

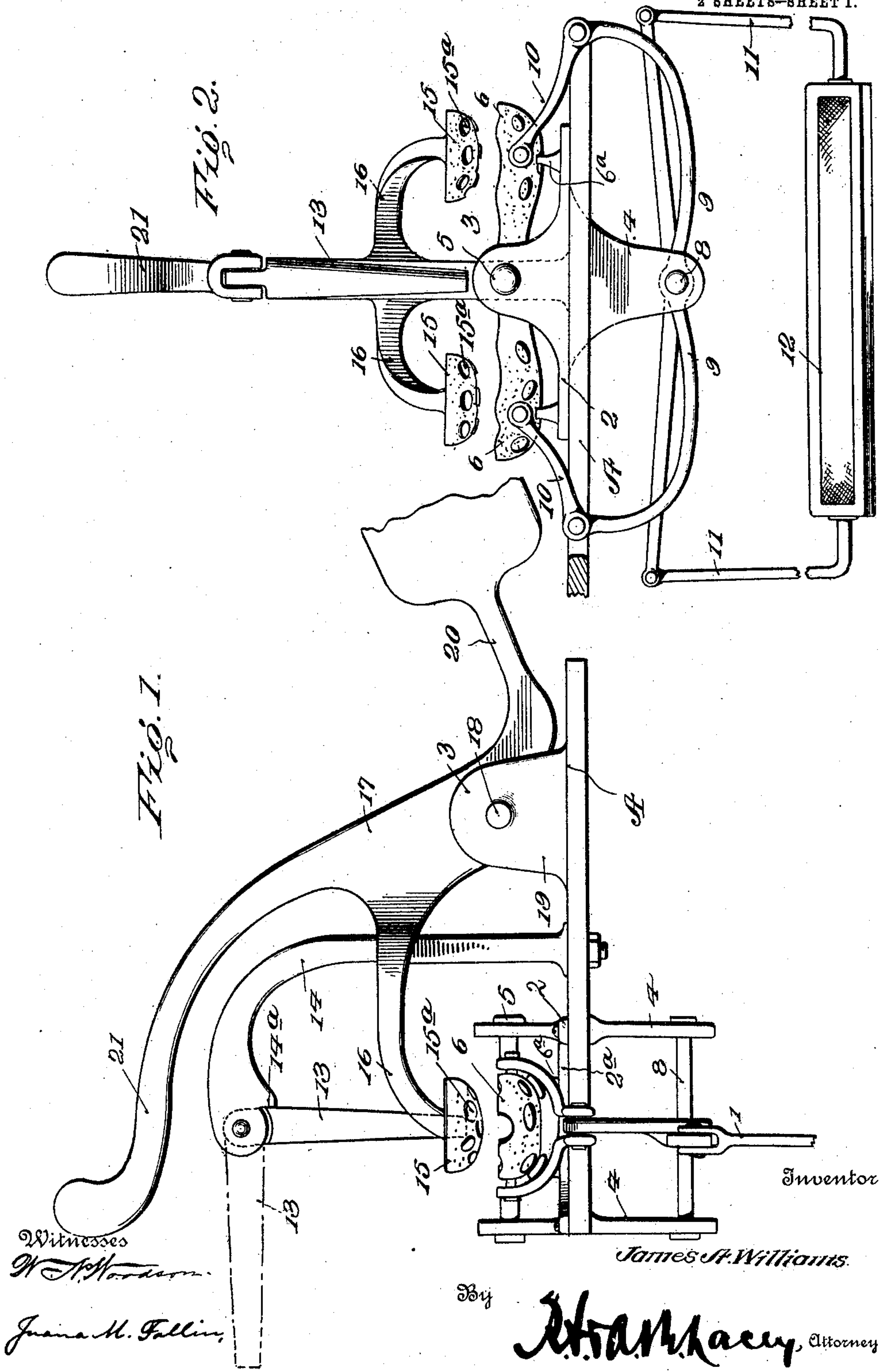
J. A. WILLIAMS.  
MOLDING MACHINE.

APPLICATION FILED MAR. 22, 1910.

Patented Nov. 22, 1910.

976,530.

2 SHEETS-SHEET 1.



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Fig. 3.

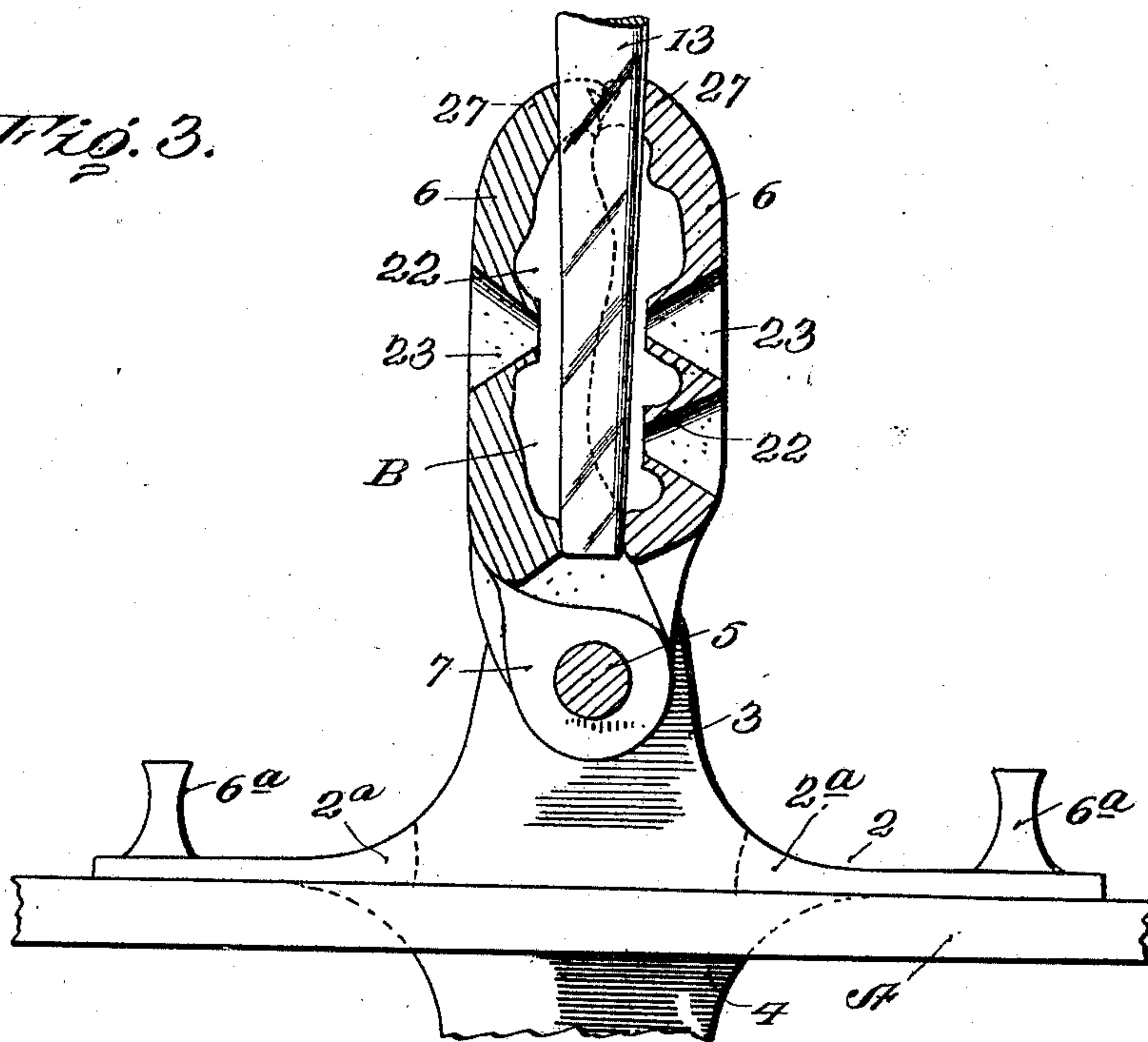


Fig. 4.

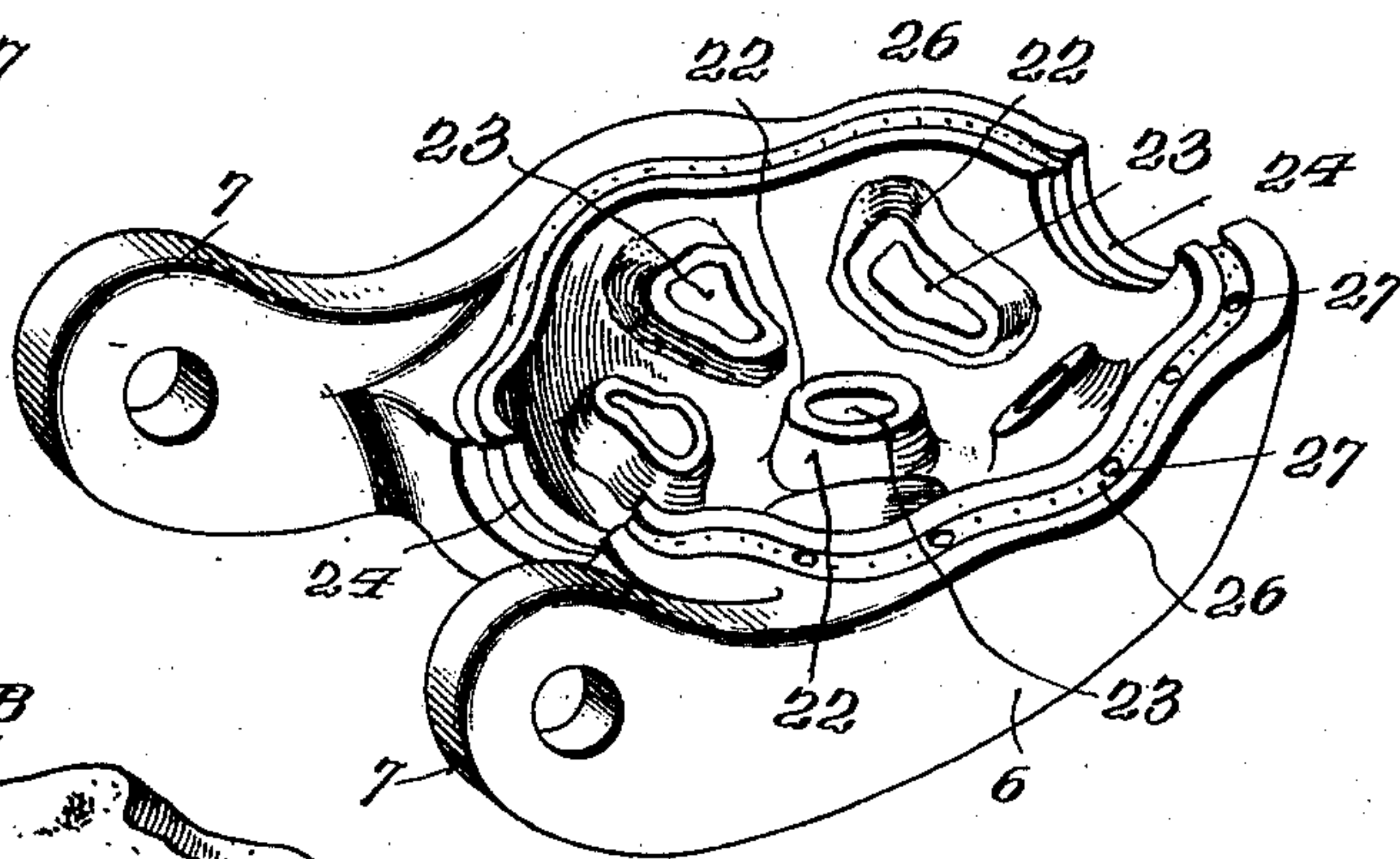


Fig. 6.

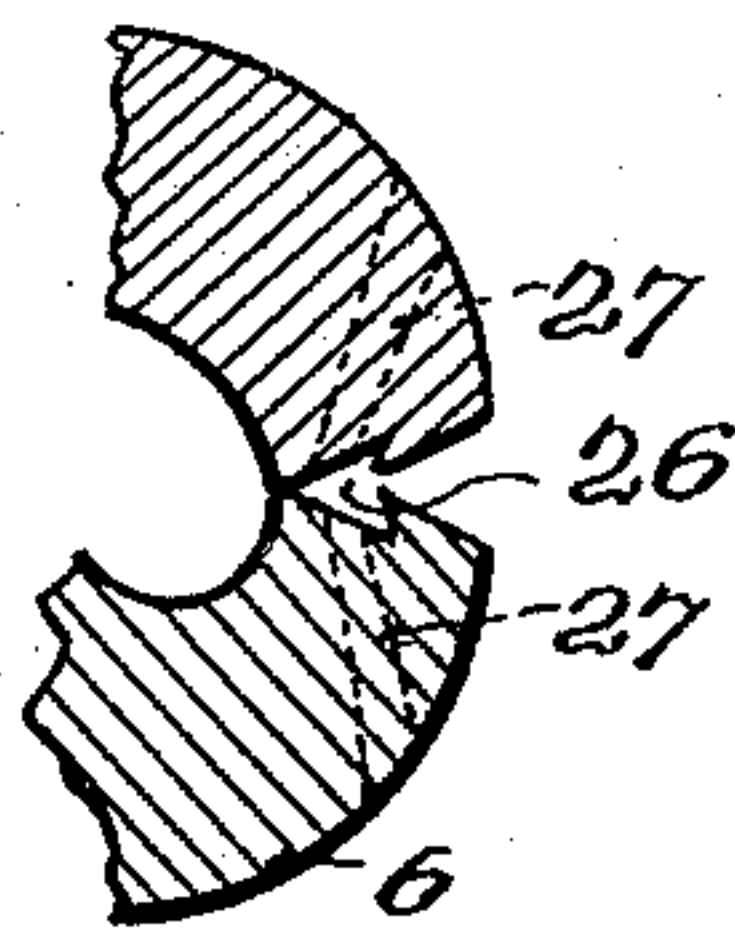
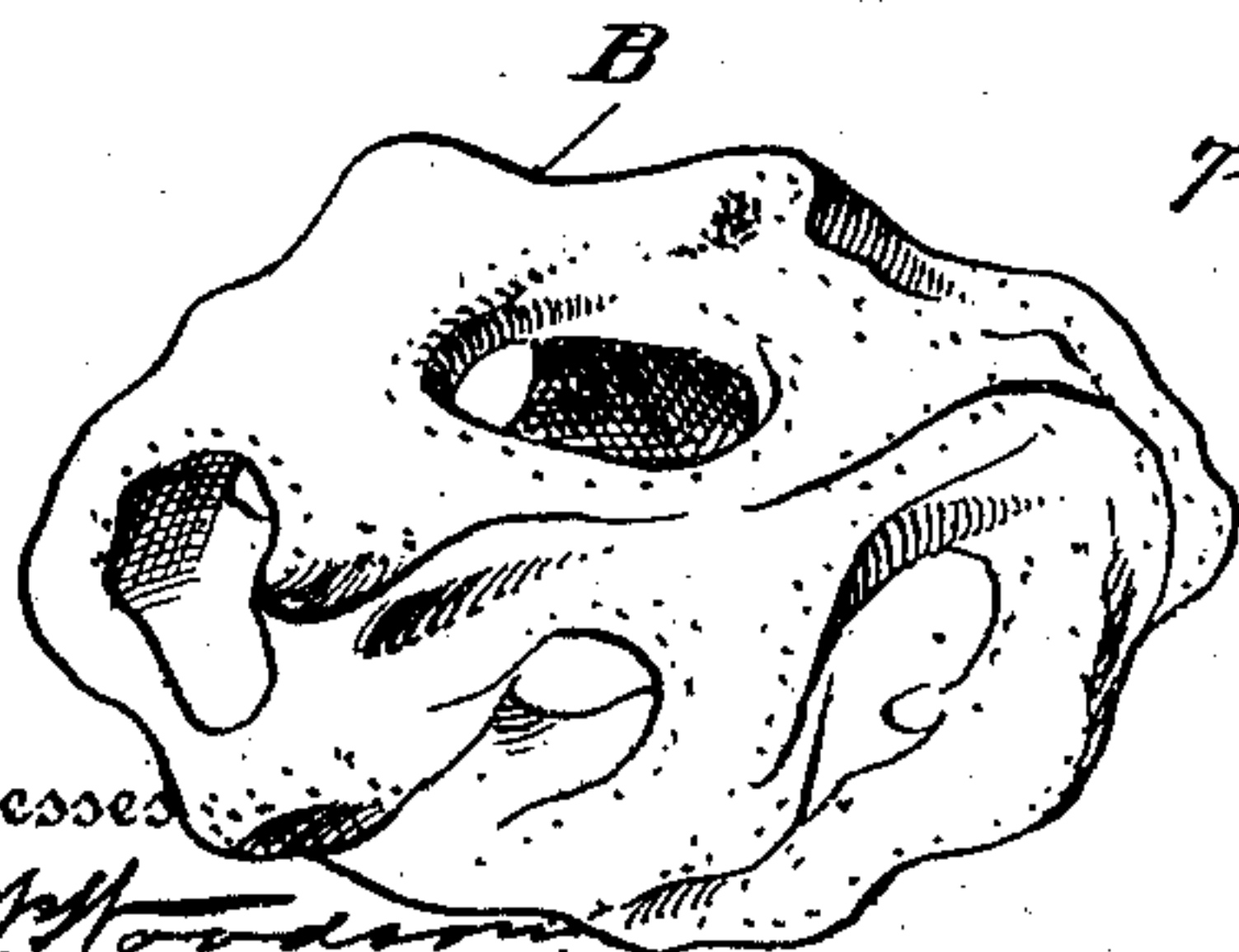


Fig. 5.



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# UNITED STATES PATENT OFFICE.

JAMES A. WILLIAMS, OF CINCINNATI, OHIO.

## MOLDING-MACHINE.

976,530.

Specification of Letters Patent. Patented Nov. 22, 1910.

Application filed March 22, 1910. Serial No. 551,009.

*To all whom it may concern:*

Be it known that I, JAMES A. WILLIAMS, a citizen of Great Britain, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Molding-Machines, of which the following is a specification.

My invention relates to molding machines, and particularly to machines to be used in molding clay into gas fuel such as described in my Patent No. 864,582, of August 27, 1907.

In the operation of the mechanism shown in my prior patent above referred to, it was necessary for all the work of placing the clay in the dies to be done by hand. A sheet of clay was placed in each of the half dies of the press, and then the operator with his fingers shaped the sheet of clay to fit the interior of the die. The two parts were then brought together, and the two halves of the complete article joined in a press. There were numerous waste pieces of clay which had to be removed by hand with this device, and further there was no means whereby a uniform pressure could be secured upon the sheets of clay when they were put in the dies, the sheets being molded, as before stated, by the hands of the operator, and hence being sometimes thinner and sometimes thicker than they should be, and of varying thickness in various portions of the sheets. The product was therefore not uniform, and often the proper openings did not extend entirely through the sheets of clay after they came from the press, as they should have done.

In order to obviate these objections, I have devised the apparatus which will be hereafter described. In this construction, the clay is not forced into the dies by hand, but by plungers having a certain degree of conformity to the interior die and acting to force the clay down in a uniform thickness into the die, the excess clay being forced out of the die. After the plungers have operated, they are raised, and the two sections of the die are brought together, and the two halves of the article are joined under pressure. Further than this, my improvement comprehends a central plug or core which, when the dies are closed, passes through the center of the molded article and not only forms upper and lower openings through the center of the article, but also forms means whereby the clay may be thoroughly com-

pressed along the meeting edges, which was not the case with the old construction.

For a full understanding of the invention and the merits thereof, and to acquire a knowledge of the details of construction, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation of my improved mechanism, the dies being shown as opened; Fig. 2 is a front elevation thereof; Fig. 3 is a vertical section showing the dies or mold members in their closed position; Fig. 4 is a perspective view of one of the mold members or dies; and, Fig. 5 is a perspective view of the article made by my machine; Fig. 6 is a fragmentary detail section showing the meeting edges of the dies.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to these figures, A designates a bench or other suitable support upon which the molding mechanism is mounted.

2 designates a base plate which is screwed or otherwise fastened to the bench and which has the upwardly projecting spaced ears 3 extending parallel to the length of the base. Projecting downwardly from the base are the spaced ears 4, these ears 3 and 4 forming bearings for the operating parts of the mechanism. Passing through the ears 3 is the pivot pin 5 to which the two halves or sections of the dies 6 are pivoted. These dies are provided with spaced lugs 7 through which the pin 5 passes, the lugs 7 of one die being spaced from each other a sufficient distance to permit them to be inserted between the lugs 7 of the other die. The dies are approximately hemispherical, and their particular construction will be described later. Pivoted between the ears 4 by the pivot bolt 8 are the levers 9, these levers crossing each other, as shown in Fig. 2, and extending upward to a point about in line with the base 2, and being there provided with bifurcated links 10 which are pivoted at 11 to lugs formed on the exterior of the die sections 6. The levers 9 beyond the pivot bolt 8 extend in opposite directions beneath the bench A and are then connected by links 11 or connecting rods to any suitable treadle 12 whereby the links may be simultaneously operated to close the dies. The weight of the dies will ordinarily hold them open, but



pressure upon the treadle 12 will rotate the levers 9 and rotate the sections 6 upon the pivot pin or bolt 5 so that the two sections are brought together. The major axis of the dies extends ordinarily so that the major axis of the dies is in line with a tapered plug or core 13 which is pivoted upon a standard 14 attached at its base to the base plate 2 of the machine. This standard 14 is curved at its upper end and extends over the movable dies 6 so that as the dies are moved into their vertical position, they will surround and inclose the lower portion of the plug, it being understood that the dies, as will be hereafter described, are made with an opening in which the plug is accommodated when the dies are closed.

In order to provide means for forcing the sheets of clay into the two halves of the die, I have provided the formers 15, preferably of rubber, formed on their under sides to fit the interior of the dies, as will be hereafter described. These formers are each supported upon an arm 16 which extends out from a lever 17 which is pivoted at 18 in ears 19 projecting up from the base 2. The lower end of this lever is rearwardly extended, at 20, and is counterweighted so that these formers 15 will be held normally in a raised position but may be depressed by the depression of a handle 21 which extends from the lever 17. This handle preferably extends upward and over the die so as to be in convenient position for operation. Means might also be provided whereby the lever 17 could be operated by foot power, if desired. Upon a depression of the handle 21, the formers 15 will be carried down into the open sections of the die, and will force the clay sheet previously laid in the die into conformity with the interior surface of the die. After this has been done, the formers are allowed to rise, the clay sheets remaining in the halves of the mold, and the dies 6 are then closed around the plug 13, pressing the edges of the clay sheet against each other and against the plug, this plug extending entirely through the object formed in the dies. After the object has been formed, the dies are allowed to open, whereupon the object will be left upon the plug 13, the plug projecting through the small openwork fuel piece of clay. The plug is then turned to a horizontal position, and the object withdrawn from the plug. A stop 14<sup>a</sup> is provided on the extremity of the standard 14, which limits the downward movement of the plug 13 so that when allowed to fall, it will fall to a vertical position in precisely the proper position to be engaged by the die sections when they close.

While I do not wish to limit myself to the particular formation of the interior of the die, or the particular formation of the operating face of the formers 15, I have shown

for illustration dies such as are used for making the clay fuel pieces before referred to. These fuel pieces are shown in Fig. 5 and consist of a hollow body of clay or like refractory material formed with a plurality of spaced openings extending into the hollow body from all sides, these openings having a somewhat irregular form.

For the purpose of forming the fuel piece shown in Fig. 5, each half of the die 6 is formed as shown in Fig. 4, that is, the interior of the die is concave but irregular and provided with a plurality of inwardly extending frusto-conical protuberances 22 through which the perforations 23 are formed which extend to the outside of the mold, these perforations being expanded outwardly so that material which is forced through the perforations will not stick to the die, but drop outside of the same. The opposite ends of each mold section are formed with the semicircular recesses 24 which, when the mold sections are brought together form two holes at opposite ends of the mold, these holes being sufficiently large to snugly surround the plug 13. The meeting edges of the die sections are preferably undulating in contour, and the faces of these meeting edges are provided with undercut grooves 26 formed at intervals with small holes 27 which extend into the material of the die. These holes are drilled through the outer edge of the die, and they are intended to hold the clay in the die at the time when the rubber former leaves the die. Then, when the two halves of the die meet, the waste clay is cut off around the edge. The groove is undercut so that the spare edge of the clay squeezes through the small holes, thus holding the clay down in place when the former leaves it.

The formers 15 are so shaped as to fit inside the dies and to tightly engage and press against the protuberances 22. These protuberances or studs 22 act as cutters to cut holes in the clay sheet. These formers are preferably of rubber and preferably are provided with slightly projecting studs 15<sup>a</sup> which are so placed as to aline with the studs or protuberances 22 when the former is forced down into the die.

The operation of my invention is as follows: The two halves of the die being open in the position shown in Fig. 2, and resting upon the studs or supports 6<sup>a</sup>, a thin sheet of clay is laid in each half. The formers 15 are then forced downward by actuating the handle 21, and this forces the clay down into the dies so as to form a semispherical shell in each die provided with a plurality of irregular openings, the edges of the clay lying over the edge of the section of the die and being forced down into the undercut recesses or grooves 26 and into the holes therein. The plungers are then raised, and as soon as



they have cleared the sections of the die, the levers 9 are actuated to bring the sections into the vertical position shown in Fig. 3 and around the plug. The two semispherical sections of the article are thus forced together with their edges around the plug. When sufficient pressure has been applied to thoroughly merge the edge of one section of the article into the other, the dies are opened and the article will remain upon the plug 13. The plug is then turned in a horizontal position, as previously described, and the article withdrawn, whereupon the plug will drop into its vertical position for further use.

My invention is thoroughly effective in practice, and the article is uniform in thickness,—a necessary feature, for the reason that the pieces so formed are intended to be used as gas fuel, and hence should become uniformly incandescent. It will be seen that by my invention hand molding is entirely dispensed with, and the operation is purely mechanical. It may be operated by unskilled labor and is so simple that none of the parts are liable to get out of order.

It will be perfectly obvious that other forms of dies may be used in place of those described, and that my machine might be used for other purposes than for the forming of fuel pieces.

While I have shown the sections 6 of the molds or dies as being formed with the inwardly projecting protuberances 22 having the central openings 23, I do not wish to be limited to this, as it might be advisable in many cases to form the rubber plunger with a protuberance which would act to cut openings through the sheet of clay placed in the section of the mold or die. Neither do I wish to limit myself to the use of rubber as a material for the former, though rubber is best for this purpose, as it will yield to a slight extent sufficiently to approximately conform to the interior of the die.

In order to provide for the support of the dies when in their open position I provide the upwardly projecting studs 6<sup>a</sup> formed upon the base 2 upon which the dies will rest in their open position, as shown in Fig. 2. The base 2 immediately beneath the dies is cut away, as shown in dotted lines in Fig. 3, so that the particles of clay expelled from the opening 23 may fall freely through the machine onto the ground.

Having thus described the invention, what I claim is:—

1. A mold for forming hollow articles of plastic material, including hollow complementary, separable sections each having inwardly projecting protuberances on its inner face, said protuberances each surrounding a material discharging opening extending to the exterior of the section thus providing a plurality of annular cutting edges, a former

having a convex face adapted to be forced into the section to press the material therein and force the surplus material out through said discharge openings, and means for bringing the sections together after the former has been removed, to join the sections of the molded article.

2. A mold for forming hollow articles of plastic material, including hollow, complementary, separable sections, each of the said sections having a plurality of protuberances upon its inside face, the sections being formed with outwardly expanded openings extending through the walls of the sections and through the center of each protuberance, a former composed of yielding material and having a rounded face adapted to fit the interior of the separable sections, means for forcing said former into each separable section and removing it therefrom, and means for bringing the molded sections together to join the sections of a molded article.

3. A mold for forming hollow articles of plastic material, including hollow complementary, separable sections, each of said sections at its opposite extremities being provided with a semi-circular recess, a cylindrical plug longer than the length of the sections supported in position to be surrounded by said sections and received within the opposite recessed ends thereof when the sections are brought together, and means for bringing said sections together to join the two halves of the molded article and force them into engagement with the plug.

4. A mold for forming hollow articles of plastic material, including two hollow, complementary, separable sections, each of said sections being formed at its opposite extremities with semicircular recesses, means for bringing the sections together to join the two halves of the molded article, a standard, and a tapering plug mounted on said standard and normally supported in position to be inclosed by said sections and received in said recesses of the sections when the sections are brought together to join the two halves of the molded article and force them into engagement with the plug, said plug being pivoted at one end to the standard so that it may be raised into position to permit the article to be removed from the plug.

5. A mold for forming hollow articles of plastic material, including hollow complementary, separable sections, each of said sections having a plurality of hollow protuberances on its inside face, said protuberances thereby forming annular cutting edges, and a former having a rounded face adapted to fit the interior of the sections and force the plastic material into contact with the inner faces of the sections and against said annular cutting edges.

6. A mold for forming hollow articles of plastic material, including hollow comple-



mentary, separable sections, each pivotally mounted at one end so that the sections may be turned on their pivotal axes into position to join the two halves of the molded article, 5 a support pivotally mounted above the separable sections having vertical movement, a double former mounted on said support, said former being composed of two sections, each adapted to approximately fit the interior of 10 the corresponding mold section, a handle on said pivoted support whereby the former may be depressed into the mold sections, a counterweight acting to raise said pivotal support and the mold sections when released, 15 and means operatively connected to the mold sections for simultaneously rotating them upon their axes and bringing them together to join the two halves of the molded article.

7. A mold for forming hollow articles of 20 plastic material, including hollow, complementary, separable sections pivoted on a common axis and having openings through their walls, a base upon which said sections are supported in an open position, a double 25 former supported above said base for a vertical movement, said former being composed of two sections, each adapted to approximately fit the interior of the corresponding mold section, means for depressing the 30 former into the mold sections, means for turning the mold sections upon their pivotal axis to bring them together to join the two halves of the molded article, a standard overhanging the mold sections, and a taper- 35 ing plug depending from said standard in a position to be surrounded by said mold sections when they are forced together.

8. A mold for forming hollow articles of 40 plastic material, including opposed, complementary, hollow sections pivoted at one end upon a common axis, each of said mold sections being formed with a plurality of inwardly extending protuberances, and the walls of the mold sections having openings 45 extending through said protuberances, formers, one for each section of the mold and supported above said sections, said formers having faces approximately conforming to the general shape of the interior of the sections, a lever for depressing said formers 50 into the mold sections, levers for closing said mold sections together to join the two halves of the molded article, and means for operating said levers.

55 9. A mold for forming hollow articles of plastic material, including opposed, complementary, hollow sections pivoted at one end upon a common axis and each provided at opposite ends with semicircular recesses,

each of said molds being formed with a plu- 60 rality of inwardly extending protuberances, and the walls of the sections being formed with openings passing through said protuberances, pivotally supported lever arms projecting from said lever, formers carried by 65 said arms and disposed immediately above the mold sections when the latter are open, each of said formers having a face approximately conforming to the general shape of the interior of the mold section immediately 70 beneath, a plug supported above the pivotal axis of the mold sections, and levers operatively engaged with the mold sections to close the same when actuated around the said plug to join the two halves of the mold- 75 ed article.

10. A mold for forming hollow articles of plastic material, comprising a base plate, opposed, complementary, hollow mold sections, each pivoted at one end upon a common axis 80 supported upon said base plate, levers pivoted to said base plate and adapted when moved in one direction to rotate the mold sections upon their axis and bring them to a vertical and closed position, a standard 85 mounted upon said base plate, a vertically disposed tapering plug carried by said standard and located above the pivotal axis of the mold sections, a counterweighted lever pivoted to the base plate, arms extend- 90 ing out from the lever, each arm being provided with a former on the end thereof, normally supported above the corresponding mold sections when opened, and a handle on said lever whereby the formers may be dis- 95 posed into said mold sections, each of said formers having its lower face formed to fit approximately the interior of the mold section.

11. In a mold for forming hollow articles 100 of plastic material, opposed, complementary mold sections having edges fitting each other, each of said mold sections being provided with a plurality of inwardly extending protuberances, the walls of the mold sections having outwardly expanding openings 105 extending through said protuberances, the edge of each mold section being formed with an under-cut groove and with a plurality of holes passing through the walls of the mold 110 sections and extending from said grooves.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES A. WILLIAMS.

Witnesses:

JOHN E. MOLONEY,  
JOHN C. HEALY.