May 17, 1932. W. M. DUNCAN 1,859,078

MOLDED METALLIC CORE

Filed Jan. 19, 1931

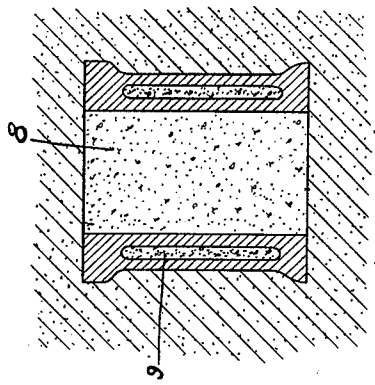


Fig. 2.

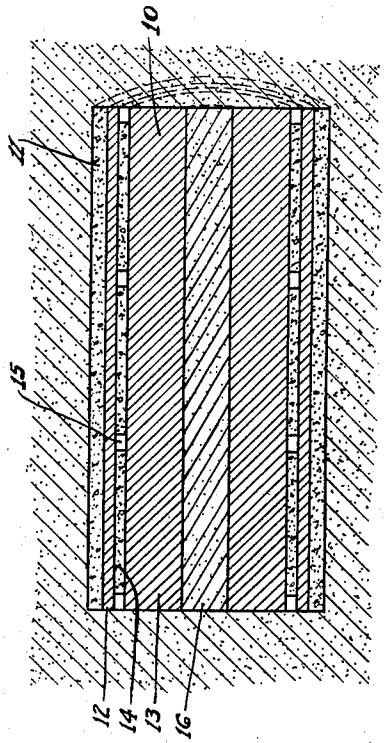


Fig. 4.

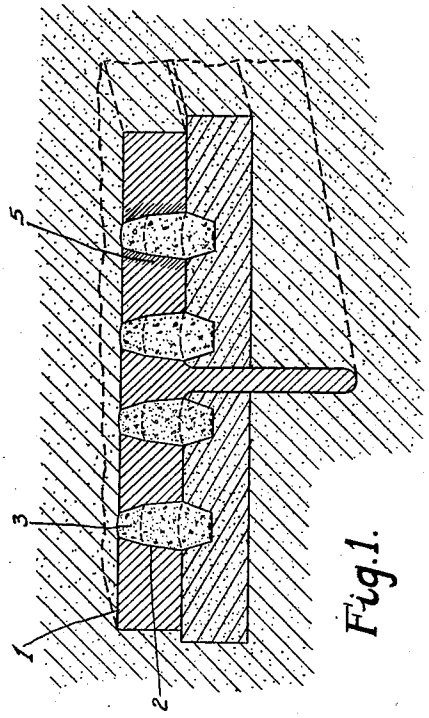


Fig. 1.

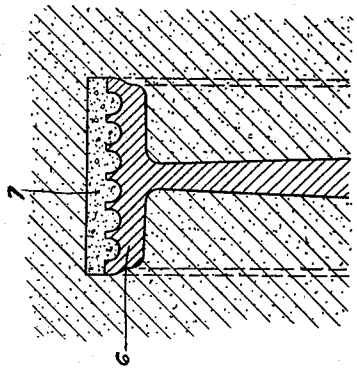


Fig. 3.

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MOLDED METALLIC CORE

Application filed January 19, 1931. Serial No. 509,705.

This invention relates to certain new and useful improvements in molded metallic cores for use in molds for cylindrical and other forms of castings, the peculiarities of which will be hereinafter fully described and claimed.

The main objects of my invention are first, to provide a core comprising ferrous metallic particles, and a suitable binder; second, to vary the proportion of said metallic particles intermixed with core sand so as to vary the chilling effect accordingly on the poured casting; third, to provide such a core with a preponderance of metallic particles for chilling the outer surface of a comparatively thin portion of the casting formed between said chilling core and another core spaced therefrom and adapted to shield it from the body of the casting; fourth, to use fine, ground up particles of iron or other suitable metal in various proportions to the core sand intermixed therewith and held together by linseed oil or other suitable binder; fifth, to reclaim the metallic particles from the core as disintegrated after use; and other objects hereinafter fully described and claimed.

The ordinary chill of solid metal is either in one piece or in sections disposed in the mold where an effect is desired on the poured casting. My metallic composition core consists of iron borings or other suitable metal reduced to sandlike particles and held together by a binder, or forming various percentages of the core when intermixed with core sand and molded with a binder of linseed oil, or a suitable core compound, in a similar manner to that employed in making dry sand cores. The percentages of metallic particles in such cores would likewise vary the chilling effect from a maximum when a preponderance of metallic particles is used, to a lesser chilling effect by a lesser percentage of metallic particles employed in cases where it is desired to give a dense impervious iron casting, rather than a chill of the same. By varying the percentage of iron in my molded metallic composition cores, the chilling action can be controlled so that a dense grey iron can be produced as well as a chilled surface.

A chill of this kind could be used wherever a core could be used. In other words, a chill could be produced on a casting wherever desired as my metallic composition core is plastic in its initial state. It would thus replace sectional chills due to the fact that it can be removed just as a core is removed. Heat would destroy the binder and the iron or other metallic particles forming the base of the disintegratable core could be reclaimed by a magnet for further use, if such metallic particles used are magnetic as is the case with ground up iron borings which preferably form such a base.

Referring to the drawings on which like reference numerals indicate corresponding parts,

Fig. 1 represents a section of a mold containing a flat plate casting having holes therein such as a sintering machine grate bar, and my metallic composition core applied thereto;

Fig. 2, a water jacketed cylinder as poured in a mold with my improved cores applied thereto;

Fig. 3, a similar view of a rope sheave with my metallic composition chill applied to the grooved face of the rim; and

Fig. 4, a similar view of a roller having a sleevelike outer portion spaced from the body of the roller, and my metallic composition chill applied thereto.

Referring to the drawings, the numeral 1 represents a flat plate having holes 2 therethrough, the surfaces of which it is desired to chill, such as in a sintering machine grate bar where down draft suction through the holes draws coke dust and iron ore, thus enlarging them by the abrasive action thereof in an incredibly short time to such proportion that the grate bars are made useless. When a composition of metallic and nonmetallic material containing a suitable percentage of metallic particles as shown at 3 Fig. 1, are used in said holes, a corresponding chill is obtained in the poured casting at 5, as indicated at the right in Fig. 1.

In Fig. 3, the rim 6 of a rope sheave in which it is essential for effective use the the grooved surface for a hard face, has my

partially metallic chill 7 shown applied thereto.

In Fig. 2 showing a water jacketed cylinder, the central core 8 and chamber core 9, are formed of my partially metallic core containing a suitable lesser percentage of iron particles so as to obtain a lesser condensation of the metal without the former chilling effect of a larger percentage of iron particles.

In Fig. 4, a roller 10 is provided with a partially metallic core 11 as a lining for the surrounding mold, and such lining contains a large percentage of metallic particles so as to produce upon the outer sleevelike cylindrical portion 12, the desired density and chill capable of withstanding abrasion.

In this construction of roller, the said sleevelike outer portion 12 is spaced from the body 13 by a core 14 having holes 15 therethrough to form connecting bridges between said outer and the inner portions. This inner core 14, concentric with the sleeve portion, contains a reduced number of metallic particles in the core mixture, or may dispense with the same. The object of this construction of cylinder is to shield the outer chilled portion of the poured casting from the heat of the body of the roller. The central bore 16 may be of similar composition to the core 14.

I have made such core chills containing pulverized iron borings and there has been no difficulty experienced in making good smooth cores. I have also illustrated herewith the application of my partially metallic core to various forms of poured casting. In such cores of my construction the iron or other magnetic particles are reclaimed from the core sand after the heat of the casting has destroyed the binder, and such particles are available for further use.

When my molded core is mainly composed of metallic particles, and intermixed core sand is reduced to a minimum or omitted altogether, and the maximum of metallic particles are held together by linseed oil or otherwise, a fracture examined by a low powered microscope shows a structure closely resembling coarse grained cast iron. Such a core as molded or cast in an initial plastic state, will produce a maximum chill in a poured casting, yet the particles can be reclaimed after use, for later cores of various proportions of said particles as the base.

While I may provide my cores having intermixed iron particles as stated above, in the usual dry condition of ordinary dry sand cores, I may use my partially metallic core otherwise than in such usual dry condition under other circumstances and requirements, but have given these illustrations and description of the same as the preferred form of carrying out my invention. I therefore do not limit myself to the construction shown except as by the claims herewith.

I claim:

1. The combination with a mold, of a chill core comprising a mixture of fine metallic particles and sand held together by a suitable binder and disposed in said mold at the place where a chill is desired in the poured casting, and another core disposed in said mold and spaced from said chill to shield the resulting chilled surface of the interposed portion of said casting from the heat of the body of the casting, substantially as described.

2. The combination with a mold, of a chill core comprising a mixture of metallic particles and sand and a suitable binder and disposed in said mold where a chilled surface is desired in a comparatively thin portion of a casting, and an inner core spaced opposite said chill and having through holes to form connecting bridges between said thin portion and the body of the casting, substantially as described.

3. The combination with a mold for a cylindrical casting, of a metallic core lining the outer surface of said mold to form a chill on the poured casting, a sleevelike cylindrical core spaced from and concentric with the outer core to form a comparatively thin portion of the casting and having holes to form connecting bridges between said thin portion and the inner body of the casting, and a central core to form the bore of the casting, the said sleevelike core shielding the chilled outer surface of the thin portion of the casting from the heat of the inner body, substantially as described.

In testimony whereof I have affixed my signature.

WILLIAM M. DUNCAN.