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FOUNDRY CORE AND DRY BINDER FOR THE
PREPARATION THEREOF

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This invention relates to foundry cores and dry binders for the preparation thereof.

Heretofore, in making foundry cores for use in the production of castings, it has been the usual practice to mix core sand with one or more of a variety of dry or liquid binders, e. g. pulverized foundry pitch, pulverized rosin, pulverized cereal, pulverized casein, sulfite pulp waste liquor, molasses, sour beer, linseed, soya bean, or other vegetable oil, oil-rosin mixtures known as core oils, etc. The mixture of sand and binder, in suitable proportions, is then moistened with a suitable proportion of water, so that it can be rammed or blown into core boxes of various shapes and sizes, corresponding to the shapes and sizes of cavities it is desired to produce by means of the cores.

When the core box is removed, the grains of sand must be bound together by the binder, so as to permit handling in an approved manner and transferring to an oven. In the oven, the cores are then baked to expel the water, drive off volatile constituents, and make the core capable of withstanding the ferrostatic pressure encountered in the casting operation.

In the casting operation, the heat of the molten metal burns out the binder, the gases from which escape through the cores and molds, leaving the core in a friable form or as loosely held core sand, readily removable from the cavity in the casting when cooled.

Each of the above mentioned core binders has its disadvantages. Foundry pitch has no "green strength", and is also hard to clean from the cavity. Pulverized rosin reverts to solid rosin on storage, i. e. flows together to form a solid mass. Rosin-kerosene-linseed oil mixtures (core oils) tend to crystallize and precipitate the rosin on storage. Cereal binders produce cores which swell during baking, absorb moisture after baking, and give rise to large volumes of acrid smoke in the casting operation. Liquid core binders migrate to the surface of the green core and form a hard, impenetrable film or skin. Linseed oil binder must dry by oxidation, which necessarily slows down production. Casein, skimmed milk, etc., are hygroscopic and putrescible when used in cores.

Many attempts have been made heretofore to overcome the above difficulties, without being wholly successful.

I have found that a foundry core prepared from core sand and a gasoline-insoluble pine wood resin, with or without the addition of other materials customarily used in core compounds, over-

comes the above difficulties encountered in the use of old art core binders.

The gasoline-insoluble, pine wood resin I employ in the preparation of my improved core binder and cores made therefrom is hereby defined as the resin such as may be produced from resinous wood, described and claimed in application, Serial No. 61,745, filed January 31, 1936, by Lucius C. Hall, which resin may be produced, for example, by extracting resinous wood with a coal tar hydrocarbon, removing said hydrocarbon by evaporation, leaving a residue comprising a mixture of wood rosin and the new resin, extracting wood rosin from said residue by a petroleum hydrocarbon, leaving the new, gasoline-insoluble, pine wood resin.

The gasoline-insoluble, pine wood resin may be used alone with core sand, as a binder, in place of limed wood rosin heretofore employed, and will be found not to absorb moisture after incorporation into the cores and baking, and the cores so made will retain their tensile strength indefinitely during storage. It will also be found that pulverized, gasoline-insoluble, pine wood resin will not revert, or set to a solid cake, during storage thereof, as does gum rosin and wood rosin.

Baked cores made by the use of gasoline-insoluble, pine wood resin will be found to have a high permeability, thus allowing gases formed during casting to vent naturally and readily. Cores so made will also be found to shake out readily after casting and cooling, because the binder burns out completely, and no objectionable gases will be formed on casting, as is the case with cereal binders.

Cores made by the use of gasoline-insoluble, pine wood resin alone as the binder, are best baked at about 350° F. and not over 400° F. as compared to about 425° F., normally used in baking cores prepared from oil binders, e. g. linseed oil, and during the baking of cores made by the use of the gasoline-insoluble, pine wood resin no objectionable gases are formed, and, as a matter of fact, very little gas of any sort is formed. Furthermore, during the baking of my improved cores there is no swelling thereof, which is an objectionable feature with many prior art cores.

The proportion of gasoline-insoluble, pine wood resin to core sand used in the preparation of my improved foundry cores may be varied, depending upon the type of metal to be cast and the intricacy of the shape of the core, but in general I have found that a proportion of about

0.2% to about 3% by weight gasoline-insoluble, pine wood resin is suitable for use in cores intended for casting cast iron or steel.

While in the above I have described the advantages of the use of gasoline-insoluble, pine wood resin and core sand alone, in the preparation of foundry cores, I may, if desired, also use, in addition to said resin, other ingredients, commonly employed in core compounds, and still retain many of the advantages of the gasoline-insoluble, pine wood resin. For example, in preparing my improved foundry cores, I may employ a mixture of core sand with a mixture of gasoline-insoluble, pine wood resin in conjunction with a vegetable oil, e. g. linseed oil, rosin, foundry pitch, cereal, protein, dextrin, sulphite pulp waste liquor, or other recognized core binder, and the cores so produced will be found to have superior qualities, due to the presence of the gasoline-insoluble, pine wood resin.

What I claim and desire to protect by Letters Patent is:

1. A foundry core including core sand and a gasoline-insoluble, pine wood resin produced by extracting resinous wood with a coal tar hydrocarbon, removing said hydrocarbon by evaporation, leaving a residue comprising wood rosin and a gasoline-insoluble resin, and extracting wood

rosin from said residue by a petroleum hydrocarbon.

2. A foundry core including core sand, a drying oil, and a gasoline-insoluble, pine wood resin produced by extracting resinous wood with a coal tar hydrocarbon, removing said hydrocarbon by evaporation, leaving a residue comprising wood rosin and a gasoline-insoluble resin, and extracting wood rosin from said residue by a petroleum hydrocarbon.

3. A foundry core including core sand, a cereal binder, and a gasoline-insoluble, pine wood resin produced by extracting resinous wood with a coal tar hydrocarbon, removing said hydrocarbon by evaporation, leaving a residue comprising wood rosin and a gasoline-insoluble resin, and extracting wood rosin from said residue by a petroleum hydrocarbon.

4. A foundry core including core sand, linseed oil, and a gasoline-insoluble, pine wood resin produced by extracting resinous wood with a coal tar hydrocarbon, removing said hydrocarbon by evaporation, leaving a residue comprising wood rosin and a gasoline-insoluble resin, and extracting wood rosin from said residue by a petroleum hydrocarbon.

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