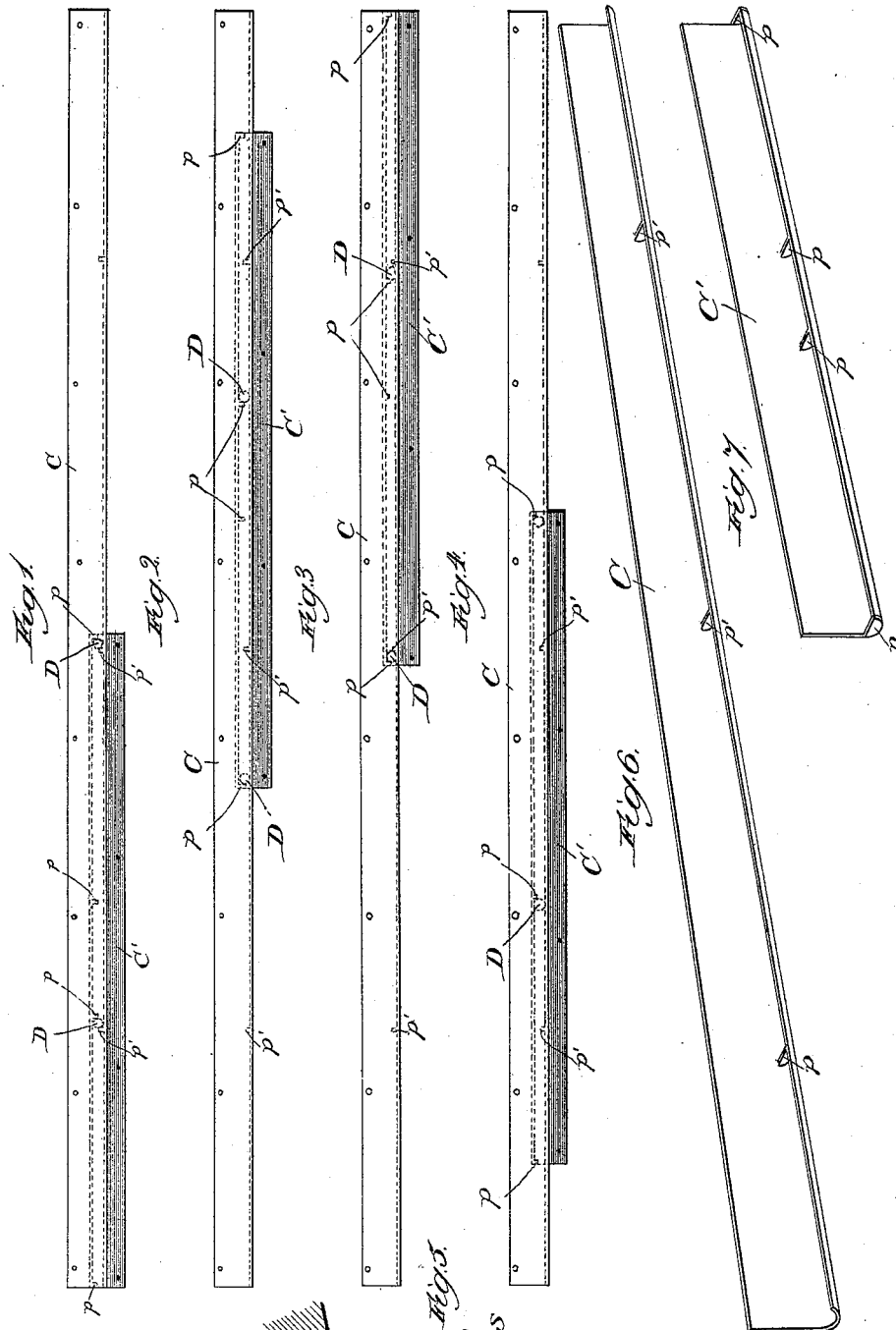


(No Model.)

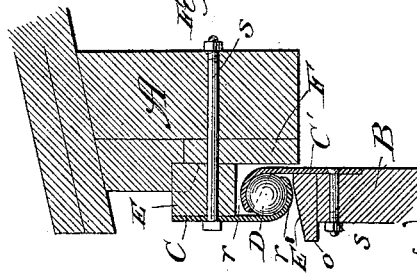
A. B. PULLMAN.
CAR DOOR HANGER.

No. 420,831.

Patented Feb. 4, 1890.



Witnesses:
E. C. Gaylord,
J. M. Dymond.



Inventor:
Albert B. Pullman,
By Dymond & Dymond,
Attys.

UNITED STATES PATENT OFFICE.

ALBERT B. PULLMAN, OF CHICAGO, ILLINOIS.

CAR-DOOR HANGER.

SPECIFICATION forming part of Letters Patent No. 420,831, dated February 4, 1890.

Application filed May 26, 1888. Serial No. 275,230. (No model.)

To all whom it may concern:

Be it known that I, ALBERT B. PULLMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Car-Door Hangers, of which the following is a specification.

My invention relates to an improvement upon the door-hanger for which Letters Patent of the United States, No. 285,575 were granted to Benjamin J. Cloes on the 25th day of September, 1883. In that invention an angle-iron depending from the wall of the structure above the door serves as a track for balls to travel on, and an angle-iron extending upward from the top of the door serves as a hanger to rest and travel on the balls, and the angle-irons are provided with stops at certain intervals to limit the movements of the balls.

A marked characteristic of that invention is the ease with which the door may be operated, only a very slight pressure being required to move it in either direction. The invention, however, contemplated a uniform facility of operation throughout the whole distance traveled by the door in opening or closing, while practice has demonstrated that in some applications of the invention, notably the application to freight-cars, it is preferable to have the door move with diminished freedom upon nearing either limit of its travel. This I effect by so locating the stops that they engage the balls before the door has reached the limit of its travel, and, by exerting a binding effect upon the balls, prevent them from rolling, whereby a sliding effect is produced for the remainder of the distance.

The term "angle-iron" is used in a generic sense, implying any material suitable for the purpose, as set forth in the Cloes patent.

In the accompanying drawings, Figure 1 is a detached view of my improved door-hanger, showing the relative positions occupied by the parts thereof when the door is closed; Fig. 2, a similar view showing the relative positions occupied by the parts when, in the operation of opening the door, the balls cease to roll and begin to slide; Fig. 3, a similar view showing the relative positions

of the parts when the door is fully open; Fig. 4, a similar view showing the relative positions of the parts when, in the operation of closing the door, the balls cease to roll and begin to slide; Fig. 5, a broken vertical cross-section through the car, the door, and the hanger, showing the mode of attachment of the angle-irons to the door and car, as well as their preferred form; and Figs. 6 and 7, perspective views of the two angle-irons in their preferred form.

A is the wall of the car; B, the sliding door; C, the angle-iron depending from the wall of the car; C', the angle-iron projecting upward from the door, and D the balls, of which two are employed ordinarily, as indicated by the dotted lines in Figs. 3 to 6.

To give the angle-iron C its proper position, a wooden strip E is placed along the upper part of the fascia-board F, and the parts are firmly secured together by nut-bolts extending from the outside of the angle-iron to the interior of the car. The angle-iron C' is secured to the inner face of the upper part of the door by means of nut-bolts s', and it is advisable that the parts be so related as to bring this angle-iron as close to the fascia-board as possible without frictional contact. The angle-irons C and C' overlap each other in reverse order and embrace the balls between them, as in the patent of Benjamin J. Cloes, above referred to; but I prefer, instead of making the overlapping portions flat, as in the said Cloes patent, to form them so that the parts r, which embrace the balls, shall be hollowed on their inner surfaces. The effect of the hollowed form is to prevent lateral movement of the balls in the track and to maintain the angle-iron C' close to the fascia-board, thus preventing jarring or rattling of the door when the car is in motion, and excluding dust, cinders, rain, and the like from the interior of the car.

The preferred length of the angle-iron C is about double the breadth of the door, so that the door may be fully opened, while the preferred length of the angle-iron C' is about equal to the breadth of the door.

The patent aforesaid of Benjamin J. Cloes describes stops at intervals on the angle-irons to limit the movement of the balls by form-

ing sockets equal or substantially equal to the distance traveled by the balls in the operation of the door, the purpose being to cause the balls to roll freely throughout the whole distance traveled by the door. In my improvement the angle-iron C' is provided with stops *p*, which, however, are not in such position as to permit the balls to roll freely during the whole operation of the door, but are in such position as to overtake the balls before the door is either fully opened or fully closed. Thus, in Fig. 2 it will be seen that while the door has still some distance to travel the stops *p* have reached the balls D, and the obvious effect will be that they will serve to bind the balls, so that the latter will slide for the remainder of the distance, greatly increasing the friction and rendering a correspondingly-increased force necessary in order to complete the opening of the door. In other words, the door moves with great freedom from the position shown in Fig. 1 to the position shown in Fig. 2, and a considerably greater force is required to move it from the position shown in Fig. 2 to the position shown in Fig. 3. The same is true in closing the door, since by reason of the location of the stops *p* the door moves with great freedom from the position shown in Fig. 3 to that shown in Fig. 4, at which position the stops *p* overtake the balls D, and a largely-increased force is required to move the door from the position shown in Fig. 4 to the fully-closed position shown in Fig. 1. While, however, this increased resistance occurs as the door nears its limit, either in opening or closing, there is no increasing resistance in starting the door, either from the open or closed position; but the balls will roll freely when the door is moved from either limit until they are overtaken by the stops. This will be readily apparent from an inspection of Figs. 2 and 3 or Figs. 1 and 4. In the two last-named figures, for example, it will be seen that while the balls D remain bound by the stops *p* in contact with them until the door has passed from the position shown in Fig. 4 to the position shown in Fig. 1, as soon as the direction of movement of the door is reversed the balls are again free to roll until they are overtaken by the opposite stops. The exact points at which the balls will be overtaken by the stops may easily be determined, since, so long as the balls are left free to roll, the distance which they travel in any given time is just half that traveled by the door in the same time. From the time when the stops overtake the balls, however, the distance traveled by the balls in any given time is equal to that traveled by the door in the same time. Therefore if it is desired to have the stops *p* begin to operate as a brake upon the balls at a distance of about one foot from either limit of the movement of the door, the intermediate stops *p* should be about one foot apart, or each about six inches from the center of the

angle-iron C'. The remaining stops *p* are at opposite ends of the angle-iron C'.

If desired, stops *p'* may be provided on the angle-iron C. The purpose of these additional stops is fully explained in the patent of Benjamin J. Cloes aforesaid. If employed, one should be at the center of the angle-iron C and one at each side of the center at a distance therefrom equal to the full distance traveled by the balls both in rolling and sliding. Of course, so far as the location of the stops *p* on the angle-iron C' is concerned, whereby the balls slide instead of roll toward the ends of their course, it is immaterial whether the parts of the angle-irons which embrace the balls are hollowed, as shown in the accompanying drawings, or straight, as shown and described in the patent to Benjamin J. Cloes. Therefore my claims are intended to include either construction of angle-irons, provided the stops *p* are located in accordance with my invention, as above described.

One great merit of the Cloes door-hanger is that the two angle-irons overlapping each other in reverse order serve as a most effective guard for preventing rain, sleet, snow, dust, sparks, &c., from entering the interior of the car over the top of the door. One of the objects of the construction in the accompanying drawings is to improve this attribute of the Cloes device by beveling the top of the door, as shown at E' in Fig. 5. When the top of the door is horizontal, it serves as a lodging-place for all of the above substances, and in winter the rain, sleet, and snow thus lodged are liable to produce an accumulation of ice sufficient to impede the operation of the door. By giving the top of the door a suitable incline downward and outward, as described, no such lodging-place is afforded, and it becomes impossible for ice to accumulate in such quantity as to produce any injurious effect.

It is preferable to form the beveled top E' with a projecting ledge *o*, as shown, though the purpose will be answered also by simply beveling the upper ends of the boards which form the door.

In cases where there is no occasion for having the hanger serve as a weather and cinder guard—as, for example, in sliding doors for houses—that portion of the angle-iron C' which is between the intermediate stops *p* may be omitted.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a hanger for sliding doors, the combination of an angle-iron to depend from the wall of the structure above the door and serve as a track for balls, a second angle-iron to project upward from the top of the door and hang upon the balls, and stops *p* in position to engage the balls and bind them against rolling before the door has reached the limit of its movement, substantially as described.

2. In combination with the wall A and door B, the angle-iron C, secured to the wall above the door and carrying balls D, and the angle-iron C', secured to the upper part
5 of the door and hanging upon the balls D, and provided with stops *p* in position to overtake the balls before the limit of movement

of the door is reached, substantially as described.

ALBERT B. PULLMAN.

In presence of—

J. W. DYRENFORTH,
M. J. BOWERS.