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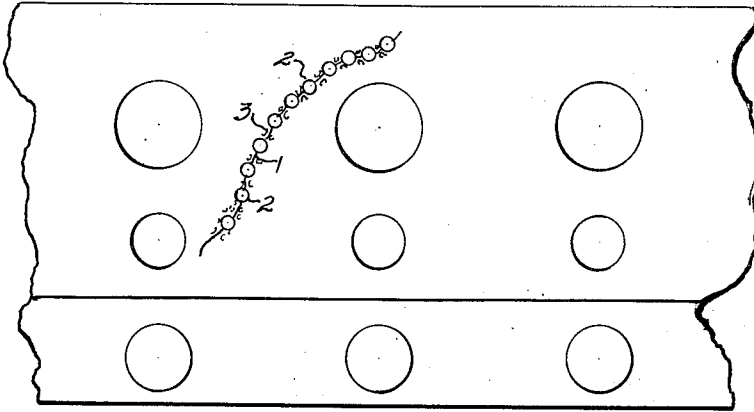
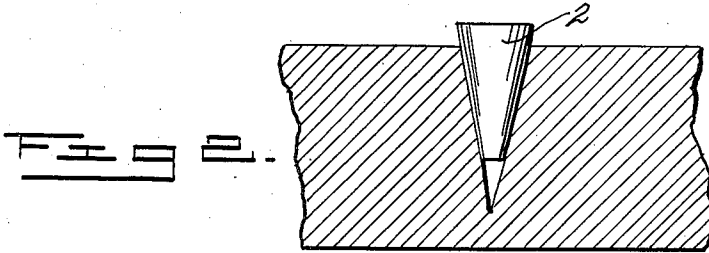
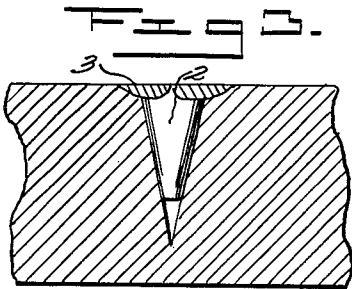
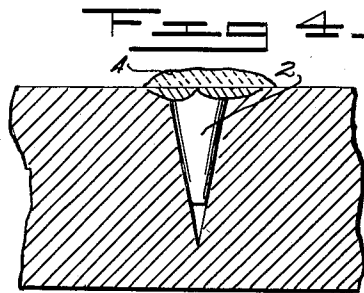
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2,537,533

METHOD OF REPAIRING CRACKS IN CASTINGS

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Fig 1.



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METHOD OF REPAIRING CRACKS IN CASTINGS

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4 Claims. (Cl. 29-148)

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The present invention relates to improvements in methods for repairing castings and more specifically refers to an improved method for repairing breaks in castings such as cylinder blocks of internal combustion engines.

Cracked castings have presented considerable repair problems especially in that when castings are repaired by conventional welding methods it is necessary to remove the cylinder block casting from the remainder of the engine in order to heat treat the casting prior to welding. This operation is cumbersome, time consuming, and expensive, and the above method has not proved generally satisfactory in all cases.

It is an object of this invention to do away with the above difficulties and to provide a method whereby a casting or cylinder which has been cracked can be repaired without requiring the removing of the cylinder block from the engine.

A further object of the present invention is to accomplish the above mentioned repair without the conventional excessive heat treatment or annealing of the complete cylinder block or casting.

Further objects and advantages of my invention will be apparent from the following detailed description and claims taken in conjunction with the annexed drawings wherein like parts are indicated by like reference numerals and where:

Figure 1 is a fragmentary plan view of the conventional internal combustion engine cast cylinder block showing break or crack in the said cylinder.

Figure 2 is a fragmentary section view cut longitudinally through the cracked section and showing the insertion of a plug.

Figure 3 is also a fragmentary section view cut longitudinally through the cracked section and showing the plug inserted and mechanically welded before brazing.

Figure 4 is a sectional view as mentioned above and showing the completed mechanical weld.

Referring now in detail to the accompanying drawings and more specifically to Figure 1, which illustrates an internal combustion engine cylinder block having a break or crack 1. In my method of repairing such casting breaks, the general area of the break is heat treated with a torch of suitable nature in order that the metal casting may be annealed in and around the general area of the break. This operation is followed by the insertion of metallic tapered circular plugs 2 into the break or crack 1 at a distance relatively close together. Following the insertion of the aforementioned plugs both edges

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of the break are peened with a peening tool or a round headed punch and hammer so as to close the said break around the plugs and as indicated by the numeral 3. This operation mechanically forces the break closed and is so facilitated by the preheating which makes the metal soft and prevents further breaking when the plugs are inserted. This peening or mechanical welding step is followed by a heat treating operation combined with a brazing operation or by a heat treating operation without brazing along the break, so as to fuse the metal into a solid mass as well as fuse the casting metal and the inserted plugs. Any suitable or conventional brazing method is satisfactory. This operation seals up and fuses the break as indicated by numeral 4 of Figure 4.

The composition of the plug inserts depend upon the type of metallic casting to be repaired. Copper or copperized iron plugs have proved satisfactory in repairing the cylinder block casting of the conventional internal combustion engine. The above recited method for repairing casting breaks or cracks is satisfactory for merely a straight crack or a radial break. It is a simple and economical means of repairing casting breaks.

It is apparent that many deviations from my method may be accomplished without departing from the scope and spirit of my invention, I therefore do not limit myself to the specific examples herein set forth.

What I claim as my invention is:

1. Method of repairing a crack in a casting comprising heating the area of the casting along the crack so as to soften the metal thereof, then driving tapered fusible metal plugs into the crack in close side by side relation along the crack, then peening the edges of the crack onto the plugs, and then heating the resultant so as to fuse the plugs conformably in place in a manner to fill the crack, and brazing said resultant so as to cover the plugs and the peened edges of the crack so as to seal the filled crack.

2. Method of repairing a crack in a metal casting comprising heating the area of the crack sufficiently to soften the metal, driving tapered fusible metal plugs into the crack in side by side positions along the crack and peening the edges of the crack upon the plugs while the metal is still soft from the heating, said plugs being driven with sufficient force to produce conforming and intimate association of the plugs and the sides of the crack and said peening of the edges of the crack being sufficient to maintain the driven plugs in place, and then reheating the area of the

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crack sufficiently to fuse the plugs to fill the crack.

3. Method of repairing a crack in a metal casting comprising heating the area of the crack sufficiently to soften the metal, driving tapered fusible metal plugs into the crack in side by side positions along the crack and peening the edges of the crack upon the plugs while the metal is still soft from the heating, said plugs being driven with sufficient force to produce conforming and intimate association of the plugs and the sides of the crack and said peening of the edges of the crack being sufficient to maintain the driven plugs in place, and then reheating the area of the crack sufficiently to fuse the plugs to fill the crack, said reheating being accompanied by brazing of the plugs and peened edges of the crack together in a manner to seal the crack.

4. Method of repairing a crack in a casting comprising heating the area of the casting along the crack so as to soften the metal thereof, procuring tapered fusible metal plugs at least as wide

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as the crack, then inserting the smaller ends of said plugs into the crack in closely spaced side by side relation along the crack and driving the plugs further into the crack so as to partly fill the crack, then peening the edges of the crack onto the plugs, and then heating the resultant so as to fuse the plugs conformably in place so as to fill the crack.

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