(No Model.) 2 Sheets—Sheet 1.

W. E. WOODBRIDGE.

CAR FENDER.

No. 546,798. Patented Sept. 24, 1895.

Fig. 1.

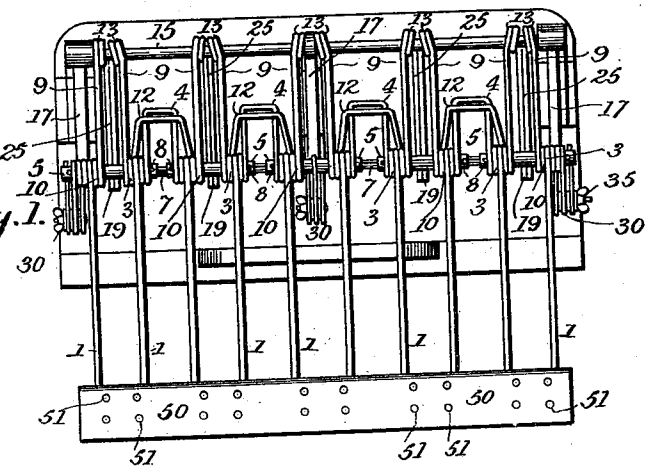


Fig. 2.

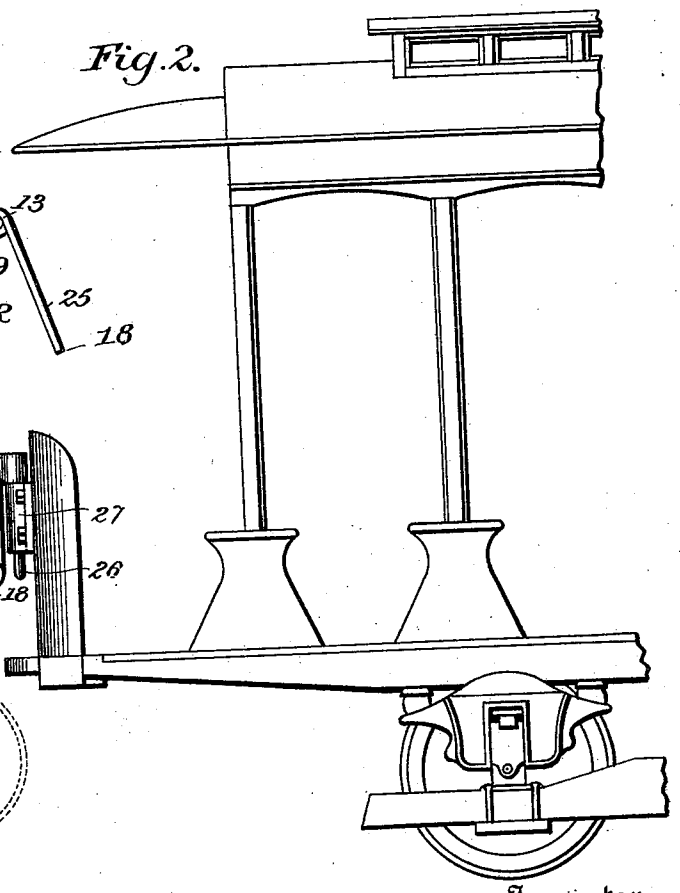


Fig. 6.

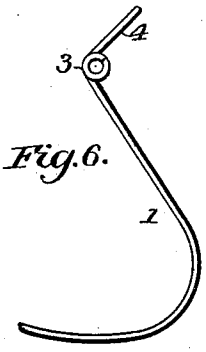
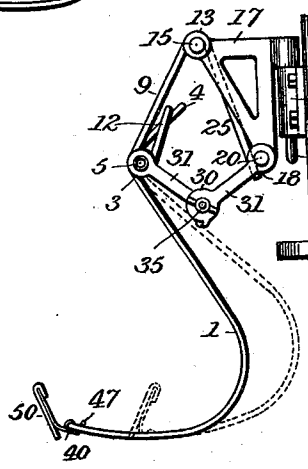


Fig. 7.



Witnesses
Jno. G. Hinkel
L. A. Faignieve

Inventor
William E. Woodbridge
by Foster Freeman
Attorneys

(No Model.) 2 Sheets—Sheet 2.

W. E. WOODBRIDGE.

CAR FENDER.

No. 546,798. Patented Sept. 24, 1895.

Fig. 3

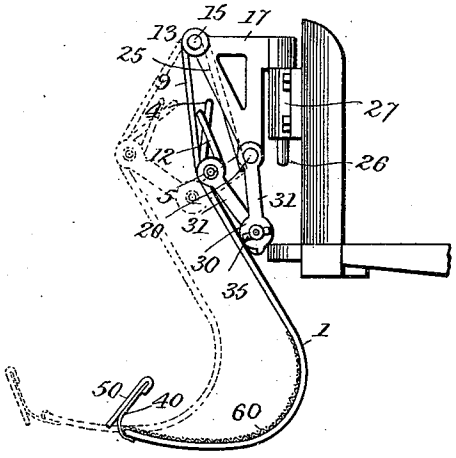


Fig. 4.

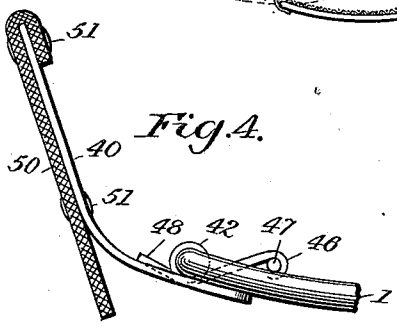


Fig. 5.

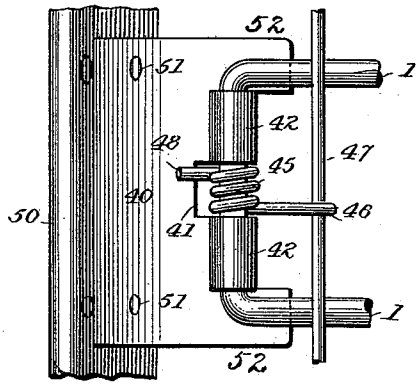


Fig. 10.

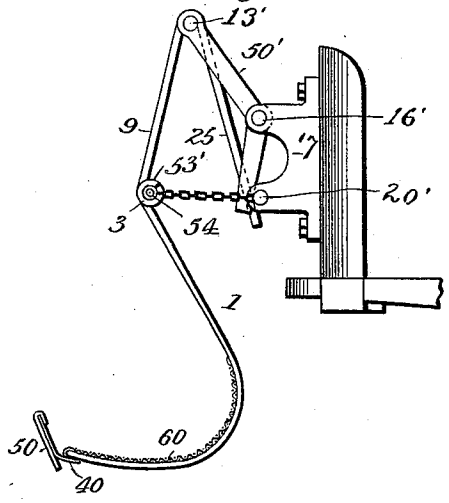


Fig. 8.

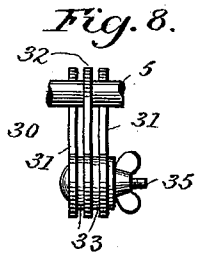
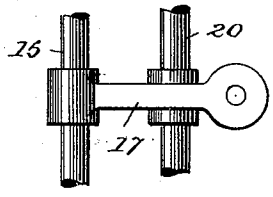


Fig. 9.



Witnesses
Jno. G. Hinkel
F. A. Faigniere

Inventor
William E. Woodbridge
by Foster Freeman
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM E. WOODBRIDGE, OF WASHINGTON, DISTRICT OF COLUMBIA.

CAR-FENDER.

SPECIFICATION forming part of Letters Patent No. 546,798, dated September 24, 1895.

Application filed May 17, 1895. Serial No. 549,653. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. WOODBRIDGE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Car-Fenders, of which the following is a specification.

This invention relates to certain new and useful improvements in fenders or safety devices for cars and other similar vehicles; and it consists substantially in such features of construction, arrangement, and combinations of parts as will hereinafter be more particularly described. In a large proportion of the cases in which a fender is needed for the protection of persons from injury or death by the action of a moving car the person is struck while upon his feet and in a nearly erect position. It is conceded to be necessary that the first resistance of the fender as it strikes the person should be applied to the lower part of his person, not much above his feet. However rude or gentle this action of the fender in its collision may be, its effect in moderating the shock to be encountered by the mass of the body above the point of first contact is very small. The result of this shock and the rebound following it have many times been fatal.

It is the principal object of this invention to supply the means of overcoming the violence of the shock just mentioned and of preventing injury.

Other objects will also more fully hereinafter appear when taken in connection with the accompanying drawings, in which—

Figure 1 is a front view of a car-fender constructed and arranged in accordance with my invention; and Fig. 2 is a side elevation thereof, the full lines indicating the normal position of the cradle and its suspension-springs, and the dotted lines representing the position assumed by the cradle when resistance is met only at the forward and lower part of the fender. Fig. 3 is a similar view to Fig. 2, representing in full lines the positions to which the suspension-springs and cradle are carried when a heavy object is encountered, the normal positions of said parts being shown in dotted lines. Fig. 4 is an enlarged side view in detail of the spring-operated retaining-flap, and Fig. 5 is also an enlarged detail plan view of said retaining-flap, showing more clearly the connections thereof with the arms of the cradle. Fig. 6 is a detail side view of the cradle proper, showing the resilient abutting arms thereof, which co-operate with similar arms formed with the suspension-springs. Fig. 7 is also a detail side view of the suspension-springs, showing the relative arrangement of the abutting arms, which co-operate with those of the cradle. Figs. 8 and 9 are views in detail of certain parts which will be more specifically referred to hereinafter. Fig. 10 is a view in side elevation of a modification in the construction and arrangement of the cradle, together with the devices by which the same is suspended.

In carrying my invention into effect, while I may employ any suitable form of cradle, I preferably resort to the construction such as is herein shown and which consists of a number of downwardly-curved spring-arms 1, which, while capable of being formed in several different ways, are so arranged herein as to constitute double spring-arms, which are formed from a single or continuous piece of wire of sufficient thickness and strength and which are suspended in a manner to bring their lower curved portions a suitable short distance above the ground, so as to operate to pick up a body or object which may be encountered on the track or bed over which the car travels. In order that my invention shall operate as intended, I employ what may be termed a "main point of suspension" for the entire fender apparatus, while the point of suspension of the cradle proper is an intermediate one, and the effect is such that when an object is struck only by the lower part of the fender the immediate points of suspension of the cradle only will be affected, whereas when a heavy object is encountered higher up by the fender the main suspension-springs are brought into play, and in either case the object is lifted gently from the ground and the resistance and reaction of the devices are such as to prevent the object from again being thrown off, as very often occurs with other forms of car-fenders at present in use. In order that the devices shall operate as set forth, it is furthermore desirable that the suspension-springs of the apparatus shall be of greater strength, and this is provided for by

constructing such springs of a little heavier material than that employed for the cradle. Thus, as will be observed on reference to Figs. 1 and 2, the arms of the cradle extend upwardly for a suitable height and are coiled several times at the points 3, so as to furnish an independent spring-support therefor; and after being so coiled around the wire is extended upwardly, so as to constitute intermediate abutting arms 4, which co-operate with arms of the suspension-springs, as will hereafter be explained. The intermediate or independent support for the cradle should be as light as possible, and while I might employ any suitable devices therefor, such as light rods passing through the coils of the arms, I preferably mount the coils 3 upon independent short sections of light tubing 5, the ends of the tubing being joined together by means of flexible links, such as chains 7, which are held in place by means of suitable ribs or pins 8, which are inserted through the walls of the tube-sections and secured therein. Instead of this form of connection it is evident that various other forms could be resorted to with equal effect, it being the main purpose to make the independent support for the cradle as light as possible and to combine a certain amount of fixedness of the support and yet to render the same of a yielding character whenever an object is struck or encountered by that portion of the fender. From this it will appear that instead of uniting the ends of the tube-sections by chains suitable springs could be employed as the connecting-links, and in fact a great many different forms of connection might be employed.

While various forms of suspension-springs could be resorted to, I have especially devised the construction herein shown, which consists of the springs 9, extending downwardly at an inclination with respect to the front of the dashboard of the car, and which are formed into coils 10, which fit upon the sections of tubing 5, as shown in Fig. 1, and at their lower forward portions they are bent or turned upwardly to constitute abutting arms 12, through which pass the abutting arms 4 of the cradle, and these two sets of arms interact and co-operate in such manner that when an object is encountered or struck the effect will be very yielding or elastic, while the cradle proper is permitted to swing forward upon its own support, so as to prevent the injurious effect of recoil. The said suspension-springs are likewise formed at their upper portions with a number of coaxial coils 13, through which is passed a suitable supporting-rod 15, the ends of the latter, as well as the central portion thereof, being held or supported by suitable brackets 17, although it is evident that any other preferred manner of support could be used instead. After being coiled at 13 the wire of which the said suspension-springs are constituted is carried downwardly and formed at 18 into loops abutting against rod 20, which likewise has its supports or bearings in the lower extremities of the said brackets 17. It will thus be seen that while the cradle is constituted of a series of downwardly-turned arms, which alternate with upwardly-projecting arms constituting abutments, the said suspension devices above mentioned are also constituted of a number of abutting arms co-operating with those of the cradle combined with intermediate or alternating suspension-arms, together with downwardly and rearwardly extending resistance-arms 25. While the suspension devices could be made up of separate springs or sections, it is preferred to construct them of a single or continuous piece of wire a little heavier than that of which the cradle is composed. The brackets 17, above mentioned, are of any preferred shape; but preferably they are formed with pintles 26, which are received in sockets 27, secured in any suitable manner to the front part of the car.

In order to avoid the tendency when an object is struck to throw the object from the cradle, I preferably employ some form of friction device supported between the rod 20 and the tube-sections 5, either at the ends or other suitable points, and while these devices may be constructed in different ways I employ the link 30, which, as herein shown, consists of arms 31, each provided with an eye 32 for suspending the link between the tubing and rod, and the inner faces of the lower ends of said arms are formed or provided with friction-disks 33. The said arms are fastened together at their lower ends, which form disks, by means of a rivet or a screw 35, by which the degree of friction between the disks of the arms is easily regulated. Whenever a comparatively heavy and elevated object is struck—as, for instance, a standing person—the cradle, together with its suspension devices, will be carried to or toward the position indicated in full lines, Fig. 3, the effect of the friction devices being to retard the movement of the cradle and to cause its return or outward movement to take place comparatively slowly and without undue force or shock. If desired, the friction may be such as to altogether prevent the return of the springs after compression until they are purposely drawn forward into their normal position. In this way the object struck will be caught and retained in the cradle instead of being thrown therefrom, as might be the case if the reactionary effort of the cradle or its suspension devices were very great. The said friction devices also prevent the cradle from being carried outwardly too far; but instead of employing the friction devices for this particular purpose a suitable chain could be employed—such, for instance, as is shown in the modification, Fig. 10.

While the arms of the cradle, without being connected at their lower ends, might operate to pick up the object when struck, I preferably employ special positively operating devices for this purpose with a view to preventing injury by the collision, and while I

can construct the same in many different ways I prefer the construction constituting a retaining-flap set forth and shown more particularly in Figs. 4 and 5. In said figures, 40 indicates a curved sheet-steel hinged plate, which is cut out or slotted at 41 and has its lower edge turned over at 42 to form bearings which surround the lower end of the curved arm, it being understood that a plate is employed for each pair of wires constituting a downwardly-curved arm. The connecting portion of the wires forming an arm is provided with a spring 45, one extremity 46, of which rests or bears upon a wire or rod 47 secured to the cradle lengthwise thereof, while the other extremity thereof (indicated at 48) bears or exerts a pressure upon said plate, the tendency being to maintain the curved plate somewhat outward of an upright position. The extent of the motion of the plate is controlled by the extensions 52 of the plate 40 coming in contact with the arms 1. Connecting the several plates so as to form a continuous or unbroken front to the lower end of the cradle is a strip of leather or other stout flexible material 50, which is secured in place by means of rivets 51, passing through the same and through openings formed in the several plates of the series. This construction, which affords a good deal of flexibility and yielding under the stress of a collision and offers relatively broad surfaces of contact of a character not likely to have an abrasive action, is believed to avoid, so far as practicable, injury to the person received into or upon the cradle. If desired, I may employ in the bottom of the cradle a suitable wire mat, (indicated at 60;) but it is obvious that said mat is not an essential to the operation of my improved device.

The height at which the fender should be placed above the track will depend in some degree upon the question of the employment of an adjunct fender placed at a short distance in front of the wheels, a proposition which now receives approval, and may be determined according to special demands without affecting its operation. In like manner the configuration of the cradle may be changed to meet requirements, the principles of its construction remaining the same.

In the modification shown in Fig. 10 the wires of which the cradle is formed are continuous from the intermediate point of suspension 3, where they form a series of coaxial coils up to the point of suspension at 13′, where they form coils about the suspension-rod 15′, and thence descend in loops, such as previously described, to the forward side of the rod 20′, against which they rest. This continuation of the cradle proper, constructed as described, forms a series of springs which are prevented from opening beyond a desired distance by means of chains, as shown in Fig. 10, or by means of the friction-links already described, as shown in Figs. 2 and 3. The supporting-rod 15′ is held by the arms 50′, hinged to the bracket 17′, as shown at 16′. The forward motion of the said arms and of the supporting-rod which they carry is restrained by the continuation of the arms downward to the rod 20′, against which they rest. In this particular instance I may, if desired, employ the tube-sections for the intermediate support of the cradle proper, or I may employ a very light rod 54, and said rod passes through the coils 53′ in precisely the same manner. In other respects the construction is the same, and it is thought the same will be fully understood. As thus constructed and arranged, it will be seen that when a person in a standing position is encountered by the fender he is received upon it with moderated shock, both as regards first contact and the immediately subsequent more severe collision checked by the yielding suspension apparatus from which the cradle proper depends, the efficiency of this latter being in nowise impaired. In this way a yielding resistance is afforded and the object retained in the cradle. If the object struck is of considerable weight and elevated above the track, the springs which constitute the suspension devices will yield and the parts will be carried to the positions shown in full lines in Fig. 3. In either case the reaction is not sudden and the outward return movement of the cradle, as well as its co-operating devices, is limited by reason of the construction and arrangement of devices herein explained.

It is apparent that the various details of my improved apparatus may be altered or changed in many immaterial respects, and therefore it is to be understood that I do not limit myself in such respect.

I claim—

1. A car fender comprising suspension springs resilient in the direction of the motion of the car, a suspended swinging cradle supported by said springs, and intermediate co-operating abutting arms between said springs and cradle, substantially as described.

2. A car fender comprising suspension springs having coils alternating with upwardly projecting arms, and a cradle provided also with alternating coils and arms, the two sets co-operating, substantially in the manner shown and described.

3. A car fender comprising suspension springs having coils alternating with upwardly projecting abutting arms, a cradle provided also with alternating coils and arms, and tube sections passing through both sets of coils and united at their ends by links, substantially as described.

4. A car fender comprising suspension springs having abutting arms, a spring cradle having abutting arms co-operating therewith, and a friction link interposed between the points of suspension and the rearward bearing of the suspension springs, substantially as shown and described.

5. A car fender comprising downwardly

curved arms, plates hinged to said arms, a flexible strip connecting the plates, and springs exerting an outward pressure upon the plates, substantially as shown and for the purpose described.

6. A car fender comprising a cradle and a retaining flap attached to its lower front edge, said retaining flap being constituted of bent plates forming a hinged attachment to the front of the cradle, and of a flexible band extending along the front of the cradle and connecting the hinged plates, substantially as described.

7 A car fender comprising a cradle, curved-plates having their lower edges turned over to form bearings through which the arms pass, springs carried by the arms and having their bearings between the plates and an independent longitudinal rod, and a leather strip extending along the lower edge of the cradle and secured to the plates, substantially as described.

8. In a car fender, a friction link interposed between parts of the same which react upon each other in its operation, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM E. WOODBRIDGE.

Witnesses:
F. L. FREEMAN,
W. C. DUVALL.