J. A. JEFFERY.

METHOD OF PREPARING CERAMIC ARTICLES FOR HANDLING.

APPLICATION FILED APR. 19, 1913.

1,240,575.

Patented Sept. 18, 1917.

2 SHEETS—SHEET 1.

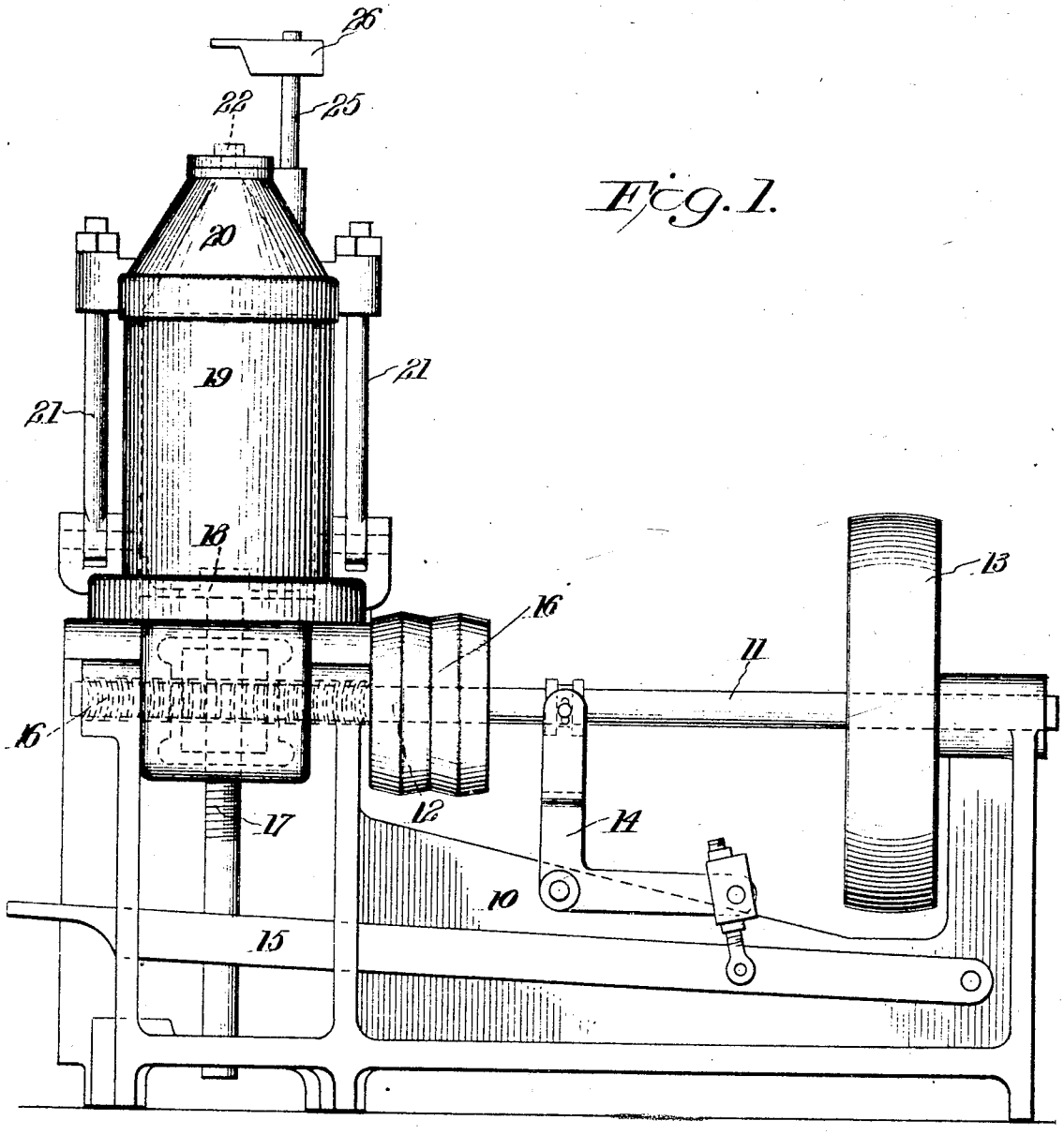


Fig. 1.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

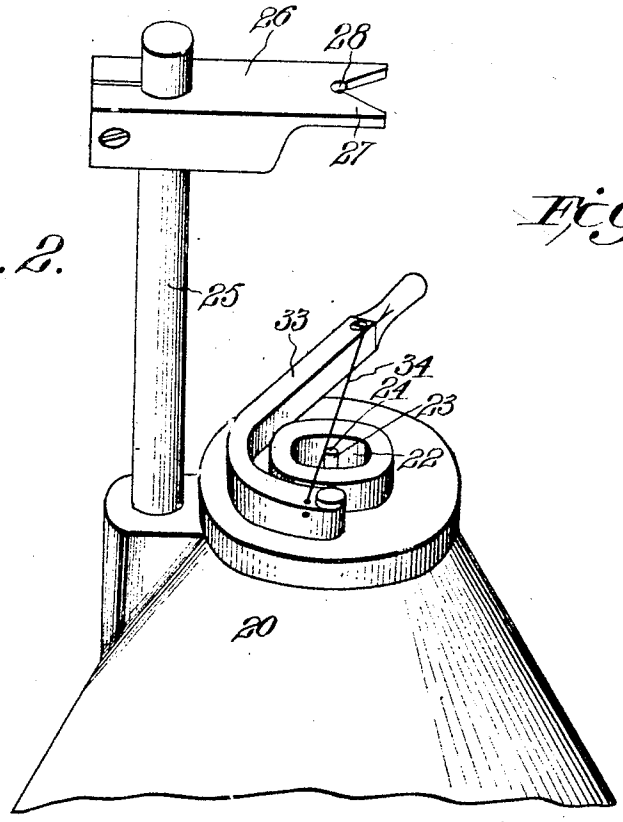


Fig. 5.

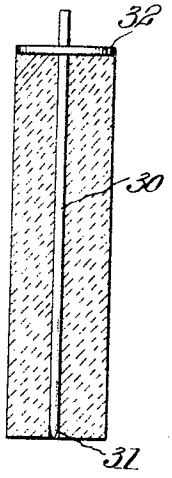


Fig. 3.

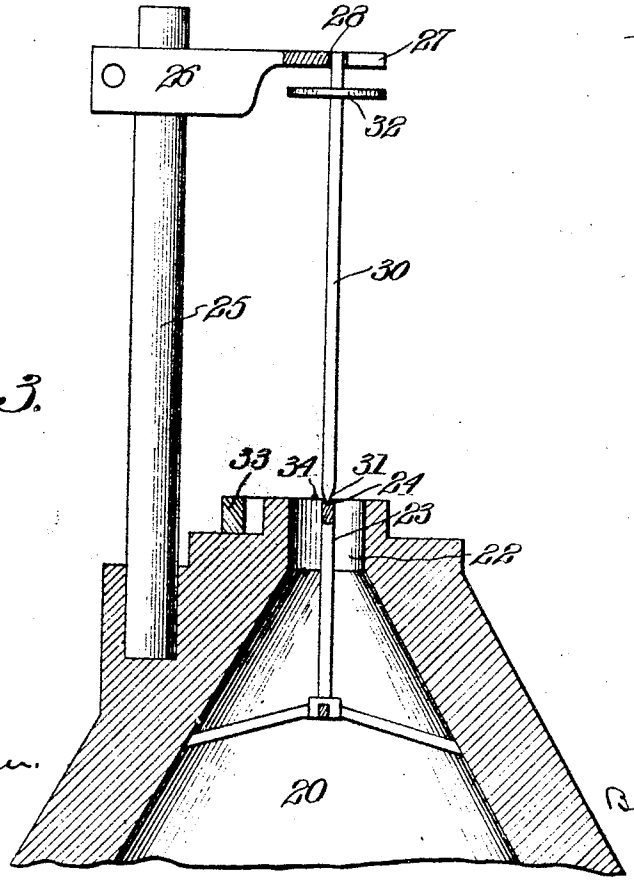
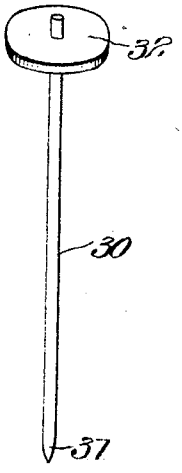


Fig. 1.



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METHOD OF PREPARING CERAMIC ARTICLES FOR HANDLING.

1,240,575. Specification of Letters Patent. Patented Sept. 18, 1917.

Application filed April 19, 1913. Serial No. 762,414.

To all whom it may concern:

Be it known that I, JOSEPH A. JEFFERY, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Methods of Preparing Ceramic Articles for Handling, of which the following is a specification.

This invention relates to an improved method of preparing ceramic articles for handling in the subsequent steps of manufacture, and it will be understood in this connection that although the method is particularly described in connection with the manufacture of porcelain insulators for spark plugs, it is by no means limited to this field, but is equally applicable to various other forms of porcelain articles.

The common practice of manufacturing insulating plugs of porcelain, as well as other similar porcelain articles, is to place a mass of the plastic clay upon a rapidly revolving table, and then the operator roughly shapes the material by hand to the desired form, after which the clay is allowed to stand for a definite period until it reaches the condition known as "green" or half hard. When in this condition the blank is brought to the desired shape by being placed upon a turning lathe, the proper contour being imparted by means of tools held in the hands of the operator or otherwise positioned over the surface of the clay. After the blank has been brought to the desired shape it is dried and dipped into a suitable glaze and placed directly in the kiln and fired. In practice it is found that after the clay is "thrown" or receives its preliminary shape by hand, the blank must be very carefully handled to prevent collapse and distortion while being placed upon drying trays, and while being moved from place to place as is necessary in transporting the blanks from one department to another. Furthermore in the case of such porcelain articles as may require a longitudinal bore, it is very common for a large percentage of the blanks to become useless by reason of the collapse of the wall of said bore while the material is still plastic. It has also been found that a considerable variation in the dimensions in the finished or fired ware results where the clay is thrown, the shrinkage in such work being about ten per cent. in diameter and fifteen per cent. in the length. One of the objects of the present invention is to overcome the foregoing difficulties in handling the plastic blanks by providing means whereby the blank is more uniformly shaped than is possible with "thrown" work, and the material rendered more uniform and compact. A further object is to provide a method of handling the blanks while in a plastic condition in such manner that they cannot collapse or become distorted during handling while in a plastic condition.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings I have illustrated suitable means for carrying out the various steps of my improved process, but it will be understood that the drawings are for illustrative purposes only and that the method is not limited to the means shown. In said drawings, Figure 1 is a side elevation of a tube press and its actuating mechanism. Fig. 2 is a detail perspective view thereof. Fig. 3 is a longitudinal sectional view of Fig. 2. Fig. 4 is a detail of a mandrel constructed to coöperate with said tube press. Fig. 5 shows a blank with the mandrel embedded therein.

Referring to the drawings, 10 designates a supporting frame in which is mounted a driving shaft 11 and a driven shaft 12, the driving shaft receiving power from any suitable source through a pulley 13. The shaft 11 is moved longitudinally by means of a bell crank lever 14 adjustably connected with a treadle 15, a suitable clutch 16 serving to connect the shafts 11 and 12. Shaft 12 is provided with a worm meshing with a worm gear 16 having a threaded engagement with a vertical shaft 17 to the upper end of which is connected a piston 18 adapted to traverse the length of the receiving chamber 19. Said chamber 19 is provided with a removable cover 20 which is locked in position by suitable locking rods 21. The cover 20 is preferably of conical form and provided with a reduced die-like opening 22. Centrally located in said opening is a core-pin 23 which is supported by a suitable spider secured to the top 20 at a point well below the die-opening 22, the upper end of said core pin being recessed as indicated at 24. Extending upwardly from the top of the

cover 20 is a rod 25 to which is adjustably secured a gage 26 having a forked end 27, the inner extremity of the forked portion terminating in a circular recess 28 in perpendicular alinement with the core-pin 23. Coöperating with the gage 26 and the core pin 23 is a core rod 30 having a reduced end 31 arranged to fit in the seat 24 of the core-pin 23, the other end of said rod seating in the recess 28 of the gage 26. Suitably secured to the rod 30 is a circular disk 32, the same being located near the upper end of the rod, and when the latter is in position on the tube press, the disk 32 comes beneath the arms of the forked portion 27, being slightly spaced therefrom. Pivotally mounted upon the top of cover 20 is a lever 33 provided with a cutting wire 34, said lever being so mounted as to permit the wire 34 to swing transversely across the opening 22.

In practice a core-rod 30 of the desired length is placed in position with its lower end resting in the seat 24 and the upper end in the recess 28, the gage 26 having first been adjusted to the proper position. In this connection it will, of course, be understood that a suitable quantity of the plastic clay has first been placed within the receiving chamber 19, and the cover 20 secured in position. The operator then presses downwardly on the treadle 15, connecting the shafts 11 and 12 through the clutch 16, whereupon the piston 18 forces the plastic clay upwardly through the die-opening 22. As the clay passes through said opening the core pin 23 forms a longitudinal bore therein, the mass being delivered in perfect cylindrical form. As the discharged mass rises it passes over the core-rod 30, embedding the latter in the cylindrical body, and as long as the treadle 15 is depressed the mass will continue to rise. When the upper end of the blank thus formed engages the disk 32 the latter is moved upwardly elevating the rod 30 so as to disengage the latter from the pin 23. At this point the pressure is taken off of the treadle 15 and the lever 33 is swung so that the wire 34 will sever the blank close to the top of the die opening. When in this stage a portion of the rod 30 above the disk 32 protrudes from the blank, and the operator may then lift the blank by grasping this protruding portion. The blanks as they are thus formed are placed upon a tray or other suitable support and allowed to rest until the clay has hardened sufficiently to retain its shape, after which the core-rods 30 may be removed in any suitable manner. In this connection it will be noted that the rod 30 prevents distortion of the blank, acting to hold the same to its alinement, and it also serves to preserve the bore in the blank. After the rods 30 have been removed the blank may be shaped by the lathe process, or by any other suitable means, after which the article may be completed in any well known manner.

From what has been said it will be seen that by forcing the plastic extruded material through a die the material forming the blank is of much more uniform structure than when "thrown," and that by providing a rigid core for the blank while the latter is still plastic, said blank is retained in the desired shape and may be handled with great facility and without danger of injury. In this connection it will be noted that the change in the texture of the material due to forcing it through a die so affects the shrinkage of the blank in the subsequent manufacture that said shrinkage amounts to fifteen per cent. in diameter and ten per cent. in length, which is a desirable result.

I claim as my invention.

1. An improved method of preparing ceramic articles for handling in subsequent steps of manufacture comprising forcing plastic ceramic material over a rigid core, allowing said material to partly harden while the core is embedded therein to prevent distortion of the blank, and subsequently removing said core when the plastic material has dried sufficiently to permit handling.

2. An improved method of preparing ceramic articles for handling in subsequent steps of manufacture comprising imparting a preliminary shape to the plastic material, embedding a rigid core in the shaped material, allowing said material to partly harden with the core embedded therein to prevent distortion of the blank, and subsequently removing said core when the plastic material has dried sufficiently to permit handling.

3. An improved method of preparing ceramic articles for handling in subsequent steps of manufacture comprising embedding a rigid core in the plastic ceramic material and allowing said material to partly harden while the core is embedded therein to prevent distortion of the blank, and subsequently removing said core when the plastic material has dried sufficiently to permit handling.

4. An improved method of preparing ceramic articles for handling in subsequent steps of manufacture comprising imparting a preliminary shape to the plastic material by extrusion to render the same dense and compact, forcing the plastic material over a rigid core, allowing said material to partly harden while the core is embedded therein to prevent distortion of the blank, and subsequently removing said core when the plastic material has dried sufficiently to permit handling.

5. An improved method of preparing ceramic articles for handling in subsequent steps of manufacture comprising forcing plastic ceramic material through a die to

impart a preliminary shape thereto, forcing said plastic material over a rigid core as it leaves the die, allowing said material to dry with said core embedded therein, and finally removing said core when the plastic material has hardened sufficiently to retain its shape.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOSEPH A. JEFFERY.

Witnesses:
MORTIMER C. DEWITT,
R. W. GREEN.