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3,266,915

WAX EMULSION FOR USE IN PRECISION CASTING

Evan James Faulkner, Sylcroft, Crispin Way, Farnham Common, England; Lothar Norman Hocking, Sandy-croft, Taplow, England; and John Aherne-Heron, Farnham Royal Lodge, Farnham Royal, England
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This invention relates to precision casting with more special reference to wax for the manufacture of expendable models used for investment casting by the lost wax process.

Wax when used for expendable models in investment casting suffers from a number of defects, and by far the most important is the shrinkage, causing distortion of the patterns to take place on thick sections.

Blended wax (65% microcrystalline wax 190/195° F. + 35% gum damar) gives a pattern wax within the consistency permitted by the use of a natural product such as gum damar. However, its shrinking on cooling, particularly on heavy sections, makes it difficult to maintain the wax patterns to the dimensional accuracy required. Several attempts have been made to overcome this shrinkage by introducing various solids in powder form as fillers.

The main problem was to find a powder which had the same specific gravity as wax so that it would remain in suspension. This difficulty together with the necessity of having no ash content on burning out resulted, after many experiments, in a search for a radical alternative.

Gases of various types were tried, including air, in an attempt to reduce the wax content of the model.

Liquid fillers were then tried. The first trial was with water which was added to liquid blended wax, and as gum damar is an emulsifying agent the experiment resulted in an emulsified wax.

It has been found that the wax is greatly improved by emulsifying it prior to forming the pattern by injection moulding, e.g., using the method and apparatus described and shown in the specification of our co-pending application Serial No. 243,809, now abandoned.

The emulsification which can be effected with or without emulsifying agents, either gas, liquid or solid, greatly improves the flowability of the wax and decreases the shrinkage and subsequent distortion.

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Ingredients and ranges of proportions for suitable models forming emulsified compositions are as follows:

	Percent
Basic-micro-crystalline wax	50-60
Emulsifying agent—gum damar	25-30
Filler—water	10-25

Emulsification with water is effected by heating the wax to a temperature of circa 95° C.

Where the patterns are to be formed by injection moulding with solid pre-loading according to the aforementioned specification the emulsified wax is cast into billets having a central aperture giving sufficient clearance to enable the billet to be slidden over the piston rod in the feed cylinder.

We claim:

1. A microcrystalline wax composition consisting essentially of from 50-60% basic-micro-crystalline wax, 25-30% gum damar emulsifying agent, 10-25% water.

2. The composition of claim 1 wherein the microcrystalline wax has an A.S.T.M. rating of between 190-195° F.

3. The method of preparing a blended wax emulsion composition for the manufacture of expendable models used for investment casting by the lost wax process, comprising mixing 50-60% microcrystalline wax with 25-30% gum damar and 10-25% water and agitating the resulting mixture at a temperature of about 95° C.

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ALEXANDER H. BRODMERKEL, *Primary Examiner.*

MORRIS LIEBMAN, *Examiner.*

J. B. EVANS, *Assistant Examiner.*