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A. E. HUGHES.

SAFETY ATTACHMENT FOR STREET CARS.

No. 549,316. Patented Nov. 5, 1895.

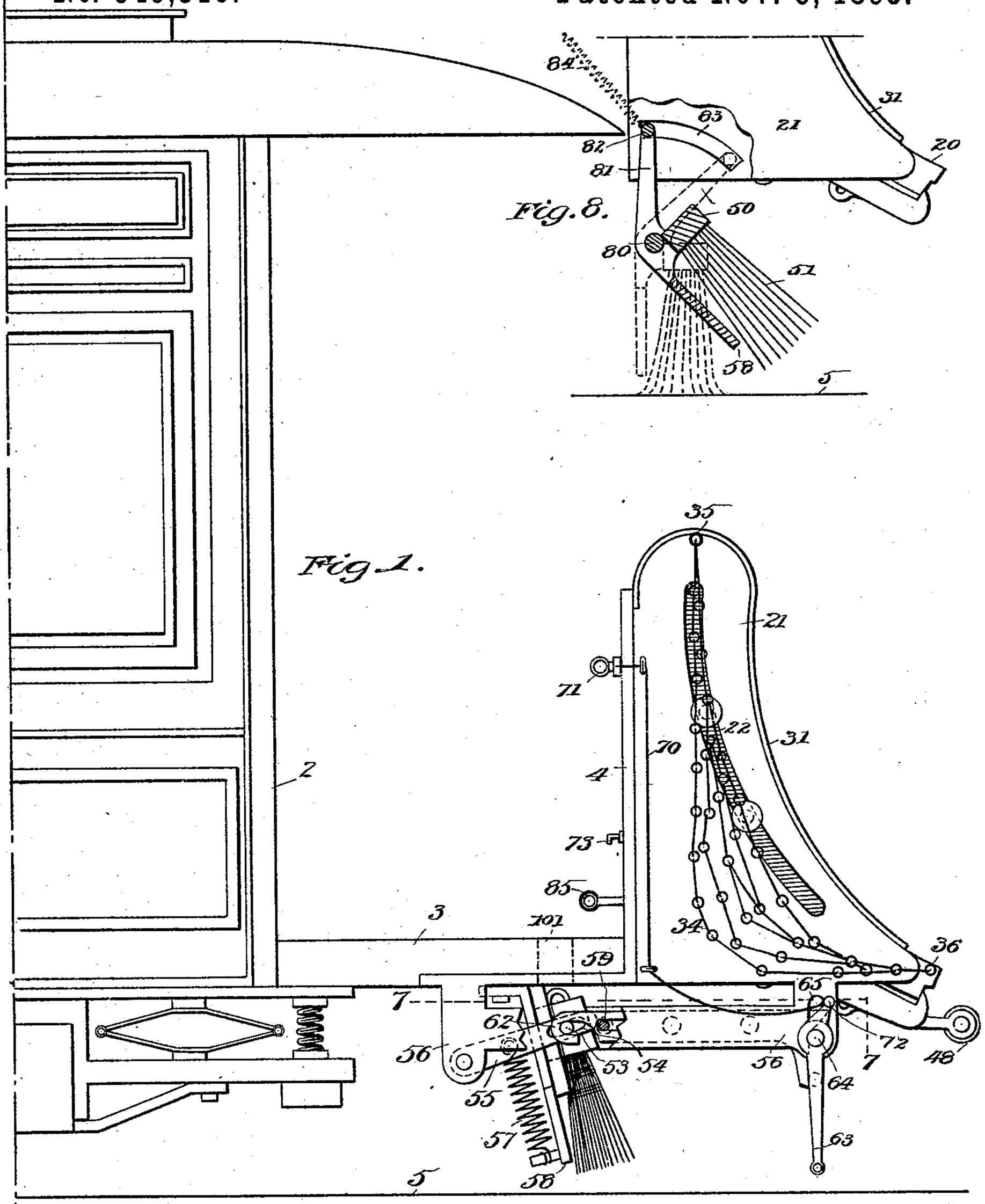

Fig. 1.

Fig. 8.

Fig. 2.

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Fig. 3.

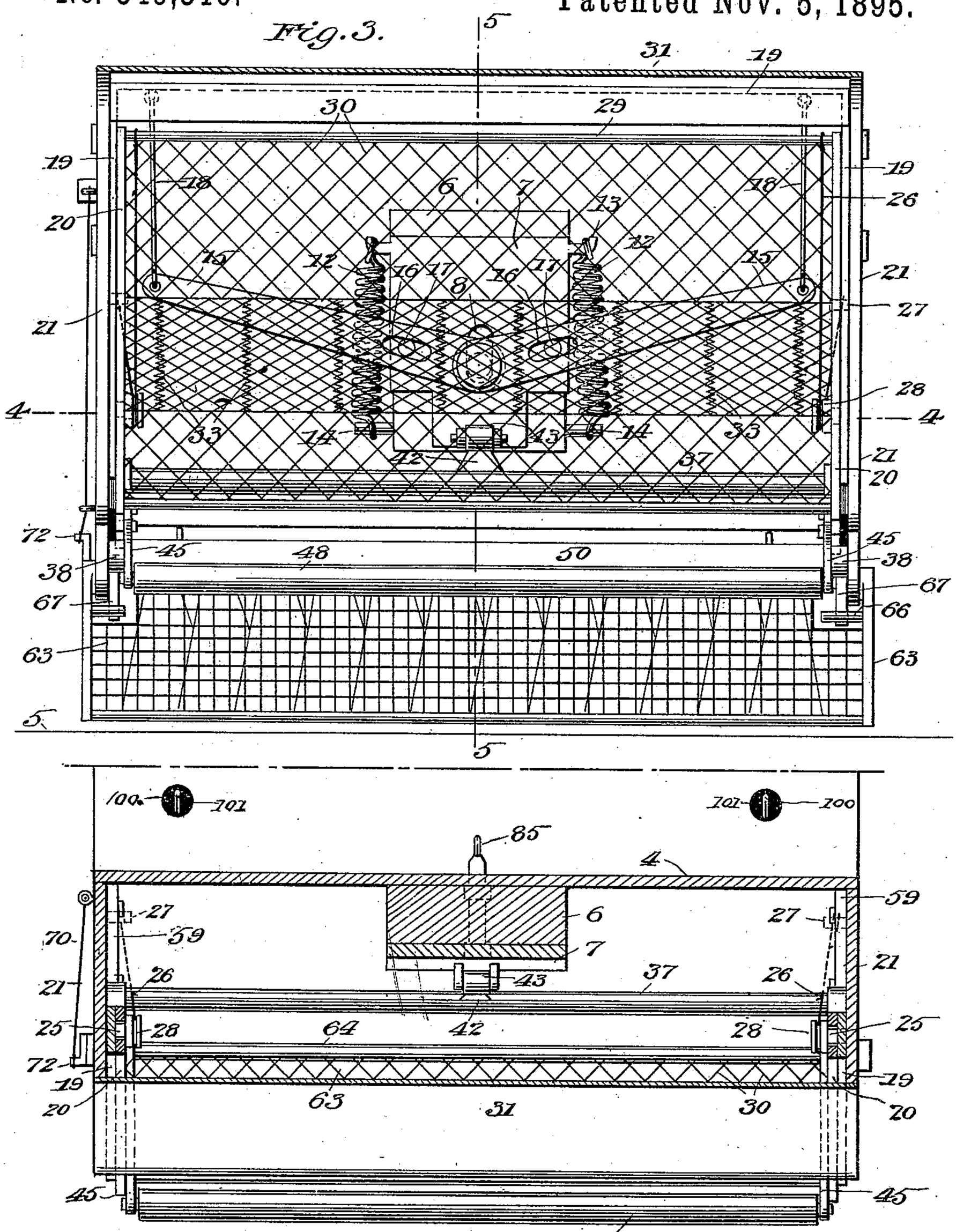

Fig. 4.

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Fig. 5.

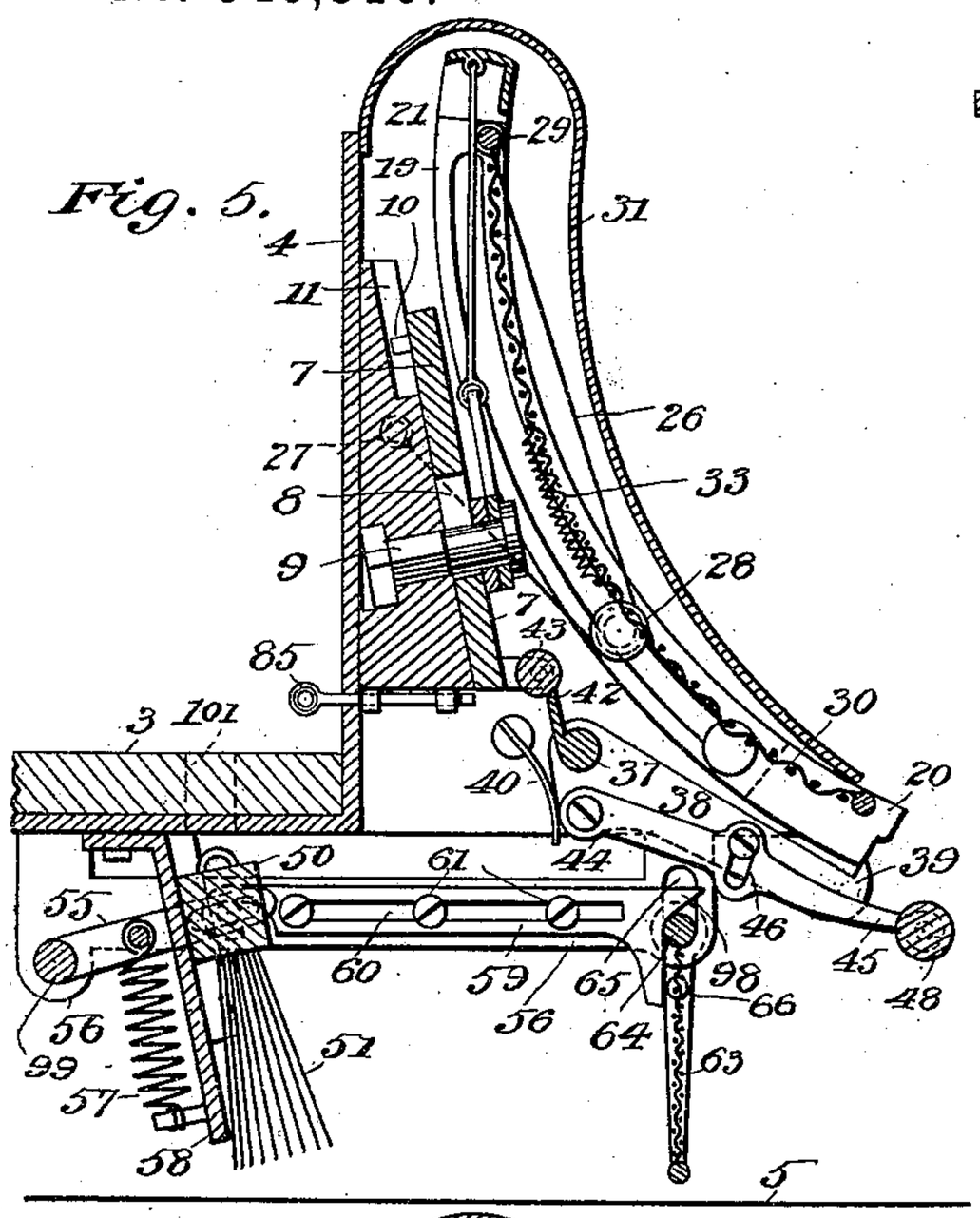


Fig. 7.

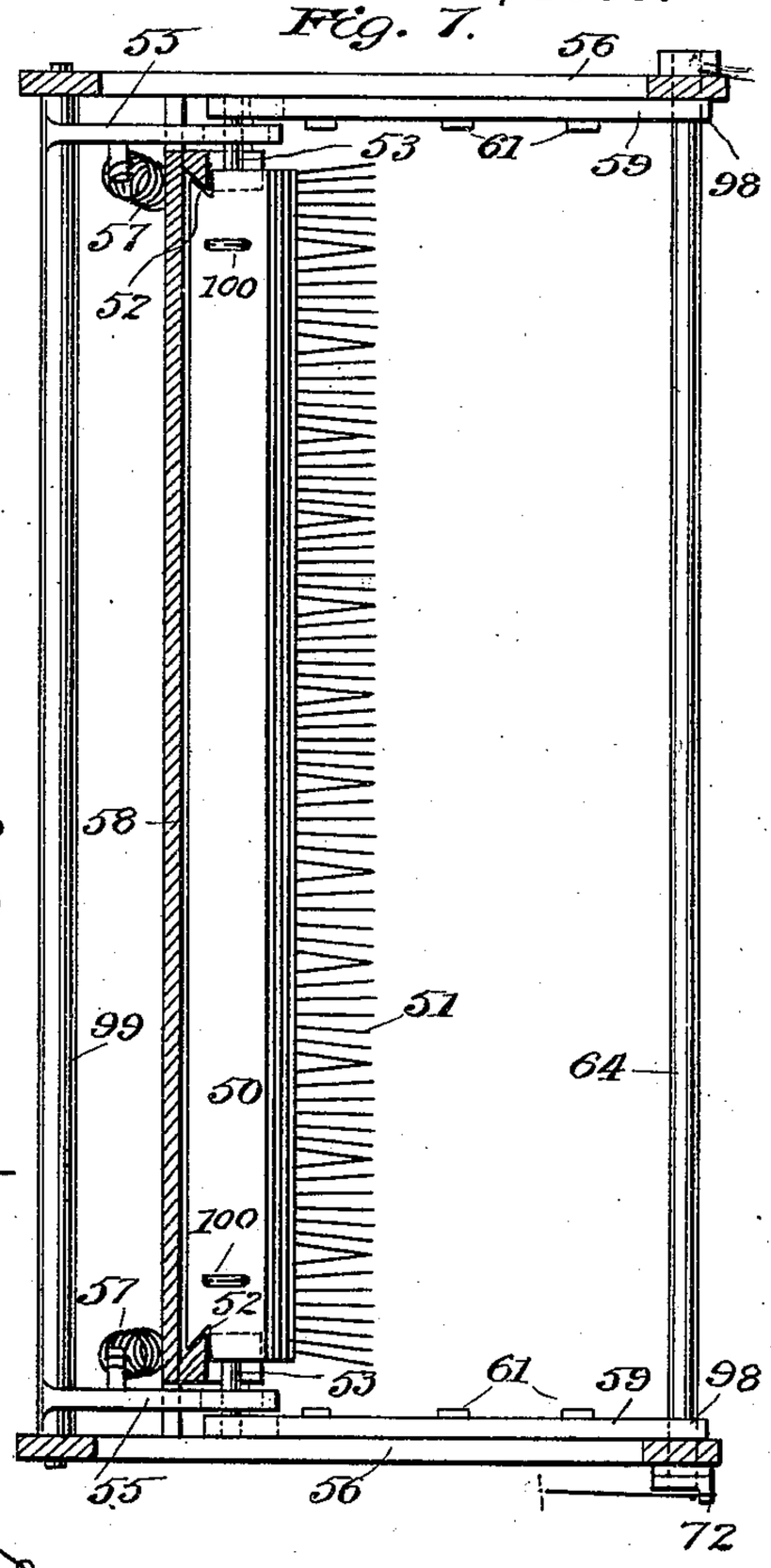
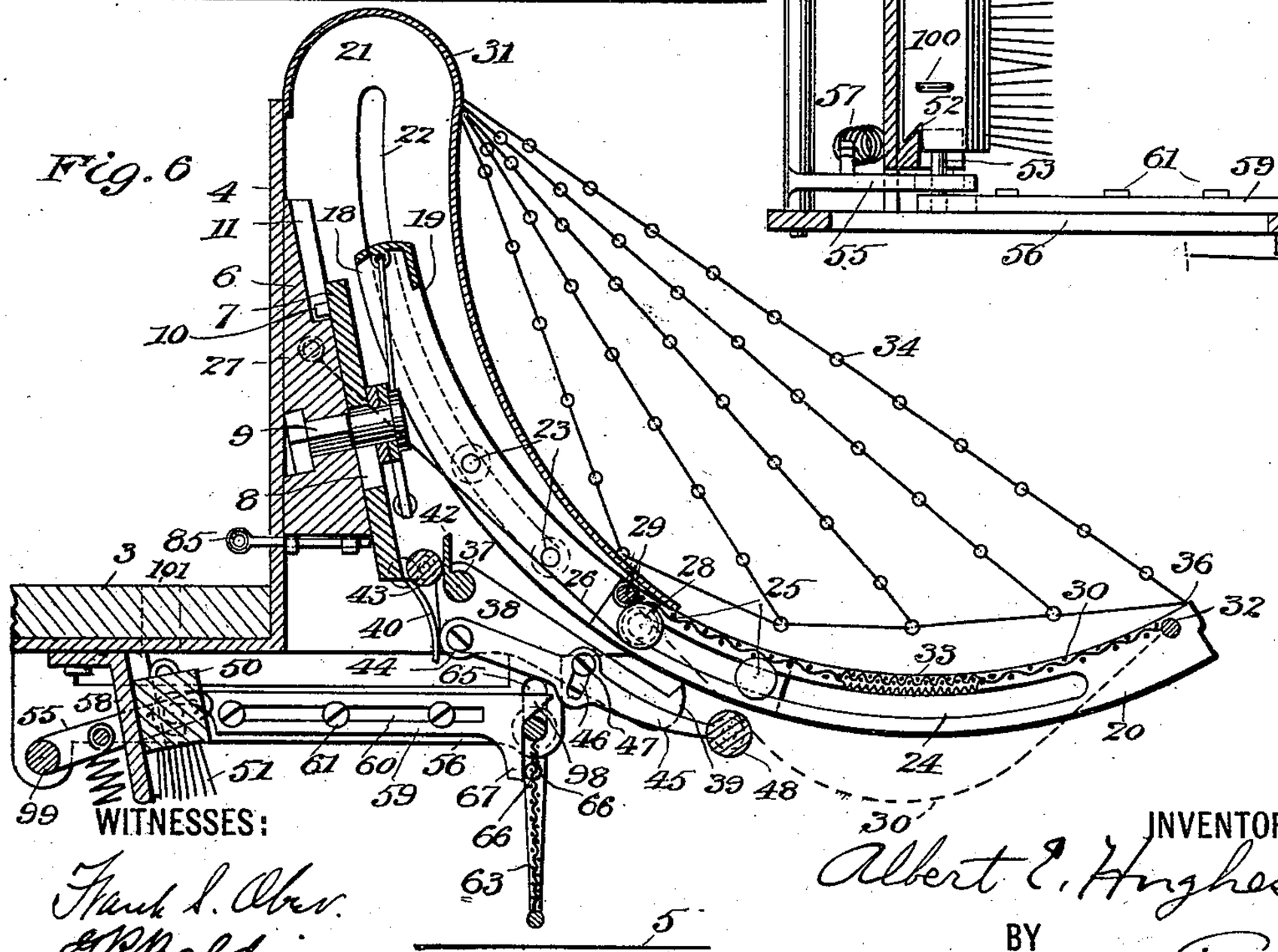


Fig. 6



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SAFETY ATTACHMENT FOR STREET CARS.

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Fig. 9.

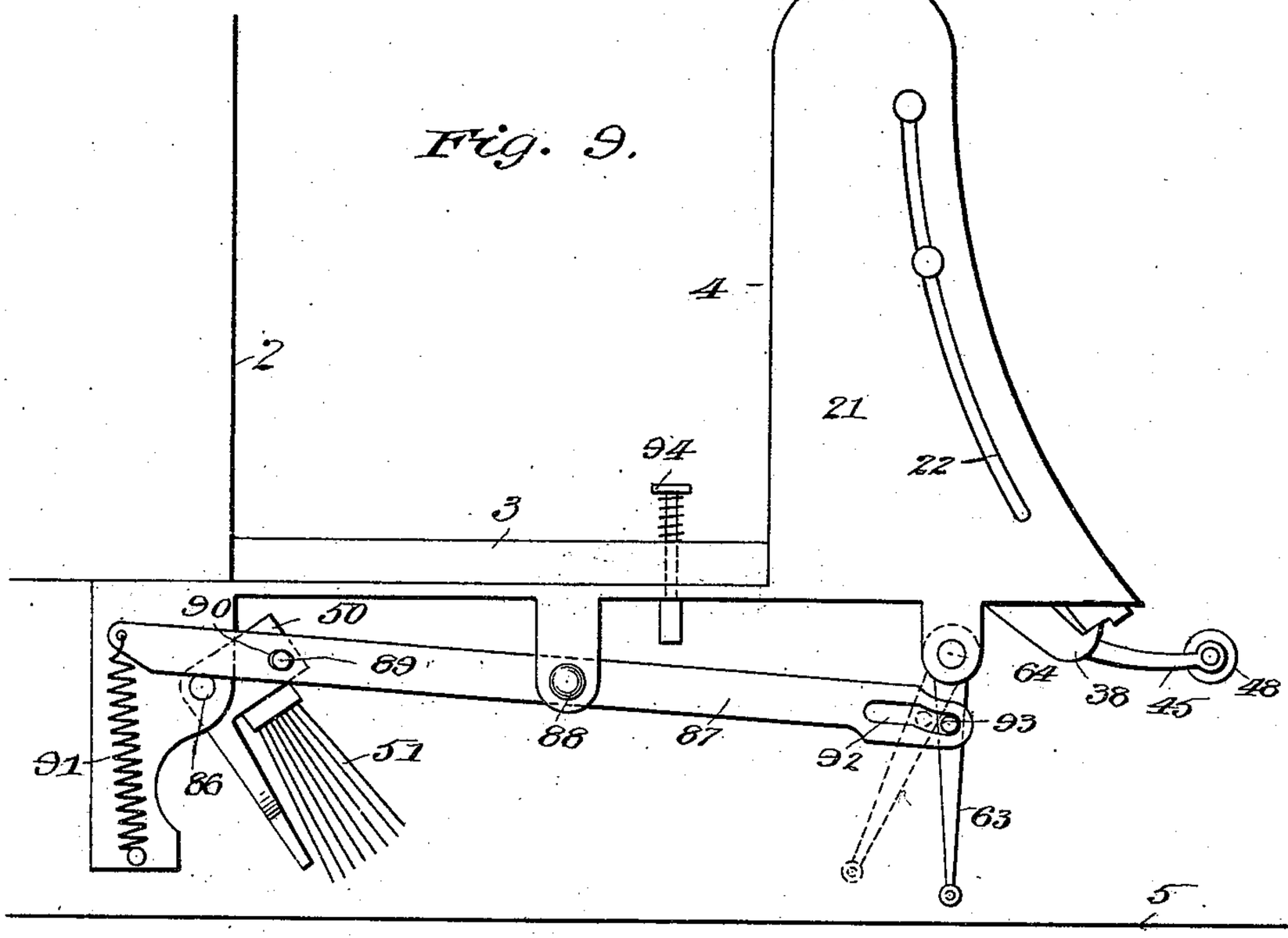
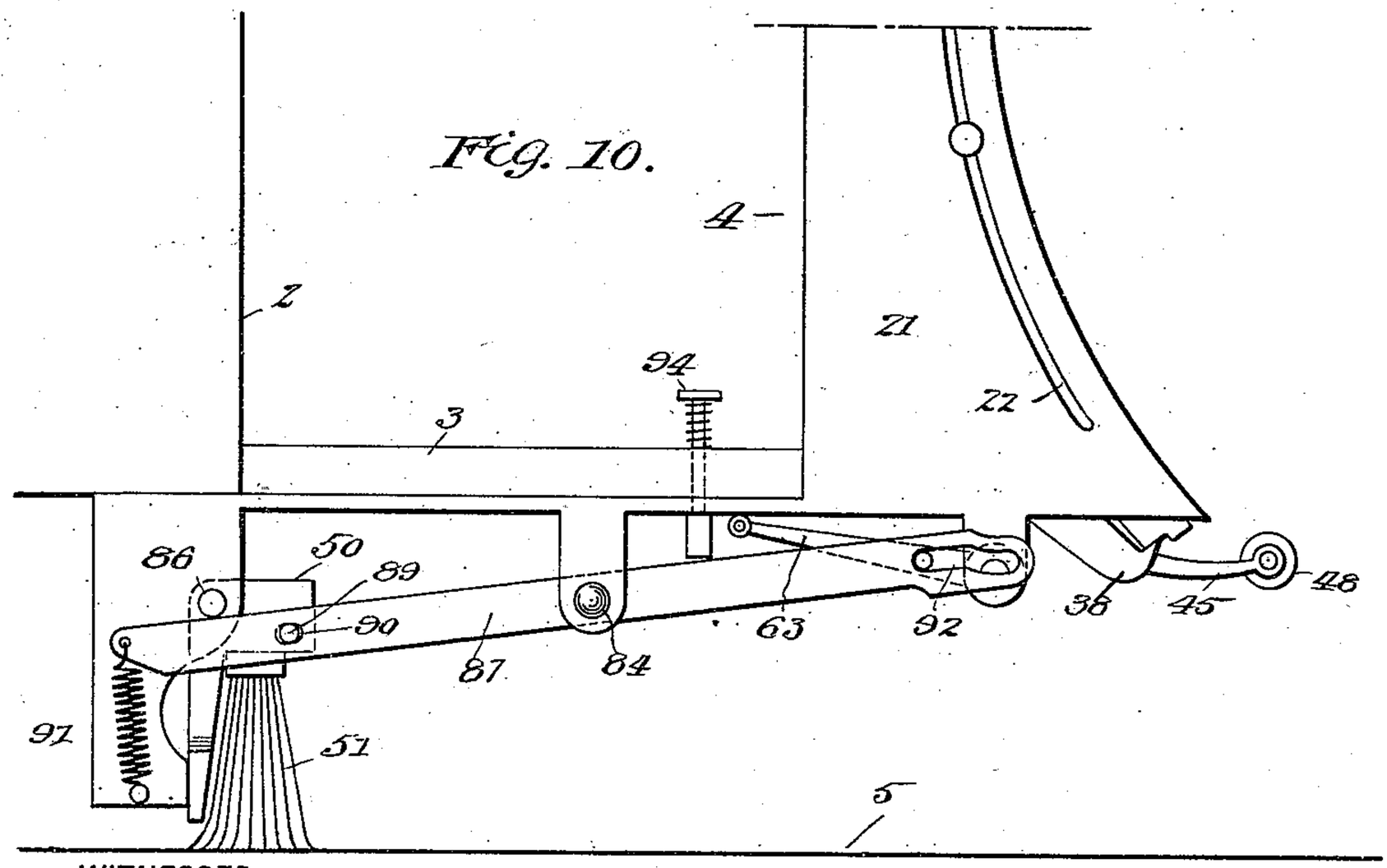


Fig. 10.



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UNITED STATES PATENT OFFICE.

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SAFETY ATTACHMENT FOR STREET-CARS.

SPECIFICATION forming part of Letters Patent No. 549,316, dated November 5, 1895.

Application filed February 21, 1895. Serial No. 539,196. (No model.)

To all whom it may concern:

Be it known that I, ALBERT E. HUGHES, a citizen of the United States, residing at Darien, Fairfield county, State of Connecticut, have invented certain new and useful Improvements in Automatic Safety Attachments for Street-Cars, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to devices which are designed to be attached to the end of a cable or electric car for the purpose of preventing a person from being run down by the car or brought into contact with the wheels thereof; and the invention consists in the various novel and peculiar arrangements and combinations of the several parts of the apparatus, all as fully hereinafter described, and then pointed out in the claims.

I have illustrated types of my invention in the accompanying drawings, wherein—

Figure 1 is a side view of one end of an ordinary cable or self-propelled street-car having attached thereto my improved sliding screen, with its trip device, and my improved wheel-guard, with its trip device, all of the parts being shown in normal position, a portion of the side bracket of the wheel-guard being broken away in order to show the details of the same. Fig. 2 is a side view of the wheel-guard and its trip device, showing the several parts in the positions assumed by them when the trip device has been swung backwardly by striking against a prostrate person on the track and the guard has thereby been forced down against the ground. Fig. 3 is a front view of the parts shown in Fig. 1, but with the car proper omitted and the flexible shield removed from in front of the sliding screen. Fig. 4 is a horizontal sectional view, the plane of the section being indicated by line 4 4, Fig. 3. Fig. 5 is a view of a vertical section taken on a plane indicated by line 5 5, Fig. 3, with the several parts shown in normal positions and with the flexible shield in place. Fig. 6 is a similar view to that shown in Fig. 5, but with the sliding screen projected, the dotted line below the screen indicating the position assumed by the sagging net when a person is precipitated into it. Fig. 7 is a view of a horizontal section of the wheel-guard and its trip device, the plane of the section being indicated by line 7 7, Fig. 1. Fig. 8 is a side view of a modified form of the yielding broom-like wheel-guard, the dotted lines in said view showing the position assumed automatically by the guard when it comes in contact with a prostrate person and is pressed backwardly. Figs. 9 and 10 are side views of a modified form of the tripping and locking device for the wheel-guard, the former view showing the parts set in normal positions, while the latter shows them in the positions which they assume when the trip device has actuated the guard and caused it to be forced down against the ground.

Referring to the said drawings, in which like numbers of reference indicate like parts throughout, 2 designates an ordinary street-car having end platform 3 and dashboard 4, and 5 indicates the level of the car-tracks or surface of the road-bed over which the car runs.

In front of the dashboard is secured a suitable bracket or bed-piece 6, upon which is mounted in slightly-inclined position a slide 7, having its range of up-and-down movement determined by a slot 8, which moves over a stud 9, projecting from the inclined face of the piece 6. This slide 7 is provided upon its back with a guide-pin 10, working in a guide-way 11, formed in the piece 6, and springs 12 12, which are secured between the slide and fixed points, serve to draw the slide down to its lowest limit of movement, the springs in the present instance being each secured between a pin 13 on the slide and a pin 14 on the fixed piece 6. A pair of arms 15 15 are mounted at their inner ends upon a stud 9, so as to swing freely on a common center, and each arm is provided at the same distance from its center of movement with a longitudinal slot 16, in which travels a pin 17, projecting from the slide 7, (see Fig. 3,) so that the downward movement of the slide will simultaneously draw down the arms 15 15 with a sharp quick action in order to project or shoot forwardly the telescoping screen, to which the free ends of the arms are respectively connected by links 18 18.

The telescoping screen comprises a section or frame 19, which, being arranged uppermost, I will term the "upper" frame, and a section 20, sliding upon or within the upper frame in the same plane therewith and which I will term the "lower" frame. Both of these frames are similarly curved about a horizontal axis running parallel with the dashboard, and the radius of curvature is such as to permit of the screen being carried within a small compass when drawn up into normal retracted position, but at the same time to bow sufficiently to give a good scoop-like action to the screen when it is shot forward. In Figs. 9 and 10 the radius of curvature is greater than that of the other figures, and consequently the screen when folded up or telescoped will occupy less space lengthwise the car than in the other constructions. The upper frame 19 is mounted in the side pieces 21, extending from the dashboard, by means of slots 22, formed in the side pieces, and studs 23, projecting from the side of the frame into said slots. In order to make the pins 23 move smoothly in the curved slots, they may be provided with antifriction-rollers.

The lower frame 20 is about the same length as the upper frame and is of the same curvature, but is shown in the present construction of slightly less width in order to slide within the same, the sliding connection between the two being provided by means of a curved longitudinal slot 24, formed in the lower frame, one at each side thereof, and fixed pins 25, projecting inwardly from the inner face of each side of the upper frame 19. These pins 25 are headed, so as to keep the frames securely together, and, like the pins 23, they may also be provided with antifriction-rollers.

The upper frame 19 is given a positive motion through means of the swinging arms or levers 15 15, which have already been described and which are indirectly connected therewith at the upper end of the frame, and as these levers are comparatively of great length they project the screen forwardly with a very positive action when moved by the spring-actuated slide 7. The lower frame 20 is given an independent movement on the upper frame in order to accelerate the speed with which the telescoping screen may be unfolded when shot forward, and I make particular claim to this idea. There are many ways in which the lower frame may be caused to have its own movement upon the sliding upper frame by positive motion, though I have shown but one such way of accomplishing it, and that consists in a cord or flexible connection 26, arranged one at each side of the frames, with one end secured to a stationary point 27, (located upon the side piece 21,) passing thence around a pulley 28, shown, by preference, as turning upon one of the pins 25 of the upper frame, to a fixed point or rod 29, located at the upper end of the lower frame. When now the upper frame is drawn downwardly, each pulley 28 draws upon its flexible connection 26, and thereby slides the lower frame upon the upper one with even greater speed than the upper frame is itself moved.

In the present construction only the lower section or frame 20 is provided with a net, (indicated by the numeral 30,) since a flexible shield 31, made, for instance, of a suitably thin sheet of rubber or other suitable and preferably waterproof material, is placed in front of the screen and extends down to a sufficiently low point to entirely cover the main part of the upper frame and in effect takes the place of a net in the upper frame. If preferred, however, the upper frame may also be provided with a net. This flexible shield 31 is secured at its upper end to the dashboard, and its side edges are fastened to the edges of the side plates 21 21, so that in addition to acting as a fender or guard to prevent any one falling against the dashboard or the projecting mechanism of the screen it also serves as a housing for the mechanism. I also make special claim to this flexible shield in conjunction with the sliding screen.

The net 30, carried by the lower frame 20, is secured therein between the end rods 29 and 32 and is made sufficiently loose to sag a considerable distance below the frame when a person falls therein, the position assumed by the net under such condition being indicated by the dotted line in Fig. 6. The slack of the net 30 is taken up by a set of coiled springs 33, which are directly secured to the net or incorporated therein in such a way as to keep the same taut when there is no weight upon it.

The telescoping screen is so mounted that it can descend only within such distance of the ground as to permit the screen when projected to easily clear a prostrate person, for in the present construction the same is designed to strike a person when standing erect at or about the knee in order to precipitate him into the net. However, the telescoping screen can be mounted so as to descend to the level of the tracks, if preferred. In practice I propose to provide the forward end of the lower frame with a suitable cushion or spring device, so as to harm the person as little as possible when struck thereby. At each side of the screen is arranged a folding wing or net 34, which is connected at 35 and 36 with the side plates 21 and the shooting screen, respectively. (See Figs. 1 and 6.) The arrangement of the side nets is such that they each are stretched taut when the screen is projected in order to prevent a person when precipitated into the screen from falling out sidewise.

The telescoping screen is normally held in retracted position, as shown in Figs. 1 and 5, by means of a locking and a tripping device, which I will now describe. A horizontally-arranged bar 37, loosely mounted between the

side plates 21, so as to easily turn on its axis, carries near each end a locking-arm 38, the outer end of which projects downwardly and forwardly and is provided with a projection or hook 39, adapted to engage the end of the side of the lower sliding frame 20 and retain the same in locked position when folded up. A spring 40 bears upon each of the locking-arms 38 and tends constantly to press it into locking position, so that upon folding up the screen they will snap into locking position. This same locking and trip device also locks the spring-actuated slide 7 in elevated position by means of a blade 42, which engages the under side of the periphery of a roller 43, carried by the slide. This construction of the roller with a blade engaging its periphery on a line parallel with the axis of the roller is employed for the purpose of making the device very sensitive in its action. Upon each of the locking-arms 38 is pivoted at 44 a member 45, formed with a transverse slot 46, through which projects a pin 47 for limiting the swinging movement of the member on the arm. These members 45 project out beyond the forward end of the arms 38 and are connected by a bar 48, which is normally carried a sufficient distance in advance of the same and of the sliding screen when in retracted position to strike or collide with a person who may be in the way of the car. It will be noted that the center about which the members 45 move on the arms 38 is non-coincident with that about which the arms themselves move. This construction is used in order to prevent the locking device from binding and becoming inoperative when the trip strikes a person at a certain angle. By virtue of having the tripping device proper mounted independently upon the locking mechanism and with its center of movement non-coincident with that of the latter the parts will not bind even though the trip device is struck by an object in a downward or upward direction or at right angles.

My improved wheel-guard is arranged beneath the level of the car-floor, and comprises, essentially, non-rigid or flexible members adapted to be forced into close but yielding contact with the ground, together with means for normally holding it out of contact with the ground, and this guard may or may not be used in conjunction with the trip device. In the construction shown the guard consists in a broom-like device comprising a head or bar 50, which is provided with thickly-set bunches of flexible fingers or blades 51. The head or bar 50 is placed transversely the car in a horizontal position and is mounted to slide vertically on guides 52, (see Fig. 7,) and from each end projects a pin 53, working in a slot 54, formed in an arm 55, arranged at each end of the head-piece 50. The arms 55 are secured fast upon a loosely-mounted shaft 99, carried by side brackets 56, and each one is acted upon by a spring 57, normally tending to draw the arm down, and thereby force the flexible fingers of the guard into close but yielding contact with the ground, as shown in Fig. 2.

In order to prevent the flexible members of the guard from being forced back past a certain point, I place back of them a rigid piece or plate 58, which in the present construction is bolted to the car-floor and depends therefrom in a forwardly-inclined position and also supports the guides 52 upon which the bar or head-piece 50 slides. This wheel-guard is normally held in elevated position and under spring-tension by means of the sliding bars 59, one of which is mounted upon the inner side of each bracket 56 by means of slot 60, formed in the slides, and pins 61, projecting from the brackets. These bars are each provided at their inner ends with a hook 62, which engages the pin 53, and thereby locks the guard in elevated position when the bars are at their outer limit of movement. When these sliding bars 59 are moved inwardly toward the wheels, their hooked ends release the pins 53, whereupon the guard is forced down against the ground. The operation of the sliding bars 59 so as to release the guard is automatically effected by means of a trip device placed in advance of the guard, and which comprises a frame 63, depending across the car and swinging upon the horizontal axis 64, which has its ends mounted in vertical slots 65, formed in the respective brackets 56, so as to have a free vertical movement when the frame is pressed upwardly—as, for instance, when the body of a person should be encountered with the lower end of frame 63 and the car should rock or teeter. If in such case the trip-frame 63 could not readily yield or move upwardly, it would pound or crush the person. This frame 63 is preferably provided with a netting stretched across it, and at each side it carries an inwardly-projecting pin 66, which is adapted to push against a projection 67 upon the outer end of each of the sliding bars 59, so that when this swinging frame meets with a prostrate person it is swung inwardly and upwardly and serves to force in the sliding bars by means of the pins 66 bearing upon the projection 67 of the bars, and thereby release the wheel-guard to the action of its spring. If the trip-frame 63 is forced upwardly upon encountering a person, such upward movement will cause the sliding bars to move inwardly and release the guard by virtue of the rod 64 of the swinging frame sliding over the inclined faces of the projections 98, located at the outer end of each bar 59. It will thus be seen that the trip device of the wheel-guard serves to operate the latter, whether such device is struck upwardly, downwardly, or at right angles, as in case of the trip device of the telescoping screen.

It will be noted that when the wheel-guard is forced downwardly against the ground it will be practically impossible for a person to

pass under it or even for his clothes to be caught between the guard and the ground, by reason of the peculiar action of the closely-set flexible fingers or blades, which, being very long and resilient, will move along in continuous and close contact with the ground when they are jammed or crushed forcibly down against the ground.

One important advantage resulting from the use of the closely-set bunches of long flexible members is that when the guard is forced down the flexible members are held in yielding contact with the ground and conform to the inequalities in the surface thereof, so that they will readily adapt themselves to any formation of road-bed.

It is preferable to arrange the trip device for the guard such a distance in advance thereof as to render it impossible for a person's arm or leg to get under the trip device and then under the guard before the former has been given sufficient movement by the body of the person to cause the guard to close down.

In order to prevent a stone or similar obstacle on the track from actuating the trip device of the guard, I provide mechanism which may be operated by the motorman or gripman on the platform of the car whereby the trip device may be raised in order to clear such obstacle or be allowed to swing backwardly without at the same time actuating the guard. The mechanism shown consists in a pull-cord 70, having a hand-ring 71, located at a convenient point on the dash-board, the other end of the cord being connected with a projection 72 on the trip-frame 63. By pulling upon the cord this trip-frame may be swung forwardly and upwardly a sufficient distance to clear an ordinary obstacle when desired, and it may be permanently held in such elevated position by hooking the ring 70 over a hook 73, located also upon the dash board.

In Fig. 8 the flexible guard is shown without the use of a trip device, and in this construction the broom-like guard 50 51 is, together with the back plate 58, swung on a horizontal shaft 80 and is provided with an upwardly-projecting arm 81, provided with pin 82, which moves through an arc-shaped slot 83 for limiting the movement of the guard on the axis 80. Suitable springs 84 serve to hold the guard in elevated position, but yield and allow it to be jammed down against the ground when the guard itself strikes against a person.

In Figs. 9 and 10 the wheel-guard 50 51 is pivoted or hinged to swing on an axis 86, so that by its own weight it tends to close down on the ground, as shown in Fig. 10. A horizontal bar 87, pivoted intermediate its ends at 88, is arranged at each side of the guard, with which it is connected by means of a pin 89, projecting laterally from the end of the piece 50, and a slot 90, formed in the bar. Each bar 87 is provided with a spring 91, acting upon the inner end thereof, so as to draw it downwardly. The normal position of each tilting bar 87 is shown in Fig. 9, in which position it is maintained against the action of its spring by means of the swinging frame 63, which keeps the tilting bars locked on a dead-center and until the frame is swung inwardly a certain distance. The locking of the tilting arms on a dead-center is provided for by means of a slot 92, formed in each of the tilting arms, through which travels a pin 93, projecting from the frame 63. These parts are so adjusted that when the frame 63 is swung inwardly on its axis 64, so as to pass the dead-center point, the springs 91, together with the weight of the guard, serve to force the latter downwardly against the ground and hold it in close contact therewith, the several parts then assuming the positions shown in Fig. 10. The guard and the tripping and locking device after being thus actuated may be reset, so that the parts resume their normal positions, (shown in Fig. 9,) by pressing down the vertically-moving rod or treadle 94, which engages with its lower end the outer end of the tilting bar 87 and depresses it, so as to allow the swinging trip-frame 63 to gravitate past the dead-center point and into its normal position, and thereby automatically locking the guard in elevated position, ready to be again called into action. The several described parts may be reset in normal positions without the use of the push-piece or treadle 94 by grasping the free end of the swinging trip-frame 63 (see Fig. 10) and drawing it downwardly until it assumes the vertical position shown in Fig. 10. In fact, by making the trip-frame 63 sufficiently heavy it will act to reset itself by gravity.

In order to permit the trip-frame 63 to encounter a small obstacle, such as a stone, and pass over the same without actuating the guard, I so construct it that it may be swung inwardly a considerable distance before passing the dead-center point, and consequently without actuating the guard. This I do by curving the outer end of the slot 92 of the tilting bar, so that the pin 93 of the trip-frame 63 may move through the curved portion of the slot before passing the dead-center, and thus permit sufficient idle movement of the trip-frame to allow it to be knocked inwardly by a stone lying on the track, and thereby raise it, so as to clear the stone. The range of idle movement or lost motion of the swinging frame 63 is shown by the full and dotted line positions thereof in Fig. 9—that is, the trip-frame 63 may be idly swung inwardly to the dotted-line position without setting off the locking device of the guard, though a further inward movement causes the dead-center to be passed and the guard thrown into action, unless the treadle 94 is depressed, so as to hold down the tilting arm 87.

The wheel-guards herein shown are of such constructions that they may be conveniently placed under the car a sufficient distance

from the end thereof to avoid in any way interfering with the ordinary draw-gear or coupling apparatus that is carried beneath the platform of the car for coupling the cars together. Instead of having the lower edge of the swinging trip-frame 63 provided with a rigid bar a wire rope or other yielding material could be substituted in order not to injure the body of the person during the teetering motion of the car.

When it is desired to lock the sliding screen, so as to prevent its being operated by its trip device, this may be done by moving the bolt 85, mounted on the dashboard, so as to bring it under the lower end of the slide 7, and thereby prevent the springs acting on the slide from moving it downwardly.

In the form of wheel-guard shown in Figs. 1 to 7 the parts may be reset in normal position, after having been thrown into operation, by passing a hand-hook through opening 101 in the platform of the car and engaging therewith an eye or staple 100 on the head-piece of the guard and lifting the same until the pins 53 come into position to be re-engaged by the hooked ends of the sliding bars 59, which are at the same time drawn forwardly.

The feature of the yielding wheel-guard comprising sets or bunches of long flexible fingers or members adapted to be forced into contact with the ground to obstruct the passage of a person thereunder is shown but not claimed in my Patent No. 534,218, dated February 12, 1895, the claims thereon having been reserved for this application.

My invention is not limited to the constructions herewith illustrated and described, as the principles upon which the different features work may be embodied in other forms without making a material departure from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A wheel-guard for a car consisting essentially of long flexible fingers or members arranged closely together and projecting from the car downwardly toward the ground normally clearing the same and serving themselves essentially as the guard, and means for forcibly jamming said members endwise against the ground for preventing a person from passing under them.

2. A wheel-guard for a car comprising closely arranged sets of long flexible fingers or blades extending obliquely downward with their lower ends normally clearing the ground so that the impact of the prostrate person against them will cause them to move into close yielding contact with the ground and receive the person and prevent him from passing thereunder, said members serving themselves essentially as the guard.

3. A wheel-guard for a car comprising non-rigid or flexible members adapted to be forced endwise into close but yielding contact with the ground thereby conforming to inequalities of the same, and serving themselves essentially as the guard means for holding said members normally out of contact with the ground, and a trip-device extending normally in advance of said guard for actuating the same when said device collides with a person.

4. The combination of a wheel-guard carried normally out of contact with the ground and adapted to be forced into close contact therewith, a trip-device extending normally in advance thereof for actuating the same upon colliding with a person, and means for elevating the trip-device at will and independently of the action of the guard whereby the trip-device may be caused to clear an obstacle on the track.

5. A wheel-guard carried normally out of contact with the ground and adapted to be forced into close contact therewith, springs tending to force the guard against the ground, sliding locking-mechanism for normally holding the guard against the action of the springs, and a swinging vertically-movable trip-device for actuating said locking-mechanism.

6. The combination of a wheel-guard carried normally out of contact with the ground and adapted to be forced into close contact therewith, and a trip-device swinging on a horizontal axis with its bearings or axle vertically-movable and extending normally in advance of the guard for actuating the same upon colliding with a person, said device being constructed to move out of the way after colliding with a person and actuating the guard.

7. The combination of a wheel-guard carried normally out of contact with the ground but tending to move into contact therewith, sliding locking-mechanism for normally holding said guard clear of the ground, a trip-device swinging on a horizontal axis with its bearings or axle vertically-movable and extending normally in advance of the guard and controlling the movement of said locking-mechanism.

8. The combination of a rigid back-plate placed beneath a car in advance of the wheels and a wheel-guard mounted thereon and consisting of a broom-like device having the head-piece thereof mounted in guides upon said back-plate, springs tending normally to move the same downwardly so as to force the fingers or flexible members of the broom into close but yielding contact with the ground and means for normally holding the guard against the action of the springs.

9. A wheel-guard comprising in combination a broom-like device extending transversely the car in front of the wheels thereof and adapted to be moved downwardly so as to force the free ends of the fingers or members of the broom into close but yielding contact with the ground, and a non-yielding back-plate for preventing the fingers or members of the broom from being forced backwardly beyond a prescribed limit.

10. The combination of a car and a tele-

scoping screen comprising a curved screen section moving in the arc of its curvature and another screen section sliding upon the same.

11. The combination of a car, a curved telescoping screen mounted in front of the dash-board and sliding in the arc of its curvature, a net arranged in said screen with its upper and lower ends made fast therein and left free at its sides so as to move independently thereof and having springs incorporated in the body of the net for holding it normally taut but permitting it to sag under the weight of a person.

12. The combination of a car, a telescoping screen mounted in front of the dash-board and comprising an upper sliding-frame and a lower frame sliding thereon and provided with a net, said upper frame being adapted to slide downwardly and forwardly upon being released, and means for sliding said lower frame on the upper one simultaneously with the sliding of said upper one whereby the projection of the screen may be accelerated.

13. The combination of a car, a telescoping screen mounted in front of the dash-board and comprising an upper sliding-frame and a lower frame sliding thereon and provided with a net, said frame being adapted to slide downwardly and outwardly upon being released, connections intermediate said lower and upper frames whereby the lower one may be slid on the upper one while the latter itself is moving.

14. The combination of a car, a telescoping screen mounted in front of the dash-board and comprising an upper sliding-frame and a lower frame sliding thereon and provided with a net, said upper frame being adapted to slide downwardly and outwardly upon being released, a rope, chain or the like made fast to a point near the upper end of the lower frame and to a suitable stationary point near the frame and passing about a fixed point on said upper frame for sliding the lower frame upon the upper when the latter is moving forwardly.

15. The combination of a car, and a screen placed forwardly of the dash-board thereof for receiving a person thereon, said screen being provided with a loose net having spiral springs incorporated in the body of the net for holding it taut and permitting it to sag under the weight of a person.

16. The combination of a screen adapted to be projected forwardly, a pivoted locking-device for holding the screen in retracted position, a frame pivoted to said locking-device having a limited range of movement thereon, said frame projected in advance of said locking-device and the screen when the latter is retracted and acting as a trip-device.

17. The combination of a screen adapted to be projected forwardly, a pivoted locking-device for holding the screen in retracted position and tending constantly to swing into locking position, a frame pivoted to said locking-device having a limited range of movement thereon, said frame being carried by said locking-device and projecting in advance of the same and the screen when the latter is retracted and acting as a trip-device.

18. The combination of a screen adapted to be projected forwardly, a pivoted locking-device for holding the screen in retracted position, and a frame pivoted to said locking-device and having a different pivotal axis from that of the locking-device, said frame being carried by said locking-device and having a limited range of movement thereon and projecting normally in advance of said device and said screen when the latter is retracted and acting as a trip-device.

19. The combination of a screen adapted to be projected forwardly, a pivoted spring-actuated locking-device for holding the screen retracted and tending normally to swing into locking position, a frame pivoted to said locking-device below the pivotal line of the same and having a limited range of movement thereon and projecting normally in advance thereof and also in advance of the screen when the latter is retracted.

20. The combination of a sliding-screen normally tending to shoot forwardly, a roller mounted upon a moving part adapted to move simultaneously with said screen, a pivoted locking-device provided with a blade for engaging the periphery of said roller to hold the screen retracted, a trip-device extending normally in advance of said locking-device and also of the screen when the latter is in retracted position and controlling the movement of said locking-device.

21. The combination of a sliding-screen normally tending to shoot forwardly, a roller mounted upon a moving part adapted to move simultaneously with said screen, a pivoted locking-device adapted to engage and lock said screen in retracted position and provided with a blade for engaging the periphery of said roller, and a trip-device controlling the movement of said locking-device projecting normally in advance thereof and also in advance of said screen when the latter is retracted.

22. The combination of a sliding-screen adapted to be projected forwardly, a spring-actuated slide connected therewith and provided with a roller, a locking-device provided with a blade for engaging the periphery of said roller to hold the screen retracted, and a trip-device controlling the movement of the locking-device extending normally in advance thereof and in advance of said screen when retracted.

23. The combination of a sliding screen comprising telescoping sections with connections intermediate said sections and a fixed adjacent point for moving one section on the other as the latter is itself moved, a pair of arms each pivoted at one end to a fixed point so that their free ends have a wide range of

movement and said free ends connected with said screen for moving it and means for simultaneously moving the arms on their centers to project the screen.

24. The combination of the dash-board of a car, of a curved screen mounted in front thereof and adapted to be slid downwardly and forwardly in the arc of its curvature, and a shield consisting of a sheet of rubber placed forwardly of said screen and covering the same when in retracted position but forming substantially a continuation thereof when the screen is projected.

25. A car-fender having a telescoping screen comprising a sliding screen section with another screen section sliding upon it.

26. A telescoping screen comprising a sliding section having another sliding section mounted upon it, means for projecting said screen forwardly when released, a locking-device engaging said means and normally holding it so as to keep the screen retracted and also engaging the outermost section of the screen to hold it retracted, and a trip-device for actuating said locking-device.

27. The combination of a car, a vertically-movable swinging-guard adapted to be forced into close but yielding contact with the ground and consisting of a broom-like device comprising a horizontal shaft or head having long flexible fingers or members depending obliquely therefrom and serving themselves essentially as the guard, a rigid piece or frame arranged back of said flexible fingers or members for limiting the rearward movement thereof, springs for forcing said fingers or members in contact with the ground and means for normally holding the same out of contact with the ground.

28. The combination of a car, a vertically-movable swinging-guard adapted to be forced into close but yielding contact with the ground and consisting of a broom-like device comprising a horizontal shaft or head having long flexible fingers or members depending obliquely therefrom and serving themselves essentially as the guard, a rigid piece or frame arranged back of said flexible fingers or members for limiting the rearward movement thereof, springs for forcing said fingers or members in contact with the ground and means for normally holding the same out of contact with the ground, a trip-device extending normally in advance of said guard for actuating the same on colliding with a person, means for elevating the trip-device at will and independently of the action of the guard, whereby the trip-device may be caused to clear a small obstacle on the track.

29. The combination of a sliding-screen, a pivoted locking-device 38, for holding the screen in retracted position, a frame 45 pivoted to said locking-device having a limited range of movement thereon and projecting in advance of the screen when the latter is retracted and acting as a trip-device.

30. The combination of a screen adapted to be projected forwardly, a slide connected with and controlling the movements of said screen and provided with a roller 43, a pivoted locking-device 38 provided with a member or projection for engaging the periphery of said roller 43 to hold the slide in normal position, and a trip-device 45 pivoted to said locking-device and having a limited range of movement thereon and projecting in advance of the screen.

31. A wheel-guard carried normally out of contact with the ground and adapted to be forced in close contact therewith, means for holding the guard in normal position, and a trip-device 63 swinging on a horizontal axis with its bearings or axle vertically-movable and adapted to engage and actuate said locking means.

32. A wheel-guard carried normally out of contact with the ground and adapted to be forced into close contact therewith, slides 59, 59, for normally engaging said guard and holding it out of contact with the ground, and a trip-device 63 swinging on a horizontal axis with its bearings or axle vertically-movable for engaging and actuating said slide.

33. A wheel-guard comprising a member 50 provided with non-rotating long flexible fingers or blades 51, projecting obliquely toward the ground, springs for drawing the guard downwardly in close contact with the ground when released, locking-mechanism for holding the guard against the action of the springs and a trip-device for actuating said locking-mechanism.

In testimony whereof I have hereunto set my hand, this 11th day of February, 1895, in the presence of the two subscribing witnesses.

ALBERT E. HUGHES.

Witnesses:
F. V. CANTRELL,
W. F. REED.