

No. 752,797.

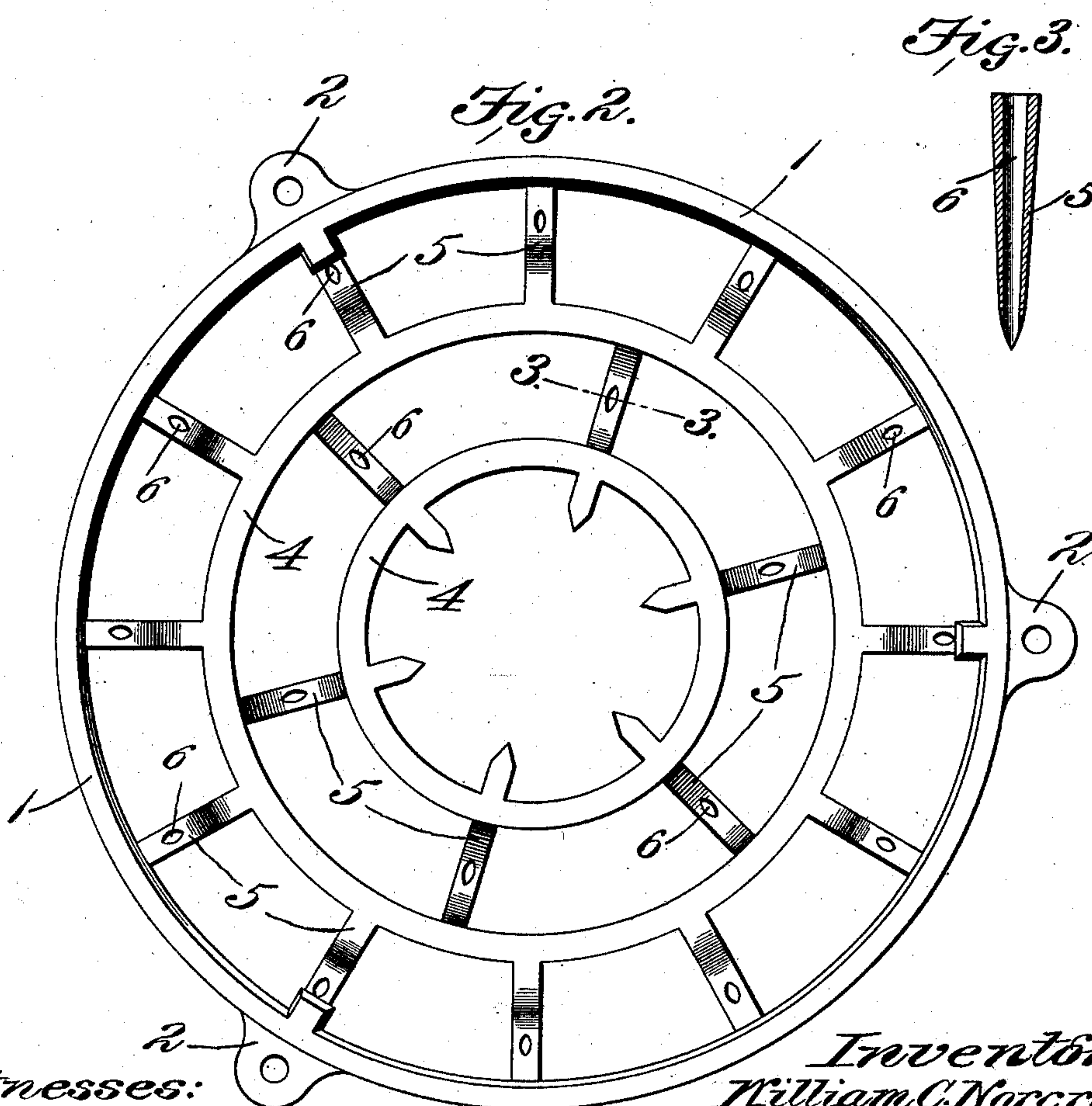
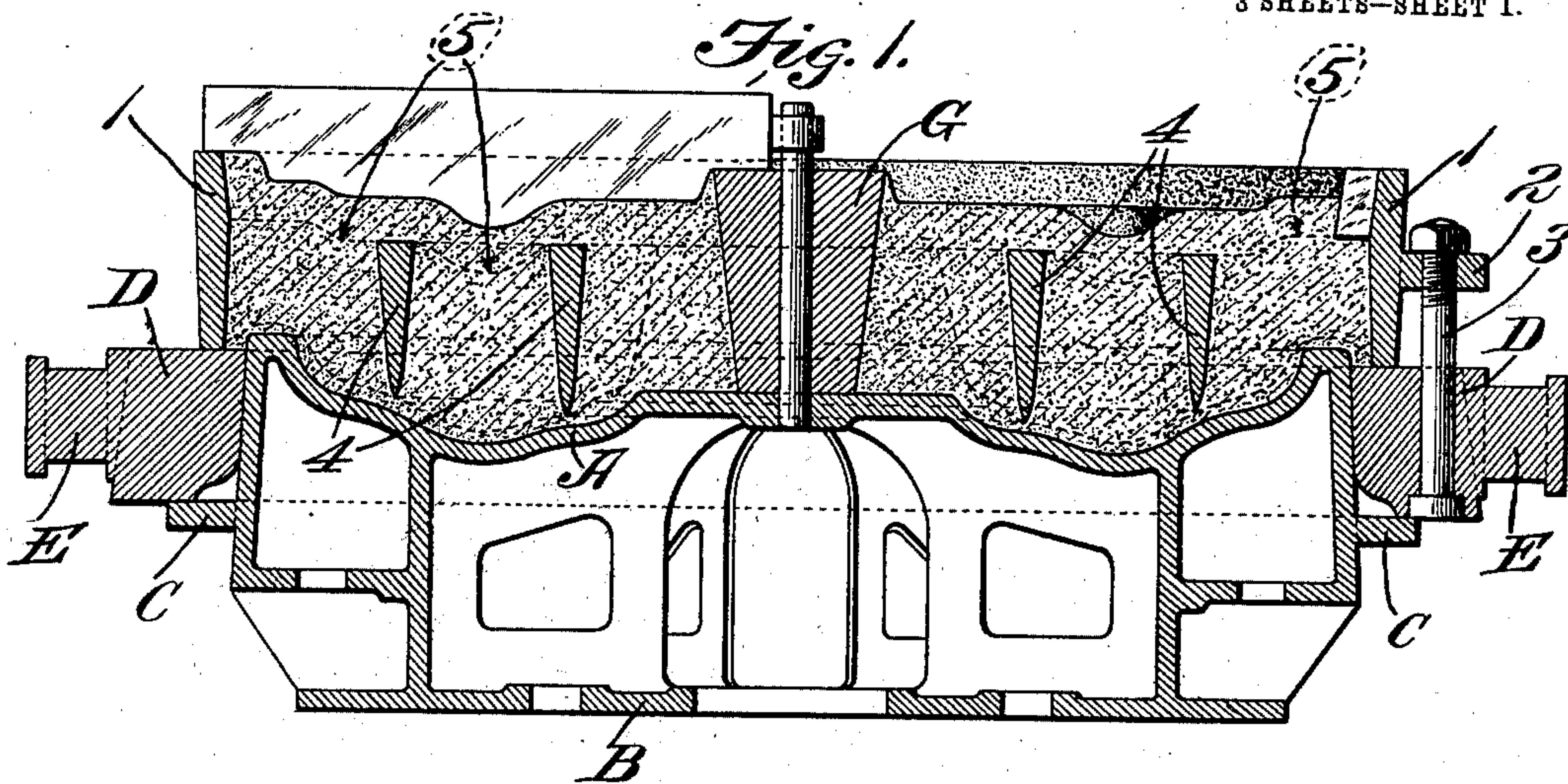
PATENTED FEB. 23, 1904.

W. C. NORCROSS.  
COPE FOR MOLDING.

APPLICATION FILED JULY 11, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:

G. A. Pennington  
J. H. Gibbs

Inventor:  
William C. Norcross,  
by Bakerwell Cornwall  
Attys.



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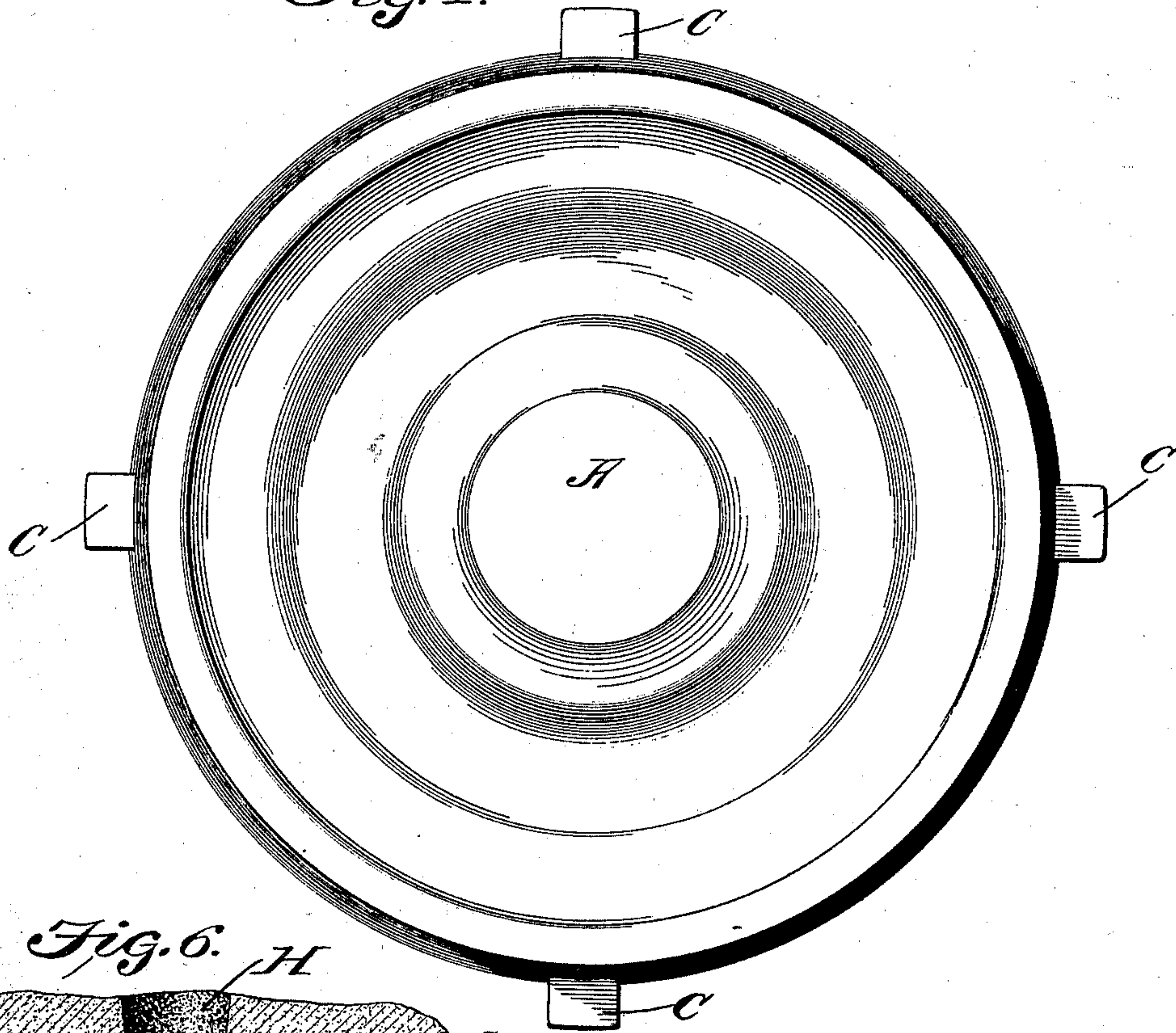
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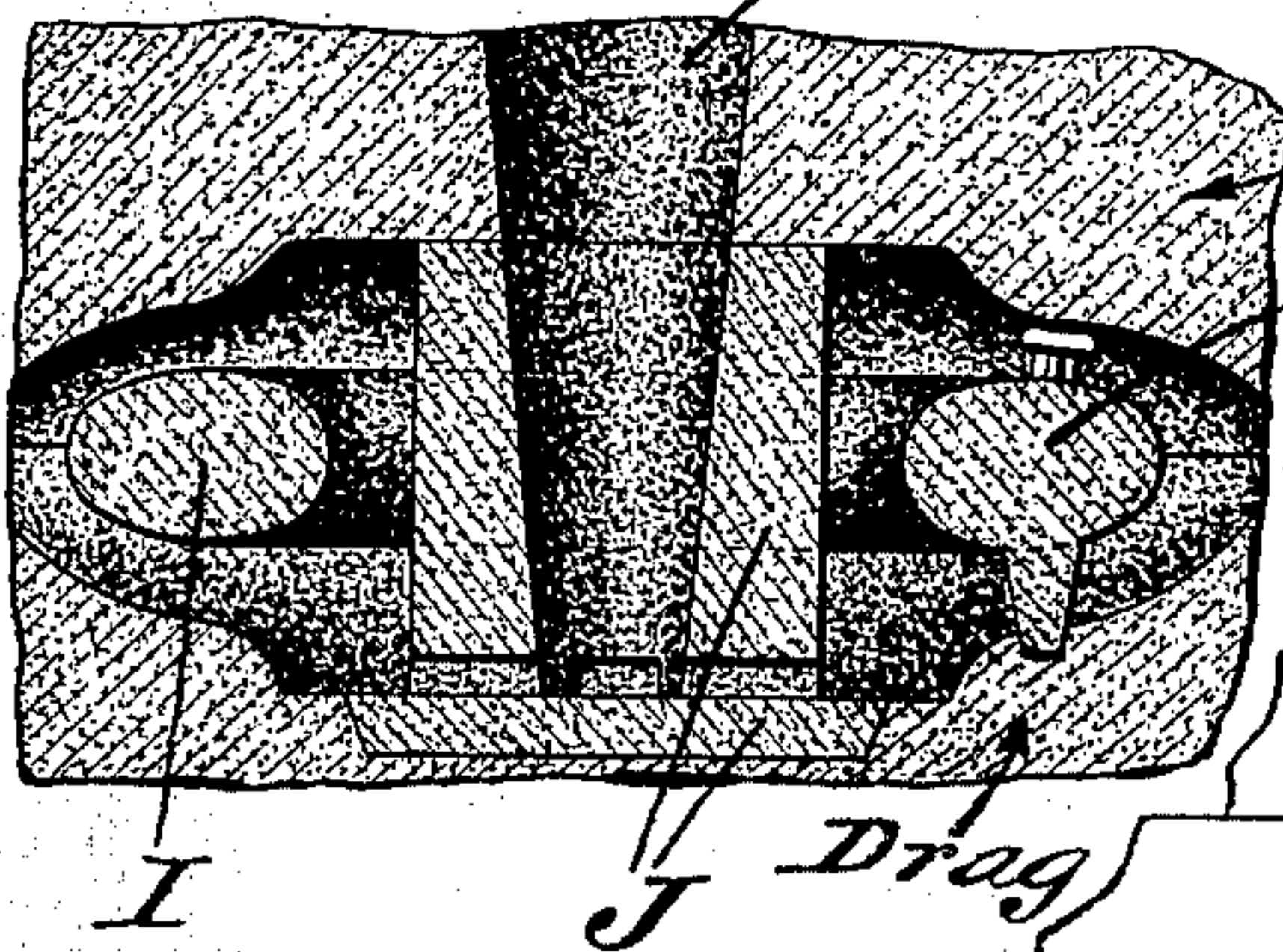
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3 SHEETS—SHEET 2.

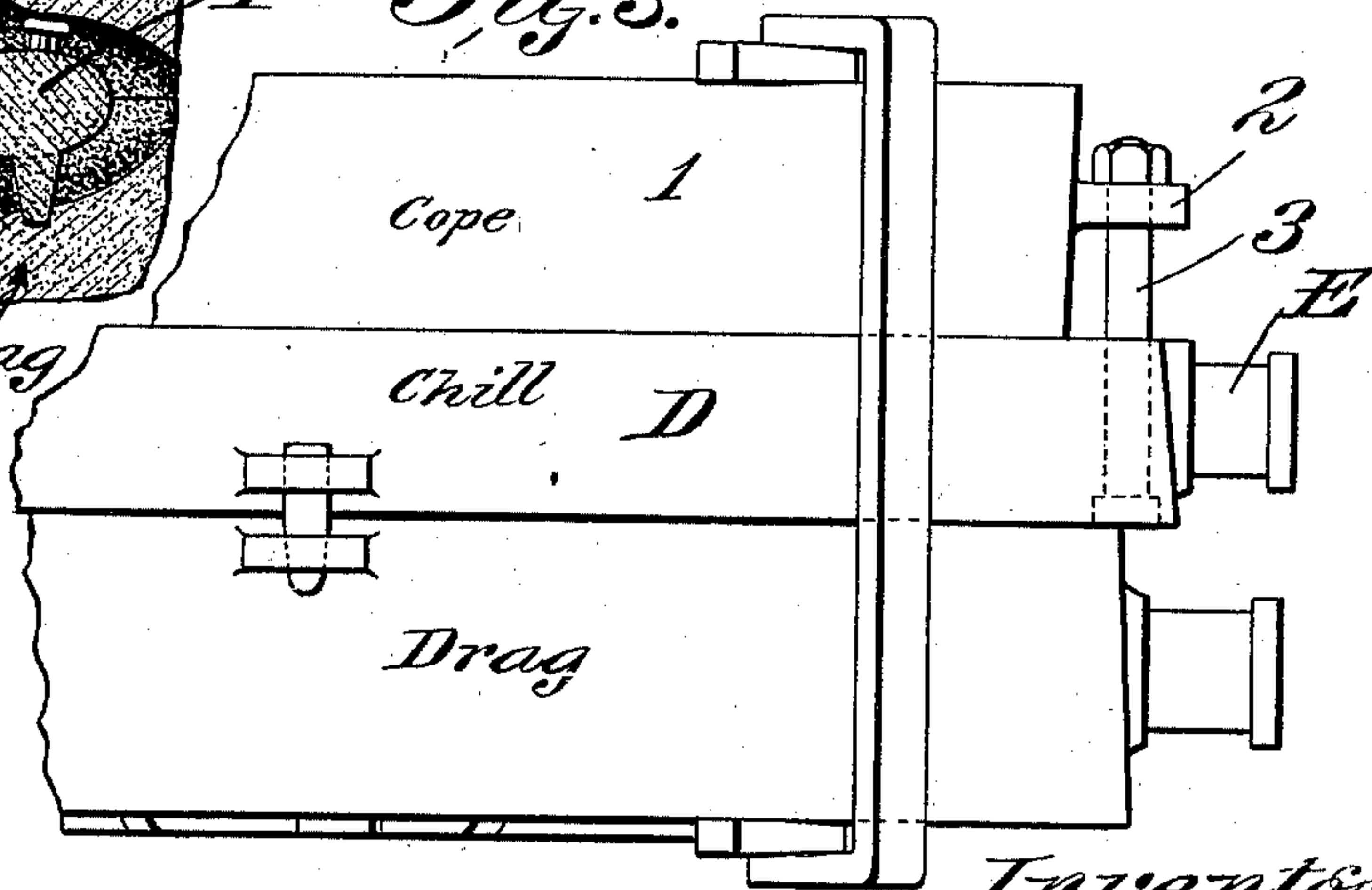
*Fig. 4.*



*Fig. 6.*



*Fig. 5.*



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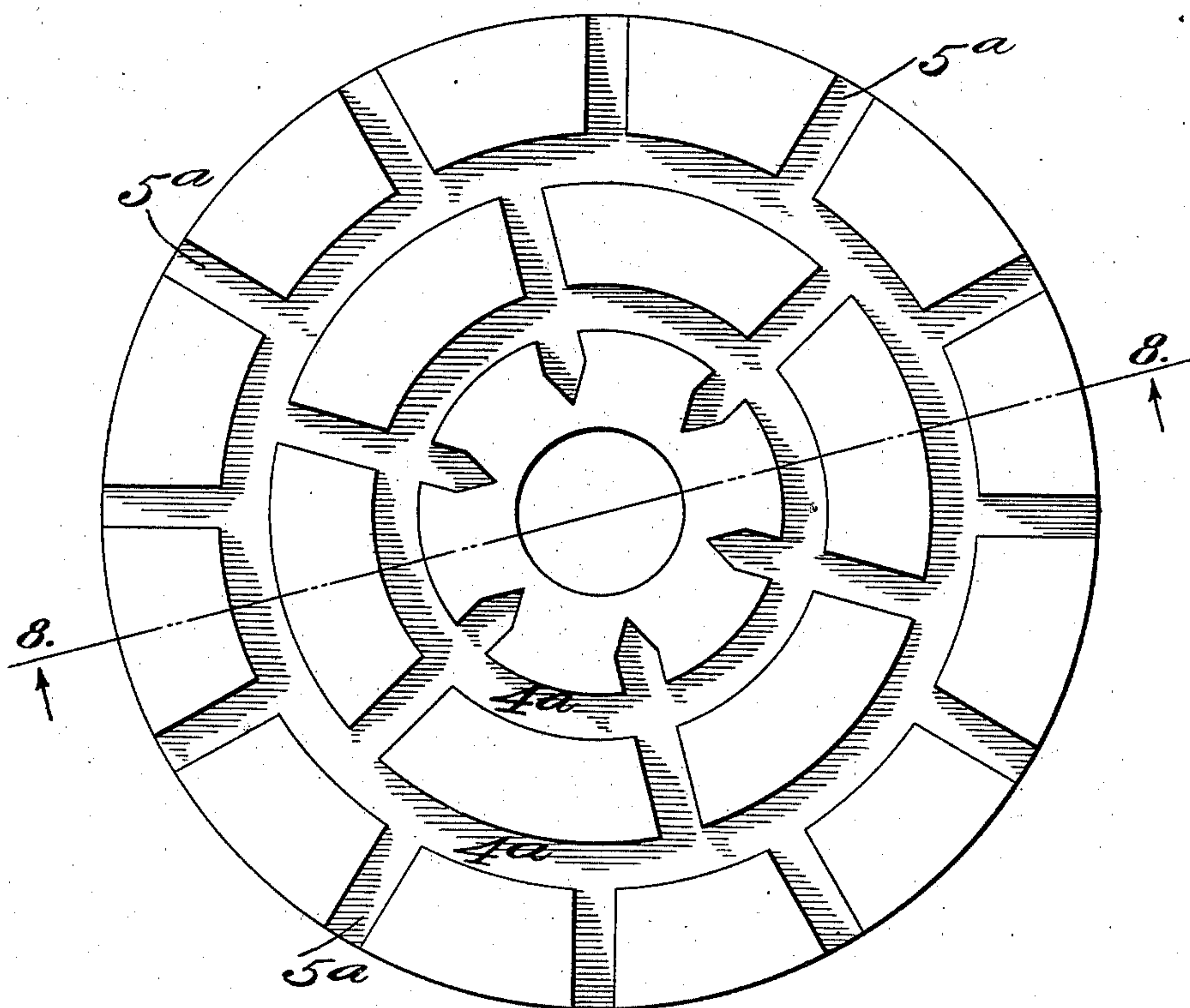
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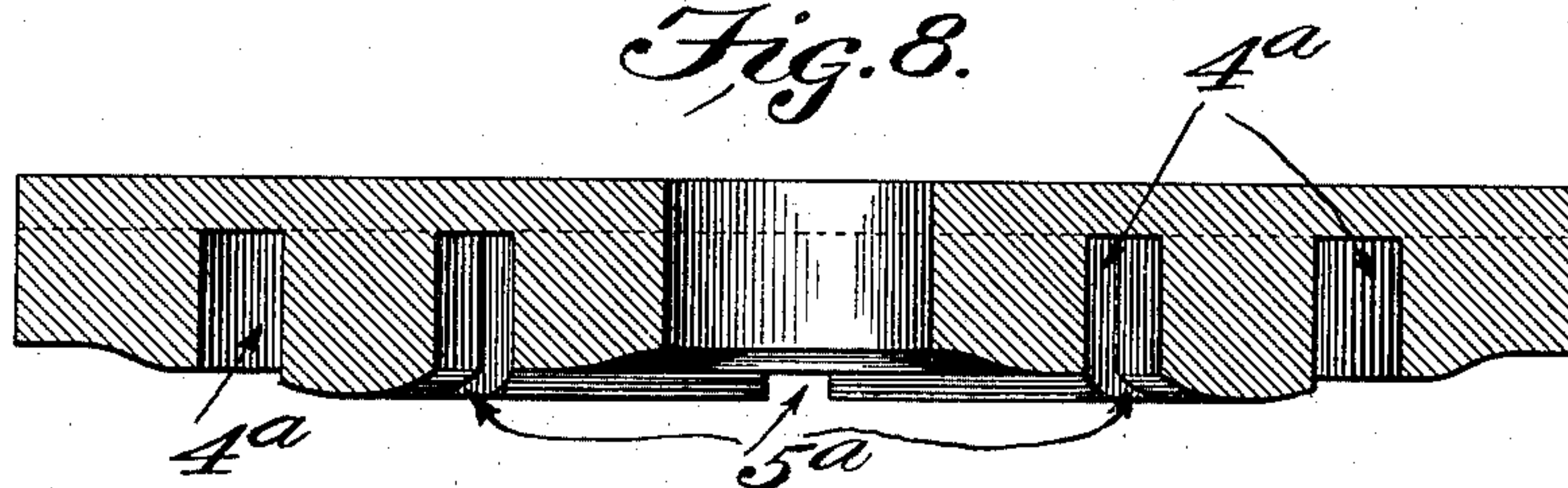
NO MODEL.

3 SHEETS—SHEET 3.

*Fig. 7.*



*Fig. 8.*



*Witnesses:*

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# UNITED STATES PATENT OFFICE.

WILLIAM C. NORCROSS, OF TERRE HAUTE, INDIANA, ASSIGNOR TO  
AMERICAN CAR & FOUNDRY COMPANY, OF ST. LOUIS, MISSOURI,  
A CORPORATION OF NEW JERSEY.

## COPE FOR MOLDING.

SPECIFICATION forming part of Letters Patent No. 752,797, dated February 23, 1904.

Application filed July 11, 1903. Serial No. 165,143. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM C. NORCROSS, a citizen of the United States, residing at Terre Haute, Indiana, have invented a certain new and useful Improvement in Copes for Use in Molding, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical sectional view through a cope and cope-pattern. Fig. 2 is a plan view of the cope. Fig. 3 is a sectional view on line 3 3 of Fig. 2. Fig. 4 is a face view of the cope-pattern. Fig. 5 is an elevation of one end of the molding-flask with the cope, chill, and drag in operative position. Fig. 6 is a detail interior sectional view of the wheel-matrix, showing the ring-core and hub-core in position for use. Fig. 7 is a face view of the cope-follower, and Fig. 8 is a sectional view on line 8 8 of Fig. 7.

This invention relates to new and useful improvements in copes designed for use in casting car-wheels and in other features used in connection therewith.

The object of the invention is to produce a more perfect and better-ventilated cope for the purpose specified; and it consists in certain new and useful features of construction, all as hereinafter more fully described, and specifically pointed out in the claims.

Referring to the drawings, A is the cope-pattern provided with a base portion B and laterally-extending supporting-lugs C, the lugs C being adapted to support thereon a chill-ring D, provided with the usual trunnions E for lifting the same when desired. The cope proper comprises an exterior ring or shell 1, with lugs 2 projecting therefrom, adapted to receive the bolts 3 used to connect therewith the chill-rig D, before referred to. It is preferred that the chill-ring be rigidly connected with the cope during the time of filling the cope with sand and pressing the sand therein, as well as during the subsequent casting of the wheel, as it has been found that more per-

fect castings result from establishing this positive correlation of parts and maintaining them in such relation. Within the shell 1 are shown a plurality of concentric rings 4, connected by intermediate arms 5, the said arms being provided with vertically-extending perforations 6, preferably contracted at their lower ends, their upper ends being enlarged or flared, as best illustrated in the detached Fig. 3, said perforations or openings extending entirely through the arms from top to bottom, and said arms being projected to different vertical planes at their lower edges with relation to each other and with relation to the lower plane of the outer shell 1, so as to bring the lower edges of said arms, with their vent-openings, as near as possible to the wheel-matrix and permit of a thin layer of sand below the arms in forming said matrix. By providing the vent-openings with relatively small inlets and comparatively large outlets, so that they take the form of cones, the gases are permitted to readily escape from the matrix without allowing the casting to become unduly chilled by an inrush of the outer air. The contour of the inner skeleton portion of the cope is not material so long as a sufficient number of parts are there provided to form a suitable support for the sand which is pressed therein, preferably in a power-molding apparatus, such as that patented to Johnson in Letters Patent No. 672,778, of April 23, 1901. In pressing the sand within the cope the pattern-cope and chill-ring are placed, as shown in Fig. 1, with the follower of Figs. 7 and 8 resting upon the sand within the shell 1. Pressure is applied to the parts vertically, whereby the sand is compressed between the pattern A and said follower, which follower is provided with channels 4<sup>a</sup> and 5<sup>a</sup> or any other suitable channels corresponding to the contour of the several members of the inner skeleton of the cope, so that the cope skeleton will rest within said channels and the sand receive a sufficient degree of pressure between the intermediate portions of the follower and the face of the pattern, after which the cope and chill-ring are lifted by means of the trunnions E and placed



in proper position upon a suitable drag, such as that illustrated in a companion application, filed July 11, 1903, Serial No. 165,141, when the metal may be poured to form the casting.

5 Upon filling the cope a centrally-disposed block G is placed in position therein, which block forms a pouring-basin H, coöperating with the sprue-opening in the core, as shown in Fig. 6, the block G being removed after  
10 the sand is pressed in the cope. It will be understood that the usual ring-core I and hub-core J are placed in position in the mold before pouring the metal, the said hub-core J being in alinement with the opening formed  
15 by the centrally-disposed block G, placed in the cope during the pressing of sand therein.

The pressing of the sand in the cope is accomplished by means of the follower shown in Figs. 7 and 8, in which follower the channels  
20 4<sup>a</sup> and 5<sup>a</sup> are formed to correspond with the contour of the skeleton cope shown.

Because of the multiplicity of parts comprising the skeleton cope a large percentage of the surface area of the follower is cut away  
25 to form the channels referred to. The remaining surface only is available for the purpose of pressing the sand in the cope; but because of the peculiar shape of the members comprising the skeleton interior portion there-  
30 of there is sufficient available area to accomplish the desired result. The arms and rings of the skeleton are wedge-shaped in cross-section, widest at the top and tapering gradually to as thin a lower edge as is practical in form-  
35 ing the same of cast metal.

It is of prime importance that this wedge shape be preserved to accomplish the very best results and permit the flow of the sand beneath the edges of the bars, so as to get as  
40 much sand in close proximity to the pattern as possible, because if straight parallel sides were maintained with abrupt angles at their base the sand would not flow readily under the bars and form a mold as hard under the  
45 bars as that portion thereof between the bars and rings of the skeleton referred to.

The thickness of the several members of the inner skeleton is necessarily somewhat increased by reason of the vertical openings  
50 therethrough, which openings should be of such size that they may be easily cleared of any sand which may accidentally find lodgment therein.

I am aware that minor changes in the construction, arrangement, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

60 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A device for use in venting a molding-

flask, comprising a supporting exterior shell forming a cope, means thereon for connection  
65 with a chill-ring, and inwardly-extending arms which are of wedge shape throughout the major portion thereof and which are provided with vertical vent-passages extending entirely  
70 through said arms; substantially as described.

2. A cope for use in a molding-flask comprising an exterior supporting-shell, and having inwardly-projecting arms which are substantially wedge-shaped throughout, and which are provided with vent-openings ex-  
75 tending vertically therethrough; substantially as described.

3. A cope for a molding-flask, comprising an outer shell with integral lugs, and having integral arms which are substantially wedge-  
80 shaped throughout, and project inwardly therefrom, said arms being provided with perforations projected therethrough; substantially as described.

4. A cope for use in molding car-wheels, 85 comprising an exterior shell of metal, and a plurality of inner concentric rings connected with said exterior shell by means of radially-extended arms which are provided with ver-  
90 tical perforations projected therethrough, said rings being substantially wedge-shaped in section; substantially as described.

5. A cope for use in molding car-wheels, comprising an exterior ring, an inner concentric ring, and vertically-perforated radial  
95 arms, which arms are wedge-shaped in cross-section throughout their depth and extend to a lower plane than said exterior ring; substantially as described.

6. A cope for use in a molding-flask com- 100 prising an exterior supporting-shell, and having inwardly-projecting arms which are wedge-shaped and vertically elongated, and which are provided with vent-openings extending vertically therethrough; substantially  
105 as described.

7. A cope for a molding-flask, comprising an outer shell with integral lugs, and having integral arms projecting inwardly therefrom, said arms being wedge shape and vertically  
110 elongated, and provided with perforations projected therethrough; substantially as described.

8. A cope for use in a molding-flask, having inwardly-projecting arms provided with vent-  
115 openings extending therethrough, said openings being substantially conical in section; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, 120 this 6th day of July, 1903.

WILLIAM C. NORCROSS.

Witnesses:

FREDERICK G. SCHAAL,  
JOHN F. FRY.