APPARATUS FOR APPENDAGING PREFABRICATED POTTERYWARE

Fig. 1.

Fig. 2.

Fig. 3.

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This is a division of our co-pending application Serial No. 392,276, filed May 7, 1941, and the invention hereof relates to apparatus for fabricating potteryware and has to do particularly with the means for molding and attaching appendages to prefabricated potteryware.

In the drawings:

Fig. 1 is a perspective view of the preferred form of apparatus for molding and attaching appendages to prefabricated potteryware as it would appear when associated with a chain conveyor.

Fig. 2 is a top plan view of the molding and attaching apparatus of Fig. 1.

Fig. 3 is a vertical section taken on line 3--3 of Fig. 2, with ware in the appendaging position.

Fig. 4 is an end-view of the apparatus of Fig. 3 as viewed from the left.

Fig. 5 is a bottom plan view of the carriage of Fig. 3, viewed in the direction of arrows 5--5 of Fig. 3.

Fig. 6 is a vertical section through the center of the mold carrier illustrating how ware may be tilted into leakproof sealed engagement with the mold.

The drawings illustrate how handles are formed and united to prefabricated cups. The invention is not limited, however, to handling cups, since it may be used to appendage other forms of pottery articles with appendages, protuberances, lugs and the like of various shapes, sizes, composition and description which may be located at various points on the article.

The apparatus shown in Fig. 1 consists generally of a movable single strand endless chain 1 which is centered and supported on the twin rails of a track 5 by means of underneath transverse supports 8 having flanged wheels 7 resting on the track.

With reference to Figs. 3 and 4, each casting unit comprises a horizontal base plate 19 having a vertical end post 20, Fig. 3, having a flat plate 2 bolted to a horizontal plate 21 fastened to the chain 1. A hinge pin 22 is socketed in plate 19 on which rigid frames or backing members 23 of a partible mold assembly are pivotally mounted. Each frame 23 has one-half of a mold 24 (preferably made of absorbent material such as plaster of Paris) cemented or removable secured as by screws thereto.

Since the mold is divided, each part is formed with one-half 3 of the molding cavity and an inlet passage portion 4 leading thereto and an outlet portion. Thus, when the mold is closed, a molding chamber is formed which may be of any desired contour, having an outlet through the wall 24b, the form here shown being a handle such as that commonly found on pottery cups. The end wall or ware engaging surface 24b is shaped to fit the circumferential and vertical curvature of the ware.

It will be observed that there are no dowels in the mating faces of the mold sections 24. The mold sections are located by the members 23 which rotate about the hinge pin as a fixed axis. Dowels and their holes adds expense to the manufacture of the molds and are hard to keep clean. Any dirt in a dowel hole will spring the mold and cause it to leak.

A guided, freely sliding, carriage composed of upper and lower plates 21 and 25, Fig. 3 straddles the base plate 18 and is secured together by bolt 29 which extends through an elongated opening 30 in plate 19 to thereby enable limited horizontal shifting.

A stud 35 threaded into plates 27 and 28 passes through an oversize aperture 36 in plate 19 to permit limited relative movement of the carriage and plate 19. A coil spring 36 bearing against stud 35 holds the carriage retracted.

Adjustably secured to the carriage by bolt 31 is L-shaped thrust member sometimes herein called “thrustor” 32, having a replaceable plaster facing 33 preferably contoured to the shape of the cup cavity to which a resilient pad 34 is secured. The pad 34 faces the cavity opening in the mold and is spaced approximately the thickness of the cup wall or more from the opening in the mold, when the thrustor is in retracted position. The thrustor presses the wall of the cup firmly against the contoured ware receiving surface of the mold in leakproof, sealed relation therewith. A narrow slightly projecting rim around the cavity opening in the mold will improve sealing contact and will produce cleaner juncture lines.

The arrangement is such that the ware automatically centers itself upon engagement with the ware-receiving surface of the mold. This is due to the horizontal curvature of the ware-receiving surface 34b of the mold which causes the ware to swing around into proper seated relation if the ware is off center. To facilitate the action, the ware may be caused to tilt on its brim on the mold side thereby lifting the other side off the carriage and pivoting the cup on the ware-receiving surface of the mold as illustrated by dotted lines in Fig. 6. This may be done by tilting the ware-receiving surface of the mold back slightly from its normal position or if the ware has pronounced vertical curvature, the thrustor will cause the ware to tilt automatically into
nested relation with the ware-receiving surface of the mold.

To prevent the application of smaller diameter ware than the unit is suited for, the through means may have a gauge means in the form of vertical guide member 30b adjustably mounted thereon.

Said pad 34 is preferably composed of a low density resilient material, such as, sponge rubber or it may be a resilient cavitied pad filled with fluid. The object is to provide a self-aligning surface that will fit the internal contour of the ware and will compensate for variations in wall thickness thereof. Thus the ware does not have to be gauged for wall thickness or curvature and can be placed on the appending machine in whatever condition it comes from the dryer as long as the shape is uniform.

The importance of a self-aligning “thruster” is emphasized by the fact that the exterior of the ware is formed by a mold, therefore, it is always of uniform contour, but not necessarily diameter because the mold wears with a while. The exterior of the cup is formed by an edged profile blade which through wear, re-sharpening or resetting may change the wall thickness of the ware. Variations in wall thickness up to 20% have been known to occur and the zones of occurrence are apt to vary. Cast cups also vary in wall thickness and therefore, the provisions of a yieldable backing up or support member is highly advantageous particularly in commercial production.

Pivoted on the lower end of stud 35, Figs. 1, 2 and 5 is a double-ended mold opening and closing lever 37. The mold is opened and closed and the carriage 21—28 is shifted by links 36 and 38 that are attached to depending pins 48 secured to the frames 23 extending through slots 41 in the plate 19. Links 38 and 39 are pivotally attached to a common pin 42 attached to a crescent shaped link 43 pivotally connected to a crank extension 42b near the center of lever 37. The inside ends of the lever project beyond the marginal edges of plate 19.

When the lever 37, Fig. 2 is moved in a counterclockwise direction, links 38 and 39 pull the mold sections closed. After the sections are closed further movement of the lever 37 pulls the carriage assembly 21—28 to right against resistance of spring 36 thus forcing the ware W gingly but firmly into leak-proof sealing relation with the mouth of the mold cavity. Further movement of lever 37 moves pin 42a over dead center thus locking the carriage assembly and mold sections in closed position, pin 35 acting as a stop on link 43. When the opposite end of the lever 37 is moved in a clockwise direction, the ware W is first unclamped and is free to float as the mold starts to open, thus avoiding cracking of appendage as juncture if there should be a slight lateral shifting of mold due to worn hinge or link pin bearings.

The conveyor 1 moves the casting unit to the left toward a stationary, adjustably positioned, track side trip 88 which engages and turns the lever 37 to thereby cause the sections of the appendage mold to close. If the ware is applied off center and it is necessary that it be precisely located on the support) the mold sections will nudge the ware into approximately proper position. After the mold sections have closed, continued movement of the lever 37 advances the thruster 32 to first finally position the ware, then press the adjacent portion of ware wall against the contoured surface of the mold in leak-proof sealed relation with the opening of the molding cavity. As the lever 37 reaches its limit of movement, link 43 travels over the center of lever 37 to thereby lock the mold halves together and the thruster against the internal wall of the ware.

An adjustably positioned track side trip 87 is to engage the lever 37 thereby unlocking the mold and unclamping the ware in obvious fashion. The handle by this time has hardened and united to the ware. The operator removes the appended ware from the unit, flips off the material formed in the well 244 and then smooths the mold joint fln (if any) off the appendage.

Shape changes may be quickly accomplished either by pulling the mold sections 23 and 24 off the hinge pin 22 and replacing them with another set or by lifting out the plaster inserts. The molds can be made up before hand to proper sizes and specifications and stored in segregated bins convenient to the operator who will be in a position to detect worn molds and quickly replace the same.

The ware is held in leakproof sealed relation with the margin of the casing 211 for properly defining the juncture margins and facilitating streamlining and blending the handle juncture through a fillet, thus producing a super quality joint and bond generally known as a “welded joint” having double strength of joints employed on conventional ware. It is impossible in practice to obtain an air-tight seal between the adjacent faces of the mold and this provides sufficient vent for escape of all air from the mold cavity, without permitting entrance of slip.

The molding and appending unit thus described may be considered a wheeled support because the undercarriage and the mold platform are both attached to the same chain link. If the link was removed from the chain, the entire unit would be detached. Of course, the appending apparatus may not include a wheeled support depending on whether or not the unit is to travel whilst in operation. Having thus described our invention, what we claim is:

1. Apparatus for appending prefabricated pottery ware comprising, in combination, a separable appendage mold having a molding cavity provided with an inlet and outlet, a relatively movable ware support co-operative with the mold to grip prefabricated ware therebetween in sealed relation with the outlet, a travelling carrier for the mold and the ware support and means travelling with the carrier operable to open and close the mold and relatively move the mold and support.

2. Apparatus for appending prefabricated pottery ware comprising, in combination, a separable appendage mold having a molding cavity provided with an inlet and outlet, a relatively movable ware support co-operative with the mold to grip prefabricated ware therebetween in sealed relation with the outlet, a travelling carrier for the mold and the ware support and means travelling with the carrier operable to open and close the mold and relatively move the mold and support.

3. Apparatus for appending prefabricated pottery ware comprising, in combination, a separable appendage mold having a molding cavity provided with an inlet and outlet, a relatively
movable ware support co-operative with the mold to grip prefabricated ware therebetween in sealed relation with the outlet, a travelling carrier for the mold and the ware support and means travelling with the mold to grip prefabricated ware therebetween in sealed relation with the outlet, a carrier having slidably associated interfitting relatively movable parts supporting the mold and the ware support and releasable locking mechanism mounted on the carrier for actuating the mold and the ware support.

5. Apparatus for appending prefabricated pottery ware comprising, in combination, a separable appendage mold having a molding cavity provided with an inlet and outlet, a relatively movable ware support co-operative with the mold to grip prefabricated ware therebetween in sealed relation with the outlet, a carrier supporting the mold and the ware support attached to said chain conveyor, and releasable locking mechanism mounted on the carrier for actuating the mold and the ware support.

10. Apparatus for appending prefabricated pottery ware comprising, in combination, a separable appendage mold having a molding cavity provided with an inlet and outlet, a relatively movable ware support co-operative with the mold to grip prefabricated ware therebetween in sealed relation with the outlet, a carrier for the mold and the ware support, and mechanism for actuating said mold and ware support including a member projecting beyond the carrier on opposite sides thereof to be engaged and actuated from either end.

11. Apparatus for appending prefabricated pottery ware comprising, in combination, a separable appendage mold having a molding cavity provided with an inlet and outlet, a relatively movable ware support co-operative with the mold to grip prefabricated ware therebetween in sealed relation with the outlet, a carrier for the mold and the ware support and releasable locking mechanism for actuating said mold and ware support including a member to be moved in one direction to move the mold and ware support into appending position and lock the same and to be moved in another direction to release the same.

12. Apparatus for appending prefabricated pottery ware comprising, in combination, a separable appendage mold having a molding cavity provided with an inlet and outlet, a relatively movable ware support co-operative with the mold to grip prefabricated ware therebetween in sealed relation with the outlet, a carrier for the mold and the ware support and releasable locking mechanism for actuating said mold and ware support including said mold and ware support including a member to be moved in one direction to move the mold and ware support into appending position and lock the same and to be moved in another direction to release the same.

13. Apparatus for appending prefabricated pottery ware comprising, in combination, a support, a separable mold carried by said support, a ware supporting member carried by said support, said member and said mold being relatively movable to co-operate prefabricated ware with said mold, and means for actuating said mold and relatively moving said support and member including a releasable locking device for drawing the member and mold sections together and locking them in such position upon movement of the locking device past a dead center position.

14. Apparatus for appending prefabricated pottery ware comprising, in combination, a support, a pair of mold receivers fitted with replaceable mold sections movably mounted on said support, a ware supporting member having a resilient pad for engagement with the ware mounted on said support, said member and said mold being relatively movable to co-operate prefabricated ware with said mold, and lever operated means operable to move said mold receivers and said member to close the mold and then relatively move the member and support to engage the ware with the mold.

15. Apparatus for appending prefabricated pottery ware comprising, in combination, a support, a pair of mold receivers fitted with replaceable mold sections pivotally mounted on said support, a ware supporting member carried by said support, said member and said mold being relatively movable, and means for actuating said mold receivers and said member including a floating lever mounted on and movable with the ware supporting member attached to the mold sections by a pair of connected links.

16. Apparatus for appending prefabricated pottery ware comprising, in combination, an appendage mold and a fixed ware support mounted and arranged to move relative to one another to
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tilt the ware into sealed relation with the mold.

17. Apparatus for appending prefabricated pottery ware comprising, in combination, an appen-
dage mold and a fixed ware support mounted and arranged to move relative to one another to
grasp prefabricated ware therebetween in sealed relation with the mold, the angular position of
the ware engaging surface of the support or the mold or both being such that the ware is tilted
between the support and mold into proper nested relation with the ware receiving surface of the
mold.

18. Apparatus for appending prefabricated pottery ware comprising, in combination, a wheeled carriage including a platform, a sec-
tional appendage mold mounted on the platform, a ware support carried by the platform, said ware
support and said mold being relatively movable to co-operate prefabricated ware with the mold
and operating mechanism for opening and clos-
ing the mold and relatively moving the ware sup-
port and mold disposed below the platform in-
cluding a lever projecting beyond the platform
on both sides in position to be operated from
either side of the platform.

19. In combination with a support, a hinge
pin mounted thereon, a partible casting mold
carried by the support and pivotally mounted
on said hinge pin and mechanism for opening
and closing said mold including a link attached
to each mold, a pivot pin connecting the oppo-
site ends of said links together, a pivoted oper-
ating lever, and a link connected to the oper-
ating lever and the pivot pin adapted to ride
over dead center when the operating lever has
pulled the mold sections to closed position to
thereby lock the mold in closed position.

20. The combination with a separable casting
mold for making appendages and the like to be
joined to prefabricated potteryware and a hinge
pin on which the mold is mounted of a ware
support in front of said mold aligned with and
movable toward and away from the hinge pin
having means for internally re-enforcing the
ware incident to co-operation with the mold.

21. The combination with a separable casting
mold for making appendages and the like to be
joined to prefabricated potteryware and a hinge
pin on which the mold is mounted of a ware
support in front of said mold aligned with and
movable toward and away from the hinge pin
having means for internally re-enforcing the
ware incident to co-operation with the mold.

22. The combination with a separable casting
mold for making appendages and the like to be
joined to prefabricated potteryware and a hinge
pin on which the mold is mounted of a ware
support provided with means for internally re-
enforcing the ware in front of the mold and
means operable to spread the mold sections apart
on the pin and relatively move the mold and ware
support.

23. The combination with a separable casting
mold for making appendages and the like to be
joined to prefabricated potteryware of a hinge
pin on which the mold is mounted, a ware
support in front of the mold at the side opposite
the hinge pin on which the ware is received in
inverted position, means for internally re-en-
enforcing the ware incident to co-operation with
the mold carried by the support and a member
spaced from said means and carried by the sup-
port, which in co-operation with said means pre-
vents ware whose inside diameter is smaller than
an allowable minimum from being placed on said
support.

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