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ROTATING DOOR AND SHELF FOR CORNER CABINETS AND THE LIKE

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2 Sheets-Sheet 1

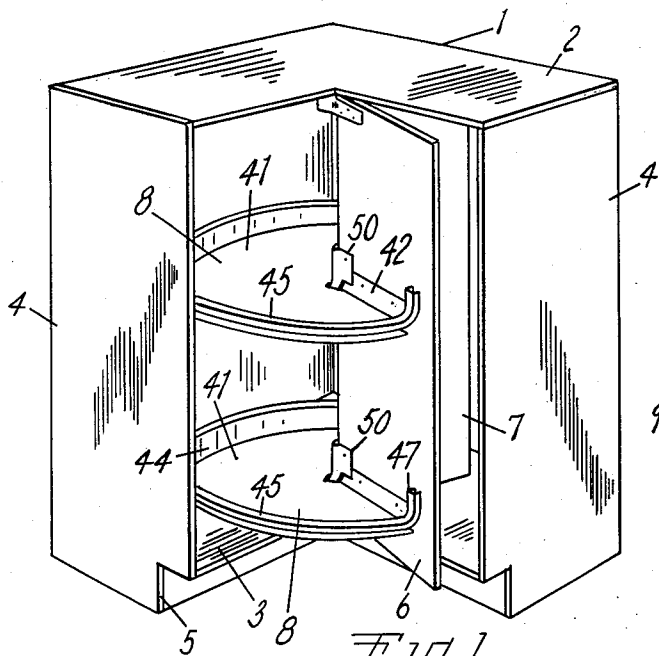


Fig. 1

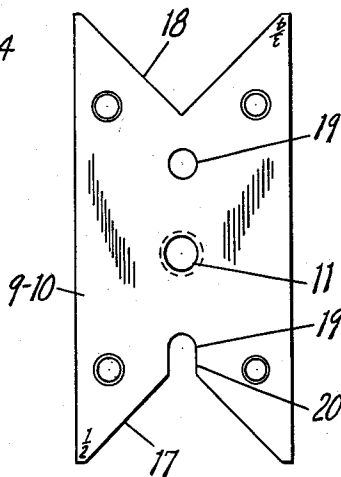


Fig. 3

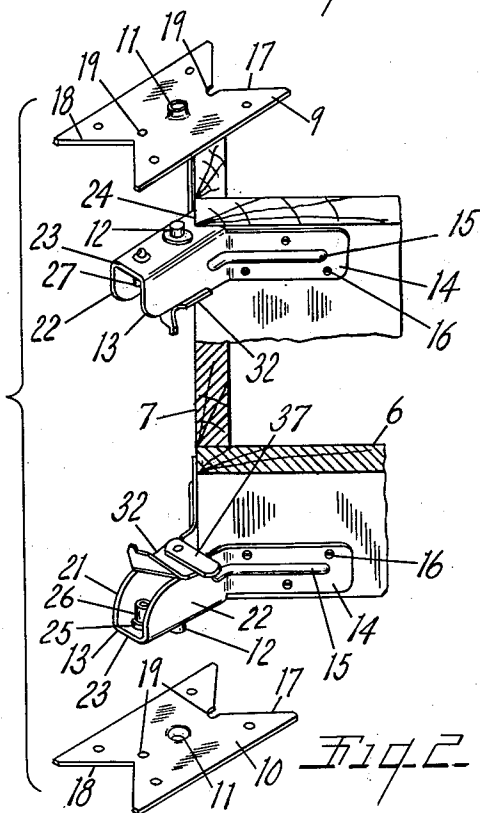


Fig. 2

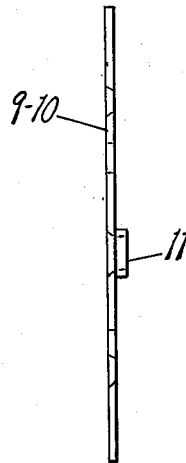


Fig. 4

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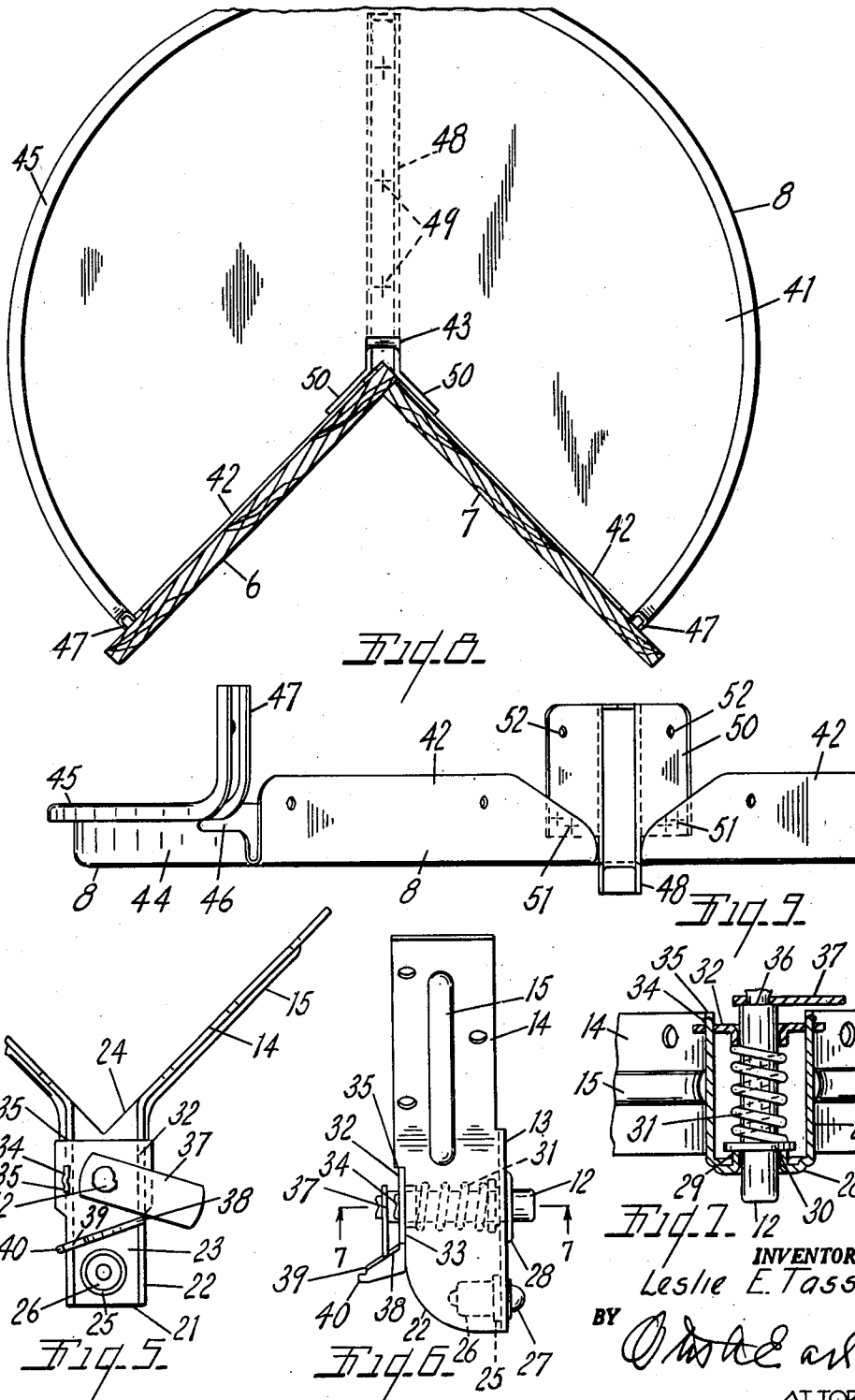
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2 Sheets-Sheet 2



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ROTATING DOOR AND SHELF FOR CORNER CABINETS AND THE LIKE

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This invention relates to improvements in rotating door and shelf for corner cabinets and the like. The principal objects of this invention are:

First, to provide a mounting for a right angled corner door which will permit the swinging edges of the panels of the door to be cut square and without bevel and still swing in closely fitting closing relation to the end walls of a corner cabinet in which the door is mounted.

Second, to provide a mounting plate and coacting corner bracket which can be mounted at the top and bottom of a corner door and cabinet to removably and swingably mount the door in a corner cabinet.

Third, to provide a novel mounting bracket which is attachable to a pair of door panels arranged at right angles to each other to connect the adjacent edges of the panels and retractably support a pivot pin in parallel closely spaced relation to the line of intersection of the panels.

Fourth, to provide a mounting bracket attachable to two corner door panels arranged at an angle to each other, the bracket having a pivot pin reciprocally mounted therein and adjustably supported on a cam lever to support the pin in either projected or retracted position relative to the end of the bracket and the ends of the door panels.

Fifth, to provide a rigid and economical segmental circular shelf which is easily attached to two corner door panels to connect the panels at a right angle and be supported thereby around approximately 270° about the panels.

Sixth, to provide a mounting plate and coacting corner bracket for a corner door that are reversible to mount at the top or bottom of the door and to permit the use of relatively thick or thin door panels while providing a spring pressed stop or detent to hold the door in closed position.

Seventh, to provide sturdy and economical shelf, pivot bracket and mounting plate hardware which will permit a cabinet maker to assemble an angle door of either of two thickness panels with rotating shelves in close fitting relation in a corner cabinet.

Eighth, to provide a mounting plate and coacting door bracket which can be mounted by a cabinet maker at the top and bottom of an angled corner door and provide holding detents to restrain the door in closed position while permitting swinging in either direction.

Other objects and advantages of the invention will be apparent from a consideration of the following description and claims. The drawings of which there are two sheets illustrate a highly practical form of the mounting plate, door pintle bracket and shelf as mounted in a corner cabinet.

FIG. 1 is a fragmentary perspective view of a corner cabinet with the door of the invention mounted therein.

FIG. 2 is an exploded fragmentary view, partially in section, of the door and cabinet parts and the door mounting hardware.

FIG. 3 is a plan view of the mounting plate of the invention, two of which are used to mount the door.

FIG. 4 is a side elevational view of the mounting plate shown in FIG. 3.

FIG. 5 is a plan view of the pintle bracket for mounting on the door. Two brackets are used, one in the position illustrated in FIG. 5 and one in inverted position.

FIG. 6 is a side elevational view of the bracket in FIG. 5.

FIG. 7 is a fragmentary vertical cross sectional view taken along the plane of the line 7-7 in FIG. 6.

FIG. 8 is a fragmentary top plan view of the shelf used on the door, the door panels being shown in cross-section.

FIG. 9 is a fragmentary front elevational view of the door shelf, the door panels being removed.

FIG. 1 shows the relationship and use of the door of the invention. A corner cabinet 1 adopted for mounting in the corner of a room has an L-shaped top panel 2 and an L-shaped bottom panel 3 connected by two end panels 4. The end panels may have notches 5 in their forward corners to provide toe space under the cabinet as is common. The front or inner side of the cabinet thus has two merging openings in two angularly disposed planes that are closed by the angled panels 6 and 7 when the door is closed. One or more segmental arcuate shelves 8 (two illustrated) connect the door panels and rotate therewith to swing to in front of the cabinet when the door is rotated about an upright axis in either direction.

As appears more clearly from FIG. 2, the door is mounted in the cabinet by means of an upper mounting plate 9 secured to the underside of the top panel 2 and a lower plate 10 secured to the top of the bottom panel 3. The plates 9 and 10 are identical, the top plate 9 being inverted. The plates 9-10 have axially outwardly extruded bearings 11 projecting into shallow holes bored therefor in the cabinet panels. The bearings receive pintle pins 12 projecting from identical but reversely mounted door brackets 13. The brackets 13 have door panel connecting arms 14 extending at right angles to each other and desirably reinforced by ribs 15. The arms form angles and one of the door panels 6 is butted into this angle while the other panel 7 is butted against the inner edge of the first panel. The panels are secured together and to the arms by screws 16 passed through the arms of the brackets. The door panels are square edged as is most convenient to saw them. A neat overlapped joint is produced at the apex of the angled door. One panel 7 is narrower than the panel 6 by an amount equal to the thickness of the panels.

Particular attention is directed to the detail plan of FIG. 3 which shows the ends of the plates 9-10 to be notched with angle notches (90° illustrated) corresponding to the angle of the door panels. One notch 17 is closer to the bearing 11 than the notch 18. The difference in spacing is about equal to the difference between the thickness of popular door panel stock, i.e. one quarter inch, to accommodate door panels of one half or three quarter inch stock. The notch, 17 or 18, corresponding to door panels being used is mounted flush with the corner in the L-shaped top panel 2 and bottom panel 3. When closed, the door panels are flush with these edges. The plates 9-10 further define detent holes or keepers 19 at equal distances from the bearing 11 and aligned with the notches 17 and 18. Due to the difference in the spacing of the notches, one hole opens to the closer spaced notch as at 20.

Returning to the pintle brackets 13, it will be noted from FIGS. 5, 6 and 7 that the bracket has a channel shaped body 21 of folded sheet metal with the arms 14 projecting from the side flanges 22 of the body. The web 23 of the channel is notched at 24 in the planes of the arms to form a firm apex locating the edges of the door panels. Near its rear end (rearwardly of the door panels) the web is extruded inwardly of the channel to form a collar 25 into which is pressed fitted the housing 26 of a spring pressed ball detent 27 cooperative with the keepers 19.

Near its center but as close to the notch 24 as clearance will permit the web 23 is embossed or offset downwardly in a thrust bearing seat 28 and the seat is upwardly extruded as at 29 to form a bearing for the pintle pin 12. The pintle pin projects upwardly between the side flanges 22 and has a collar 30 that limits outward projection of the pintle and acts as an abutment for the spring 31. The upper end of the spring bears against a cover and cam plate 32.

The upper edges of the flanges 22 have a flat portion 33 with ears 34 projecting thereabove and a locating shoulder 35 at their outer ends. The cover plate 32 has holes 135 that receive the ears 34 which are staked or bent over to hold the plate in place. The cover plate defines a hole passing and guiding the axially inner end of the pintle pin. The pintle pin is thus normally spring pressed axially outwardly for coaction with the bearing 11.

At its inner end the pintle pin 12 is shouldered as at 36 to receive the laterally projecting operating lever 37. The lever is secured in place by press fitting and staking the end of the pin. The rear end of the cover plate is turned up at an angle to form a pintle pin retracting cam with an inclined cam edge 38 terminating in a flat rest 39 and stop 40. By rotating the levers 37 of two brackets 13 the pintle pins can be retracted into the rests 39. The door can then be inserted in or removed from the cabinet. Reverse action of the levers permits the spring 31 to engage the pintles in the bearings 11.

The shelves 8 are both supported by the door panels and assist in holding the panels together. As appears from FIGS. 8 and 9, the shelves have segmental arcuate panels 41 of about 270° arcuate shape and 90° notches corresponding to the angle of the door panels 6-7. The edges of the sector shaped notch are turned up in attaching flanges 42 that are screwed to the door panels at selected levels. A notch 43 provides clearance for arms to be described. The periphery of the panel 41 is turned up in a reversely turned stiffening rim 45. Near its ends the rim 45 is separated from the wall 44 as at 46 and turned upwardly in attaching ears 47 of channel section that are secured by screws to the rear sides of the door panels. The shelves are supported in their centers by arms 48 of downwardly opening cross section welded to the bottoms of the shelves at 49. At their inner ends of the arms 48 are turned upwardly through the notches 43 and the flanges of the channel are enlarged into plates 50 that overlap and are welded to the end flanges 42 at 51. The plates 50 are also connected to the door panels by screws passed through the holes 52. The shelf is thus securely supported from the door panels at its ends and center and also assists in holding the door panels together.

What is claimed as new is:

1. In combination with a corner cabinet having L-shaped top and bottom panels,
 - a door consisting of angularly disposed panels arranged to close the space between the inner arms of said L-shaped panels,
 - mounting plates having notches in their ends secured in flush relation to the inner sides of said L-shaped panels and projecting rearwardly therefrom,
 - bearing flanges turned from said plates rearwardly from said notches and projecting into said top and bottom panels,
 - said plates having other notches at their opposite ends spaced differently from said bearing flanges than said first notches,
 - detent recesses formed in said plates between said bearing flanges and each of said notches,
 - mounting brackets positioned at the upper and lower ends of said door panels and having channel shaped bodies facing inwardly of the cabinet with the webs of the channels opposed to the inner sides of said L-shaped panels,
 - connecting arms turned angularly outwardly from said

- channel shaped bodies and secured to the rear sides of said door panels,
 - offset bearing seats formed in the webs of said bodies and faced outwardly of said cabinet in lapped relation with said plates,
 - inwardly turned bearing flanges formed on said seats, pintle pins reciprocally mounted in said last bearing flanges and having shoulders engageable therewith,
 - cover plates secured across the side flanges of said channel shaped body members by means of ears on the channel flanges passed through the cover plates and staked against the plates,
 - the inner ends of said pintle pins being journaled in said cover plates and having laterally projecting operating levers secured thereto,
 - cam flanges with inclined edges on said cover plates positioned in the path of rotation of said operating levers,
 - spring pressed detents carried by said bodies and co-operative with said recesses in said mounting plates, springs compressed between said shoulders on said pintle pins and said cover plates,
 - a segmental circular shelf of approximately 270° embracing the rear sides of said door panels and having upturned flanges on its angular edges secured to said door panels,
 - a peripheral wall on said shelf having a downturned stiffening rim,
 - the ends of said rim being turned upwardly and secured to the rear sides of said door panels,
 - and a shelf supporting bracket having angularly disposed flanges secured to the back side of said door panels above said shelf with an arm projecting downwardly and radially outwardly underneath the center portion of the shelf to support the shelf.
2. In combination with a corner cabinet having L-shaped top and bottom panels,
 - a door consisting of angularly disposed panels arranged to close the space between the inner arms of said L-shaped panels,
 - mounting plates having notches in their ends secured in flush relation to the inner sides of said L-shaped panels and projecting rearwardly therefrom,
 - bearing flanges turned from said plates rearwardly from said notches and projecting into said top and bottom panels, detent recesses formed in said plates between said bearing flanges and said notches,
 - mounting brackets positioned at the upper and lower ends of said door panels and having channel shaped bodies facing inwardly of the cabinet with the webs of the channels opposed to the inner sides of said L-shaped panels,
 - connecting arms turned angularly outwardly from said channel shaped bodies and secured to the rear sides of said door panels,
 - offset bearing seats formed in the webs of said bodies and faced outwardly of said cabinet in lapped relation with said plates,
 - inwardly turned bearing flanges formed on said seats, pintle pins reciprocally mounted in said last bearing flanges and having shoulders engageable therewith,
 - cover plates secured across the side flanges of said channel shaped body members,
 - the inner ends of said pintle pins being journaled in said cover plates and having laterally projecting operating levers secured thereto,
 - cam flanges with inclined edges on said cover plates positioned in the path of rotation of said operating levers,
 - spring pressed detents carried by said bodies and co-operative with said recesses in said mounting plates, springs compressed between said pintle pins and said cover plates,
 - a segmental circular shelf of approximately 270° embracing the rear sides of said door panels and having

upturned flanges on its angular edges secured to said door panels,
 and a peripheral wall on said shelf having a downturned stiffening rim,
 the ends of said rim being turned upwardly and secured to the rear sides of said door panels. 5
 3. In combination with a corner cabinet having L-shaped top and bottom panels,
 a door consisting of angularly disposed panels arranged to close the space between the inner arms of said L-shaped panels, 10
 mounting plates having notches in their ends secured in flush relation to the inner sides of said L-shaped panels and projecting rearwardly therefrom,
 bearing openings formed in said plates rearwardly from said notches, 15
 detent recesses formed in said plates between said bearing openings and said notches,
 mounting brackets positioned at the upper and lower ends of said door panels and having channel shaped bodies facing inwardly of the cabinet with the webs of the channels opposed to the inner sides of said L-shaped panels, 20
 connecting arms turned angularly outwardly from said channel shaped bodies and secured to the rear sides of said door panels, 25
 inwardly turned bearing flanges formed on the webs of said bodies,
 pintle pins reciprocably mounted in said last bearing flanges and having shoulders engageable therewith, 30
 cover plates secured across the side flanges of said channel shaped body members,
 the inner ends of said pintle pins being journaled in said cover plates and having laterally projecting operating levers secured thereto, 35
 cam flanges with inclined edges on said cover plates positioned in the path of rotation of said operating levers,
 spring pressed detents carried by said bodies and cooperative with said recesses in said mounting plates, 40
 springs compressed between said pintle pins and said cover plates,
 a segmental circular shelf of approximately 270° embracing the rear sides of said door panels and having upturned flanges on its angular edges secured to said door panels, 45
 and a peripheral wall on said shelf having a downturned stiffening rim.
 4. In combination with a corner cabinet having L-shaped top and bottom panels, 50
 a door consisting of angularly disposed panels arranged to close the space between the inner arms of said L-shaped panels,
 mounting plates having notches in their ends secured in flush relation to the inner sides of said L-shaped panels and projecting rearwardly therefrom, 55
 bearing flanges turned from said plates rearwardly from said notches and projecting into said top and bottom panels,
 said plates having other notches at their opposite ends spaced differently from said bearing flanges than said first notches, 60
 detent recesses formed in said plates between said bearing flanges and each of said notches,
 mounting brackets positioned at the upper and lower ends of said door panels and having channel shaped bodies facing inwardly of the cabinet with the webs of the channels opposed to the inner sides of said L-shaped panels, 65
 connecting arms turned angularly outwardly from said channel shaped bodies and secured to the rear sides of said door panels, 70
 offset bearing seats on the webs of said bodies and faced outwardly of said cabinet in lapped relation with said plates, 75

inwardly turned bearing flanges formed on said seats, pintle pins reciprocably mounted in said last bearing flanges and having shoulders engageable therewith,
 cover plates secured across the side flanges of said channel shaped body members by means of ears on the channel flanges passed through the cover plates and staked against the plates,
 the inner ends of said pintle pins being journaled in said cover plates and having laterally projecting operating levers secured thereto,
 cam flanges with inclined edges on said cover plates positioned in the path of rotation of said operating levers,
 spring pressed detent carried by said bodies and cooperative with said recesses in said mounting plates, and springs compressed between said shoulders on said pintle pins and said cover plates.
 5. In combination with a corner cabinet having L-shaped top and bottom panels, 5
 a door consisting of angularly disposed panels arranged to close the space between the inner arms of said L-shaped panels,
 mounting plates having notches in their ends secured in flush relation to the inner sides of said L-shaped panels and projecting rearwardly therefrom, 10
 bearing openings formed in said plates rearwardly from said notches,
 detent recesses formed in said plates between said bearing openings and said notches, 15
 mounting brackets positioned at the upper and lower ends of said door panels and having channel shaped bodies facing inwardly of the cabinet with the webs of the channels opposed to the inner sides of said L-shaped panels, 20
 connecting arms turned angularly outwardly from said channel shaped bodies and secured to the rear sides of said door panels, 25
 bearing openings formed in the webs of said bodies, pintle pins reciprocably mounted in said last bearing openings and having shoulders projecting beyond the bearing portions of the pins, 30
 cover plates secured across the side flanges of said channel shaped body members,
 the inner ends of said pintle pins being journaled in said cover plates and having laterally projecting operating levers secured thereto, 35
 cam flanges with inclined edges on said cover plates positioned in the path of rotation of said operating levers, 40
 spring pressed detents carried by said bodies and cooperative with said recesses in said mounting plates, and springs compressed between said shoulders on said pintle pins and said cover plates.
 6. In combination with a corner cabinet having L-shaped top and bottom panels, 45
 a door consisting of angularly disposed panels arranged to close the space between the inner arms of said L-shaped panels,
 mounting plates having notches in their ends secured in flush relation to the inner sides of said L-shaped panels and projecting rearwardly therefrom, 50
 bearing openings formed in said plates rearwardly from said notches and projecting into said top and bottom panels, 55
 mounting brackets positioned at the upper and lower ends of said door panels and having channel shaped bodies facing inwardly of the cabinet with the webs of the channels opposed to the inner sides of said L-shaped panels, 60
 connecting arms turned angularly outwardly from said channel shaped bodies and secured to the rear sides of said door panels, 65
 bearing openings formed in the webs of said bodies, pintle pins reciprocably mounted in said last bearing openings and having shoulders engageable therewith, 70

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cover plates secured across the side flanges of said channel shaped body members, the inner ends of said pintle pins being journaled in said cover plates, and springs compressed between said shoulders on said pintle pins and said cover plates.

7. Hardware for mounting a corner door in a corner cabinet having L-shaped top and bottom panels comprising mounting plates having notches in their ends adapted to be secured in flush relation to the inner sides of said L-shaped panels and project rearwardly therefrom, bearing flanges turned from said plates rearwardly from said notches to projecting into said top and bottom panels, said plates having other notches at their opposite ends spaced differently from said bearing flanges than said first notches, detent recesses formed in said plates between said bearing flanges and each of said notches, mounting brackets adapted to be positioned at the upper and lower ends of angled door panels and having channel shaped bodies to face inwardly of the cabinet with the webs of the channels opposed to the inner sides of said L-shaped panels, connecting arms turned angularly outwardly from said channel shaped bodies adapted to be secured to the rear sides of said door panels, offset bearing seats on the channels of said bodies and faced outwardly of said bodies to lap against said plates, inwardly turned bearing flanges formed on said seats, pintle pins reciprocally mounted in said last bearing flanges and having shoulders engageable therewith, cover plates secured across the side flanges of said channel shaped body members by means of ears on the channel flanges passed through the cover plates and staked against the plates, the inner ends of said pintle pins being journaled in said cover plates and having laterally projecting operating levers secured thereto, cam flanges with inclined edges on said cover plates positioned in the path of rotation of said operating levers, spring pressed detents carried by said bodies and co-operative with said recesses in said mounting plates, and springs compressed between said shoulders on said pintle pins and said cover plates biasing said pins outwardly of said channel shaped bodies.

8. Hardware for mounting a corner door in a corner cabinet having L-shaped top and bottom panels comprising mounting plates having notches in their ends adapted to be secured in flush relation to the inner sides of said L-shaped panels and project rearwardly therefrom, bearing openings formed in said plates rearwardly from said notches, said plates having other notches at their opposite ends spaced differently from said bearing openings than said first notches, detent recesses formed in said plates between said bearing flanges and each of said notches, mounting brackets adapted to be positioned at the upper and lower ends of angled door panels and having channel shaped bodies to face inwardly of the cabinet with the webs of the channels opposed to the inner sides of said V-shaped panels, connecting arms turned angularly outwardly from said channel shaped bodies adapted to be secured to the rear sides of said door panels, bearing openings formed on the webs of said bodies, pintle pins reciprocally mounted in said last bearing openings and having axially facing stops, cover plates secured across the side flanges of said channel shaped body members, the inner ends of said pintle pins being journaled in

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said cover plates and having laterally projecting operating levers secured thereto, cam flanges with inclined edges on said cover plates positioned in the path of rotation of said operating levers, and springs compressed between said pintle pins and said cover plates biasing said pins outwardly of said channel shaped bodies.

9. Hardware for mounting a corner door in a corner cabinet having L-shaped top and bottom panels comprising mounting plates having notches in their ends adapted to be secured in flush relation to the inner sides of said L-shaped panels and project rearwardly therefrom, bearing openings formed in said plates rearwardly from said notches, said plates having other notches at their opposite ends spaced differently from said bearing openings than said first notches, mounting brackets adapted to be positioned at the upper and lower ends of angled door panels and having channel shaped bodies to face inwardly of the cabinet with the webs of the channels opposed to the inner sides of said L-shaped panels, connecting arms turned angularly outwardly from said channel shaped bodies adapted to be secured to the rear sides of said door panels, bearing openings formed on the webs of said bodies, pintle pins reciprocally mounted in said last bearing openings and having axially facing stops, cover plates secured across the side flanges of said channel shaped body members, the inner ends of said pintle pins being journaled in said cover plates and having laterally projecting operating levers secured thereto, cam flanges with inclined edges on said cover plates positioned in the path of rotation of said operating levers, and springs compressed between said pintle pins and said cover plates biasing said pins outwardly of said channel shaped bodies.

10. A mounting bracket for an angled corner door comprising, a channel shaped body having a web wall with an angled notch in one end and side flanges, arms extending at an angle from one end of said side flanges and attachable to angularly disposed panels of a door, a plate forming a cover wall bridging said side flanges in spaced relation to the inner ends of said arms and secured to said flanges by ears on the flanges passed through holes provided therefor in the plate and staked over the plate, said walls defining aligned pintle pin holes with bearing flanges extruded therefrom inwardly of said body, a thrust seat off-set from the web wall of said body around the pintle hole therein, a pintle pin reciprocally mounted in said pintle holes and projectable beyond said thrust seat, shoulder means on said pin engageable with one of said walls to limit outward protection of said pin, an operating lever projecting from said pin inwardly of the projectable end thereof, a spring positioned between said walls and biasing said pin outwardly, and a stop on said cover wall cammingly engageable with said operating lever to retract and hold said pin in retracted position.

11. A mounting bracket for an angled corner door comprising, a channel shaped body having a web wall and side flanges, arms extending at an angle from one end of said side flanges and attachable to angularly disposed panels of a door,

a plate forming a cover wall bridging said side flanges in spaced relation to the inner ends of said arms, said walls defining alined pintle pin holes with bearing flanges therearound,
 a thrust seat off-set from one of said walls around 5 the pintle hole therein,
 a pintle pin reciprocably mounted in said pintle holes and projectable beyond said thrust seat,
 means on said pin to limit outward protection of said pin, 10
 an operating lever projecting from said pin inwardly of the projectable end thereof,
 and a stop on said body engageable with said operating lever to hold said pin in retracted position.
 12. A mounting bracket for an angled corner door 15 comprising,
 a channel shaped body having a web wall and side flanges,
 arms extending at an angle from one end of said side flanges and attachable to angularly disposed panels 20 of a door,
 a plate forming a cover wall bridging said side flanges in spaced relation to the inner ends of said arms, said walls defining alined pintle pin holes,
 a pintle pin reciprocably mounted in said pintle holes 25 and projectable beyond said walls,
 means on said pin to limit outward protection of said pin,
 an operating lever projecting from said pin inwardly of the projectable end thereof, 30
 and a stop on said body engageable with said operating lever to hold said pin in retracted position.
 13. In a mounting for an angled corner door,

a mounting plate having oppositely notched ends adapted to be selectively mounted flush with the edge of an angled door opening,
 said plate defining a bearing opening alined between said notches and closer to one notch than the other, said plate further defining detent keeper stops at diametrically opposed points equally spaced on opposite sides of said bearing opening,
 a door bracket having a body attachable to an angled door in projecting relation from the apex of the door and having a wall arranged to lie in opposed relation to said plate,
 a pintle pin mounted in said body and projecting from said wall to coact with said bearing opening,
 and a spring pressed detent mounted in said wall and projecting yieldably therefrom at the same distance therefrom as the spacing between said bearing opening and said keeper stops on said plate to coact with said stops.

References Cited in the file of this patent

UNITED STATES PATENTS

953,205	Hughes	Mar. 29, 1910
2,036,184	Armstrong	Apr. 7, 1936
2,226,933	Johnson	Dec. 31, 1940
2,239,734	Pratt	Apr. 29, 1941
2,693,401	Brown	Nov. 2, 1954
2,710,242	Chase	June 7, 1955

FOREIGN PATENTS

597,352	Great Britain	Jan. 23, 1948
652,711	Great Britain	May 2, 1948