April 11, 1961 J. V. HRABOVSKY 2,978,764

CASTING OF CORED MACHINE PARTS

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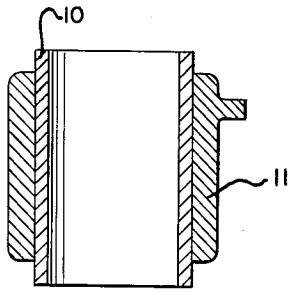


FIG. 1

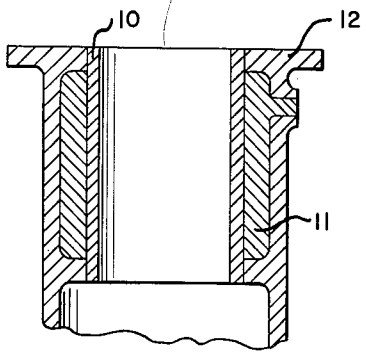


FIG. 2

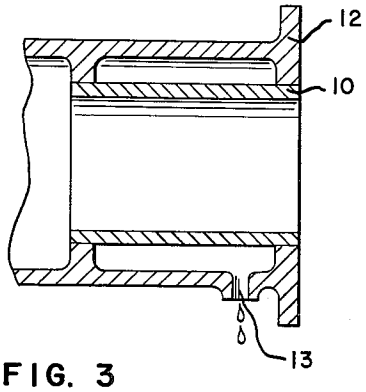


FIG. 3

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CASTING OF CORED MACHINE PARTS

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2 Claims. (Cl. 22—203)

This invention relates to the foundry art and specifically discloses a process for the production of cored machine parts which machine parts are free from many of the limitations imposed upon machine designers by the inherent properties of sand based moulding materials.

This invention is especially adapted to the production of aluminum internal combustion engine parts into which are incorporated during their manufacture cast iron or steel cylinder barrels. However, this invention is not so limited and may be employed wherever it is desired to manufacture assemblies by casting a cored aluminum element around a steel or cast iron element.

To better explain this, three figures of drawing are submitted herewith in which:

Figure 1 is a cross sectional view of a cylinder barrel and a surrounding coolant jacket core,

Figure 2 is the structure shown in Figure 1 with an aluminum cylinder block cast around the assemblage, and,

Figure 3 is a sectional view of the structure shown in Figure 2 after the coolant jacket core has been liquefied by heat and drained.

Reverting to Figure 1, a cylinder barrel **10** is prepared from either cast iron or steel and in a die casting machine a coolant jacket core **11** is cast around the periphery of cylinder barrel **10**. Coolant jacket core **11** is formed from zinc or an alloy which is basically zinc with minimum amounts of alloying elements, as for example, silicon or copper.

After coolant jacket core **11** has been cast around cylinder barrel **10**, the assemblage, which is depicted in Figure 1, is placed in a die casting machine and the aluminum cylinder block **12** is cast around coolant jacket **11** and cylinder barrel **10**. Aluminum cylinder block **12** in cooling shrinks and in so doing makes a very firm joint between itself and cylinder barrel **10**. It is essential in designing the casting to be produced by this process to so choose the mass and temperature of casting of aluminum cylinder block **12** and the mass of coolant core jacket **11** and its heat dissipating properties so that no consequential melting of coolant jacket core **11** occurs during the casting procedure.

After the assemblage shown on Figure 2 has been cast, it is then heated to a temperature intermediate the melting point of aluminum cylinder block **12** and coolant jacket core **11** and then turned on its side so that the molten metal resulting from the liquefaction of coolant jacket **11** may flow out through the opening **13** to complete the rough casting. The melting of zinc cooling jacket core **11** in the presence of cylinder barrel **10** will result in an effective galvanizing of cylinder barrel **10** to produce a rust resistant structure. To obtain the maximum benefit from the galvanizing action it is necessary that the surface of cylinder barrel **10** be chemically clean prior to the casting thereon of coolant jacket **11** as shown in Figure 1.

I claim as my invention:

1. The process of producing an internal combustion engine casting including a ferrous cylinder barrel enclosed in an aluminum cylinder block, said cylinder block being cored for the production of engine coolant passages, comprising casting around the cylinder barrel a zinc coolant jacket core shaped to correspond to the desired coolant passage, casting around the assembly of cylinder barrel and coolant jacket core an aluminum cylinder block, heating the cylinder block, coolant jacket core and cylinder barrel to a temperature intermediate the melting point of the cylinder block and the coolant jacket core, and pouring from the cylinder block the liquefied core.

2. The process of producing an internal combustion engine casting including a ferrous cylinder barrel enclosed in an aluminum cylinder block, said cylinder block being cored for the production of engine coolant passages, and simultaneously galvanizing the ferrous cylinder liner adjacent the coolant passages, comprising casting around the cylinder barrel a zinc coolant jacket core shaped to correspond to the desired coolant passage, casting around the assembly of cylinder barrel and coolant jacket core an aluminum cylinder block, heating the cylinder block, coolant jacket core and cylinder barrel to a temperature intermediate the melting point of the cylinder block and the coolant jacket core, and pouring from the cylinder block the liquefied core.

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