

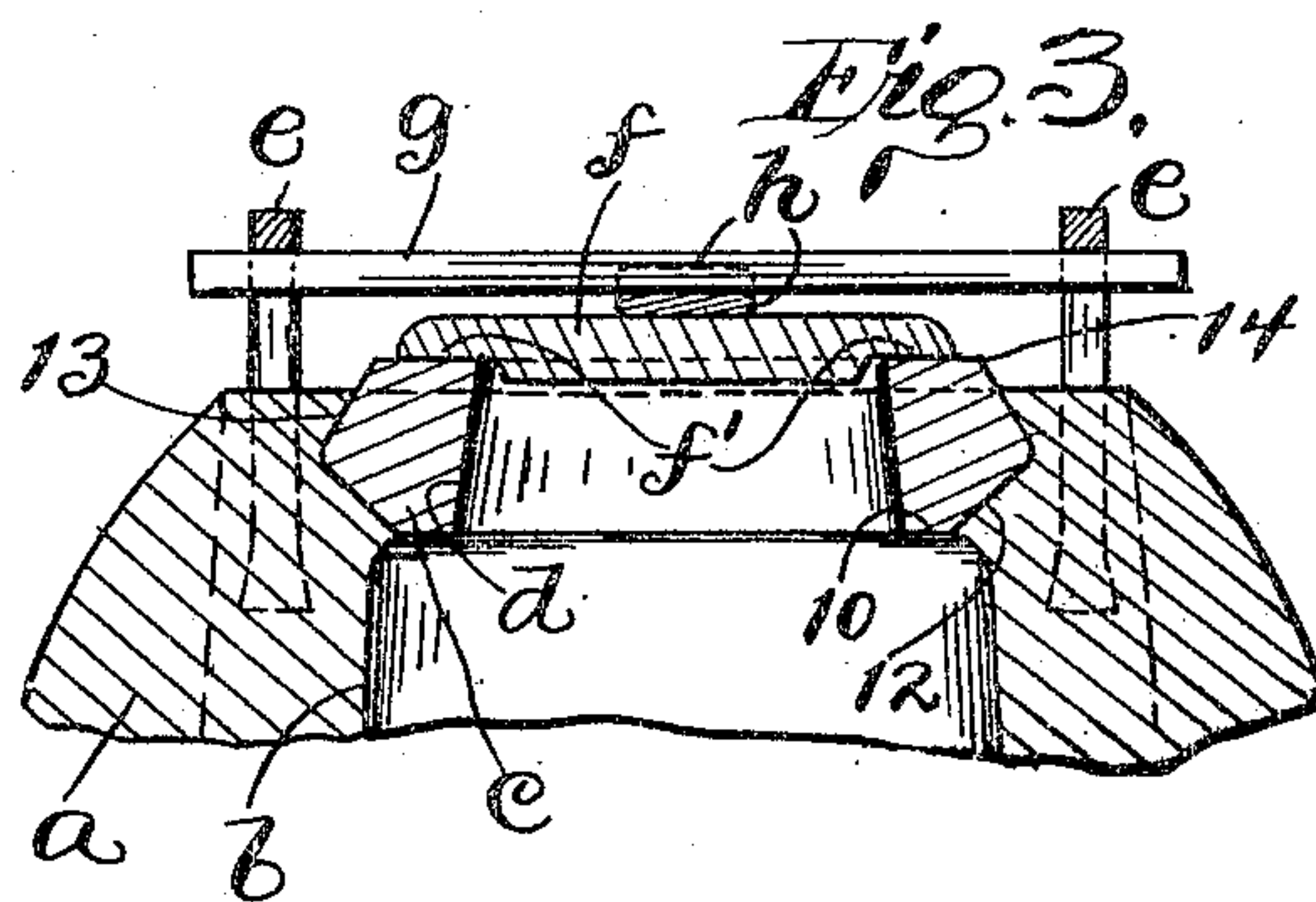
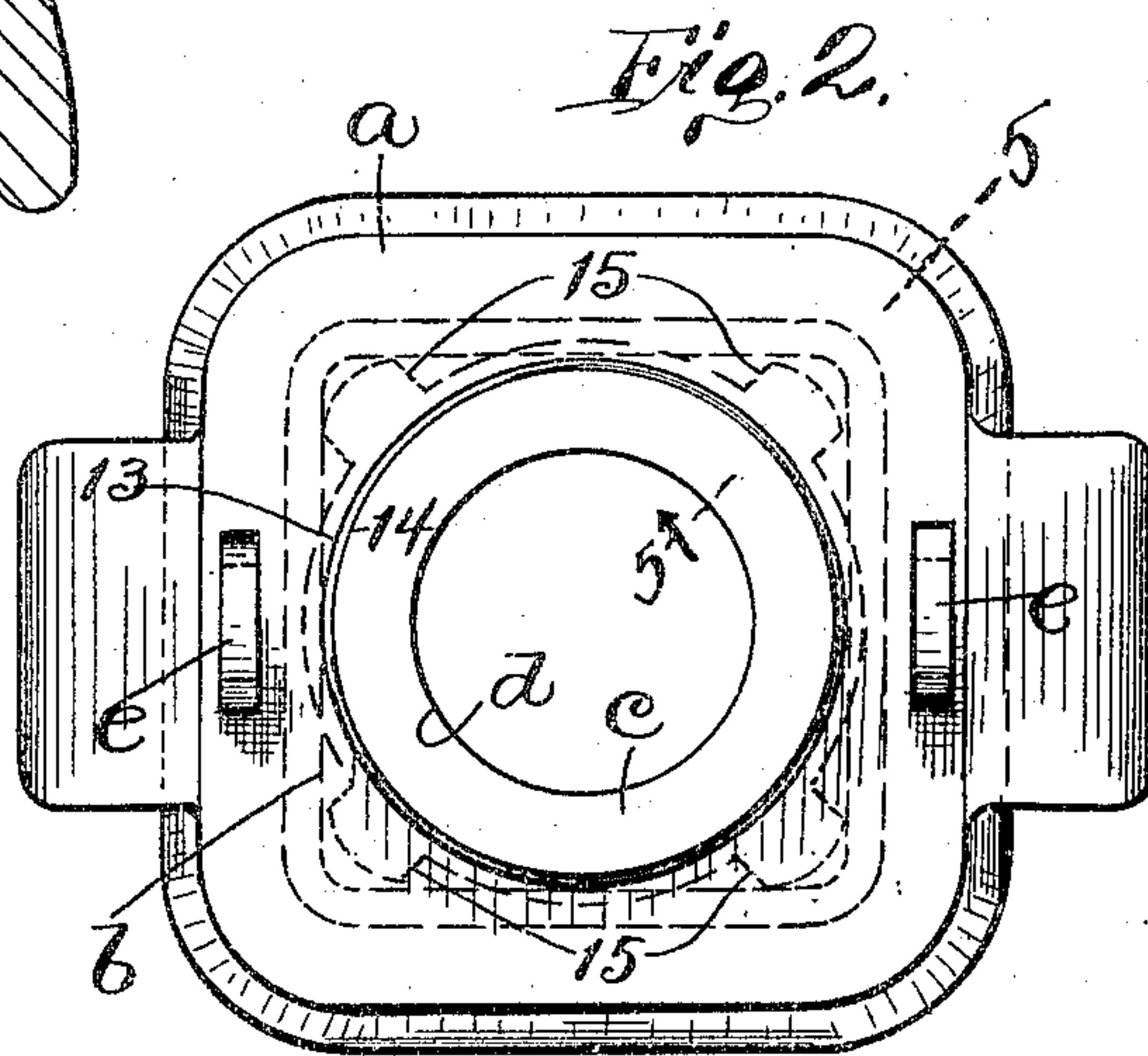
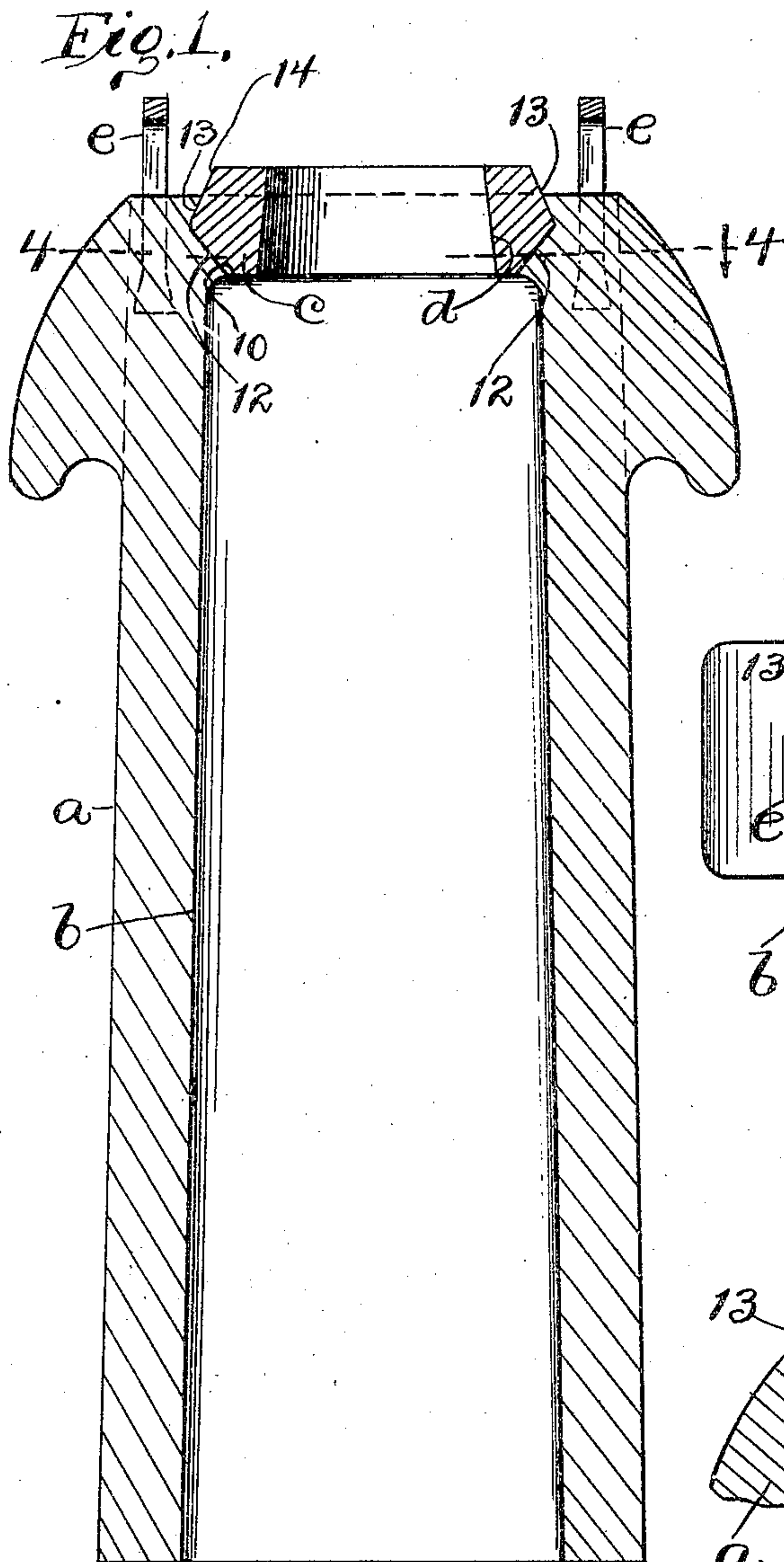
No. 789,828.

PATENTED MAY 16, 1905.

T. D. WEST & G. H. BOYD.
INGOT MOLD.

APPLICATION FILED OCT. 5, 1904.

2 SHEETS—SHEET 1.



WITNESSES:
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G. M. Hayes.

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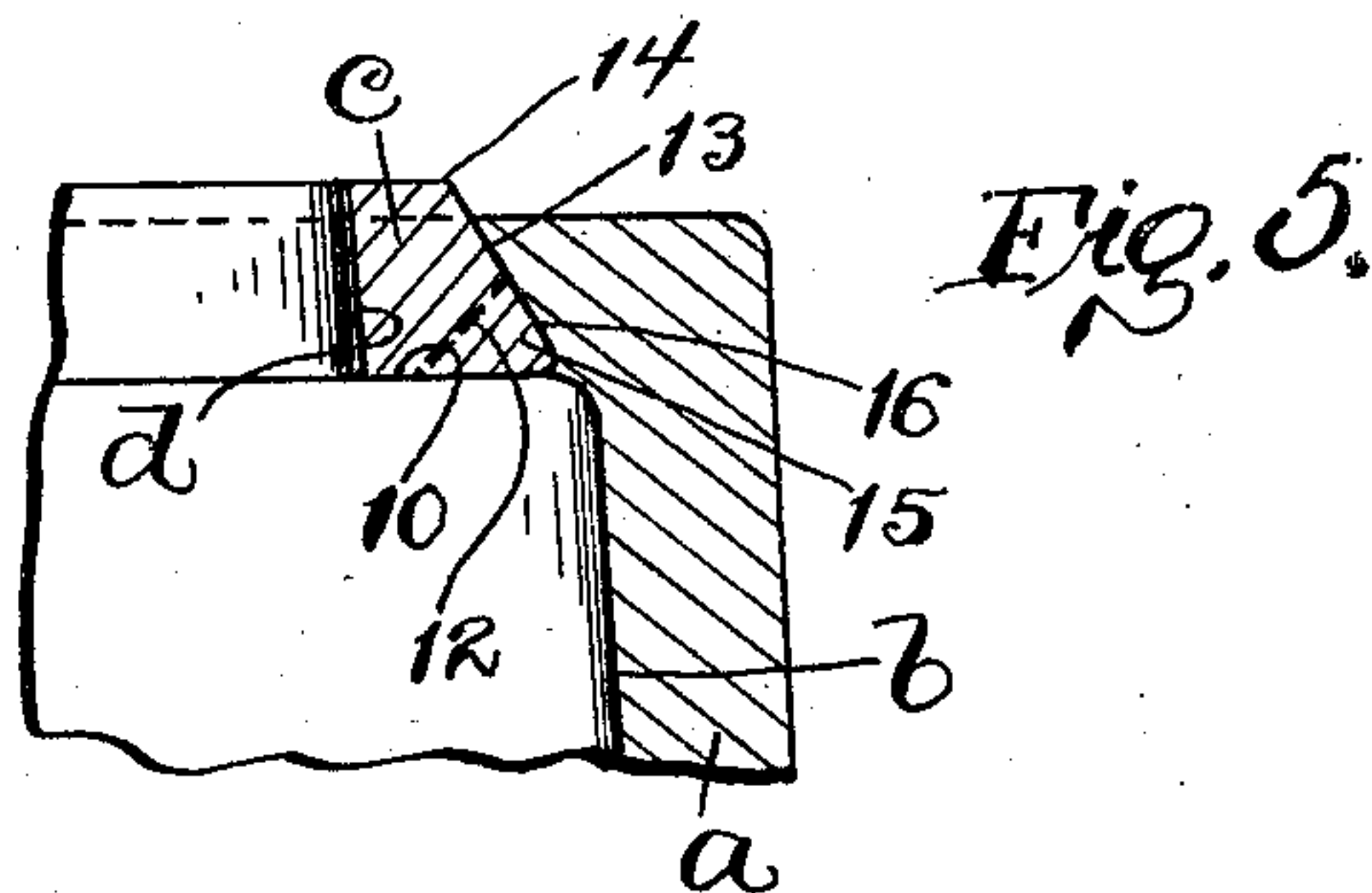
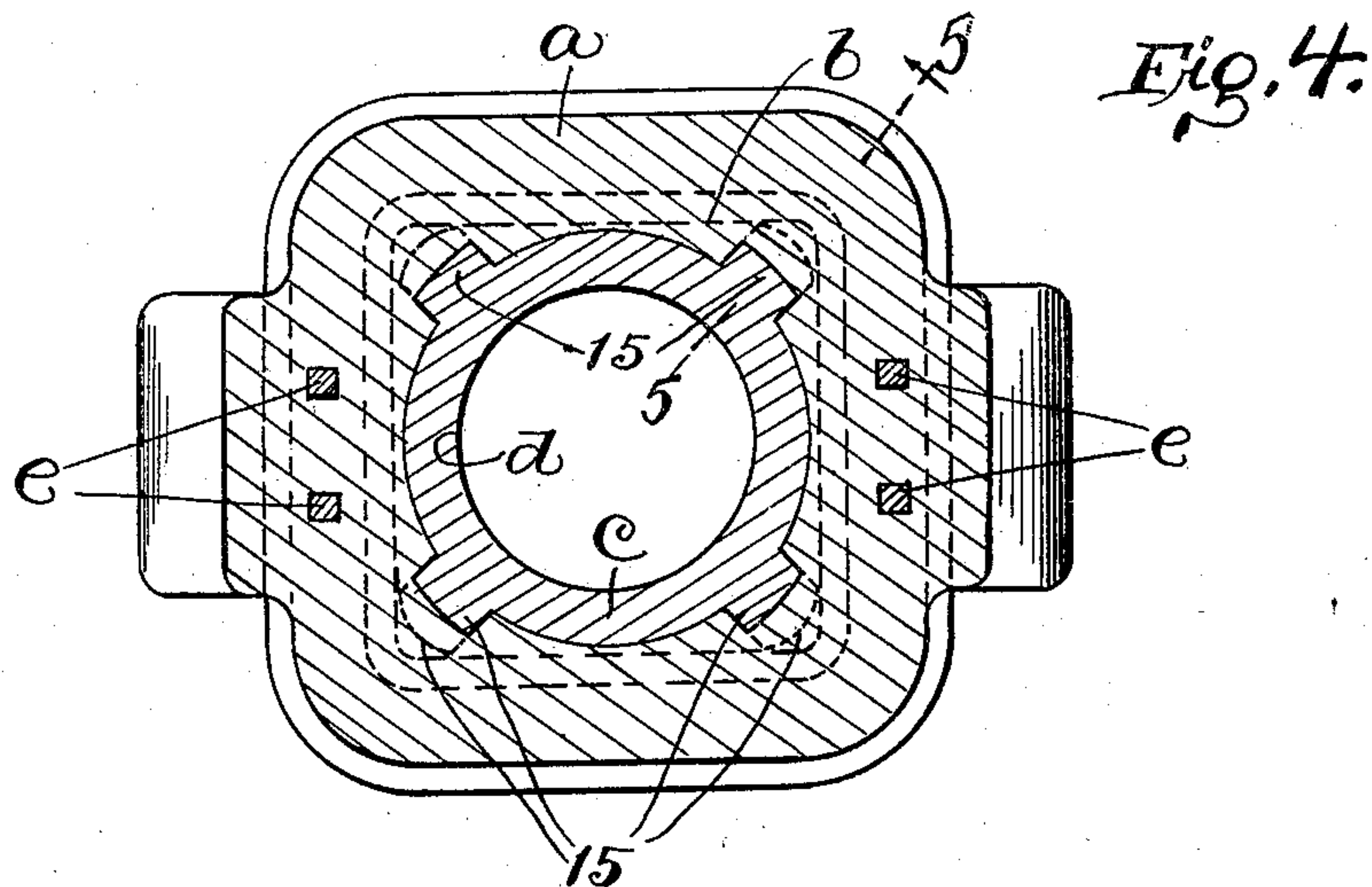
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UNITED STATES PATENT OFFICE.

THOMAS D. WEST, OF SHARPSVILLE, AND GEORGE H. BOYD, OF
SHARON, PENNSYLVANIA.

INGOT-MOLD.

SPECIFICATION forming part of Letters Patent No. 789,828, dated May 16, 1905.

Application filed October 5, 1904. Serial No. 227,246.

To all whom it may concern:

Be it known that we, THOMAS D. WEST, residing at Sharpsville, and GEORGE H. BOYD, residing at Sharon, in the county of Mercer and State of Pennsylvania, citizens of the United States of America, have invented certain new and useful Improvements in Ingot-Molds; and we 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 pertains to make and use the same.

This invention relates to improvements in ingot-molds.

The molten iron or metal employed in casting an ingot-mold is subject more or less to shrinkage and accompanied by kish and dirt, which rises to the upper end of the casting. The action of shrinkage and the ascent of the kish and dirt to the upper end of the casting results in the formation on top of the mold of an unsound body or rough uneven surface so full of depressions, pits, or cavities as to prevent the formation of a tight joint between the upper end of the mold and the cap employed in covering the chamber of the mold in forming what is known in the art as a "closed-top" ingot-mold. Especially great is the liability of the formation of shrinkage-holes and a rough and uneven surface on top of the body portion of an ingot-mold when the molten metal employed in casting the said mold is poured directly from the blast-furnace, and a large number of ingot-molds made in the past had to be rejected because of the unsoundness and roughness of the tops of the molds, and much loss occurred to steel-makers in trying to use imperfect molds.

The object of our invention is to positively form a solid and even smooth surface on the top of the body portion of an ingot-mold.

With this object in view and to the end of realizing other advantages hereinafter appearing this invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a central vertical section of our improved ingot-mold. Fig. 2 is a top plan relative to

Fig. 1. Fig. 3 is a vertical section of the upper end of the ingot-mold and illustrates the application of a cover-forming cap employed in closing the chamber of the mold. Fig. 4 is a horizontal section on line 4 4, Fig. 1. Fig. 5 is a vertical section on line 5 5, Figs. 2 and 4, looking in the direction indicated by the arrow.

Referring to the drawings, *a* represents the upright chamber-forming body portion of an ingot-mold, and *b* indicates the chamber of the said mold. The body portion *a* is preferably a casting of Bessemer iron and provided at its upper end and centrally with a metal piece *c*, which consists, preferably, of a Bessemer-iron ring "cast in" during the casting of the body portion of the mold. The bore *d*, formed in and extending through the ring *c*, forms the upper end of the chamber *b*. The chamber *b* is preferably gradually enlarged in dimensions horizontally toward its lower end to facilitate the withdrawal or separation of the mold from an ingot which is cast in the mold, and the bore *d* for the same reason is gradually enlarged in dimensions horizontally toward the lower end of the ring *c*; but the bore *d* is enough smaller in dimensions horizontally than the chamber *b* below the ring *c* to form a downwardly-facing shoulder or wall interiorly of the mold around the lower end of the said bore, which shoulder is formed, preferably, by the lower end of the ring in a mold having the form indicated.

The lower portion of the ring *c* is undercut externally and preferably annularly, as at 12, and the upper portion of the ring tapers somewhat upwardly, as at 13, and preferably projects, as at 14, above the body portion of the mold.

The ring *c* is preferably a casting made of the same grade of iron going into the ingot-mold casting, as hereinbefore indicated, and is cast separately with its top face downward in its mold, so as to cause the said ring when "cast in" in the ingot-mold, as shown, to insure a solid and clean true face not attainable by past methods of casting ingot-molds.

The lower undercut portion of the ring *c*

and the lower portion of the upwardly-tapering upper portion of the said ring are embedded in the cast body portion of the mold.

It will be observed, therefore, that the ring
5 is securely locked in position within the upper end of the body portion of the mold.

The body portion *a* of the mold is provided at its upper end with two staples *e*, which are arranged at opposite sides, respectively, of
10 the ring *c* and are cast in the said body portion during the casting of the latter.

It is a general practice to use a cap to compress the liquid steel in casting a steel ingot, and in Fig. 3 a cover-forming cap *f* is shown
15 resting upon the upper end of the ring *c*, as required to form a closed-top ingot-mold, which cap rests upon the ring and completely closes the upper end of the bore *d*. The cap or cover *f* is held in its closed position by a
20 bar *g*, which extends between and into the staples *e*, abutting against the inner sides of the central member of the staples, and a wedge *h* is interposed between the said bar and the cover and is instrumental in tightly holding the
25 cover down upon the ring *d*.

The ring-overlapping surface *f'* of the cap or cover *f* is of course level, even, and smooth and conforms to the seat-forming surface of the ring *c*, so that the joint formed by the said
30 surfaces when the cover is applied cannot be penetrated by liquid steel or metal. We would also remark that the mold is cast in an upright position, and it is not unimportant to have the ring *c* so firmly secured in place that the
35 ring is not liable to come out or work loose when the molten metal during the casting of the mold does not run up high enough over the upwardly-tapering portion 13 of the ring. Therefore the ring *c*, as shown more clearly
40 in Figs. 4 and 5, is provided exteriorly of its undercut lower portion with several laterally-projecting lugs 15, arranged at suitable intervals circumferentially of the ring and embedded in the body portion of the mold and
45 having downwardly and outwardly sloping exterior surfaces 16, covered by metal of the said body portion. Obviously the metal forming the body portion of the mold, even if it does not during the casting of the mold rise
50 far enough to cover the upwardly-tapering surface 13, will at least ascend to and over and thereby cover the sloping surface 16 of each lug 15, (see Fig. 5,) so as to cause the ring *c* to become permanently fixed in place.

55 What we claim is—

1. An ingot-mold having its chamber-forming body portion provided at the upper end with a piece embedded in the body portion, said embedded piece projecting above the end
60 portion and being provided on top with a seat-forming surface.

2. An ingot-mold having its chamber-forming body portion provided, at the upper end, with a metal piece embedded in the body portion and shaped to form the upper end of the
65

chamber of the mold, said embedded piece projecting above the body portion and being provided with a solid even top surface.

3. An ingot-mold having its chamber-forming body portion provided, at the upper end, with a piece embedded in the body portion and shaped to form the upper end of the chamber of the mold, said embedded piece being provided with a solid, level, even and smooth top surface.

4. An ingot-mold having its chamber-forming body portion provided at the upper end with a piece embedded in the body portion and extending around the upper end of the chamber of the mold, said embedded piece being provided on top with a seat-forming surface arranged above the body portion.

5. An ingot-mold having its chamber-forming body portion provided at the upper end with a piece provided with a seat-forming surface on top and embedded within the body portion, said embedded piece having an external upwardly and inwardly sloping external surface overlapped and tightly engaged by the body portion.

6. An ingot-mold having its chamber-forming body portion provided at the upper end with a piece extending around the upper end of the chamber of the mold and embedded in the body portion, said embedded piece being provided with a seat-forming surface on top and having a portion thereof embedded in the body portion, said embedded portion being provided with an upwardly and inwardly sloping external surface and being undercut.

7. An ingot-mold having its chamber-forming body portion provided, at the upper end, with a metal ring embedded in the body portion and extending around the upper end of the chamber of the mold, said ring projecting above the body portion and being provided on top with a seat-forming surface arranged above the body portion.

8. An ingot-mold having its chamber-forming body portion provided, at the upper end, with a metal ring embedded in the body portion and extending around the upper end of the chamber of the mold, said ring having an upwardly and inwardly sloping annular external surface and a downwardly-facing annular external surface tightly engaged by the body portion.

9. An ingot-mold having a cast body portion provided at the upper end with a metal ring embedded in the body portion and extending around the chamber of the mold, said ring being provided on top with a seat-forming surface arranged above the body portion.

10. An ingot-mold having its body portion provided, at its upper end, with a seat-forming ring embedded in the body portion and extending around the upper end of the chamber of the mold, said ring being provided with an external undercut lower portion and an upwardly-tapering portion above the undercut

portion, with the last-mentioned portion and the aforesaid tapering portion tightly engaged by the body portion.

11. An ingot-mold having its body portion 5 cast and provided, at the upper end, with a metal ring embedded in the body portion and arranged to form the upper end of the chamber of the mold and projecting above the body portion, said ring being provided with a seat-forming surface above the body portion and having its embedded portion tightly engaged by the body portion.

12. An ingot-mold having its body portion 5 provided, at the upper end, with a metal piece participating in the formation of the upper end of the mold and forming a seat on top for a cap or cover employed in closing the chamber of the mold, said seat-forming piece being provided externally with a plurality of 10 lugs arranged a suitable distance apart and embedded in the body portion.

13. An ingot-mold having a cast-iron body portion provided, at the upper end, with a cast-iron piece participating in the formation 5 of the upper end of the mold and forming a seat on top for a cap or cover employed in closing the chamber of the mold, said seat-forming piece embedded in the body portion and provided externally with a plurality of 10 lugs arranged a suitable distance apart and embedded in the body portion.

14. An ingot-mold consisting of a casting forming the body portion of the mold and provided, at the upper end, with a metal piece 35 participating in the formation of the upper end of the mold and forming a seat on top for a cap or cover employed in closing the chamber of the mold, said seat-forming piece embedded in the body portion and provided externally with a plurality of lugs arranged a 40

suitable distance apart and having downwardly and outwardly sloping exterior surfaces covered by metal of the body portion.

15. An ingot-mold having its body portion provided at the upper end with a metal ring 45 extending around the upper end of the chamber of the mold and forming a seat on top for a cap or cover employed in closing the said chamber, which ring is provided externally with several lugs suitably spaced circumferentially of the ring and embedded in the body 50 portion.

16. An ingot-mold having its body portion provided at the upper end with a metal ring extending around the upper end of the cham- 55 ber of the mold and forming a seat on top for a cap or cover employed in closing the said chamber, which ring has its lower portion undercut externally and provided with lugs suitably spaced circumferentially of the ring and 60 embedded in the body portion.

17. An ingot-mold having its body portion provided at the upper end with a metal ring extending around the upper end of the cham- 65 ber of the mold and forming a seat on top for a cap or cover employed in closing the said chamber, which ring has an upwardly-tapering upper portion and is undercut below the said upwardly-tapering portion and provided externally of its said undercut portion with 70 several lugs suitably spaced circumferentially of the ring and embedded in the body portion.

Signed by us at Sharpsville, Pennsylvania, this 24th day of August, 1904.

THOMAS D. WEST.
GEO. H. BOYD.

Witnesses:

M. J. McDOWELL,
P. J. BARTLESON.