In an installation for the mass production of bathroom pieces such as toilets and bidets, of the type utilizing mould mounts comprising two wheels rotatably mounted in two parallel vertical planes, each wheel consisting of two unequal segments of which the minor one is adapted to be removed when said wheels have been rotated for causing the major segment thereof to bear on a cradle supporting the mount and slidably mounted in the direction of he planes of said wheels on a base plate provided with rollers enabling this plate to travel on a track perpendicular to the plane of said wheels, the piston of the mould, at the piston-release station, is lifted by a fork, rotated about one of its two pairs of pivot studs and deposited as a consequence of a downward movement of the fork upon a lateral conveyor directing the assembly to a waiting position close to the stripping station.

5 Claims, 11 Drawing Figures
Fig. 7.

Fig. 8.
INSTALLATION FOR MANUFACTURING CERAMIC BATHROOM PIECES

FIELD OF THE INVENTION

The present invention relates to installations for the commercial production of bathroom china or ceramic pieces such as toilets or bidets. It is known to manufacture ceramic or china bathroom pieces by filling with slip a mould comprising a stand, a pair of half-moulds mounted on either side above said stand and a piston adapted to fit on the upper outer periphery of said mould halves and formed with a projecting portion adapted to engage the gap left between these two halves.

BACKGROUND OF THE INVENTION

It is also known to dispose the mould elements in a movable mount and to provide an equipment for manufacturing bathroom pieces which comprises a pair of rails on which a series of mounts are caused to travel, each mount being directed by turns to a casting station where the mould is filled with slip, then to a draining station where the excess of slip is removed by draining, to a piston-release station where the piston is removed mechanically and laid upon a lateral conveyor and transferred thereby to a waiting position close to a stripping station where the following steps are carried out mechanically: releasing the stand, moving the two half-moulds away from each other, removing the moulded piece and laying same upon a lateral conveyor whereby said moulded piece is directed to finishing stations, and finally re-positioning the piston between the two half-moulds and re-setting the stand, each mount thus re-equipped with the empty mould being subsequently conducted through a drying station in which the mould elements are dried, and eventually recycled towards the casting station.

On the other hand, the Applicants disclosed in U.S. Pat. Application Ser. No. 160,719 filed July 8, 1971, a movable mount comprising two wheels rotatably mounted in two parallel vertical planes, each wheel consisting of two unequal segments of which the minor one is adapted to be removed when the set of wheels has been tipped or rotated for causing the major segment thereof to bear on a cradle supporting the mount, said cradle being slidably mounted in the direction of the planes of said wheels on a base plate provided with rollers enabling this plate to travel on a pair of rails directed at right angles to the planes of said wheels.

SUMMARY OF THE INVENTION

It is the essential object of this invention to provide an installation for manufacturing ceramic or china bathroom pieces such as toilets and bidets by resorting to the above-defined known arrangements permitting a mass production by using a small number of unskilled hands.

To this end, in the piston release station, the piston, after having been lifted by the fork, is rocked about one of its two pairs of pivot studs and deposited as a consequence of a downward movement of said fork upon a lateral conveyor directing this assembly to a waiting position close to the stripping station.

Moreover, this stripping station comprises a fork engageable from beneath by the mount after overturning the two wheels by rotation on said cradle and pivoting the casting on a stripping plate, the upper portion of the mould stand supporting wheel being lifted for releasing this stand.

BRIEF DESCRIPTION OF THE DRAWING

The features and advantages of this invention will appear more clearly as the following description proceeds with reference to the accompanying drawings illustrating typical forms of embodiment of the invention. In the drawings:

FIG. 1 illustrates the general mount arrangement, the reference numerals designating the same parts as in the above-mentioned prior Patent application;

FIG. 2 is a diagrammatic illustration of the general arrangement of the manufacturing installation;

FIG. 3 is a diagrammatic view showing a mount equipped with the mould filled with slip as it registers with the mechanical piston removing device;

FIG. 4 illustrates the same mount engaged under the mechanical device during the operation thereof;

FIG. 5 is a view taken in the direction of the arrows V—V of FIG. 4;

FIG. 6 illustrates the mechanical device provided in the apparatus for removing the piston after the release of said mount and during the laying of said piston upon the lateral conveyor;

FIG. 7 illustrates the mount registering with the mechanical stripping device;

FIG. 8 illustrates the mount engaged under the mechanical stripping device subsequent to a movement preliminary to the operation of this device;

FIG. 9 is a view taken in the direction of the arrows IX—IX of FIG. 8 after the engagement of one of the pieces of the mechanical stripping device;

FIG. 10 is a view similar to FIG. 9 illustrating the manner in which the stand is released;

FIG. 11 illustrates similarly the release of the final piece by removing the lateral half-mould therefrom.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, the mould to be used in the installation of this invention is of the type comprising essentially a piston 43, a pair of lateral half-moulds or shells 2 and a stand 16 assembled and locked to constitute an integral body for moulding an object, namely a toilet or a bidet in the specific example considered herein, and is held in a circular mount 1 according to the above-mentioned prior patent application of the Applicants. More particularly, this mount 1 comprises two vertical wheels consisting each of two unequal segments 3b, 3a adapted to be assembled as illustrated in FIG. 1, one of these segments being detachable when the two-wheel assembly is tipped or rotated for causing the other segment to be supported by the cradle 22. This cradle 22 supporting the two wheels is adapted either to be supported in turn by a tray 19 rolling through small wheels on rails 20, or to travel on this tray 19 in a direction at right angles to the track 20 for engaging a transverse or perpendicular clearing track (not shown in FIG. 1).

The complete installation illustrated in FIG. 2 comprises a pair of rails 20 forming a loop circuit track on which a plurality of such mounts 1 are adapted to
3 travel; each mount is thus directed in succession to a casting station 30 where the mould is filled with slip, to a draining station 31 where the excess slip is removed from the mould, to a piston release station 32 where the piston 43 is removed mechanically and laid upon a lateral conveyor 33 and driven to a waiting position adjacent a stripping station 34 where the following steps take place, namely: stripping the stand 16, moving the two half-moulds or shells 2 away from the assembly, stripping the moulded piece proper and laying same it upon another of the lateral conveyors (not shown), and eventually re-positioning the piston 43 between the two half-moulds 2 and re-introducing the stand 16, so that each mount 1 thus re-equipped with a complete empty mould assembly can be directed to a drying station 36 in which the mould elements are dried, whereafter the mount 1 is recycled by being directed to the casting station 30.

The casting station 30 and draining station 31 have no specific features, yet it should be emphasized that by using the mount 1 it is possible for each operation to set the mould in the optimum angular position as may be required for a particularly easy handling, consisting in rotating the two-wheel assembly on the cradle 22.

Now the piston release station 32 and stripping station 34 will be described more in detail.

The piston release station 32 is connected to the main track 20 by a lateral or transverse clearance track 37. Thus, when a mount 1 is stopped in lateral alignment with this clearance track 37 the upper segment 36 is removed from the mould, thus eliminating the hold-down pressure on piston 43. Then the cradle 22 is transferred laterally to said clearance track 37 as shown in FIG. 4 and during this movement the two pairs of pivot studs 38, 39 projecting from opposite sides of piston 43 engage corresponding lugs 40, 41 of a fork 42. Then this fork 42 is lifted and, as shown in FIGS. 4 and 5, the studs 38, 39 and piston 43 are raised accordingly and removed from the mould assembly. Then, the mount 1 is returned to the main track 20 and piston 43 can be tipped in the direction of the arrow of FIG. 6 about the lugs 40 of fork 42 until the rear end of this piston engages an apron 44 and the piston is deposited upon this apron as a consequence of the downward movement of fork 42. The movement of apron 44 in the direction of the horizontal arrow of the Figure is attended by the deposition of said piston 43 upon the lateral transfer conveyor 33 shown in the drawing in the form of sequence of rollers, this assembly being thus driven to a waiting position adjacent the stripping station 34.

The mount 1 carried by track 20 and leaving the piston release station 32 is directed along the track 20 to a position in which it registers with another transverse track 54 as shown in FIG. 7, this track 54 leading to the stripping station 34. In the waiting position as illustrated in FIG. 7 the mould is completed with a stripping plate 17 fitting on the upper peripheral contour of the pair of lateral half-moulds or shells 2, and the remaining elements are re-assembled by refitting the segments 3b on segments 3a. Then the wheels are rotated through half a revolution and the cradle 22 is transferred to the lateral track 54 as shown in FIG. 8. Suitable studs or lugs 45 carried by the major segment 3a (now the upper segments of the wheels of mount 1) are then caused to engage the pair of arms of a fork 46 mounted in this station 34 above the transverse track 54, as shown in FIG. 9. The fork 46 is subsequently lifted so that the stand 16 is raised bodily with the pair of segments 3a until said stand 16 is released completely above the two half-moulds 2 as shown in FIG. 10. The two half-moulds 2 are subsequently moved away as shown in FIG. 11, by causing them to bear on side brackets 47 provided in station 34 on either side of the transverse track 54, so that the casting or moulded piece 48 can eventually be removed and deposited upon the lateral conveyor 35 which directs it to the other finishing stations. The piston 43 in a waiting position at the end of conveyor 33 is then picked up by the oncoming fork 46 and replaced in its central position with respect to the wheel. The two half-moulds or shells 2 are folded back against the piston sides and the stand 16 is finally lowered between the two half-moulds or shells 2.

Then the two segments 3a, 3b of each wheel are locked to each other and the mount 1 fully equipped with the mould is released from the stripping station 34 through the transverse track 54 and returned to the main track 20 on which it is pushed as shown in FIG. 2 towards a drying chamber 36 from which the mount is directed towards the casting station 30 where another cycle identical with the preceding one is started.

Of course, various modifications and variations may be brought to the specific form of embodiment illustrated and described herein without departing from the basic principle of the invention as set forth in the appended claims.

What we claim is:

1. Installation for manufacturing ceramic or china sanitary or bathroom pieces such as toilets and bidets by using a mould of the type comprising a stand, a pair of half-moulds mounted on either side above said stand and a piston adapted to engage the upper peripheral contour of said two half-moulds, the projecting portion of said piston projecting within the gap left between said two lateral half-moulds, this installation comprising movable mounts each adapted to carry a mould and comprised of a pair of wheels adapted to rotate in two vertical parallel planes, each wheel consisting of a pair of unequal segments of which the minor one is adapted to be removed when the two-wheel assembly has been rotated for causing the wheel to bear with its major segment on a cradle adapted in turn to slide in the direction of the planes of said two wheels on a base plate provided with rollers permitting the translation of said plate at right angles to said wheel planes, a pair of rails supporting through wheels a plurality of mounts each adapted to be driven separately to a casting station adapted to fill the mould with slip, to a draining station adapted to remove the excess slip by draining, and to a piston release station adapted to remove the piston mechanically and place it upon a lateral transfer conveyor to a waiting position adjacent to a stripping station where stand removal followed by movement of the pair of half-moulds away from each other, removal of the casting and deposition thereof upon a lateral transfer conveyor are performed mechanically, said last-named lateral transfer conveyor leading to conventional finishing stations, means adapted to subsequently
reposition said piston between said two half-moulds and redengage said stand into the assembly, each mount thus reequipped with the empty mould being adapted to be eventually directed through a drying station for properly drying the mould elements and finally recycled at said casting station.

2. Installation as set forth in claim 1, wherein said piston release station comprises a fork under which the mount is engaged after releasing its upper segments, said fork mounted to pick up the studs of said piston, so that the latter is lifted to free the lower elements of the mould.

3. Installation as set forth in claim 2, wherein said piston, when picked up by said fork is adapted to be tipped around one of its two pairs of pivot studs and laid as a consequence of the downward movement of said fork upon a lateral transfer conveyor track for directing this assembly to a waiting position adjacent to the stripping station.

4. Installation as set forth in claim 1, wherein the stripping station comprises a fork under which the mount is engaged after tipping the two wheels by rotation on said cradle by causing the casting to bear on a stripping plate and lifting the upper portion of the wheel supporting the mould stand by releasing said stand.

5. Installation as set forth in claim 4, wherein a pair of lateral brackets are provided in said stripping station on either side of the position occupied in this station by the mount during the stripping operation for supporting the two half-moulds when they are moved away from each other for releasing the casting.

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