 28a, bushing 70, longitudinal fingers 74, and ball 78 as in Fig. 3. The releasing means of Fig. 5 comprises a fulcrum pin 44b in the door carrying a cam lever 58b fulcrumed on said fulcrum pin and having a cam part engageable with the intermediate part of the leaf bar. Said lever forms a handle 60b curved around the side edge of the door and disposed in front of the door and extending a distance greater than the distance of said fulcrum pin to the side edge of the door, the fulcrum end of the cam having a cam part 88b of greater radius near the outer edge of the door, whereby when the free end of a handle 60b is pulled frontward, said cam part 88b engages the flat face of the adjacent leaf bar 20 and causes such cam part to push the adjacent side of the door from the lugs and draw the pin from the bore, leaving the pins 30a of the opposite side of the door still held in the bores, causing the bar 20 at said opposite

side to act as a hinge member to support the door while the door is being opened.

Each cam lever 58a or 58b is provided with an inner arm 90 extending in a direction inward from the fulcrum pin and engaged by a spring 92 compressed between the free end of the inner arm and the front wall of the door for yieldably holding the cam lever in inactive position.

The control bar 66 of Fig. 2 may also be used with the releasing means of Figs. 4 and 5 and is engageable with projections 94 on the levers 58a of Fig. 4 or 58b of Fig. 5, the bar being of such a length that only one lever 58a or 58b may be actuated to releasing position at the same time.

I claim as my invention:

1. In an assembly for movably mounting and holding a door on a door frame having a flat front face at each side edge of the door opening, the combination of an upright hinge leaf bar hinged to the frame at the outer side edge of said face and disposable flat against said front face and spaced from the inner side edge of said flat face; each end part of each bar having a bore therethrough; said door being disposable in a position substantially flat against said bars at said bores and having pins mounted thereon disposable in said bores and disengageable from the bores by movement of the door in door-opening direction; a gasket engageable between and with said door and said front face between said bars and inner edges and holding means for holding said pins in the bores and said door in said position.

2. In an assembly for movably mounting and holding a door on a door frame having a flat front face at each side edge of the door opening, the combination of a substantially upright leaf hinge bar hinged at each outer side edge of said front flat face and disposable flat against said front face and spaced from the inner side edge of said flat face; each end part of each bar having a frontwardly faced flat contact part; a door having contact parts engageable against said flat contact parts; the interengageable contact parts being respectively provided with bores and pins disposable in said bores; a gasket engageable between and with said door and said front face between said bars and inner edges and releasable holding means at each side of the door for holding said pins in the bores; the contacting faces of said contact parts being sufficiently extended to prevent pivotal action between the bar and door when the pins are held in the bores.

3. In an assembly for movably mounting and holding a door on a door frame having a flat front face at each side edge of the door opening, the combination of a substantially upright leaf hinge bar hinged at the outer side edge of said flat front face and disposable flat against said face and spaced from the inner side edge of said flat face; each end part of each bar having a bore therethrough having a front flat contact face surrounding the bore; a door disposable against the contact faces and having pins disposable in said bores; a gasket engageable between and with said door and said front face between said bars and inner edges and releasable holding means at each side of the door for holding said pins in the bores and said door in contact with said contact faces; said contact faces being sufficiently extended to prevent pivotal movement between the bar and door when the pin is held in the bore.

4. In an assembly for movably mounting and holding a door on a door frame having a flat front face at each side edge of the door opening, the combination of an upright hinge leaf bar hinged to the frame at the outer side edge of said face and disposable flat against said front face; each end part of each bar having a boss having a flat front face and a bore therethrough; said door being disposable in a position substantially flat against the entire front faces of said bosses and having pins mounted thereon disposable in said bores and disengageable from the bores by movement of the door in door-opening direction; a gasket engageable between and with said door and said front face between said bars and inner edges and holding

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means for holding said pins in the bores and said door in said position against the bosses.

5. An assembly for movably mounting and holding a door on a door frame having a flat front face at each side of the door opening, the combination of a substantially upright leaf hinge bar hinged at the outer side edge of said flat front face and disposable flat against said face and spaced from the inner side edge of said flat face and having frontwardly faced contact parts; said door being disposable against the contact parts of said bars; a gasket engageable between and with said door and front face between said bars and inner side edges, and releasable holding means for holding said bars against the doors.

6. In an assembly for movably mounting and holding a door on a door frame having a flat front face, the combination of an upright hinge leaf bar hinged to the side of the frame at the outer side edge of said face and disposable flat against the front face and spaced from the inner edge of side edge of the side of the frame; each end part of each bar having a boss having a flat front face and a bore therethrough; said door being disposable in a position substantially flat against said bosses and having pins mounted thereon disposable in said bores and disengageable from the bores by movement of the door in door-opening direction; a gasket on the door engaging the frame between the bar and the inner side edge of the side of the frame; and holding means for holding said pins in the bores and said door in said position.

7. An assembly as in claim 6 comprising releasing means for releasing said pin from the bores and the door from said position at the side of the door, while the pins at the other side of the door are held in the bore to cause the bar to act as a hinge member and allow the door to open; and means operated by each holding means when in non-holding position to hold the other holding means in holding position.

8. An assembly as in claim 7 wherein said holding means is yieldable for yieldably holding said pins in said bores and releasing said pins as a consequence of opening the door at the side adjacent to the pins being released; and door carried handle means operable to engage said leaf bar and push the door from the leaf bar.

9. In an assembly for movably mounting and holding a door on a door frame having a substantially flat front face, the combination of an axially upright hinge member pivoted to the frame at the outer side edges of said face remote from the inner edges of the sides of the frame; each member having a part having a front face and a socket through its said front face; said door being disposable in a position adjacent to the front face of said parts and having bolts mounted thereon disposable to fit in said sockets and disengageable from the sockets by movement of the door in door-opening direction; a gasket engageable between and with said door and said front face between said bars and inner edges and releasable holding means for holding said door in said position and said bolts in the socket and releasing door from said position and said bolts from the sockets at a side of the door, while the bolts at the other side of the door are held in the sockets to cause the member to rotate and allow the door to open.

10. In an assembly for movably mounting and holding a door on a door frame having a substantially flat front face, the combination of an axially upright hinge member hinged to the frame at the outer side edges of said face remote from the inner edges of the sides of the frame; each member having a part having a flat front face and a socket through its said front face; means for yieldably holding each member with its front

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face frontward; said door being disposable in a position against said parts and having bolts mounted thereon disposable to fit in said sockets and disengageable from the sockets by movement of the door in door-opening direction; a gasket engaging the door and said front face of the frame between said inner edge and the hinge members; and releasable holding means for holding said door in said position and the bolts in the sockets and adapted for releasing the door from said position and said bolts from the sockets at one side of the door, while the bolts at the other side of the door are held in the sockets to cause the member to rotate and allow the door to open.

11. In an assembly for movably mounting and holding a door on a door frame having a substantially flat front face, the combination of axially upright hinge members hinged to the frame at the respective outer side edges of said face remote from the inner edges of the sides of the frame; each member having a portion having a flat front face substantially parallel to said flat front face, and a socket through said front face of said portion; means for yieldably holding each member with its said front face frontward; said door carrying parts disposable in a position against said front faces of said portions and having bolts mounted thereon disposable to fit in said sockets and disengageable from the sockets by movement of the door in door-opening direction; a gasket engaging the door and said front face of the frame between said inner edge and the hinge member when the door is closed; and releasable holding means for holding said bolts in the sockets and said door in said position and for releasing the bolts from the sockets and the door from said position at one side of the door, while the bolts at the other side of the door are held in the sockets to cause the hinge member to rotate when the door opens.

12. In an assembly for movably mounting and holding a door on a door frame having a substantially flat front face, the combination of axially upright hinge members hinged to the frame at the respective outer side edges of said face remote from the inner edges of the sides of the frame; each member having a portion having a socket therethrough substantially axially perpendicular to the plane of said flat front face; means for yieldably holding each member with its said front face frontward; said door having bolts mounted thereon disposable to fit in said sockets and disengageable from the sockets by movement of the door in door-opening direction; a gasket engaging the door and said front face of the frame between said inner edge and the hinge members when the door is closed; and releasable holding means for holding said bolts in the sockets and said door in closed position and for releasing the bolts from the sockets and the door from said position at one side of the door, while the bolts at the other side of the door are held in the sockets to cause the member to rotate when the door opens.

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