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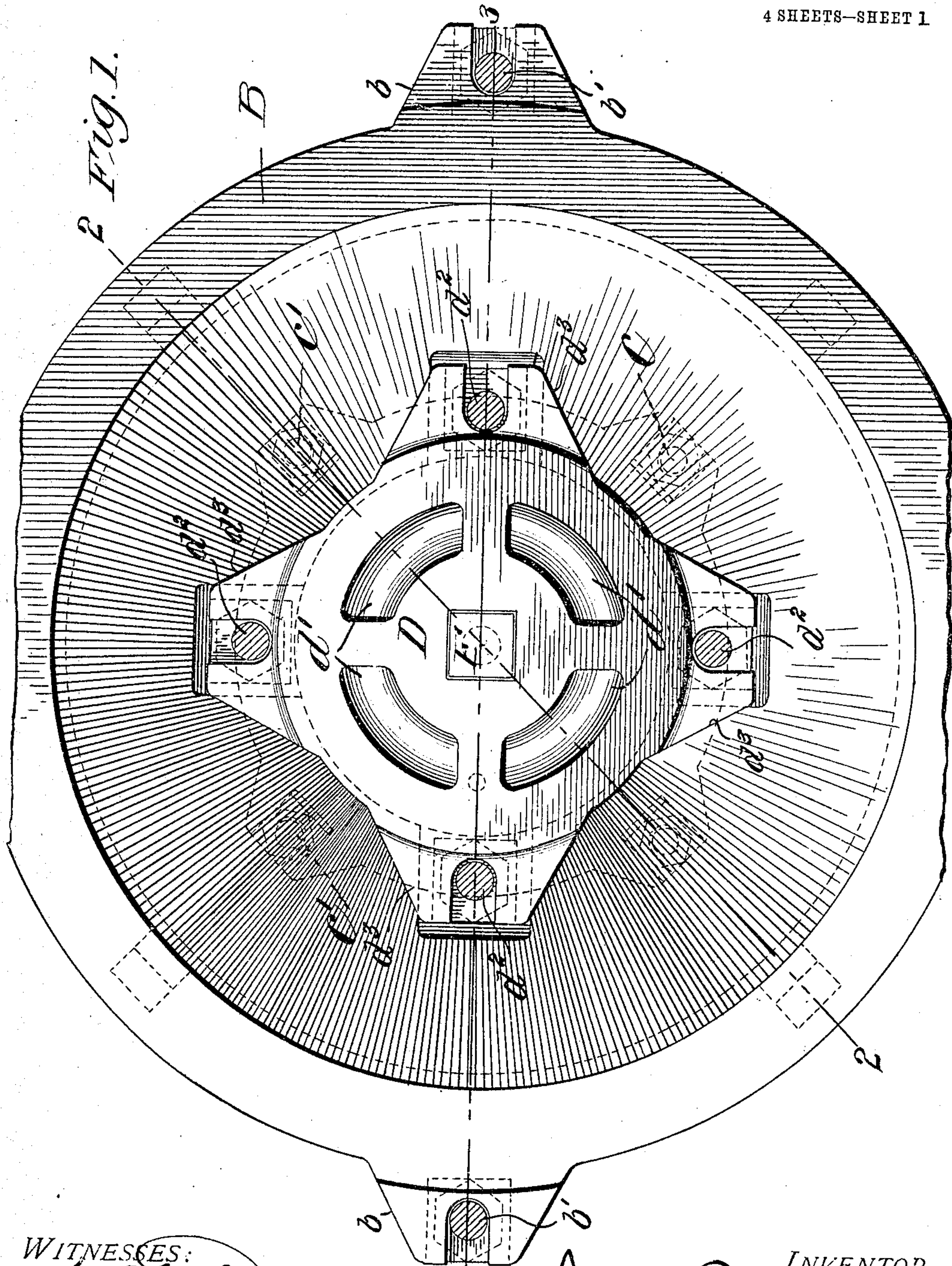
PATENTED NOV. 26, 1907.

J. CLARK.

APPARATUS FOR UPSETTING METAL RINGS.

APPLICATION FILED APR. 5, 1907.

4 SHEETS—SHEET 1



WITNESSES:

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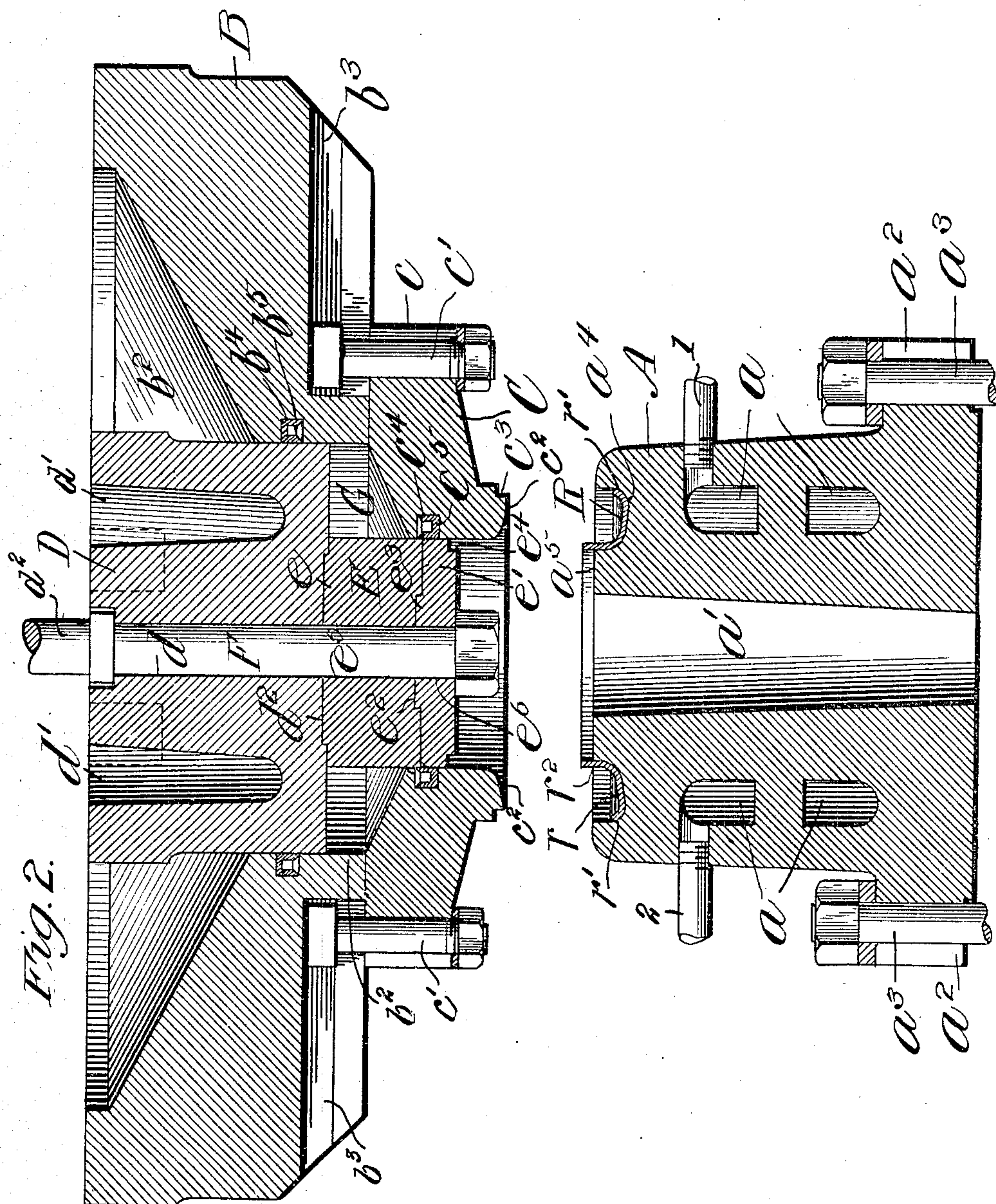
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4 SHEETS—SHEET 2.



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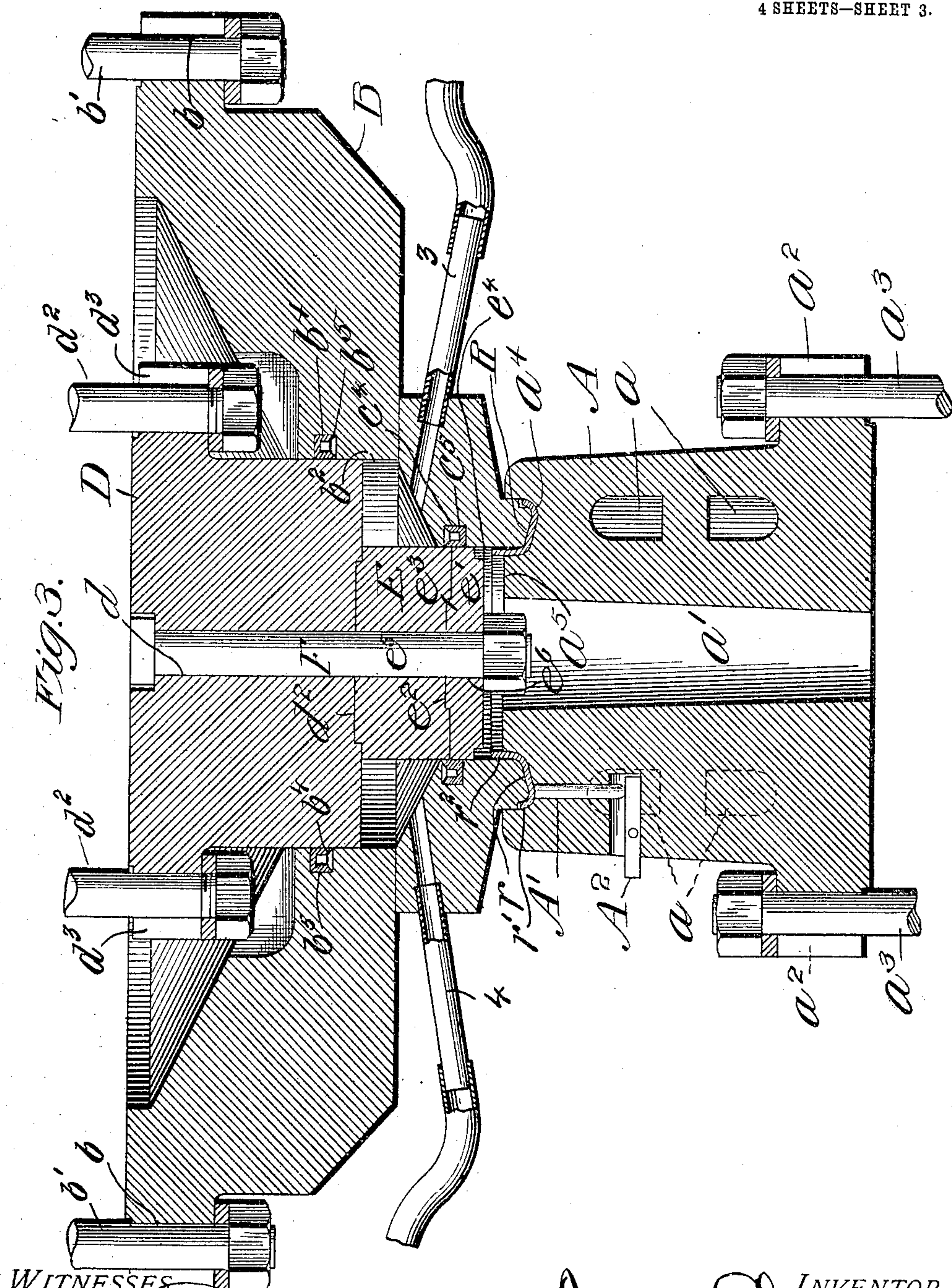
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4 SHEETS—SHEET 3.



WITNESSES.

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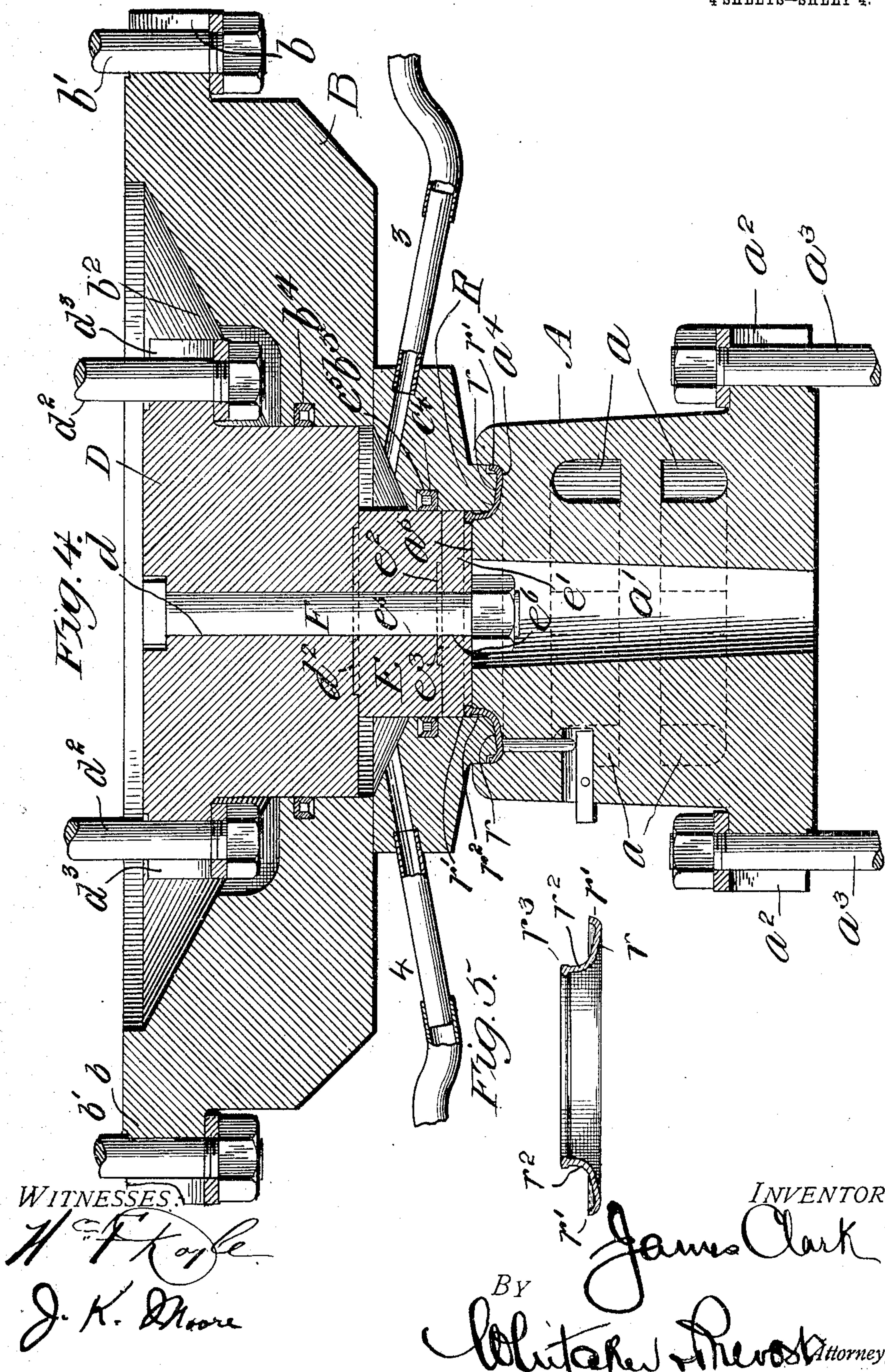
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4 SHEETS—SHEET 4.





# UNITED STATES PATENT OFFICE.

JAMES CLARK, OF BRADFORD, PENNSYLVANIA, ASSIGNOR TO S. R. DRESSER MANUFACTURING COMPANY, OF BRADFORD, PENNSYLVANIA.

## APPARATUS FOR UPSETTING METAL RINGS.

No. 872,168.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed April 5, 1907. Serial No. 366,573.

*To all whom it may concern:*

Be it known that I, JAMES CLARK, citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Upsetting Metal Rings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is an improvement in upsetting dies for the clamping rings for pipe couplings and consists in the novel features hereinafter described, reference being had to the accompanying drawings which illustrate one form in which I have contemplated embodying my invention and said invention is fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 represents a top plan view of a set of dies embodying my invention. Fig. 2 is a vertical sectional view of the same on line 2—2 of Fig. 1, showing the dies separated. Fig. 3 is a vertical sectional view of the dies on line 3—3 of Fig. 1 showing the dies partly closed upon the ring, prior to the upsetting operation. Fig. 4 is a sectional view similar to Fig. 3 showing the dies completely closed and the flange portion of the ring upset. Fig. 5 is a detail sectional view of the clamping ring after the upsetting operation has been performed.

My invention relates to the manufacture of clamping rings for pipe couplings. These rings are made of wrought metal such as wrought iron or steel, and comprise an annular plate member, having a central aperture to permit the passage of a pipe therethrough, and having a plurality of bolt holes formed therein, to receive clamping bolts, and an annular flange member, projecting from the plate member on one side thereof, surrounding the pipe aperture and having its outer end upset so that its outer edge is of greater width than the thickness of the other portions of the flange member, or the plate member, forming a packing engaging face. These clamping rings, one of which is shown in detail in Fig. 5, are made in a great variety of sizes.

My present invention consists in improved dies for effecting the upsetting of the outer end of the flange members of such clamping rings, which comprise a main bottom section

having an annular recess to receive and hold the partly finished rings, a main top section carrying a detachable upsetting plug, and an annular distance piece surrounding the main top section and carrying a detachable holding ring, which is lowered, with the distance piece upon the clamping ring to confine and hold it firmly upon the lower section after which the main top section carrying the upsetting plug is forced down into engagement with the outer end of the flange member of the clamping ring to upset it, the end of the upsetting plug being provided with an annular recess to permit the metal to expand laterally therein. The parts are so constructed that in treating rings of different diameters it is only necessary to change the main bottom section, the holding ring and the upsetting plug, which are removed and others of the same shape, but constructed for a different size ring, substituted, the main top section and the annular distance piece being employed for a large number of different sizes as hereinafter described. The upsetting operation is usually conducted by means of these dies in a hydraulic press, but the dies may be operated by any other style or type of press which may be found suitable for the purpose.

In the drawings A represents the bottom section of the die, which is formed ordinarily of cast iron, and cored to provide interior water spaces indicated at  $a$ , to which a circulating cooling liquid is supplied by suitable piping. The section A is ordinarily made, circular in horizontal cross section, and is provided with a central aperture  $a'$ , and with a peripheral flange  $a^2$  at its lower end, having notches or bolt holes formed therein to receive the bolts  $a^3$  by means of which it is secured to a supporting base, as the lower platen of a hydraulic press. The upper face of the bottom section A is provided with an annular recess  $a^4$  which exactly fits the clamping ring R to be treated, the interior or central portion  $a^5$  of the said section extending up within the annular flange member of the ring, but permitting a sufficient part of said flange to extend above it, to allow for upsetting the same. The clamping ring R to be treated comprises the plate member  $r$  having a central pipe aperture and an exterior peripheral reinforcing flange  $r'$  and the flange member  $r^2$ , extending on the same side of the plate member as the flange  $r'$ , and surrounding the pipe aperture as shown.



B represents the annular distance piece also formed preferably of cast iron, and is provided with a peripheral flange  $b$ , having recesses or bolt holes therein to receive bolts  $b'$  by which it is secured to the outer annular platen of a duplex ram, or other form of press (not shown). On its upper face the distance piece is preferably tapered downwardly to the central aperture as indicated at  $b^2$  and on its lower face, which is horizontal it is provided with radial T-shaped slots  $b^3$  to receive the heads of bolts for securing the holding ring thereto. An annular groove  $b^4$  is formed on the interior of the distance piece in which is placed an annular packing or gasket  $b^5$ .

C represents the holding ring, which is carried by the distance piece B, and engages the lower horizontal face thereof. The holding ring is provided on its periphery with recesses or bolt holes  $c$  to receive the bolts  $c'$ , the heads of which engage the slots  $b^3$  of the distance piece thus enabling the holding ring to be rigidly clamped to the latter. The lower end of the holding ring is provided with a ring engaging portion  $c^2$ , adapted to fit over the clamping ring R and hold it firmly upon its seat in the main bottom section, and said holding ring is preferably provided with an annular recess  $c^3$  to accommodate the annular exterior flange  $r'$  with which the plate member of the clamping ring is preferably provided. The ring C is also provided on its interior with an annular recess  $c^4$ , in which is located an annular packing or gasket  $c^5$ .

D represents the main top section preferably made of cast iron which is circular in cross section and has its lower end fitted in the central aperture of the distance piece, and engaging the packing ring or gasket  $b^5$ , thus making a water tight joint. The said top section D is also provided with a central vertical aperture or bolt hole  $d$  and with cored recesses  $d'$   $d'$  which may be piped to supply them with a suitable cooling liquid if desired. On its lower face, the section D is provided with an annular recess  $d^2$  surrounding the bolt hole  $d$ , said recess being concentric with the section D. E represents the detachable upsetting plug also preferably made of cast iron and circular in cross section. This plug is fitted in the central aperture of the holding ring and engages the packing ring or gasket  $c^5$  thereof, so as to make a tight joint. The upper face of the plug E is provided with a circular concentric centering lug, fitting the recess  $d^3$  of the top section D, and thus serving to center both the plug E and the detachable holding ring C, and facilitating the attachment of upsetting plugs and clamping rings for the various sizes of rings operated upon.

On its lower face the plug E is provided with an upsetting plate of tool steel  $e'$  and I

prefer to provide the plug E and plate  $e'$ , the one with a centering recess and the other with a centering projection as indicated at  $e^2$   $e^3$ . The plug E and plate  $e'$  are provided with central apertures  $e^5$   $e^6$  registering with the central aperture in the top section D and a clamping bolt F extends through all three of said parts and holds them rigidly together. The top section D is also connected by bolts  $d^2$  engaging apertures or recesses in flanges  $d^3$  thereof with the platen of the central or inner ram (not shown) which is operated independently of the ram for operating the exterior platen. The plate  $e'$  is also provided on its lower face with an annular peripheral recess  $e^4$  which I term the upsetting recess, of sufficient width to permit the desired lateral expansion of the upset portion of the clamping ring R. For convenience of reference I term the plug D and plate E the upsetting "die."

It will be seen that an annular space G surrounding the upsetting plug is formed by the construction just described and this space is supplied with a circulating cooling liquid, by means of suitable pipe connections, thereby keeping the holding ring C, upsetting plug E and upsetting plate  $e'$  cool during the operation of the apparatus. The water is prevented from escaping from the space or water jacket G by the gaskets  $b^5$ ,  $c^5$  previously described. Suitable packing may also be inserted between the holding ring C and distance piece B if desired to prevent leakage from the water jacket G.

In the operation of the devices hereinbefore described, the rings R are heated to the proper temperature and laid one at a time upon the bottom section A, in the groove or recess  $a^4$  thereof, while the other parts are in raised position as shown in Fig. 2. Both rams (or other operating devices) are then brought into operation and the distance piece B, with its holding ring C, and the main top section D with its upsetting plug E are caused to descend together (the holding ring C being slightly in advance of the plug E) until the holding ring C engages the ring R and clamps it rigidly against the bottom section A, as shown in Fig. 3 leaving only the upper or outer edge of the flange member  $r^2$  exposed, within the holding ring C. The pressure is then maintained on the distance piece B and the holding ring C, and the top section D and upsetting plug E are moved downward within the exterior parts, until the annular recessed portion  $e^4$  of the upsetting plate  $e'$  is brought into contact with the projecting portion of the ring R, thus upsetting the same and causing the upset portions of the metal to expand laterally within said recess  $e^4$ , as shown in Fig. 4. The upper parts of the apparatus are then elevated and returned to their initial positions, the top section D and upsetting plug E being raised



first out of contact with the ring R, while it is held by the holding ring C and then all the parts B, C, D and E move upward together, leaving the ring R in the recess of the bottom section from which it is removed in any suitable manner. I prefer to provide a knock-out pin or stud A' located in a vertical recess in the bottom section A, and having an arm A<sup>2</sup> extending through a lateral recess to the exterior of the section A, where it may be struck by a bar, or hammer to elevate the knock-out pin and lift the ring R free from the bottom section, from which it may be then removed.

Fig. 5 shows a section of the upset ring R, the upset portion being indicated at  $r^3$ . In order to upset rings of various diameters, a series of sets of the bottom section A, holding ring C and upsetting plug D will be provided, to conform to the various sizes of rings, and these may be used interchangeably with the distance piece B and top section D, as before indicated. In connecting one of the upsetting plugs E and its corresponding holding ring, it will be seen that the centering projection  $e$  of the plug engaging the centering recess  $d^2$  in the bottom face of section D, will center both the plug and its surrounding holding ring, and they can then be rigidly secured in position by means of bolt F, and bolts  $c'$  as previously described.

What I claim and desire to secure by Letters Patent is:—

1. In apparatus for upsetting the annular flange member of a clamping ring for pipe couplings and like articles, the combination with the main bottom section having its upper end provided with an annular recess for receiving the ring to be treated, and having a central portion for extending into the flange member thereof, of an annular holding ring having portions for engaging the ring to be treated and holding it in said annular recess, and an upsetting die located within said holding ring and movable with respect thereto, substantially as described.

2. In apparatus for upsetting the annular flange member of a clamping ring for pipe couplings and like articles, the combination with an annular holding ring, of an upsetting die located within said holding ring and movable with respect thereto, said holding ring and upsetting die being constructed to provide an annular cooling chamber between them, means for making a liquid tight connection between the contacting portions of said ring and die, and means for supplying liquid to said chamber, to cool the ring and die, substantially as described.

3. In apparatus for upsetting the annular flange member of a clamping ring for pipe couplings and like articles, the combination with an annular holding ring, of an upsetting die, located within said holding ring and movable with respect thereto, said

holding ring and upsetting die being constructed to provide an annular cooling chamber between them, one of said parts being provided with an annular packing recess adjacent to the other part, an annular packing in said packing recess, and means for supplying a cooling fluid to said chamber, substantially as described.

4. In apparatus for upsetting the annular flange member of a clamping ring for pipe couplings and like articles, the combination with the main bottom section having its upper end provided with an annular recess for receiving the ring to be treated, and having a central portion for extending into the flange member thereof, of an annular holding ring having portions for engaging the ring to be treated and holding it in said annular recess, and an upsetting die, located within said holding ring and movable with respect thereto and provided on its lower face with an annular upsetting recess, substantially as described.

5. In apparatus for upsetting the annular flange member of a clamping ring for pipe couplings and like articles, the combination with the main top section, and an annular distance piece surrounding said top section, and movable with respect thereto, of an upsetting die, means for detachably securing it to the main top section, a holding ring surrounding said die, means for detachably connecting said ring to said distance piece, whereby said upsetting die, holding ring and bottom section may be replaced by others to enable rings of different sizes to be upset, substantially as described.

6. In apparatus for upsetting the annular flange member of a clamping ring for pipe couplings and like articles, the combination with a main top section, and an annular distance piece surrounding said top section, and movable with respect thereto, of an upsetting die, means for detachably securing it to the main top section, a holding ring surrounding said die, means for detachably connecting said ring to said distance piece, said main top section and said upsetting die having the one a centering projection for engaging a centering recess in the other, to center said ring and die with respect to the annular distance piece and the main top section, substantially as described.

7. In apparatus for upsetting the annular flange member of a clamping ring for pipe couplings and like articles, the combination with a main top section having a cylindrical portion, an annular distance piece movable with respect thereto and having a central aperture engaging the cylindrical portion of said top section, means for effecting a liquid tight joint between said parts, an upsetting die carried by said main top section and having a cylindrical portion, a holding ring carried by said distance piece and having a cen-



tral aperture fitting the cylindrical portion of said die and means for effecting a liquid tight connection between said ring and die, said ring and die being constructed to provide an annular cooling chamber between them and between said liquid tight connections, means for supplying a cooling liquid to said annular chamber, substantially as described.

10 8. In apparatus for upsetting the annular flange member of a clamping ring for pipe couplings and like articles, the combination with a main top section, and an annular distance piece surrounding the same and movable with respect thereto, said distance piece having its lower face provided with radial bolt engaging slots, of an upsetting die detachably secured to said main top section, a holding ring surrounding said die, and bolts engaging said ring and said radial slots in the distance piece for detachably uniting the same, substantially as described.

9. The combination with the main top sec-

tion provided on its lower face with a centering recess, of an annular distance piece surrounding said top section, formed separately therefrom and having its lower face provided with radially disposed bolt engaging grooves, an upsetting post having its upper face provided with a centering projection to engage the centering recess of the top section and its lower end provided with a part having an annular upsetting recess, means for detachably securing said post to the top section, a holding ring surrounding said upsetting post, and provided with portions fitting the clamping ring to be treated, bolts engaging said holding ring and said slots in the distance piece, for uniting them detachably, substantially as described.

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

JAMES CLARK.

Witnesses:

F. P. SCHOONMAKER,  
E. M. KOCH.