F. W. S. ELSTROTH.

DOOR HANGER.

APPLICATION FILED JUNE 20, 1910.

990,243.

Patented Apr. 25, 1911.

Fig. 1.

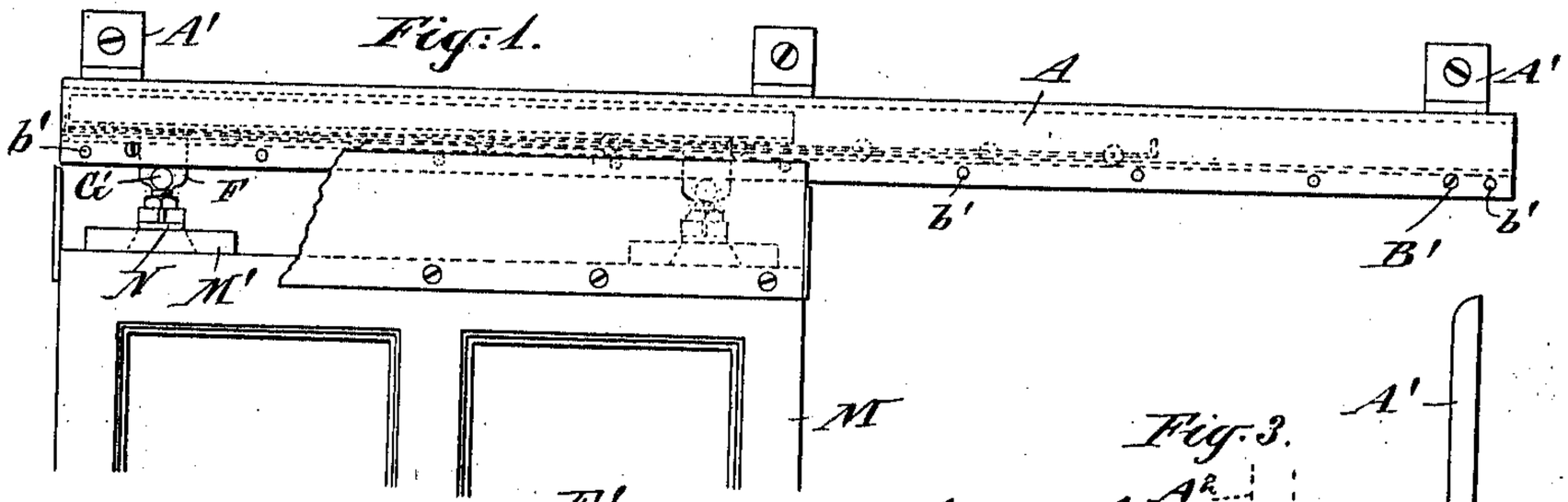


Fig. 2.

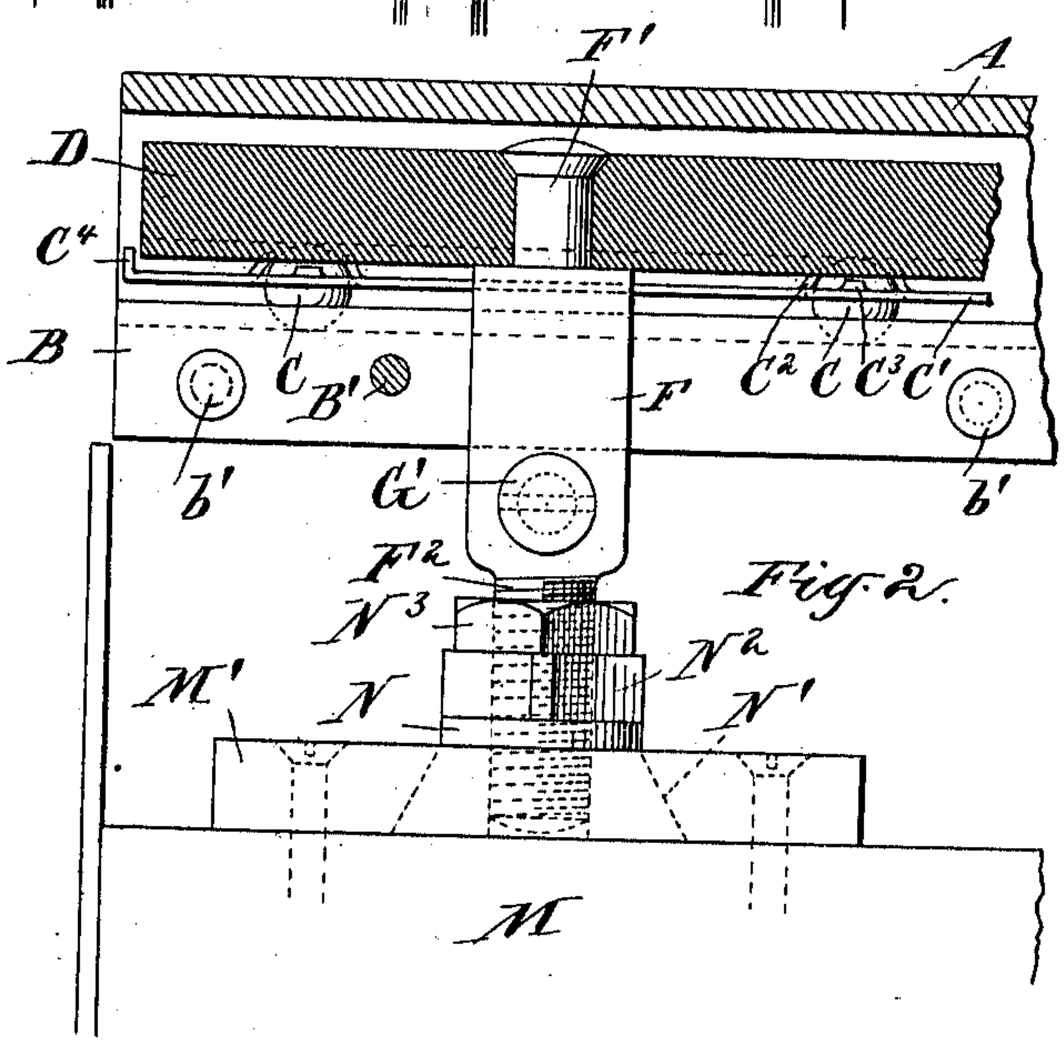


Fig. 3.

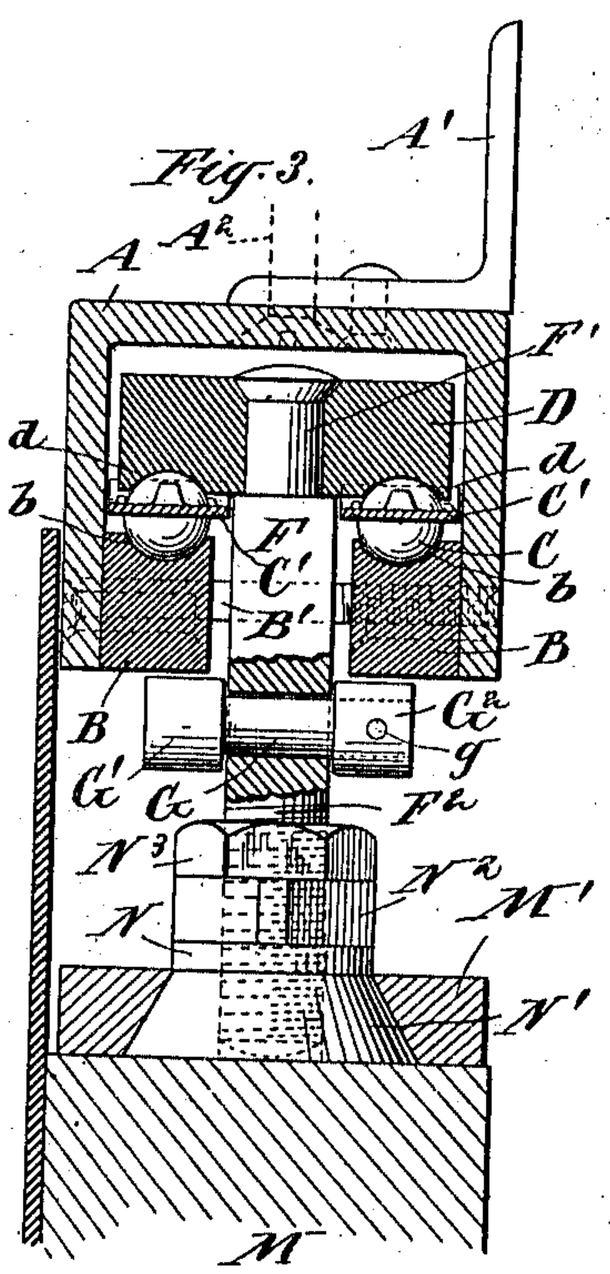


Fig. 4.

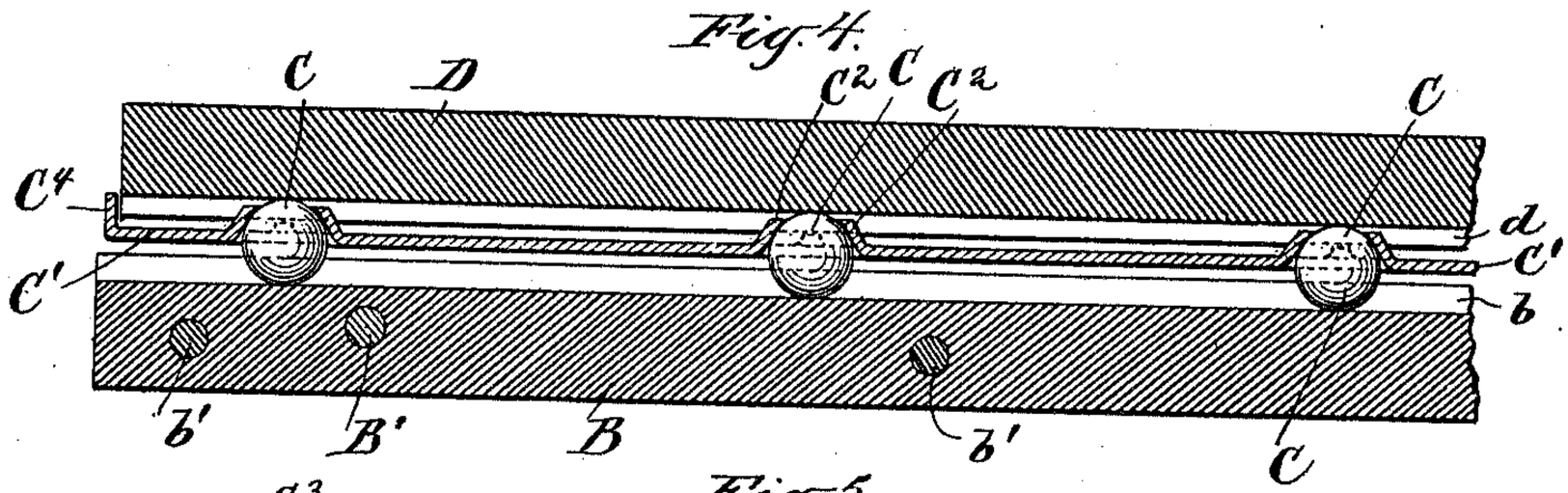


Fig. 5.

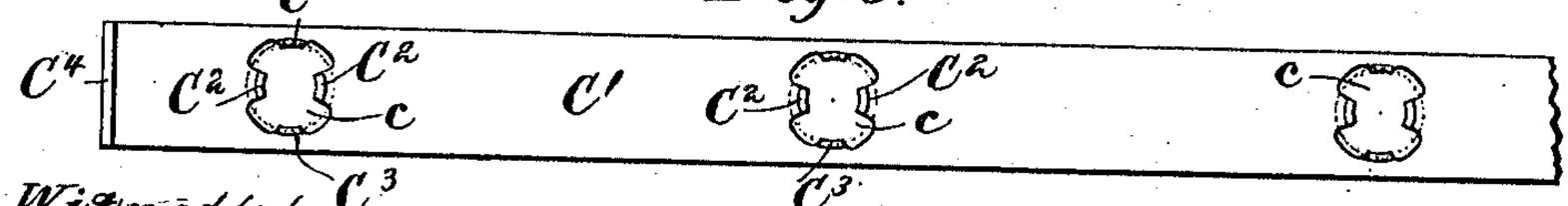
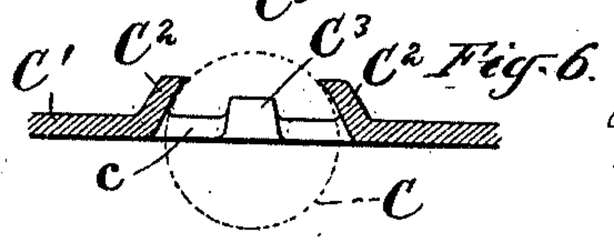


Fig. 6.



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UNITED STATES PATENT OFFICE.

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DOOR-HANGER.

990,243. Specification of Letters Patent. **Patented Apr. 25, 1911.**

Application filed June 20, 1910. Serial No. 567,869.

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 in which the door is suspended from a carrier arranged to travel on antifriction balls rolling upon a track.

The object of the invention is to provide a durable, strong, and economical construction in which the load is reliably supported without lateral or torsional strains on the hanger, and in which the carrier, tracks, balls, and ball-carriers are inclosed and protected against the entrance of dust or other matter falling from above.

Another important object is to provide ball carriers for spacing and controlling the balls, in which the tendency to twist and to ride upon the balls is effectually resisted.

A further object is to provide a construction by which the spaces between the hanger and door may be practically closed to lessen the danger of fire passing from one face of the door to the other through such spaces when the door is in the closed condition.

The invention consists in certain novel features of construction and arrangement by which the above objects are attained, to be hereinafter described.

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

Figure 1 is an elevation of the hanger and upper portion of a door, on a small scale. Fig. 2 is a longitudinal section partly in elevation, on a larger scale. Fig. 3 is a corresponding transverse section with certain portions in elevation. Fig. 4 is a vertical longitudinal section through the carrier and one of the tracks and ball carriers. Fig. 5 is a plan view of an end portion of one of the ball carriers alone. Fig. 6 is a longitudinal section of a portion of a ball carrier, on a still larger scale, showing an inclosed ball in dotted lines.

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

A is a channel iron or rail of inverted U-section having secured to its upper face brackets A^1 or other means of attachment to the wall and carrying on the interior faces of its depending flanges oppositely placed tracks B B secured thereto by rivets b^1. The upper faces of tracks are each grooved longitudinally to receive a series of balls C located at the desired distances in a ball door carrier C^1.

Above the tracks B B is a door carrier D of sufficient width to overlie both tracks, and having two grooves *d d* on its under face, spaced to match the grooves *b b* in the tracks and rest upon both series of balls C.

The door M, which may be understood to be of any type, is attached to the door carrier by suspension bars, each comprising a body F of rectangular section received in the longitudinal opening or space between the tracks, having a cylindrical upper end F^1 extending through a corresponding hole drilled through the door carrier and headed or riveted on the upper face of the latter, and a downward cylindrical extension or bolt F^2 screw-threaded for attachment to the door. On the upper edge of the door, and securely fastened thereto, are plates M^1 M^1 each having a tapered opening extending therethrough in which is received the conical head N^1 of a nut N drilled or tapered to engage the screw-threaded bolt F^2 and having a squared portion N^2 by which it may be turned.

N^3 is a jam-nut above the nut N.

The bar F is drilled transversely below the tracks B B and loosely receives the shaft G extending through the bar from one side to the other, having a head G^1 at one end lying immediately beneath the track, and on the other a removable head G^2 of the same diameter as the head G^1, held to the shaft by a pin *g*. The shaft G with its head G^1 and head G^2 serves to limit the rise of the carrier D and hold it in place on the balls, and also to serve as a roller against the lower faces of the tracks and reduce the friction when the door and carrier is lifted or tilted in the opening or closing movement.

The ball carriers C^1 C^1 each consists of a thin strip of metal having openings *c* inclosing the balls C. The openings are formed by suitable dies and each has two oppositely placed tongues C^2 arranged longitudinally on the center line of the strip and bent upwardly to contact with the ball above its diameter, and two oppositely placed shorter tongues or spurs C^3 arranged transversely of the strip. The tongues and spurs with the openings form pockets in which the balls are

retained with liberty to rotate. The tongues C^2 support the strip upon the balls and extend into the groove *d* in the door carrier, while the shorter spurs C^3 extend nearly to the lower face of the door carrier on each side of the groove and by contact with such face prevent lateral tilting or twisting of the strip and also prevent the ball carrier from riding up on the balls and jamming between the latter and the door carrier. Each end of the ball carrier is turned up to form a flange C^4 adapted to be struck by the door carrier at each end of its complete movement and force the ball carrier into proper position relatively thereto.

It will be noted that the door carrier, ball carriers, balls and tracks are housed or inclosed in the channel rail A and thus protected from the weather and against the entrance of dust or chips falling from above the hanger.

The two tracks with the door carrier above and suspension bars between them sustain the load equally and reduce the friction to a minimum by avoiding lateral or torsional strains, aided by providing an independent ball carrier and series of balls for each track.

The conical nuts by which the suspension bars are attached to the door permit the latter to be easily and nicely adjusted as to height and level, and the jam-nuts N^3 serve to hold the conical nuts reliably against rotation when thus adjusted.

At each end of the tracks B B is a pin or screw B^1 inserted after the door carrier and ball carriers have been mounted on the tracks, and serve as stops to be struck by the suspension bars and limit the movement of the door carrier to insure the latter against running off at the ends of its travel.

The brackets A^1 are intended for use in applying the hanger to the face of a wall. When it is to be placed in an overhead pocket in a partition between two rooms the channel rails may be held by screws inserted from below as indicated in dotted lines at A^2 in Fig. 3.

Other modifications may be made in the forms and proportions, and parts of the invention may be used without the whole.

I claim:—

In a device of the character set forth, a grooved track, a grooved carrier above said track, a series of balls received in the grooves of said track and carrier, a ball carrier having openings for said balls, tongues extending upwardly from the margins of said openings into the groove in said carrier and arranged longitudinally of said ball carrier, and spurs extending upwardly from the margins of said openings nearly to the under face of said carrier and arranged transversely of said ball 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:

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