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METHOD FOR THE PRODUCTION OF REFRACTORY CONTAINERS

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Fig.1

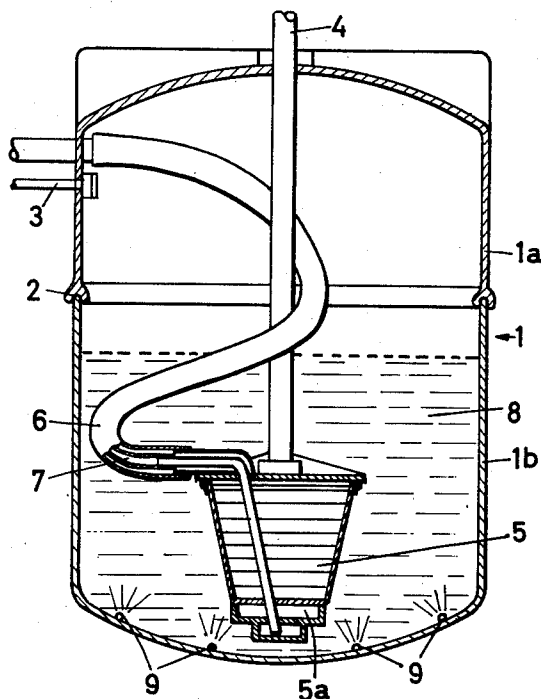
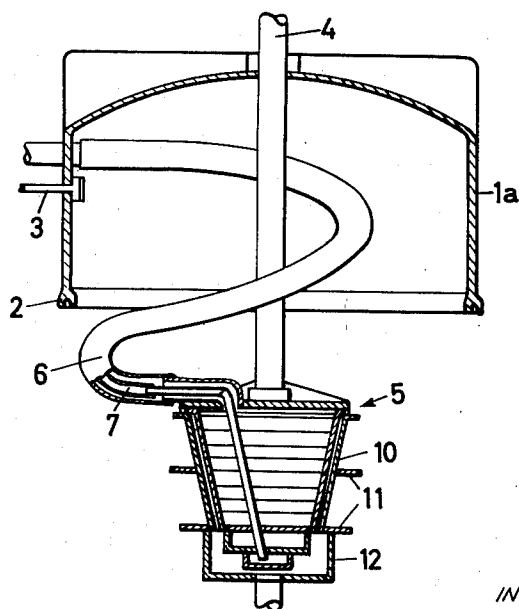


Fig.2



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METHOD FOR THE PRODUCTION OF REFRACTORY CONTAINERS

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1 Claim. (Cl. 162-227)

This invention is concerned with the forming of refractory containers, such as those employed as moulds for the casting of metals, and is particularly concerned with the method of forming such containers from refractory fibres suspended in liquid, from which suspension the fibres are applied to a model form of mould forming a coating thereon, which coating is thereafter processed to the final container product.

In order to provide a sufficiently cohering coating upon the model mould, the refractory fibres must be mixed with a binder substance. This is particularly necessary if the suspension, besides containing the fibres, contains a finely ground refractory material in order that the final product will consist of a mixture of fibres and such finely ground material.

Prior efforts to form the desired refractory containers were directed toward proceeding in the known manner employed in the production of other forms of containers such as those consisting, for instance, of cellulose fibres. There a suspension of the fibres in a liquid is formed, a perforate model mould is supported in the suspension, and a layer of fibres is formed upon the model mould by means of suction from within the mould. This prior procedure did not, however, enable satisfactory results to be achieved; satisfactory containers having the desired wall thickness and adequately large dimensions were not obtainable.

After numerous experiments, however, it was discovered and this is the basis for the instant invention, that the problem could be solved in a simple manner, for instance by applying the fibres to the model mould by means of pressure instead of by means of suction.

Thus the object of this invention consists in a method for manufacturing refractory containers, especially moulds for casting of metals, which is characterised by the steps of suspending a mixture of refractory fibres, and possibly finely ground fire-proof material, and a binder agent in a liquid, then dipping a perforate model mould into the suspension, which latter is subjected to air pressure, so that material from the suspended mixture is pressed onto the model mould until a layer of desired thickness has been deposited thereon, whereafter the model mould with its coating is removed from the suspension, and the coating is further processed to a final container.

The invention also includes an apparatus for effecting said method. The most characteristic features of said apparatus will appear from the showing in the annexed drawing furnishing by way of example an embodiment of such an apparatus.

FIGURE 1 shows an elevation, partially in section, of the main portion of the apparatus, and

FIGURE 2 illustrates the use of the model mould in connection with a combined removing and drying cup for the formed container.

The illustrated apparatus for use in carrying out the method of the invention comprises a vessel 1, which consists of an upper member 1a and a lower member 1b, which members may be combined or removed from each other by means of a suitable device, such as an eccentric not shown. Tightening of the members together is obtained by means of a gasket 2. The upper member 1a may be raised for a certain distance, for instance 25 mm., above the lower member 1b and thereafter be shifted laterally

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for positioning over a combined removing and drying cup 11, which is described in more detail below. In the combined condition of the members 1a and 1b the vessel shall be able to withstand an inner air pressure of 5-10 kgs. Air under pressure may be supplied to the upper part of the vessel through the tube 3.

Within the vessel 1 a model mould 5 is suspended by means of an upwardly and downwardly movable rod 4. The rod 4 passes through a pressure tight packing (not shown) at the top of the container. Said model mould has a liquid penetrable portion, consisting of a wire screen placed upon a perforate plate, the latter being carried by an interned steel skeleton. The lower box-formed portion 5a of the mould and the lid portion thereof consist of solid metal. In the lid are provided openings for tubes 6 and 7.

The combined removing and drying cup 11 seen in FIG. 2 is open at its bottom and top. Below the cup 11 a box 12 is positioned and provided with a packing, by means of which the open bottom portion of the cup may be completely closed by causing the box 12 to be raised by means of an eccentric so that the box makes a close fit with the cup.

The method of operation is as follows:

Through tubes 9 the container 1 is filled with a suspension 8 of refractory fibres, admixed with binding agent, up to the level shown in FIGURE 1. If desired the suspension may contain also finely ground refractory material. The model mould 5 is lowered into the suspension 8 by means of the rod 4, and compressed air is applied to the interior of the container 1 through the tube 3. The suspension is thereby pressed against the model mould and suspended material is deposited upon the perforate portion thereof, whereas liquid flows through said portion into the interior of the model mould. The model mould remains stationary until a layer 10 of desired thickness has been formed thereupon. The model mould 5 is then raised by means of the rod 4 to above the level of the liquid in the container, and the air pressure within the container then drives the water, which had accumulated within the model mould 5, out through the tube 7. When the water has been driven out of the model mould, the admission of compressed air is cut off, and the top vessel member 1a is lifted so that the mould 5 is a little above the lower vessel member 1b. Thereafter the member 1a together with model mould 5 and coating thereon is shifted horizontally by suitable means, not shown, until the model mould arrives over the removing cup 11, situated near by the vessel. By means of the rod 4 the model 5 with coating thereon is then lowered into the removing cup 11, whereby the outer face of the coating is smoothed. Then compressed air is admitted through the conduit 6, whereby the fibre container loosens from the model mould, which latter is then raised by means of the rod 4, and together with the container member 1a shifted back to starting position.

The cup 11 with the already shaped container therein is passed into a drying chamber or the like. After drying the container is taken out of the combined removing and drying cup and may, if desired, be heated to incandescence before being put to use. In this manner large containers may be manufactured without difficulty for instance such containers having a diameter greater than ½ m., which are hard and very durable, and which are by way of example suitable for use when casting metals, such as steel.

I claim:

The method of producing refractory containers, particularly molds for the casting of metals which comprises, introducing a mixture of refractory fiber and a binder agent into a liquid occupying the lower portion of

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a closed chamber and suspending said mixture in said liquid, immersing a hollow perforated mold within such suspension, subjecting such suspension to air pressure to deposit said suspended mixture onto the outer surface of said mold to form a layer thereon and when a layer of desired thickness has been applied raising said mold above the level of said liquid while maintaining the same within said closed chamber and forcing liquid out of said layer by maintaining said air pressure within the portion of said chamber above said liquid.

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