July 21, 1931. H. F. BEERS 1,815,607

AIR TIGHT DOOR FOR CABINETS

Filed Dec. 18, 1929

Fig. 1.

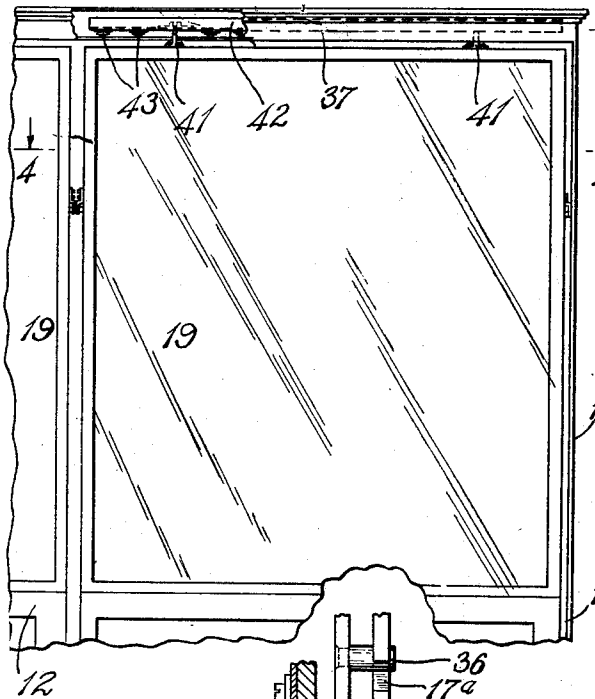



Fig. 2.

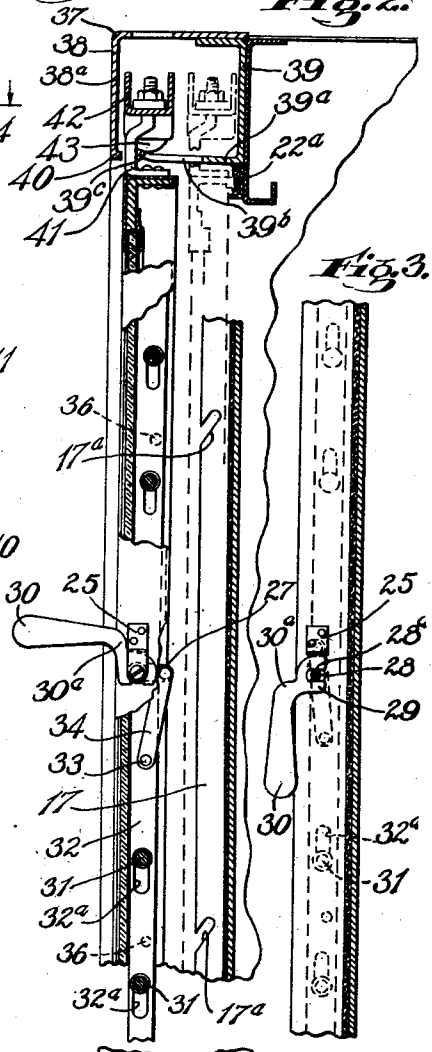



Fig. 3.




Fig. 5.

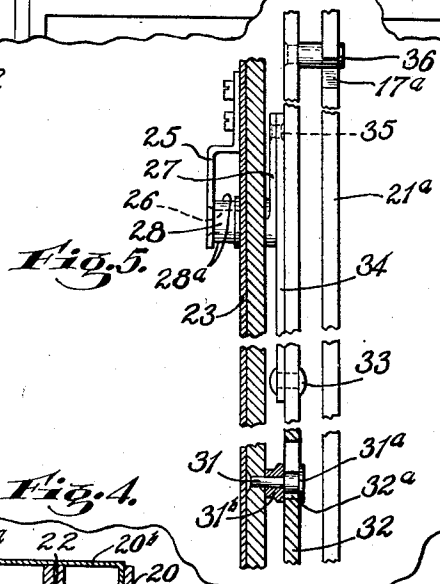
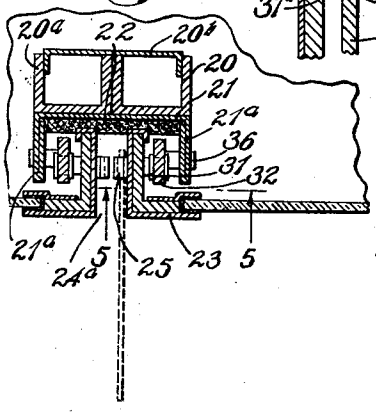
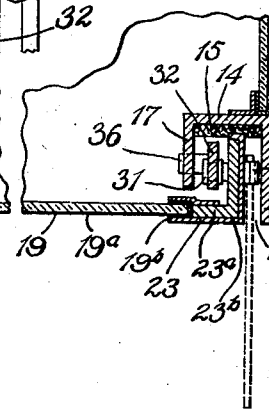
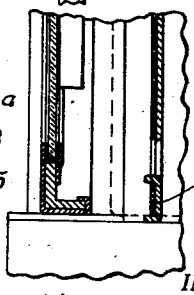



Fig. 4.




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# UNITED STATES PATENT OFFICE

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## AIR-TIGHT DOOR FOR CABINETS

Application filed December 18, 1929. Serial No. 414,903.

This invention relates to display cabinets and particularly to the construction of doors of cabinets and the manner of mounting, operating and securing the same, and the invention relates particularly to cabinets for use in displaying samples or specimens of various kinds and classes and particularly to improvements in doors of the class specified such as described and claimed by me in my prior Patent No. 1,075,622 granted October 14, 1913; and the object of my invention is to provide an improved and simplified means for securely clamping a door to the cabinet in such manner as to conceal said securing and clamping means and thus enhance the outer appearance of the cabinet and door of the cabinet as a whole; a further object being to provide means involving a detachable tool or handle member for moving the locking elements of the door into inoperative position and for facilitating the movement of the door into position to slide the same laterally with respect to the front open end of the cabinet to obtain access to the interior of the cabinet; a further object being to provide a door construction for cabinets which are preferably arranged in pairs, each pair being coupled together as a unit, and means being provided to move each door of the cabinets into position in front of the other door whenever desired in gaining access to either section of the cabinet; a further object being to provide improved means for guiding the doors in their sliding movement; and with these and other objects in view, the invention consists in a door structure of the class described and for the purpose specified which is simple in construction, efficient in use and which is constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawings forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Fig. 1 is a front view of the upper end portion of a part of a complete cabinet unit indicating one complete door with parts of the construction broken away.

Fig. 2 is a vertical, sectional view of the upper end portion of the cabinet, parts of the construction being shown in full lines and other parts in section and illustrating the door in an open position.

Fig. 3 is a sectional, detail view of a part of the structure shown in Fig. 2, but showing the door in closed position.

Fig. 4 is a sectional, plan view on the line 4—4 of Fig. 1 with part of the construction broken away; and,

Fig. 5 is a sectional detail view on the line 5—5 of Fig. 4, and on an enlarged scale.

While my invention relates primarily to specimen displaying cabinets such as are commonly employed in museums and other public institutions, it will be understood that the same may be applied to cabinets for any use or purpose, especially where it is desirable to retain the doors of the cabinets in firm engagement with the cabinet proper to effect a seal therebetween.

In the accompanying drawings, I have indicated at 10 a part of one complete cabinet unit which preferably consists of two sections 11 and 12, the upper end portion of the section 11 being complete whereas only part of the section 12 is shown, the same being identical with the section 11. For this reason, the brief description of one section will apply to the other.

Each section has an end wall 13 and this wall in the construction shown terminates at its outer or front end in a channel-shaped post 14 of relatively heavy material in the bottom of the channel of which is arranged a seal pad or strip 15. One arm 16 of the post is longer than the other arm 17. The arm 16 forms the outer wall of the post and is preferably faced with a thin facing strip or sheet 18 channeled as seen at 18*a* to receive the wall 13. The arm 17 is provided with two or more vertically inclined notches 17*a* by means of which the door 19 may be clamped in position as later described. The adjacent ends of the sections 11 and 12 are provided at the front end of the cabinet with vertical posts 20—20*a* channel-shaped in cross sectional form and coupled together and finished by a relatively thin strip 20*b*

on the inner open ends of said channels, and secured to the outer posts thereof is a U-shaped finishing strip 21 which forms a large channel, in the base of which is a packing or sealing strip 22, and the side walls of said channel are folded upon themselves as seen at 21*a* to give strength thereto, and these walls are also provided with notches not shown arranged in alinement with and corresponding to the notches 17*a*.

The doors 19 of each section are identical in construction. Therefore the brief description of one will apply to the other. These doors consist of a glass panel 19*a* mounted in channel portions 19*b* of a door frame 23 which is L-shaped in cross sectional form, said frame being composed of a relatively heavy angle iron part 23*a* and a facing sheet 23*b* as clearly seen in Fig. 4 of the drawings. At this time, it will be noted that the inwardly directed arm of the frame 23 is adapted to engage the packing or sealing strips 15 and 22 disposed at opposite sides of the door as well as similar strips 22*a* and 22*b* arranged at the top and bottom of the cabinet as seen in Fig. 2 of the drawings.

It will be noted that the transverse dimensions of the door 19 including the frame 23 are less than the corresponding dimensions of the cabinet section in conjunction with which the door operates. This provides a clearance space 24 between the side edges of the door and the part 16 of the posts of the cabinet, and a similar space 24*a* between adjacent ends of the frames 23 of each door. Secured to the outer side walls of the frames 23 and arranged within the spaces 24—24*a* are bracket posts 25, one of which is clearly shown in Fig. 5 of the drawings, which form bearings for a rivet pin or screw 26 which secures and retains an arm 27 against displacement from the frame 23 and also forms a pivot permitting the swinging movement of the arm 27, a collar 28 being arranged outwardly of the frame and inwardly of the bracket 25, said collar having flat sides 28*a*, note Fig. 3, to receive the yoke-shaped jaw 29 of an operating tool and handle member 30 detachable with respect to said collar.

Secured to the frame 23 at vertically spaced intervals are guide pins 31, the inner ends of which are headed as seen at 31, and collars 31*b* are arranged on said pins to provide guides for the movement of a lock bar 32 which extends substantially the full height of the door and is arranged within the side wall thereof and is also arranged within the channels 14 and 21 when the door is in closed position. Pivoted to the lock bar 32 as seen at 33 is a link 34 which is also pivoted to the free end of the arm 27 as seen at 35. In rotating said arm, the link 34 will cause the bar 32 to move upwardly and downwardly depending upon the direction of rotation of said arm, and this movement of the lock bar is facilitated by providing elongated apertures 32*a* therein in which the pins 31 are free to move.

The bar 32 is provided with inwardly projecting lock pins 36 which are so arranged as to register with the lower open end of the notches 17*a* of the arm 17, and corresponding notches in the part 21*a* of the channel 21, and to move upwardly in said notches in the operation of closing and clamping the door in firm engagement with the cabinet, the inclination of the notches functioning as cams to facilitate this clamping action, it being understood that when the arm 27 is rotated through the hand grip or tool 30, the pins 36 will be forced upwardly in the notches by the movement imparted to the lock bar and this operation continues until the door has been securely clamped or wedged in position, the inner ends of the frame 23 being forced into the sealing pads or strips 15—22—22*a* and 22*b*.

It will be understood that both of the lock bars 32 are of similar construction and the above description of one will apply to the other, each side of the door structure being identical in construction. From the foregoing, it will be apparent that when the door is in closed position, the tools 30 are removed, thus leaving a very neat and finished appearance to the door structure of the cabinet as well as the cabinet as a whole. The only thing that is visible are the brackets 25 and the sleeves 28 arranged in the recesses 24 and 24*a*.

Extending longitudinally of the top front wall of the cabinet and over both sections 11 and 12 is a substantially box-shaped housing 37 made up of two substantially L-shaped strips 38 and 39, the strip 38 constituting the front and top walls of the housing 37 whereas the strip 39 constitutes the back and bottom wall. The front edge of the bottom wall 39*a* of the strip 39 terminates short of the lower edge of the front wall 38*a* of the strip 38 to form an aperture 40 extending longitudinally of the housing 37. At spaced intervals, the bottom wall 39 is cut out to form backwardly extending apertures 39*b* through which door hanging brackets 41 are free to pass in moving the door into closed position. Two of these brackets are preferably employed on each door 19 as seen in Fig. 1 of the drawings. Said brackets are secured to the upper edge of the door and when the door is moved outwardly the standards of said brackets are free to slide back and forth in the apertures 40.

Each bracket 41 carries within the housing 37 a channel-shaped bar 42 in connection with which is mounted a plurality of ball castors 43, two of said castors being disposed at each side of the bracket 41, and these castors are free to slide upon the upper face of the bottom wall 39*a* of the housing 37, the

front edge of said wall being turned upwardly to form a rounded seat 39*a* which limits the outward movement of the castors 43 and provides for a free and easy sliding movement of the door, retaining the brackets 41 as well as the bars 42 in spaced relation with respect to the walls of the housing 37.

In the use of my improved cabinet and door construction therefor, and assuming that the doors are in closed position when it is desired to release one of the doors, two of the hand grips or tools 30 are coupled with the collars 28 at each side of the door by coupling the tools therewith in the manner seen in Fig. 3 of the drawings, after which the hand gripping portions of said tools are raised into the position shown in Fig. 2, in which operation, the lock bars 32 at each side of the door are moved downwardly, thus releasing the door, and by the aid of the handle members 30, the door may be moved forwardly to bring the brackets 41 in alinement with the aperture 40, thus permitting the sliding movement of the door to one side of the cabinet and over or in front of the other door as said side of the cabinet, the latter being in closed position. In this connection, it will be understood that sufficient outward movement of the door in the housing 37 will be provided to permit the free sliding movement of one door with respect to the other.

When it is desired to again close the cabinet, the open door is moved into proper position in front of the cabinet and then moved inwardly, in which operation, the brackets 41 pass through the apertures 39*b* and the pins 36 pass into the notches 17*a*, and the handle members 30 are then moved downwardly to raise the lock bars 32 and to move the pins 36 upwardly in said notches, which operation moves the door inwardly into firmly sealed position.

In the foregoing operation of opening the door and moving the tools or handle members 30 into the position shown in Fig. 1, it will be understood that the offset shoulder portions 30*a* on said members engage the brackets 25 to permit the slight lifting of the door to ease its outward movement and further operate to clamp said members against displacement from the door until they have been moved into the position shown in Fig. 3, in which position they may be freely removed. In apparatus of the class under consideration, it is customary to lock the cabinet doors, and at least two of the handle members 30 may be kept with the keys of such lock and taken with the keys to facilitate the operation of opening the door as will be apparent.

While I have shown certain details of construction for carrying my invention into effect, it will be understood that I am not necessarily limited to these details nor to any specific use of the structure herein disclosed, and other changes in and modifications of the invention herein shown and described may be made within the scope of the appended claims without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A door structure for cabinets of the class described, said door including inwardly directed top, bottom and side wall members, the cabinet having channels into which the side wall members of the door are adapted to pass, means arranged in said channels and inwardly of the side wall members of said door for coupling the door with the cabinet structure and for firmly retaining the same in closed position, and a member in operative engagement with said first named means and projecting through the side wall of the door and arranged in said channel whereby said means may be moved into operative and inoperative position by a tool detachably coupled with respect to said member.

2. In cabinets of the class described, two cabinet sections, the outer side walls of said sections having channel members, the channels of which are directed outwardly and the adjacent sides of said sections having a comparatively large channel opening outwardly through the front of the cabinet, two door members of similar construction arranged to move toward and from each of said sections and longitudinally with respect thereto, each of said doors having inwardly directed wall members adapted to engage sealing pads at the bottom of said channels to effect a seal between the doors and cabinet, a lock bar arranged within the side walls of each door, means for coupling said bar with said walls to permit movement of said bars longitudinally with respect thereto, an arm pivoted to each side wall and coupled with the adjacent lock bars through a coupling link and the pivot of each of said arms extending through the side walls of the door and being normally arranged in the channels of said cabinet, and means whereby a suitable tool may be coupled with said pivots to rotate the same and impart movements to said lock bars in the operation of opening or closing said doors.

3. In cabinets of the class described, two cabinet sections, the outer side walls of said sections having channel members, the channels of which are directed outwardly and the adjacent sides of said sections having a comparatively large channel opening outwardly through the front of the cabinet, two door members of similar construction arranged to move toward and from each of said sections and longitudinally with respect thereto, each of said doors having inwardly directed wall members adapted to engage sealing pads at the bottom of said channels to effect a seal between the doors and cabinet, a lock bar arranged within the side walls of each

door, means for coupling said bar with said wall to permit movement of said bars longitudinally with respect thereto, an arm pivoted to each side wall and coupled with the adjacent lock bar through a coupling link, and the pivot of each of said arms extending through the side walls of the door and being normally arranged in the channels of said cabinet, means whereby a suitable tool may be coupled with said pivots to rotate the same and impart movement to said lock bars in the operation of opening and closing said doors, and said lock bars including coupling pins adapted to enter notches formed in one of the side walls of each of said channels, the arrangement of said notches being such as to provide a cam-like action which will operate to draw the doors inwardly into firm engagement with the cabinet.

4. A door for cabinets of the class specified said door comprising side wall members arranged angularly with respect to the front wall thereof, lock bars arranged within the side walls of said door and movable longitudinally with respect thereto, a plurality of members spaced longitudinally of said lock bars adapted to be moved into engagement with parts of said cabinet and coupling the door therewith and in the movement of said bars with respect to said walls, and means projecting through the side walls of the door and in operative engagement with said bars whereby said bars may be moved into position to couple and uncouple the doors with respect to the cabinet, said last named means involving a pivot pin having a squared collar arranged outwardly of said walls whereby suitable tools may be coupled therewith to impart rotary movement to said pins.

5. A door for cabinets of the class specified said door comprising side wall members arranged angularly with respect to the front wall thereof, lock bars arranged within the side walls of said door and movable longitudinally with respect thereto, a plurality of members spaced longitudinally of said lock bars adapted to be moved into engagement with parts of said cabinet and coupling the door therewith and in the movement of said bars with respect to said walls, means projecting through the side walls of the door and in operative engagement with said bars whereby said bars may be moved into position to couple and uncouple the doors with respect to the cabinet, said last named means involving a pivot pin having a squared collar arranged outwardly of said walls whereby suitable tools may be coupled therewith to impart rotary movement to said pins, and arms on said pins within said walls and coupled with said bars through coupling links.

6. A door for cabinets of the class specified said door comprising side wall members arranged angularly with respect to the front wall thereof, lock bars arranged within the side walls of said door and movable longitudinally with respect thereto, a plurality of members spaced longitudinally of said lock bars adapted to be moved into engagement with parts of said cabinet and coupling the door therewith and in the movement of said bars with respect to said walls, means projecting through the side walls of the door and in operative engagement with said bars whereby said bars may be moved into position to couple and uncouple the doors with respect to the cabinet, said last named means involving a pivot pin having a squared collar arranged outwardly of said walls whereby suitable tools may be coupled therewith to impart rotary movement to said pins, arms on said pins within said walls and coupled with said bars through coupling links, and means attached to the outer surfaces of said side walls for providing bearings for the outer ends of said pins.

7. A door for cabinets of the class specified said door comprising side wall members arranged angularly with respect to the front wall thereof, lock bars arranged within the side walls of said door and movable longitudinally with respect thereto, a plurality of members spaced longitudinally of said lock bars adapted to be moved into engagement with parts of said cabinet and coupling the door therewith and in the movement of said bars with respect to said walls, means projecting through the side walls of the door and in operative engagement with said bars whereby said bars may be moved into position to couple and uncouple the doors with respect to the cabinet, said last named means involving a pivot pin having a squared collar arranged outwardly of said walls whereby suitable tools may be coupled therewith to impart rotary movement to said pins, arms on said pins within said walls and coupled with said bars through coupling links, means attached to the outer surfaces of said side walls for providing bearings for the outer ends of said pins, and the upper end of the door having spaced brackets attached thereto and projecting upwardly above the door, and means for supporting a plurality of ball castors in connection with said brackets.

8. A cabinet structure for doors of the class specified comprising two cabinet sections, the side walls of said sections having standards which are channel-shaped in cross sectional form, the channels being directed outwardly with respect to the front of the cabinet, another comparatively large channel arranged at the adjacent sides of said sections and opening outwardly with respect to the front thereof, one side wall of the first named channels having spaced notches inclined upwardly and opening outwardly through the forward ends of said walls, and corresponding notches arranged in each of the side walls of the second named channel whereby the doors

of each of said sections may be coupled therewith.

9. A cabinet structure for doors of the class specified comprising two cabinet sections, the side walls of said sections having standards which are channel-shaped in cross sectional form, the channels being directed outwardly with respect to the front of the cabinet, another comparatively large channel arranged at the adjacent sides of said sections and opening outwardly with respect to the front thereof, said side wall of the first named channels having spaced notches inclined upwardly and opening outwardly through the forward ends of said walls, corresponding notches arranged in each of the side walls of the second named channel whereby the doors of each of said sections may be coupled therewith, said doors including lock bars arranged within the side walls of said doors, the said bars having pins adapted to enter the notches in the respective channels in moving the doors inwardly into firm engagement with said sections.

10. A cabinet structure for doors of the class specified comprising two cabinet sections, the side walls of said sections having standards which are channel-shaped in cross sectional form, the channels being directed outwardly with respect to the front of the cabinet, another comparatively large channel arranged at the adjacent sides of said sections and opening outwardly with respect to the front thereof, said side wall of the first named channels having spaced notches inclined upwardly and opening outwardly through the forward ends of said walls, corresponding notches arranged in each of the side walls of the second named channel whereby the doors of each of said sections may be coupled therewith, said doors including lock bars arranged within the side walls of said doors, the said bars having pins adapted to enter the notches in the respective channels in moving the doors inwardly into firm engagement with said sections, and means outwardly of the side walls of each door and accessible within said channels for moving the lock bar into operative and inoperative positions.

11. A door structure for cabinets of the class described, said door including inwardly directed top, bottom and side wall members, the cabinet having channels of a depth substantially equal to the width of the side wall members of the door and into which said side wall members are adapted to pass, and means arranged in said channels and inwardly of the side wall members of said door for coupling the door with the cabinet structure and for firmly retaining the same in closed position.

12. A door structure for cabinets of the class described, said door including inwardly directed top, bottom and side wall members, the cabinet having channels of a depth substantially equal to the width of the side wall members of the door and into which said side wall members are adapted to pass, means arranged in said channels and inwardly of the side wall members of said door for coupling the door with the cabinet structure and for firmly retaining the same in closed position, and a member in operative engagement with said first named means and projecting through each side wall of the door and arranged in said channels whereby said means may be moved into operative and inoperative positions.

13. A door structure for cabinets of the class described, said cabinet having vertically arranged channels opening outwardly with respect to the front of the cabinet, said door having inwardly directed wall members adapted to pass into said channels, and of a width substantially equal to the width of the side walls of said channels, a lock bar movably mounted in connection with the inner faces of each of the wall members of said door, and means in operative engagement with said lock bar and projecting outwardly through the wall members of said door and arranged within said channels whereby said locking bar may be moved into operative and inoperative positions.

14. A door structure for cabinets of the class described, said cabinet having vertically arranged channels opening outwardly with respect to the front of the cabinet, said door having inwardly directed wall members adapted to pass into said channels, and of a width substantially equal to the width of the side walls of said channels, a lock bar movably mounted in connection with the inner faces of each of the wall members of said door, means in operative engagement with said lock bar and projecting outwardly through the wall members of said door and arranged within said channels whereby said locking bar may be moved into operative and inoperative positions, and said locking bars having spaced coupling pins adapted to engage recesses formed in one of the side walls of each of said channels to firmly secure the door in closed position.

15. A door structure for cabinets of the class described, said cabinet having vertically arranged channels opening outwardly with respect to the front of the cabinet, said door having inwardly directed wall members adapted to pass into said channels and of a width substantially equal to the width of the side walls of said channels, a lock bar movably mounted in connection with the inner faces of each of the wall members of said door, means in operative engagement with said lock bar and projecting outwardly through the wall members of said door and arranged within said channels whereby said locking bar may be moved into operative and

inoperative positions, said locking bars having spaced, coupling pins adapted to engage recesses formed in one of the side walls of each of said channels to firmly secure the door in closed position, and a sealing pad arranged in the bottom of said channels and in connection with which the inner ends of the side wall members of the door operate.

16. A door structure for cabinets of the class described, said cabinet having vertically arranged channels opening outwardly with respect to the front of the cabinet, said door having inwardly directed wall members adapted to pass into said channels and of a width substantially equal to the width of the side walls of said channels, a lock bar movably mounted in connection with the inner faces of each of the wall members of said door, means in operative engagement with said lock bar and projecting outwardly through the wall members of said door and arranged within said channels whereby said locking bar may be moved into operative and inoperative positions, said locking bars having spaced, coupling pins adapted to engage recesses formed in one of the side walls of each of said channels to firmly secure the door in closed position, a sealing pad arranged in the bottom of said channels and in connection with which the inner ends of the side wall members of the door operate, and means for supporting and guiding the door in its movement with respect to the cabinet, said means comprising a housing arranged at the front top portion of the cabinet and a plurality of ball castors coupled with the upper end of the door and arranged to move within said housings.

17. In a cabinet of the class described, a door for closing the front open end of the cabinet, said door being movable toward and from the front end of the cabinet and longitudinally with respect thereto and including inwardly directed side walls, and means arranged within and adjacent the side walls of the door and substantially concealed therein and cooperating with the cabinet for moving the door into firm engagement with the cabinet and to permit the release of the door therefrom.

18. In a cabinet of the class described, a door for closing the front open end of the cabinet, said door being movable toward and from the front end of the cabinet and longitudinally with respect thereto and including inwardly directed side walls, and means arranged within and adjacent the side walls of the door and substantially concealed therein and cooperating with the cabinet for moving the door into firm engagement with the cabinet and to permit the release of the door therefrom, said means involving lock bar arranged in parallel relation to the side walls of the door and including operating members accessible outwardly of said side walls and adapted to be engaged by tools for moving said bars into operative and inoperative positions.

In testimony that I claim the foregoing as my invention I have signed my name this 17th day of December, 1929.

HARRY F. BEERS.