

Nov. 20, 1923.

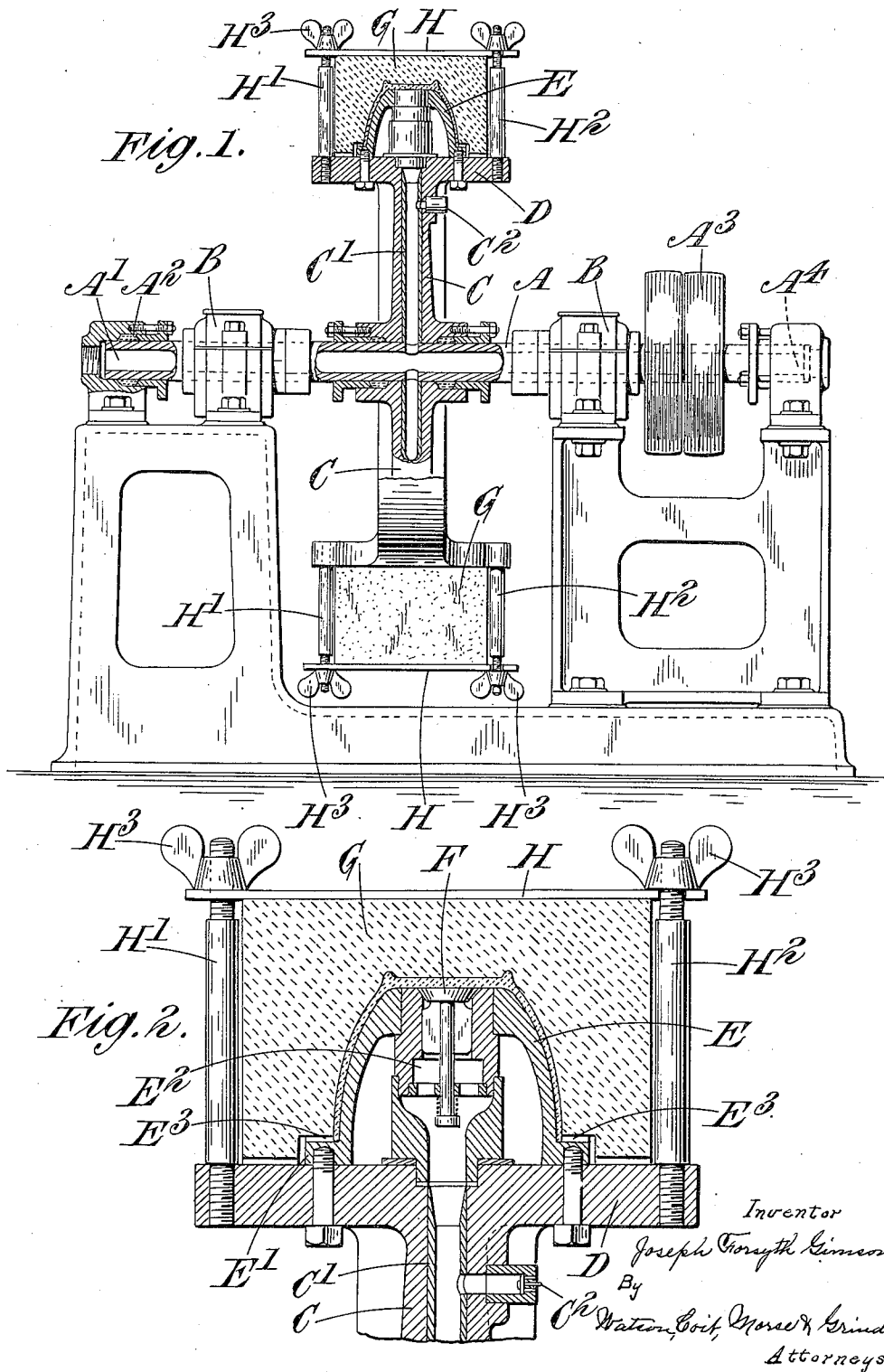
J. F. GIMSON

1,474,432

APPARATUS FOR CASTING OR MOLDING POTTERY AND LIKE ARTICLES

Filed Nov. 25, 1922

2 Sheets-Sheet 1



Nov. 20, 1923.

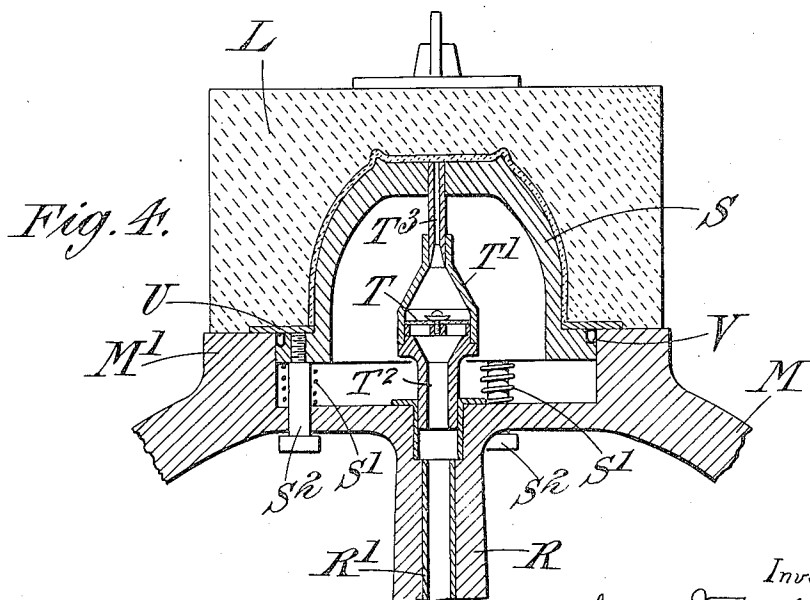
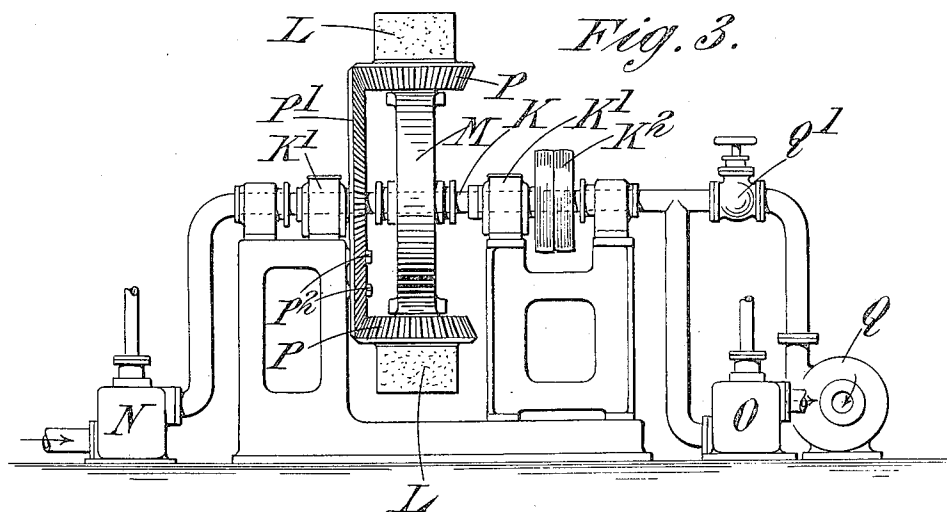
J. F. GIMSON

1,474,432

APPARATUS FOR CASTING OR MOLDING POTTERY AND LIKE ARTICLES

Filed Nov. 25, 1922

2 Sheets-Sheet 2



Inventor
Joseph Foreyth Gimson

By

Hutton, Coit, Morse & Grindle
Attorneys

UNITED STATES PATENT OFFICE.

JOSEPH FORSYTH GIMSON, OF NEWCASTLE, ENGLAND, ASSIGNOR OF ONE-HALF TO
CLOSE BROTHERS & COMPANY LIMITED, OF LONDON, ENGLAND, A COMPANY OF
GREAT BRITAIN.

APPARATUS FOR CASTING OR MOLDING POTTERY AND LIKE ARTICLES.

Application filed November 25, 1922. Serial No. 603,210.

To all whom it may concern:

Be it known that I, JOSEPH FORSYTH GIMSON, subject of the King of England, and residing at Newcastle, Staffordshire, in England, have invented certain new and useful Improvements in Apparatus for Casting or Molding Pottery and like Articles, of which the following is a specification.

This invention relates to an apparatus for casting or molding pottery and like articles from clay slip or the like and has for its object to effect such casting in a more expeditious and efficient manner.

In the method carried out by the apparatus according to the present invention the clay slip or like material is caused to pass through a hollow rotatable shaft and a hollow arm radiating therefrom to a mould of plaster or other absorbent or porous material, so that the moisture is removed from the slip and absorbed into the moulds under the action of the centrifugal force set up by the rotation of the apparatus. The apparatus may comprise a mould of absorbent or porous material mounted on the outer end of each of a number of hollow arms radiating from a hollow rotatable shaft, the interior of each hollow arm being in communication with the interior of the shaft. The hollow arms may conveniently be formed as the spokes of one or more wheels mounted on the shaft, the moulds, which are preferably detachable, being carried on flats on the rims of the wheels adjacent to the ends of the spokes. Each wheel rim may thus have a polygonal form and may carry, say, twentyfour moulds.

The invention may be carried into practice in a number of ways but a preferred construction employing a single wheel is illustrated by way of example in the accompanying drawings, in which

Figure 1 is a side elevation of the apparatus,

Figure 2 is an enlarged sectional view of the mould,

Figure 3 is a side elevation of a modified construction of apparatus, and

Figure 4 is an enlarged sectional view of a modified form of mould.

In the construction shown in Figures 1 and 2, the hollow shaft A is mounted in suitable bearings B B, and carries a wheel comprising a number of hollow spokes C and

a rim D. A tube C' is mounted within each spoke C in such a manner that it is permanently in communication with the interior of the hollow shaft A. A die or former E of suitable material such as iron is secured by its flange E' to the rim D of the wheel and is provided with a central passage E², which thus forms a continuation of the tube C'. This passage E² is controlled by a non-return valve F of suitable type. The plaster mould G is disposed on the wheel rim D outside the former E and is held thereto by means of a plate H and bolts H' H². The plate H is conveniently pivoted about the bolt H', so that when the retaining nuts H³ are released the plate may be swung clear of the mould G. This arrangement allows the mould to be quickly and easily removed from the wheel when the casting operation is completed, and replaced by a fresh mould.

The clay slip is fed into the hollow shaft A by means of a feed pump (not shown in Figure 1 but arranged in a manner similar to that shown in Figure 3) attached at one end A' of the shaft, a gland A² being provided to prevent the slip from escaping along the outside of the shaft. It then passes through the shaft A and the tubes C' past the valves F into the moulds G. Small grooves E³ are provided in the flange E' of the former E to allow the escape of air from the interior of the mould. The supply of slip is continued until the moulds are full and slip begins to escape through the grooves E³. The feed pump is then cut off, and the rotation of the machine started. The shaft A may be driven by any suitable means such for example as by means of a belt on the pulley A³. During the rotation the slip in the mould G is thrown centrifugally outwards against the mould, and the plaster, of which the mould is constructed, absorbs the water and leaves the clay in a semi-solid state pressed tightly against it. After a sufficient time has elapsed to allow all the water to be absorbed, the machine is stopped by means of a suitable braking device and the moulds containing the clay castings are removed and dried, fresh empty moulds being placed over the formers for the next charge of slip.

Owing to the fact that there is a tendency for the slip left in the tubes C' to congeal during the rotation and thereby clog up

the machine, it is desirable to provide an exhaust pump (not shown in Figure 1 but arranged in a manner similar to that shown in Figure 3) at the other end A⁴ of the shaft

5 A. This exhaust pump is brought into operation shortly before or about the same time as the rotation of the machine is started, and serves to draw out the surplus slip from the shaft A and the tubes C'. The non-return valves F prevent the slip from being withdrawn from the moulds G by the exhaust pump. An air valve C² is provided in each spoke C to prevent the formation of a vacuum in the tube C' when the exhaust pump is working. The exhaust pump is cut off as soon as the surplus slip has been removed.

If desired, the die or former E may be allowed a little play so that it will be able to move outwardly through a small distance under the action of centrifugal force, so as to press against a washer of rubber or other suitable material disposed between the flange of the former and the mould. This small movement may be necessary to assist in removing the moisture from the casting when materials are used which are of such a nature as to prevent the moisture from passing readily into the absorbent moulds. Means may also be provided for heating the formers E, for example electrically or by means of steam, to assist in the drying of the moulds. The space between the casing of the valve F and the wall of the former may be utilized for this purpose.

For the casting of symmetrical articles, means may be provided if desired, for rotating the moulds about their own axes. This additional rotation may be imparted to the moulds in any suitable manner, as for example by means of bevel gearing driven by the main shaft.

Such an arrangement is shown in Figure 3. In this figure the hollow shaft K, which is constructed in a manner similar to that described for the shaft A in Figure 1, is mounted in bearings K' and is driven by means of a belt on the pulley K². The moulds L, of which any suitable number may be employed, two being shown in the drawings, are rotatably mounted on the rim M of a wheel carried by the shaft K, so that they are opposite the ends of hollow spokes communicating with the interior of the hollow shaft K. The clay slip is pumped into one end of the shaft K by means of a slip pump N, the other end of the shaft being connected to an exhaust pump O, these pumps being employed in the manner already described for the previous construction. The rotation of the moulds L about their own axes is produced by means of bevel wheels P rotatably mounted on the wheel rim M, each mould being connected to the corresponding bevel wheel P so as to ro-

tate therewith. The teeth of the wheels P engage with those of a bevel wheel P' loosely mounted on the shaft K and fixed to the frame of the machine by means of bolts P². Thus as the shaft K rotates the bevel wheels P, and therefore also the moulds L, are rotated about their own axes in addition to rotating about the axis of the shaft K.

Figures 3 and 4 are also employed to illustrate a further modification in which an air former is employed. This arrangement may be combined, as shown in Figure 3, with mechanism for imparting an additional rotation about their own axes to the moulds, or may be employed independently of such mechanism if desired.

An air compressor Q or other source of compressed air is connected up to the same end of the shaft K as the slip exhaust pump O and is provided with a valve Q' by means of which it may be cut off therefrom. The details of one of the moulds and its associated parts are shown somewhat diagrammatically in Figure 4. The mould L is shown mounted directly on a projection M' on the rim M of the wheel, but it must be understood that if bevel wheels P P' are employed, as in Figure 3, the mould will be mounted on the bevel wheel P. A hollow spoke R containing an inner tube R' connects the hollow shaft K to the rim M at a point adjacent to the mould L. The general arrangement of these parts is substantially the same as that described in connection with Figures 1 and 2. In this construction, however, the die or former S is separated from the rim M by means of springs S' surrounding bolts S². The former S can thus move away from the mould through a short distance. Mounted within the former S is a valve casing T' containing a non-return valve T which controls a passage T² T³ leading from the hollow spoke R to the interior of the mould L. A ring or washer U engages with the surface of the former S so as to prevent the escape of slip when the former moves. The former is also provided with a packing ring V which presses against the wall of the projection M' of the rim M.

The operation of the constructions shown in Figures 3 and 4 is very similar to that already described for Figures 1 and 2 and will only be described in detail where it differs therefrom. The clay slip is admitted by the pump N into the hollow shaft K and passes thence into the spokes R and past the valves T into the moulds L. When the moulds are full the pump N is cut off and the rotation of the machine started, the exhaust pump O being brought into operation to remove the slip from the shaft K and the spokes R. The valves T prevent the removal of slip from the moulds L. When this surplus slip has been removed the pump O is cut off and the valve Q' opened to ad-

mit air under high pressure into the interior of the machine. This compressed air flows past the valves T into the moulds L, and gradually forces the formers S away from the moulds against the action of the springs S'. The air then itself acts as a former until the casting operation is completed. If bevel wheels P P' are employed as shown in Figure 3, the moulds are given a rotation about their own axes in addition to their rotation about the axis of the shaft K.

It will be understood that the constructions illustrated are given by way of example only, and that modifications other than those specifically described may be made without departing from the scope of the invention. Thus for example a number of wheels each carrying moulds may be mounted on the same shaft, or again the portions of the rim of a wheel between the moulds may be cut away, so that the wheels consist of spokes carrying moulds on their outer ends.

What I claim as my invention and desire to secure by Letters Patent is:—

1. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a hollow arm radiating therefrom and having its interior in communication with the interior of the shaft, an absorbent mould carried by the hollow arm, means for supplying the material to be treated to the interior of the shaft and thence through the hollow arm to the mould, and means for rotating the shaft, the moisture being removed from the material and absorbed into the mould under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

2. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a plurality of hollow arms radiating therefrom, an absorbent mould mounted on the outer end of each hollow arm and communicating therethrough with the interior of the hollow shaft, means for rotating the shaft, and means for supplying the material to be treated through the shaft and the hollow arms to the moulds, the moisture being removed from the material and absorbed into the moulds under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

3. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, at least one wheel mounted thereon and comprising a rim and a number of hollow spokes, an absorbent mould detachably mounted on the wheel rim opposite to the end of each hollow spoke and communicating therethrough with the interior of the hollow shaft, means for rotating the shaft, and means for sup-

plying clay slip through the shaft and the spokes to the moulds, the moisture being removed from the slip and absorbed into the moulds under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

4. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a hollow arm radiating therefrom and having its interior in communication with the interior of the shaft, an absorbent mould carried by the hollow arm, a former mounted on the end of the hollow arm within the mould, means for supplying the material to be treated to the interior of the shaft and thence through the hollow arm to the mould, and means for rotating the shaft, the moisture being removed from the material and absorbed into the mould under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

5. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a plurality of hollow arms radiating therefrom, an absorbent mould detachably carried on the outer end of each hollow arm and communicating therethrough with the interior of the hollow shaft, a former mounted on each hollow arm within the corresponding mould, means for rotating the shaft, and means for supplying the material to be treated through the shaft and the hollow arms to the moulds, the moisture being removed from the material and absorbed into the moulds under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

6. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, at least one wheel mounted thereon and comprising a rim and a number of hollow spokes, an absorbent mould detachably mounted on the wheel rim opposite to the end of each hollow spoke and communicating therethrough with the interior of the hollow shaft, a former mounted on the outer end of each hollow spoke and disposed within the corresponding mould, means for rotating the shaft, and means for supplying clay slip through the shaft and the spokes to the moulds, the moisture being removed from the slip and absorbed into the moulds under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

7. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a hollow arm radiating therefrom and having its interior in communication with the interior of the shaft, an absorbent mould carried by the hollow arm, means for supplying the material to be treated to the interior of the shaft and thence through the hollow arm to the

mould, means for rotating the shaft, a non-return valve controlling the supply of material through the hollow arm to the mould, and means for exhausting the surplus material contained in the interior of the shaft and the arm, the moisture from the material left in the mould being removed and absorbed into the mould under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

8. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, at least one wheel mounted thereon and comprising a rim and a number of hollow spokes, an absorbent mould detachably mounted on the wheel rim opposite to the end of each hollow spoke and communicating therethrough with the interior of the hollow shaft, means for rotating the shaft, means for supplying clay slip through the shaft and the spokes to the moulds, a non-return valve controlling the flow of slip to each mould, and means for exhausting the surplus slip contained in the interior of the shaft and the hollow spokes, the moisture from the slip left in the moulds being removed therefrom and absorbed into the moulds under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

9. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a plurality of hollow arms radiating therefrom, an absorbent mould mounted on the outer end of each hollow arm and communicating therethrough with the interior of the hollow shaft, means for rotating the shaft, a feed pump serving to supply clay slip through the shaft and the hollow arms to the moulds, a non-return valve controlling the flow of slip to each mould, and an exhaust pump serving to remove the surplus slip contained within the hollow shaft and the arms, the moisture from the slip left in the moulds being removed therefrom and absorbed into the moulds under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

10. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, at least one wheel mounted thereon and comprising a rim and a number of hollow spokes, an absorbent mould detachably mounted on the wheel rim opposite to the end of each hollow spoke and communicating therethrough with the interior of the hollow shaft, a former mounted on the outer end of each hollow spoke and disposed within the corresponding mould each former being provided with a central passage, means for rotating the shaft, a feed pump serving to supply clay slip to one end of the hollow shaft and thence through the hollow spokes to the

moulds, a non-return valve disposed within the central passage in each former, and an exhaust pump connected to the other end of the hollow shaft and serving to remove surplus slip from the interior of the shaft and the hollow spokes as set forth.

11. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a hollow arm radiating therefrom and having its interior in communication with the interior of the shaft, an absorbent mould carried by the hollow arm, means for supplying the material to be treated to the interior of the shaft and thence through the hollow arm to the mould, means for rotating the shaft, and means for imparting to the mould an additional rotation about its own axis as set forth.

12. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a plurality of hollow arms radiating therefrom, an absorbent mould mounted on the outer end of each hollow arm and communicating therethrough with the interior of the hollow shaft, means for rotating the shaft, means for imparting to each mould an additional rotation about its own axis, and means for supplying the material to be treated through the shaft and the hollow arms to the moulds as set forth.

13. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, at least one wheel mounted thereon and comprising a rim and a number of hollow spokes, an absorbent mould detachably mounted on the wheel rim opposite to the end of each hollow spoke and communicating therethrough with the interior of the hollow shaft, a former mounted on the outer end of each hollow spoke and disposed within the corresponding mould, means for rotating the shaft, means for imparting to each mould an additional rotation about its own axis, and means for supplying clay slip through the shaft and the spokes to the moulds as set forth.

14. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a hollow arm radiating therefrom and having its interior in communication with the interior of the shaft, an absorbent mould carried by the hollow arm, means for supplying the material to be treated to the interior of the shaft and thence through the hollow arm to the mould, means for rotating the shaft, means for imparting to the mould an additional rotation about its own axis, a non-return valve controlling the supply of material through the hollow arm to the mould, and means for exhausting the surplus material contained in the interior of the shaft and the arm as set forth.

15. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, at least one wheel mounted thereon and comprising a rim and a number of hollow spokes, a bevel wheel rotatably mounted on the wheel rim opposite the end of each hollow spoke, an absorbent mould detachably mounted on the bevel wheel opposite to the end of each hollow spoke and communicating through the hollow spokes with the interior of the hollow shaft, means for rotating the shaft, means for supplying clay slip through the shaft and the spokes to the moulds, a fixed bevel wheel which engages with the bevel wheels mounted on the ends of the hollow spokes thereby imparting to each mould an additional rotation about its own axis as set forth.

16. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a hollow arm radiating therefrom and having its interior in communication with the interior of the shaft, an absorbent mould carried by the hollow arm, means for supplying the material to be treated to the interior of the shaft and thence through the hollow arm to the mould, means for rotating the shaft, and means for supplying compressed air to the interior of the mould to act as an air former therein, the moisture being removed from the material and absorbed into the mould under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

17. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, at least one wheel mounted thereon and comprising a rim and a number of hollow spokes, an absorbent mould detachably mounted on the wheel rim opposite to the end of each hollow spoke and communicating therethrough with the interior of the hollow shaft, means for rotating the shaft, means for supplying clay slip through the shaft and the spokes to the moulds, and means for supplying compressed air to the interior of the moulds to act as an air former therein, the moisture being removed from the slip and absorbed into the moulds under the action of the centrifugal force set up by the rotation of the apparatus as set forth.

18. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a hollow arm radiating therefrom and having its interior in communication with the interior of the shaft, an absorbent mould carried by the hollow arm, means for supplying the material to be treated to the interior of the shaft and thence through the hollow arm to the mould, means for rotating the shaft, a non-return valve controlling the supply of material

through the hollow arm to the mould, means for exhausting the surplus material contained in the interior of the shaft and the arm, and means for supplying compressed air to the interior of the moulds after the surplus material has been exhausted this compressed air acting as an air former in the moulds as set forth.

19. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a plurality of hollow arms radiating therefrom, an absorbent mould mounted on the outer end of each hollow arm and communicating therethrough with the interior of the hollow shaft, means for rotating the shaft, a feed pump serving to supply clay slip through the shaft and the hollow arms to the moulds, a non-return valve controlling the flow of slip to each mould, an exhaust pump serving to remove the surplus slip contained within the hollow shaft and the arms, an air compressor serving to supply compressed air through the hollow shaft to the moulds to act as an air former therein as set forth.

20. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a plurality of hollow arms radiating therefrom, an absorbent mould mounted on the outer end of each hollow arm and communicating therethrough with the interior of the hollow shaft, means for rotating the shaft, means for imparting to each mould an additional rotation about its own axis, means for supplying clay slip through the shaft and the hollow arms to the moulds, and means for supplying compressed air to the interior of the moulds to act as an air former therein as set forth.

21. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, a plurality of hollow arms radiating therefrom, an absorbent mould detachably carried on the outer end of each hollow arm and communicating therethrough with the interior of the hollow shaft, a former mounted on each hollow arm within the corresponding mould and radially movable relative to the hollow shaft, springs tending to press the formers outwardly towards the moulds, means for rotating the shaft, means for supplying clay slip through the shaft and the hollow arms to the moulds, and means for supplying compressed air to the interior of the moulds to act as an air former therein as set forth.

22. Apparatus for casting or molding pottery and like articles including in combination a hollow rotatable shaft, at least one wheel mounted thereon and comprising a rim and a number of hollow spokes, a bevel wheel rotatably mounted on the wheel rim opposite the end of each hollow spoke, an absorbent mould detachably mounted on the

bevel wheel opposite to the end of each hollow spoke and communicating through the hollow spokes with the interior of the hollow shaft, a former mounted on the outer end of
5 each hollow spoke within the corresponding mould and radially movable relative to the hollow shaft, springs tending to press the formers outwardly towards the moulds, means for rotating the shaft, a feed pump
10 serving to supply clay slip to one end of the hollow shaft and thence through the hollow spokes to the moulds, a non-return valve controlling the flow of slip to each mould, an exhaust pump connected to the other end
15 of the hollow shaft and serving to remove

surplus slip from the interior of the shaft and the hollow spokes, an air compressor, a pipe leading from the air compressor to the end of the shaft to which the exhaust pump is connected, and a valve controlling this
20 pipe, the air from the compressor being supplied through the hollow shaft to the interior of the moulds so as to force the formers inwards against the action of the springs and to act as a compressed air former as set
25 forth.

In testimony whereof I have signed my name to this specification.

JOSEPH FORSYTH GIMSON.