

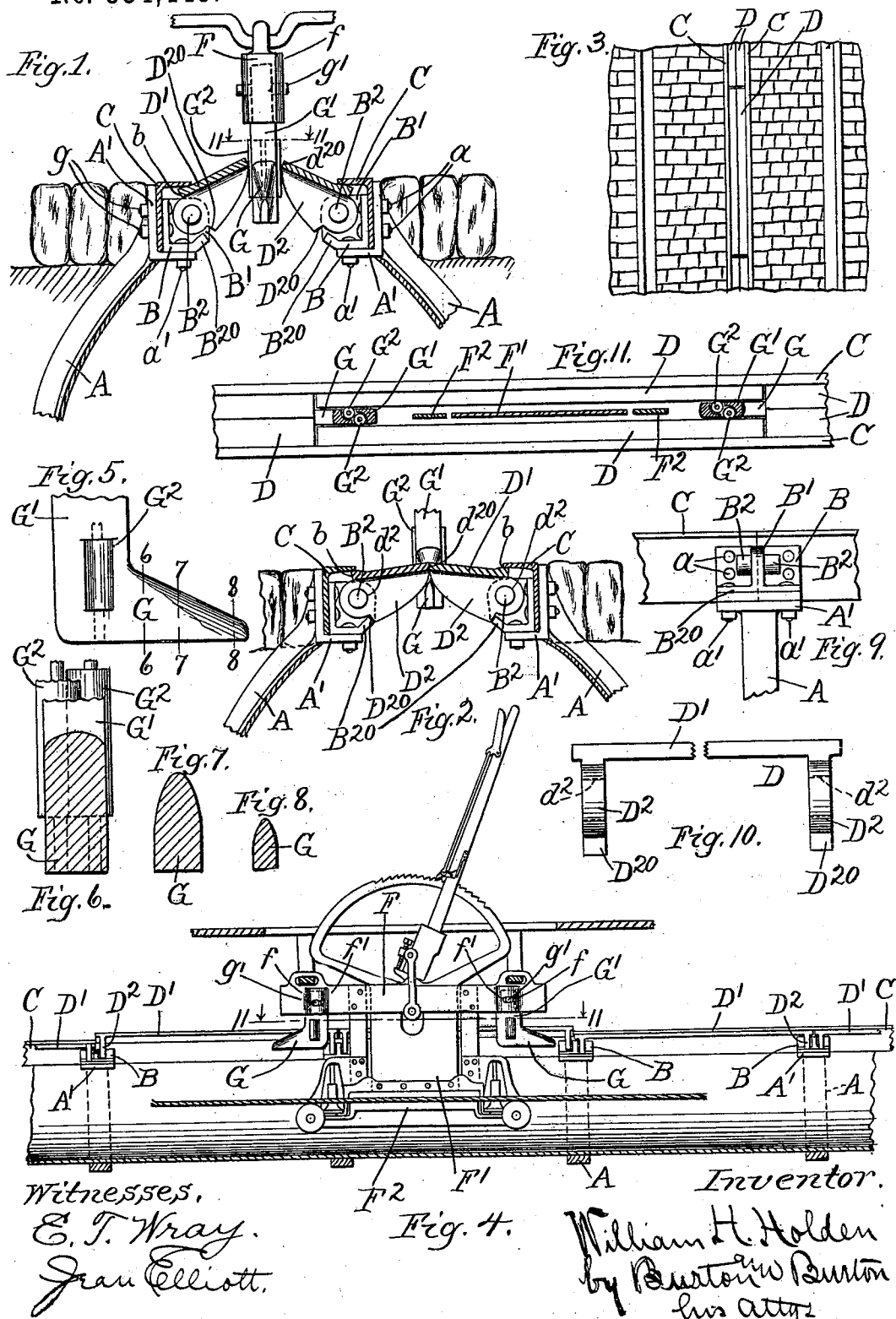
(No Model.)

W. H. HOLDEN.

SLOT IRON FOR STREET RAILWAY CONDUITS.

No. 554,445.

Patented Feb. 11, 1896.



UNITED STATES PATENT OFFICE.

WILLIAM H. HOLDEN, OF CHICAGO, ILLINOIS.

SLOT-IRON FOR STREET-RAILWAY CONDUITS.

SPECIFICATION forming part of Letters Patent No. 554,445, dated February 11, 1896.

Application filed July 27, 1895. Serial No. 557,335. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. HOLDEN, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Slot-Irons for Street-Railway Conduits, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide devices constituting the lips or side irons of a slot in a conduit for electric or cable railway, adapted to normally keep the slot closed, and to be opened, one section at a time, for the gripper, in the case of a cable railway, or the insulating-bar which carries the electric wires, in the case of an electric railway.

In the drawings, Figure 1 is a detail section of a portion of track having such a conduit, the yoke-irons thereof being partly shown and provided with my improvement and the gripper being shown in position between the lips of the slot holding a section of the same open. Fig. 2 is a similar view of the upper ends of the yoke and the lip-irons pivoted thereto, the latter being shown in closed position as when the gripper is not passing them. Fig. 3 is a detail plan of a piece of track having my improved slot-irons. Fig. 4 is a longitudinal detail section of the conduit, taken through the center of the slot and showing in side elevation the gripping mechanism of a cable car, the conduit and the grip being provided with my improvements. Fig. 5 is a detail and side elevation of the pilot-shoe or prow by which the slot is opened section by section. Figs. 6, 7, and 8 are vertical sections at the lines 6, 7, and 8, respectively, on Fig. 5, showing a taper of the pilot-shoe. Fig. 9 is a detail elevation of the upper end of the yoke and the clip mounted thereon for the purpose of pivoting the slot-irons and the tie and guard bars which connect the yokes at their upper ends. Fig. 10 is a detail side elevation of one of the slot-irons broken out between its ends to condense the view. Fig. 11 is a horizontal section at 11 11 on Fig. 1 or Fig. 4.

A represents one of the yoke-irons of the conduit. It terminates at the upper ends in an angular seat A'.

B is a cast fitting having a horizontal and

a vertical web and a transverse web B', from which studs B² B² project, one in each direction. This fitting is adapted to be seated in the angular seat A' of the yoke-iron. Consecutive yokes are tied together by the angle-iron C, the vertical web of which may intervene between the vertical web of the fitting B and the vertical web of the seat A' of the yoke-iron, so that the tie may be secured by the same bolts *a* which secure the fitting to the yoke through the vertical webs. Additional bolts *a'* may be used to secure the fitting to the yoke through the horizontal webs of the fitting and yoke respectively.

D D are the slot iron or irons which form the lips of the slot. The slot-iron has the horizontal or approximately horizontal web D', constituting the lip proper of the slot, and bracket-like ends or lugs D², projecting from the under side of the web D' near the ends and serving as the means of mounting the slot-irons on the yoke-irons of the conduit, for the said bracket-lugs have pivot-apertures *d*² to adapt them to be mounted on the studs B² of the fitting B. The brackets D² at the heel or outer edge are shaped in the arc of a circle about the center of the aperture *d*², and are provided with a shoulder D²⁰ at the lower side which is adapted to stop against the edge of the horizontal web of the fitting B, which may be turned upward for that purpose, as shown at B²⁰. The horizontal web of the angle-iron C laps onto the horizontal web of the slot-irons at the rear edge *b*, as seen in Figs. 1 and 2. The width of the horizontal web of the slot-irons is such that when they are mounted upon the opposite ends of the yoke-irons, as seen in Figs. 1 and 2, their inner edges will meet and stop against each other at the same time that the shoulders D²⁰ stop against the upturned lips of the horizontal webs of the fittings B, respectively. The lower edges of the bracket ends D² of the slot-irons are oblique to the web D', said bracket ends being tapered down from the heel or rear edge toward the forward edge, the most desirable form being probably slightly curved, as shown in the drawings, and it is preferable also that at the extreme inner ends the brackets should have a short straight portion *d*²⁰, whereat they may seat against each other when closed together.

To co-operate with the slot-irons pivoted to the yokes and adapted to stop against each other and close the slot and having sloping lower edges at their ends, as illustrated, I provide the grip-bar with pilot-shoes or prow-
5 adapted to enter under and between the sloping edges of the bracket ends of the slot-irons and separate the latter to open the slot as the car advances.

10 F is the grip-bar of a common form of grip device for cable cars.

F' F² are two parts of the gripper extending downwardly from the grip-bar and operated by the lever mechanism extending upwardly
15 therefrom, and which need not be described, as it constitutes no part of the present invention. To this grip-bar I secure pilot-shoes or prow-
20 G G, one at each side of the gripper, so that one precedes and one follows the gripper in the direction of travel of the car. The pilots G G are preferably connected to the grip-bar so as to have a slight range of piv-
25 otal movement about the axis of the vertical stem G' of the pilot-shoe. This is conveniently obtained by extending the stem G' up
30 into a pivot-bearing provided in a boss f on the grip-bar and securing the shoe in position by means of a pin g' inserted through the boss and stem, the holes f' in the boss through
35 which it is inserted being slightly elongated horizontally, as shown in Fig. 4, and the pin being made fast in the stem of the pilot-shoe.

The shape of the pilot-shoe is shown in Figs. 5, 6, 7 and 8, the successive sections 6, 7 and
35 8 serving to indicate substantially the taper of the shoe, which widens from the toe to the heel, and at the same time slopes upward on top, the lower edge being horizontal. In the
40 heel portion of the pilot—that is, the portion at the larger end and after the full width is reached—I prefer to journal vertical anti-fric-
45 tion-rollers G² G², which project slightly at the opposite sides respectively of the shoe, so that they take the friction of the slot-irons after the slot is fully opened by the entrance
of the shoe between such irons.

In order to use as large rollers as possible they are set not directly opposite each other but one a little in advance of the other, as
50 seen in the drawings.

The operation of these devices applied to an ordinary grip-car in the manner shown may be understood to be that as the car ad-
55 vances the foremost pilot-shoe poking its nose under and between the converging lower edges of the bracket ends of the slot-irons en-
60 gages them on its sloping surface and tilts them up and apart, entering between them, as shown in Fig. 1, so that the gripper is free
65 from contact with the edges of the slot-irons, which rest upon the anti-friction-rollers G² as the car advances. The length of each slot-iron being at least greater than the distance from stem to stem of the front and rear pilot-shoes, the rear shoe will have entered the slot between each pair of slot-irons before the forward shoe has got beyond the forward ends

of the same pair. The slots are thus kept from collapsing against the gripper, and are also caused to close together with the same
70 gradual movement with which they were separated, thus preventing the noise which would otherwise be caused by their sudden collapse. The advantage of allowing slight pivotal
75 movement to the pilot-shoes is chiefly to enable them to assume positions slightly out of line in passing around curves in the track, wherein consecutive sections of slot-irons
80 would be at a slight angle to each other, one shoe being between one pair of irons while the other shoe is between the next pair in the rear. This expedient also gives flexibility to the device and permits easy adaptation to slight irregularities in the tracks.

I do not limit myself to the particular mode
85 of hinging the slot-irons to the fixed structure of the track, and any mechanic will readily devise variations in this respect; but in all such variations the essential points to be kept in mind and provided for are, besides
90 economy in construction, protection against danger of throwing the irons out by the impact of the shoe against them when cars are moving very rapidly, protection against the danger of the irons falling too far inward when
95 they for any cause fail to meet properly at the center, and provision for enabling each slot-iron, independently of its mate, to sustain a weight which may be put upon it by loaded teams passing over it or running upon
100 it when for any reason it is not braced properly by its mate.

It is also necessary to so construct the hinge connection that its action shall not be liable to be interfered with by sand and gravel from
105 the road-bed, nor by ice and snow, and to this end it is desirable to avoid in such hinge connection shoulders which advance toward each other as the slot opens, and which might in the opening movement pinch between them
110 sand or gravel or ice, which would prevent the proper opening of the slot or impose too great strain upon the shoe in forcing such opening. These points, it will be observed, are provided for in the structure herein
115 shown, and said structure is to be taken therefore as a specimen, from which, however, many departures in the details might be permitted without departing from the essence of my invention.

For the sake of convenience and clearness in the phraseology of my claims I use the term "power-arm" to indicate in any system employing a conduit the bar or arm through which power is communicated from any
125 source in the conduit to the car outside of the conduit, whether that power be the gripper or grip-bar of a cable system, the trolley-arm of an underground-trolley system, or bar or arm of whatever form which extends from
130 the car through the slot having the electric conducting-wires for transmitting power from a line-wire in the conduit to the motor on the car.

I claim—

1. In a cable or electric railway fixed supports on opposite sides of the conduit, slot-irons hinged upon such supports adapted to tilt thereon to open and close the slot, having their ends cut away at the lower inner corner to render them oblique to the vertical plane at which the irons meet to close the slot, in combination with a pilot-shoe carried by the car, adapted to protrude within the conduit and located in advance of the power-arm, such shoe having its upper surface sloped rearwardly upward and being at its upper part wider than the thickness of the power-arm, whereby it is adapted to enter under and between the sloping edges of the slot-irons to tilt them apart as the car advances, and hold them separated while the power-arm enters between them, substantially as set forth.

2. In a cable or electric railway fixed supports on opposite sides of the conduit, slot-irons hinged and adapted to tilt on such supports to open the slot, in combination with a pilot-shoe carried by the car protruding into the conduit and located in advance of the power-arm, such shoe being tapered, widening horizontally from the front end rearward, and sloping upward from front toward the rear, whereby it is adapted to engage under the slot-irons at their proximate edges and tilt them upward apart as the car advances, substantially as set forth.

3. In a cable or electric railway fixed supports on opposite sides of the conduit and the slot-irons hinged upon such supports and adapted to tilt thereon to open and close the slot, such slot-irons having their ends toward the direction from which the car advances sloped downward and away from the vertical plane at which the irons come in contact when the slot is closed, in combination with a pilot-shoe carried by the car protruding into the conduit and located in advance of the power-arm, such shoe being tapered widening horizontally from the front end rearward and sloping upward from front toward the rear, whereby it is adapted to engage under and between the slot-irons at their proximate edges and tilt them upward apart as the car advances, substantially as set forth.

4. In combination with the yoke-irons the fitting B mounted rigidly on the upper opposite ends of the yoke-irons, and having the

pivot-lugs B', the slot-irons adapted to be pivoted on said lugs and to rock over such pivots to meet at their inner edges and close the slot, and the longitudinal tie-irons C adapted to be lodged between the yoke ends and the fittings B and secured by the same bolts which fasten said fittings to the yokes, substantially as set forth.

5. In combination with the yoke-irons the fittings B mounted upon their opposite ends respectively, and the slot-irons pivoted to such fittings and adapted to tilt over such pivots to meet and close the slot, and the angle-iron ties C extending from yoke to yoke and having its horizontal lip overhanging the heels or outer edges of the slot-irons respectively, substantially as set forth.

6. In combination with the yoke-irons having terminals B B, the slot-irons pivoted to such terminals and adapted to tilt over their pivots to meet and close the slot and having their upper surfaces exposed to the travel, and their pivots below the level of the travel and of their upper line of contact with each other; stops on the said terminals which arrest the slot-irons, respectively in their closing movement at substantially the point at which their said upper edges should come into contact: substantially as set forth.

7. In a cable or electric railway in combination with the conduit-frame and the slot-irons pivoted thereon and adapted to rock over their pivots to open and close the slot, shoes carried by the car and protruding within the conduit and located one in advance and the other in the rear of the power-arm, such shoes being adapted respectively to open the slot in advance of and permit it to close in the rear of the power-arm, and being provided with vertical stems whereat they are pivotally connected to their support and adapted to oscillate slightly about such pivotal connection, whereby the two shoes may stand at a slight angle to each other in passing around curves, substantially as set forth.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 24th day of July, 1895.

WILLIAM H. HOLDEN.

Witnesses:

CHAS. S. BURTON,
JEAN ELLIOTT.