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H. BREWER

2,301,513

METHOD OF REPAIRING CRACKED MACHINE PARTS

Filed April 8, 1941

Fig. 1.

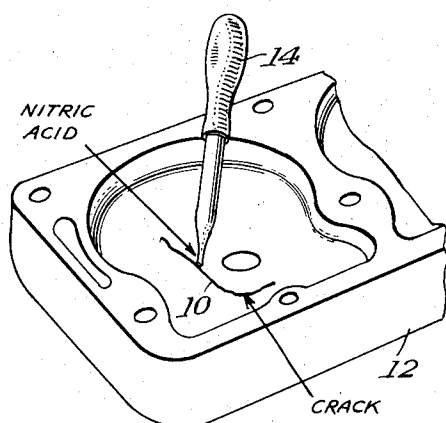


Fig. 2.

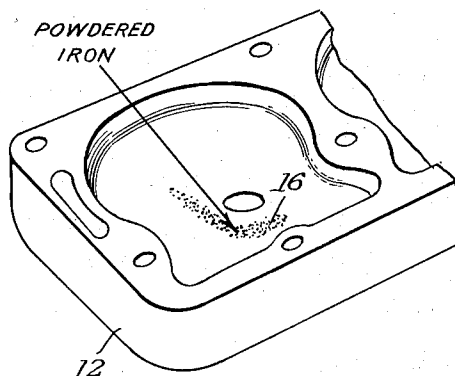


Fig. 3.

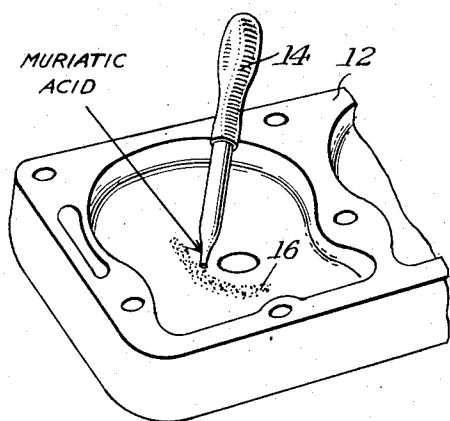
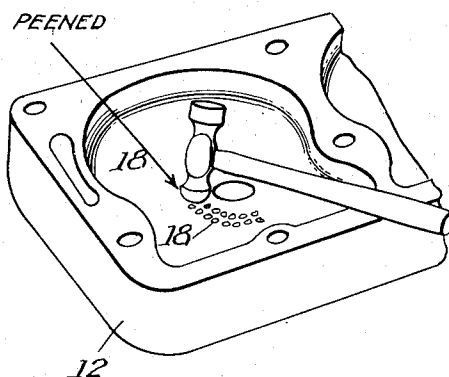


Fig. 4.



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METHOD OF REPAIRING CRACKED
MACHINE PARTS

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2 Claims. (Cl. 29-148)

This invention relates to the repair of machine castings, particularly cracked cylinder blocks and cylinder heads of the type employed in internal combustion engines, and has among its objects and advantages the provision of an improved method of sealing cracks in such parts.

Engines of the internal combustion type frequently become damaged through cracking of certain parts thereof because of sudden temperature changes. As an example, frequently an engine becomes overheated and cold water is poured into the cooling system with the result that the cylinder block, the cylinder head or both crack because of the sudden temperature change. Such cracks have heretofore been difficult to repair in that the application of heat for welding purposes has caused objectionable warping of the parts, and considerable difficulty has been encountered in the matter of avoiding undue straining of the joint by temperature changes incident to the application of heat.

An object of my invention is to provide a novel method of repairing cracked cylinder blocks, cylinder heads and the like, wherein the method may be practiced without the application of heat which heretofore has caused warping of the machine part under repair.

A further object is to provide a method of the type described wherein cracks in machine parts may be effectively sealed through the medium of a few simple steps which are easily carried out in a relatively short period of time.

In the accompanying drawing:

Figure 1 is a view illustrating one step in practicing my invention;

Figure 2 illustrates a second step;

Figure 3 illustrates a third step; and

Figure 4 illustrates a fourth step.

In practicing the invention, the first step consists in the application of nitric acid to the crack 10 in the machine part 12 of Figure 1, the amount of which acid should be such as to penetrate the crack. In the ordinary case, a few drops of the acid is all that is necessary, although an excess amount does no harm. Nitric acid has a tendency to anneal the cast iron from which the part is made. A dropper 14 may be used for applying the acid.

After the application of nitric acid to the crack, powdered cast iron is heaped on the part over the crack 10, as at 16 in Figure 2. To the powdered cast iron is applied nitric acid in an amount sufficient to thoroughly saturate the iron powder. The part is then set aside for five or ten minutes, although the part may stand for several hours with no consequent harm. A part of the cast iron powder is dissolved and runs into the smallest crack.

The next step consists in the application of muriatic acid to the nitric acid treated iron

powder 16, as in Figure 3. The muriatic acid causes the iron powder to oxidize. Enough muriatic acid should be employed to neutralize the two acids, which may easily be determined by noting cessation of the brown smoke incident to the application of the muriatic acid. After the smoking stops, a period of fifteen minutes is permitted to elapse before the cracked area is wiped off.

At this time, the material of the part in and about the crack may be peened, as at 18 in Figure 4, to effectively close the crack. The material about the crack may be peened with a hammer 18 or suitable peening punch, so as to eliminate all visual identity of the crack, after which the respective acids and cast iron powder are again applied to the peened area in accordance with the foregoing procedure. The sealing material in the crack tends to swell when coming in contact with water so as to provide a permanent and complete seal.

My method is particularly effective and expeditious in the sealing of internal and external cracks in motors, pipes and the like that come in contact with water. The peening punches are preferably of the rounded end type, but the specific shapes of the punches will of course depend upon the structural environment of a given job. Little expense is involved in the matter of time and materials, and warping of the parts being repaired is entirely eliminated, since the only heat employed is that which is generated by the chemical action of the materials applied to the parts.

Without further elaboration, the foregoing will so fully illustrate my invention that others may, by applying current knowledge, readily adapt the same for use under various conditions of service.

I claim:

1. The herein described method of repairing cracked cast iron parts, which comprises flowing nitric acid into the crack to anneal the surrounding material of the part, applying cast iron powder over the crack, applying muriatic acid to the cast iron powder, and subsequently peening the material of the part about the crack.

2. The herein described method of repairing cracked cast iron parts, which comprises flowing nitric acid into the crack to anneal the surrounding material of the part, applying cast iron powder over the crack, applying muriatic acid to the cast iron powder, subsequently peening the material of the part about the crack, applying nitric acid a second time to the crack and surrounding material of the part, again applying cast iron powder, and saturating the cast iron powder with muriatic acid.

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