

L. W. WELCH.
DOOR STRUCTURE IN DISPLAY CABINETS.
APPLICATION FILED DEC. 30, 1911.

1,025,350.

Patented May 7, 1912

2 SHEETS—SHEET 2.

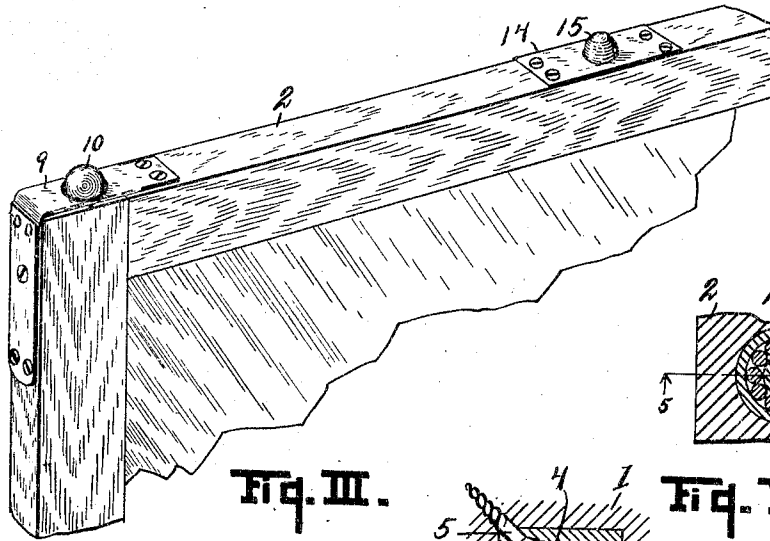


Fig. III.

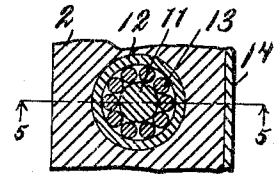


Fig. VI.

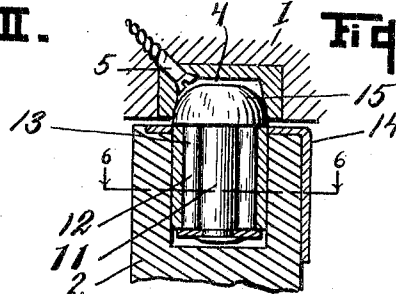


Fig. V.

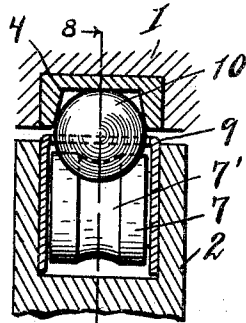


Fig. VII.

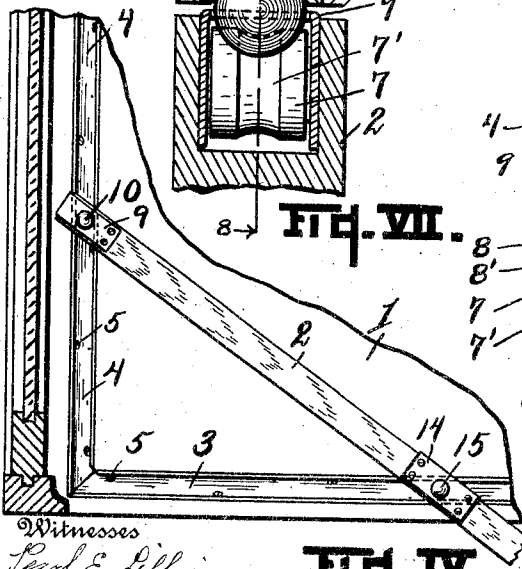


Fig. IV.

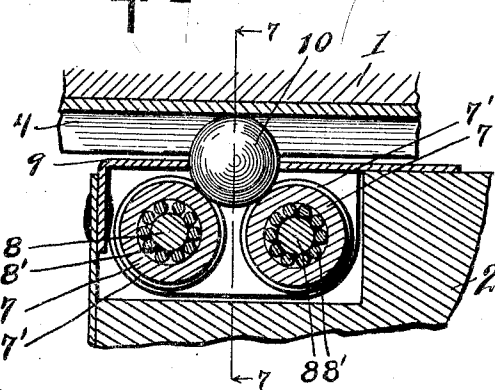


Fig. VIII.

Witnesses
Paul E. Lillie
Luella J. Greenfield

Inventor
Leonard W. Welch
By
L. Russell Earl
Attorneys

UNITED STATES PATENT OFFICE.

LYMAN W. WELCH, OF GRAND RAPIDS, MICHIGAN.

DOOR STRUCTURE IN DISPLAY-CABINETS.

1,025,350.

Specification of Letters Patent.

Patented May 7, 1912.

Application filed December 30, 1911. Serial No. 668,633.

To all whom it may concern:

Be it known that I, LYMAN W. WELCH, a citizen of the United States, residing at Grand Rapids, Michigan, have invented certain new and useful Improvements in Door Structures in Display-Cabinets, of which the following is a specification.

This invention relates to improvements in door structures for display cabinets.

The objects of this invention are to provide a door structure for closing the front of a display cabinet, which shall largely recede into the cabinet as the door is swung open, and will, when completely opened, be disposed within the end of the case.

The objects of the invention are to simplify such a structure, insure effective guiding, and reduce the friction in operating such doors to the minimum.

Objects relating to details and economies of construction and operation will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure I is a horizontal sectional plan view of a show case with door structure embodying the features of my invention, taken on a line corresponding to line 1—1 of Fig. II. Fig. II is a detail vertical sectional view enlarged and broken into sections, taken on a line corresponding to line 2—2 of Fig. I. Fig. III is an enlarged detail perspective view of the upper inner corner portion of the left hand door illustrated in Fig. I. Fig. IV is an enlarged detail sectional plan view taken on a line corresponding to line 4—4 of Fig. II, showing details of construction of the bottom track and the door in full lines in partially open position. Fig. V is an enlarged detail sectional view through the revoluble guiding pin and its anti-friction bearing, taken on a

line corresponding to lines 5—5 of Figs. II and VI. Fig. VI is an enlarged detail transverse sectional plan view taken on a line corresponding to line 6—6 of Fig. V, showing details of the roller bearing for the revoluble guiding pin. Fig. VII is an enlarged detail sectional view on a line corresponding to lines 7—7 of Figs. II and VIII, showing details of the anti-friction double roller ball bearings. Fig. VIII is a detail sectional view on a line corresponding to line 8—8 of Fig. VII, showing details of construction of the double roller ball bearings.

In the drawings sectional views are taken looking in the direction of the little arrows at the ends of the section lines, and similar numerals of reference refer to similar parts throughout the several views.

Referring to the numbered parts of the drawings, a show case 1 open at the front is provided with a pair of doors 2. These are supported on suitable guiding and carrying devices, and travel in the tracks, 3, 4, portions of the track 3 being parallel with the front of the case and disposed in the top and bottom rails thereof, and the sections of the track 4 being parallel with the ends of the case and disposed in the top and bottom thereof. The backs are formed of channel iron or bar, as clearly appears in the cross sectional views. The tracks are retained in position by oblique screws 5 in the angles thereof (see Figs. IV and V), and they are joined at right angles at the corners of the case by a mitered joint 6, so that the guiding devices for carrying and guiding the door travel in these tracks and turn in the same, carrying the door at right angles to the front and inside the end walls of the case at each end thereof.

In Fig. I, I show the right hand door in the closed position and the left hand door run to a position parallel with the end of the case, showing its position as it is moved back into the case. In Fig. IV, I show the left hand door 2 at an angle in the intermediate position, showing how it moves in opening and closing, and is carried by the tracks.

Underneath each door I provide a ball bearing support. This consists of a pair of rollers 7, having peripheral groove slit 7' and carried on pins 8, 8, provided with roller bearings 8' 8' in proximity to each other, in suitable housing 9. The housing is perforated toward the edge of the door to receive the bearing ball 10 which is thus engaged between the pair of bearing rollers 7-7, making a very effective anti-friction bearing. As the ball rotates it revolves the rollers and the ball thus has a very free movement. This roller ball bearing is also provided at the inner end of the door at its upper corner, the device being a very effective device for use in carrying a load. It will be observed, in the manipulation of this door, the weight of the same is carried on the ball 10 below, and as the bearing is toward the rear, being located about thirteen inches from the inner end of a forty inch door, the pressure is exerted upwardly at the rear end, making it highly desirable to provide an effective anti-friction device at that point.

I provide a rotary guide pin in a vertical anti-friction journal bearing in the edge of the door, diametrically opposite each bearing ball. These consist of a revolving pin 11 supported in a suitable housing 12, with anti-friction rollers 13, the whole being secured in place by an attaching plate 14. The upper end of the pin 11 is suitably shouldered so that it is carried effectively on the rollers, and is rounded in substantially a hemisphere for engagement with the track, either above or below the door as the case may be.

In operation, when it is desired to open the door, the same is moved laterally toward the end of the case, when the front edge swings outwardly and the rear edge swings inwardly along the section 4 of the track. The bearing ball underneath travels in the track 3 until the door comes to the corner, when it can be slipped back into the case after the manner indicated at the left of Fig. I. During this operation, it will be observed that the pin at the central part of the top of the door has no load to carry and contacts only with the sides of the groove and serves effectively as a guide in manipulating the door; and, likewise, that the pin at the lower rear edge of the door has no load to carry because the load is carried entirely by the bearing ball under the door. The anti-friction device is therefore most effectively disposed for carrying the door into the case, and, owing to the rounded projecting ends of the guide pins, they move with very slight friction in the track.

The roller bearing ball will very effectively pivot because the ball is quite free to rotate, and its polished surface affords a very satisfactory pivot anyhow. The pivot

pins, however, are effective devices in securing the proper pivoting of the door, and they are located opposite the bearing balls for that special reason, and are disposed in such a way that they operate effectively in securing the complete guiding of the device, and because they are secured to the door, there is no rattling or noise. Because the projecting ends of these guide pins are rounded, their frictional contact with the track is very small at any one point, and they are very free to rotate, owing to the anti-friction roller bearings therefor, reducing friction of operation to the minimum. Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination in a door structure for show cases, of a door; diametrically opposed upper and lower grooved tracks with portions parallel with the front of the case and with other portions connected thereto at an angle and extending within the case at substantially right angles thereto; an anti-friction bearing ball disposed in suitable anti-friction bearing supports comprising a pair of grooved rollers on the under side of said door intermediate the ends thereof and toward the rear engaging in the groove of the lower tracks; a revoluble guiding pin at the top of said door with rounded projecting end disposed in a vertical journal bearing diametrically opposite to the said bearing ball disposed to engage in the groove of the upper track; an anti-friction bearing ball supported in suitable anti-friction bearings comprising a pair of grooved rollers at the upper inner corner of said door and in engagement with the groove of said upper track; and a revoluble guide pin disposed in a vertical journal bearing at the inner lower rear corner of said door, diametrically opposite the upper bearing ball, with projecting rounded end for engagement with the said bottom track, coacting as described.

2. The combination in a door structure for show cases, of a door; diametrically opposed upper and lower grooved tracks with portions parallel with the front of the case and with other portions connected thereto at an angle and extending within the case at substantially right angles thereto; an anti-friction bearing ball disposed in suitable anti-friction bearing supports on the under side of said door intermediate the ends thereof toward the rear and engaging in the groove of the lower track; a revoluble guiding pin with projecting end disposed in a vertical journal bearing diametrically opposite to the said lower bearing ball disposed to engage in the groove of the upper track; an anti-friction bearing ball supported in suitable anti-friction bearings at the upper inner corner of said door and in engagement with the groove of said up-

per track; and a revoluble guide pin disposed in a vertical journal bearing at the inner lower corner of said door diametrically opposite the upper bearing ball, with projecting end for engagement with the said
5 bottom track, coacting as described.

In witness whereof, I have hereunto set

my hand and seal in the presence of two witnesses.

LYMAN W. WELCH. [L. s.]

Witnesses:

ARTHUR SHARPE,
RAYMOND W. SMITH.