United States Patent Office 3,023,112 Patented Feb. 27, 1962

3,023,112

CORE OILS, FOUNDRY CORES AND MOULDS AND METHODS OF MAKING THE SAME

August Tobler, Bruneggstrasse 906, Windisch, near Brugg, Switzerland

No Drawing. Filed May 25, 1956, Ser. No. 587,194
12 Claims. (Cl. 106—38.7)

This invention relates to core oils, cores and moulds and methods of making the same and more particularly to non-deforming cold setting core oils, cores and moulds and methods of making them.

The foundry business requires great quantities of cores and moulds, large and small. Some of the cores and moulds are relatively complex as well as being large in size. One of the major problems in preparing such cores and moulds is that of binding the sand which is their basic component so that they maintain their integrity during preheating and when fitted together prior to casting and during the casting operation. Various types of binder materials have heretofore been used and proposed but, generally speaking, no completely satisfactory non-deforming cold setting core oil, cores or moulds have been available. It has been the general practice to use drying oils, such as linseed oil, sunflower oil, grape seed oil, and similar drying oils with the sand or other core forming or mould forming material. Such oils are used to form a film around the sand grains in an effort to hold the grains in position. Difficulty has been experienced, however, because these conventionally used oils form a film which softens when the core or mould is baked in the oven, as is the general practice in the industry. As a result these cores tended to soften and collapse or slump, or at least suffer some damage by reason of their own weight, resulting in a large number of unusable cores and moulds.

The present invention provides non-deforming cold-setting cores and moulds which are free from the difficulties outlined above. I provide a core oil made up of an admixture of a blown drying oil and a conjugated oil. I have found that a mixture of a blown non-conjugated type of drying oil and a conjugated oil having an iodine number of 100 or greater and a diene number of 7 or greater will form foundry cores having surprising cold-setting and non-deforming qualities.

Preferably, I blow a non-conjugated drying oil with air or other oxygen containing gas and subsequently add a conjugated oil to provide an admixture having an iodine number of 100 or greater and a diene number of 7 or greater. Preferably, I maintain the diene number below 18. Preferably, this admixture is at least partially polymerized by heating before adding to the mineral core forming material such as sand. Preferably, oxidizing acceleration such as chlorites, carbonates, metallic oxides, lead acetates, calcium chlorite, and the like are used to accelerate the polymerization and bonding of the mixed oils.

The manner of carrying out this invention will be more apparent from the following examples, showing certain preferred practices of my invention.

Example I

90 parts of refined linseed oil were heated to 200° F. Air was started through the material and the temperature raised to 395° F. and held until the viscosity was Y–Z (Gardner-Holdt method). 10 parts of Oiticica oil were then added and the oil held at 350° F. until the viscosity reached between Z and Z_1. On cooling a drier was added. The oil had an iodine number of 106 and a diene number of 7.8. 10 pounds of No. 48 Ottowa silica sand were mixed with 68 g. of this mixed oil for 10 minutes in a muller. A bar 1" x 1" x 7" was formed in a mold by hand ramming. The bar was then air dried for four hours and suspended on two knife edges. The bar was baked for two hours at 292° F. and then cooled. The amount of sagging or deformation was found to be only 5/64".

Tensile bars were rammed by hand, air dried overnight, baked for two hours at 400° F. cooled and broken in a tensile machine. The tensile strength was very good at 290.

Example II

A run similar to that of Example I was made, substituting an equal amount of Tung oil for the Oiticica oil. The resulting product had an iodine number of 101.5 and a diene number of 8.4. Deformation and tensile strength were high.

Example III

85 parts of refined linseed oil and 15 parts of Oiticica oil were used. The procedure was the same as that of Example I. The iodine number of the product was 104. The diene number was 10.4. Deformation and tensile strengths were good.

Example IV

85 parts of raw linseed oil were heated to 300° F. and blown to a temperature of 400° F. 15 parts of Oiticica oil was added and heated to a temperature of 360° F. while blowing. 0.1% metallic cobalt and 0.3% metallic lead were added. Satisfactory cores were made.

Example V

90 parts of raw linseed oil were treated as in Example IV above and 10 parts of Tung oil were added and heated as in Example IV. 0.1% cobalt naphthenate and 0.3% lead naphthenate were added as driers. Satisfactory cores were made.

Example VI

85 parts of soybean oil and 15 parts of Oiticica oil were treated and mixed as in Example I. The final product had an iodine number of 76 and a diene number of 9.7. The test pieces broke on baking for deformation. The tensile strength was low.

Example VII

85 parts of fish oil and 15 parts of Oiticica oil were treated and mixed as in Example I. The final product had an iodine number of 97 and a diene number of 9.5. Then tensile strength was low and the test pieces for deformation broke on baking.

While I have described certain preferred practices and compositions according to my invention, it will be understood that the invention may be otherwise embodied within the scope of the following claims.

I claim:

1. A cold setting, non-deforming core oil consisting essentially of an admixture of a blown non-conjugated drying oil and a conjugate bonded oil, said admixture having an iodine number not less than 100 and a diene number not less than 7.

2. A cold setting, non-deforming core oil consisting essentially of an admixture of a blown non-conjugated drying oil and a conjugate bonded oil, said admixture having an iodine number not less than 100 and a diene number between 7 and 18.

3. A method of preparing a cold setting, non-deforming core oil by the steps of blowing a non-conjugate drying oil and adding thereto a conjugate bond oil to form an admixture having an iodine number not less than 100 and a diene number not less than 7.

4. A method of preparing a cold setting, non-deforming core oil by the steps of blowing a non-conjugated drying oil and adding thereto after blowing a conjugate bond oil to form an admixture having an iodine number not less than 100 and a diene number between 7 and 18.

5. A cold setting, non-deforming core oil consisting essentially of 90 parts of linseed oil blown with air and 10 parts of Oiticica oil to form an admixture having an iodine number not less than 100 and a diene number not less than 7.

6. A cold setting, non-deforming core oil consisting essentially of about 75% to 90% of linseed oil blown with an oxygen containing gas and the balance a conjugate bonded oil selected from the group consisting of Oiticica oil and Tung Oil and having an iodine number not less than 100 and a diene number not less than 7.

7. A cold setting, non-deforming core oil consisting essentially of about 75% to 90% non-conjugate drying oil blown with an oxygen containing gas and the balance a conjugate bonded oil and having an iodine number not less than 100 and a diene number not less than 7.

8. A non-deforming, cold setting foundry core consisting essentially of an admixture of foundry sands, a core oil consisting of an admixture of a blown non-conjugate drying oil and a conjugate bonded oil having an iodine number not less than 100 and a diene number not less than 7.

9. A non-deforming, cold setting foundry core consisting essentially of an admixture of foundry sands, a core oil consisting of an admixture of a blown non-conjugate drying oil and a conjugate bonded oil having an iodine number not less than 100 and a diene number not less than 7 and a metallic drying agent.

10. A non-deforming, cold setting foundry core consisting essentially of an admixture of foundry sands, a core oil consisting of an admixture of a blown non-conjugate drying oil and a conjugate bonded oil having an iodine number not less than 100 and a diene number not less than 7 and an oxidizing agent.

11. A non-deforming, cold setting foundry core consisting essentially of an admixture of foundry sands, a core oil consisting of an admixture of a blown non-conjugate drying oil and a conjugate bonded oil having an iodine number not less than 100 and a diene number not less than 7, a metallic drying agent and an oxidizing agent.

12. A foundry core composition comprising a refractory core sand and a binder therefor consisting essentially of from 85 to 90 parts by weight of blown linseed oil, from 10 to 15 parts by weight of Oiticica oil and at least 0.1 part by weight of metallic cobalt in the form of a drying salt soluble in said oils.

References Cited in the file of this patent

UNITED STATES PATENTS

2,040,461	Bonney et al.	May 12, 1936
2,381,653	Drummond	Aug. 7, 1945
2,556,335	Moser	June 12, 1951

FOREIGN PATENTS

165,372	Australia	Sept. 26, 1955
653,530	Great Britain	May 16, 1951