(No Model.)

2 Sheets—Sheet 1.

F. P. DAVIDSON.

DIE.

No. 551,529. Patented Dec. 17, 1895.

Fig 1

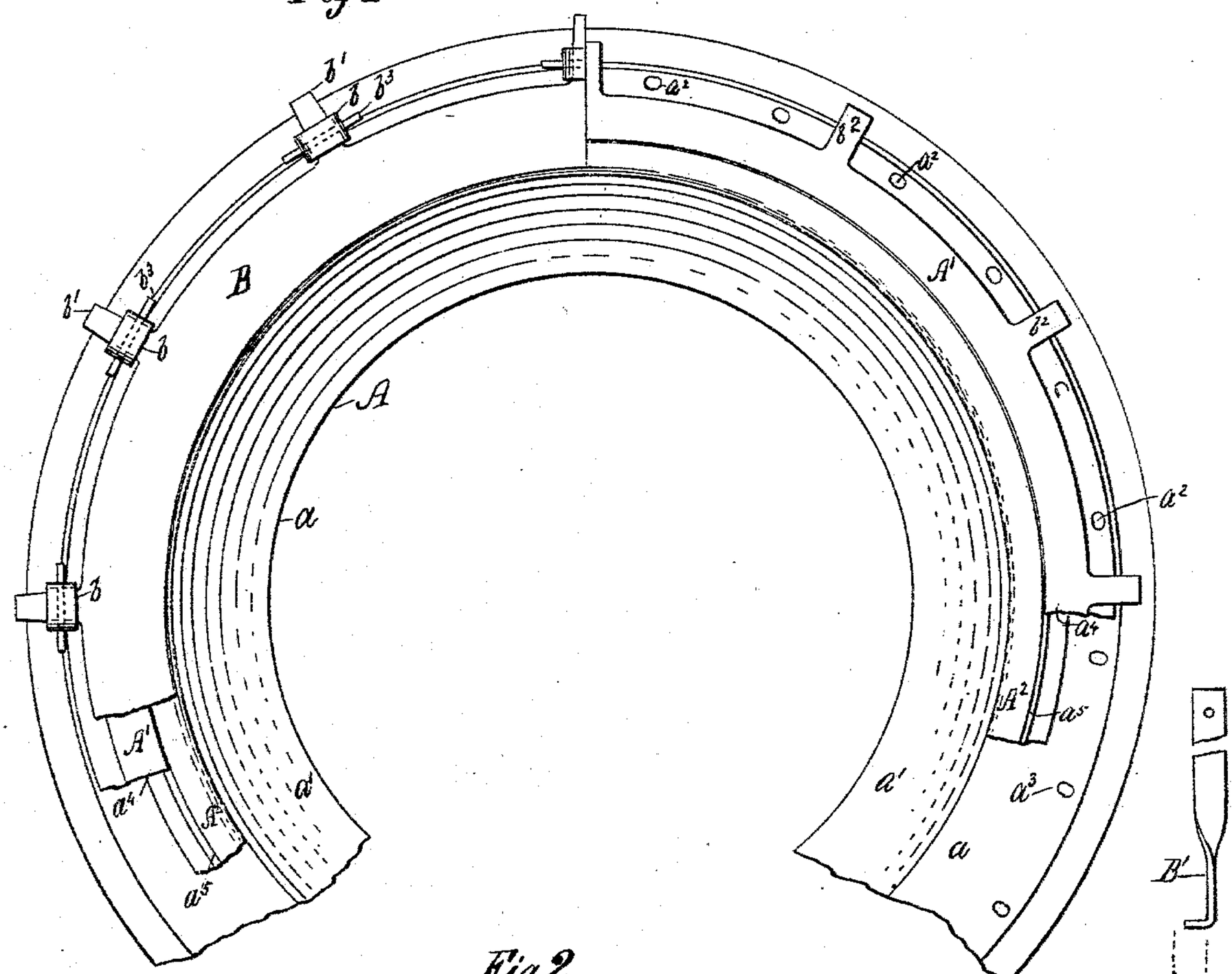
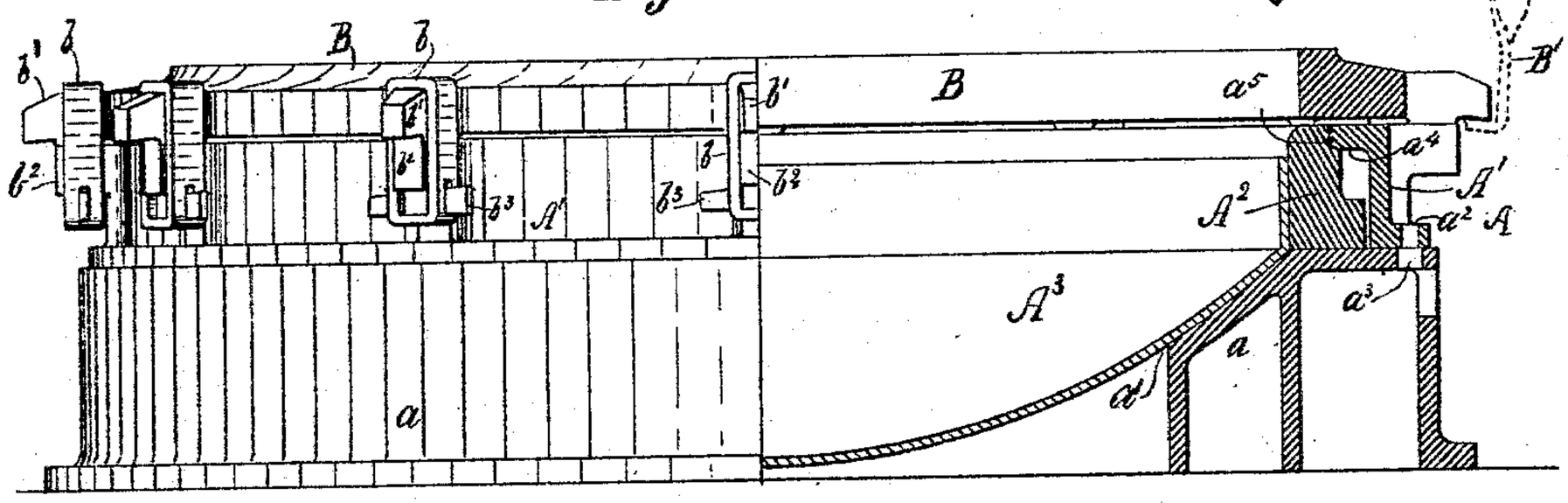


Fig 2



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

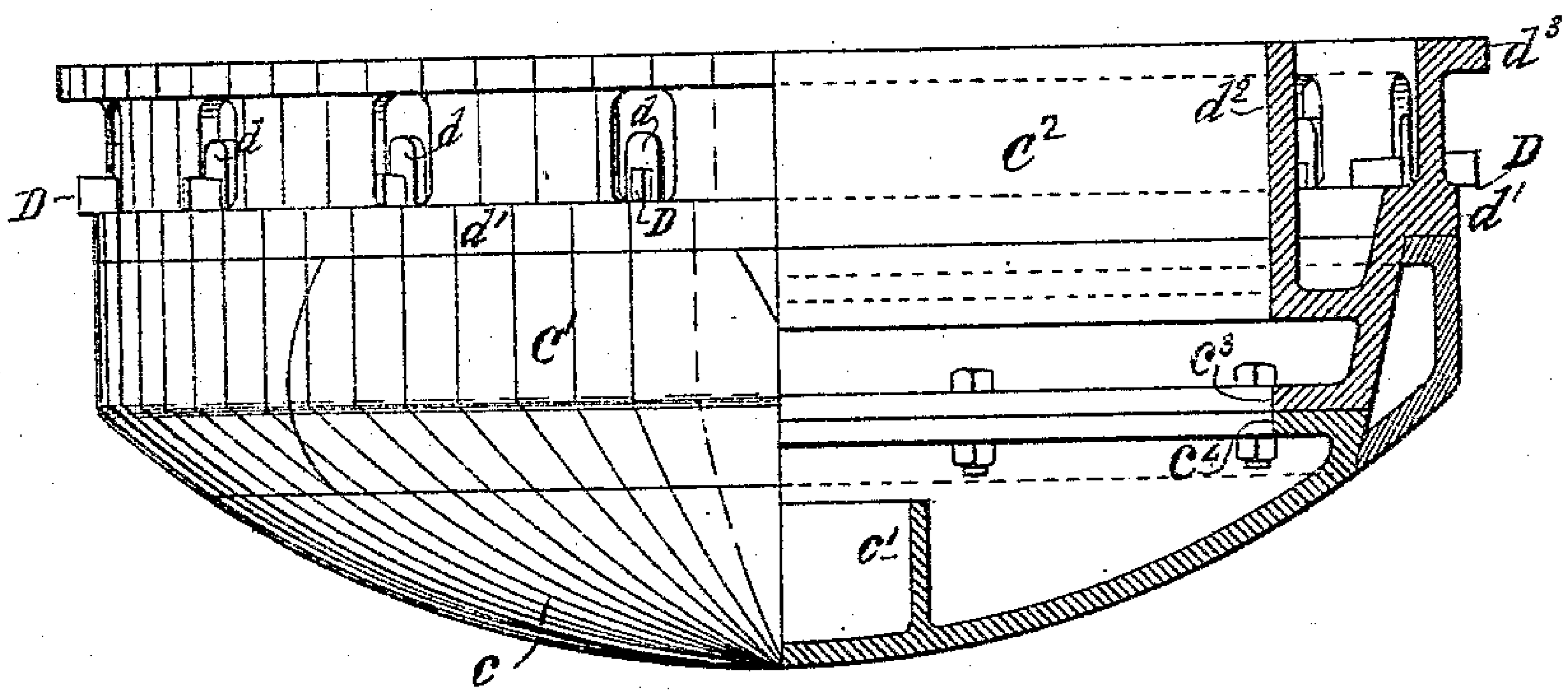
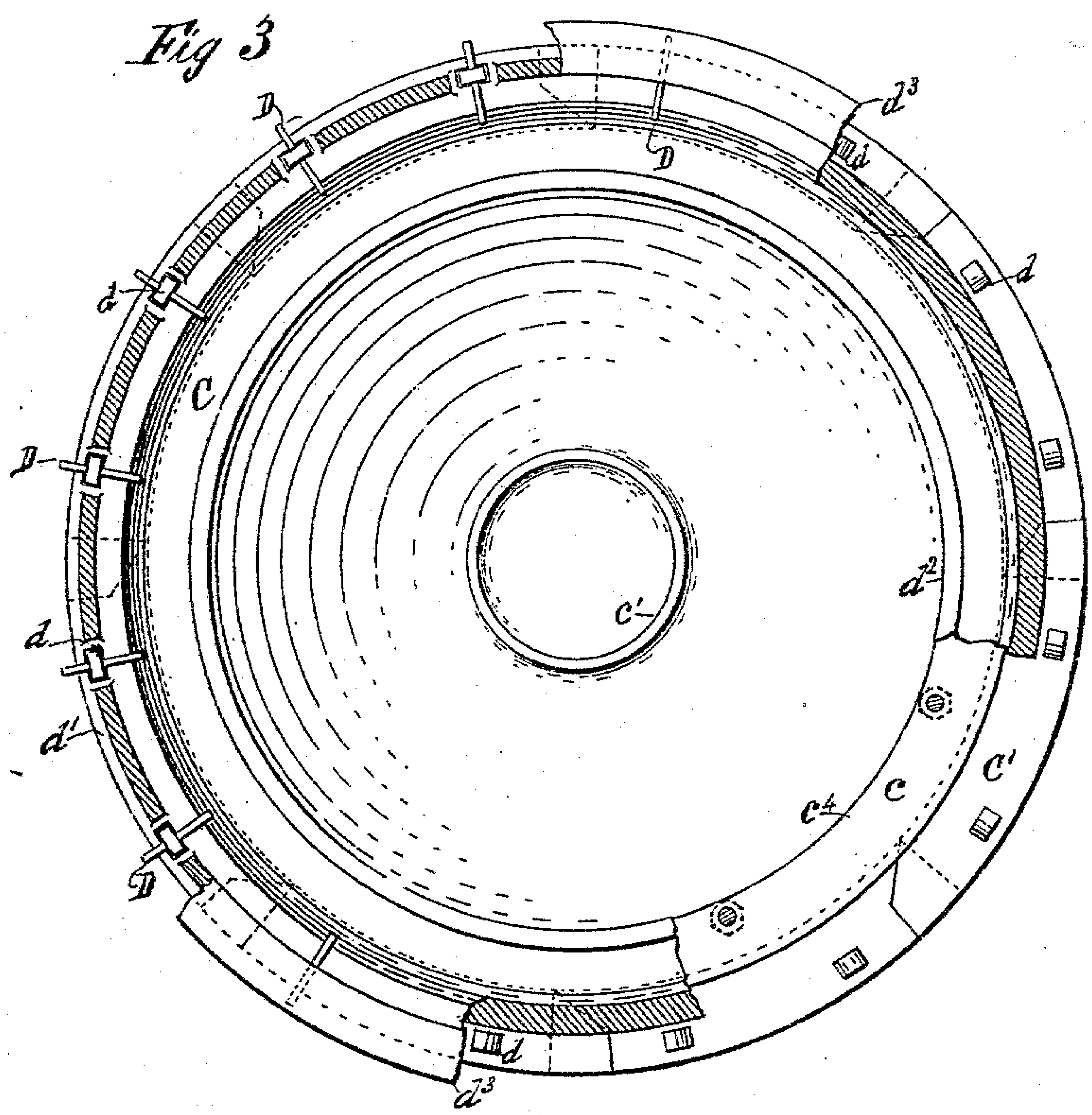


Fig 3



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UNITED STATES PATENT OFFICE.

FRANCIS P. DAVIDSON, OF JOLIET, ILLINOIS, ASSIGNOR TO THE FOX SOLID PRESSED STEEL COMPANY, OF SAME PLACE.

DIE.

SPECIFICATION forming part of Letters Patent No. 551,529, dated December 17, 1895.

Application filed May 11, 1892. Serial No. 432,670. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS P. DAVIDSON, of Joliet, Will county, State of Illinois, have invented a new and useful Improvement in Dies, of which the following is a specification.

This invention relates more particularly to dies for pressing or forming cylinder-heads of steel.

I will describe a die embodying my improvement, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a top or plan view of the lower die, partly in section. Fig. 2 is a side view thereof, partly in vertical section. Fig. 3 is a top or plan view of the upper die, partly in section. Fig. 4 is a side view thereof.

Referring by letter to the drawings, A designates the lower die, consisting of the annular base a, having the forming-surface a', the ring A′ secured by bolts to the upper side of the base and the ring A^2.

The ring A′ has bolt-holes a^2 elongated in the direction of the circumference of the ring and the base a has bolt-holes a^3 elongated in a direction opposite to that of the holes a^2. By so constructing the holes and when bolts are pressed through them provision is made to allow the expansion and contraction of the parts, one relatively to the other, without buckling, as would be the case were the parts rigidly secured together. The ring A^2, against which the flange of the cylinder-head A^3 is formed, rests loosely upon the base a within the ring A′. There is normally a slight space between the vertical surfaces of the rings A′ A^2, so as to allow for the expansion of the ring A^2, and when near the limit of its expansion the ring A^2 will bear against the ring A′ and be strengthened thereby and prevent its breaking under expansion strain. The ring A′ has an inwardly-turned flange a^4 adapted to bear upon a shoulder a^5 of the ring A^2 and the upper inner edge of the ring A^2 is rounded.

B designates a holder-ring supported by the ring A′ and having a space between its lower surface and the upper surfaces of the rings A′ A^2 substantially equal to the thickness of the metal from which the cylinder-head A^3 is formed.

After a plate from which the cylinder-head is formed shall have been placed in position on the rings A′ A^2 the ring B is placed thereon and secured against movement relatively to the ring A′. As a means for securing the ring B to the ring A′, I employ links b which engage over the top of lugs b' and extend around lugs b^2 extending outwardly from the ring A′. Wedge-shaped keys b^3 passed through holes in the lower portions of the links b and across the lower surface of the lugs b^2 serve to draw the parts together and tighten the links.

The ring B is to prevent the buckling or crimping of the plate being pressed into the die.

It is desirable to support the ring B away from the lower die when a plate is being placed in position and also when it is desired to remove a finished or stamped cylinder-head. As a means for so supporting the ring B, I provide a series of swinging hooks B′ pivoted to suitable uprights in a radial line with the lugs b' of the ring B. When the die is raised to bring the ring opposite the hooks, the hooks are to be swung into engagement with the lugs, and when it is desired to seat the dies as the lower die is raised the ring rising allows the hooks to swing out of engagement with the lugs.

The upper die consists of the inner or main portion C and the outer portion C′, conforming on their outer surfaces to the shape of the lower die.

The portion C of the upper die consists, as here shown, of the shell-like bottom c having an annular strengthening-rib c' on its central inner surface, and the upper annular or ring-like portion c^2. The parts c c^2 are secured together by bolts passing through inwardly-turned flanges c^3 c^4 of the respective parts.

It will be observed that the portion c^2 of the upper die is considerably less in diameter than the greatest inner diameter of the lower die, and that its outer surface is inclined downwardly and inwardly.

The portion C′ of the upper die occupies

the space between the outer surface of the portion c^2 and the inner surface of the surface a' and the ring A^2, excepting, of course, sufficient space for the thickness of the plate from which the cylinder-head is formed.

The portion C′ of the upper die is made in several segmental sections and when in position for stamping these sections are removably secured to the portion C of the die. As a means for removably securing these parts together I provide each section of the portion C with upwardly-extending tongues d which project through vertical holes in an outwardly-projecting flange d' on the portion c^2 and pass keys D through holes in the tongues d above the flange d'.

The upper die has a vertically-extending rim d^2, against which a press may bear to press the upper die into the lower die.

In operation the heated plate from which the cylinder-head is formed is placed in position on the lower die. Then the dies are forced together upon it. After forming the plate the sections of the portion C′ are released from the portion C, and the said portion C is then separated, leaving the portion C′ within the lower die, from which it may easily be removed in sections.

Having thus described my invention, what I claim is—

1. In a die, the combination with the upper die of the lower die having the base portion, the ring secured thereon, and the loose inner ring whose inner surface forms a part of the die surface, substantially as specified.

2. In a die, the combination with the upper die of the lower die, consisting of the base portion, the ring so secured to the base as to provide for expansion and contraction, and the loose ring whose inner surface forms a part of the die surface, substantially as specified.

3. In a die, the combination with the upper die of the lower die consisting of the base portion, the ring secured thereon, and the ring resting loosely on the base portion within the first named ring, its inner surface forming a part of the die surface there being a space between said loose ring and said first named ring, substantially as specified.

4. In a die, the combination with the upper and lower die, of the holder ring having outwardly extending lugs, lugs on the lower die in line with the lugs of the holder ring, a link engaging around pairs of said lugs and a binding key for each link, substantially as described.

5. In a die, the combination with the upper die and lower die of the holder ring and means substantially such as described and comprising swinging hooks for supporting the said ring above or away from the lower die, substantially as specified.

6. In a die, the combination with the lower die of the upper die consisting of the main portion having the central annular strengthening rib or flange, and the outer portion, consisting of segmental sections removably secured to the main portion, substantially as specified.

7. In a die the combination with the lower die of the upper die consisting of the main portion comprising the portion c having the central strengthening rib or flange, and the portion c^2 having the outwardly extending flange provided with vertical holes, the outer portion formed of segmental sections having the upwardly extending tongues, provided with transverse holes and extending through the holes of said flange, and keys passing through the holes in the tongues above the flanges, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

F. P. DAVIDSON.

Witnesses:
W. E. ROBERTS,
F. A. JACKSON.