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TREAD SURFACE FOR PAVEMENTS AND THE LIKE.

APPLICATION FILED OCT. 1, 1909.

**954,966.** Patented Apr. 12, 1910.

Fig. 1.

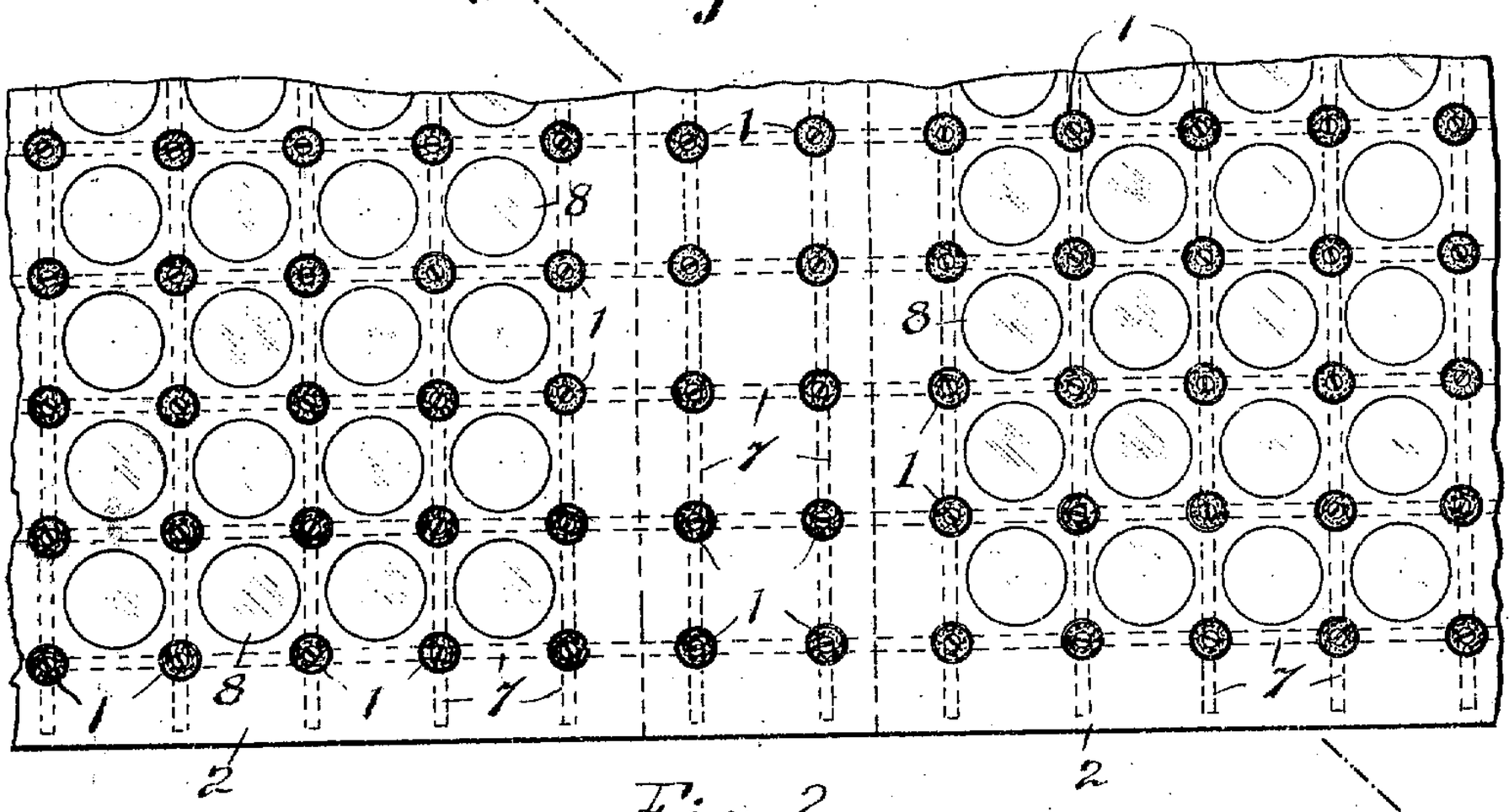



Fig. 2.

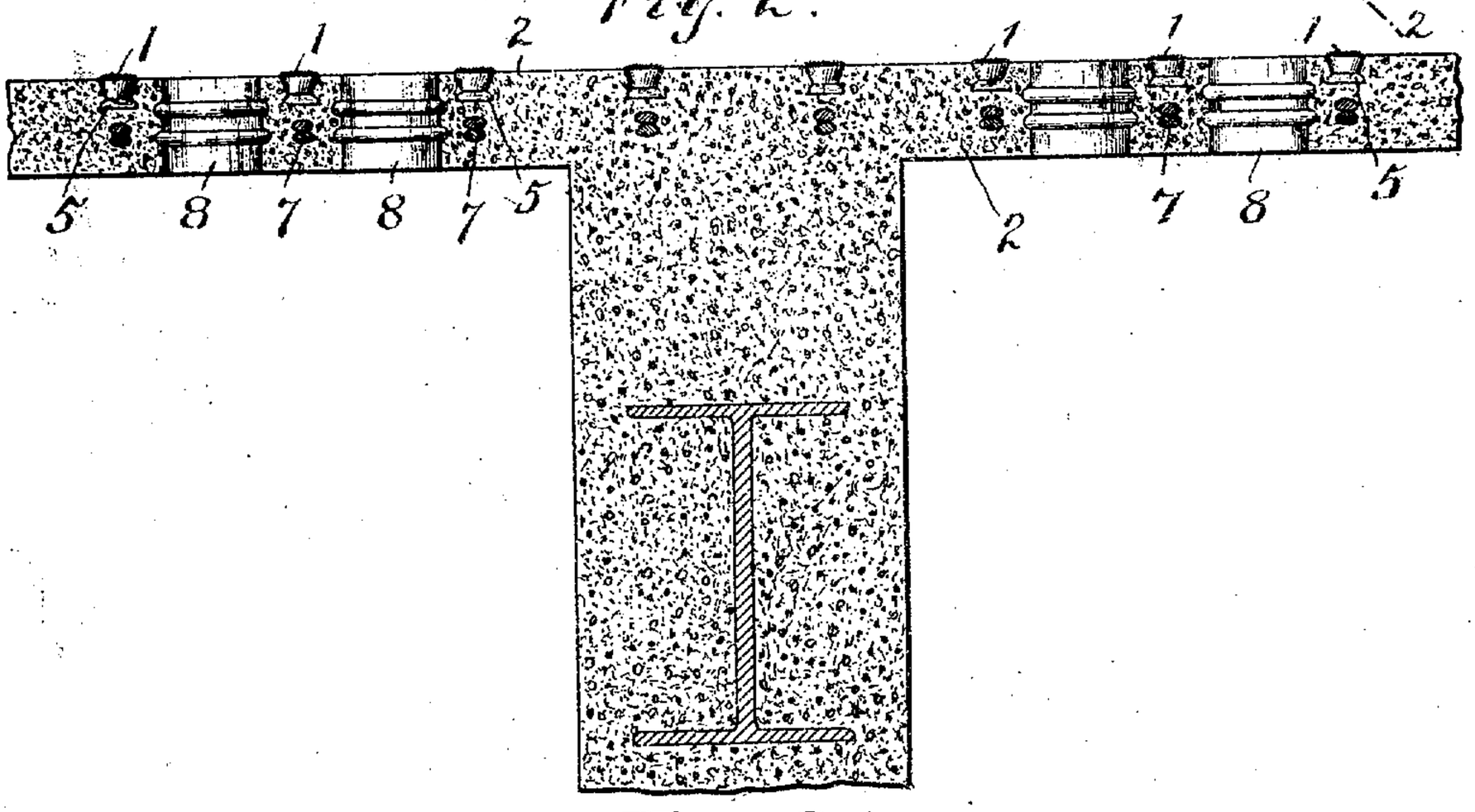
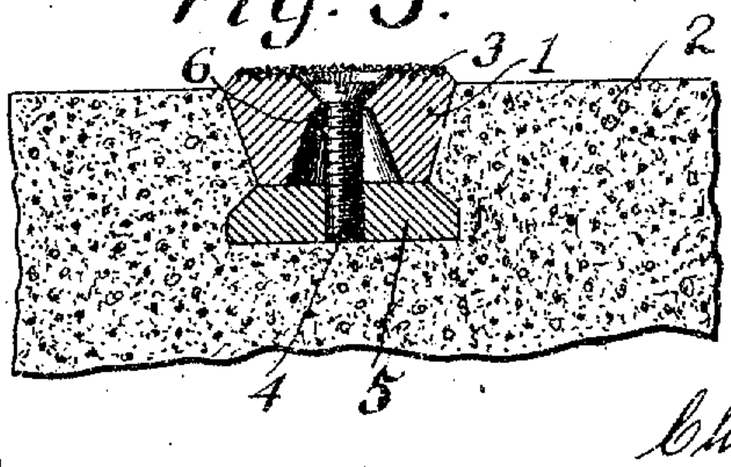



Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## TREAD-SURFACE FOR PAVEMENTS AND THE LIKE.

954,966. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed October 1, 1909. Serial No. 520,503.

*To all whom it may concern:*

Be it known that I, CHARLES B. JACOBS, a citizen of the United States, and a resident of Port Chester, Westchester county, State of New York, have invented certain new and useful Improvements in Tread-Surfaces for Pavements and the Like, of which the following is a specification.

This invention relates to tread surfaces or surfaces especially adapted for pavements, manhole and vault covers, platforms, stair treads, and footways generally.

It is desirable that any surface upon which people tread shall have and be capable of retaining anti-slipping properties. In other words, any such surface, while being smooth enough to afford comfortable footway, should nevertheless be of such a nature that the footwear of pedestrians will adhere thereto and at the same time such surface should be capable of resisting wear or abrasion without losing its adhering or anti-slipping properties.

The invention has for its object to provide a tread surface which shall possess these qualities in a high degree. These and other objects of the invention will in part be obvious and in part be more fully explained in the following description.

In accordance with one feature of the invention, the tread surface comprises a cast metal base with a surface layer of granular hard mineral elements, said elements being embedded in the metal of the base and of such material and size that they will not be destroyed by the heat of the molten metal when casting the same, and said elements being so closely arranged as to protect the softer material of the base from wear and abrasion and also to present such small or sharp edges or corners as are adapted to partially embed themselves in the contacting surfaces of footwear and thus prevent slipping.

The particular materials employed may be varied to suit varying conditions and purposes without departing from the invention, as viewed in its broader aspects. For most purposes it has been found that a base of cast iron provided with a surface layer of granular artificial corundum, known as "alundum," gives satisfactory results. However, other cast metals, such as brass, or bronze, or aluminum alloys, may be used for the base, and natural corundum, carborundum, or similar natural or artificial material, which may be granulated and which, when granulated, will not be destroyed or seriously injured by the heat of the molten metal, may be employed for the surface layer.

A tread surface of the character specified may be produced in accordance with a method which forms the subject of a co-pending application. This method is as follows: A mold for the tread is formed, preferably in green sand. A surface of the mold which is to shape a resisting anti-slipping surface of the tread is provided with a layer of the granular hard mineral elements, this layer preferably being caused to adhere sufficiently to the mold surface by lightly tamping the layer into the surface. This may be done by replacing the pattern in the mold after the layer of granular material has been applied and then exerting a suitable pressure on the pattern as by tapping the pattern with the hand or a mallet so as to force the granular elements partially into the sand surface of the mold. The pattern is then removed, the mold closed, and the molten metal introduced into the mold, the metal being in such condition that it will penetrate the layer of granular material without destroying the elements thereof and of such a character that it will thereafter become sufficiently rigid to effectively resist displacement of the mineral elements. The layer of granular elements should cover the surface of the mold or be so closely arranged that, when the interstices between the elements are filled by the cast metal, the latter will be protected by the hard elements from wear or abrasion. Preferably, the layer of granular elements is made to practically cover the mold surface and may be given a substantial thickness, the thickness of the layer being preferably as great as the distance to which the molten metal will penetrate. The coarser the grains of the layer, the thicker it may be. Ordinarily, the layer may be made to adhere sufficiently by the application of pressure, as above stated. When necessary, however, the layer of granular elements may be held in place on the mold surface by covering the same with some material the identity of which will be destroyed by the molten metal

introduced into the mold. For example, the layer of granular elements may be held in place by a piece of thin sheet metal, fine wire gauze, or the like, which will melt or become incorporated in the body of the molten metal introduced into the mold but not, however, until the molten metal has filled the mold or assumed a sufficiently quiescent state to avoid the detachment of the granular layer from the mold surface.

The invention further consists in the novel constructions and improvements herein set forth.

In order that the invention may be more fully understood reference may be had to the accompanying drawings wherein the invention is illustrated as applied to a vault light pavement, the construction shown embodying certain novel features other than those above mentioned which form parts of the invention.

Of the drawings, Figure 1 is a plan view of a vault light pavement embodying the various features of the invention; Fig. 2 is a vertical section of the same taken on the line 2—2 of Fig. 1; and Fig. 3 is a vertical sectional view illustrating a detail on a larger scale.

While the entire tread surface of a pavement or other footway may be constructed in accordance with the principal feature of the invention, in the embodiment illustrated the surface of the pavement is a composite surface, part being formed in accordance with my invention and part being formed of the materials ordinarily employed, such as concrete and glass. As shown, the parts embodying the invention are in the form of small circular bodies or buttons 1 embedded in and perfectly uniformly distributed throughout the body 2 of the pavement. One of the buttons is illustrated in detail in Fig. 3. As here shown, the button comprises a body portion 1 of cast metal the surface of which is studded with granular hard mineral elements forming a highly resistant anti-slipping layer 3, these buttons being preferably constructed in accordance with the method above described. For the ordinary pavement, as shown, the base of the tread surfaces is preferably formed of cast iron and the surface layer of granulated alundum, as above explained. In the embodiment illustrated the buttons are represented as having their resisting anti-slipping surfaces located slightly above the surrounding surfaces of the pavement. By reason of this arrangement the highly resistant surfaces of the buttons will protect the surrounding surfaces of the pavement from wear and at the same time effectually prevent slipping.

While the surfaces of the buttons are extremely durable, they will nevertheless eventually be worn down where the pavement is much used. In accordance with one feature of the invention, therefore, provision is made for readily exchanging the worn buttons for new ones. As shown, the body portions 1 of the buttons are externally tapered from the top downwardly and seated in corresponding tapering recesses in the body 2 of the pavement. Where the pavement is made of concrete, as illustrated, the buttons may be introduced into the concrete when the pavement is formed. For the purpose of removably and yet firmly securing the buttons in position they are provided with perforations, preferably centrally located, where the buttons are round, as illustrated, these perforations being adapted to receive screws 4. Preferably and as shown, the upper ends of the perforations are countersunk to receive the heads of the screws below the level of the resistant layer 3, the said heads being thus protected from wear by said resistant layer. The threaded points or ends of the screws may enter any suitable anchoring device 5. While this anchoring device may be of any suitable material, such as wood, it is preferably formed of metal and is tapped to receive the thread of the screw. The anchoring device, moreover, is preferably formed to extend beyond the lower edge of the button so as to be firmly embedded in the body of the concrete, being introduced with the button when the concrete is laid.

A further feature of the improvement consists in forming the perforation in the button with an enlarged lower portion so as to provide an internal shoulder 6 which may be engaged by a suitable implement to forcibly detach the button from the concrete, when the button has become worn.

It is obvious that the resistant tread surfaces may or may not be used in connection with other surfaces to form the pavement or footway, and that where they are used in connection with other surfaces, the latter may be of any desired material. It is also obvious that where the resistant surfaces are used in connection with concrete, the latter may be constructed of the usual materials and may be in any usual or improved form. Where the concrete forms a vault light pavement as illustrated, it may be reinforced in any of the usual or approved ways and may be provided with any of the usual or approved forms of vault glasses or lenses. As shown, the concrete is reinforced by rods or bars 7 between which are located the glasses or lenses 8. In this case the resistant buttons 1 are preferably distributed between the lenses and in the upper part of the concrete body 2 above the reinforcing bars 7, substantially as illustrated. By reason of this construction the resistant surfaces serve to protect the lenses and the adjacent concrete from wear and also prevent slipping upon

the smooth surfaces of the glass and the concrete.

I claim:

1. A tread comprising a base of cast metal and a layer of granular hard mineral elements embedded in the upper surface of said base, said elements being of such material and size that they will not be injured by the heat of the molten metal when casting the base and part at least of said elements being partly exposed to prevent slipping and to protect the metal in which they are embedded from abrasion.

2. A tread comprising a base of cast iron and a layer of granular corundum embedded in the surface of the base, part at least of the grains of corundum being partly exposed to prevent slipping and to protect the iron in which they are embedded from abrasion.

3. A pavement comprising a body portion of suitable paving material in combination with tread members distributed throughout the surface thereof, said tread members comprising each a base of cast metal and a layer of granular hard mineral elements embedded in the upper surface of the base, said elements being of such material and size that they will not be injured by the heat of the molten metal when casting the base and part at least of said elements being partly exposed to prevent slipping and to protect the metal of the base from abrasion.

4. A pavement comprising a body portion of concrete in combination with tread members consisting each of a base of cast iron and a layer of granular corundum embedded in the surface of the base, part at least of the particles of corundum being partly exposed to prevent slipping and to protect the iron of the base from abrasion.

5. A pavement comprising a body portion of concrete in combination with tread members consisting each of a base of cast metal removably secured in the body of the concrete, and a layer of granular hard mineral elements embedded in the surface of the base, the part at least of said elements being partly exposed to prevent slipping and to protect the metal of the base from abrasion.

6. A pavement comprising a body portion of concrete having tapering recesses therein in combination with tread members tapering to fit said recesses and provided with means for removably securing the same therein, said tread members having base portions and resistant surfaces formed of granular hard mineral elements embedded in said base portions.

7. A pavement comprising a body portion of concrete having recesses formed therein and anchor members embedded in the concrete below said recesses, in combination with tread members formed to fit said recesses and having base portions and resistant surfaces consisting of layers of hard mineral elements embedded in the base portions, and means adapted to engage said anchor members for securing said tread members in said recesses.

8. A pavement comprising a body portion of concrete having recesses formed therein and threaded anchor members embedded in the concrete below said recesses, in combination with tread members formed to fit said recesses and having base portions and resistant surfaces consisting of layers of hard mineral elements embedded in the base portions, and screws adapted to engage the threaded anchors and secure said tread members in said recesses.

9. A pavement comprising a body portion of concrete having recesses formed therein and anchor members embedded in the concrete below said recesses, in combination with tread members formed to fit said recesses and having base portions and resistant surfaces consisting of layers of hard mineral elements embedded in the base portions, said tread members being perforated and having countersunk upper portions and enlarged lower portions adapted to form shoulders to facilitate the removal of the tread members, and means adapted to engage said anchor members for securing said tread members in said recesses.

10. As an element of a pavement, an externally tapered tread member comprising a perforated base portion in combination with an anchor, the sides of said anchor being projected beyond the lower portion of said base portion, and detachable means for securing the tread member to the anchor, the whole being adapted to be embedded in concrete so that the tread member may be removed.

11. As an element of a pavement, a removable tread-member comprising a perforated base portion having downwardly tapered sides adapted to be embedded in concrete and means coöperating with said perforation for securing said tread to the concrete, the lower part of said perforation being enlarged to form a shoulder for removing the tread-member.

12. As an element of a pavement, a removable tread-member comprising a perforated base portion having downwardly tapered sides, the upper end of the perforation being countersunk, in combination with an anchor and a screw having a head adapted to be housed in the countersunk portion of said perforation for securing the tread-member to the anchor, the whole being adapted to be embedded in concrete so that the tread-member may be removed.

13. As an element of a pavement, a tread member comprising a perforated base of cast metal and a layer of granular hard mineral elements embedded in the surface

of the base, in combination with an anchor and detachable means coacting with the perforation of said base for securing the tread member to the anchor, the whole being adapted to be embedded in concrete so that the tread member may be removed.

14. As an element of a pavement, a tread member comprising a perforated base of cast iron having a layer of granular corundum embedded in its surface, in combination with an anchor and screw for securing the tread member to the anchor, the whole being adapted to be embedded in concrete so that the tread member may be removed.

15. As an element of a pavement, a tread member comprising a perforated base of cast iron in the surface of which is embedded a layer of granular corundum, the upper part of the said perforation being countersunk and the lower part of said perforation being enlarged to form a shoulder for removing the tread member, and means adapted to engage the countersunk portion of said perforation for securing said tread-member in place.

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

CHARLES B. JACOBS.

Witnesses:
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WM. J. DOLAN.