J. VOSS.

DOOR STRUCTURE FOR DISPLAY CABINETS.

APPLICATION FILED MAR. 4, 1920. RENEWED DEC. 14, 1921.

1,414,843. **Patented May 2, 1922.**

2 SHEETS—SHEET 1.

Fig. 1.

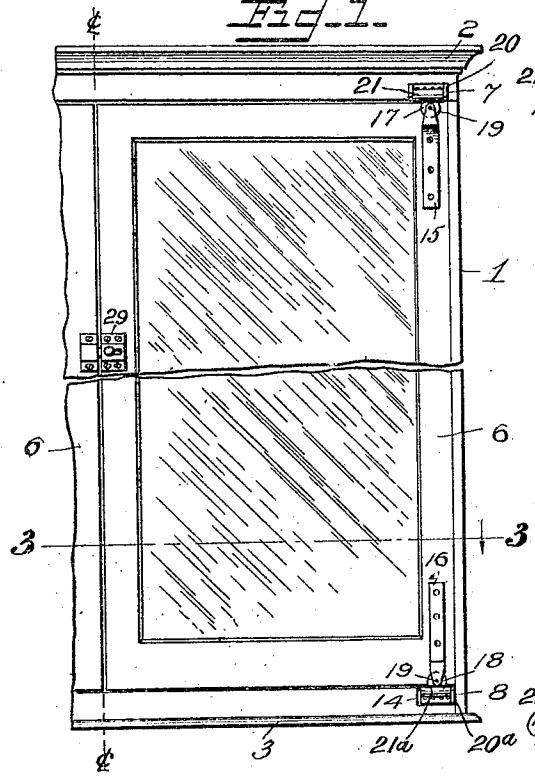


Fig. 2.

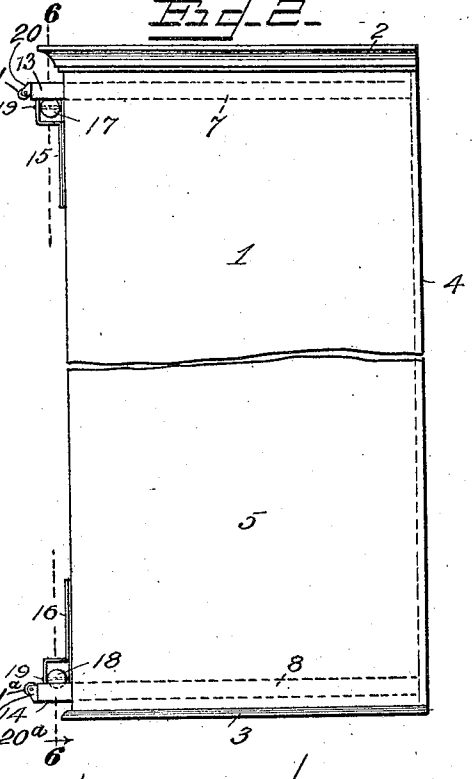


Fig. 3.

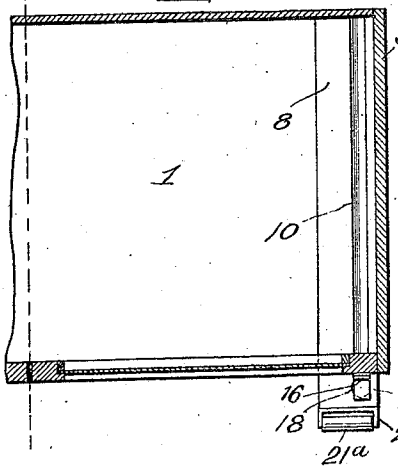


Fig. 4.

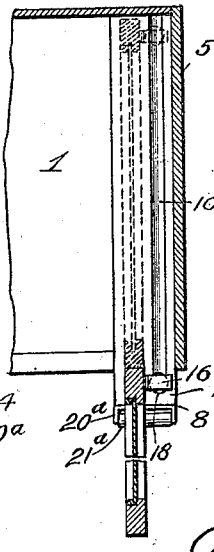
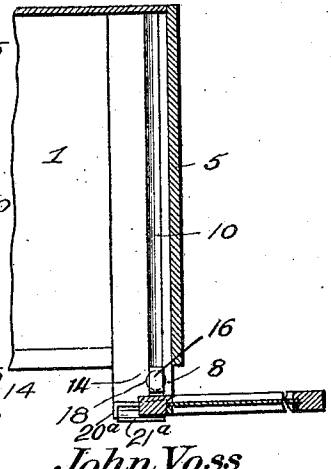


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 6.

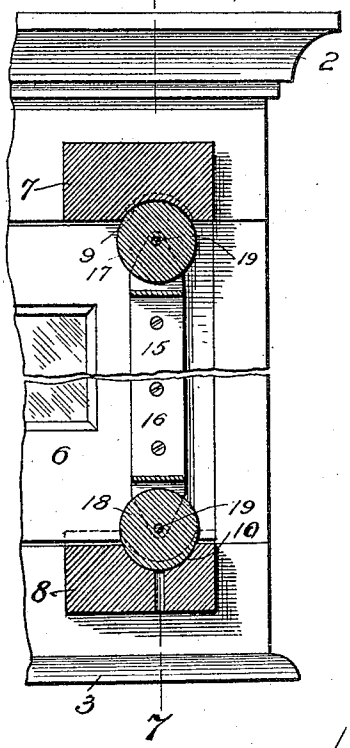


Fig. 7.

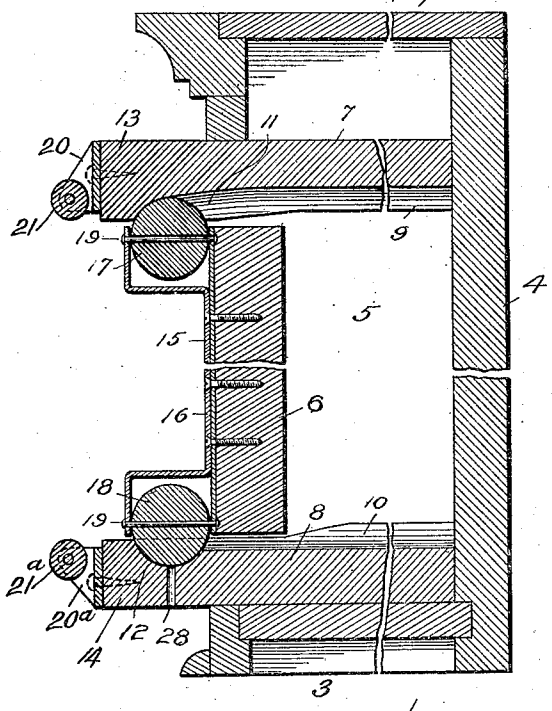


Fig. 8.

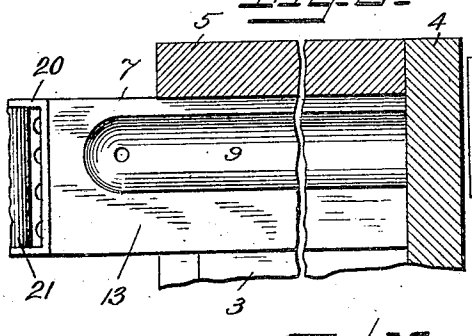


Fig. 9.

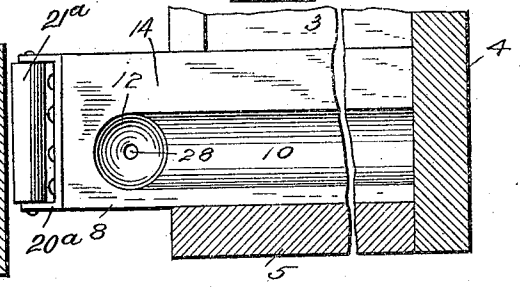


Fig. 10.

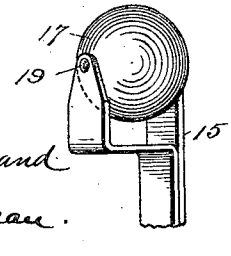
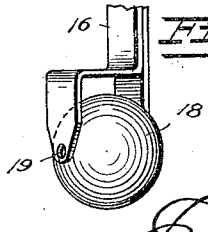


Fig. 11.



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UNITED STATES PATENT OFFICE.

JOHN VOSS, OF EVANSVILLE, INDIANA.

DOOR STRUCTURE FOR DISPLAY CABINETS.

1,414,843. Specification of Letters Patent. Patented May 2, 1922.

Application filed March 4, 1920, Serial No. 363,218. Renewed December 14, 1921. Serial No. 522,443.

To all whom it may concern:

Be it known that I, JOHN VOSS, a citizen of the United States, residing at Evansville, in the county of Vanderburg and State of Indiana, have invented a new and useful Door Structure for Display Cabinets, of which the following is a specification.

This invention has reference to door structures for display cabinets, and its object is to provide a door and mounting therefor whereby the door may be moved from a closed position to an open position and then moved into the cabinet out of the way so as to be out of obtrusive relation to the exterior of the cabinet and to be housed in the cabinet in a manner to take up a minimum of space.

In accordance with the invention, the cabinet, which may be utilized after the manner of an ordinary cabinet, is provided with a door having top and bottom hinges capable of rolling along tracks within the cabinet at one side thereof. Moreover, the door is mounted to turn about an upright axis so that the door may be opened and closed with the hinge at one long edge or upright portion of the door whereby the door may be opened and closed in the usual manner with the hinge axis close to one side of the cabinet. When, however, the door is in the open position it may be then moved into the cabinet close to one side thereof so that the door does not obtrusively project beyond the front of the cabinet or over the front portion of another cabinet alongside of the first cabinet. The invention provides means whereby a row of cabinets may be placed in a display room or store in side by side engagement and the doors may be fully opened so far as access to the interior of the cabinets is concerned so that the opening of the door of a cabinet in no wise interferes with access to the next cabinet in order. Moreover, the interior capacity of a cabinet is not interfered with to any material extent, since the door, when in the open position, is lodged within the cabinet close to one side and flatwise thereof, whereby the room taken up by the door represents only the thickness of the door, the balls and mountings.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing in the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings,

Fig. 1 is a front elevation of a portion of a cabinet equipped with a door constructed in accordance with the invention.

Fig. 2 is a side elevation of the cabinet shown in Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 1, showing the door closed.

Fig. 4 is a section similar to that of Fig. 3 but showing the door wide open and ready to be moved into the cabinet.

Fig. 5 is a section similar to that of Fig. 3, showing the door swung beyond the position of Fig. 4.

Fig. 6 is a section on the line 6—6 of Fig. 2, drawn on a larger scale.

Fig. 7 is a section on the line 7—7 of Fig. 6.

Fig. 8 is an inverted plan view of the upper door track drawn on the scale of Figs. 6 and 7.

Fig. 9 is a top plan view of the lower door track drawn on the same scale as Fig. 8.

Fig. 10 is a perspective view of the upper ball hinge member.

Fig. 11 is a perspective view of the lower ball hinge member.

Referring to the drawings, there is shown a cabinet 1 of any appropriate construction including a top 2, bottom 3, back 4, ends 5 and door or doors 6, since the cabinet may be provided with either one or two doors, or more.

Adjacent to the ends 5 at the top and bottom of the cabinet are track strips 7, 8, respectively. While not confined to any special conformation, the track strips 7, 8 are of similar construction, with one on substantially a level with the floor or bottom of the cabinet and the other close to the top of the cabinet on the underside of such top and extending from front to rear close to a corresponding end 5. The track strip 7 has a longitudinal groove 9 on its underside and the track strip 8 has a longitudinal groove 10 on its upper face. The groove 9 is rounded in cross section and has a gentle drop portion 11 at the outer end and the groove

10 terminates at the outer end in a shallow depression 12. The grooves 9 and 10, where provided with the terminal portions 11 and 12, are continued into extensions 13, 14, respectively, of the tracks 7, 8, projecting beyond the plane of the front of the cabinet.

The door 6, or each door 6, where more than one are provided, is in the form of a suitable frame of any approved construction to fit properly into the front of the cabinet so as to constitute a closure therefor. Fast to one side of the door frame are brackets 15, 16, one at the upper corner of the frame and the other at the lower corner thereof. The bracket 15 is forked or otherwise formed to receive a ball roller 17, and the bracket 16 is similarly shaped to receive a ball roller 18. Each ball roller 17 and 18 is held in the respective bracket by means of a pin 19 serving as a journal pin for the roller.

The door 6 is so placed that the balls 17 and 18 are lodged in the respective grooves 9 and 10, and when the door is in the closed position the ball 17 is lodged in the outer end of the track 9 and the ball 18 is lodged in the depression 12, so that the two balls are one above the other and constitute hinge supports.

At the front or outer end of the track strip 7 there is a frame or bracket 20 in which a roller 21 is mounted, and at the front or outer end of the track strip 8 a similar bracket 20^a has a roller 21^a mounted therein so that the lower roller 21^a sustains the weight of, and the upper roller 21 steadies and guides the door 6 as the latter is moved into and out of the cabinet.

If it be assumed that the door 6 is closed, in which case the ball hinge member 18 is seated in the socket 12 and the ball hinge member 17 is in the outer end of the groove 9, the door may be opened by swinging it upon its hinge supports on a perpendicular axis in which the door is held at the lower end by the depression 12 and at the upper end by the end 11 of the groove 9, the door being capable of swinging through an arc of about 180°. If the door be swung through an arc of 90°, it is then in line with the inner edges of the track strips 7, 8 but is held, particularly by the depression 12, from movement lengthwise of the door. The depression 12 is quite shallow and therefore the door may be readily pushed into the cabinet, for but little effort is required to roll the door out of the depression 12, whereupon the ball 18 will support the door and the ball 17 will guide the door, rising along the portion 11 of the groove 9 to compensate for the lifting of the door out of the depression 12. As the door moves back into the cabinet it travels along the rollers 21 and 21^a, one supporting the bottom rail of the door and the other engaging the top rail of the door, as before stated, so that the latter, when moved into and out of the cabinet, is guided by the rollers and by the grooves 9 and 10, thus contributing to the steadiness of movement of the door. When the door has been moved out of the cabinet, the lower ball 18 drops into the depression 12 and the upper ball 17 also drops but remains in the groove 9 because of the forward drop portion 11 of the groove 9.

The cabinet structure is particularly useful as a display cabinet in stores and the like and where numerous cabinets are to be placed end to end, permitting economy of space, without the doors, when open, interfering with the neighboring cabinets. This is due to the fact that the structure permits the housing of the doors in the cabinets with little or no front projection when the doors are open. By properly proportioning the parts, what little projection may occur is so slight as not to be ordinarily noticeable.

The ball rollers act after the manner of anti-friction rollers, thereby rendering the operation of the door particularly easy, and the door may be opened after the manner of an ordinary hinged door, or may be so disposed that the door is in effect a disappearing door when open.

Since the cavity 12 may trap dirt, and so interfere with the free action of the ball 18, the track strip 8 is traversed by a passage 28 permitting the escape of any dirt which may reach the depression or cavity 12.

A latch 29 or other door holding device may be provided to hold the door or doors 6 shut.

What is claimed is:—

1. In a door structure for display cabinets or the like, the combination with a door or closure for the cabinet, of upper and lower hinge members in the form of balls and mounted on the door, and tracks for the balls extending into the cabinet toward the rear thereof, the balls each provided with a pivotal axis diametrically of the ball.

2. In a door structure for display cabinets or the like, the combination with a door or closure for the cabinet, rotatable members at the upper and lower corner portions of one end of the door, each mounted to rotate about an axis having fixed relation to and movable with the door, and tracks for the rotatable members extending into the cabinet from front to rear, whereby the door may swing on the rotatable members about an upright axis and move bodily on the rotatable members into and out of the cabinet along the tracks.

3. In a door structure for display cabinets or the like, the combination with a door or closure for the cabinet, rotatable members at the upper and lower corner portions of one end of the door, each mounted to rotate about an axis having fixed relation to

and movable with the door, and tracks for the rotatable members extending into the cabinet from front to rear, whereby the door may swing on the rotatable members about an upright axis and move bodily on the rotatable members into and out of the cabinet along the tracks, said tracks having depressed portions at their outer ends to temporarily lock the door against movement along the track.

4. In a door structure for display cabinets or the like, the combination with a door or closure for the cabinet, said door having rotatable members at one end, one at the top and one at the bottom portions constituting hinges for the door, with said rotatable members each mounted to rotate upon an axis fixed to the door with the rotatable members constituting supporting hinges for the door, and tracks at the top and bottom portions of the cabinet entering the latter from front to rear and the tracks having forward depressed portions into which the rotatable members may drop when the door is in the open position to hold the rotatable members temporarily in hinge position.

5. In a door structure for display cabinets or the like, the combination with a door or closure for the cabinet, of rollers mounted on the top and bottom portions of the door near one end thereof in offset relation to the face of the door, and tracks for the rollers extending into the cabinet from the front thereof toward the rear near one end of the cabinet, whereby the door may be swung about an upright axis on the rollers as hinges with the rollers engaging in the forward ends of the tracks and then moved into the cabinet with the rollers following the tracks.

6. In a door structure for display cabinets or the like, the combination with a door or closure for the cabinet, of rollers mounted on the top and bottom portions of the door near one end thereof in offset relation to the face of the door, and tracks for the rollers extending into the cabinet from the front thereof toward the rear near one end of the cabinet, whereby the door may be swung about an upright axis on the rollers as hinges with the rollers engaging in the forward ends of the tracks and then moved into the cabinet with the rollers following the tracks, the cabinet being also provided with other rollers in the path of the upper and lower edges of the door when moved into and out of the cabinet whereby the last-named rollers then guide and support the weight of the door.

7. In a door structure for display cabinets or the like, the combination with a door or closure for the cabinet, of rollers mounted on the top and bottom portions of the door near one end thereof in offset relation to the face of the door, tracks for the rollers entering the cabinet from the front toward the rear near one end of said cabinet, whereby the door may be swung about an upright axis on the rollers as hinges, with the rollers engaging in the forward ends of the tracks and then moved into the cabinet with the rollers following the tracks, and other rollers mounted at the forward ends of the tracks for engaging the top and bottom parts of the door to guide and support the weight of the door.

8. In a door structure for display cabinets and the like, the combination with a door or closure for the cabinet, of rollers carried by the door near the top and bottom portions thereof in offset relation to the face of the door, tracks for the rollers entering the cabinet near one end thereof toward the rear of said cabinet and projecting beyond the front of the cabinet, whereby the door may be swung about an upright axis on the rollers as hinges and said door together with the rollers may then be moved into the cabinet along the tracks, and other rollers at the forward ends of the tracks in advance of the latter and constituting guiding and supporting means for that portion of the door remote from the hinge rollers as the door is moved into and out of the cabinet.

9. In a door structure for displaying cabinets or the like, the combination with a door or closure for the cabinet, of tracks in the form of grooves extending into the cabinet from the front toward the rear, said tracks being disposed near the upper and lower portions of the cabinet, and balls mounted on the door near the top and bottom thereof adjacent to one end of the door, said balls each having a pivot pin diametrically traversing it and fast to the door, whereby the door may be moved along the tracks in a direction perpendicular to the length of the pivot pins and may be swung about an upright axis diametrically of the balls.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

JOHN VOSS.