F. W. S. ELSTROTH.

DOOR HANGER.

APPLICATION FILED JAN. 5, 1910.

1,027,705. **Patented May 28, 1912.**

Fig. 1.

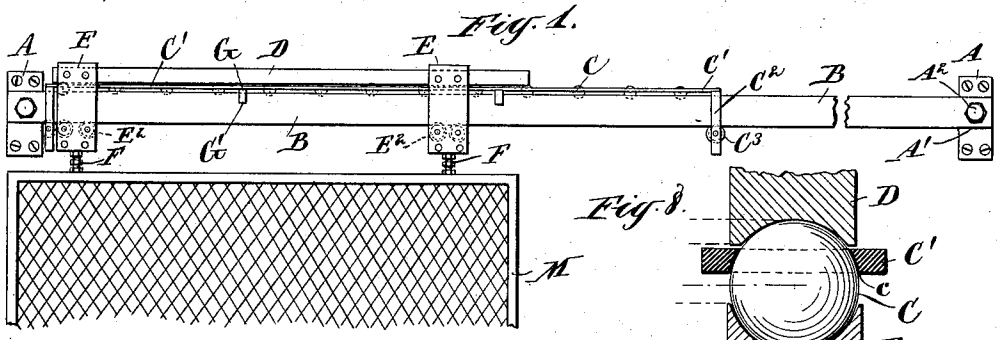
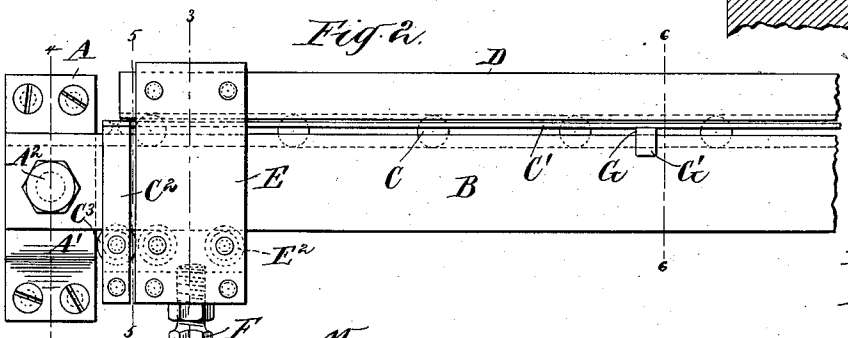


Fig. 8.

Fig. 3.

Fig. 2.



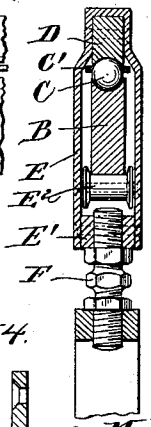


Fig. 4.

Fig. 5.

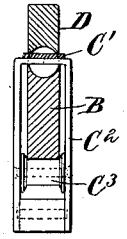
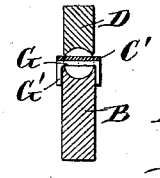
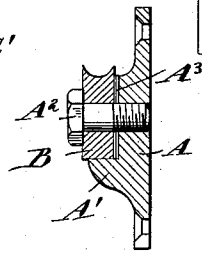


Fig. 6.





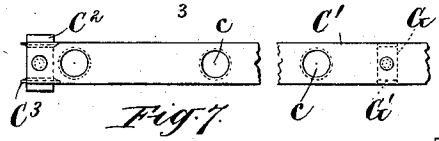


Fig. 7.

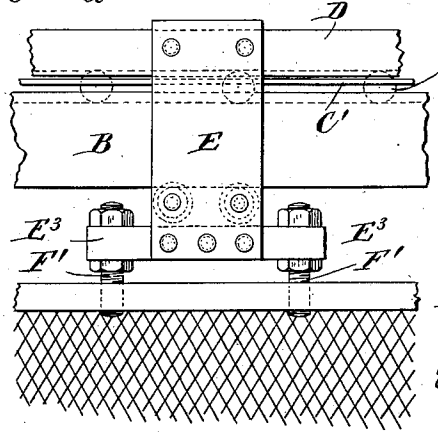


Fig. 9.

Witnesses:
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UNITED STATES PATENT OFFICE.

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DOOR-HANGER.

1,027,705. Specification of Letters Patent. Patented May 28, 1912.

Application filed January 5, 1910. Serial No. 536,452.

To all whom it may concern:

Be it known that I, FRANK W. S. ELSTROTH, a citizen of the United States, residing in the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Door-Hangers, of which the following is a specification.

The invention relates to door-hangers of that class in which the door is suspended from a traveling-carriage supported upon balls held in position in a ball-carrier and rolling upon a fixed track.

The invention consists in certain novel features of construction and arrangement of parts, to be hereinafter described.

The accompanying drawings form a part of this specification and show approved forms of the invention.

Figure 1 is an elevation on a small scale, showing a door supported by the improved hanger. Fig. 2 is a similar view showing a portion of a hanger and door on a larger scale. Fig. 3 is a vertical transverse section through the traveling-carriage track and portion of the door, the line of section being indicated by the line 3—3 in Fig. 2. Fig. 4 is a similar section through the track and one of its supporting brackets, taken on the line 4—4 in Fig. 2. Fig. 5 is a similar section, on the line 5—5 in Fig. 2, through the traveling-carriage track, and ball-carrier, a portion of the latter being shown in elevation. Fig. 6 is a vertical section corresponding to Fig. 5 but taken on the line 6—6 in Fig. 2. Fig. 7 is a plan or top view of a portion of the ball-carrier alone. Fig. 8 is a vertical section through the ball-carrier and portions of the adjacent track and carriage, on a greatly enlarged scale, showing one of the balls in elevation and the relative positions of the other parts thereto. Fig. 9 is an elevation corresponding to Fig. 2 but showing a modification in the means for attaching the door to the hanger.

Similar letters of reference indicate like parts in all the figures.

A A are brackets fastened to the wall and supporting each end of a deep narrow rectangular track B resting on the lips A^1 of the brackets and held thereto by bolts A^2. The upper edge of the track is grooved longitudinally to form a race for the series of balls C C held properly spaced by openings *c* in the ball-carrier C^1 which consists essentially of a long thin strip, wider than the track, through which the upper portions of the balls protrude, the lower portions traveling in the groove in the track and the upper portions matching to a similar groove in the lower face of the traveling-carriage D resting on the balls and arranged to move longitudinally of the track thereon.

E E are loops or hanger-straps inclosing and secured to the track D by riveting, expanded below the latter, the legs of each strap-hanger being joined by riveting to a thick plate E^1 between them, below and inclosing the track. The door M is suspended from the strap-hangers.

In Figs. 1, 2 and 3, the attachment is made by a single right-and-left screw-bolt F for each hanger-strap E, screwed at the upper end into the plate E^1 and at the lower end into the door M, and in Fig. 9 by two bolts F^1 F^1 extending through the projecting ends E^3 E^3 of the plates of each hanger-strap E and into the upper edge of the door. In both cases the transverse section through the carriage, track, carrier, and hanger-strap shows these parts to be bi-laterally equal on each side of a line passing vertically through the balls and their points of contact; it follows that if the center of gravity of the door lies in the same vertical plane with such line and equidistant between the hanger-straps, the suspension strains will be equally distributed and the door will hang vertically without inducing torsional strains on the track or rail. To permit the rail B to be shifted outwardly to accommodate thicker doors thus suspended, filling-pieces A^3 are provided adapted to lie between the rear face of the track and the brackets and held by the bolts A^2. By adding to or subtracting from the filling pieces, the center line of track the balls may be moved inwardly or outwardly relatively to the wall, as may be required.

On each hanger-strap E beneath the track are flanged rollers E^2 E^2 engaging the lower face or edge of the track to prevent the straps and door lifting from the track, and also serving to keep the carriage D in engagement upon the balls. The ball-carrier C^1 is also provided at each end with a loop C^2 similar to but lighter than the hanger-straps, having each a flanged roller C^3 engaged with the same lower edge of the track and serving to hold the carrier and its balls

to the groove in the track B. The carrier is of such length and the loops C^2 so disposed that at each end of the travel of the door one of such loops lies between the hanger-strap E and adjacent bracket, the parts being so proportioned that the travel of the ball-carrier is enough shorter than the full travel of the door to secure this result.

The groove in the upper edge or face of the track is deeper than that in the carriage, the effect being to locate the space, in which the ball-carrier travels between the track and carriage, more than half above the center of the ball, see Fig. 8, and permit the ball-carrier to lie above such center, so that the openings *c* in which the balls are engaged may be less than the full diameter of the balls and by encircling a portion of the upper hemisphere of each prevent their escape upwardly through such openings. As the ball-carrier thus rides upon the balls, and as it is necessarily long and thin, it is desirable to support it at intervals to lessen the friction of the balls in the openings *c* and also to hold the carrier against side movement; both these objects are attained by placing at suitable intervals, between contiguous balls, a reversed U-shaped support or guide G attached to the under face of the carrier with its legs G^1 embracing the upper edges or margins of the track. The cross-bar of the support rides upon the track and is of such thickness as to raise the carrier slightly but sufficiently to relieve the balls; and the legs G^1 by contacting with the sides of the track hold the carrier parallel therewith. There may be as many such supports or guides as conditions may require.

The right-and-left screw-bolts F with their check-nuts permit the parallelism of the upper edge of the door relatively to the carriage to be easily adjusted; the same result may be obtained in the form shown in Fig. 9 by adjusting the nuts on the bolts F^1.

Modifications may be made in the forms and proportions within wide limits in adapting the invention to doors of different weights and sizes, length of travel, and other conditions of service.

I claim:—

1. A track having a groove in its upper face, a carriage having a groove in its lower face, balls in said grooves and a ball carrier constructed to prevent upward displacement of the balls through said carrier, and means supporting said carrier in position to lessen the friction of the balls and embracing the upper edges of the track to prevent side movement of the carrier.

2. A track having a groove in its upper face, a carriage having a groove in its lower face, balls in said grooves and a ball carrier constructed to prevent upward displacement of the balls through said carrier, means supporting said carrier in position to lessen the friction of the balls and to prevent side movement of the carrier, said means comprising a reversed U-shaped guide on the under face of the carrier, the depending portions thereof engaging the track and embracing the upper edges thereof and slightly raising said carrier.

3. In a device of the character set forth, a track having a groove in its upper face, a carriage having a groove in its under face, a ball carrier interposed between the adjacent faces of said track and carriage balls therein, and a support for said carrier interposed between contiguous balls and having depending portions embracing the track.

4. In a device of the character set forth, a track having a groove in its upper face, a traveling-carriage above said track and having a groove in its lower face, a series of balls received in said grooves and supporting said carriage, a ball-carrier in the space between said track and carriage and having openings receiving said balls, and supports for said carrier beneath the latter, each consisting of a cross-bar constructed to ride upon the upper face of said track and support said carrier, and legs embracing both sides of said track to prevent lateral movements of said carrier relatively thereto.

5. In a device of the character set forth, a track having a groove in its upper face, a carriage having a groove in its under face, a ball carrier interposed between the adjacent faces of said track and carriage, balls therein and a support for said carrier interposed between the contiguous balls and having depending portions embracing the track and a transverse member engaging the lower edge of the track and connected with the end of the carrier.

In testimony that I claim the invention above set forth I affix my signature, in presence of two witnesses.

FRANK W. S. ELSTROTH.

Witnesses:
CHARLES R. SEARLES,
WALLY E. YOUNG.