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A. E. STACEY, JR

PROCESS OF CASTING POTTERY

Filed March 24, 1924

Fig. 1.

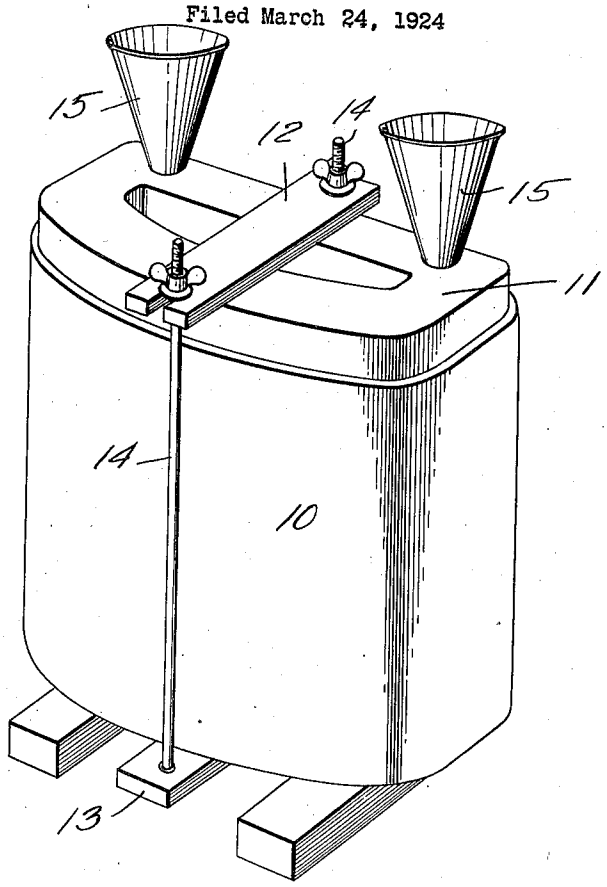
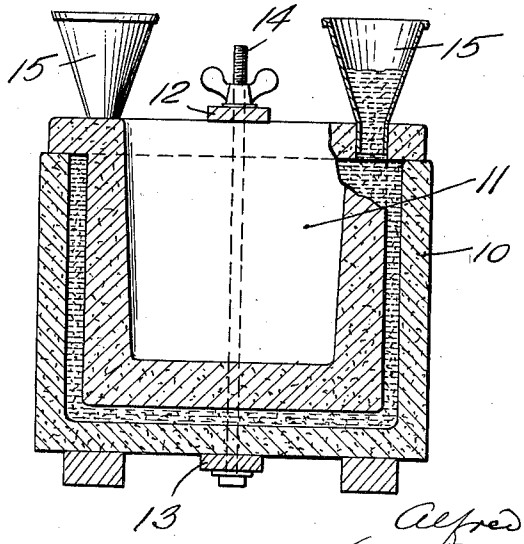


Fig. 2.



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UNITED STATES PATENT OFFICE.

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PROCESS OF CASTING POTTERY.

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To all whom it may concern:

Be it known that I, ALFRED E. STACEY, Jr., a citizen of the United States, residing at Essex Fells, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Processes of Casting Pottery, of which the following is a specification.

In casting pottery, such for instance as porcelain tanks and other articles by the methods commonly employed at the present time, the "slip" or fluid mixture of clays and other ingredients used for making the casts or pottery is poured into molds of the required shapes. When molding hollow pottery of this character, as is well known, a core is used in the mold leaving a space between the mold and core conforming in shape and dimensions to the walls of the article. The slip ordinarily used is a fluid mixture composed of a blend of suitable clays having the required characteristics, flint, spar, water and electrolytes; sodium carbonate and sodium silicate. Usually about 30 per cent of water is used in the mixture and the slip is cold, or at its natural temperature when poured into the molds. In the average commercial pottery works the slip is mixed in large tanks and then pumped to the different casting floors through pipe lines, flexible hose being connected at the necessary points with the pipe lines and equipped with faucets, so that the molder can move around among his molds and fill them from the faucets. The molds and cores are made of suitable material, such as plaster of Paris which is adapted to absorb moisture from the slip in the molds, and after a mold is poured it is allowed to stand until sufficient water has been absorbed from the slip by the mold and core to make the cast stiff enough to stand without the core. The core is then removed which should be done before enough water is absorbed to cause the cast to shrink enough to cling to the core and spoil the piece by cracking at the corners. The piece is then left in the mold until it has shrunk sufficiently to loosen from the mold, when it is dumped out onto a board or support. After trimming the piece it is ready to be dried and baked.

This method of casting pottery has certain objections and results in a considerable percentage of imperfect castings especially in the case of articles having relatively thick walls or portions. I have discovered that these can be obviated and the product greatly improved by heating the slip as hereinafter more fully explained so that it will have a temperature sufficiently higher than its natural temperature when being poured into the molds.

According to my invention, therefore, the slip is heated and is poured while warm. I have found that by thus using the heated slip, the cores can be removed from the molds after standing a very much shorter time and the castings are tougher and stiffer. The castings also show a freedom from stratification, piping and balling in the corners which are common imperfections in this type of work when cold slip is used. Another benefit which I found is in freeing the slip from air bubbles. The heat expands the air stirred into the slip during the compounding thereof and also makes it more fluid so that the bubbles can escape when the slip is carefully stirred. Corner cracks are also eliminated to a large extent. In articles cast from cold slip these occur chiefly when there is a thicker section and it is necessary to leave the core in the mold a sufficient time to allow the clay to set, but there is so much contraction of the casting that the corners around the core are broken apart. It is possible with the heated slip to make consistently good castings in shapes which practically preclude them from being cast from cold slip.

Preferably the slip is heated in a closed vessel so as to prevent the loss of moisture, although this might be compensated for by the addition of water after heating, or preferably by starting with a slip having a higher water content. Jacketed kettles heated by steam or hot water afford a convenient means for heating the slip. I prefer to heat the slip after the mixing of its ingredients and just prior to pouring it into the molds and to stir the slip in the heating vessel, after the heating period, to remove the air bubbles. If the bubbles remain in the slip when it is being molded they will break through the surfaces of the casts during the firing and spoil the ware.

In plants which are equipped to pipe the slip to the points where the molds are lo-

cated, the cold slip is preferably pumped from the mixing tank or tanks to a heating vessel on each floor or in each molding room so that it is not necessary for the heated slip to travel far from the heating vessel to the point of use. This prevents objectionable cooling of the slip and avoids the trouble of pipe lines becoming clogged. Each heating vessel should be of sufficient capacity to take care of a day's or a half day's casting so that there will be no slip to be returned to the main mixing tanks.

The temperature to which the slip should be heated may vary more or less, depending upon the composition of the different slips used and the proportion of sodium silicate and sodium carbonate therein. The best results have been obtained with temperatures between about 130° F. and about 140° F., although temperatures ranging from approximately 105° F. to 170° F. have shown substantial improvements in results, and there appears to be advantage in any increase in the temperature of the slip above natural temperatures.

In the accompanying drawings:

Fig. 1 is a perspective view of a mold assembled ready for molding a porcelain tank by my hereindescribed method.

Fig. 2 is a sectional view through the mold showing the pottery material therein.

10 and 11 represent respectively the body and the core of the mold which, as usual are preferably made of plaster of Paris and in the form required for the piece of pottery ware to be cast. The core is removably secured in place in the mold body by the usual clamping boards 12 and 13 and bolts 14 and the slip is poured into the mold through the usual funnels 15 at the top of the mold. The manner of using the mold in casting the pottery from heated slip in accordance with my invention has been already explained.

I claim as my invention:

1. The hereindescribed process of casting pottery which consists in using a fluid slip which is heated to a temperature higher than natural temperatures, and casting the heated slip into the desired shape.

2. The hereindescribed process of casting pottery which consists in using a fluid slip which is heated to a temperature higher than natural temperatures, and pouring the heated slip into a mold which is adapted to absorb moisture from the slip.

3. The hereindescribed process of casting pottery which consists in mixing the necessary ingredients to make a fluid slip, heating the slip and pouring the heated slip into a mold which is adapted to absorb moisture from the slip.

4. The hereindescribed process of casting pottery which consists in mixing the necessary ingredients to make a fluid slip, heating the slip after mixing the same and before casting the slip, and then casting the heated slip into the desired shape.

5. The hereindescribed process of casting pottery which consists in using a fluid slip which is heated to a temperature higher than natural temperatures, stirring the heated slip to remove air bubbles, and casting the heated slip into the desired shape.

6. The hereindescribed process of casting pottery which consists in using a fluid slip which is heated to a temperature between approximately 120° F. and approximately 150° F., and casting the heated slip into the desired shape.

7. The hereindescribed process of casting pottery which consists in mixing the necessary ingredients to make a fluid slip, heating the slip to a temperature between about 130° F. and about 140° F., and casting the heated slip into the desired shape.

ALFRED E. STACEY, JR.