Feb. 7, 1956 J. F. BRYER 2,733,493

METHOD AND APPARATUS FOR REMOVING SCRAP FROM DIES FOR THE PRESSING OF CLAY BODIES

Filed July 14, 1952 4 Sheets-Sheet 1

FIG. 1.

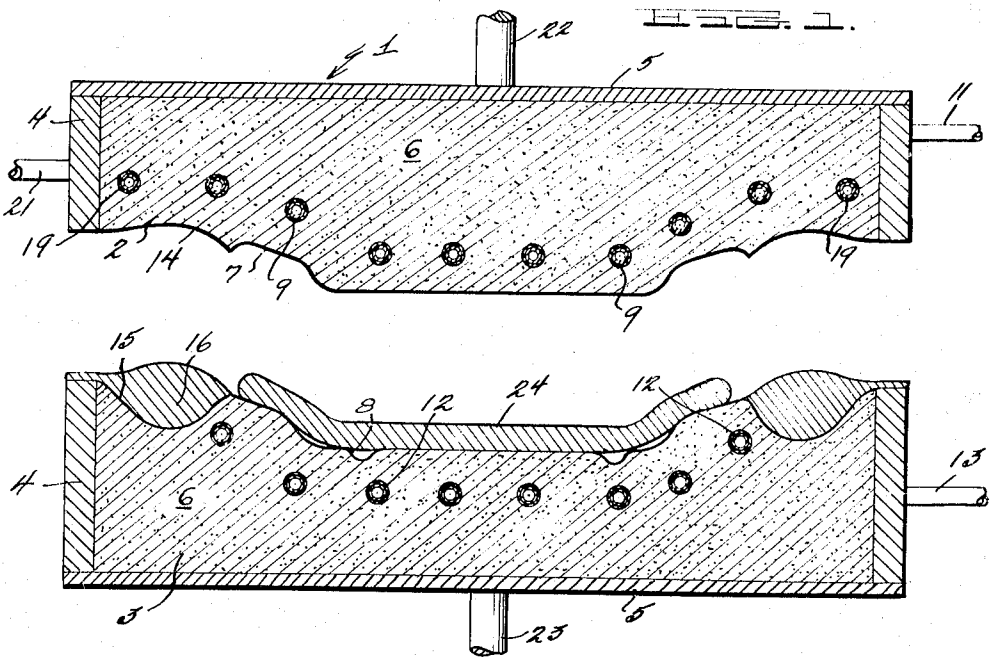
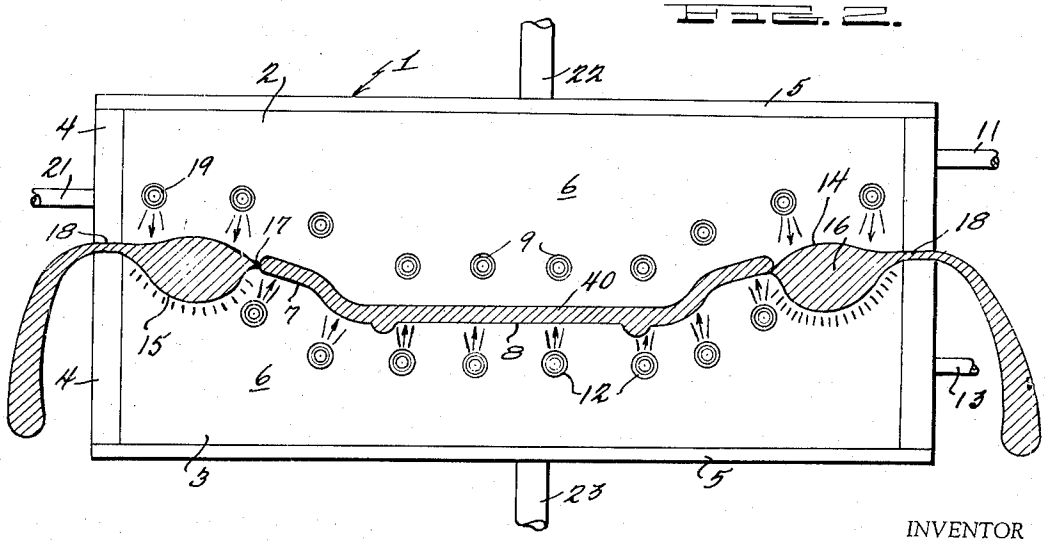


FIG. 2.



INVENTOR
JOHN F. BRYER

BY
Lemmon, Keegin, Fitzsimmons & Lemmon
ATTORNEYS

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METHOD AND APPARATUS FOR REMOVING SCRAP FROM DIES FOR THE PRESSING OF CLAY BODIES

Filed July 14, 1952

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FIG. 3.

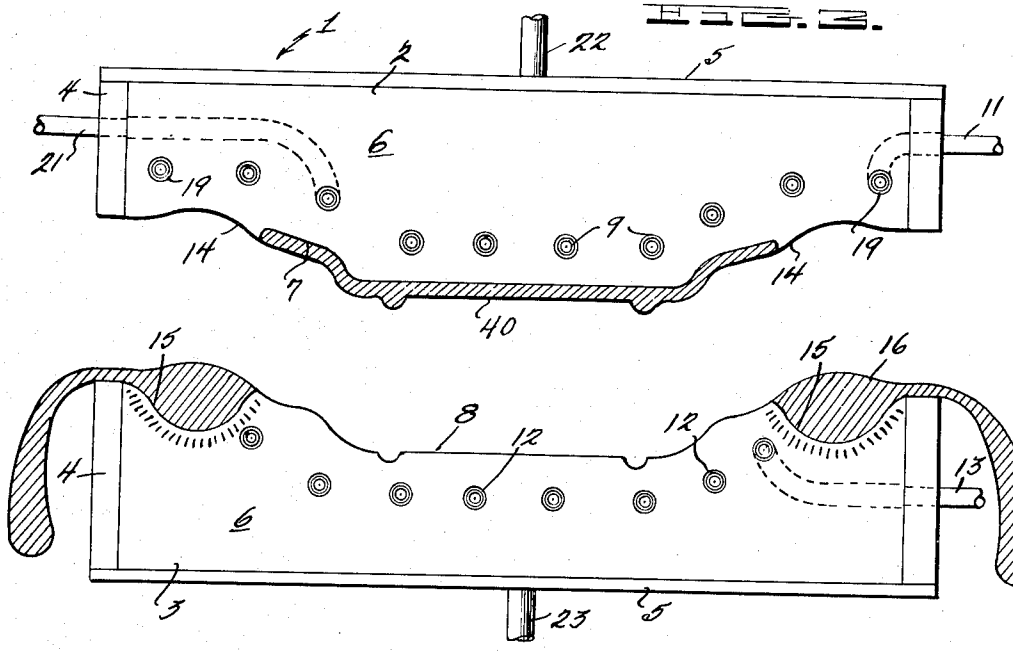
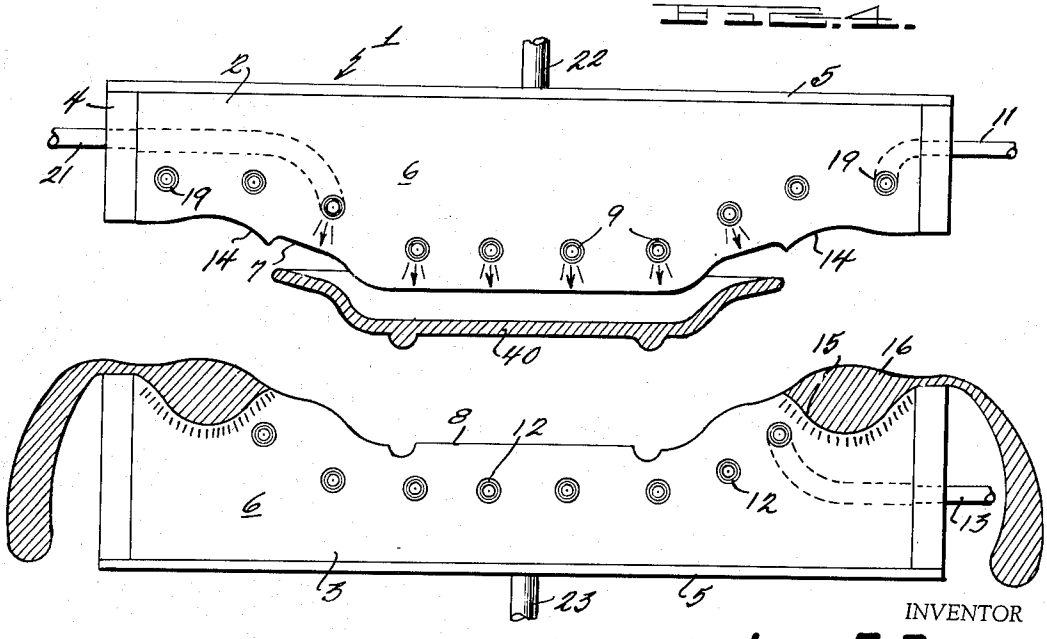


FIG. 4.



INVENTOR

JOHN F. BRYER

BY

Semmes, Keegin, Johnson & Semmes

ATTORNEYS

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METHOD AND APPARATUS FOR REMOVING SCRAP FROM DIES FOR THE PRESSING OF CLAY BODIES

Filed July 14, 1952 4 Sheets-Sheet 3

FIG. 5

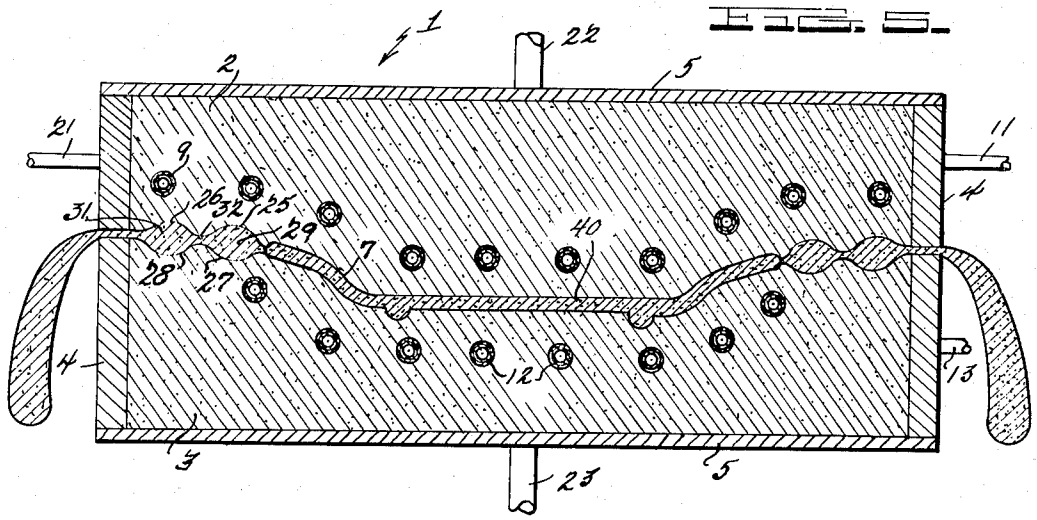
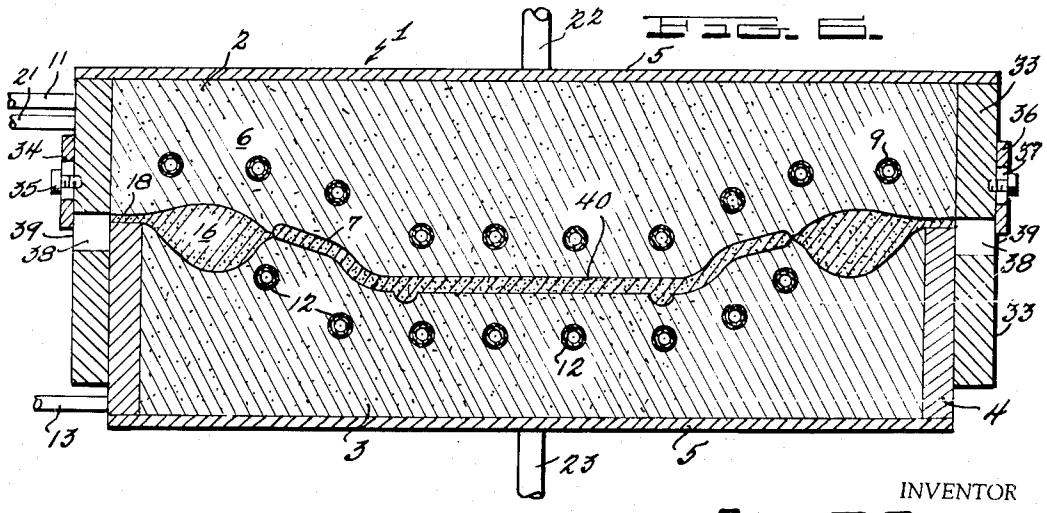


FIG. 6



INVENTOR
JOHN F. BRYER

BY
Lemmes, Keegin, Roberson & Lemmes
ATTORNEY

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METHOD AND APPARATUS FOR REMOVING SCRAP FROM DIES FOR THE PRESSING OF CLAY BODIES

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FIG. 7.

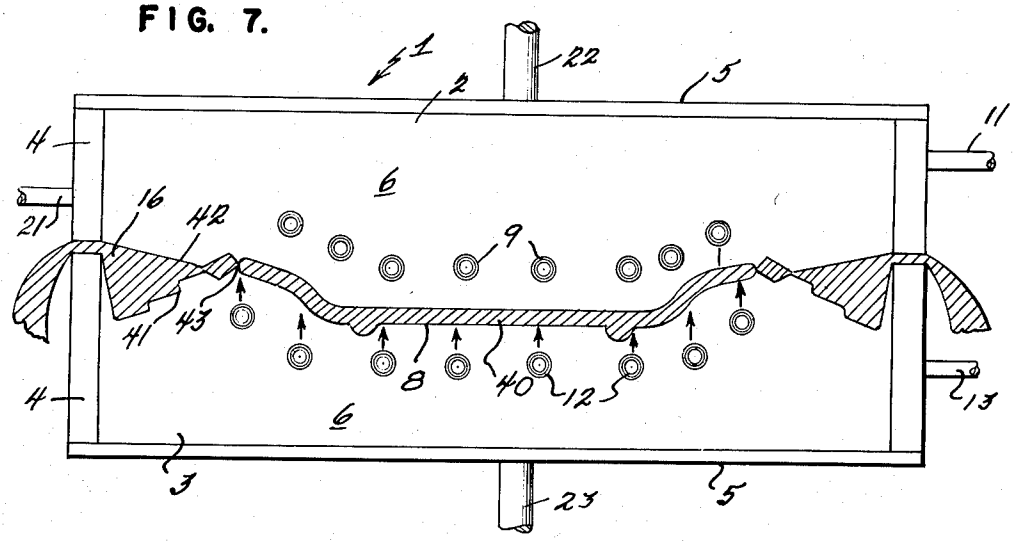
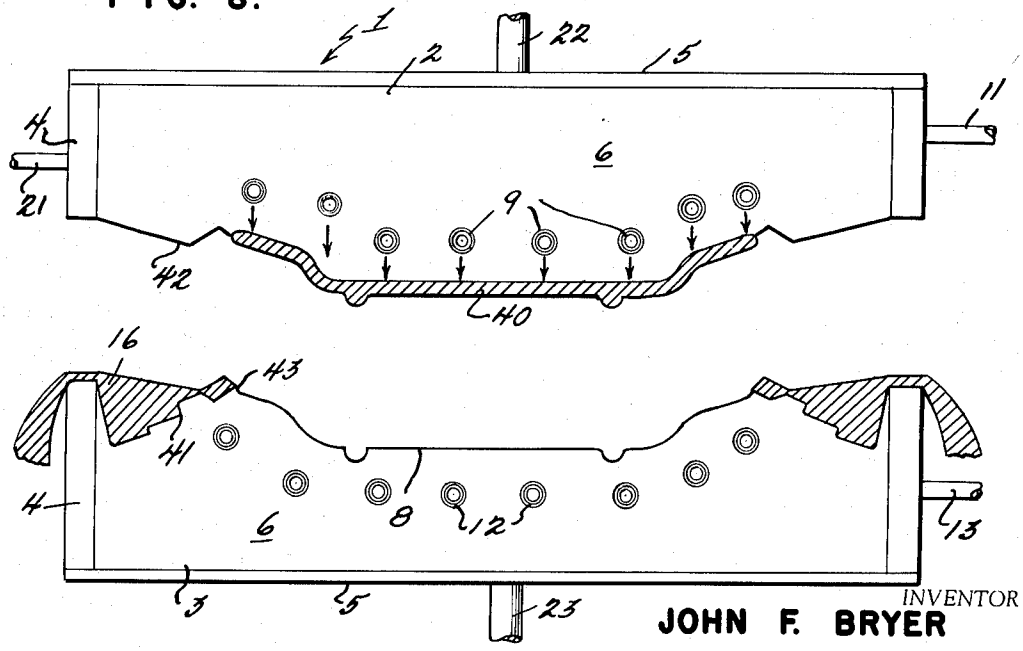


FIG. 8.



INVENTOR
JOHN F. BRYER

BY
Clemmes, Kegin, Robinson & Clemmes
ATTORNEYS

United States Patent Office 2,733,493 Patented Feb. 7, 1956

2,733,493

METHOD AND APPARATUS FOR REMOVING SCRAP FROM DIES FOR THE PRESSING OF CLAY BODIES

John F. Bryer, Wellsville, Ohio, assignor to Ram Incorporated, Columbus, Ohio, a corporation of Michigan

Application July 14, 1952, Serial No. 298,698

15 Claims. (Cl. 25—129)

This invention relates to the pressing of moldable ceramic bodies, hereafter called body, between cooperable die members to form shaped ware and more particularly to a method and apparatus for automatically removing body in excess of that required for the ware from the ware, this excess hereafter called flash.

The present application is a continuation-in-part of my copending application, Serial No. 235,119, filed July 5, 1951, now abandoned.

In the pressing of plastic body between cooperable die members to form shaped ware suitable for further processing such as drying, firing and decorating for the manufacture of ceramic articles, a batt of a measured quantity of plastic body is introduced between cooperable die members. As the die is closed for the pressing of the body to the desired shape, the body is compressed and compacted between the two die members to form a body of substantially uniform composition. Even though the amount of body placed between the die members is accurately measured, it is necessary to provide an excess of plastic body to prevent starvation of the ware forming cavity because of uneven distribution of the body during pressing or improper placing of the batt when charging the die. The excess body forms a ring of flash at the edge of the shaped ware along the line of separation of the die. Ordinarily a gutter or recess is provided in the opposing faces of the die surrounding the shaped ware forming area to receive the flash during the pressing. The flash has heretofore adhered to the ware when the die was separated and had to be removed prior to finishing of the ware.

One of the methods that has heretofore been used to remove the flash from pressed ware is for the press operator to pull the flash from the ware by hand immediately after the pressing operation. This procedure can only be used with certain types of ceramic bodies. The more plastic bodies are so tenacious that removal of the flash by this method ordinarily will cause considerable deformation of the ware. The principal objection to the hand removal of the flash however is that it will consume approximately 20 to 30% of the time of the press operator and hence greatly slow production. Moreover, it is difficult to make a clean separation of the flash from the ware by this method and the fin left on the ware is often irregular, making the ware difficult to finish.

Another method of removing the flash is to allow the flash to remain on the ware during part of the drying operation. By close control of the properties of the body and the shape of the ware and the flash, the flash may be made to drop from its own weight. This method is extremely difficult to control and suffers a disadvantage that the flash may drop from one piece of ware and not the next. Another disadvantage is that the flash is partially dried and has to be completely reprocessed before it can be used. In many instances, the weight of the flash is sufficient to deform the shaped body.

A third conventional method of removing the flash is to dry the ware completely and then tap the flash to break it from the ware. The flash, when removed in this manner, ordinarily breaks cleanly from the formed ware and produces ware which may be easily finished. It does, however, suffer the disadvantages of requiring some time of an operator. Other disadvantages are that the dried scrap must be completely reprocessed before it can be reused and the flash often cracks during the drying of the ware and the cracks sometimes run back into the ware.

It is an object of this invention to provide a method of removing scrap from pressed ware automatically without distortion of the ware.

Another object of this invention is to provide a process for the substantially instantaneous removal of flash from irregularly shaped pressed ware as the die employed to press the ware is separated.

Another object of this invention is to provide a process for the pressing of ceramic ware between cooperable die members in which stress marks in the ware are substantially eliminated.

A further object of this invention is to provide a process for the removal of the flash from pressed ware in which the scrap or flash is left in a condition suitable for immediate reuse after only a minimum of reprocessing.

A further object of this invention is to provide a die adapted to separate the flash from pressed ware as the die is separated following the pressing operation.

Another object of this invention is to provide a method of pressing body between cooperable die members to form shaped ware in which the excess body in one pressing operation is left in the die and removed from the die during subsequent pressing operations.

Still another object of this invention is to provide a die in which the excess body in the batt is removed during pressing to allow the production of ware of uniform size.

It is also an object of this invention to provide a die having a gutter surrounding its shaped ware forming cavity having outlets from the gutter for the removal of the excess body during the pressing operation in which the flash in the gutter remains on one die member and the shaped body adheres to a different die member as the die is separated.

With these and other objects in view, as will become apparent in the following detailed description, this invention resides in a method and apparatus for the substantially instantaneous removal of flash from shaped bodies pressed from plastic body between cooperable die members as the die is separated.

In the drawings:

Figure 1 of the drawings is a vertical sectional view illustrating one form of the invention and showing the cooperable die in open position with a batt of plastic body in position on the bottom die member.

Figure 2 is a vertical section view, showing the die in the closed position during pressing of the ware.

Figure 3 is also a vertical sectional view showing the die, after pressing of the ware, in the open position with the shaped ware adhering to the top die member.

Figure 4 is a vertical section through the die illustrating the method of releasing the shaped ware from the top die member.

Figure 5 is a vertical section of a modified form of this invention.

Figure 6 is also a vertical section of an additional embodiment of this invention.

Figure 7 is a vertical sectional view of a still further modification of the invention, designed to separate the flash by differential adherence, and

Figure 8 is a similar view showing the same die in open position, with the shaped ware adhering to the top die member and the flash adhering to the bottom die member.

In the following description of this invention, the term "body" designates a plastic material such as is commonly employed in the ceramic industry for the formation of

objects of the desired shape which may be fired to impart the necessary strength to the shaped objects. Typical "bodies" are clay, clay modified by the addition of various modifying compounds, or even substantially pure alumina to which plasticizers have been added. The term "ware" will be used to designate the plastic body formed to the desired shape after pressing, either before or after separation from the die. In the manufacture of ceramic articles, the pressed plastic bodies, here designated as ware, are in a condition suitable for transfer to a drier and subsequently to a kiln for firing or for other processing. Throughout the description reference will be made to the top and bottom die members used for the pressing of the ware. It will be appreciated that that designation is only for convenience in identifying the die sections and that the parts of the die may be reversed and the line of separation of the die members may be at any angle with the horizontal as well as horizontal. Similarly, in the release of the ware from the die, compressed air is ordinarily used to apply fluid pressure against the ware to separate it from the die. Clearly, many other fluids such as water or organic liquids might be employed, as well as other gases.

Referring to the form of the invention shown in Figure 1 of the drawings, the press, designated generally by reference numeral **1**, consists of a top die member **2** and a bottom die member **3**. Each of these members is formed by an outer shell **4**, ordinarily of steel or similar material, secured on a base plate **5**. The space within the shell **4** is filled with a porous material **6** such as plaster of Paris. The faces **7** of top die member **2** and **8** of bottom die member **3** are molded, or otherwise shaped, to outline the ware forming cavity which imparts the desired shape to the ware pressed between the bottom and top die members.

A conduit **9** is positioned within the mass of porous material **6** in the top die member **2** adjacent the die face **7**. The conduit **9** has openings in its wall for the discharge of air from the conduit into the porous material **6**. A line **11** passes through the shell **4** into the die body and is connected with the conduit **9** and a suitable source of compressed air, not shown, to deliver the compressed air to that conduit for the release of ware in the manner hereinafter described. Adjacent the face **8** of the bottom die member **3** is an apertured conduit **12**, similar to the conduit **9** in the top die member. The conduit **12** is connected with a line **13** which supplies compressed air to the conduit.

Referring to Figure 2 of the drawings, immediately radially outside of the shaped ware forming area **7** of the top die member and **8** of the bottom die member, the opposing surfaces of die are concave, as indicated at **14** and **15**, to form an annular gutter or recess to contain the flash **16** which surrounds the ware forming cavity during the pressing operation. The surfaces **14** and **15** are shaped to provide a restricted passage **17** surrounding the ware forming cavity and allowing communication between that cavity and the gutter when the die is approaching the closed position during the pressing operation. Similarly, the shells **4** and the faces of the two die members are constructed to provide a restricted passage **18** for the discharge of excess body from the die during the pressing operation. Passage **18** may be a single annular opening extending completely around the die **2** or a series of openings substantially uniformly spaced around the die.

Again referring to Figure 1, an apertured conduit **19** is positioned within the top die adjacent the concave surface **14** defining the gutter. The conduit **19** is connected with a line **21** which supplies compressed air to the conduit for discharge through the die member. The entire concave gutter area **15** is preferably impregnated with a suitable agent to render said surface relatively impervious to fluids. The top and bottom die members are provided with suitable means, such as connecting rods **22** and **23**, repectively, for imparting relative vertical movement to

the die members for pressing the ware. It will be obvious that either one of the die members may be made stationary and only one of the members moved for the pressing of the ware and subsequent separation of the ware from the die.

In the operation of the self-scraping die of this invention, the die will be in the position illustrated in Figure 1 at the beginning of the pressing operation. Ordinarily flash **16** of substantially the initial consistency of the body pressed to form the ware will remain on the gutter surface **15** from the preceding pressing operation. The first time a die is used a strip of plastic body may be placed on this gutter surface before proceeding with the pressing of the ware. A batt of plastic body indicated by reference numeral **24**, is placed on the ware forming area **8** of the bottom die member and the top and bottom die members are then brought to the closed position illustrated in Figure 2. Because of the passages allowing escape of excess body during pressing, the batt **24** may contain a large excess of body over that required for the formation of the ware **40**. This allows the use of less care in placing the batt on the die face and reduces the criticality of the shape of the batt as well as improves the filling of the ware forming cavity. Additionally, the oversize batt makes it possible to eliminate stress marks in the ware. On the other hand, because of the presence of a mass of plastic body within the gutter, the batt **24** may contain only a small excess of body without danger of losing pressure during the pressing of the ware, and, in this manner, the amount of scrap is reduced.

As the die is closed, any excess body in the batt is forced radially outward through the passages **17** into the gutter. This excess forces the flash **16** already in the gutter or a portion thereof radially outward through the passage **18** to be discharged from the die.

After the pressing operation, the release of the ware **40** from the die and the separation of the flash **16** in the gutter from the shaped ware **40** is accomplished as follows. While the die is in the closed position, air is introduced through lines **13** and **21** to the conduits **12** and **19**, respectively. The air from conduits **12** breaks the adhesive forces between the lower surface of the ware and the face **8** of bottom die member **3**. Similarly, the air passing through conduit **19** breaks the adhesive forces between the concave surface **14** of the top die member and the flash **16**.

After release of the ware **40** from the face **8** of the bottom die member **3** and the flash **16** from the concave surface **14** of the top die member **2**, the die is separated as illustrated in Figure 3. The ware **40** adheres to the face **7** of the top die member and is lifted free of the bottom die member. Meanwhile, the flash **16** in the gutter has been freed from the concave surface **14** of the top die member **2** and remains on the gutter surface **15** of the bottom die member. In this manner, a clean separation of the flash from the soft ware **40** adhering to the top die member is obtained while the ware firmly adheres to the surface of the top die. Control of the flow of the air is obtained by any suitable valve and timing means, not shown in the drawings. In some instances, it may be desirable to reduce the adhesive forces between the ware and the face **7** of the top die **2** prior to the separation of the die. This may be accomplished by introducing air into the conduit **9** in the top die member at a lower pressure than in the conduit **12** for a short period prior to the separation of the die. The partial release of the ware in this manner is described and claimed in application Serial No. 205,694 now Patent No. 2,632,227 of Richard E. Steele and John F. Bryer, filed on January 12, 1951, and entitled Method and Apparatus for the Release of Ceramic Ware From Porous Molds.

Following the separation of the die, compressed air is introduced through the line **11** and passes through the walls of the conduit **9** and through the porous die member **2** to break the adhesion of the ware **40** to the face

7 of the top die. The ware is thus completely separated from the sections of the die. In many instances, it is desirable to transfer the ware while still on the top die member 2 to a position over a suitable conveyor prior to the separation of the ware therefrom.

A modified form of the invention is illustrated in Figure 5 of the drawings. In this modification, the face of the top die member 2 radially outside of the ware forming area 7 is tooled as at 25 and 26 to combine with directly opposed surfaces 27 and 28 of the bottom die member 3 to form a pair of annular gutters 29 and 31 separated by a restricted passage 32. The separation of ware from the embodiment of the invention illustrated in Figure 5 is similar to that described for the preferred form of the invention. The provision of a pair of gutters separated by a restricted annular passage provide greater resistance to radial flow of excess body and thus serve as one control in the attainment of higher pressures during the formation of ware when desired. Multiple gutter dies are described and claimed in the co-pending application Serial No. 104,638, now Patent No. 2,627,641 filed July 14, 1949, entitled Multiple Gutter Mold.

Another modification of the invention especially designed to allow control and adjustment of the degree of compaction of the body during the pressing operation is illustrated in Figure 6 of the drawings. The top die member 2 is provided with a shell 33 which is tapped and threaded at a plurality of spaced points 34 for the reception of screws 35. An annular ring 36 fits over the outer surface of the shell 33. The ring 36 is provided with slots 37 for the reception of the screws 35 to allow vertical adjustment of the position of the ring 36. The shell 33 is relatively long and extends over the shell 4 on the bottom die member 3 in the manner illustrated in Figure 6 when the die is closed. A plurality of openings 38 in the shell 33 communicate with the restricted passage 18 when the die is in the closed position.

Adjustment of the position of the ring 36 will control the width of the discharge passage 39 between the lower edge of the ring and the upper edge of the openings 38. If the ring 36 is lowered, the discharge opening from the openings 38 will be extremely constricted and the compression of the body during the pressing operation will be increased. On the other hand, if the ring 36 is raised to its uppermost position, the excess body will fall freely from the restricted passage 18 through openings 38 during the pressing of the ware.

Turning to the still further modified form of the invention illustrated in Figures 7 and 8, it will be seen that while the construction and operation of the die is basically similar to those just described, the particular system of flash separation differs. Here, the air discharging conduits are omitted from the annular area of the top die body 6, adjacent the flash engaging portion of the die.

In this form of the invention, it will be seen that the differential surface design of the opposing areas of the die members, immediately radially outside of the shaped ware forming area 7, is responsible for the separation of the flash from the ware, by a differential adherence phenomena. In the bottom or female die member 3, the gutter area at 41, is so designed that it facilitates the formation of a large mass of scrap and exposes a larger surface of permeable die to the scrap, than the gutter area at 42, in the top or male die member 2.

The release coils 9 and 12 are located only adjacent the ware forming cavity proper, and when the compressed air is introduced into the female die member 3, releasing the ware 40, it permits the parting of the two die members, as shown in Figure 8, with the ware adhering to the male die member 2. The scrap or flash 16 is released from the male area 42 and remains in the female gutter 41, because of the combined effect of gravity and differential adherence. The opposing forces, that is, the adherence of the ware to the top die member and the adherence of the flash to the bottom die member, are sufficiently great to tear the flash from the bounding edge of the ware at 43 and render the ware scrap-free. That is, the design is such that there is a natural tendency for the scrap to remain on the lower die member.

While this invention has been described in detail with respect to a particular modification of the invention, it is to be understood that the concept of this invention is not limited to those details, but is determined by the scope of the appended claims.

I claim:

1. A method of pressing a moldable ceramic body in a mold comprising porous cooperable die members to form shaped ware comprising placing a batt of plastic body on the shaped ware forming surface of one of the cooperable die members, moving the die members together whereby the body is compressed to the desired shape and flows radially in the mold to form a flash surrounding the shaped ware, introducing fluid into the die members to separate the shaped ware from one die member and the flash from the other die member while the die mold is in the closed position, and separating the die members whereby the shaped ware adheres to one die member and the flash to a different die member to separate the flash from the shaped ware.

2. In the formation of shaped ware from a moldable ceramic body, a method of removing excess body from the die and separation of the flash of excess body from the shaped ware comprising placing a batt of plastic body in excess of that required for the ware between the cooperable die members, moving the die members together whereby the plastic body is pressed to the desired shape and the excess body is forced radially outwardly to form a flash on the outer edge of the shaped ware, reducing the adhesive forces respectively, between the shaped ware and one of the cooperable die members, and the flash and the second die member, reducing the adhesive forces between the shaped ware and the second die member, and separating the die members whereby the shaped ware adheres to the second die member and the flash adheres to a different die member.

3. In the formation of shaped ware by pressing a moldable ceramic body between cooperable die members, a method of separating a flash of excess body from the shaped ware comprising placing a batt containing an excess of plastic body between cooperable die members, moving the die members together whereby the shaped ware is formed and the excess body is forced radially outward to form a flash surrounding the ware, passing a fluid through one of the die members preferentially against the shaped ware and through the other die member preferentially against the flash and separating the cooperable die members whereby the shaped ware adheres to one die member and the flash to the other.

4. Apparatus for the pressing of moldable ceramic body to form shaped ware comprising a pair of cooperable die members having surfaces shaped to impart the desired shape to the body, a gutter in the surface of the die members surrounding the shaped ware forming cavity, restricted spaces between the die members when they are in the closed position to maintain pressure on the plastic body as it flows outwardly when the die members are brought together, means for reducing the adhesion of the shaped ware to a first of the die members below the adhesion of the shaped ware to a second of the die members and means for reducing the adhesion of the plastic body in the gutter to the second die member below the adhesion of the plastic body in the gutter to the first die member, whereby upon opening the die the shaped ware adheres to the second die member and the flash in the gutter to the first die member.

5. Apparatus for the pressing of a moldable ceramic body to form shaped ware comprising cooperable die members having shaped surfaces for the formation of the ware, a gutter in the surfaces of the die members

surrounding the shaped ware forming surfaces for the formation of the ware, a restricted space for compression of the plastic body as it flows outward from the shaped ware forming surfaces of the die members, means for applying fluid pressure preferentially between the shaped ware and the adjacent surfaces of a first die member, and other means for applying fluid pressure preferentially between the second die member and the flash in the gutter whereby the adhesive forces are broken between the first of the die members and the shaped ware and between the second of the die members and the flash in the gutter prior to separation of the die members.

6. Apparatus for the pressing of a moldable ceramic body to form shaped ware and the removal of flash from the ware comprising a pair of cooperable die members having surfaces shaped to impart the desired shape to the ware, said die members formed from a porous material permitting the flow of a fluid therethrough, a gutter in the surfaces of the die members surrounding the shaped ware forming surfaces, said shaped surfaces and gutter being constructed and arranged to provide restricted passages allowing flow of plastic body radially outwardly when the die members are in the closed position, adjustable means for controlling the openings of the passages for control of the pressure on the body during the pressing of the ware, a conduit having openings therein in the porous die member adjacent the shaped ware forming surface of one of the die members, a second conduit having openings therein within the other porous die member adjacent the gutter, and means for introducing a fluid into the conduits whereby the flash in the gutter and the shaped ware adhere to different die members for separation of the ware from the flash when the die members are separated.

7. Apparatus for the pressing of a moldable ceramic body to form shaped ware and the removal of flash from the ware comprising a pair of cooperable die members having surfaces shaped to impart the desired shape to the ware, said die members formed from a porous material permitting the flow of a fluid therethrough, a gutter in the surfaces of the die members surrounding the shaped ware forming surfaces, said shaped surfaces and gutter being constructed and arranged to provide restricted passages allowing flow of plastic body radially outward when the die members are in the closed position, a ring adjustably mounted on the outer surface of the die members for control of the size of the passage from the die members and compression of the body as it is discharged from the die members, a conduit having openings therein in the porous material adjacent the shaped ware forming surface of one of the die members, a second conduit having openings therein within the other porous die member adjacent the gutter, and means for introducing a fluid into the conduits whereby the flash in the gutter and the shaped ware adhere to different die members for separation of the ware from the flash when the die members are separated.

8. A method of forming shaped ware on cooperable die members from a moldable ceramic material comprising placing a batt of plastic body on the shaped ware forming surface of one of the cooperable die members, moving the cooperable die members together whereby the plastic body is shaped to the desired shape and material flows radially outward to form a flash around the edge of the ware, providing an adherence between the flash and the adjacent surface of a first of the die members which is greater than the adherence between the flash and the second of the die members, providing an adherence between the shaped ware and the adjacent surface of the second die member which is greater than the adherence between the shaped ware and the adjacent surface of the first die member whereby, upon separation of the die members the ware adheres to the second of the die members and the flash adheres to the first die member, for separation of the flash from the ware.

9. Apparatus for the pressing of a moldable ceramic body to form shaped ware comprising cooperable die members having shaped surfaces for the formation of the ware, a gutter in the surfaces of the die members surrounding the shaped ware forming surfaces for the formation of the ware, a restricted space for compression of the plastic body as it flows outward from the shaped ware forming surfaces of the die members to form a flash, means for applying fluid pressure between the shaped ware and the adjacent surfaces of a first of the die members to lessen the adherence of the shaped ware to the first die member, the gutter in said first die member having greater adherence to the flash than that of the gutter in the second die member, whereby, upon opening the die members the shaped ware adheres to the second of said die members and the flash adheres in the gutter to the first die member.

10. Apparatus as claimed in claim 9, wherein said first die member is a female die member and said second die member is a male die member.

11. Apparatus for the pressing of a moldable ceramic body to form shaped ware comprising cooperable die members having shaped surfaces for the formation of the ware, a gutter in the surfaces of the die members surrounding the shaped ware forming surfaces for the formation of the ware, a restricted space for compression of the plastic body as it flows outward from the shaped ware forming surfaces of the die members, means for applying fluid pressure between the shaped ware and the surface of a first of the die members to lessen the adherence of the shaped ware to the first die member, the gutter in said first die member being of greater concavity than that of the second die member, to provide a greater adherence of the flash to said first die member than to the second die member, whereby, upon opening the die members the shaped ware adheres to the second die member and the flash in the gutter to the first die member.

12. A method of forming shaped ware on cooperable die members from a moldable ceramic material comprising placing a batt of plastic body on the shaped ware-forming surface of one of the cooperable die members, moving the cooperable members together whereby the plastic body is shaped to the desired shape and flows radially outward to form a flash around the edge of the ware, reducing the adhesive forces respectively between the shaped ware and one of the die members and between the flash and the other of the die members to effect selective adhesion of said flash to one of said die members and of said shaped ware to the other of said die members when the die members are separated.

13. Apparatus for the pressing of a moldable ceramic body to form shaped ware and the removal of flash from the ware comprising a pair of cooperable die members having surfaces shaped to impart the desired shape to the ware, said die members formed from a porous material permitting the flow of a fluid therethrough, a gutter in the surfaces of the die members surrounding the shaped ware-forming surfaces, said shaped surfaces and gutter being constructed and arranged to provide restricted spaces allowing flow of plastic body radially outwardly when the die members are in the closed position, a conduit having openings therein in the porous body adjacent the shaped ware-forming surface of one of the die members, a second conduit having openings therein within the other porous die member adjacent the gutter, and means for introducing a fluid into the conduits whereby the flash in the gutter and the shaped ware adhere to different die members for separation of the ware from the flash when the die members are opened.

14. Apparatus for the pressing of a moldable ceramic body to form shaped ware and the removal of flash from

the ware comprising a pair of cooperable die members having surfaces shaped to impart the desired shape to the ware, said die members formed from a porous material permitting the flow of a fluid therethrough, a plurality of gutters in the surfaces of the die members surrounding the shaped ware-forming surfaces, said shaped surfaces and gutters being constructed and arranged to provide restricted passages allowing flow of plastic body radially outwardly when the die members are in the closed position, a conduit having openings therein in the porous die body adjacent the shaped ware-forming surface of one of the die members, a second conduit having openings therein within the other porous die member adjacent the gutters, and means for introducing a fluid into the conduits whereby the flash in the gutters and the shaped ware adhere to different die members for separation of the ware from the flash when the die members are opened.

15. In a method of molding shaped ware on cooperable die members wherein a batt of plastic body is placed on the ware-forming surface of one of the cooperable die members and the die members are thereafter moved together to press the batt into ware of the desired shape and flow the surplus body radially to form a flash around the edge of the shaped ware, the process which comprises

reducing the adhesive forces respectively between the shaped ware and a first of the die members and between the flash and a second of the die members to effect selective adhesion of said flash to first die member and said shaped ware to said second die member, separating the die members, removing said shaped ware from said second die member while leaving said flash in place on said first die member, and thereafter performing a second molding operation with the flash from said first molding operation remaining in said first die member in such location, the batt employed in said second molding operation containing substantially less plastic body than would be required to preclude pressure loss in the absence of said flash from said first molding operation.

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