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METHOD OF MAKING ABRASIVE CASTINGS

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1 Claim. (Cl. 22—205)

This invention is directed to the making of floor plates, stair treads, or the like, which are designed to provide an abrasive surface to prevent wear and slipping; and the method consists essentially in embedding into the metal surface of abrasive or gritty particles which are anchored within the metal during the pouring operation and lie substantially flush with the metal surface or in slightly protuberant relation thereto so as to afford a frictional grip which will prevent slipping and at the same time protect the softer metal from wear during a long period of time.

The method of the present invention eliminates the use of any form of cementing material and is designed to so distribute the abrasive particles within the mold as to provide for the flowing of the metal around the separate particles in such a way that each one will be permanently retained within a metal socket so that displacement will be prevented.

Further objects and details will appear from the description of the invention in conjunction with the accompanying drawing, wherein—

Figure 1 is a sectional elevation of a mold with the pattern in place to provide the necessary indentations in the surface of the mold;

Fig. 2 is a similar view showing the pattern removed and the gritty particles distributed in position within the mold to receive the charge of metal;

Fig. 3 is an enlarged detail showing the indentations formed in the surface of the mold;

Fig. 4 is an enlarged detail showing the gritty particles positioned within the indentations and ready for the pouring of the metal;

Fig. 5 is an enlarged detail showing the manner in which the metal flows around the particles to embed the same;

Fig. 6 is a sectional detail showing the manner of control through the completed casting to provide for the screw holes; and

Fig. 7 is a perspective view of a corner of the completed casting.

In practicing the method of the present invention the molder's sand 10 is packed into the drag 11 of the mold in the usual manner. A pattern 12 is then prepared by applying to the lower face of the pattern a roughened surface 13 which may be provided by the adherence to the pattern of a facing of abrasive cloth or paper having gritty particles of relatively fine grit, as for instance No. 24 grit, adhering to the surface, although if desired the relatively fine particles may be adhered directly to the surface of the pattern.

When the pattern is impressed into the sand within the drag, the roughened surface will form irregular minute pockets or indentations 14 (Fig. 3), the size of which will be determined by the grade of the grit employed.

The pattern is also provided with recesses 15 of conical formation, which are of a size and shape to provide for the heads of the screws or bolts to be employed in securing the completed casting in the intended position.

The cope of the mold 16 is provided with a sand filling 17 adapted to lie flush with the pattern and with the surface of the sand in the drag, with the usual pouring apertures 18 and 19 formed through the sand. After the surface of the sand has been indented in the manner stated, and after the pattern has been removed, gritty particles 20 of Carborundum, Alundum or silicon carbide or the like, of considerably coarser grit, as for instance No. 16 grit, are sprinkled and evenly distributed over the surface of the mold in such a way as to cause the coarser particles to be socketed or retained within the indentation 14, which latter, however, are of lesser volume than the gritty particles 20, so that the tips only of the latter will be socketed within the indentations, as in Fig. 4, allowing the larger mass of each particle to overlie or overhang the edges of the socket which provides for the underflowing of the metal when the latter is poured into the mold. Prior to the closing of the mold, the entire space bearing the grit may be sprayed with silicate of soda, or any other form of binder material, and then dried with a torch, so as to secure the grit to prevent its being moved out of place by the rush of molten metal.

As shown in Fig. 4, a part only of the indentations will be filled by the gritty particles, leaving open indentations interspersed therebetween, with the result that when the metal is poured to provide the body 21 of the casting, the metal will flow freely into the unoccupied indentations and afford points or projections 22 which lie in substantially flush relation to the points of the gritty particles, so that the completed surface will present the character of a roughened or serrated metal surface interspersed by the tips of the gritty particles, which latter, however, are permanently embedded by the surrounding metal, so that displacement will be impossible.

In the formation of the mold, the recesses 15 in the pattern will result in projections 23 in the mold, which projections extend very materially above the roughened or abraded surface, 55
and these projections will form conical recesses 24 in the casting, which, however, will be free from the presence of gritty particles, so that thereafter a screw hole or bolt hole 25 may be readily drilled through the metal without bringing the drill surface into contact with the gritty particles, which if present would seriously interfere with the drilling operation.

The casting produced in the manner stated 10 presents a roughened surface throughout which the metal points and the gritty points will be distributed with substantial uniformity, which surface, however, will afford high resistance to wear and slipping, but without exposing the tips of the gritty particles at a higher level than the metal, so that the former will be protected against sharp impact which might tend to break away the projecting points, which though much harder than the metal itself are of somewhat brittle character, with the result that the wearing surface will be afforded equally by the metal and by the gritty material, thereby providing a tread which will afford satisfactory service for a long period of time.

25 The castings in the form of plates or slabs are adapted for use as stair treads, floor coverings, or in any other capacity where frictional surfaces of the character described is desired. By employing a relatively fine grade of grit in the forming of the mold, and a relatively coarser grade for the embedded material, the latter will be so disposed that the metal will underflow the body of each particle to a sufficient extent to provide a rigid and permanent socket therefor without the provision of any form of coating or adherent substance, which thereby simplifies and improves the casting operation and at the same time results in a much superior product.

As shown, the grade of gritty material employed first for the pattern and later for the embedded particles, and the manner of distribution of the latter, is such as to permit the metal tips of the gritty particles to project in equal degree to the wearing surface, but variations in the selection of the intended grades of material may be made, with a resultant variation in the proportions of metal and grit exposed at the surface level. That is to say, if desired, a preponderant exposure of metal or a preponderant exposure of grit can be provided for, with like variations in the frictional character of the resultant surface.

I claim:

The method of making abrasive castings which consists in forming a mold about a pattern having closely spaced relatively small protuberances throughout its surface to produce corresponding small indentations in the surface of the mold, sprinkling in the surface of the mold particles of abrasive material and partially socketing the same within certain indentations of the mold, said particles being of a size when socketed to project over adjacent indentations, whereby intervening indentations are left empty and thereafter pouring the metal into the mold in position to underflow and embed the bodies of the abrasive particles within the metal and flow into the empty intervening indentations, leaving the tips of the abrasive particles projecting therefrom and interspersed with metal tips forming a composite abrasive tread surface with the tips all lying in substantially the same plane.

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