

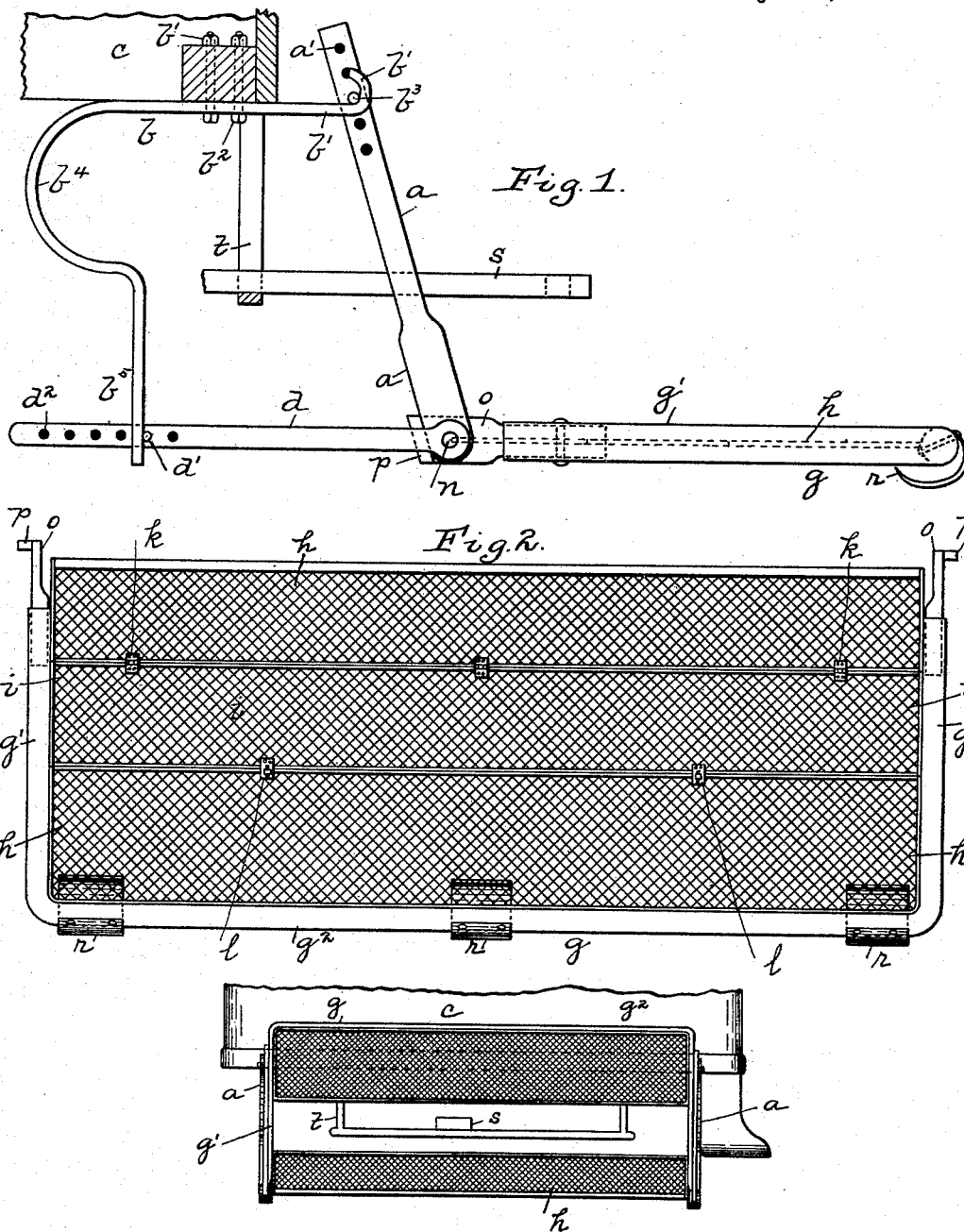
(No Model.)

R. A. CRAWFORD.  
PILOT FOR CARS.

3 Sheets—Sheet 1.

No. 522,932.

Patented July 10, 1894.



Witnesses:

*Wm. J. Martin*

*F. L. Shrum*

Fig. 3.

Inventor:

*Robert A. Crawford*  
By *Kay, Totten & Cooke*  
Attorneys

(No Model.)

3 Sheets—Sheet 2.

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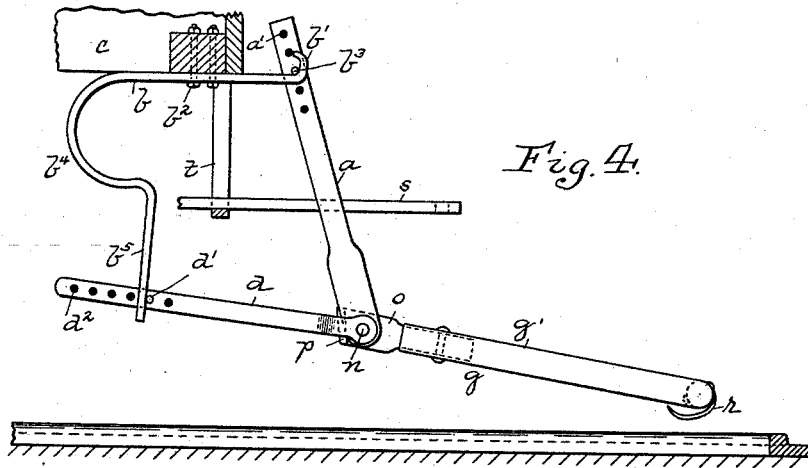


Fig. 4.

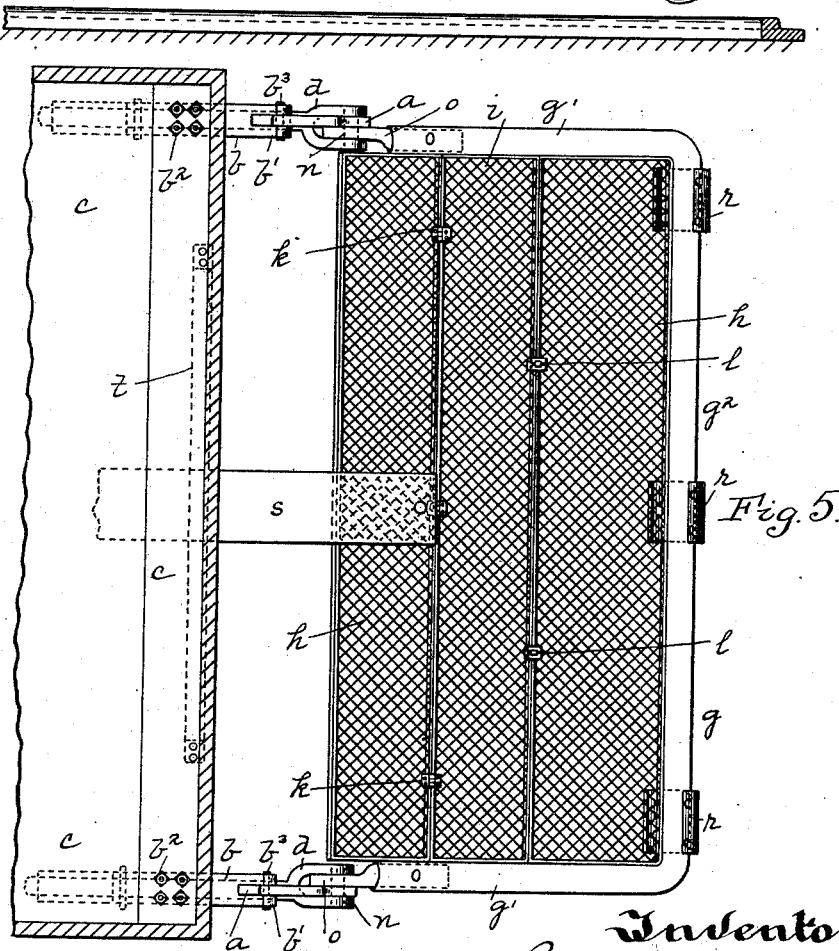


Fig. 5.

Witnesses:  
*Wm. J. Martin*  
*F. L. Shrum*

Inventor:  
*Robert A. Crawford*  
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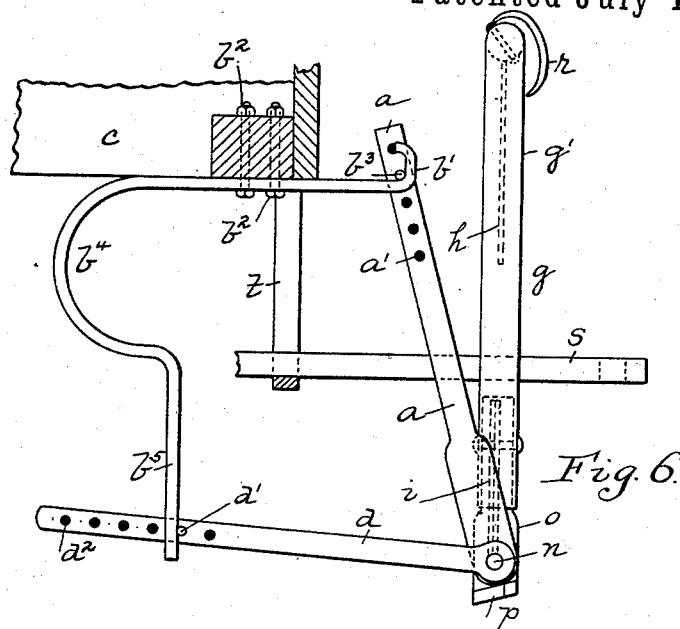


Fig. 6.



Fig. 7.

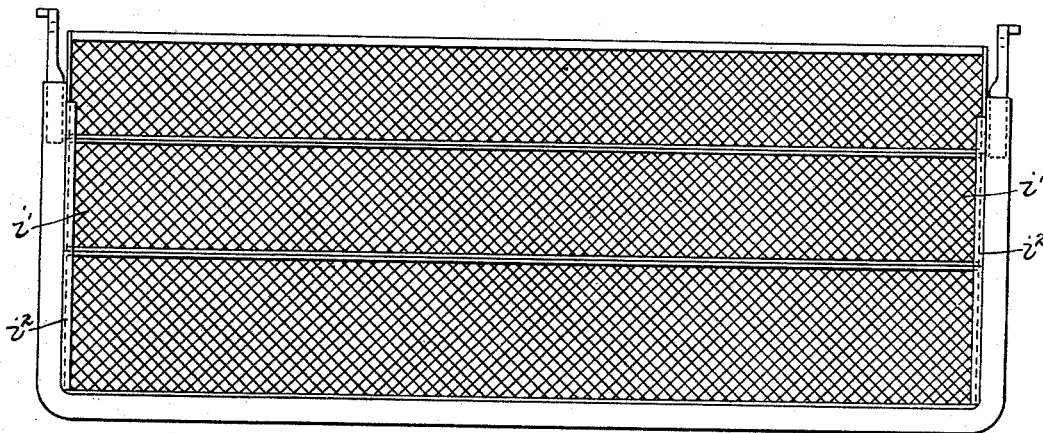


Fig. 8.

## Sickness.

John J. Martin.

F. L. Stacey

**Inventor:**

Robert A. Crawford

By Kay, Totten & Cooney  
Attorneys.

# UNITED STATES PATENT OFFICE.

ROBERT A. CRAWFORD, OF ALLEGHENY, ASSIGNOR OF ONE-HALF TO  
SAMUEL D. WARMCASTLE, OF PITTSBURG, PENNSYLVANIA.

## PILOT FOR CARS.

SPECIFICATION forming part of Letters Patent No. 522,932, dated July 10, 1894.

Application filed December 2, 1893. Serial No. 492,575. (No model.)

### *To all whom it may concern:*

Be it known that I, ROBERT A. CRAWFORD, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have  
5 invented a new and useful Improvement in Pilots or Guards for Cars; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to pilots or guards for  
10 street cars or like conveyances, whether electrically propelled or otherwise, one of its objects being to provide a pilot or guard in which the forward portion thereof may be folded back on the main body of said pilot or  
15 guard without interfering with the customary draw-bar which projects beyond the body of the car.

The further objects of my invention are to provide means for supporting said pilot or  
20 guard, and for relieving the wear and tear to which it is subjected.

My invention comprises, generally stated, a pilot or guard to fold back having a movable section whereby, upon adjusting said  
25 section in the proper position and folding the said pilot or guard back, the draw-bar of the car will pass through the opening normally covered by said movable section.

My invention also comprises certain other  
30 improvements relating to the manner of supporting the pilot or guard, all of which will be more fully hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the  
35 same more fully, referring to the accompanying drawings, in which—

Figure 1 is a side view of the front portion of the car with my invention applied thereto. Fig. 2 is a plan view of the folding portion of the pilot or guard removed. Fig. 3 is a front  
40 view of the pilot or guard with the forward portion folded back upon the main body and the movable section open. Fig. 4 is a side view showing the pilot or guard deflected. Fig. 5 is a plan view. Fig. 6 shows the folding portion folded back. Figs. 7 and 8 show  
45 a modified form of my invention.

The main or fixed portion of my improved pilot is composed of the bars *a*, which are se-  
50 cured at their upper ends to the outer ends *b'* of the spring arms *b* secured to the car body

*c* by means of bolts *b*<sup>2</sup>. The outer ends *b'* of said spring arms *b* are bifurcated so that the upper ends of the bars *a* enter said bifurcated ends *b'* and are supported therein by means  
55 of the bolts or pins *b*<sup>3</sup>. In order to adjust the bars *a* at different heights, according as it may be desired to raise or lower the pilot or guard, said bars are provided with a series of openings *a'* through which the pins *b*<sup>3</sup> may  
60 pass.

The spring arms *b* are formed of metal having the required resiliency and are bent to form the U-shaped portion *b*<sup>4</sup> and the straight lower ends *b*<sup>5</sup>. The lower ends of the bars *a*  
65 are supported by the projecting rods *d*. These projecting rods *d* pass back through openings in the lower ends *b*<sup>5</sup> of the spring arms *b*, being adapted to move back and forth within said openings. In order to regulate the dis-  
70 tance to which said rods *d* may recede within said openings pins *d'* are inserted in openings *d*<sup>2</sup> in said rods. By this construction when any pressure is brought to bear upon the pilot the spring arms *b* will yield and the  
75 forward end of said pilot will descend closer to the level of the street, and when the pressure is relieved said arms will resume their normal position by reason of their resiliency.

The forward or folding portion *g* of my improved pilot consists of the frame *g'*, said frame having the wire covering *h* secured thereto. Strips of metal may be employed in place of the wire covering if so desired. The section *i* of said frame *g'* is hinged as at *k*, so  
85 that said section may be free to swing back upon the rigid portion of said frame. In order to hold this hinged section *i* down in its normal position the buttons *l* are employed. It is apparent that this hinged section *i* may be  
90 situated at any point in this frame *g'*, as its position will vary according to the height of the draw-bar of the car, as will more fully hereinafter appear.

The frame *g'* is secured to the bars *a* by  
95 means of the pins *n*, said pins *n* passing through the openings in the extensions *o* on said frame and through openings in the ends of said bars *a* and the rods *d*. Said extensions *o* are further provided with the out-  
100 wardly projecting flanges *p* adapted to engage with the inner edges of said bars *a*. By this

form of construction the forward or folding portion of the pilot is always free to fold back on the main portion, but the flanges *p* prevent said forward portion from being lowered further than shown in Fig. 1. This manner of supporting the forward or folding portion of the pilot by means of the flanges *p* forms the subject matter of an application for Letters Patent filed by me on the 11th day of November, 1892, Serial No. 451,644.

Secured to the toe *g*<sup>2</sup> of the frame *g'* are the springs *r*, said springs being approximately semi-circular in form, one end thereof being secured to said frame *g'* and the other end being free. Any number of these springs may be employed. The object of these springs is to relieve the wear and tear of the toe of the frame *g'* due to the striking of the said toe against the surface of the street, which is caused by the oscillating of the car on its truck in running. By the use of the springs *r* the toe of said frame *g'* does not come into contact with the pavement, as the said springs *r* strike the pavement first and relieve the wear and tear of the frame *g'*.

In Figs. 7 and 8 I have shown a modified form of my invention. In this modification the movable section *i'* instead of being hinged is constructed to slide in guides *i*<sup>2</sup> in the frame. The movable section *i'* is shown open in Fig. 8, which is a cross section of the folding portion.

As stated above, one of the objects of my invention is to provide a folding pilot or guard which may be folded back without interfering with the draw-bar. The draw-bar *s* in the drawings is supported in the usual manner in the hanger *t*, and, as is well known, said draw-bar swings from one side to the other of said hanger when the car moves around a curve. When, therefore, it is desired to employ a car as a "trailer," the hinged section *i* is released by the buttons *l* and is turned back, whereupon the folding portion *g* is folded back onto the main or fixed portion, as shown in Fig. 3. By this construction the pilot does not interfere with the connecting of the draw-bar to the preceding car or the folding back of the pilot when it is desired to run the car into the car house.

By the employment of the spring arms *b* it is apparent that when the pilot or guard

comes in contact with an object offering sufficient resistance, the said spring arms *b* will yield and the forward end of said pilot or guard will be deflected toward the street level, as shown in Fig. 4, and upon the removal of said object, the pilot or guard will resume its normal position.

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

1. A pilot or guard adapted to fold back on the main portion thereof, and having a movable section thereon, substantially as and for the purposes set forth.

2. A pilot or guard adapted to fold back on the main portion thereof, and having a hinged section thereon, substantially as and for the purposes set forth.

3. A pilot or guard adapted to fold back on the main portion thereof, a hinged section thereon, and fastening devices for holding said hinged section in position, substantially as and for the purposes set forth.

4. In a pilot or guard for cars, the combination with the car body, of a bifurcated arm projecting therefrom and upwardly bent, and a bolt or pin for supporting said pilot or guard within said bifurcated arm, substantially as and for the purposes set forth.

5. In a pilot or guard for cars, the combination with the car body, of a spring arm secured thereto, the upper end of said spring arm projecting therefrom and supporting said pilot or guard, rods on said pilot or guard passing back through openings in the lower end of said spring arm, and stops on said rods, substantially as and for the purposes set forth.

6. In a pilot or guard for cars, the combination with the car body, of a U-shaped spring arm secured thereto, the upper end of said arm projecting therefrom and supporting the upper end of said pilot or guard, rods on said pilot or guard passing back through openings formed in the lower end of said U-shaped arm, and stops on said rods, substantially as and for the purposes set forth.

In testimony whereof I, the said ROBERT A. CRAWFORD, have hereunto set my hand.

ROBERT A. CRAWFORD.

Witnesses:

ROBT. D. TOTTEN,  
JAMES I. KAY.