

H. W. H. POWEL & T. S. SAFE.
 DEVICE FOR CLEARING OBSTRUCTIONS FROM THE PATH OF VEHICLES.
 APPLICATION FILED NOV. 18, 1907.

931,885.

Patented Aug. 24, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

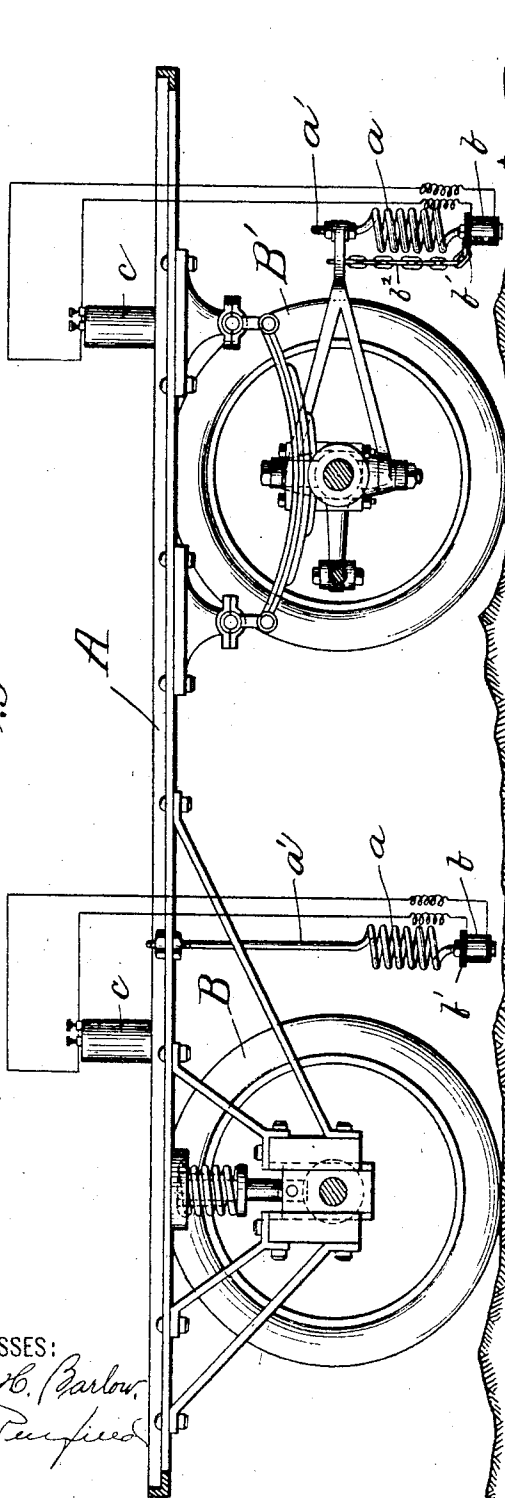


Fig. 4.

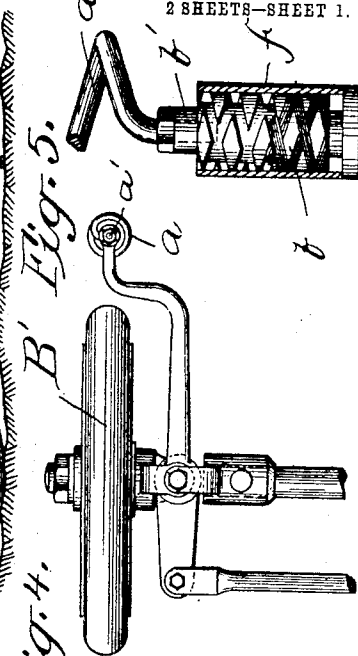


Fig. 5.

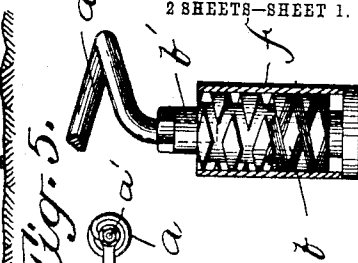


Fig. 3.

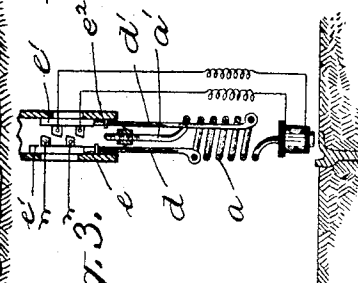
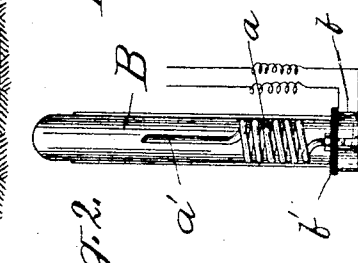


Fig. 2.



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 L. B. Purified

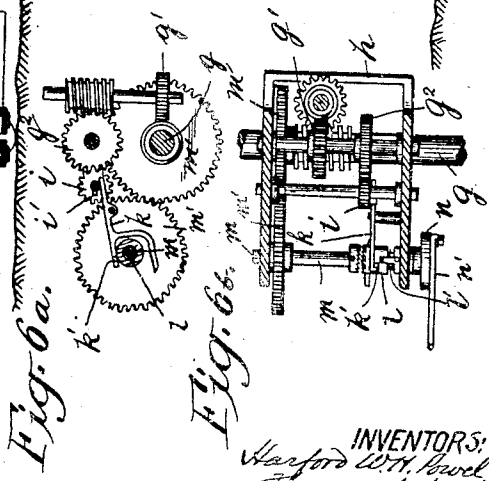
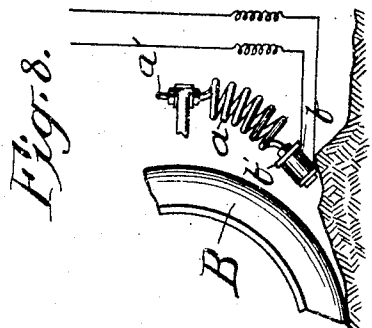
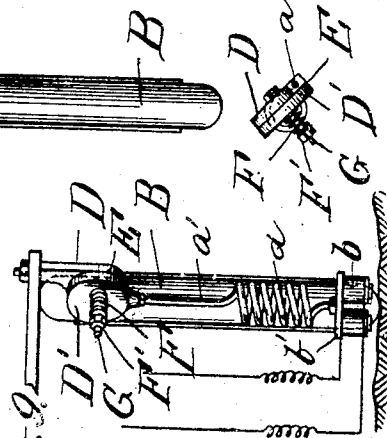
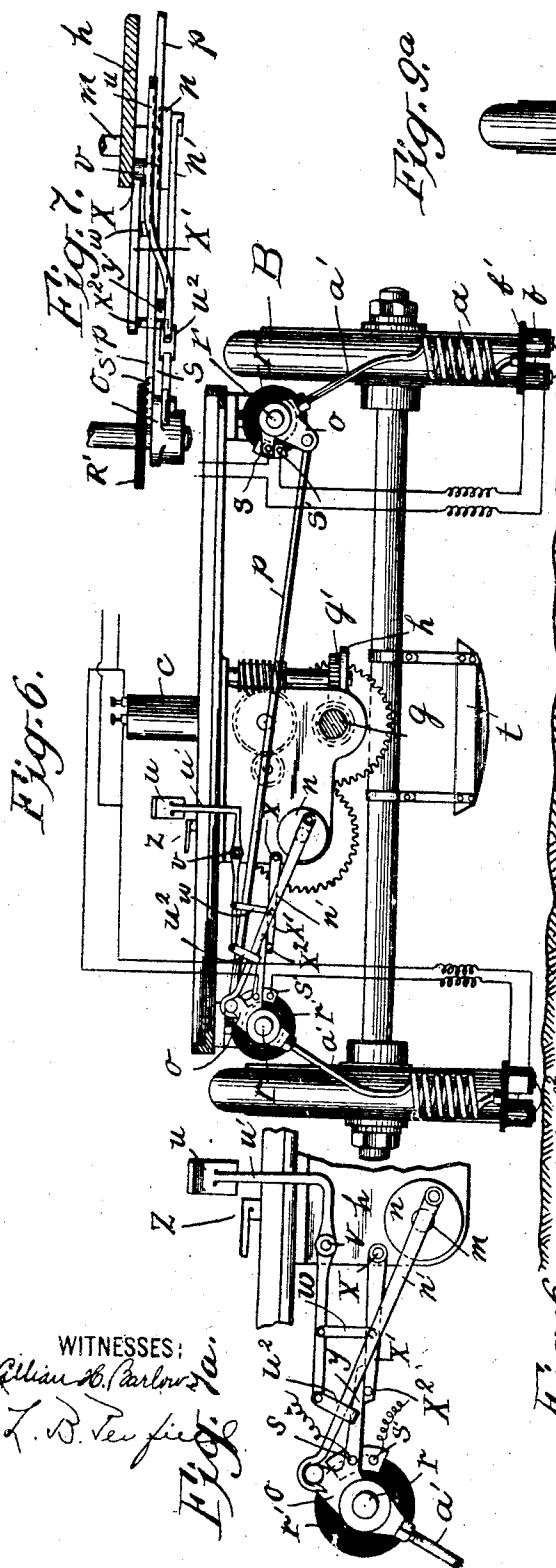
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2 SHEETS—SHEET 2.



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 Fig. 10.

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UNITED STATES PATENT OFFICE.

HARFORD W. H. POWEL AND THOMAS S. SAFE, OF NEWPORT, RHODE ISLAND.

DEVICE FOR CLEARING OBSTRUCTIONS FROM THE PATH OF VEHICLES.

931,885.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed November 18, 1907. Serial No. 402,748.

To all whom it may concern:

Be it known that we, HARFORD W. H. POWEL, a citizen of the United States, and THOMAS S. SAFE, a British subject, both residing at Newport, in the county of Newport and State of Rhode Island, have invented certain new and useful Improvements in Devices for Clearing Obstructions from the Path of Vehicles; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of the device is to clear from the paths of the wheels of vehicles, particularly where the wheels are equipped with puncturable tires, small pieces of iron and the like, and to some extent other small objects, which are capable of puncturing or otherwise injuring the tires. To this end we provide a magnet, supported just above the ground in front of the wheel and adapted to pick up small pieces of iron, such as nails, tacks and the like, and which at the same time is adapted to strike from the path of the wheels other small objects which are not capable of being magnetized, and which is so constructed and supported as to be durable, and efficient for the purpose intended.

The construction and operation of the improved device, and the manner in which the desired objects are attained, will be understood from the following description and the accompanying drawings, which describe and illustrate the preferred form of the device in its general aspect, and various useful details of construction which may be used to advantage in connection therewith.

In the drawings the same reference letters refer to the like parts throughout the several views.

Figure 1 is a central section of the chassis of a motor car showing the front and rear wheels in elevation and equipped with our improved guarding device. Fig. 2 is a front elevation of the guarding device as applied to the rear wheel of Fig. 1. Fig. 3 is a sectional detail view showing a safety arrangement for opening the energizing circuits of the magnet under certain specified conditions. Fig. 4 is a plan view of one of the

front wheels of Fig. 1 and its associated parts showing the manner of support of the guarding device. Fig. 5 is a detail view of a modified construction of a magnet. Fig. 6 is a front elevation of one axle and a pair of wheels equipped with a device for throwing the guarding magnets to one side and simultaneously deenergizing them. Figs. 6^a and 6^b are detail views of the gearing forming part of this mechanism. Fig. 7 is a plan view of a portion of the mechanism showing the connecting rods by which the guarding devices are operated, and Fig. 7^a is an elevation of the same. Fig. 8 is a view showing the manner of operation of the guarding device when it strikes an obstruction, and Figs. 9 and 9^a show a mechanism for causing the guarding device to be thrown to one side when it strikes a large obstruction.

In the construction shown in Fig. 1, the chassis A is supported on the axles carrying the rear wheels B and the front wheels B'. Each of the guarding devices comprises a stiff coil spring a hung in front of the wheel and just above the ground by a rod a' which is a continuation of the coiled spring. The other end of the spring is again continued into a vertical rod and supports a pair of magnets b connected together by an iron armature b' at the top, and through which the screw-threaded end of the supporting rod is passed and held in place by a locking nut. The upper end of the supporting rod is screw-threaded and passes through a suitable part of the framework where it is secured by locking nuts which may be adjusted to vary the distance above the ground at which the magnets are supported.

The magnets are energized by current from batteries c supported on the body of the vehicle. The guarding devices of the rear wheels are hung directly from the framework of the vehicle by the bent rods a' as shown. The guarding devices for the front wheels are supported from the T-head of the conventional steering knuckle. The springs a should be stiff so that if the magnet strikes small obstructions such as sharp rocks and the like, they may throw obstructions out of the path of the wheels, but the springs should have sufficient flexi-

bility so that if the magnets strike a firmly embedded obstruction the springs may flex as indicated in Fig. 8.

In the construction shown in Fig. 3 (which is intended to open the current of the magnet if the vehicle passes over a firmly embedded magnetizable body, in order to prevent the magnet from being drawn beneath the wheel) a tubular portion *e* is interposed in the supporting connection of the guarding device between the frame of the vehicle and the coil spring, and within this tubular portion are two sliding blocks *e'* carrying contact pieces forming terminals for the circuit connections. Each of these blocks is fastened to a flexible rod, one of which rods is connected to the upper coil of the coil spring and the other to the lower coil, as shown, so that when the spring is extended by the attraction between the magnet and the embedded magnetizable body the sliding contact blocks are displaced to open the circuit. It would be possible to effect the same result by making one set of contact terminals stationary within the tubular part *e* and connecting the other set to the lower portion of the coil spring or to the top of the magnet, but the construction illustrated in Fig. 3 is preferred.

The energizing coils of the magnets may be wound upon spools and the spools slipped upon the magnet cores, or the winding may be secured about the cores in other well known ways, but we prefer to use the construction and arrangement illustrated in Fig. 5, in which the core of the magnet is formed with a double spiral groove and the energizing coils are wound in this groove as shown, so that they are practically embedded in the structure of the magnet. We prefer to then inclose the coils by an iron sheathing *f*, making an iron-clad magnet, thereby increasing the strength of the magnet and further protecting it against abrasion and injury.

The devices illustrated in Figs. 6, 6^a, 6^b, 7 and 7^a are intended to throw the guarding devices with their magnets to one side periodically or at will, and simultaneously deenergize them so as to throw down the iron objects which they have picked up. The main shaft of the machine, *g*, carries a worm gear meshing with a corresponding gear *g'* supported in the frame-work *h*. The rotation of the gear *g'* is transmitted through a suitable reduction gear *g''* to the shaft carrying the small gear *i*, which carries a pin *i'* adapted to throw down one end of the lever *k* and by raising the other end release one half of a clutch *l*, which is thereupon thrown by the spring *l'* into engagement with the other half of the clutch which is fixed on the shaft *m* driven from the main shaft through the gears *m'*. This shaft carries on its outer end

the crank-wheel *n*, which is connected through the rod *n'* to the upper end of one of the rods *a'* carrying the guarding devices. It will be observed that this connection between the rod *n'* and the upper end of *a'* is by means of a hook for a purpose which will be further described, and as shown in Fig. 7^a. The upper end of this rod *a'* is connected to the upper end of the other rod *a'* by means of the rod *p*. The upper end of each of the rods *a'* terminates in a circular boss which is mounted to turn on a hub *r* projecting from a circular plate *r'*, and projecting from each boss is a contact piece *s* to which one wire of the battery circuit is connected. The other wire of the battery circuit is connected to a contact plate *s'* on the stationary plate *r'*. The operation of these parts is as follows: The rotation of the main shaft is transmitted, being reduced to the desired extent by the reduction gearing, to the gear *i* so that that gear is rotated, say, once for every hundred revolutions of the main shaft. The rotation of the gear *i* causes the pin *i'* to throw down one end of the lever *k*, lifting the other end, and allowing the spring *l'* to throw the two halves of the clutch into engagement. This allows the gears *m'* to give a throw to the crank-wheel *n*, and the gear *l* immediately throws itself out of engagement allowing the lever *k* to again fall behind the stop *k'* on the clutch mechanism. This throw of the crank-wheel *n* is transmitted through the rod *n'* to throw out the upper end of the rod *a'* to which it is connected, and thereby throw the guarding device beneath the machine and simultaneously deenergize the magnets by breaking the circuit connections at *s*, *s'*. This throw is transmitted through the rod *p* to the other rod *a'*, thus throwing its guarding device beneath the machine. On account of the deenergizing of the magnets the iron objects which have been picked up by them will be deposited in the pan *t*. For the purpose of enabling the driver to transmit such a throw to the guarding devices at will, either for the purpose of discharging the objects picked up thereby, or for the purpose of removing them from the path of an obstruction, the following mechanism is provided. In the floor of the car, in convenient position to be operated by the foot of the driver, is the button *u* fastened to the upper end of a lever *u'* pivoted at *v*. The other end of this lever has a stirrup *u''* through which the rod *n'* passes. Between the stirrup and the pivot *v* depends the link *w* which is connected at its lower end to the lever *x'* pivoted at *x*, and carrying a pin *x''* adapted to engage the under surface of the arm *y* on the head of the rod *a'*. By depressing this button *u* the rod *n'* is lifted, disconnecting the automatic throwing mechanism, and the guarding device is thrown by means of the lever *x'* and the arm *y*.

This throw is transmitted to the other guarding device, as before. In order that the guarding devices may be locked in an elevated position beneath the machine, a latch *z* is provided in the floor of the car adapted to hold down the button *u*.

The arrangement shown in Figs. 9 and 9^a, is adapted to prevent an injury to the guarding device by coming in contact with a fixed obstruction such, for example, as a curb-stone when the car is approaching the curb. To this end two disks *D D'*, faced with leather *E*, are interposed in the rod *a'* between the coiled spring and the support for the rod *a'*. A bolt *G* is secured to the disk *D* and passes through the disk *D'*, and a spring *F* is interposed between the nut *F'* on the end of the rod *G* and the disk *D'*; thereby pressing the disks *D* and *D'* together. These two disks are set at an angle to the plane of the wheel, as shown, so that when the magnet strikes an obstruction and is thrown back toward the wheel, it will also be thrown to one side to prevent its being over-ridden by the wheels and to remove it from any possibility of injury. Other means for preventing the over-riding of the magnetic structure by the wheels, or the undue elongation of the supporting spring for any other cause, are illustrated in Figs. 1 and 3. In Fig. 1, the slack chain *b²* extends from the iron armature *b'* of the magnetic structure to the supporting arm for the guarding device, and it will be seen that this chain will afford a positive stop to the extension of the spring *a*. Similarly in Fig. 3 the sliding block *e'* in its downward movement engages the staple *e²* which also affords a positive stop to the downward movement of the spring.

It will be understood that the features illustrated in Figs. 3 and 9 may be applied to the machine as illustrated in Fig. 1, for example, and that in general the different features herein illustrated and described may be applied separately or together, as circumstances may dictate. It will furthermore be understood that the guarding magnet may be made up of a plurality of small magnets *b* or the like extended to any desired extent across the path of the vehicle.

What we claim is:—

1. A tire guarding device for vehicles comprising an electro-magnet having energizing windings embedded therein, a support for the magnet holding it near the ground in front of the wheel, a source of current on the vehicle body, and connections between the source of current and the energizing windings; substantially as described.

2. A tire-guarding device for vehicles comprising a bar electro-magnet having energizing windings embedded therein and connected with a suitable source of current on

the vehicle body, and a stiff but flexible support for yieldingly supporting the magnet with one of its poles in front of the wheel near the ground, substantially as described.

3. A tire-guarding device for vehicles, comprising an iron-clad electro-magnet having energizing windings connected with a suitable source of current on the vehicle body, and a stiff but flexible support for yieldingly supporting the magnet in front of the wheel near the ground, substantially as described.

4. A tire-guarding device for vehicles, comprising an electro-magnet supported in front of the wheel near the ground, connections from the energizing coils of said magnet to a suitable source of electric current on the vehicle body, and contacts in said connections adapted to be opened by the drawing down of said magnet toward the ground, whereby injury to the tire-guarding device due to fixed magnetizable bodies in the roadway is prevented, substantially as described.

5. A tire-guarding device for vehicles, comprising an electro-magnet hung from the vehicle in front of the wheel near the ground by means of connections including a tubular portion and a stiff coiled spring, connections between the energizing coils of the magnet and a suitable source of electric current on the vehicle body, separable contacts within the tubular portion of the support through which the circuit connections lead, and mechanism connected with the spring for separating said contacts when the spring is elongated, substantially as described.

6. A tire-guarding device for vehicles, comprising an electro-magnet supported in front of the wheel near the ground and energized by an electric current from a suitable source on the vehicle body, and means for automatically and periodically throwing the electro-magnet to one side of the path of the wheel and simultaneously deenergizing it, substantially as described.

7. A tire-guarding device for vehicles, comprising an electro-magnet supported in front of the wheel near the ground and energized by an electric current from a suitable source on the vehicle body, and means under the control of an occupant of the vehicle for throwing the magnet to one side of the path of the wheel and simultaneously deenergizing it, substantially as described.

8. A tire-guarding device for vehicles, comprising a magnet supported in front of the wheel near the ground on a pivoted support which is capable of being turned on its pivot so that the magnet lies beneath the vehicle body out of the path of the wheels, and mechanism for locking the support in that position, substantially as described.

9. A tire-guarding device for vehicles, comprising a magnet supported in front of

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the wheel near the ground by means of a support depending from the vehicle, and means interposed in said support for automatically throwing the magnet to one side as it is forced toward the wheel by an obstruction, substantially as described.

10. A tire guarding device for vehicles, comprising a magnet supported near the ground in front of the wheel by a stiff coiled spring, and a positive stop for limiting the

extension of said spring; substantially as described.

In testimony whereof we affix our signatures, in presence of two witnesses.

HARFORD W. H. POWEL.
THOMAS S. SAFE.

Witnesses:

WM. J. H. STEWART,
N. E. DWYER.