

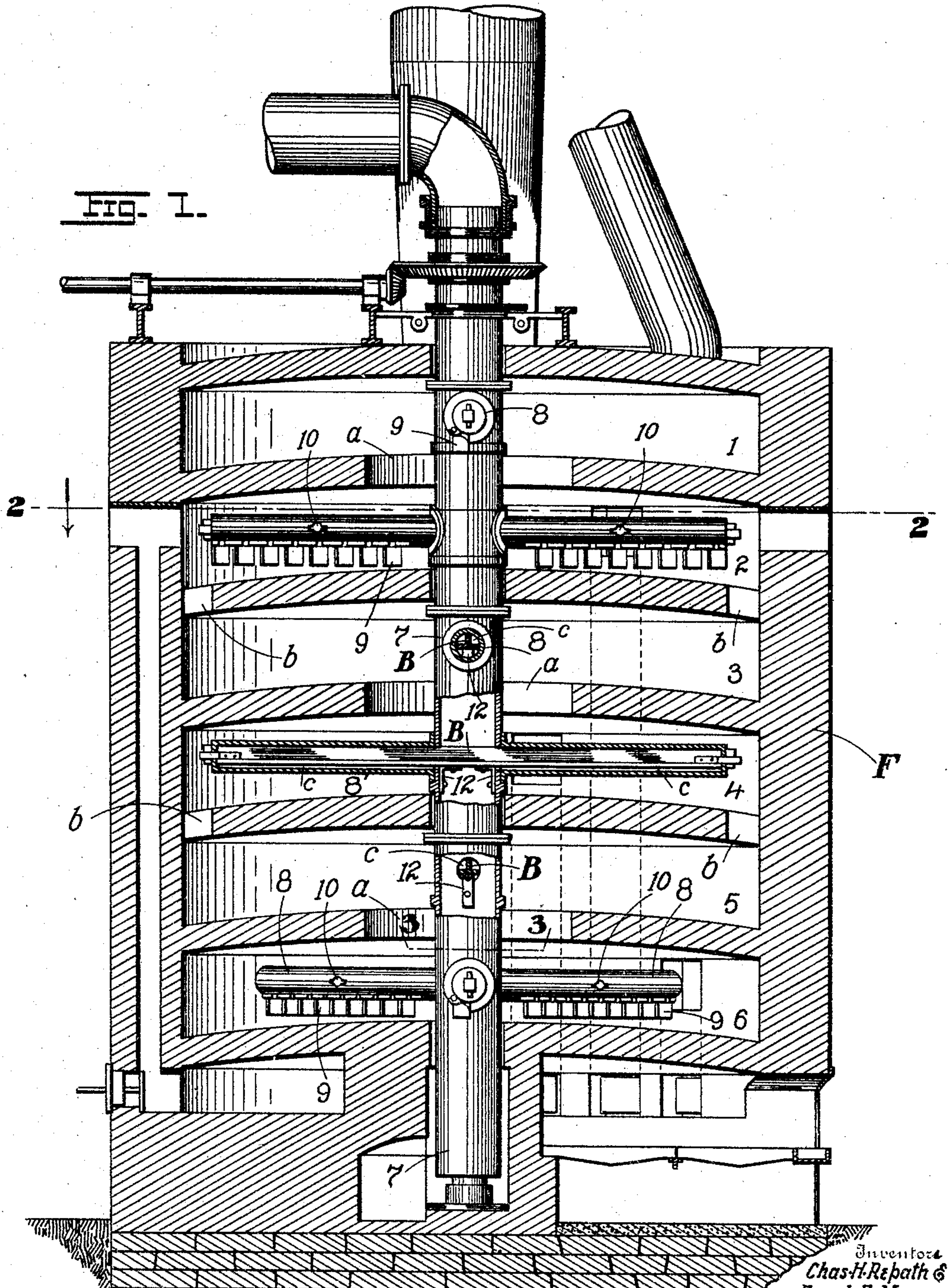
No. 794,118.

PATENTED JULY 4, 1905.

C. H. REPATH & F. E. MARCY.
ROASTING FURNACE.

APPLICATION FILED MAR. 16, 1905.

2 SHEETS—SHEET 1.



Witness

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2 SHEETS—SHEET 2.

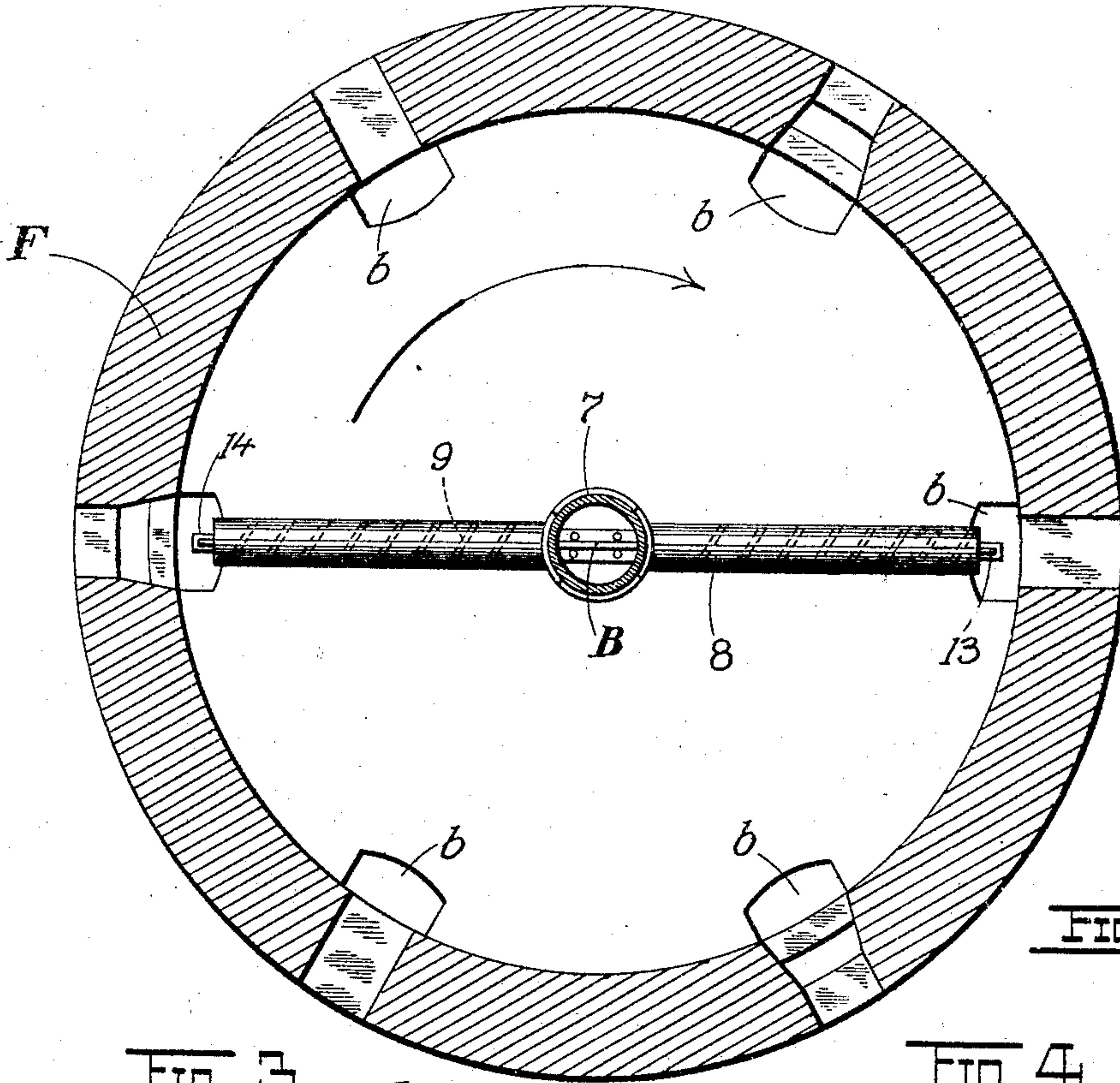


FIG. 2.

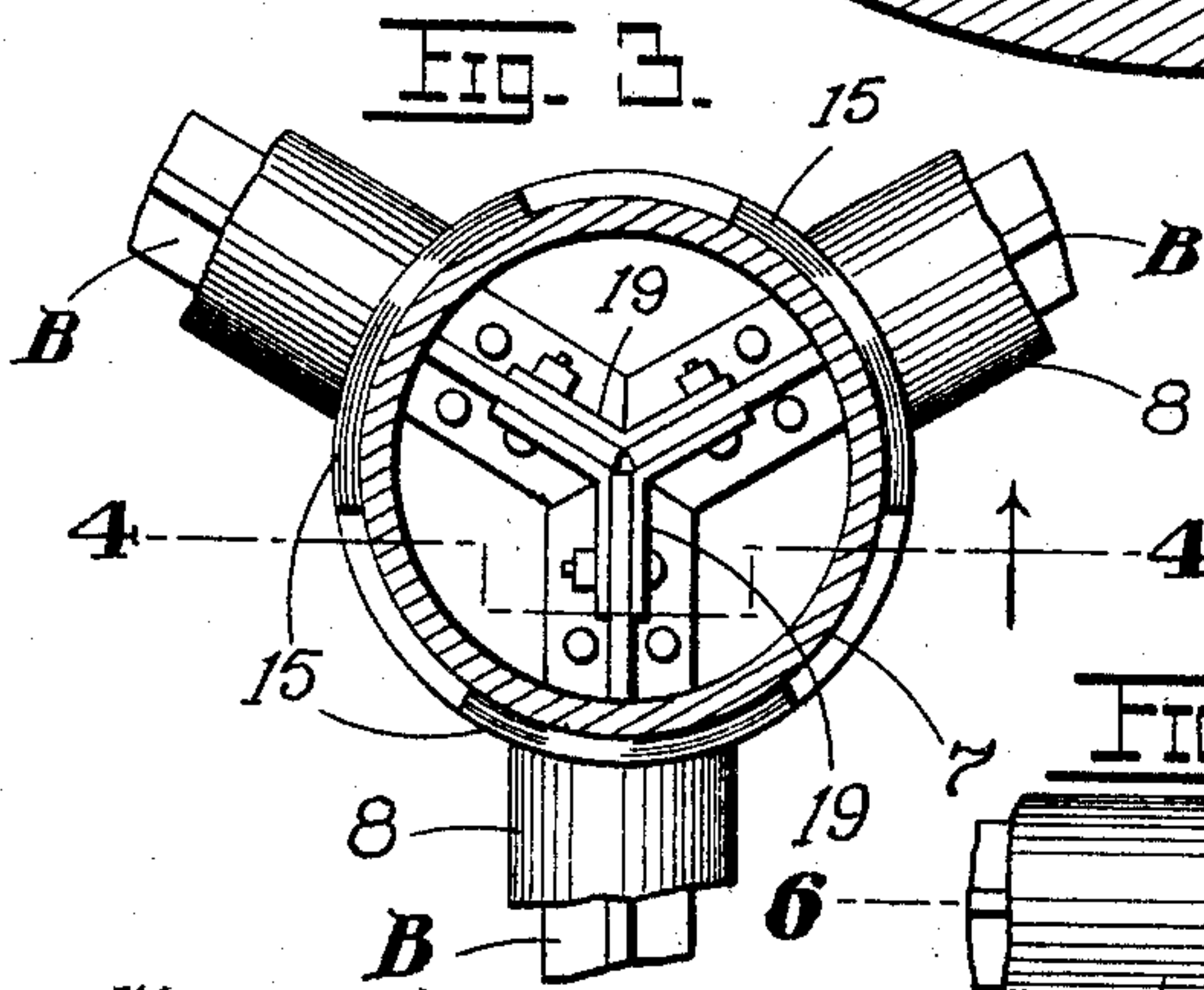


FIG. 3.

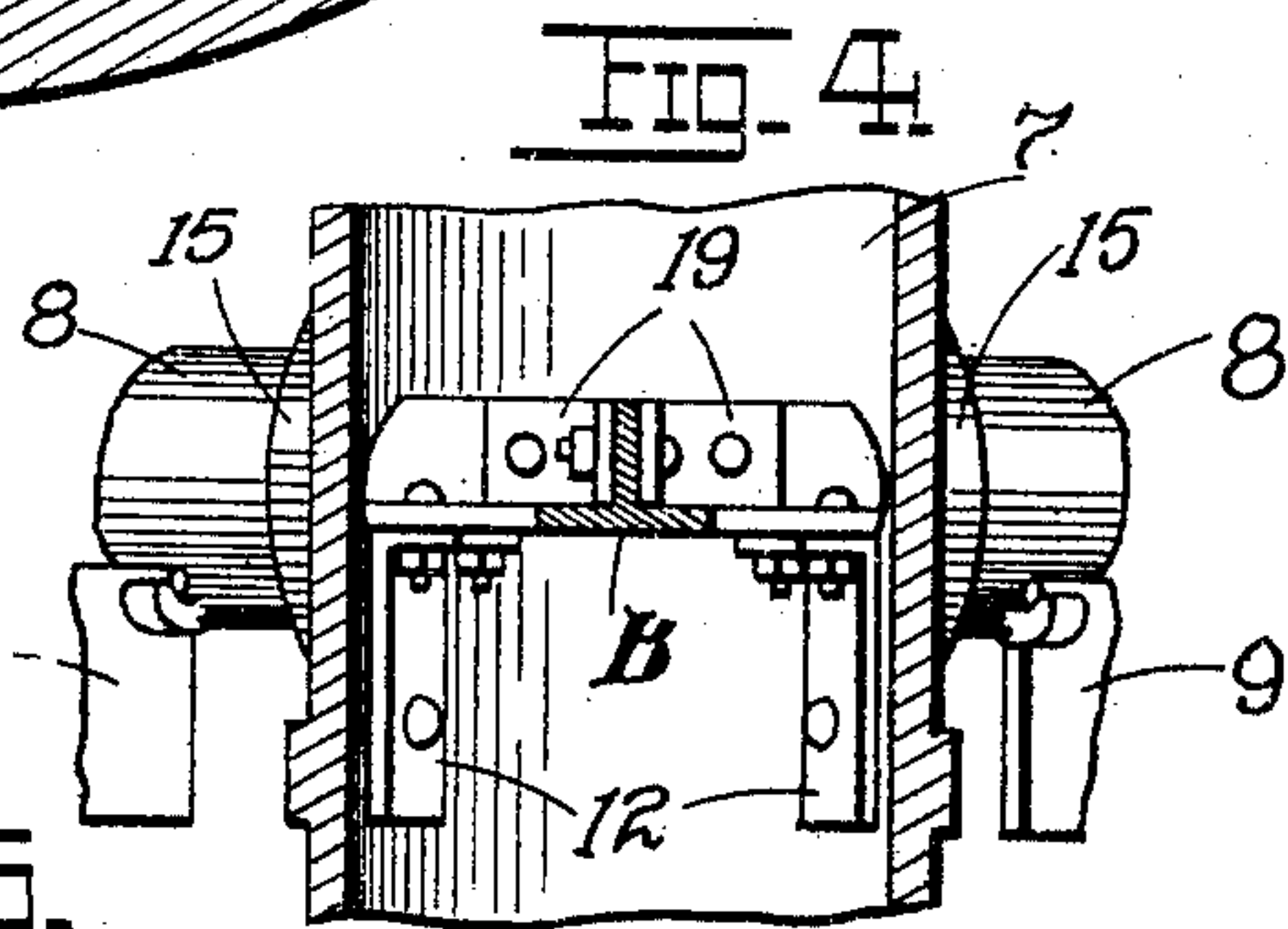


FIG. 4.

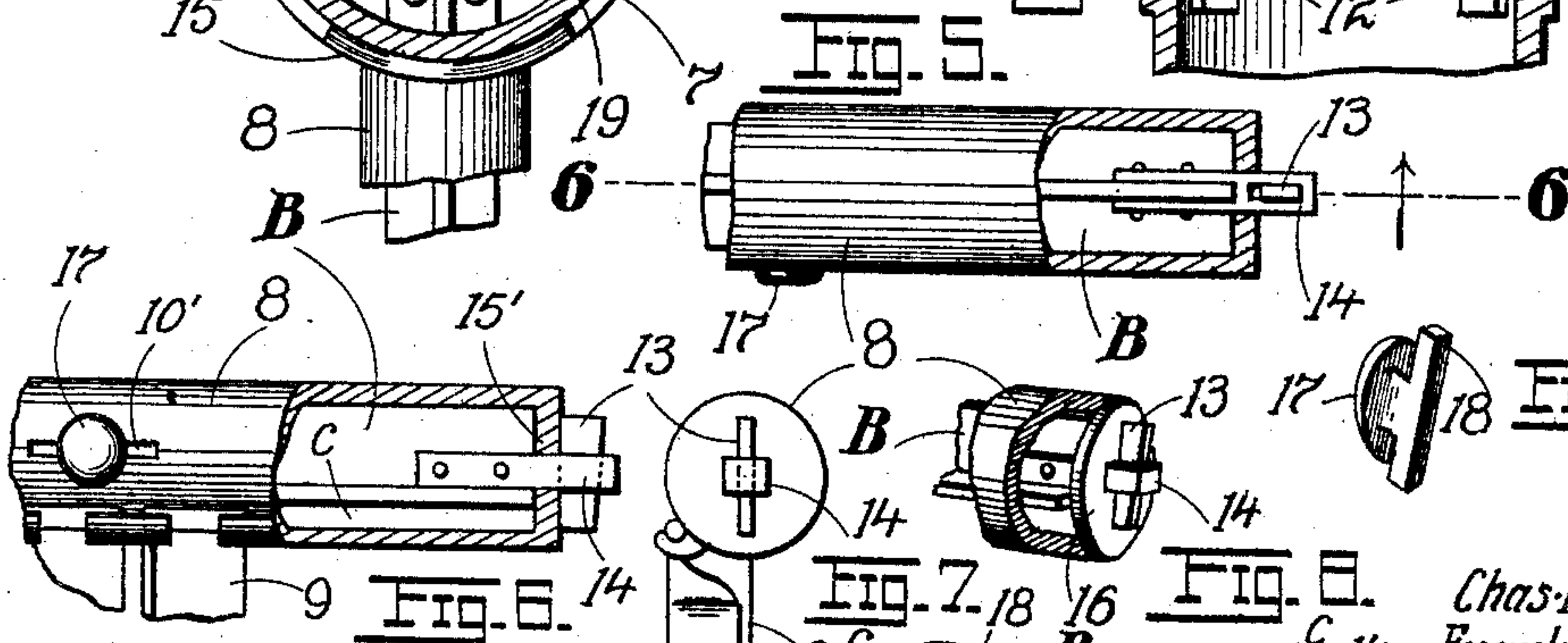


FIG. 5.

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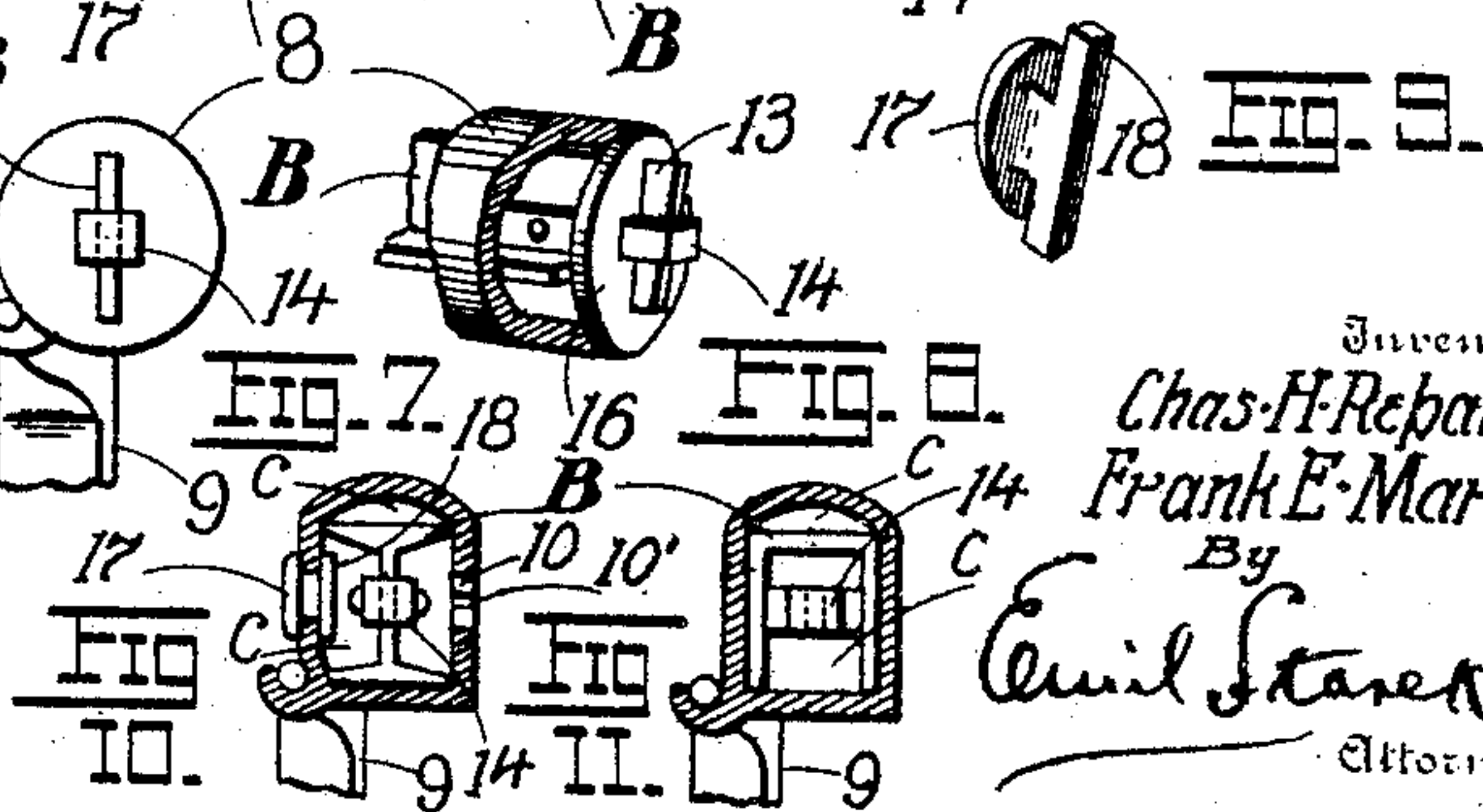


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UNITED STATES PATENT OFFICE.

CHARLES H. REPATH, OF ANACONDA, MONTANA, AND FRANK E. MARCY,
OF CHICAGO, ILLINOIS, ASSIGNORS TO FRANK KLEPETKO, OF NEW
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ROASTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 794,118, dated July 4, 1905.

Original application filed May 25, 1904, Serial No. 209,763. Divided and this application filed March 16, 1905. Serial No. 250,454.

To all whom it may concern:

Be it known that we, CHARLES H. REPATH, residing at Anaconda, in the county of Deer-lodge, State of Montana, and FRANK E. MARCY, residing at Chicago, in the county of Cook, State of Illinois, citizens of the United States, have invented certain new and useful Improvements in Roasting-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention has relation to improvements in roasting-furnaces; and it consists in the novel construction and arrangement of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a middle vertical section of a qualified form of a McDougall ore-roasting furnace, showing our invention applied thereto. Fig. 2 is a horizontal section on line 2 2 of Fig. 1. Fig. 3 is an enlarged cross-sectional detail on line 3 3 of Fig. 1, showing the meeting ends of three rabble-arm-supporting members within the rabble-shaft. Fig. 4 is a vertical section on line 4 4 of Fig. 3. Fig. 5 is a top plan of the outer end of the rabble-arm, partly broken. Fig. 6 is a vertical section on line 6 6 of Fig. 5. Fig. 7 is an end view of the rabble-arm. Fig. 8 is a perspective showing a modified method of closing the outer end of the rabble-arm. Fig. 9 is a perspective detail of the plug for closing the discharge-orifice of the rabble-arm. Fig. 10 is a cross-section showing an I-beam structural member, and Fig. 11 is a cross-section showing a channel-bar structural member.

The present invention is a division of the subject-matter covered in our original application for improvement in roasting-furnaces, filed May 25, 1904, Serial No. 209,763, being restricted to those features immediately concerned with the rabble-shaft and rabble-

arms carried thereby. Its object is to provide a construction which will insure rigidity for the rabble-arms, preventing the same from sagging under their own weight; to provide a rigid connection between the shaft and arms; to provide a construction which will insure positive cooling of the shaft and arms by means of air; to provide means for delivering a portion of the air to the hearths of the furnace, and to provide other features of construction whose advantages will be better apparent from a detailed description of the invention, which is as follows:

Referring to the drawings, F represents the furnace, which in the present instance is composed of six superimposed hearths 1, 2, 3, 4, 5, and 6, respectively, in which the material is treated, the ore dropping from the upper hearth successively through the several hearths until it reaches the sixth hearth, whence it is delivered through a discharge-spout. (Not shown.) The hearths are provided, respectively, with the central and marginal openings *a b* for the passage of the material, as well understood in the art. Passing centrally through the hearths is the rotatable (preferably) air-cooled rabble-shaft 7, from which radiate the series of hollow rabble-arms 8, extending into the several hearths and carrying rakes or blades 9, by which the material is stirred and successively fed from one hearth to the hearth immediately beneath it, all as well understood in the art. The sixth hearth (in the present furnace) is fitted with three rabble-arms, which increases the stirring by fifty per cent., at the same time giving the roasting ore a greater travel along the path of the rakes than toward the outer edges of the hearth. The air for cooling the shaft and arms is taken in at the top of the central shaft either by natural or forced draft, from where it passes into the arms, and from there it may be discharged

into the hearths through the air-openings 10, so that the air answers the two-fold purpose of cooling and furnishing oxygen to the charge.

To prevent the arms from sagging under their own weight as a result of the heat to which they are exposed, we secure said arms to the rabble-shaft 7 by a method which we will now describe: Passed transversely through the walls of the shaft in each hearth is a structural member B, which may be either a T-bar, eye-beam, angle-bar, or any other approved form, said member being secured to the shaft-walls by means of angle-plates 12. The projecting portions of this structural member B thus serve as supporting members for the interchangeable hollow arms 8, the latter being simply slipped over the supporting members B and their ends keyed by a wedge or key 13, the latter being passed through the terminal loop 14 of a reinforcing-strap riveted to the web of the supporting member. It is apparent that after the key is driven up the supporting member B will be in tension and the hollow rabble-arm 8 in compression, the several arms thus becoming rigid members which bear with their basal flanges 15 against the corresponding curved peripheral walls of the shaft and are thus held against the turning which might otherwise result from the twisting movement of the rakes. The hollow arm when slipped over the structural member rests on it the entire length, causing the load to be uniformly distributed. The outer end of the arm may be formed with an inner closing-flange 15', or a separate closing-plate 16 may be interposed between the end of the arm and key, as shown in the modification in Fig. 8. The orifices 10, (preferably located on the sides,) which admit the air through the arms into the charge, may when desired be closed by a plug 17, the latter being provided with an inner diametrically-disposed rib 18, which may be turned into alinement with the opposite recesses 10' of the orifice to properly insert the plug, after which by giving the plug a turn of ninety degrees, so as to bring the ends of the rib out of alinement with the recesses, the plug becomes locked in position. Of course it is removed by a reversal of these operations. The member B is protected from the direct effects of the heat of the furnace, and the rabble-arm being readily replaceable while the furnace is in operation and still hot it is apparent that a decided advantage flows from this construction. For the sixth hearth, which contains three rabble-arms, the connection between the structural members B and the rabble-shaft must be somewhat qualified, for the three members must meet at the axis of the shaft. In that case the separate members are secured together by plates 19, bolted to the webs thereof, and in addition they are

secured to the shaft by the angles 12, as heretofore explained.

It will be seen from the foregoing that the cross-section of the member B is such as to leave air spaces or conduits *c* between it and the walls of the rabble-arm 8 for the free circulation therethrough of the air or other available cooling medium, the latter in its circulation coming in contact not only with the walls of the rabble-arm, but with the walls of the member B as well.

Such features of construction as may be shown, but not herein specifically referred to, are either well known in the art or covered by prior patents or other pending applications. It is further to be understood that we do not wish to be limited to the precise details of construction here shown, as these may in a measure be departed from without in any wise affecting the nature or spirit of our invention.

Having described our invention, what we claim is—

1. In a furnace, a rotatable rabble-shaft having radiating structural members passing through and carried by the walls thereof, and hollow arms passed over and supported by said structural members, substantially as set forth.

2. In a furnace, a rotatable rabble-shaft having structural members radiating outwardly therefrom, and hollow arms passed thereover and supported by said members, suitable spaces being left between said members and arms for circulation of a cooling medium, substantially as set forth.

3. In a furnace having one or more hearths, a central hollow shaft passing through the hearths, structural members radiating from and passing through the walls of said shaft into the several hearths, and hollow rabble-arms passed over the structural members and supported thereby, substantially as set forth.

4. In a furnace having a plurality of superposed hearths, a central hollow rotatable shaft passing through the hearths, a series of flanged structural members radiating from and passing through the walls of the shaft and extending into the several hearths, and hollow rabble-arms passed over and supported by the structural members, substantially as set forth.

5. In a furnace having a plurality of superposed hearths, a central hollow rotatable rabble-shaft passing through the hearths, a series of flanged structural members radiating from and passing through the walls of the shaft and extending into the several hearths, and hollow rabble-arms passed over and supported by the structural members, the walls of the arms being provided with openings for the escape of air into the hearths, substantially as set forth.

6. In a furnace having a plurality of hearths, a hollow rotatable rabble-shaft pass-

ing through the hearths, a series of flanged structural members radiating from and passing through the walls of said shaft and extending into the several hearths, hollow rabbet-arms passed over and supported by the structural members, and terminal keys carried by the structural members for forcing the hollow arms against the shaft and thus binding the parts together, substantially as
10 set forth.

In testimony whereof we affix our signatures each in the presence of two witnesses.

CHARLES H. REPATH.

FRANK E. MARCY.

Witnesses for Charles H. Repath:

M. E. RUTLEDGE,

U. A. GARRED.

Witnesses for Frank E. Marcy:

H. I. KEEN,

W. A. THOMPSON.