July 19, 1932. W. J. MILLER 1,868,425

METHOD OF AND APPARATUS FOR MANUFACTURING POTTERY WARE

Filed May 5, 1928 2 Sheets-Sheet 1

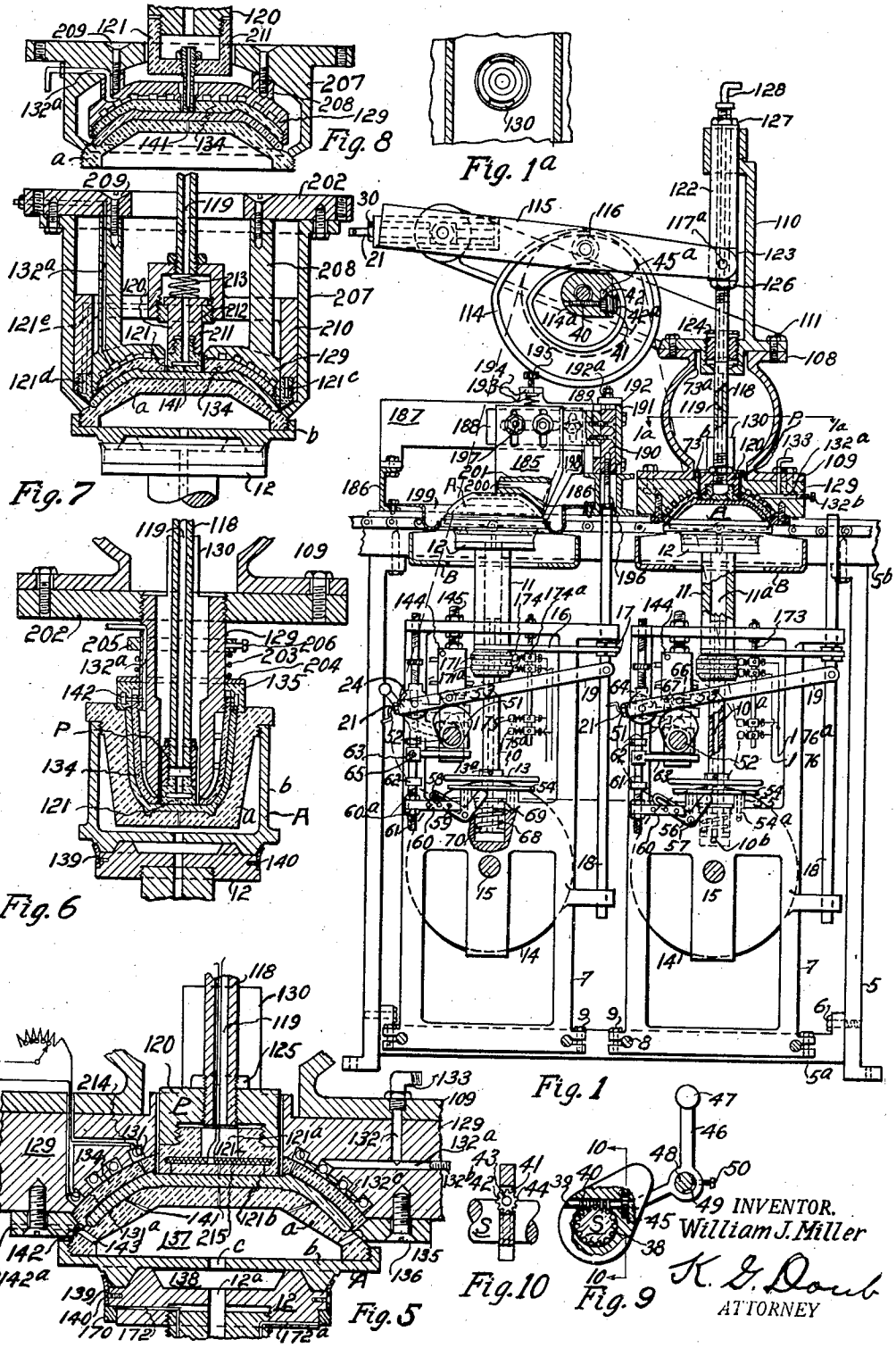

Fig. 8 Fig. 1a Fig. 7 Fig. 6 Fig. 1 Fig. 5 Fig. 10 Fig. 9

49 INVENTOR.
William J. Miller
K. G. Doub
ATTORNEY

July 19, 1932. W. J. MILLER 1,868,425

METHOD OF AND APPARATUS FOR MANUFACTURING POTTERY WARE

Filed May 5, 1928 2 Sheets-Sheet 2

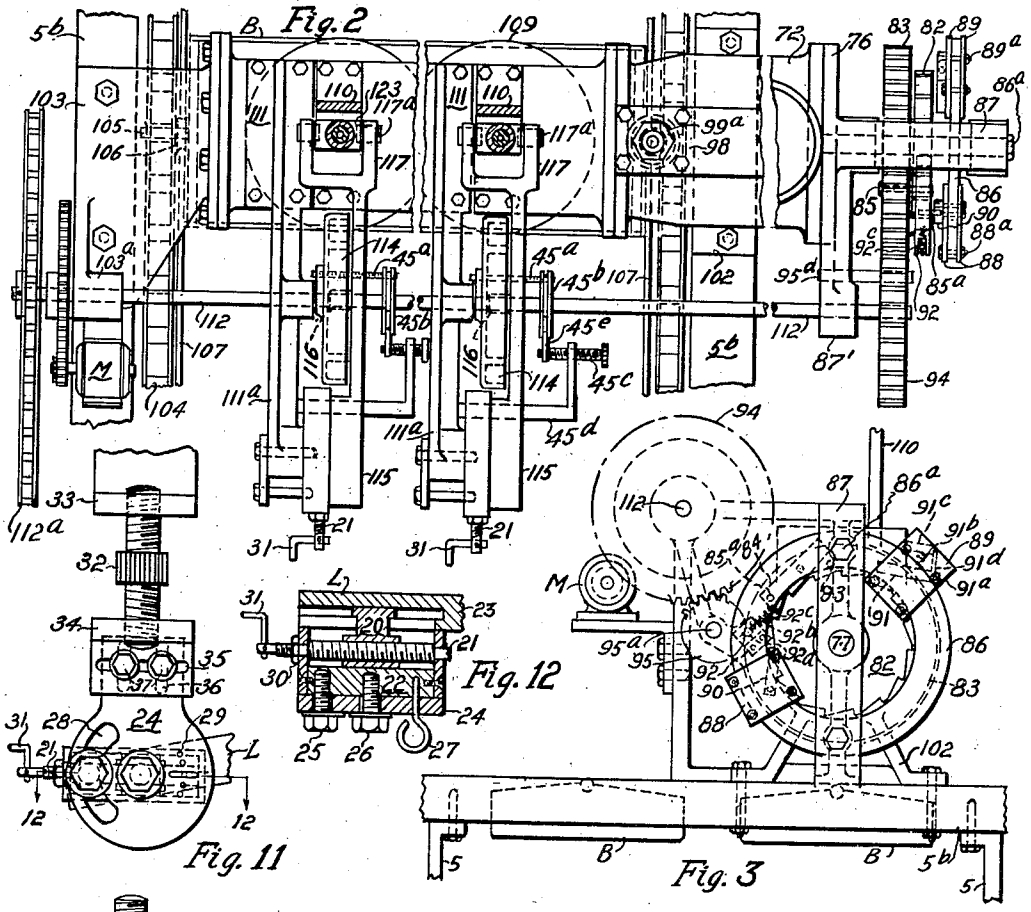

Fig. 2

Fig. 3

Fig. 11

Fig. 12

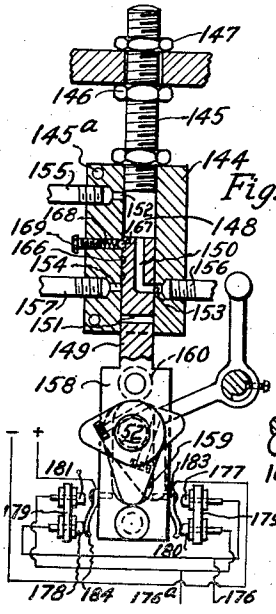

Fig. 13

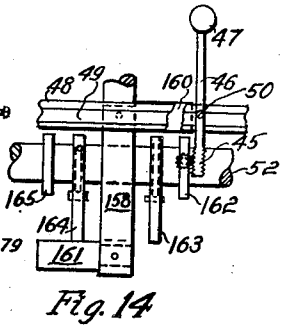

Fig. 14

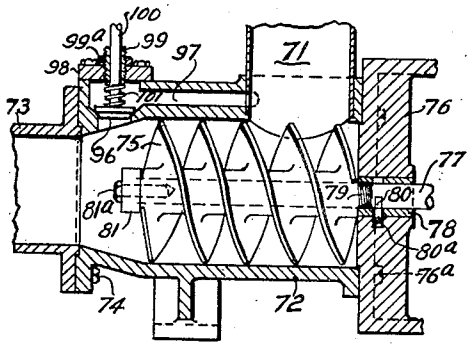

Fig. 4

INVENTOR.
William J. Miller
BY K. G. Doub
ATTORNEY.

Patented July 19, 1932

1,868,425

UNITED STATES PATENT OFFICE

WILLIAM J. MILLER, OF SWISSVALE, PENNSYLVANIA

METHOD OF AND APPARATUS FOR MANUFACTURING POTTERY WARE

Application filed May 5, 1928. Serial No. 275,395.

This invention relates to a method of and apparatus for manufacturing pottery ware, and the principal object of the same is to provide a machine of simple practical construction which will operate to automatically feed clay or plastic material to molds in measured charges and shape the charges into ware.

With the foregoing object in view, provision is made for treating the charges of clay and also for repelling the clay from, or causing the clay to adhere to such parts as will facilitate the production of the ware, and furthermore, the working parts of the apparatus may be readily adjusted and timed, both while in operation and at rest, so that the charges of clay may be accurately measured and the time and point of application to the molds gaged.

The foregoing and numerous objects and advantages will become apparent in view of the following description and appended claims taken in conjunction with the drawings, wherein,—

Figure 1 is a view in section and side elevation of a type of machine or apparatus which may be used in carrying out the method;

Fig. 1ª is a sectional view taken on the line 1ª—1ª, Fig. 1;

Fig. 2 is a broken plan view of the feeder assembly;

Fig. 3 is an end view thereof;

Fig. 4 is a framentary transverse vertical sectional view of the clay progressing and compressing chamber;

Fig. 5 is an enlarged framentary transverse vertical sectional view of parts taken from Fig. 1, to illustrate said parts more clearly;

Figs. 6, 7 and 8 are views similar to Fig. 5 of attachments or modifications in structure;

Fig. 9 is an enlarged detail view, partly broken away, of a cam adjustment structure;

Fig. 10 is a view taken on the line 10—10, Fig. 9;

Fig. 11 is an enlarged detail view in side elevation of a type of adjustment structure particularly adapted for mounting levers and other reciprocating members;

Fig. 12 is a section taken on the line 12—12, Fig. 11.

Fig. 13 is an enlarged detail view in section and side elevation of a preferred type of valve structure nd actuating cams; and

Fig. 14 is a fragmentary view in elevation of parts of Fig. 13.

It is preferred to convey the molds to and from the machine on trays of the type disclosed in my copending application Serial No. 269,273, filed April 11, 1928, through the medium of conveying mechanism such as that disclosed in my copending application Serial No. 202,629, filed June 30, 1927. While the usual type of plaster mold may be used in the present method and machine, the mold shown is in general of the construction illustrated in my copending application Serial No. 162,140, filed Jan. 19, 1927.

Referring to the drawings and particularly to Fig. 1, the numeral 5 generally designates the supporting frame of the machine, having base members 5ª and upper side members 5ᵇ extending longitudinally of the machine, said parts being assembled in knockdown relation and secured as by bolts 6. Supplementary frame units or members 7 are shown adjustably supported on the base 5ª through the medium of cross rods or bars 8, which may be secured in the base members 5ª and of such length as will accommodate the number of units employed, said supplemental frame members 7 being clamped on said bars as by bolts 9. To adjust said units longitudinally on said bars and laterally with respect to the machine as a whole and consequently any parts that may be supported thereby, bolts 9 may be loosened and the units shifted to the desired position and then secured by tightening said bolts.

The frame members 7 serve to support the jiggering assembly, which preferably comprises telescoping spindles 10 and 11 in spline-sliding engagement, the spindles 11 terminating in chucks 12, which are shown as removably threaded on said spindles but may be made integral therewith, the said chucks preferably being shaped as illustrated for example in Fig. 5 so as to center the molds thereon when elevated in contact with said molds. Friction gears 13 are adjustably secured as by screws 13ª on the lower ex-

tremities of the spindles 10, said gears being adapted to intermittently contact with continuously-driven friction gears 14, which in turn are adjustably secured on drive shafts 15 in a manner similar to gears 13, the shafts 14 having bearing in the supplemental frame units 7.

To reciprocate the chucks 12, the spindles 11 are necked or grooved at their lower extremities to receive the one extremity of cross forks 16, the opposite extremities of said forks being adjustably secured as by nuts 17 on vertically extending pitmen 18, the latter being reciprocably or vertically slidably mounted in the frame units 7. Levers 19 are pivotally secured at one extremity to the pitmen 18 and at their opposite extremities adjustably and pivotally supported from the frame members 7, preferably as illustrated in detail in Figs. 11 and 12 and whereby the throw of said levers may be varied or adjusted while in operation and while the driving and pivotal connection subsists.

This adjustment assembly preferably comprises a pivot or journal block 20, which is journaled in a longitudinally slotted portion of the lever or member to be pivoted or fulcrumed, indicated at L, and bored and threaded for insertion of an adjusting and retaining screw 21, said block being also mounted to shift or slide through adjustment of screw 21 in a longitudinally slotted portion of a block or analogous member 22, the journal or bearing portion of block 20 being headed and the side walls of the longitudinally slotted portion of lever L formed with a retaining track or groove 23 for said head. Block 22 is adjustably secured to the supporting bracket or casting 24 of the assembly as by screw bolts 25 and 26 and positioning pin 27, the bracket 24 being arcuately slotted as at 28 where the bolt 25 extends therethrough and a plurality of positioning holes 29 provided in the bracket for pin 27. By loosening bolts 25 and 26, pin 27 may be adjusted in any of said holes to definitely locate or spot the angular position of block 22 relatively to the frame or casting 24 and lever L, while screw bolt 25 may be adjusted in slot 28 to accomplish the same result independent of pin 27 and intermediate of holes 29. Adjusting screw 21 is journaled in said block 22 and provided with thrust or bearing collars or set nut 30 and adjusting crank or handle 31. It will be seen that by turning screw 21, journal block 20 may be shifted in the guideway provided therefor and thus shift the pivotal or fulcrum point of lever L and vary the throw of said lever or the extent of reciprocation thereof from a stationary point and while in operation and while the driving and pivotal connection subsists. By adjusting the angle of block 22 and/or shifting the block 20, various advantageous adjustments may be obtained. For instance, the extent of reciprocation of lever L may be varied without varying the lowermost point of reciprocation, or the intermediate point of reciprocation may be maintained constant while at the same time varying the extent of reciprocation, or the lowermost point of reciprocation may be varied to a greater or less extent than the uppermost point of reciprocation, and vice versa, or the altitude of reciprocation varied.

The foregoing assembly as a whole may in turn be adjustably supported by a turnbuckle or analogous member 32 threaded at opposite extremities in brackets 33 and 34, said turn-buckle being also adjustable to raise and lower the pivotal or fulcrum point of lever L, and to provide for both vertical and lateral adjustment independent of the turn-buckle, or as an alternate method of supporting the assembly where the space available may not be sufficient to accommodate the turn-buckle assembly, the bracket or casting 24 and bracket 34 or other supporting member may be slotted as at 35 and 36 to receive securing bolts 37. By loosening bolts 37, the assembly as a whole may be adjusted both vertically and laterally.

Figs. 9 and 10 illustrate a construction which may be adopted in mounting the cams of the machine and through the medium of which the phase of motion of the parts primarily actuated by said cams may be varied while said parts are in operation and while the driving connection subsists. For example, a cam is shown applied to a shaft S, which is formed with an annular threaded groove 38 and the cam bored as at 39, to provide a bearing housing for an adjusting and set screw 40, the bore 39 terminating in a slot or cut-out portion 41 adapted to receive a gear head 42, into which the one extremity of screw 40 may be threaded and secured as by pin or screw 43. An adjusting segment 45, shown in dotted lines, formed on one extremity of a rocking lever 46, the latter having a balancing or weighted head 47, may be used as a contact member for adjusting purposes, said lever being shown mounted on a bracket shaft 48, formed with a longitudinal groove 49, a screw 50 being threaded through the lever 46 and projecting into said groove, said lever being thus limited in its rocking movement by screw 50 contacting with the side walls of groove 49. The weighted head 47 of lever 46 serves to normally maintain the segment out of range of the projecting teeth 44 on gear 42 or out of range of the radial path of said gear. To adjust the cam, the lever may simply be rocked inwardly to bring the segment 45 within the radius of the projecting teeth 44 of gear 42 as the cam rotates, this adjustment being reversed by sliding the said lever along its supporting shaft 49 and engaging the gear 42 on the opposite side of the cam. Thus the operator may

readily gage the extent of adjustment, as at each rotation of the shaft and cam, the segment may contact with and impart a definite degree of rotation to screw 40, so that the operator may be guided by the number of times the segment contacts with said screw in determining the extent to which he adjusts the angular position of the cam. The threads of the annular groove 38 and screw 40 are preferably of the irreversible or single-thread type, to prevent angular displacement of the cam due to work imposed thereon.

The levers 19 are adapted to be actuated by cams 51, which are adjustably mounted as in Figs. 9 and 10 on shafts 52, said cams contacting with rollers 53, rotatably mounted on said levers 19.

To provide for adjustable or selective rotation of the spindles 10 and 11 and consequently the chucks 12, brake shoes 54 are mounted to slide vertically into contact with the friction gears 13, said shoes being provided with pins 54ª adapted to have a sliding fit in drilled bosses or projections 55, which may be cast integral with the frame members 7. Brake levers 56, preferably of angle shape are fulcrumed on bearing pins 57, which may be secured in or form part of the frame members 7, said levers being provided with slots 58, adapted to receive pins 59, the latter being adjustably secured in brake brackets or arms 60, which are provided with a plurality of securing holes to permit adjustment of pins 59. The brake arms 60 are adjustably mounted as by nuts 60ª on the lower extremities of pitmen rods 61, which have vertical sliding movement in lugs 62. Cam-contact brackets 63 and 64, the latter being shown in dotted lines, are adjustably secured as by screws 65 on the pitmen rods 61, said brackets being adapted to contact with cams 66 and 67, also shown in dotted lines, said cams being adjustably mounted preferably as in Figs. 9 and 10 on the shafts 52. The frame members 7 may be cast or bored to provide housings and bearing supports for the lower extremities of spindles 10, springs 68 being applied around said spindles in the housing and adjustably maintained in position by cover members 69, which are bored to fit over said spindles and threaded into the housings, the tension of springs 68 being adjusted by adjusting said cover members. The lower ends of the spindles 10 are flanged as at 70, and if desired thrust bearings may be mounted around said spindles above these flanges.

In operation, when the spindles 11 are elevated through the medium of the cams 51, levers 19, pitmen 18 and cross forks 16, to thereby elevate the chucks in contact with the molds, indicated at A, and raise the latter clear of the trays, indicated at B, for fabricating operations, the cams 66 and 67 may be adjusted on shafts 52 to contact with brackets 64 and raise the pitmen rods 61 and cause brake levers 56 to lower the brake shoes out of contact with friction gears 13, thus permitting the spindles 10 to lower by gravity assisted by springs 68, bringing friction gears 13 into contact with the continuously rotating gears 14 and imparting rotation to the spindles 10 and 11 and chucks 12 and molds A carried thereby, and when the spindles 11 are lowered, brake cams contact with cam brackets 63 and lower the pitman rods 61, thereby causing brake levers 59 to raise brake shoes into contact with friction gears 13 which in turn raise the spindles 10, moving friction gears 13 out of contact with gears 14, to thereby stop rotation of chucks 12 and molds A. Friction gears 13 and 14 are provided with suitable facings and beveled, and as cams 66 and 67 are adjustable both while in operation and at rest to move gears 13 and 14 into gradual smooth contact, the rotation imparted to the molds may be gradually accelerated and retarded, and this rotative action may be initiated at any point of reciprocation of the chucks and also stopped at any point of reciprocation of said chucks.

To facilitate a complete understanding of the foregoing structure, reference is made to my Patent No. 1,655,431, dated Jan. 10, 1928.

The means for automatically feeding the clay to the molds preferably comprises a hopper 71, see Fig. 4, a clay progressing and compacting chamber 72 and a conveying and feeding conduit or chamber 73, the wall of the chamber 72 being formed with a flanged opening to receive the hopper 71, which may have a snug fit or be threaded or otherwise secured therein, and the conduit 73 and chamber 72 are formed with interlocking flanges and secured as by bolts 74. A clay progressing and compacting screw 75 is mounted in the chamber 72, said chamber being provided with a detachable head 76, secured to said chamber by bolts 76ª, said screw 75 preferably being formed in sections and assembled on a shaft 77, the latter extending through said head, which is bored and provided with bearings or bushings 78 to receive said shaft. While the clay is being continuously progressed from the bearing 78, some particles may have a tendency to work around the shaft 77 into said bearing, and to ensure protection of this bearing, the shaft 77 is formed with a number of threads, as at 79, cut counter to the direction of rotation of said shaft and in the same direction as screw 75, so that any clay particles that may have a tendency to work into the bearing will be progressed back into chamber 72 by said threads. As an additional protection for the bearing 78, the head 76 is cored out adjacent the shaft 77 and a spring wiper 80 secured to the casting or head as by screw 80ª, the end edge of said wiper bearing against said shaft, the bearing

78 being formed in sections leaving an annular space around the shaft opening into the cored-out portion below the shaft. This wiper structure serves to prevent moisture or other matter that may seep past the threads 79 from reaching the actual working surface of bearing 78, which obviously does not fit too snugly around threads 79. That portion of the shaft 77 on which screw 75 is mounted is preferably squared, to receive the screw sections, which are applied over this squared portion and an end block or washer 81 secured on the end of the shaft as by screw 81ª, to prevent longitudinal displacement of screw 75 in the event of reverse rotation or other operations which may impose longitudinal strain on said screw toward the left as viewed in Fig. 4.

It is preferred to drive screw 75 intermittently, and with this end in view, a ratchet wheel 82 is keyed or otherwise secured on shaft 77, said ratchet being driven from a gear 83, which is rotatably mounted, or has bearing on said shaft and is provided with a pivotally mounted dog 84, a pivot pin or bolt 85 being secured in gear 83 for this purpose and projecting laterally therefrom, see Fig. 2. A contact pin 85ª is secured in the dog 84 for a purpose which will presently be specified. The head 76 is cast with bracket extensions 87 and 87′, and to cause the dog to mesh and unmesh with the teeth of ratchet 82, a ring 86 may be secured to the bracket extension 87 as by bolts 86ª, the head 76 with its extension 87 forming a bearing support for the shaft 77, said ring 86 having adjustably or radially shiftably secured thereon a trip assembly comprising brackets in the form of plates 88 and 89, which are clamped on said ring as by bolts 88ª and 89ª, the brackets 88 having a contact member 90 secured to the side thereof adjacent the ratchet 82, and the brackets 89 having a similar member 91 secured thereto, the latter being pivoted at one extremity as at 91ª and working against the pressure of a spring 91ᵇ, which is seated in a block 91ᶜ, also secured to said plates 89, the contact member 91 being formed with a stop piece 91ᵈ at right angles thereto, adapted to contact with block 91ᶜ. The contact members 90 and 91 are preferably disposed at an incline, so that when the gear 83, which may be continuously driven, rotates, the contact pin 85ª on dog 84 will contact with said members and throw the said dog out of and into mesh with the teeth of ratchet 82, contact member 90 serving to throw the dog out of mesh and contact member 91 throwing the dog into mesh, the member 91 being resiliently mounted so as to prevent breakage or jamming in case the dog should come down on top of a tooth of the ratchet. To maintain the dog 84 in tripped position when thrown in and out of mesh with the teeth of ratchet wheel 82 by contact members 91 and 90, a bracket 92 is secured to the side of gear 83 adjacent said dog and a swivel pin or analogous member 92ª swiveled therein and bored to slidably receive at right angles thereto the one extremity of a spring stabilizing and guide pin 92ᵇ having a spring 92ᶜ mounted therearound, the opposite extremity of said pin being seated and having universal bearing movement in a concave recess formed in the end of dog 84. It will be seen that spring 92ᶜ exerts a resilient pressure on dog 84 in a longitudinal plane in line with its axis or pivot pin 85, so that when said dog is oscillated against the tension of said spring by trip members 90 and 91, the spring will compress until the end of the dog oscillates past its axis in a longitudinal plane, whereupon the dog snaps back into or out of mesh with the teeth of ratchet 82. To limit the disengaged position of dog 84, a pin 93 is secured in the side of gear 83, see Fig. 3.

The drive may be applied to gear 83 through the medium of a gear 94, shown mounted on a shaft 112, to be described, said shaft having bearing at one extremity in bracket 87′, and an idler or speed gear 95, which is secured on a stub shaft 95ª also supported by and having bearing in bracket 87′, a motor M being illustrated as the source of power. However, it will be obvious that the drive may be from a line shaft or any other desirable arrangement.

It will be understood that the clay could be progressed and compacted into the conduit 73 from opposite extremities toward the center thereof by simply mounting the foregoing clay progressing and compacting assembly at opposite extremities of said conduit.

A pressure adjusting and safety valve, generally indicated at 96, see Fig. 4, is mounted in the wall of the chamber 72, said wall being formed with a chamber or passage 97 having its inlet opening controlled by said valve and shaped to provide a seat therefor, the outlet of said passage leading into the hopper 71. The chamber 97 is provided with a detachable cover 98, bored and threaded to receive an exteriorly threaded adjusting sleeve 99, in which the stem 100 of the valve 96 has vertical movement, a spring 101 encircling said stem between said sleeve and the valve 96 and a lock nut 99ª being applied over said sleeve. By adjusting sleeve 99 the unseating pressure of valve 96 may be regulated, to thereby regulate the operating pressure in the feeding conduit 73. When the valve unseats, clay passes through the chamber or passage or bypass 97 back into the hopper 71.

The chamber 72 is formed with a supporting bracket 102, by means of which the complete feeder assembly is supported at one side on one of the longitudinal side frame

members 5^b, and in the event a similar chamber and cooperating parts are to be mounted on the opposite end of the conduit 73, the opposite side of the feeder assembly may be supported in a like manner. However, in the present instance the conduit 73 is shown supported at one extremity through the medium of a bracket 103, bolted to the opposite side frame member 5^b. The trays B carrying the molds A are mounted in series in a flexible conveyor or chain indicated at 104, said trays being provided with trunnions 105 and rollers 106, the latter moving on tracks 107, as will be understood by referring to my copending applications hereinbefore specified.

As the trays bearing the empty molds move into position under the conduit or elongated chamber 73, they may be supplied with measured charges of clay therefrom, and the method and apparatus for performing this operation will now be described.

At such points along the conduit 73 as it may be desired to extrude or eject charges of clay therefrom, the walls of said member are formed or cast with flanged openings 73^a and feed orifices 73^b, the flanges being indicated at 108 and 109, the flanges 108 having bolted or otherwise secured thereto brackets 110 and 111, which serve to support a plunger and lever assembly, the brackets 111 being formed with extensions 111^a, the shaft 112 extending through and having bearing in these extensions and at opposite extremities, respectively, in the brackets 87′ and an extension 103^a of bracket 103, see Fig. 2. Plunger-actuating cams 114 are adjustably secured on shaft 112, the manner of adjustably securing these cams preferably being slightly modified relatively to the construction illustrated in detail in Figs. 9 and 10. the cams 114 being formed with bracket hubs 114^a to receive the screws 40, the teeth of the gear head 42 in this instance meshing with a rack 45^a extending through the hub 114^a and secured at one extremity in a collar 45^b, formed with an annular groove and having a sliding fit on shaft 112, see Fig. 2. An adjusting screw 45^c is mounted in an extension 45^d of bracket 111^a, the one extremity of said screw being provided with a lug or analogous member 45^e adapted to ride in the groove of collar 45^b. The slot 41 in this instance is formed in the hub of the cam and open on the radial surface thereof, to permit insertion of screw 40 and gear 42 in assembling, a retaining plug 42^a being threaded into said slot to prevent displacement of said screw and gear. By adjusting screw 45^c, rack 45^a in mesh with gear 42 will cause screw 40 to turn and thereby change or adjust the angular position of cam 114 on shaft 112, and this adjustment may be made while the driving connection subsists from a stationary point, the extent and position of adjustment being visible.

Levers 115 are pivotally and adjustably mounted at one extremity as in Figs. 11 and 12 on the bracket extensions 111^a, said levers being provided with rollers 116 adapted to contact with cams 114, the opposite extremities of said levers being formed with forks or yokes 117. Plungers, generally indicated by the reference character P, are supported by the brackets 110, the plunger assembly preferably comprising a stem 118, which may be of suitable tubing or formed with a bore 119, a head socket 120 interiorly threaded to receive one extremity of said stem, a head 121 preferably of plaster or like porous material and removably and replaceably threaded into said socket, a bearing and guide sleeve 122, pivot block 123, packing gland 124, lock nuts 125, 126 and 127, and nipple 128, the head 121 being chambered as at 121^a, see Fig. 5, and may also be provided with vents or ducts 121^b, for a purpose which will hereinafter be apparent. The yoke 117 is pivoted as at 117^a in block 123. The lower cover portion of bracket 110 is formed with an interiorly threaded recess terminating in a bore, to receive the plunger stem 118 and gland 124, the block 123 and sleeve 122 being maintained in adjusted position by lock nuts 126 and 127. By adjusting the position of sleeve 122 and block 123 on the plunger stem, the altitude of reciprocation of the plunger may be varied, and through the medium of the adjustable pivoting construction illustrated in Figs. 11 and 12, the many advantageous adjustments incident thereto may be obtained for said plunger, and furthermore, the phase of reciprocation may be varied while in operation and while the driving connection subsists by adjusting cam 114.

The reference numeral 129 generally designates upper die or former member which may be bolted or otherwise secured to the flange 109, said member being formed with a mold-cooperating portion which in Figs. 1 and 5 is of concave shape but which may be of varying shapes, as will hereinafter appear, said portion having a central opening or orifice in registration with the orifice 73^b of the conduit 73. Clay deflectors 130, see Fig. 1^a, are formed on the member 129 and when the latter is secured to the conduit 73 project upwardly into the conduit, to prevent the compacting clay from imposing undue lateral strain on plunger stem 118. Annular grooves 131 are formed in the upper die or former member 129 around the mold-cooperating portion and the die block bored to provide passageways or conduits 132 and 132^a, the conduit 132 being provided with a nipple 133 and the conduit 132^a plugged as at 132^b. However the plug and nipple may be interchangeable as to position as may prove convenient, and furthermore, a multiple of conduits each controlling a definite number of grooves of the member 129 may be provided.

A connecting duct 132c serves to establish communication between a desired number of grooves or sections of the member 129. The mold-cooperating portion of member 129 is preferably provided with a removable and replaceable facing of porous material as at 134, and if desired vents or ducts may be formed in this facing, said facing being retained in place by a ring 135, secured to the member or block 129 as by screws 136. The ridges 131a which result from the formation of the grooves 131 serve to support the facing during the feeding operation.

As hereinbefore stated, while the usual type of plaster mold may be used to advantage in the present machine, the molds illustrated are substantially of the construction disclosed in my copending application Serial No. 162,140, the body portion designated by *a* being composed of porous material such as plaster and the base, designated by *b*, of metal, the body portion being detachably applied to the base as by screw threads and the underpart fo the base being shaped to automatically seat on a chuck. The spindles 10 are hollow or formed with a bore 10a, and likewise the telescoping spindles are hollow as noted at 11a and the chuck and base *b* of the mold bored as at 12a and *c*, thus providing a passageway terminating at one extremity of a chamber 137 formed between the body *a* and base *b* of the mold A, or if the mold be of solid construction, this passageway may terminate in chamber 138, formed between the mold base *b* and chuck 12 and which is closed when the mold is seated on the chuck and adapted to be sealed as by a suitable flexible valve member 139, which may be of rubber and secured on the outer annular peripheral portion of the chuck 12 as by screws 140. The plaster portion *a* of the mold may be made of any desired thickness and, if desired, may be provided with ducts or vents as at 141. The annular ring 135 is formed with an annular groove, as at 142, communication being established between this groove and the chamber 137 of the mold when the latter is elevated in feeding position through a duct or ducts 143 formed in the body *a* of the mold. A bore or passage 142a is formed in the ring 135 and communicates with the groove 142, to permit independent application of any desired medium to said groove. The bore or passageway 10a communicates with the exterior at the lower extremity of the spindle through a threaded bore or nipple 10b.

From the foregoing, it will be seen that the charges of clay may be treated and otherwise acted upon on all sides or surfaces, viz: through the plunger assembly, upper die assembly and jigger or chuck assembly and mold, and some of the numerous advantages of this construction will be brought out in the subsequent brief description of the operation of the machine.

In addition to other treating fluids or mediums, it is of particular advantage to apply super and/or sub-atmosphere to the charges, and Figs. 13 and 14 illustrate a valve structure and actuating means therefor adapted for controlling the application of super and/or sub-atmosphere as well as other mediums.

The valve herein shown may comprise a casing 144, which may be adjustably supported from a part of the frame of the machine as by fastening devices in enlarged openings 145a or by a thread bolt 145, threaded at one extremity into said casing and at its opposite extremity extending through an enlarged opening and adjustably secured as by nuts 146 and 147, a chamber 148 being provided in the casing, a plunger 149 being mounted to reciprocate in said chamber and provided with ports 150 and 151, said casing also having formed therein ports 152, 153 and 154, which are enlarged and interiorly threaded to receive nipples for connection of suitable flexible members or hose 155, 156 and 157. The plunger is formed as a bracket at one extremity, as at 158, slotted or cast with an open portion as at 159, to enable application over the actuating shaft which in this instance may be one of the shafts 52, cam-contact members or pins 160 and 161 being secured in or cast integral with said bracket and projecting at right angles therefrom, said pins being adapted to contact with cams 162, 163, 164 and 165 which serve to control complete and intermediate shifting in both directions of the plunger, said cams being preferably adjustably mounted as in Figs. 9 and 10 on shafts 52. Ordinarily frictional contact may serve to maintain the plunger 149 in shifted position, but to balance the weight of said plunger and ensure its remaining in shifted position, the one extremity thereof is notched as at 166 and the casing bored and threaded to house a resiliently mounted registering assembly or detent structure shown in the form of a ball 167, spring 168 and screw 169, the notches 166 being spaced in accordance with the shifting movement of plunger 149. Thus when the plunger reaches its approximate shifted position, the ball 167 will engage in one of the notches 166 and releasably hold the plunger in shifted position. As each cam is so mounted as to permit adjustment thereof while in operation, the plunger may be timed and given varying dwell periods and degrees of shift while the valve is functioning, to thus time and regulate the dwell of application of the medium to be applied to the clay charges. Any number of these valves may be provided, the flexible members or hose 155 and 157 leading to a source of supply of super and sub-atmosphere or other medium, or one

of said members may lead simply to the atmosphere, and the flexible member or hose 156 may lead to the point of introduction and application of the medium, such as the feeder plunger nipple 128, upper die assembly nipple 133 and jigger assembly nipple or bore 10b.

It may be desirable in some instances to apply air under pressure or supper-atmosphere to the under portion of the molds to such an extent as will require additional means other than the force of gravity or weight of the molds to maintain the latter in stable position on the chucks, and one method of accomplishing this result is to provide the chucks with an electro-magnet and switch construction such as disclosed in my copending application Serial No. 170,613, filed Feb. 24, 1927, and an example of which is also shown in the present drawings in Figs. 1 and 13. The chucks may be provided with coils 170, see Fig. 5, and the spindles 11 with commutators 171 and 171a, see Fig. 1, the commutators and coils being connected by wires 172 and 172a. Brush holder brackets 173 are adjustably secured to the frame members 7, brushes 174, 174a and 175 and 175a being adjustably and resiliently mounted on said bracket and adapted to make contact with commutators 171 and 171a during reciprocation of the chuck. The brushes 174 and 175 connect by wires 176 with contacts 177 and 178, see Fig. 13, which are secured to and suitably insulated from brackets 179, said brackets being supported from any convenient part of the frame of the machine, and the brushes 174a and 175a connect by wire 176a with contacts 180 and 181, also secured on brackets 179. Spring contacts 183 and 184 are secured to the plunger bracket 158 and suitably insulated therefrom, the line wires being connected to these contacts.

In operation, if it should be desired to energize the chuck coil and magnetize the chuck when the latter is elevated, (the position illustrated in Fig. 1), brushes 174 and 174a may be adjusted to the proper position to contact with commutators 171 and 171a at the elevated or approximately elevated position of the chuck, thus completing the circuit from the positive line wire through wire 176, brush 174, commutator 171, wire 172 into coil 170, and return through wire 172a, commutator 171a, brush 174a, wire 176a, contact 180 to negative line wire. To repel the mold from the chuck, all that is necessary is to adjust brushes 175 and 175a so that contact is established with the commutators at the desired point of reciprocation of chuck 12 and when plunger 149 is retracted to make contact between contacts 183 and 177 and 181 and 184, whereupon the current will be reversed in coil 170, flowing in through wire 176a, brush 175a, wire 172a and into coil, and returning through wire 172, brush 175 and wire 176 to negative side of line.

After the molds have been supplied with charges of clay, they may, if found necessary, be advanced and reciprocated and rotated in operative adjacency to a profile, indicated at 185, said profile being mounted to have a limited vertical sliding movement, which movement may be adjusted to accurately measure and regulate the depth or thickness of the ware. The profile assembly as a whole is supported on cross supports 186, shown as being of channel construction, a bracket 187 being secured on said supports, a profile-supporting bracket 188 being secured as by screws 189 to a slide block 190, which may be mounted to have a limited vertical sliding movement at one side of said bracket 187, a trackway being provided by side and top plates 191 and 192, which are secured to the bracket 187, the extent of down travel or movement of the bracket 188 being adjustably limited as by nuts 192a. The bracket 187 is formed with a screw bracket 193, a compression spring 194 being seated in the top portion of bracket 188 and maintained under adjustable tension by a screw 195, inserted in bracket 193. A contact screw 196 is adjustably secured in the slide block 190, said screw being adapted to contact with the pitman 18 when the latter reaches a predetermined point during reciprocation thereof, whereupon the profile and mold will move in unison, as will be understood. By adjusting screw 196, the depth of the charge or thickness of the ware may be definitely measured. The profile may be secured to the bracket 188 by slotting said profile and bracket at right angles to receive securing bolts 197, thus enabling both vertical and lateral adjustment of said profile on said bracket.

A trimmer 198 may be adjustably secured in a manner similar to the profile on the bracket 187, said trimmer being adjustable to act on the edge of the mold approximately at the completion of the profiling operation.

An excess-material-receiving member in the form of an annular trough 199 is secured to the cross supports 186, to receive any excess material as well as water and other matter thrown off by the profile or mold, and the profile is formed with a side bracket or holder, as at 200, to receive a sponge or the like as at 201, which may be supplied with a suitable lubricant or water, either automatically through one of the control valves hereinbefore described or manually by an attendant, or the fluid may be sprayed directly onto the charge.

For automatic removal of excess material, reference is made to my copending application Serial No. 159,143, filed Jan. 5, 1927.

The shafts 112 and 52 are prefrably provided with sprockets or pulleys and connect-

ed with a suitable flexible member such as a chain 112ª or other positive drive connection and driven in synchronism. The shafts 15 having the friction drive gears 14 thereon are preferably independently driven.

From the foregoing description, the operation of the machine will be obvious. The clay may be deposited in the hopper 71 in the usual cylindrical batches as it is taken from the conditioning apparatus, the screw 75 being intermittently actuated to progress and compact the clay in a homogeneous mass into the conduit 73, the degree of actuation of said screw being readily varied by shifting the bracket plates or blocks 88 and 89 on the ring 86. The valve 96 may be adjusted in accordance with the desired maximum pressure to be attained in the conduit 73 and may operate as a safety device, as hereinbefore noted. As the clay is progressed and compacted into the conduit 73, the feeding plungers P reciprocate and eject or extrude it in measured charges onto the molds, which may be reciprocated to receive the charge, and in some instances it may be desirable to rotate the molds during the feeding operation. The feeding plungers need only be raised to a point sufficient to permit approximately the correct quantity of clay to pass into the feeding orifices, the side walls of which form an accumulating chamber or well, and at which time it is preferred to partially rotate the screw 75, whereupon the descending plungers P move into the orifices or wells and eject the charges onto the molds, which by this time may have reached the position of feed relatively to the upper die or former 129. It is preferred to leave a clearance space between the plunger head assembly and side walls of the feed orifices or wells, to permit back extrusion of excess material into the conduit 73.

No attempt is made herein to enumerate the many methods of treating the clay through the plungers P, upper dies 129 and molds A and the advantages incident thereto. However, in the event the clay should adhere to the porous plunger head and facing 134, air under pressure or super-atmosphere may be applied through the plunger bore 119 and passage 132ª to ensure release of the clay, or a suitable fluid may be applied so that the plaster head and facing may be maintained in a moist or slippery condition and which may also ensure release of the clay, and in conjunction with the foregoing operation, sub-atmosphere or suction may be applied to the mold through the passageways 10ª, 12ª and *c* and which will cause the charge to adhere to the mold and also evacuate excess moisture and air pockets from the cavity formed between the mold and facing and from beneath the charge as it covers the mold, suction being exerted on the radial edge of the charge through ducts 143, 142ª and annular groove 142, a slight clearance being permitted between the mold and facing 134 at this point when the mold is elevated, to permit the suction action to be communicated to the clay charge. Ordinarily, the porous material will permit the sub and super-atmosphere or other medium to pass therethrough and it will not be necessary to provide ducts or vents, unless it may be desired to admit a greater amount of said medium at certain points than at others, and which may also be regulated by the thickness of the facing walls. By establishing a sub-atmospheric condition between the chuck and mold, the latter will be held firmly on the chuck and prevent the mold from sticking if there should be any tendency in that direction.

Furthermore, sub and super-atmosphere may be alternately applied during the same feeding operation or simultaneously applied at different points, as where sub-atmosphere is applied to prevent the entrapping of air by the spreading charge and super-atmosphere applied to prevent adhesion and repel the charge, and in the event it is desired to apply super-atmosphere to the under-portion of the mold, the switch may be utilized to magnetize the chuck if this should be necessary to maintain the mold and chuck in association.

In the manufacture of ware embodying a comparatively stiff dry clay, by applying super-atmosphere to the under portion of the charge, the ware may be made ready for removal from the molds within a comparatively short time, or immediately subsequent to the feeding and forming operation and the molds again placed in service.

After the molds have been supplied with charges of clay and the charges acted upon by the feeder assembly, they may if found necessary be advanced and reciprocated and rotated in operative adjacency to the profile and trimmer to finish the charges or complete the forming operation.

The many facilities for timing and adjusting the working parts of the machine, both while at rest and in operation, permit the charges to be accurately measured and the application of the desired fluid or other medium at the proper time as well as length of time, the phase, extent, altitude and degree of reciprocation of all reciprocating parts being under ready and convenient control.

The upper die or former member 129 may be readily removed and other types substituted therefor, and Figs. 6, 7 and 8 illustrate different types of assemblies adapted for this purpose.

In Fig. 6 an assembly adapted for deep ware is shown, the upper die 129 in this instance being convex instead of concave and threaded into a supporting plate 202, adjustably secured to the flange 109 formed at the feeding orifice of the conduit 73, the facing 134 in this instance being threaded on said

upper die. The annular ring 135 in this instance may be made of porous material and resiliently mounted to have a sliding fit on the upper die 129, a spring 203 encircling said upper die above said ring and bearing at one extremity against a washer 204 and at its opposite extremity against an adjusting ring 205, adjustably secured as by a screw 206. The annular groove 142 in this instance may be in the form of a chamber formed in the ring 135 and communicating with passageway 132^a. In operation, when the chuck elevates the mold to feeding position, said mold contacts with ring 135 and moves upwardly a short distance therewith, compressing spring 203, and after the mold has been fed with a clay charge and is being lowered, said ring contacts with the edge of the clay charge and exerts pressure thereon and thus aids in releasing the clay from the facing if there should be any tendency of the clay to adhere thereto, said ring being also adapted to form the edge of the ware. During the feeding operation, the mold may or may not be rotated as desired, and the clay charge may be subjected to the various advantageous treating operations of which the machine is capable, as by applying a fluid medium such as sub and super-atmosphere through passageway 132^a and to and through the mold walls through the chuck spindles and chucks.

While it is preferred to use an assembly such as that illustrated by Fig. 6 in the manufacture of deep ware, it will be understood that the upper die 129 shown in Figs. 1 and 5 may also be used in making deep ware, by simply adjusting the stroke of the feeding plungers P so that the charges of clay are compacted into the bottom of the deep mold, and by applying sub-atmosphere to the head 121 during ejection of the charge, the latter may be caused to adhere to said head when the plunger lowers, and thus be deposited in the bottom of the mold in a definite position, and super-atmosphere may then be applied to prevent adhesion to the head when the plunger rises. The mold may then be advanced to the profile for the jiggering operation, and if the clay does not adhere to the mold during the latter operation, sub-atmosphere may be applied through the mold to the under-portion of the charge, to prevent slippage of the latter.

In the manufacture of ware requiring the use of a non-viscous clay or clays comprising a comparatively large amount of silica, such as those used in producing vitrified ware, great difficulty is usually experienced in causing the clay to properly amalgamate and adhere to the mold during the forming of the bat and jiggering operation. Figs. 7 and 8 show types of assemblies particularly adapted for producing ware from non-viscous clays, the clay being fed by pressure to the peripheral portion of the mold inwardly toward the center, or convergingly, or to both the peripheral and central portions of the mold, and thereby prevent cracking or rupture of the clay charge due to radial expansion or stretching of the clay.

First referring to Fig. 7, an annular housing 207, in which the plunger assembly has sliding movement, may be bolted or otherwise secured to the plate 202, the upper die member 129 being provided with posts 208, by which it may also be secured to plate 202 as by countersunk screws 209, the passageway or bore 132^a being formed longitudinally in one of said posts. The socket 120 of the plunger is extended radially or web-shaped and formed with openings to accommodate the posts 208, the annular periphery of the web preferably being solid forming a plunger as at 210 having a sliding fit in the housing 207, a porous head 121^c being threaded or otherwise secured to the lower extremity of said plunger and provided with a chamber 121^d, communication being established between the bore 119 of the plunger stem and said chamber through a passageway or bore 121^e. A supplemental plunger, generally indicated at 211, is resiliently mounted in the socket 120, the latter being shaped to provide a housing which is interiorly threaded to receive a bushing 212, the plunger 211 having a sliding fit in said bushing and formed with a retaining flange at its upper extremity, a spring 213 being seated in the socket housing and bearing at one extremity against said flanged end of the plunger, the spring being adjustable through the medium of said bushing. The supplemental plunger 211 is provided with a chambered porous head and the facing 134 constructed and applied in a manner substantially as in Figs. 1 and 5. If desired, vents may be formed in the central portion of the mold and also in the center of the supplemental plunger 211, to ensure escape of any air that may be entrapped by the converging clay charge.

In operation, the clay is forced by pressure from the conduit 73 into the housing 207, the reciprocated plunger forcing the clay onto the outer peripheral portion of the mold and inwardly over the mold toward and upwardly into the central orifice of the die 129, the converging clay moving the supplemental plunger 211,—which is preferably adjusted to descend with the plunger 210 and close the said orifice,—upwardly against the pressure of spring 213, the excess material and also any excess moisture that may be present passing back into the housing 207 through said orifice, and when the plunger 210 reaches its lowermost position and the clay ceases to pass upwardly through the central orifice, the supplemental plunger 211 descends and completes the operation by eliminating the protruding stub or smoothing and forming the central portion of the ware.. It is preferred

to enlarge the central orifice at its upper extremity so as to permit the supplemental plunger to gradually exert its final pressure, and also to provide a space between the said plunger and orifice wall to permit leakage or back extrusion as in Figs. 1 and 5. Super and/or sub-atmosphere or other mediums may be applied at such times during the foregoing operation as will produce the best results.

In Fig. 8, the supplemental plunger 211 may be non-resiliently and adjustably mounted as by threading said plunger into the head 121 and applying set nuts. In this instance the main extruding plunger may be operated to first apply pressure to the clay in the housing 207 and force said clay around the upper die 129 and onto the peripheral portion of the mold, it being preferred to apply sub-atmosphere or vacuum through the supplemental plunger 211 and central orifice, to exert a pulling action on the converging clay while pressing and also remove entrapped air, the supplemental plunger preferably being adjusted so as to first permit the converging clay to move upwardly a short distance within the central orifice to meet the descending supplemental plunger, which then slightly reverses the flow of the clay and exerts a kneading action at the point of convergence, to eliminate possible flaws at this point. The central portions of the mold and supplemental plunger may also be vented in this instance as in Fig. 7.

The supplemental plunger 211 in Fig. 8 may also be adjusted to clear the central orifice when the main plunger descends, to thus permit the clay to be applied to the peripheral and central portions of the mold simultaneously or approximately simultaneously, the clay converging at a certain point on the mold, the supplemental plunger then closing the central orifice and completing the operation, sub-atmosphere being applied to withdraw entrapped air and permit the clay to amalgamate.

Heretofore, so far as known, the clay bat or charge has been applied to the mold and worked or expanded radially, and in the case of comparatively dry or non-viscous clays, difficulty is experienced in causing the clay to adhere to the mold and in eliminating ruptures and cracks due to radial expansion. By deflecting or guiding the clay to the peripheral portion of the mold and applying pressure as may be done in Figs. 7 and 8, the clay may be caused to roll, as it were, inwardly over the mold with the result that a kneading and amalgamating action ensues, which effectively eliminates cracks and ruptures due to radial expansion.

In some instances it may be desired to heat the clay-contacting surfaces of the upper die 129 and plunger P while applying other mediums such as super and/or sub-atmosphere, and in Fig. 5 electric coils, indicated at 214 and 215, are shown disposed in the annular grooves 131 and chamber 121^a, said coils being controlled by means such as a rheostat. The upper die 129 may be suitably insulated from the coil, or said die may be formed of refractory material. By this means the temperature of the clay-contacting surfaces of the die 129 and plunger P may be regulated independently of the character of the medium to be applied to the charge.

By the improved construction and method herein described, it will be seen that the clay may be forced under pressure onto a mold and confined in a chamber formed by the upper die and mold and closed by the plunger, means being provided for ensuring the release of entrapped air and moisture and for treating the clay charge in practically any desired manner. Thus the clay may be caused to adhere to the plunger or mold or upper die and also repelled therefrom, or the walls of these members may be rendered adhesive during certain phases of the feeding and forming operation and non-adhesive during other phases of said operation, the adhesive character of the clay-contacting walls being under selective control.

What is claimed as new is:

1. In apparatus of the class specified, a plurality of reciprocating chucks, molds adapted to be supported by said chucks, a conduit member disposed horizontally over said chucks and provided with upper dies having orifices in alinement therewith, means for progressing clay into said orifices, plungers mounted to reciprocate in said orifices, means for reciprocating said chucks and said plungers to feed the clay in measured charges to said molds, and means for applying a fluid medium to said charges.

2. In apparatus of the class specified, a conduit member, means for progressing and compacting clay into said member, and a means for automatically regulating the density of the compacting mass in said member.

3. In apparatus of the class specified, an upper die provided with a discharge orifice, means for progressing clay into said orifice, a reciprocable member adapted to deliver the clay in charges through said orifice, means for reciprocating said member, and means for adjusting the phase of such reciprocation while said member is operating to deliver the charges.

4. In a pottery forming machine, an upper die provided with a discharge orifice, means for progressing clay into said orifice, a reciprocable member adapted to deliver the clay in charges through said orifice, and means for adjusting the phase and/or extent of reciprocation of said member.

5. In apparatus of the class specified, an upper die provided with a discharge orifice, means for progressing clay into said orifice, a reciprocable member adapted to eject the

clay in charges through said orifice, cam means for reciprocating said member, and means for adjusting said cam means while in operation and while the driving connection subsists.

6. In apparatus of the class specified, an upper die provided with a discharge orifice, means for progressing clay into said orifice, a reciprocating member adapted to eject the clay in charges through said orifice, and means for applying a fluid medium to said charges through said member.

7. In apparatus of the class specified, an upper die provided with a discharge orifice, means for progressing clay into said orifice, and a reciprocating member adapted to deliver the clay in charges through said orifice, said member being provided with a stem formed with a passageway terminating in a porous head.

8. In apparatus of the class specified, an upper die provided with a discharge orifice, means for progressing clay into said orifice, a reciprocating member adapted to deliver the clay in charges through said orifice, said member being provided with a chambered charge-ejecting head, communication being established between said chamber and the exterior of said head, and means for applying a clay-treating medium to said chamber.

9. In apparatus of the class specified, at least one upper die provided with discharge orifices, means for progressing clay into said orifices, porous molds and means for moving said molds into position adjacent said orifices, reciprocating members for delivering the clay in charges to said molds, and a means for applying sub and (or) super-atmosphere to the charges through said molds.

10. In apparatus of the class specified, the combination with reciprocating chucks and molds adapted to be supported by said chucks, of at least one upper die mounted in alinement with said chucks and provided with discharge orifices, means for progressing clay into said orifices, reciprocating members adapted to deliver the clay in charges from said orifices to said molds, and means for applying a fluid medium to the charges through said reciprocating members, upper die and molds.

11. In apparatus of the class specified, at least one upper die provided with discharge orifices, means for progressing clay into said orifices, molds and means for moving said molds adjacent said orifices, means for delivering clay in charges to said molds, and means for applying a clay-treating medium to all surfaces of the charges during delivery to and while on said molds.

12. In apparatus of the class specified, at least one upper die provided with discharge orifices, means for progressing clay into said orifices, molds and means for feeding charges of clay thereto from said orifices, means far applying a fluid medium to the charges, and means for regulating the application of said medium, said latter means being adjustable to vary the dwell and/or time instant of application of said medium.

13. The method of producing pottery ware, which consists in providing a limited chamber between a mold and upper die, forcing the clay under pressure onto the peripheral portion of the mold and into said chamber, the clay converging toward and amalgamating at a central point, to thus eliminate flaws due to radial expansion.

14. The method of producing pottery ware, which consists in providing a limiting space between a mold and upper die, forcing the clay under pressure onto the peripheral portion of the mold and into said space, the clay converging toward and amalgamating at the apex of the mold, and applying pressure to the apex portion of the clay to initiate radial expansion during convergence and knead the point of, and ensure amalgamation.

15. The method of feeding clay to molds in the manufacture of pottery, which consists in progressing the clay in a plastic state into an orifice formed in an upper die, delivering the clay therefrom in measured charges to molds, confining the charges between the mold and upper die to limit the charges, and applying super-atmosphere to the charges to repel them from the said die.

16. The method of feeding clay to molds in the manufacture of pottery, which consists in forcing the clay in measured charges into a chamber the walls of which are formed by an upper die and mold, and applying super-atmosphere to repel the charges from said die and sub-atmosphere to attract the charges to the mold and treat the charges.

17. The method of feeding clay to molds in the manufacture of pottery, which consists in progressing the clay in a plastic state into a delivery orifice, delivering the clay therefrom in charges to molds, and applying a fluid medium to the charges to facilitate delivery thereof.

18. In apparatus of the class specified, at least one upper die provided with discharge orifices, means for progressing clay into said orifices, and reciprocating members adapted to deliver the clay in charges from said orifices, said members being provided with clay-contacting portions of porous material.

19. In apparatus of the class specified, at least one upper die provided with discharge orifices, means for progressing clay into said orifices, reciprocable members adapted to deliver the clay in charges from said orifices, means for reciprocating said members, and means for adjusting the reciprocation of said members to measure said charges while operating to deliver the latter.

20. In apparatus of the class specified, at

least one upper die provided with discharge orifices, and means for applying a clay-treating medium to the clay contacting surfaces of said die.

21. In a pottery forming machine, at least one upper die provided with porous clay-contacting surfaces, to permit a fluid medium to be applied to the clay through said die.

22. In a pottery forming machine, at least one upper die provided with removable and replaceable facings of porous material.

23. In apparatus of the class specified, a horizontally disposed conduit member, a screw for progressing and compacting clay into said conduit, and means for intermittently actuating said screw comprising a continuously rotating member, a pawl and ratchet, and means for automatically coupling and uncoupling said continuously rotating member and said ratchet.

24. The method of feeding clay to molds in the manufacture of pottery, which consists in forcing the clay into a chamber the walls of which are of porous material and partly formed by the mold, and applying a fluid medium to the clay through the porous walls of the chamber to treat the charges and control adhesion of the clay to said walls.

25. The method of feeding clay to molds in the manufacture of pottery, which consists in extruding the clay in measured charges through an orifice formed in an upper die onto a mold, moving the mold and die substantially together to press the clay charge against and conform it to the contour of the mold, and applying a fluid medium to the clay charge through the walls of the die to ensure release of the clay therefrom when the mold is moved away from the die.

26. The method of feeding clay to molds in the manufacture of pottery, which consists in forcing the clay in measured charges into a chamber the walls of which are partly formed by the mold, and evacuating air from said chamber to dissipate air pockets and assist in the spreading action of the charge.

27. In apparatus of the class specified, a container for plastic material provided with a multiple of orifices, molds, reciprocating chucks adapted to move the molds into alinement with said orifices, and means for extruding the clay in measured charges into or on said molds.

Signed by me this 2nd day of May, 1928.

WILLIAM J. MILLER.