

C. J. KIRK.

PROCESS AND APPARATUS FOR FORMING ARTICLES OF PLASTIC MATERIAL.

APPLICATION FILED NOV. 17, 1909.

952,745.

Patented Mar. 22, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

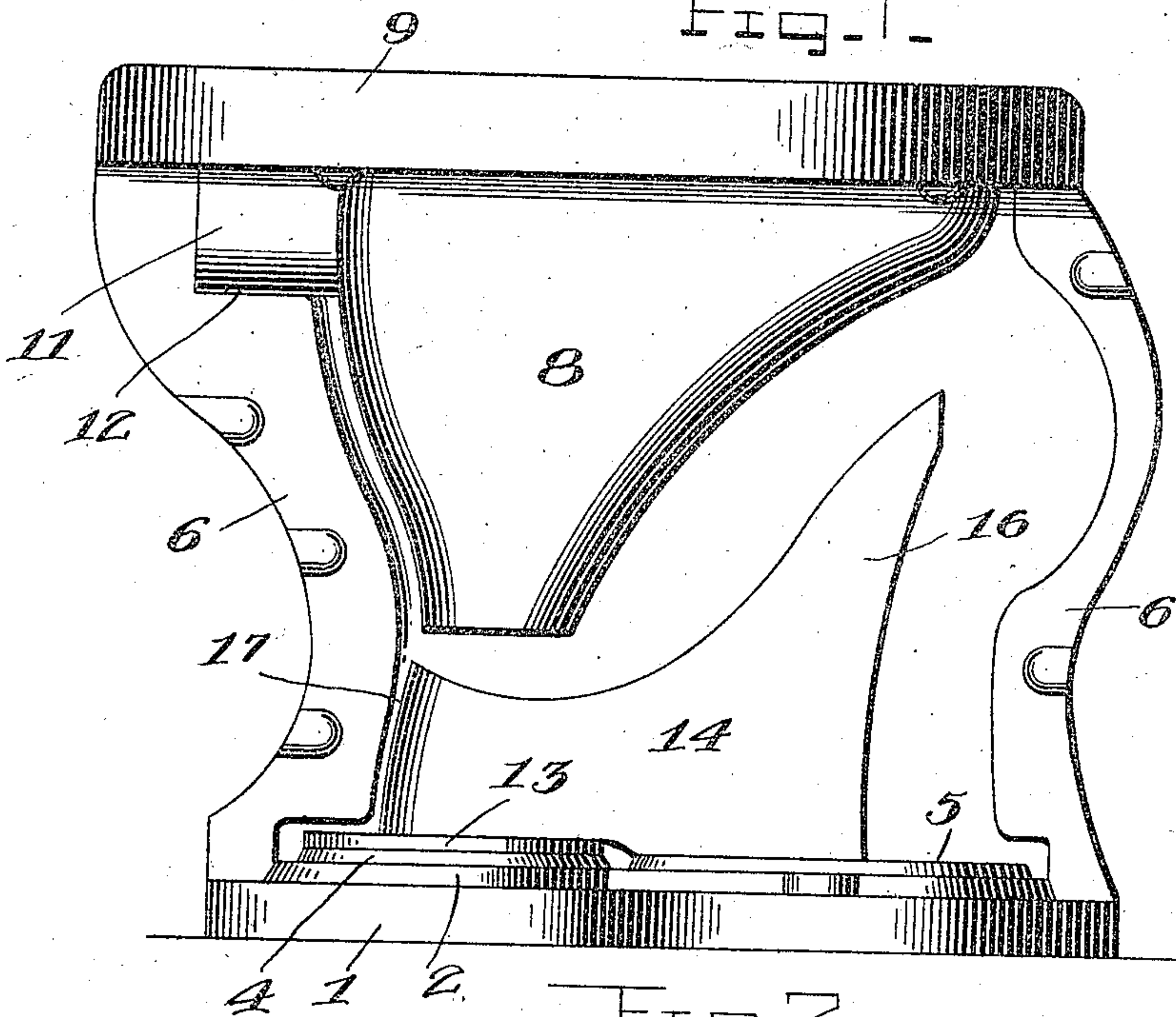
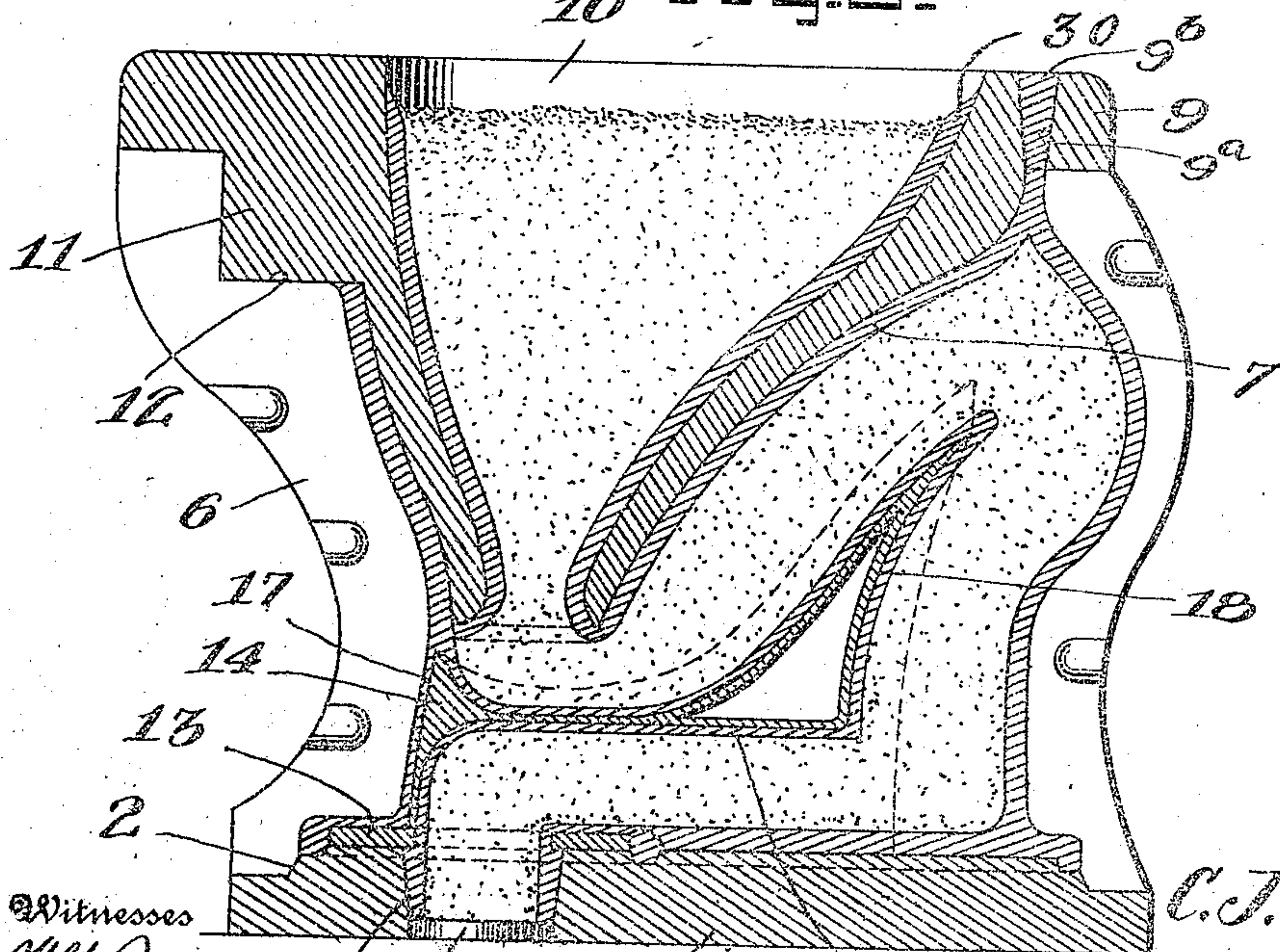


Fig. 2.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 3.

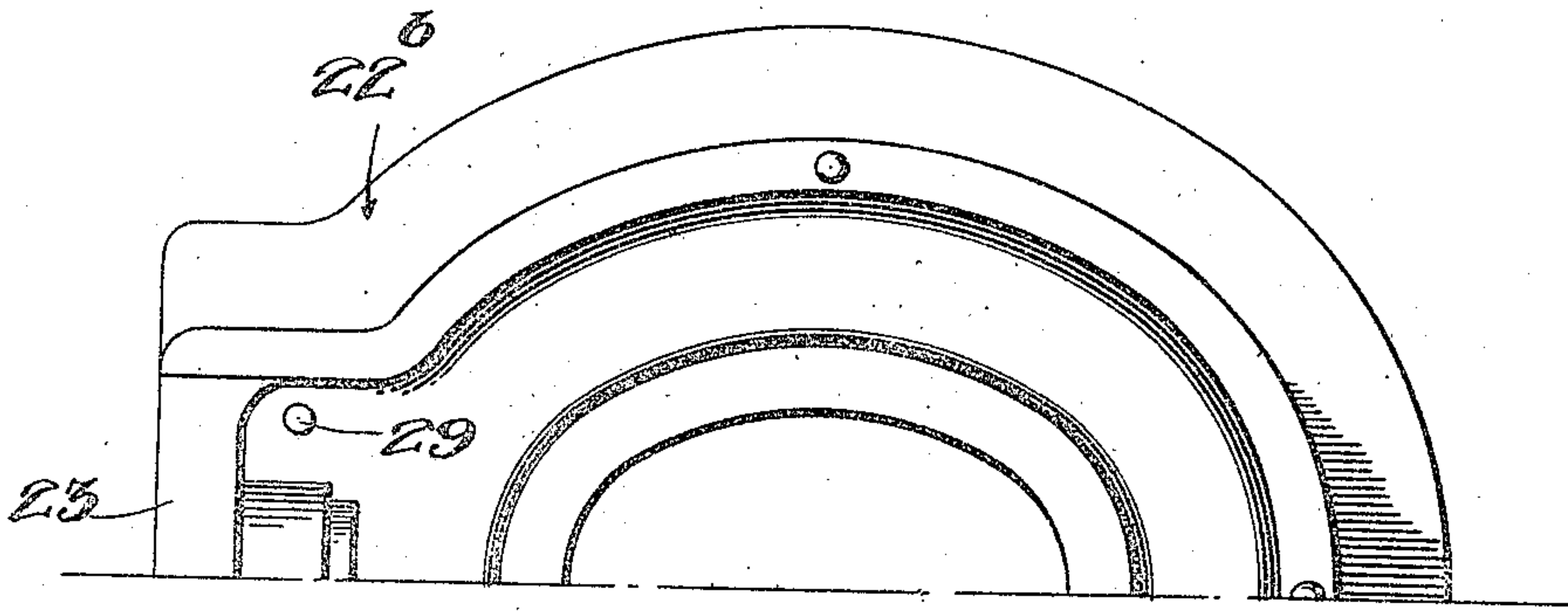


Fig. 4.

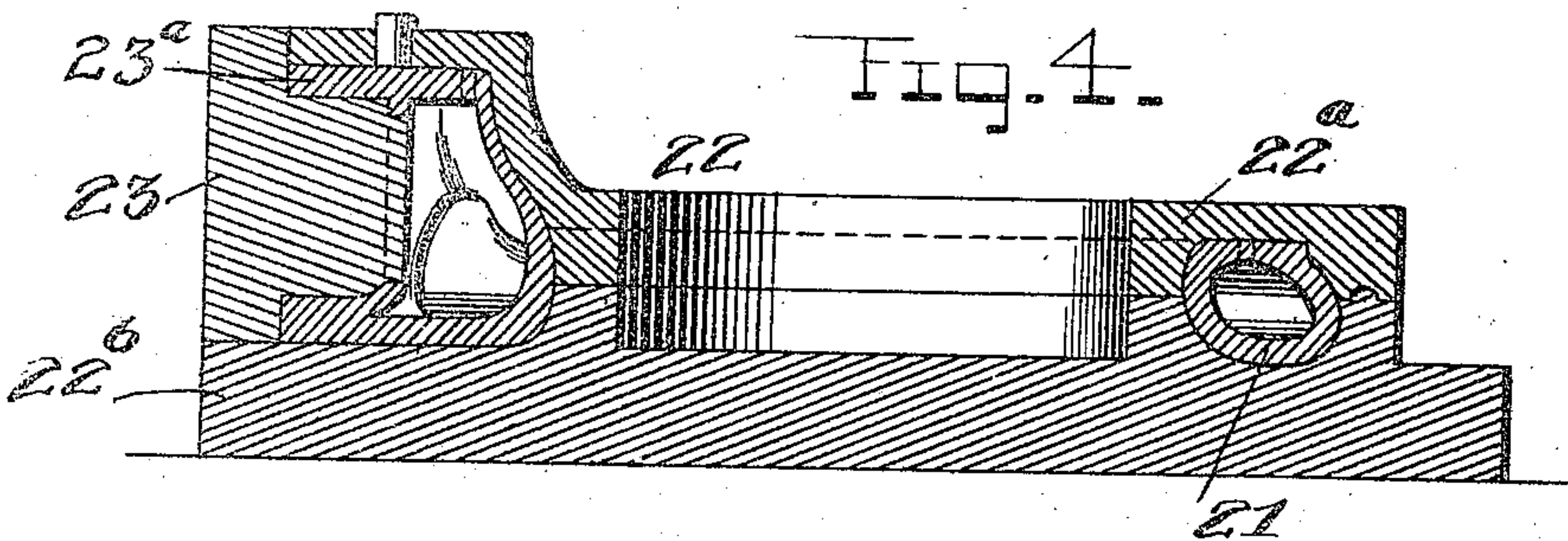
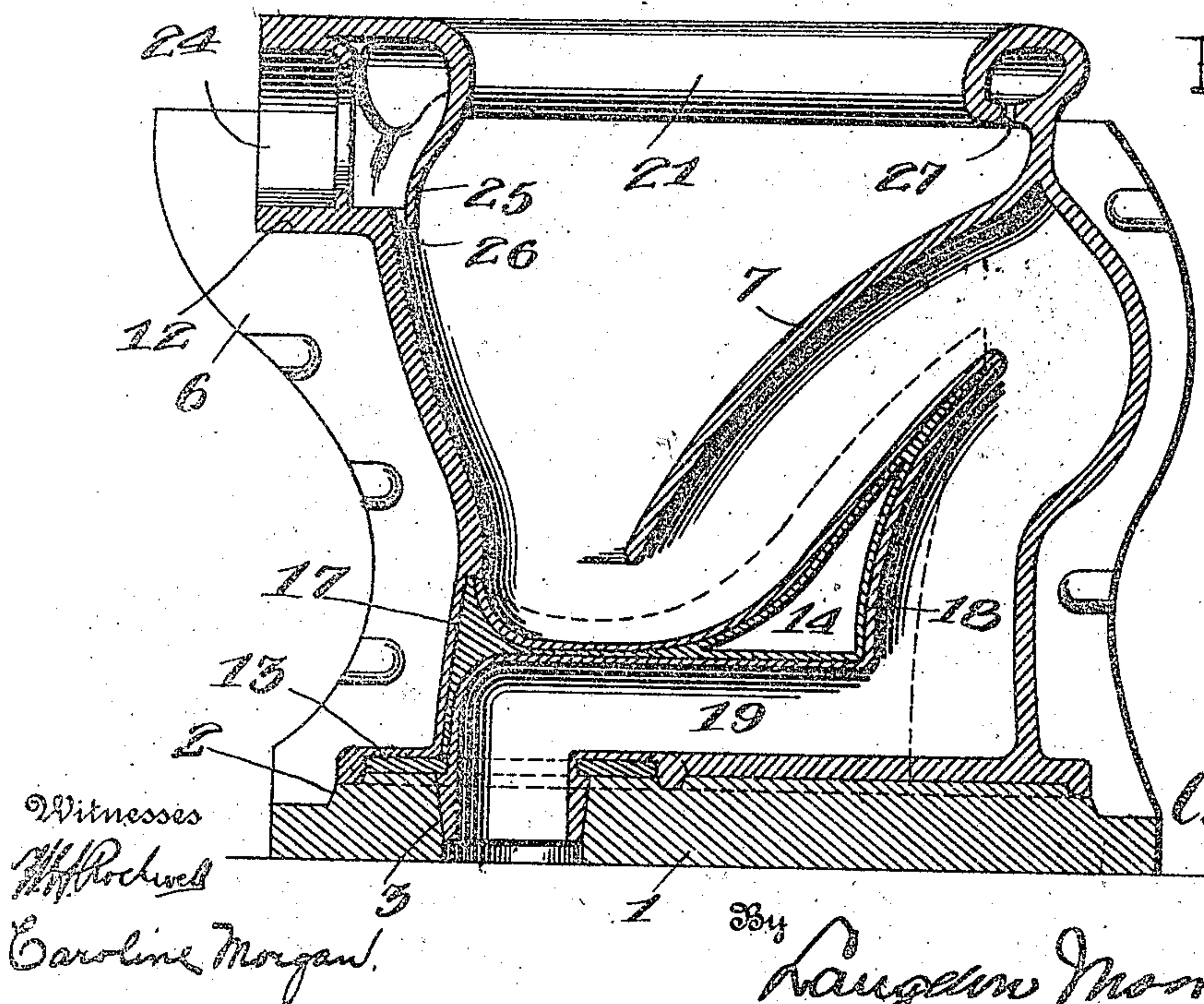


Fig. 5.



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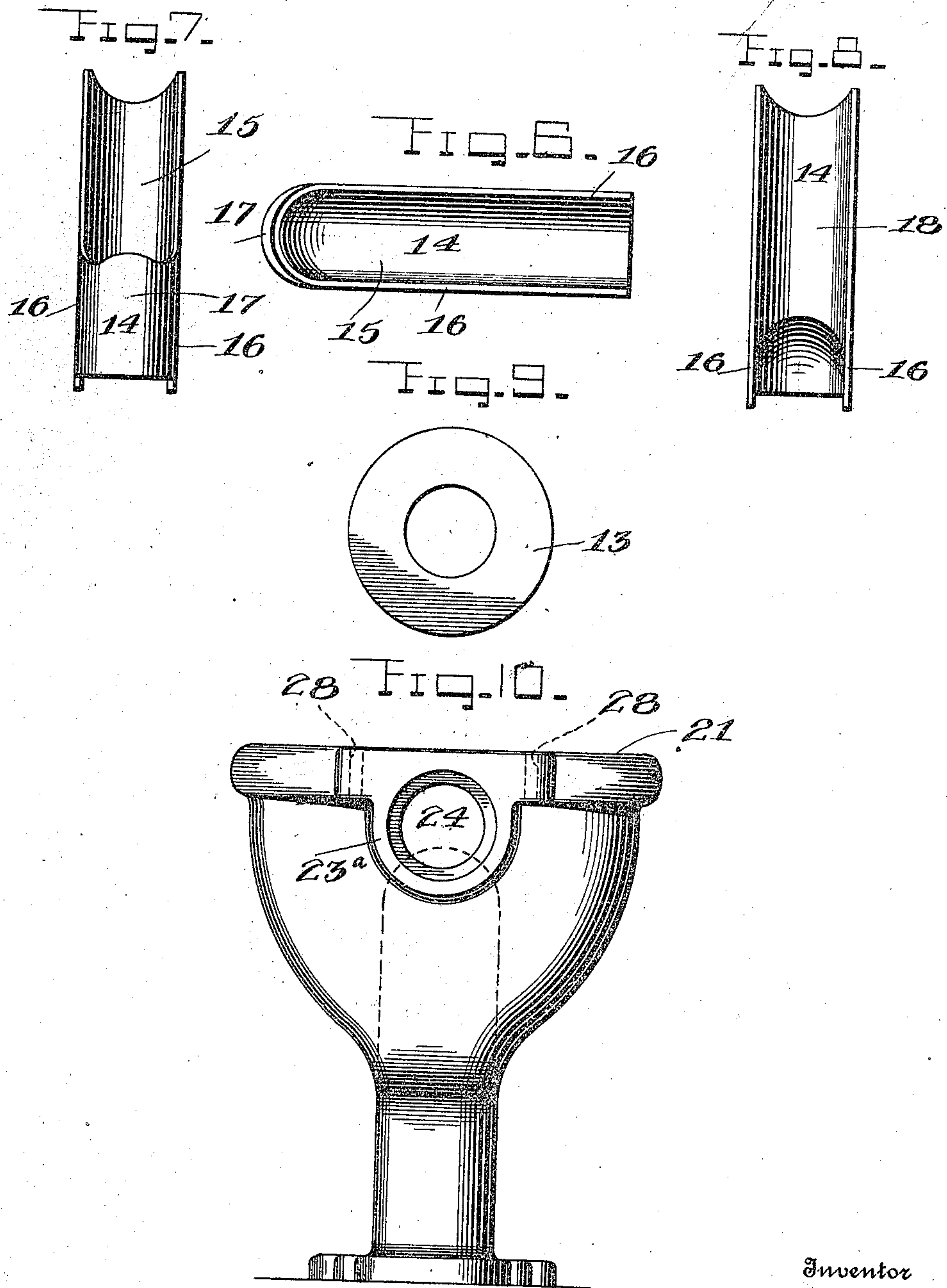
By *Langdon Mason* Attorney

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Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES J. KIRK, OF NEW CASTLE, PENNSYLVANIA.

PROCESS AND APPARATUS FOR FORMING ARTICLES OF PLASTIC MATERIAL.

952,745.

Specification of Letters Patent.

Patented Mar. 22, 1910.

Application filed November 17, 1909. Serial No. 528,549.

To all whom it may concern:

Be it known that I, CHARLES J. KIRK, a citizen of the United States, residing at New Castle, in the county of Lawrence and State of Pennsylvania, have invented new and useful Improvements in the Process and Apparatus for Forming Articles of Plastic Material, of which the following is a specification.

This invention relates to a process and apparatus used in forming articles of plastic material having tortuous passages therein, and more particularly to the process and apparatus used in forming water-closets.

The object of this invention is to provide a process by which the water-closet bowl and siphon may be cast at the same time in one piece by one operation.

This invention also contemplates the casting of the flushing ring either separately or integrally with the bowl and siphon, so that the complete closet is a cast article, and the apparatus which is used in carrying out this invention also forms a part thereof.

Water-closets of this type upon the market at the present time are made in several separate parts each pressed separately for the reason that heretofore it has been impossible to form the closet bowl and siphon in one piece. These parts which have been pressed separately are dried, united by cement, glazed, and burned. If each part which has been pressed separately is not of the same consistency as the other parts during the burning, the closet will crack. Furthermore in a closet composed of separately pressed parts there will be a certain amount of unevenness at the joints, even under the glaze, which is a very objectionable feature in articles of this character.

The advantages of this process are many. The labor necessary in completing the finished articles is greatly reduced, the process is so simple that it does not require a skilled workman to operate it, the cast article being integral all parts are of the same consistency and is not liable to crack during the second burning after the glaze has been applied. The inner and outer surfaces of the closet are continuous, and as there are no joints to cause unevenness the walls are perfectly smooth.

While the preferred means for carrying out this process is illustrated in the accom-

panying sheets of drawing, it is to be understood that the flushing ring may be cast integral with the bowl and minor detail changes may be made without departing from the scope of this invention.

Figure 1 is a view in side elevation of a closet mold with one of the side members removed, showing the permanent core and base ring in place. Fig. 2 is a view in longitudinal section through a closet mold, showing the mold filled with the liquid slip just before drawing off the same. Fig. 3 is a top plan view showing one-half of the lower portion of a flushing ring mold. Fig. 4 is a view in section taken longitudinally through a complete flushing ring mold, showing the flushing ring as formed therein. Fig. 5 is a longitudinal view through the completed article, showing the base block of the mold in section, and one side member in place. Fig. 6 is a top plan view of the permanent core. Fig. 7 is a view in elevation of one end of the permanent core. Fig. 8 is a view in elevation of the opposite end of the permanent core. Fig. 9 is a top plan view of a base ring. Fig. 10 is a view in rear elevation of a completed closet.

It is preferable to cast the closet bowl, siphon and closet base in one mold and the flushing ring in another mold. The top of the closet bowl mold is then removed, that part of the mold forming the lower part of the flushing ring is removed, and the flushing ring in that part of its mold forming the top is placed over the closet bowl mold, and allowed to remain with both parts still retained within and surrounded by the respective portions of their molds until the ring and bowl have been joined together.

The base block 1 of the closet mold conforms roughly to the base of the completed closet, and is provided with a projecting portion 2 having the same outline as the completed base. A circular aperture 3 is provided through the base block for the discharge opening of the closet siphon and is closed during the casting process. The upper surface of the base block at this point is provided with a concentric circular portion 4 slightly raised and of less diameter than the width of the base of the finished article. The remaining upper surface of the base block is provided with a separate raised portion 5 conforming to but slightly smaller

than the remainder of the base of the completed article. The outer contour of the closet is formed by a mold centrally divided into two removable side members 6. The inner upper surface 7 of the closet bowl is formed by a depending member 8 of the contour of the bowl carried by the top block 9. The top block is provided with a funnel shaped aperture 10 which opens through the lower extremity of the bowl forming member 8. The top block is also provided with a depending semicircular member 11 projecting centrally from one end of the bowl forming member, which is received in a correspondingly shaped recess 12 in the walls of the side members 6 and rests thereon. A base ring 13 and a permanent core 14 are then placed in the position shown in Fig. 1 upon the base block. The base ring 13 corresponds in diameter to the circular raised portion 4 of the base block and is provided with an aperture coinciding with the aperture 3 through the base block. The permanent core 14 is in the form shown in side elevation in Fig. 1 and in longitudinal section in Fig. 2. The upper portion 15 of the permanent core is curved in cross section and is of the general contour of the bottom of the intake arm of the siphon passage of the closet. The sides 16 of the core extend downward and rest upon the separate raised portion 5 of the base block and are cut away at one end to permit the core to rest upon the base ring 13, the end walls 17 passing around the opening or aperture 3 through the base ring and base block. The opposite end 18 of the core is of the general contour of the inner side wall of the siphon and a passage way 19 is provided between the walls 16, end 17, and top of the core to connect with the aperture 3 through the base block and base ring to the closet siphon as shown in Fig. 2. The base ring 13 and core 14 are cast separately from preferably the same material as is used in the casting of the closet, or from some other material which will contact at about the same rate during the burning, and are placed in the closet mold while they are of a consistency which will allow them to readily adhere to each other. The mold is now ready for filling and the material having been properly mixed to form a liquid slip is poured in through the top block until the funnel shaped aperture therein is completely filled. An air vent 9^a is left open in the top block 9 allowing the air to escape from the entire mold while it is being filled and is then closed with a plug 9^b to prevent the slip in this part of the mold from shrinking. The base block, side members, and top block are of plaster of paris, and therefore will absorb the water contained in the slip, which is in contact with these parts leaving a deposit of the plastic material 30 thereon, as shown

in section in Fig. 2. The consistency of the base ring and permanent core being less porous than the plaster of paris mold will not receive as great a deposit of the plastic material.

As seen in Fig. 2 there is a space between the walls of the fixed core and the walls of the mold, as well as a space between the top of the base ring and the mold. The bottoms of the side molds are recessed and are of the general contour of the base of the closet, the lower inner edges of the mold engaging the continuous raised surface 2 of the base block and the smaller separated raised surfaces thereon form a space between these portions and the inner walls of the mold. The base ring and permanent core are not completely dried when placed in the mold and will therefore readily adhere to each other. Providing the base ring extending into the correspondingly formed cut away portions upon the inner surface of the mold will prevent the permanent core from being raised or displaced by the liquid slip as it is poured into the mold proper. The slip being in liquid form will enter into all of the spaces between the sides of the permanent core, base ring, bowl forming member on the top block, and the side members of the wall molds. After the slip has been allowed to set within the mold a sufficient time a deposit of plastic material 30 will form upon the inner sides of the mold and envelop the permanent core. When this deposit is of the proper thickness the closure 20 for the discharge opening 3 in the base block is removed and the remaining liquid will be drawn off, leaving a perfectly formed closet bowl, siphon passage therefrom, and closet base within the mold, with the permanent core and base ring embedded in place. The top block with depending bowl forming member is then removed, and that part of the deposit 30 of plastic material upon the inner surfaces of the funnel shaped opening may be removed and mixed over in forming the slip. The integral bowl, siphon passage and base remaining in the mold is now ready to receive the flushing ring.

The flushing ring 21 is cast in a two part hollow mold 22, the interior of which corresponds with the exterior of the completed ring, and the ends are closed by a removable plug 23. The liquid slip is poured into the mold and is allowed to set in the same manner as in the closet mold. When the deposit has become of sufficient thickness the plug 23 is removed and the remaining liquid slip withdrawn. That portion of the mold 22^a which forms the lower portion of the ring is removed thereby exposing the lower half of the molded ring. The mold 22^b containing the ring is then inverted and placed upon the closet mold. A portion of the same plas-

tic material as used in forming the two articles may be placed upon the top of the walls forming the closet bowl and the ring then placed thereover until the two parts have become attached. The portion 22^b of the ring mold is then removed, the side members 6 of the closet mold are taken apart and the completed article is lifted from the base block 1 and allowed to thoroughly dry out. After the completed closet has dried out it is burned to form the biscuit, given a coating of the glaze, and again burned to produce the completed article of commerce.

As illustrated the flushing ring 21 is provided with a semicircular depending member 23^a to provide a space of sufficient size to permit the formation of a circular aperture 24 to receive the supply pipe. This portion is also hollow and is in communication with the interior of the ring. The inner lower portion 25 of the depending member enters within the closet bowl and is formed with an aperture to produce a flushing jet 26. About the lower surface of the flushing ring within the closet bowl a series of apertures 27 are formed for the discharge of the water into the bowl. The depending semicircular portion 23^a of the ring sets exactly into the semicircular orifice formed in the bowl by the depending semicircular member 11 projecting from the bowl forming member carried on the top block of the closet mold. The upper surface of this projection 23^a is flat and is flush with the top of the ring 21. Two bolt receiving apertures 28 are formed through this flat portion, one on each side of the center, for receiving the securing bolts for the wooden closet seat. These apertures are formed by providing pins 29 extending upward through the ring mold.

As seen in Fig. 10 the core is completely embedded within the cast closet and the outer sides of the completed article present a perfectly smooth surface. The inner sides of the bowl and the interior of the siphon passage are also perfectly smooth and even throughout their extent.

What I claim is:—

1. The process of forming earthenware articles provided with tortuous passages, which consists in embedding in such articles during the act of casting a permanent core adapted by its contour to form part of such tortuous passage.

2. The process of forming tortuous passages in earthenware articles, which consists in placing a permanent core forming part of the passage way within a mold forming the remainder of the passage way and casting the core within the article.

3. The process of forming tortuous passages in earthenware articles, which consists in placing a permanent core forming the bottom of one passage way and the top of another passage way within a mold forming

the top and bottom respectively of the passage ways and exterior surfaces of the article, and casting the core within the article.

4. The process of forming a closet, which consists in supporting a permanent core to form the siphon upon the base of a mold forming the exterior of the closet bowl, and casting the core within the closet.

5. The process of forming a closet bowl and siphon, which consists in supporting a core forming the top of the discharge arm of the siphon and bottom of the intake arm of the siphon upon the base of a mold forming the outer side of the bowl and closet, and casting the core within the closet.

6. The process of forming a closet, which consists in forming a hollow mold conforming to the outer surface of the closet bowl and siphon, placing therein a permanent core forming the inner surface of the siphon passage way, and casting the core within the closet.

7. The process of forming a closet, which consists in forming a hollow porous mold conforming to the outer surfaces of the closet and bowl having a porous base provided with a discharge opening corresponding with the discharge opening of the siphon, placing a base ring thereon with a corresponding opening and of greater width than the portions of the mold directly above the ring, securing a permanent core forming the inner walls of the siphon to the ring, and casting the ring and core within the closet.

8. The process of forming an earthenware closet, which consists in casting the flushing ring and core forming the inner surfaces of the siphon separately, casting the core within the closet bowl and base, and joining the flushing ring to the closet bowl.

9. The process of forming an earthenware closet, which consists in casting the flushing ring and core forming the inner surfaces of the siphon separately, placing the core within a hollow mold conforming to the outer surfaces of the siphon and bowl, casting the core within the base below the bowl and joining the ring and bowl.

10. In a mold for casting siphon closets, the combination of the top, side, and bottom members conforming with the outer surfaces of the closet, with a core of substantially the same material as the closet conforming to the interior surfaces of the siphon walls supported upon the base member and adapted to be covered with a deposit of the closet material and form a homogeneous part of the completed closet.

11. In a mold for casting siphon closets, the combination of the top, bottom, and side members conforming to the outer surfaces of the closet, with a core of substantially the same material as the closet conforming to the bottom of the intake arm and the top of the discharge arm of the siphon adapted to be

covered with a deposit of the closet material and form a homogeneous part of the completed closet.

12. In a mold for casting siphon closets, the combination with the top, side, and bottom porous members conforming to the outer surfaces of the closet, with a base ring and an inner siphon wall forming core adapted to be covered with a deposit of the closet material and form an integral part of the completed closet.

13. In an earthenware closet mold, top, side and bottom members of porous material conforming to the outer surfaces of the closet, and a permanent inner siphon wall forming core of material adapted to be covered with a deposit of the closet material and form an integral part of the completed closet.

14. In an earthenware closet mold, top,

side, and bottom members, a permanent inner siphon wall forming core adapted to be covered with a deposit of the closet material and form an integral part of the completed closet, and means for holding the core in position as the mold is being filled.

15. In an earthenware closet mold, top, side, and bottom members, a permanent inner siphon wall forming core and base ring of material adapted to be covered with a deposit of the closet material and form an integral part of the completed closet, the bottoms of the side members being recessed to receive the base ring and retain the ring and core in position as the mold is being filled.

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Witnesses:

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