UNITED STATES PATENT OFFICE.

BENJAMIN HOWARD, OF HANWELL, ENGLAND, ASSIGNOR TO THE LONDON GENERAL OMNIBUS COMPANY LIMITED, OF WESTMINSTER, LONDON, ENGLAND.

WHEEL GUARD FOR VEHICLES.


(Granted under the provisions of the Act of March 3, 1921, 41 Stat. L. 1313.)

To all whom it may concern:

Be it known that I, BENJAMIN HOWARD, a subject of the King of England, residing at Hanwell, Middlesex, England, have invented certain new and useful Improvements in Wheel Guards for Vehicular, for which on May 12, 1914, I filed application No. 11,741 for British patent,) of which the following is a specification.

This invention relates to wheel-guards for vehicles its object being to provide an improved construction of such device, which shall be simple and efficient. A common fault with devices of this kind, such as have hitherto been proposed, has been the tendency to pin an obstacle of small height, such for example as an arm or hand to the ground thus involving a person in injury to a limb even though the position of the body be protected.

It has many times been proposed to provide a buffer-rail in front of the wheels of a vehicle such rail being supported by mechanism so that when the forward part of the rail or some member operatively connected therewith is struck, the rail drops on to the road or low enough to prevent any object from passing beneath it. Further, it has been proposed to provide such buffer-rails with an inflatable tube at the front to constitute a cushion-device.

It will be appreciated that where a device has to be dropped by the impact of, say, a person knocked down by the vehicle, a limb or some part of the body of such person is likely to be pinned beneath the wheel-guard, in which case the wheel-guard may do considerable damage itself by riding up over the limb and even over the body of the person and it may thus be rendered practically inoperative.

Fixed buffer-rails have been proposed with or without pneumatic or other cushioning devices, such as the fixed so low as to prevent the hand or limb of a person knocked down, from getting beneath them, with the result that considerable damage may be done to the limb, and moreover, the limb thus being pinned down, the body of the person may be swung round against the vehicle.

The object of the present invention is to provide an impact-device, hereinafter referred to as a cushion, in front of the wheels, which does not depend upon any drop action, is high enough from the road to clear the same, but low enough and so constructed that when it strikes an object it will yieldingly close up the space between it and the road.

According to this invention the wheel-guard comprises a fixed support whereon is mounted an impact-cushion of flexible and resilient material (for example a fabric built up of alternate layers of rubber and canvas) having its lower face towards and near the road and being connected to the support fore and aft (for example by upwardly-directed continuations of the same material) and so constructed that it is readily deformable downwardly along a line at right angles to the direction of travel by impact against the front of the cushion, the proportions of the deformable parts of the cushion being such relatively to the distance of the under-face of the same from the road that when the impact against the front of the cushion takes place, the said face is driven downwards in the form of a flexible fold or tongue whose lower edge approximately makes contact with the road for the purpose above described.

Preferably the impact-device is in the form of a loop or tube which is downwardly and forwardly directed from its support, the under-side of such tube constituting the aforesaid downwardly deformable face, the cross-sectional diameter of the loop or tube and the stoutness of the material composing the same, being such as to operate in the manner previously described.

Where a tube is employed, a backing-plate may be provided on the support which extends from a point about half-way up the tube, whose throughway lies horizontally at right-angles to the direction of travel of the vehicle, to a point near the top of the tube. A rigid backing is thus provided for the rearward and upper portion of the tube which the latter ensures the desired action of the tube.

A number of short sections of tube may be used placed end-to-end, and, if desired, spaced apart across the front of the vehicle.
or any part where it is desired to apply the invention.

Means may be provided for adjusting the height of the impact-device from the road.

Conveniently the under-face of the impact-device may be formed of, or provided with, India-rubber or other friction-producing material, so that upon contact with an obstacle of too small a height to strike the impact-face of the device properly, such as the hand of a person, the friction with the obstacle will carry the latter along over the roadway free from serious injury.

In the accompanying drawings:

Figure 1 is a front elevation of a life-guard device constructed according to one method of carrying out this invention;

Figure 2 is a plan of the same;

Figure 3 is a detail section on line 3—3 of Figure 2;

Figure 4 is a detail showing the attachment of the wheel guards to the frame;

Figure 5 shows a plan of a modification of the construction of a portion shown in Figures 1 and 2;

Figures 6 and 7 are elevation and plan respectively of a modification showing an application of this invention to a rear wheel; and

Figure 8 is a side view of a device constructed according to the present invention as applied for use between the front and rear wheels of a vehicle.

The same reference characters indicate the same parts in all the figures.

A wheel-guard is provided for each front wheel and turns with it in its turning movements. This wheel-guard comprises a C-shaped supporting bracket A having an external stiffening rib A, which is mounted to turn upon the pivot-pin A₁ about which the front wheel turns. The bracket is so shaped as to engage this pivot pin both at its upper and lower ends and so work firmly and easily thereon. To the rib A₁ of the bracket A is bolted a wood and steel framework or shield A², which extends forwardly from the bracket inside the wheel and outwardly in front of the wheel. The lower edge A₃ of the shield A² is arranged close to the ground, and carries an impact-receiving cushion as hereinafter described. In order that the two shields A² may turn about the pivots A¹ in unison with the steering movements of the wheels, the brackets A have rearward extensions A₃ which carry studs A₄ engaged by lugs A₅ on the steering mechanism of the front wheels. This steering mechanism is of the usual kind and comprises two levers C and C¹ each secured to the axle of one of the front wheels and connected together by a cross-bar C². The lugs A₅ are mounted on the levers C and C¹ and are nearer the centre of the vehicle than the studs A₄, so that they can act upon the studs A₄ and extensions A₃ to push them outwardly from the centre. Such an action of course moves the shields A² and attached parts of the wheel-guard inwardly. The extensions A₃ are drawn together and held against the lugs A₅ by the spring A₆ connected to each of them by rods A₇. As previously stated, the shields A² are bent outwardly at their forward ends in front of the front wheels, and it will be readily understood that if one of these shields should strike any obstacle, such as a curb-stone, the spring A₆ permits it to yield inwardly, turning about the pivot A¹ independently of the wheel, but normally the lugs A₅ on the steering mechanism cause the shields to turn in unison with the steering movements of the wheels.

The shields A² are carried downwards close to the ground and rearwardly between the wheels. Along the lower edges A₃ of the shields there are secured stout impact-receiving cushions B formed of sections of rubber and canvas hose. As shown in Figure 3, the cushion is secured to the shield between a backing-plate B¹ and a clamping-plate B². A backing-plate B³ formed by an extension of the plate B² extends over the upper rear portion of the cushion. It will be seen that the backing-plate B³ together with the shields A² constitutes a rigid support for the cushions or impact-devices B.

The under-face B of Figure 3, of the cushion curves downwardly towards the road so that it has a bias in that direction when the face B² strikes an obstacle, and the fact that the parts B₁, B₃ may be viewed as a loop or tube which projects forwardly and downwardly from the plate B², tends to increase the downward movement of the part B₃ when the part B² is struck.

It will be seen that the throughway of the forward end of the tube B is horizontal and at right-angles to the direction of travel. The tube is extended down the side faces of the edges A₄ of the shields B², where its 110 throughway is not at right-angles to the direction of travel, but it is not so effective when thus placed obliquely to the direction of travel. A suitable construction of the cushion has been found to be a hose about 115 inches in external diameter formed of about 7-ply canvas and rubber alternately with a total thickness of wall of about three-quarters of an inch. The lower edge of the cushion may be about three-quarters of an inch 120 from the ground level, but this distance may be slightly increased or diminished as desired.

In order to protect the cushion from wear by accidental contact with a road surface or objects thereon, it may be provided with a single row of steel studs, but care must be taken to place these so that they do not interfere with the frictional action between the cushion and an obstacle of small height.
In order to provide for the vertical adjustment of the cushion, the shield A is connected to the bracket A by bolts A1 and a series of bolt-holes A2 is provided in the web of the bracket so that the shield may be secured thereto in a number of positions corresponding to the various holes.

Between the wheels, another guard is provided secured to the cross-member D of the chassis of the vehicle. This consists of several short sections E of rubber and canvas hose, each mounted on a vertical supporting member E1 bolted to the cross-member D of the frame. The vertical supports E2 are further connected together by a horizontal bar E3. In order to provide for the vertical adjustment of this life guard, a series of bolt-holes E4, E5 is provided in each of the supports E1 so that it may be bolted to the cross-member D in a number of different positions nearer to or further from the ground level. Each of the cushions E is provided with a constraining-plate E6.

In the modification shown in Figure 6, the inclined portion extending from a position just in advance of the wheel to a position beneath the front axle is replaced by a series of short cushions B arranged step-wise.

The construction shown in Figures 6 and 7, having a cushion F, is very similar to that hereinbefore described with reference to Figures 1 and 2 except that as applied to a rear wheel provision does not have to be made for any pivotal movement of the wheel.

Short cushions may also be employed, one at each end of a guard H as seen at G in Figure 8, placed between the front and rear wheels of a vehicle.

It will be appreciated that each cushion or tube, B, F or G, provides an under part of flexible and resilient material with its face near the road, which under part is connected fore and aft by the continuation of the material upwardly to the support or backing-plate B3. The tube thus constitutes a loop of material whose under-side has a bias downwards so that it is readily deformable downwardly along a line at right-angles to the direction of travel when impact takes place against the front of the cushion and the said under part is placed near enough to the road and is sufficiently deformable, so that when the tube is struck at the front, the under-face is forced down approximately in contact with the road. The part thus forced down is in the form of a flexible fold or tongue which obviates or reduces the risk of a portion of the obstacle, for example the hand or part of a person's clothing, from passing beneath the cushion.

In the case, however, in which what is first encountered is of small height, such for example as the hand of a person, the friction between the rubber surface of the cushion and the hand will serve to brush or sweep the hand along over the ground until fuller impact occurs with the person, which full impact is taken by the body of the cushion and results in the person being carried bodily along free from serious injury.

It has been proposed to use a solid rubber or pneumatic buffer on a spring-carried frame in front of a vehicle wheel, which buffer projected forwardly and was sufficiently resilient to enable it to be forced down by the impact of any object upon the upper side of it.

It has also been proposed to support a pneumatic tube on a buffer-rod by a backing-plate extending approximately from the top of the tube down to a point near the bottom of the same, but this buffer-rod was arranged to drop when struck by an obstacle. When the buffer-rod was in the dropped position the tube formed a downwardly and forwardly projecting loop on the rod, but being carried on a movable frame and being inflated, its action would not be the same as the impact-device according to the present invention.

No claim is made for either of these two last-described arrangements.

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

1. A wheel-guard for a vehicle comprising a support, an impact-cushion of flexible and resilient material having its lower face towards and near the road, and means for mounting said impact-cushion on the support in such a manner that it is connected thereto fore and aft, said impact-cushion being so constructed that it is readily deformable downwardly along a line at right-angles to the direction of travel by impact against the front of the cushion, and the proportions of the deformable parts of the cushion being such relatively to the distance of the under face of the same from the road that when the impact against the front of the cushion takes place, the said face is driven downwards in the form of a flexible fold or tongue whose lower edge approximately makes contact with the road for the purpose described.

2. A wheel-guard for a vehicle comprising a support, an impact-cushion of flexible and resilient material having its lower face towards and near the road, and means for mounting said impact-cushion on the support in such a manner that it is connected thereto fore and aft by upwardly-directed continuations of the support, said impact-cushion being so constructed that it is readily deformable downwardly along a line at right-angles to the direction of travel by impact against the front of the cushion, and the proportions of the deformable parts.
of the cushion being such relatively to the distance of the under face of the same from the road that when the impact against the front of the cushion takes place, the said face is driven downwards in the form of a flexible fold or tongue whose lower edge approximately makes contact with the road, for the purpose described.

3. A wheel-guard for a vehicle comprising a support, an impact-cushion of flexible and resilient material built up of alternate layers of rubber and canvas and having its lower face towards and near the road, and means for mounting said impact-cushion on the support in such a manner that it is connected thereto fore and aft, said impact-cushion being so constructed that it is readily deformable downwards along a line at right-angles to the direction of travel by impact against the front of the cushion, and the proportions of the deformable parts of the cushion being such relatively to the distance of the under face of the same from the road that when the impact against the front of the cushion takes place, the said face is driven downwards in the form of a flexible fold or tongue whose lower edge approximately makes contact with the road, for the purpose described.

4. A wheel-guard for a vehicle comprising a support, an impact-cushion having its lower face towards and near the road, and means for mounting said impact-cushion on the support in such a manner that it is connected thereto fore and aft, said impact-cushion being in the form of a loop which is downwardly and forwardly directed from the support, is of flexible and resilient material whose underside constitutes a face that is readily deformable downwardly along a line at right-angles to the direction of travel by impact against the front of the cushion and the cross-sectional diameter of the loop and the stoutness of the material composing the same being such that when the impact against the front of the cushion takes place, the said face is driven downwards in the form of a flexible fold or tongue whose lower edge approximately makes contact with the road, for the purpose described.

6. A wheel-guard for a vehicle, comprising an impact cushion in the form of a tube, a support having a concave wall constituting a backing for the tube, and means attaching one side of said tube to the support in such a manner that the tube is directed downwardly and forwardly from the support so as to have its lower face situated substantially nearer the road than is the bottom of the support, said backing extending from a point approximately half-way up and behind the tube towards the top of the same.

7. A wheel-guard for a vehicle, comprising an impact cushion in the form of a tube, a support having a curved wall constituting a backing for the tube, and means attaching one side of said tube to the support in such a manner that the tube is directed downwardly and forwardly from the support so as to have its lower face situated substantially nearer the road than is the bottom of the support, said backing extending upwards from a point approximately half-way up and behind the tube, and downwards from a point below the top of the tube.

8. A wheel-guard for a vehicle, comprising an impact-device in the form of a plurality of short sections of open-ended loops, concave supports for said sections, and means for mounting said sections against the concave walls of the supports with their through-way axes at right-angles to the direction of travel of the vehicle, the concave walls of the supports providing each a backing for a section which extends from a point approximately half-way up and behind the section towards the top of the same, for the purpose described.

9. A wheel-guard for a vehicle comprising a support, an impact-cushion of flexible and resilient material having its lower face towards and near the road and formed of friction-producing material, and means for mounting said impact-cushion on the support in such a manner that it is connected thereto fore and aft, said impact-cushion being so constructed that it is readily deformable downwardly along a line at right-angles to the direction of travel by impact against the front of the cushion, and the proportions of the deformable parts of the cushion being such relatively to the distance of the underface of the same from the road that when the impact against the front of the cushion takes place, the said face is driven downwards in the form of a flexible
fold or tongue whose lower edge approximately makes contact with the road, for the purpose described.

10. A wheel-guard for a vehicle comprising a support, an impact-cushion of flexible and resilient material having its lower face towards and near the road and there provided with a rubber friction surface, and means for mounting said impact-cushion on the support in such a manner that it is connected thereto fore and aft, said impact-cushion being so constructed that it is readily deformable downwardly along a line at right-angles to the direction of travel by impact against the front of the cushion, and the proportions of the deformable parts of the cushion being such relatively to the distance of the underface of the same from the road that when the impact against the front of the cushion takes place, the said face is driven downwards in the form of a flexible fold or tongue whose lower edge approximately makes contact with the road, and means for turning said support in unison with the steering movements of the wheel.

11. A wheel-guard for a vehicle comprising a support, an impact-cushion in the form of a tube having its lower face towards and near the road and there provided with a rubber friction surface, and means for mounting said impact-cushion on the support in such a manner that the support provides a backing for it which extends from a point approximately half way up and behind the tube towards the top of the same, for the purpose described.

12. A wheel-guard for a vehicle comprising an impact-cushion of flexible and resilient material having its lower face towards and near the road, supports for said cushion to which it is connected fore and aft, whereby it is carried in front of a steering wheel of the vehicle, said cushion being so constructed that it is readily deformable downwardly along a line at right-angles to the direction of travel by impact against the front of the cushion, and the proportions of the deformable parts of the cushion being such relatively to the distance of the underface of the same from the road that when the impact against the front of the cushion takes place, the said face is driven downwards in the form of a flexible fold or tongue whose lower edge approximately makes contact with the road, and means for turning said support in unison with the supports of the wheel.

13. A wheel-guard for a vehicle comprising an impact cushion having its lower face towards and near the road, a support for said cushion, means for mounting said cushion on the support in such a manner that it is connected thereto fore and aft and is carried in front of a steering wheel of said vehicle, said cushion being in the form of a tube which is downwardly and forwardly directed from the support, is of flexible and resilient material whose underside constitutes a face which is readily deformable downwardly along a line at right-angles to the direction of travel by impact against the front of the cushion, and the cross-sectional diameter of the tube and the stoutness of the material composing the same being such that when the impact against the front of the cushion takes place, the said face is driven downwards in the form of a flexible fold or tongue whose lower edge approximately makes contact with the road, and means for turning said support in unison with the steering movements of the wheel.

14. A wheel-guard for two steering wheels of a vehicle comprising for each wheel an impact-cushion in the form of a tube having its lower face towards and near the road, a support for each cushion, means for mounting said cushion on the support in such a manner that the support provides a backing for it which extends from a point at approximately half way up and behind the tube towards the top of the same, and means for turning said supports in unison with the steering movements of the wheels, said cushions being adapted to move yieldedly and independently of the wheels towards the centre of the vehicle, for the purpose described.

15. A wheel-guard for the steering wheel of a vehicle comprising an impact-cushion in the form of a tube having its lower face towards and near the road, a support for said cushion, means for mounting said cushion on the support in such a manner that the support provides a backing for it which extends from a point approximately half way up and behind the tube towards the top of the same, means for steering the vehicle wheel and resilient means for holding the cushion against said lug, which latter is adapted to move the cushion inwardly towards the centre of the vehicle.

16. A wheel-guard for two steering wheels of a vehicle comprising for each wheel an impact-cushion in the form of a tube having its lower face towards and near the road, a support for each cushion, means for mounting said cushion on the support in such a manner that the support provides a backing for it which extends from a point approximately half way up and behind the tube towards the top of the same, means including a lug at each side of the vehicle, for steering the vehicle wheel and resilient means connecting the cushions together and holding them against said lugs, which latter are adapted to move the cushions inwardly towards the centre of the vehicle.

17. A wheel-guard for two steering wheels of a vehicle comprising for each wheel an impact-cushion of flexible and resilient ma-
terial having its lower face towards and near the road, a support for each cushion, means for mounting each impact-cushion on a support in such a manner that it is connected thereto fore and aft, said impact-cushions being so constructed that they are readily deformable downwardly along a line at right-angles to the direction of travel by impact against the front of the cushions, and the proportions of the deformable parts of the cushions being such relatively to the distance from the underfaces of the same from the road that when the impact against the front of the cushions takes place, the said faces are driven downwards in the form of flexible folds or tongues whose lower edges approximately make contact with the road, means including a lug at each side of the vehicle, for steering the vehicle wheel and resilient means connecting the cushions together and holding them against said lugs, which latter are adapted to move the cushions inwardly towards the centre of the vehicle.

18. A wheel-guard for a vehicle, comprising an impact cushion in the form of an open-ended transverse flexible tube which is stiff enough to maintain its shape when not in collision with an obstacle, a supporting backing plate for the tube, means attaching one side of the tube to the plate in such a manner that the tube is directed downwardly and forwardly from the plate with its through-way axis approximately horizontal and at right-angles to the direction of travel of the vehicle, said plate extending from a point approximately half way up and behind the tube towards the top of the same, and means adjustable in height from the ground for mounting said support on a vehicle.

In testimony whereof I affix my signature.

BENJAMIN HOWARD.