METHOD OF TRUING MANGANESE CASTINGS

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METHOD OF TRUING MANGANESE CASTINGS

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3 Claims. (Cl. 29—552)

The invention relates to an improvement in truing or "rounding up" castings and, for example, manganese castings. One purpose is to provide means for truing castings which have been received in out-of-round conditions due, for example, to high temperature quench.

Another purpose is to correct or to round up castings which in use must conform to a specific form or to specific dimensions, or to a specific surface.

Another purpose is to provide means for and a method of rounding up more or less conic manganese castings where an inner or outer bearing or supporting surface should, in use, conform to a particular contour.

Other purposes will appear from time to time in the course of the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawing which shows the manganese cast mantle of a gyratory crusher in position to be rounded up.

Referring to the drawing, 1 generally indicates a suitable normally formed shaping mass. In the structure shown in the drawing a mantle 2 is illustrated, which is intended to be applied to the outer surface of the conic crushing head of a gyratory crusher. The heavy shaping mass 1 is formed with an outer surface 1a which is accurately re-produced the surface of the crushing head or cone of a gyratory crusher to which the mantle is to be applied.

The inner surface 2a of the casting 2 is illustrated as out of conformity to the opposite surface 1a. The purpose of the invention and method is to provide ready means and a ready method for truing or rounding up castings of the general type above discussed, in such fashion that the inner surface 2a of the mantle 2 will conform precisely to the opposite surface 1a of the shaping mass. By being made to conform to the surface 1a of the shaping mass this may be varied or rounded up to conform to the outer surface of the crushing head upon which it is intended to be used.

Assuming a proper heavy and suitably supported shaping mass as shown at 1, and assuming a casting such as the mantle 2, with an inner surface 2a somewhat distorted or "out of round," the operator positions the casting upon the shaping mass 1, as shown in the FIGURE. Either before or after such positioning, a layer of explosive 3 is applied to the outer surface of the casting. Normally, all that is required is to position the casting 2 upon or about the heavy shaping mass, to provide a proper layer of the explosive 3 and then to detonate the explosive by any suitable detonating means, the details of which do not of themselves form part of the present invention, and are not herein illustrated. The result of the detonation is to form or force the casting 2, as a whole, against the shaping mass 1. Assuming that the shaping mass is symmetrically machined to the desired contour, it acts as a male die to receive the punch of the explosive or, rather, the punch of the casting 2, which, under the influence of the explosive, is positively forced against and formed by the shaping mass 1. The out-of-roundness of the casting, or the undesired irregularities of its bearing surface, are thereby removed or, at the least, reduced to a greater symmetry than is now obtained by grinding out-of-round castings.

Whereas the invention has been described in connection with a conic mantle opposed to a male shaping mass 1, it will be understood that various forms of shaping mass and of casting or metal part can be used. For example, the bowl liner used with gyratory crushers may be similarly rounded up by positioning it within a female die and by coating the inner surface of the conic liner, the reverse of the arrangement shown in the drawing filed herewith.

While the invention may be employed with various forms of casting and with various materials, it is particularly advantageous in rounding up bowl liners and mantles for gyratory crushers which are prevalently made of manganese steel. The detonated explosive forces or drives the unsymmetrical manganese against the heavy symmetrical shaping mass, whether it is convex or male, as shown in the drawing in connection with the mantle, or whether it is concave or female, as would be necessary in rounding up a conic bowl liner where the outside surface of the bowl liner is the bearing surface which has to be trued to conform to the opposed supporting surface of the bowl liner with which it will ultimately be used.

The method does not damage the cast; in fact, in connection with manganese castings, the detonation of the explosive definitely improves the wearing characteristics of the casting.

It should be kept in mind that the present invention meets and solves a practical problem. One of the main manufacturing difficulties encountered in the shop preparation of manganese parts for crushers is the out-of-roundness of the castings as received from the foundry. Much of this distortion is probably due to the drastic high temperature quench necessary to put the material in solution. This condition not only makes for a random sizing or shaping of the manganese wearing parts but makes the application of supporting material difficult or costly. It will be understood that in gyratory crushers it is customary, in applying a mantle to a head, or a bowl liner to a bowl, to employ some intermediate material between the face of the casting and the opposed face of the head or bowl. Molten zinc has been prevalently employed and, under some circumstances, it is possible to substitute a plastic backing. The random sizing and out-of-roundness of bowl liners and mantles makes the application of plastic, for example, more expensive. The cavity to be filled with the plastic may be varied or increased widely by the out-of-roundness of the bowl liner or mantle. This out-of-roundness may be completely or substantially reduced by the above-described method of detonating an explosive coating in order to force an unsymmetrical manganese part against and in conformity with a heavy shaping mass with a properly formed surface. When the casting, by detonation of the explosive, has been forced to conform to the opposed surface of the shaping mass it is thereby prepared properly to engage and conform to the opposed surface of the head or bowl to which it will later be applied. It may be shipped to the point of use, and applied to the head or bowl, without further grinding or truing.

I claim:

1. The method of rounding up castings received in out-of-round condition, for example concave or convex castings for use in gyratory crushers or the like, which includes providing a shaping mass having an accurately finished surface which is precisely the same as the desired shape of a finished casting, applying to such shaping mass a casting to be rounded up, said casting being seated upon said accurately finished surface with the out-of-round areas forming spaces between the casting and said finished surface applying a generally uniform layer of explosive to the surface of the casting remote from the shaping mass, detonating said explosive and thereby forcing the casting against the shaping mass and conforming the surface of the casting opposite to the explosive to the finished surface of the shaping mass.
2. The method of claim 1, characterized by the employment of a convex shaping mass and the opposition to it of a concave casting, with the convexity of the shaping mass penetrating the concavity of the casting, with the casting closely approaching the outer surface of the shaping mass, and with the explosive located exteriorly of the casting.

3. The method of claim 1, characterized by the employment of a concave shaping mass and the opposition to it of a convex casting, with the convexity of the casting penetrating the concavity of the shaping mass, with the casting closely approaching the surface of the shaping mass, and with the explosive located on the side of the casting away from the shaping mass.