

No. 734,171.

PATENTED JULY 21, 1903.

A. K. HAMILTON.
WASHER FOR JOURNAL BEARINGS.

APPLICATION FILED MAR. 4, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 3

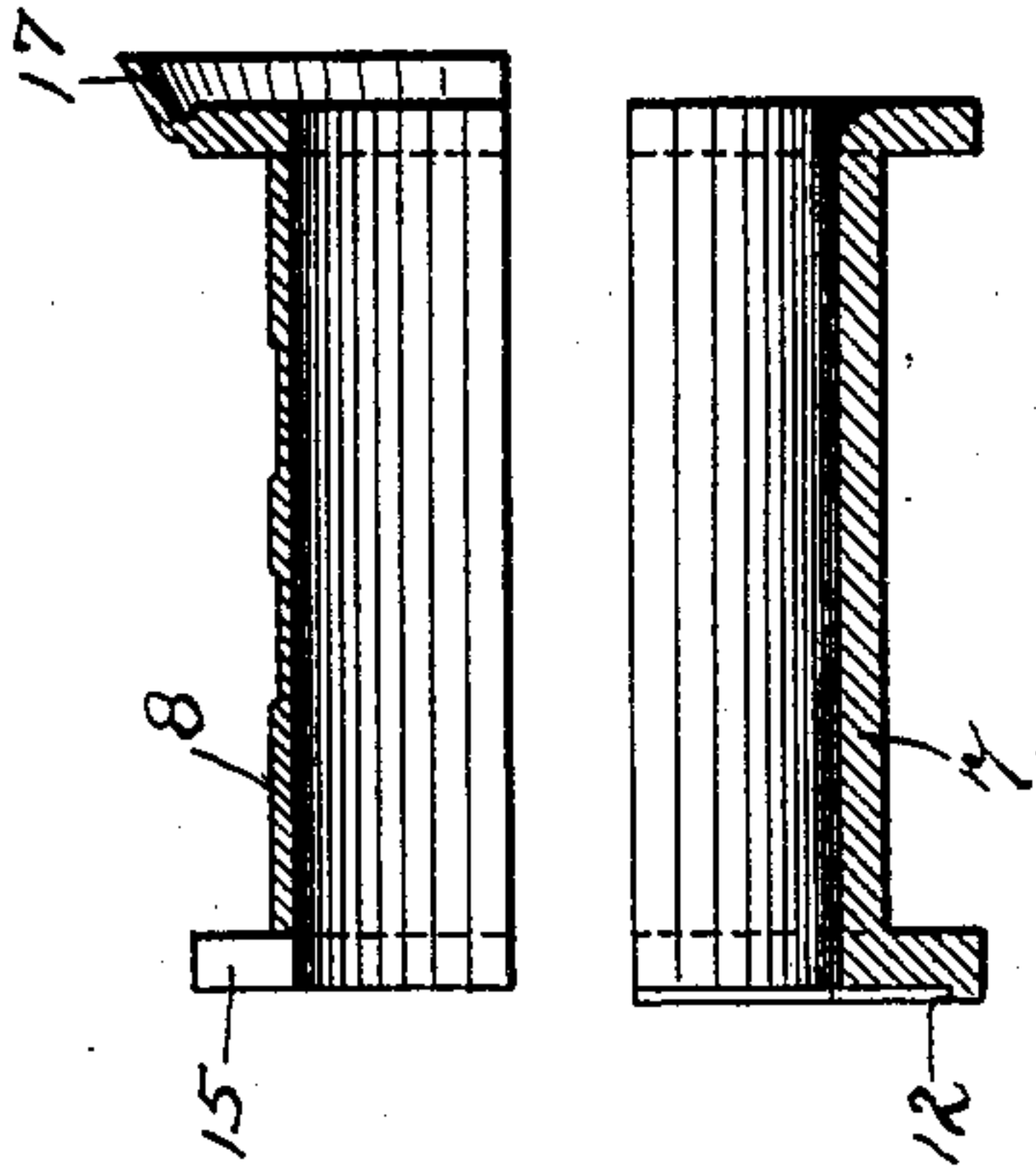


Fig. 2

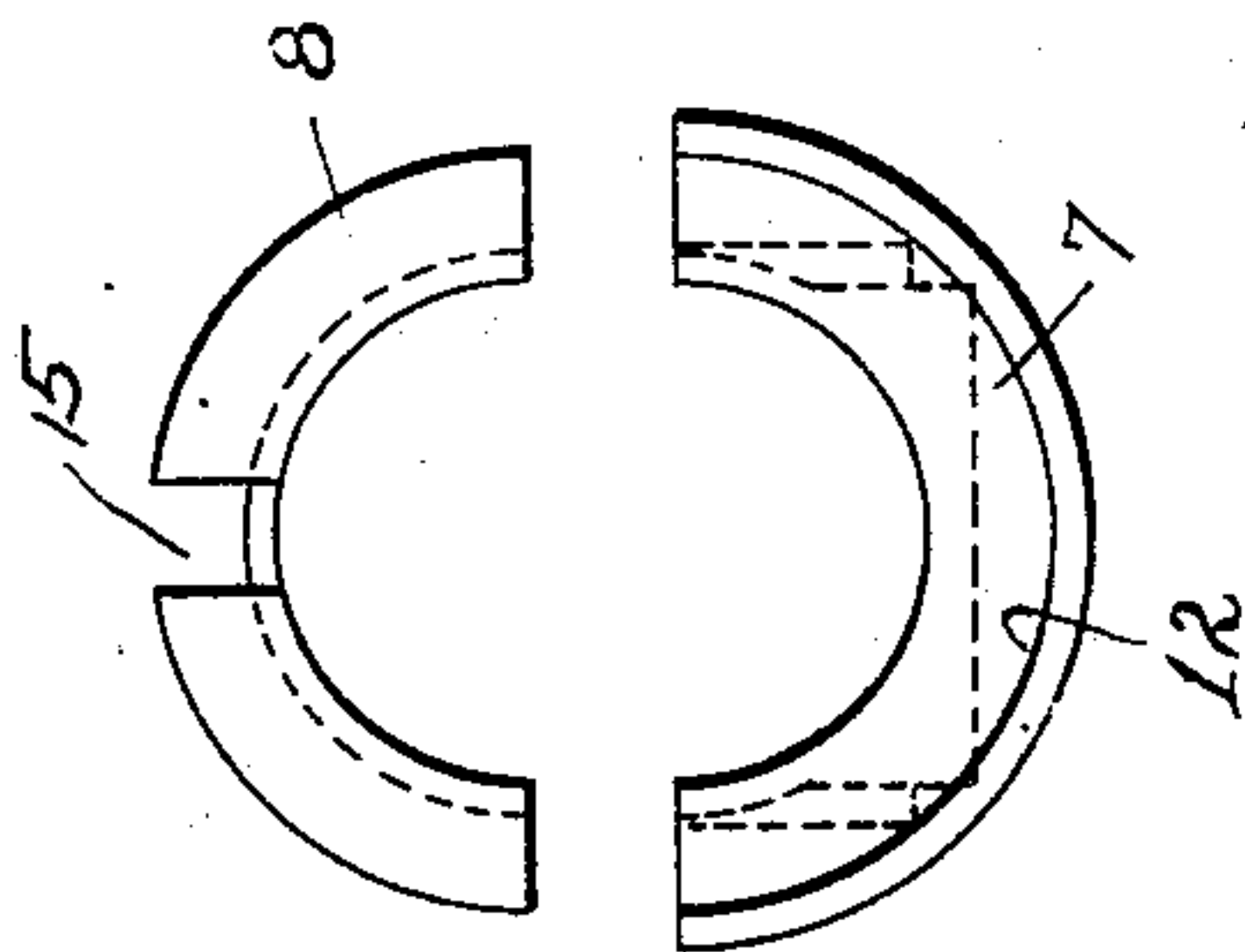


Fig. 1

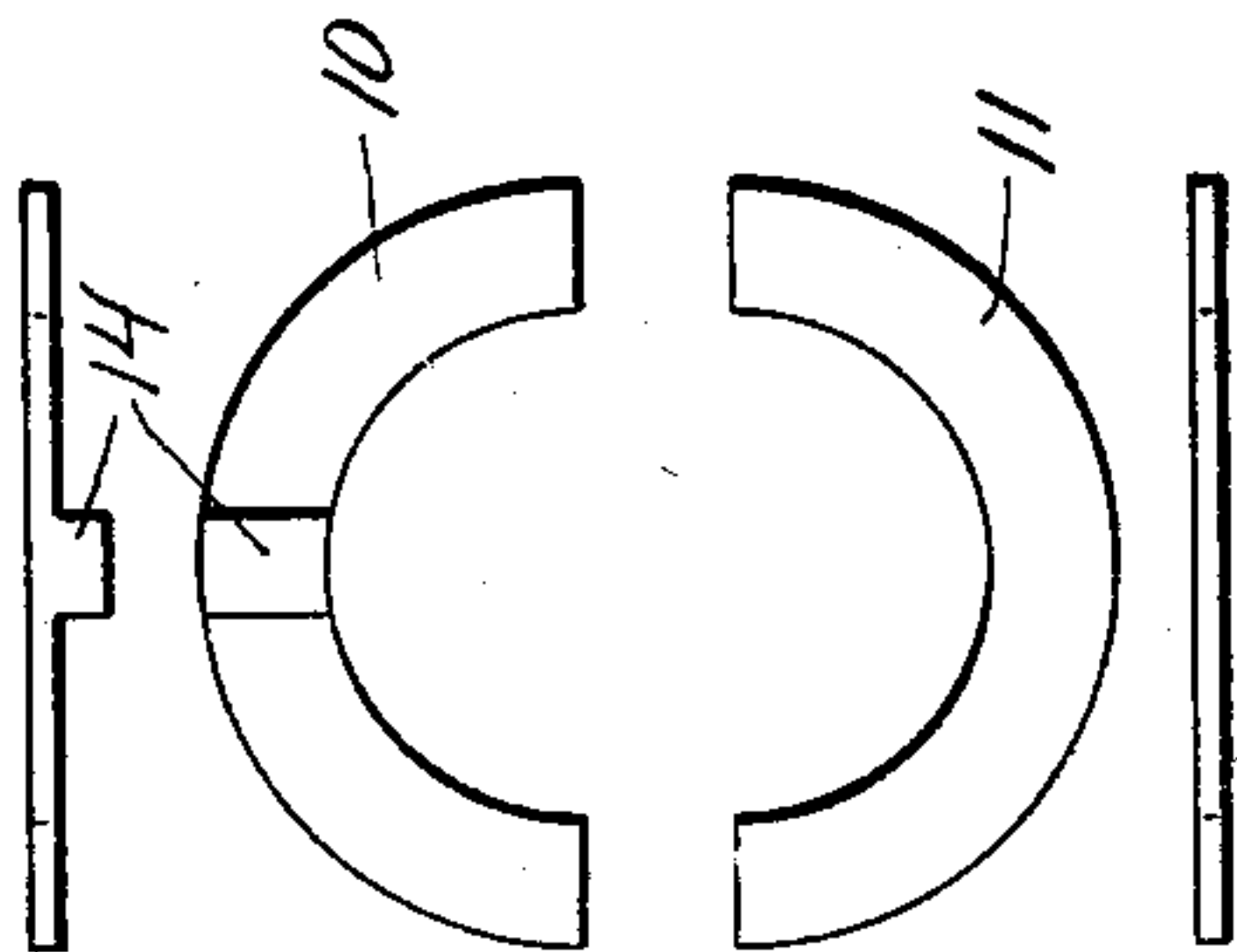


Fig. 5

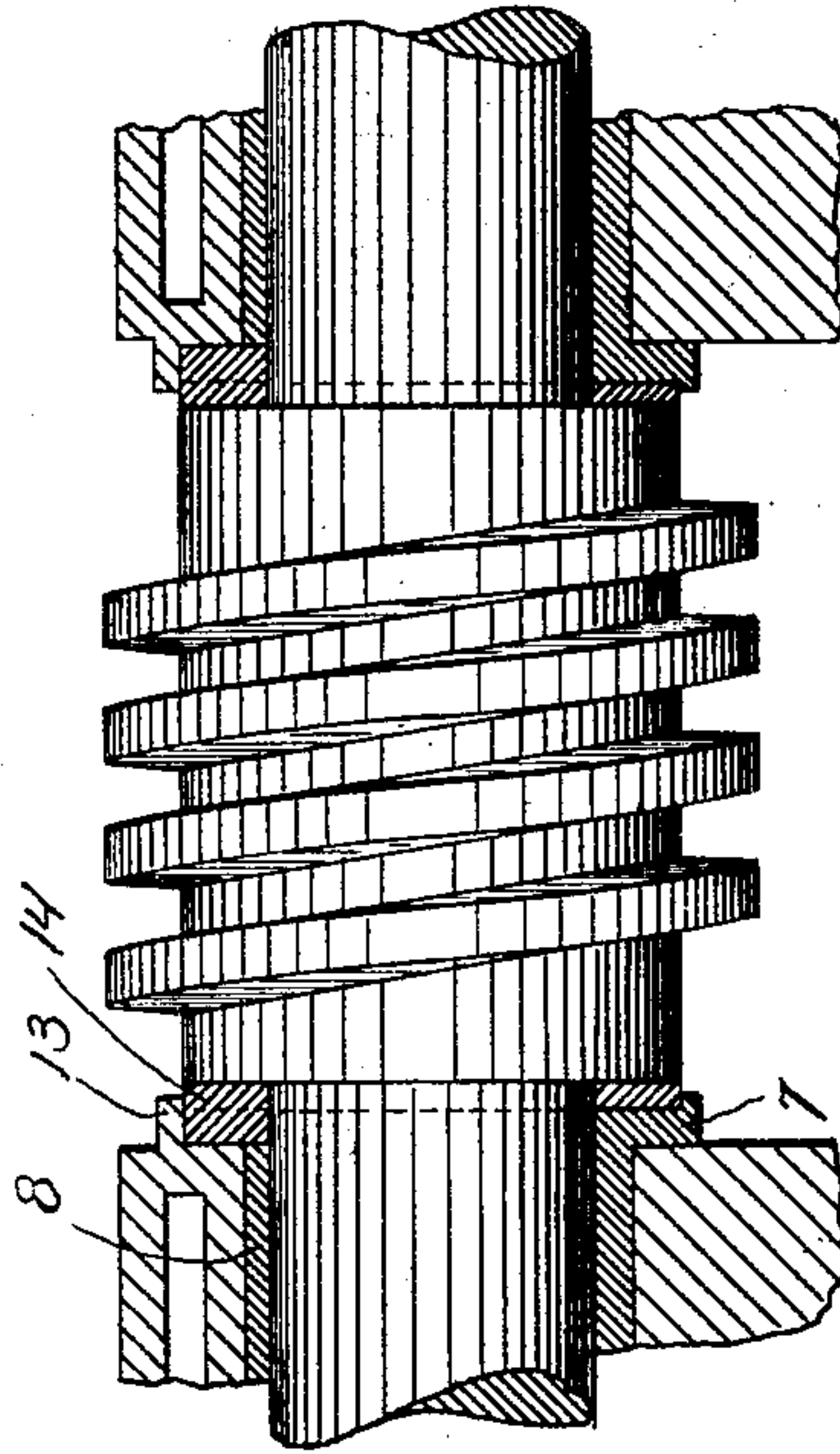
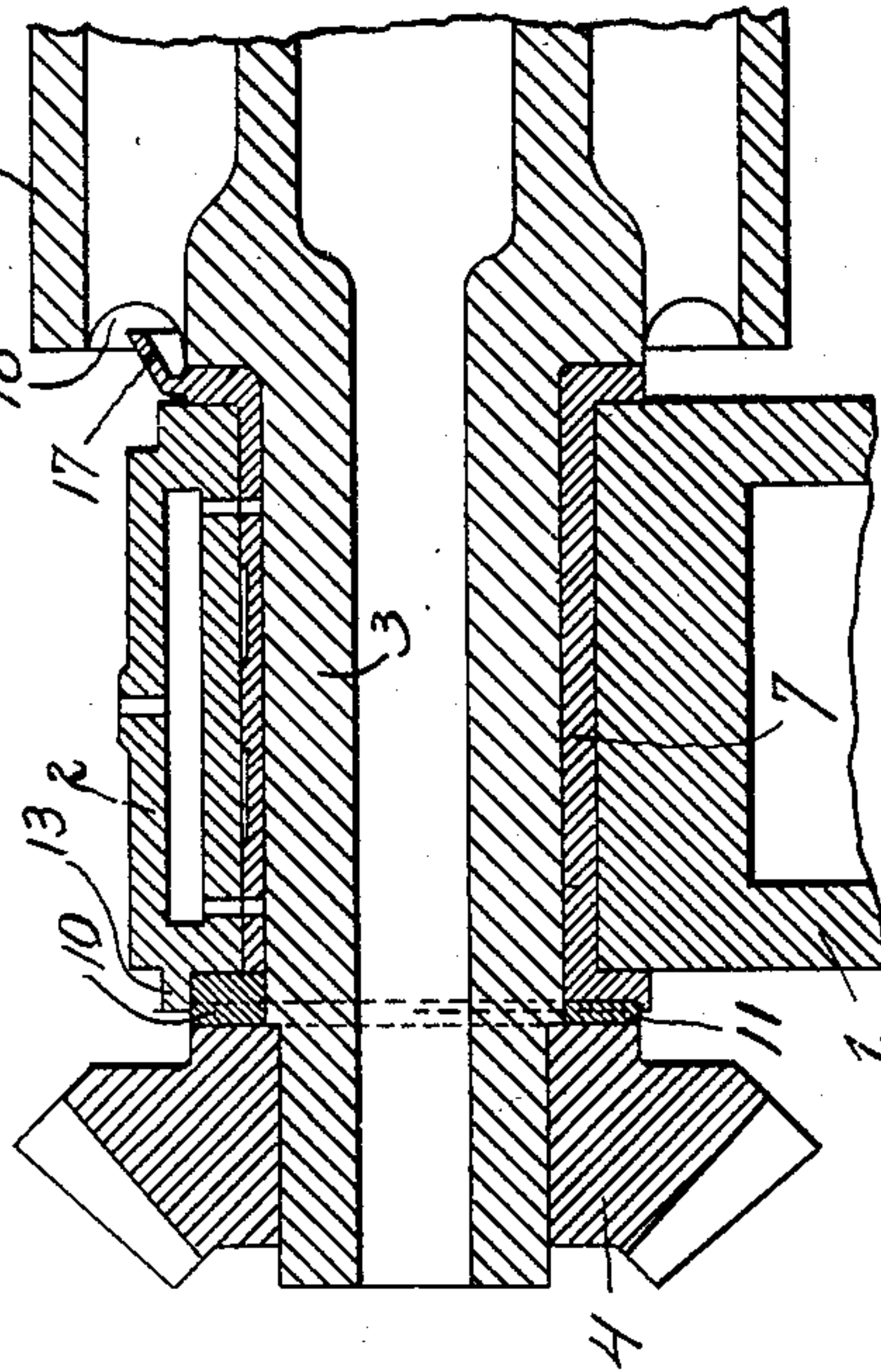


Fig. 4



Witnesses.
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3 SHEETS—SHEET 2

Fig. 8

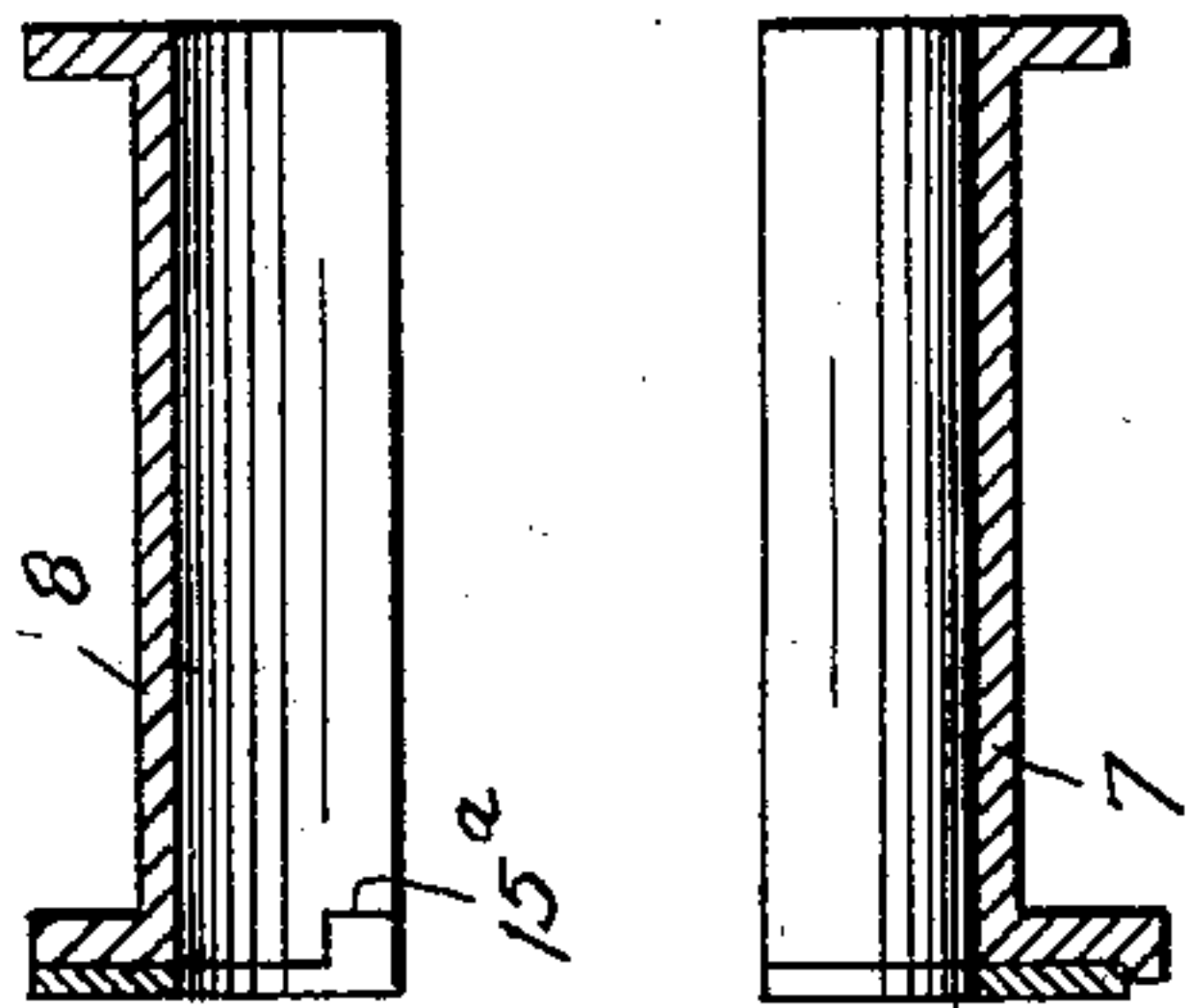


Fig. 7

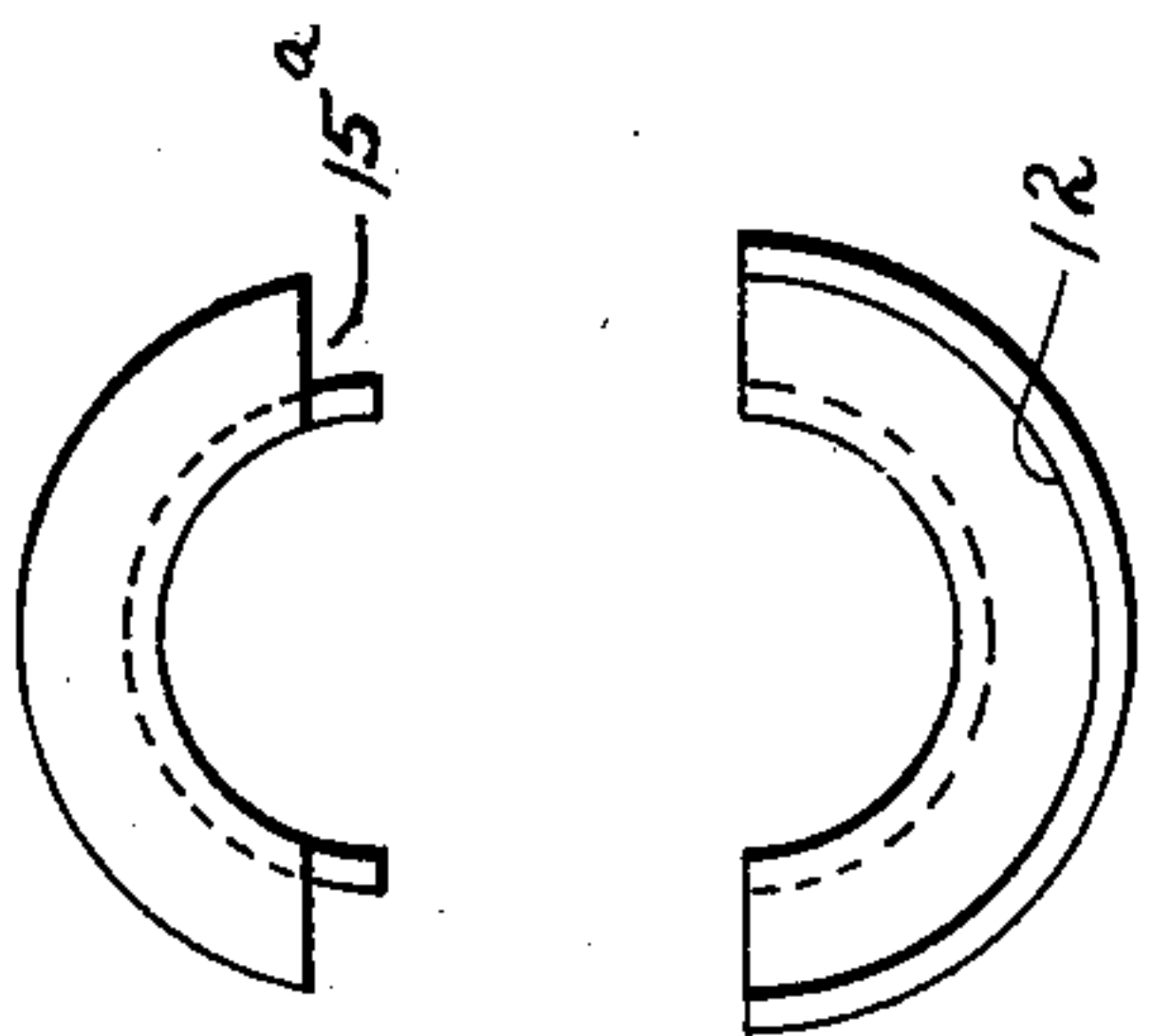


Fig. 6

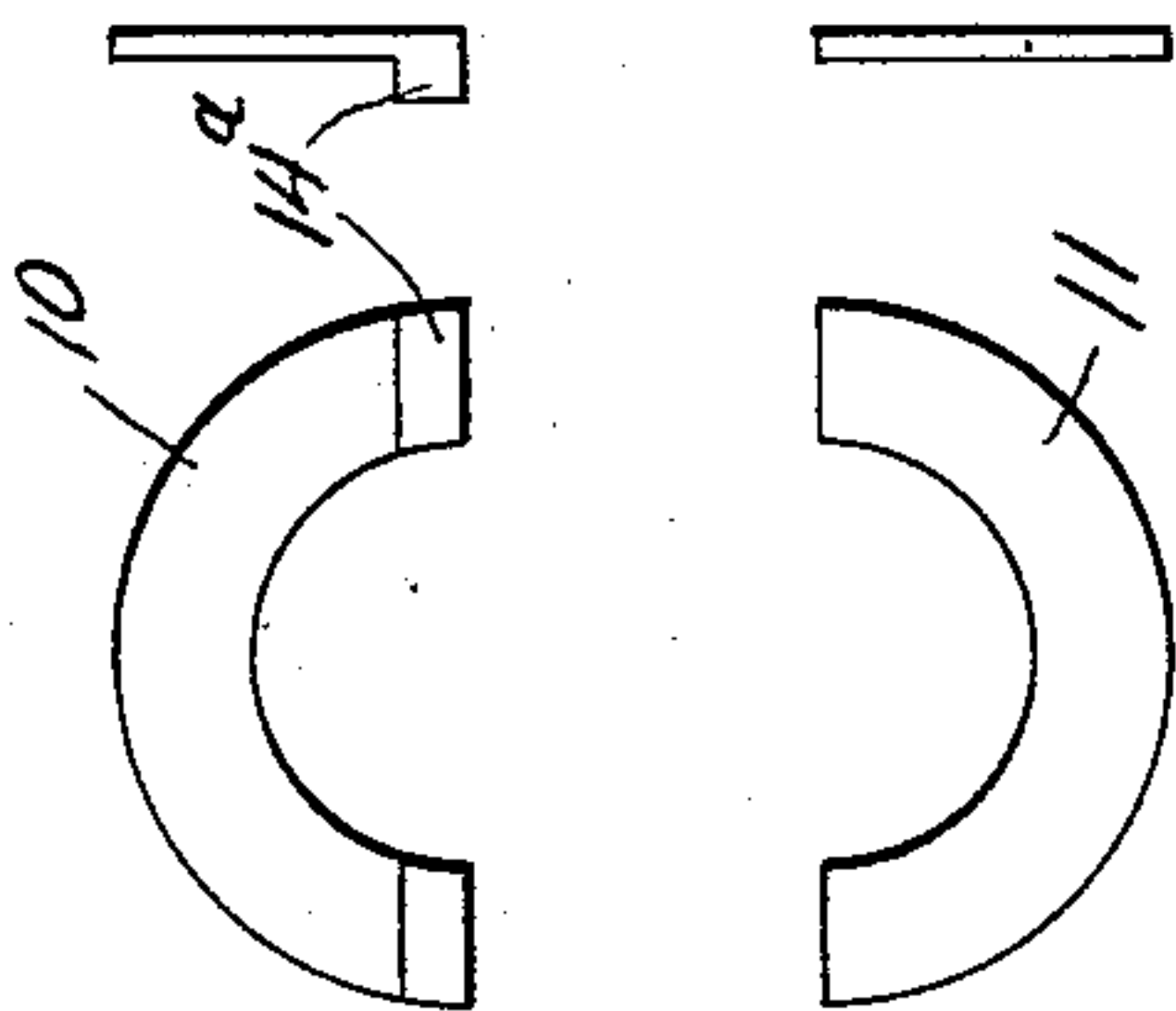


Fig. 11

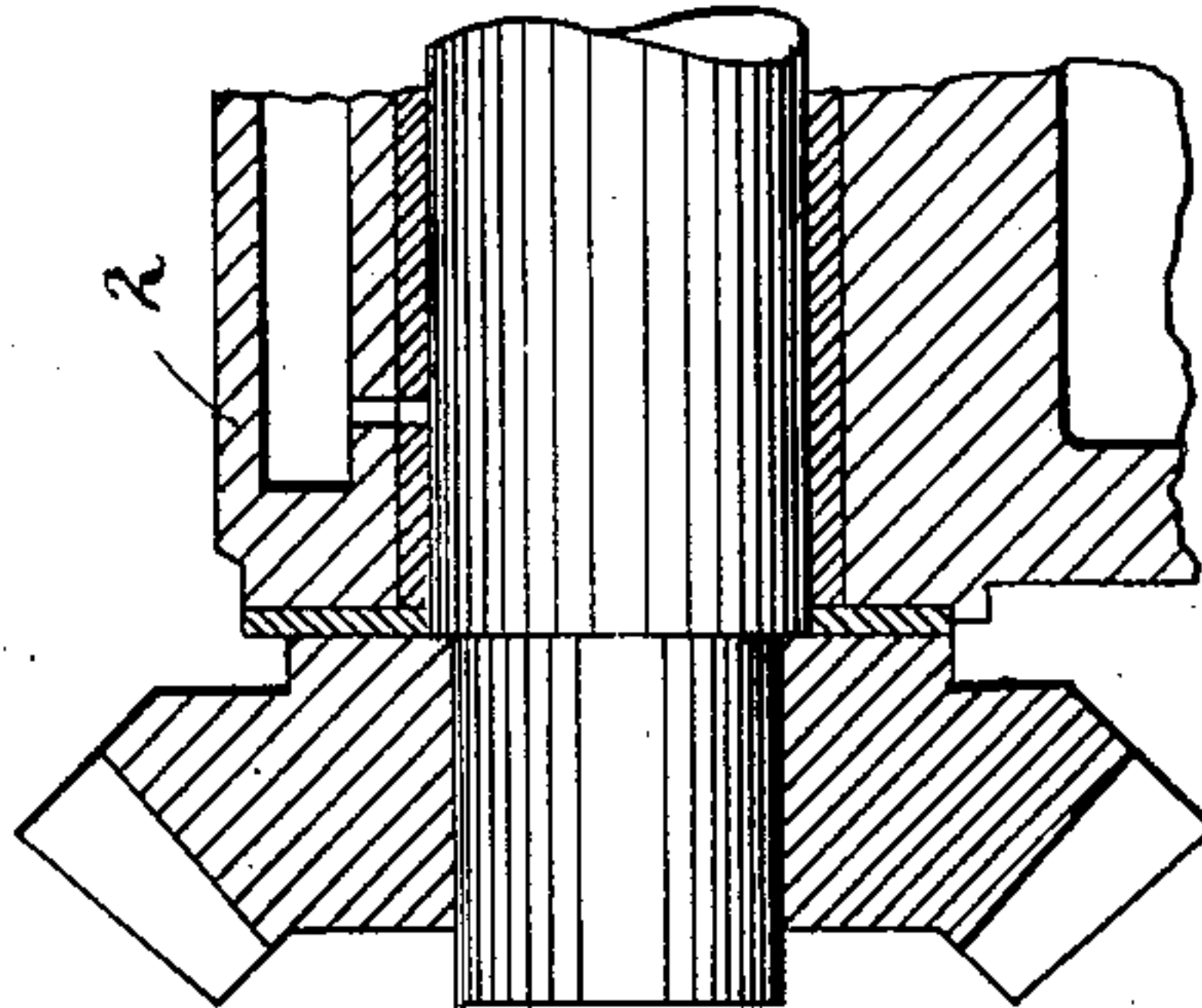


Fig. 10

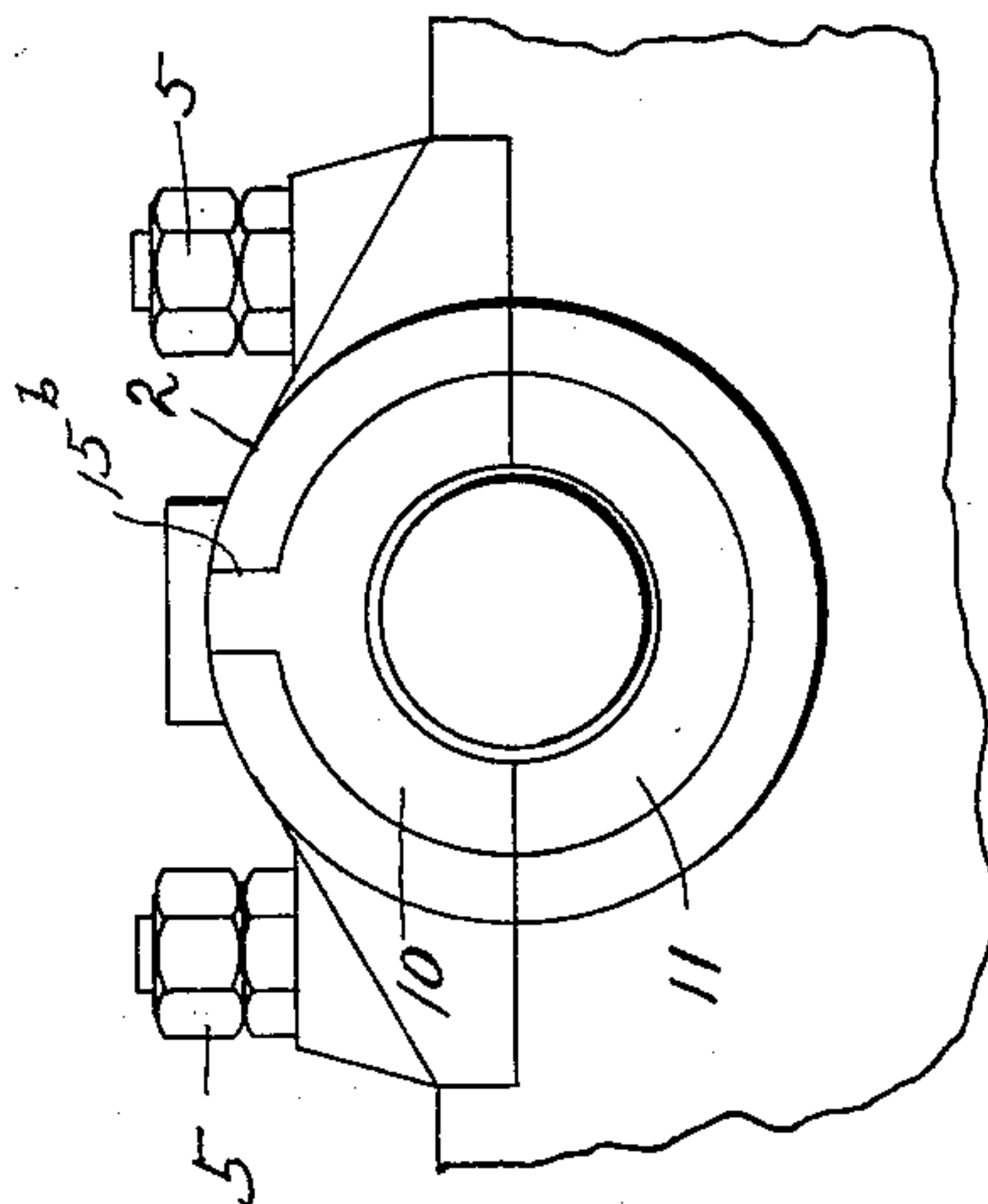
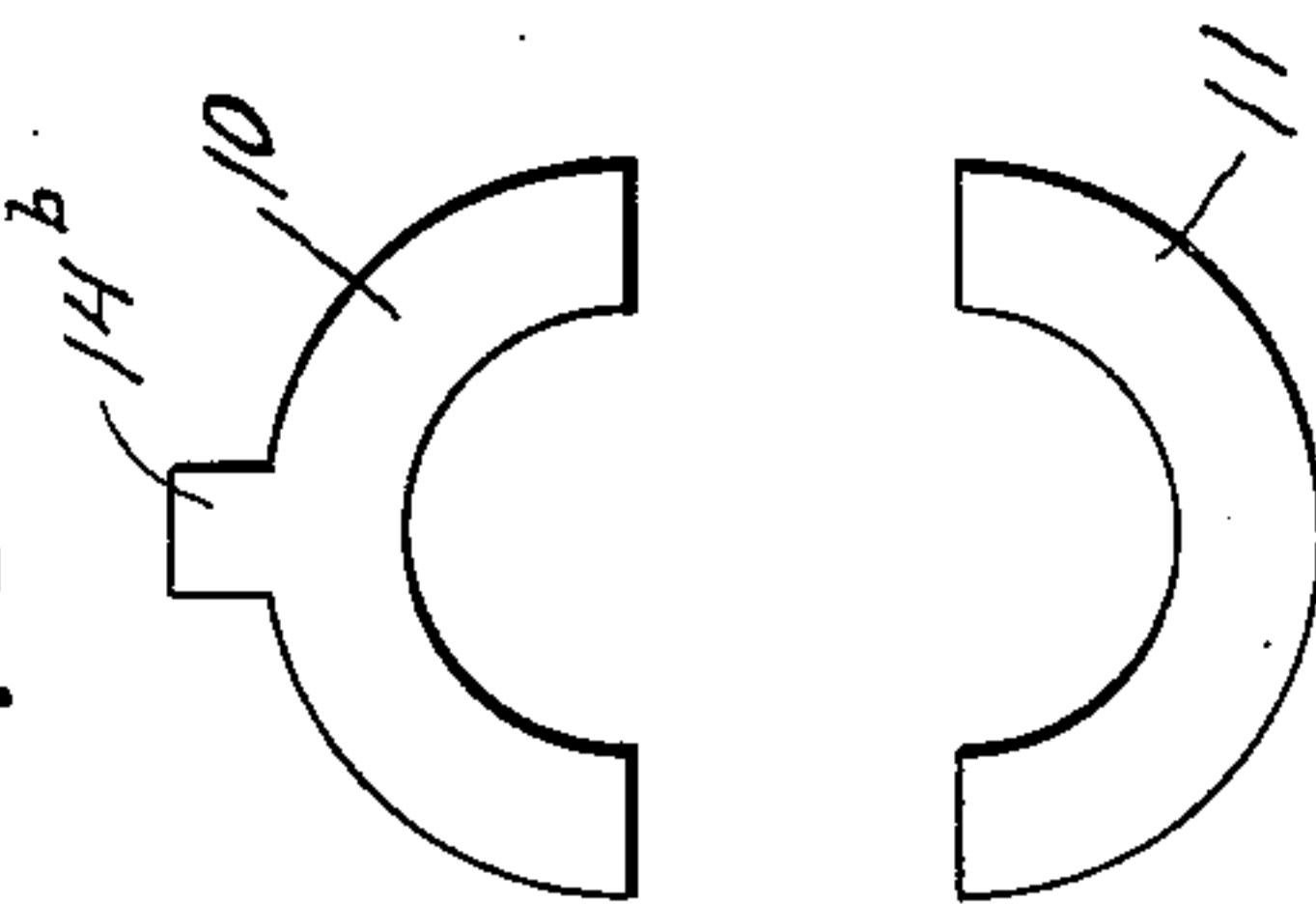


Fig. 9



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3 SHEETS—SHEET 3.

Fig. 12

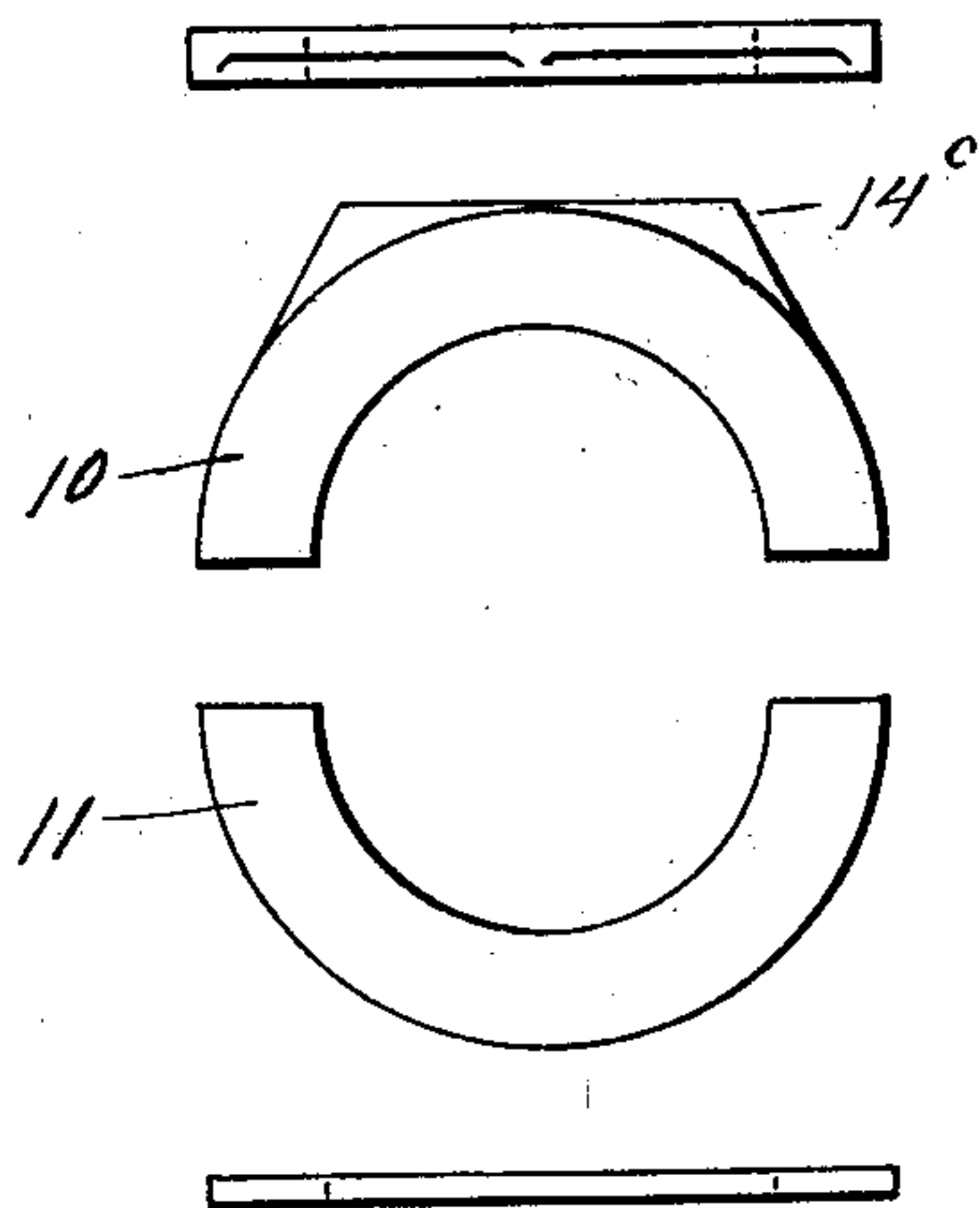


Fig. 13

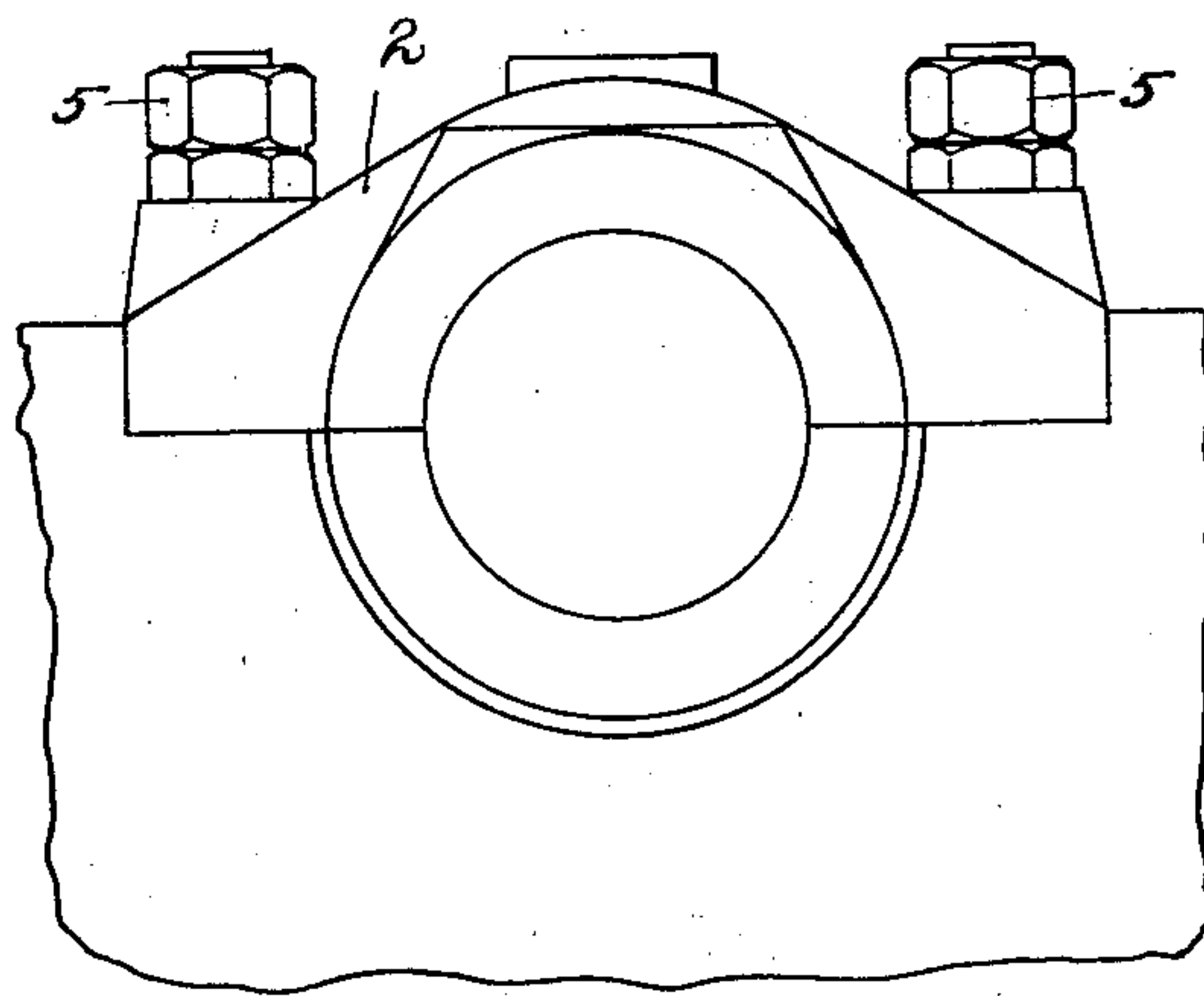
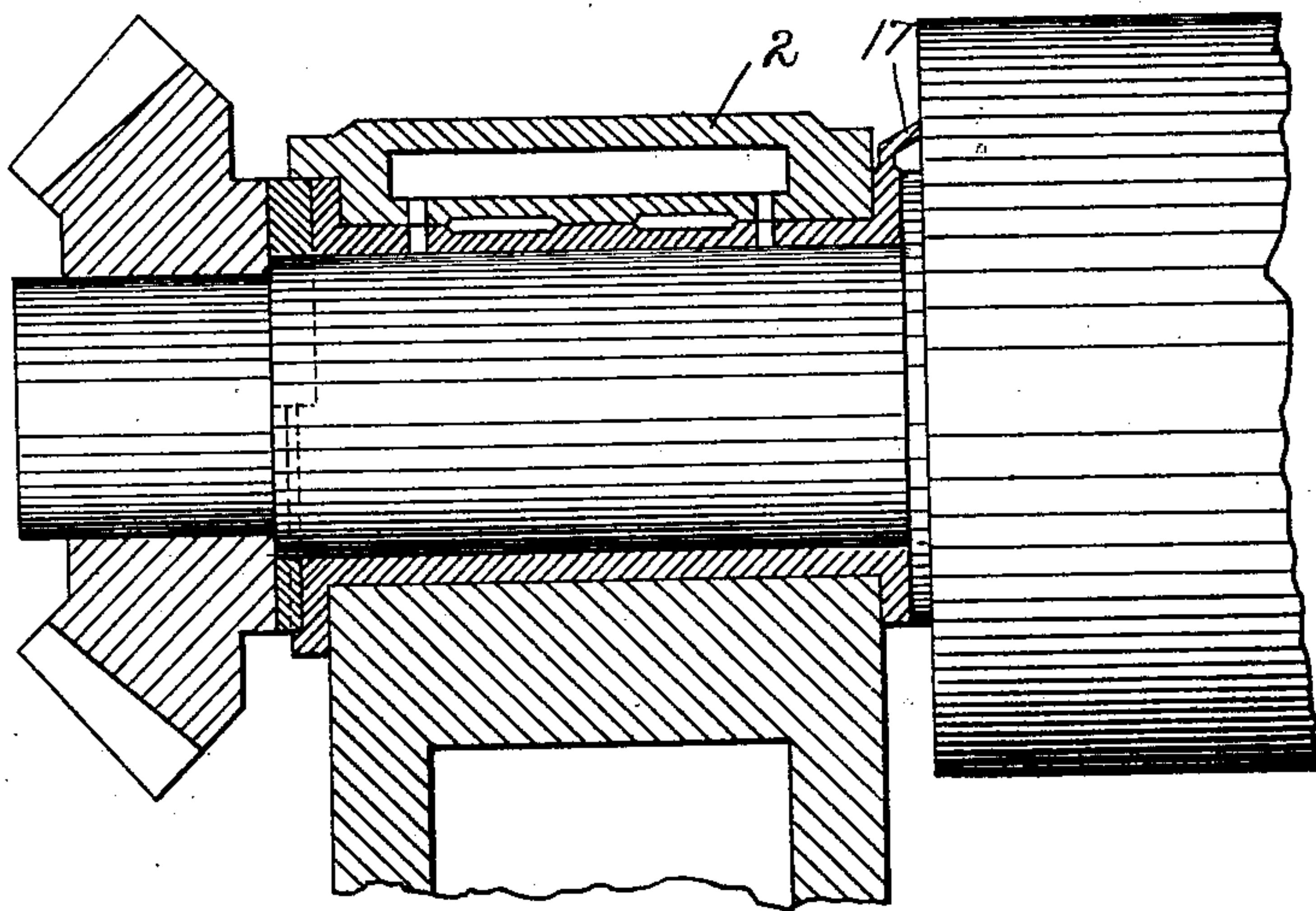


Fig. 14



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UNITED STATES PATENT OFFICE.

ALEXANDER K. HAMILTON, OF BUFFALO, NEW YORK.

WASHER FOR JOURNAL-BEARINGS.

SPECIFICATION forming part of Letters Patent No. 734,171, dated July 21, 1903.

Application filed March 4, 1903. Serial No. 146,132. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER K. HAMILTON, a resident of Buffalo, in the county of Erie and State of New York, have invented
5 a new and useful Improvement in Washers for Journal-Bearings; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to thrust-washers for
10 use with bevel, worm, or other gears which give an endwise thrust to their shafts; and its object is to provide a washer for this purpose which can be removed and replaced without removing the shaft from its bear-
15 ings or the gear from its shaft.

All bevel-gears, worm-gears, and the like exert more or less endwise thrust on the shaft, and consequently it has been the custom to place between the gear and its bear-
20 ings a washer which takes the end thrust of the gear and relieves the bearings from the wear incident to such thrust. One common application of such washers is on rolling-mill tables wherein the live-rollers are usu-
25 ally driven by bevel-gearing from a line-shaft, and the custom has been to place these thrust-washers between the gears and their bearings both on the line-shaft and on the table-rollers. On account of the thrust on
30 the washers they wear out after moderate use, and consequently must be renewed. Heretofore these washers have always been made in one piece, so that when worn out it was necessary to take the shaft or roller out
35 of its bearings, strip the gear from the shaft, then remove the old washer and put on the new one, again apply the gear, and replace the shaft or roller in its bearings. With the rollers only one gear need be stripped from
40 the shaft; but with line-shafts, which are made from ten to twenty feet long and contain from five to twelve gears, all must be stripped in renewing the washers. Thus the renewal of worn-out thrust-washers as heretofore
45 constructed is a difficult and expensive operation. As a consequence the washers are frequently permitted to wear excessively, thus allowing the gears to get out of true contact, so that they wear more rapidly than
50 they would if the thrust-washers were kept to the proper thickness.

The object of my invention is to provide a

thrust-washer for use with bevel, worm, and similar gears which give end thrusts, whereby the foregoing difficulties of renewal are over-
55 come, so that said washers can be removed or replaced without removing the shaft from its bearings or the gear from the shaft.

To this end the invention consists, generally stated, in making the washers in sec-
60 tions, preferably two equal semi-annular sections, and providing suitable means for holding said sections in place, so constructed that they may be renewed by merely removing the cap of the bearing.
65

The invention also comprises certain details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents one form of my improved washer
70 in front and top view. Fig. 2 is a front view of the brasses of the journal-bearing. Fig. 3 is a longitudinal section through the same. Fig. 4 is a longitudinal section through the bearing, shaft, and gear. Fig. 5 is a longi-
75 tudinal section showing the application of the washer to a worm-gear. Fig. 6 is a front and side view of a modified form of washer. Fig. 7 is a front view of the journal-brasses adapted for this form of washer. Fig. 8 is a
80 longitudinal section through the brasses and washer, showing their manner of application. Fig. 9 is a front view of still another modified form of washer. Fig. 10 is a front ele-
85 vation of the bearing with this washer in place. Fig. 11 is a longitudinal section through the bearing, shaft, and gear, showing the application of this form of washer. Fig. 12 is a front and plan view of still an-
90 other modified form of washer. Fig. 13 is a front view of the bearing with this washer in place; and Fig. 14 is a longitudinal section through the bearing, shaft, gear, and washer.

In the drawings several different forms of washers are shown in order to illustrate my
95 invention; but the forms shown are not all those by which the result may be accomplished.

The essential principle of my invention consists in making the washer in sections,
100 preferably two, so that it can be removed without disturbing the shaft or its gear. In all forms of my invention the lower member of the bearings is shown at 1, the upper mem-

ber or cap at 2, the shaft at 3, and the gear at 4. The cap will be made removable in the usual or any preferred manner, such as by means of the nuts and bolts 5. (Shown in Figs. 10 and 13.) The shaft 3 in Figs. 4, 11, and 14 is shown as the axle or journal of a roller 6, such as used in rolling-mill tables; but obviously the shaft may be of any other kind and applied to any other use. In all forms of the invention there is shown a lower journal-brass 7 and an upper journal-brass 8; but these are not absolutely essential to my invention, as the bearing member 1 and cap 2 may directly contact with the journal of the shaft.

The washer is interposed between the gear 4 and its bearing, so as to take the end thrust of said gear, and, as above stated, said washer is made in sections, preferably two sections 10 and 11, which are substantially equal semi-annular or arc-shaped segments. The journal-bearing will be provided with suitable means for holding this sectional washer in place, and to that end either the lower bearing member 1 or the lower brass 7 is provided with a seat 12, which preferably is arc-shaped, as shown, and in which one section, such as the lower section 11 of the washer, is seated. This seat 12 in Fig. 11 is shown as formed in the lower bearing member 1 and in all of the other figures as formed in the front collar of the lower brass 7. In both forms, however, it serves as a support for the sectional washer and prevents the same from falling out. Suitable means will also be provided for preventing the escape of the sectional washer upwardly, and this is conveniently accomplished by providing the cap 2 of the bearing with a projection 13, which overhangs the washer. Obviously, however, this overhanging portion might be formed in the forward collar of the upper brass 8. Instead of making this projection integral with the cap or the upper brass it might be a piece removably secured thereto. In all cases, however, the seat 12 and the overhanging portion 13 securely confine the washer, so that the sections cannot escape. I also preferably provide means for preventing the rotation of the sectional washer, and this is best accomplished by providing suitable cooperating lugs and depressions in the washer and the bearing. As shown in Figs. 1 to 5, one of the washer-sections, such as the section 10, is provided with a single boss or projection 14, which fits into a corresponding groove or depression 15 cut into the upper journal-brass 8. In Figs. 6 to 8 the upper washer-section 10 is provided with a boss or projection 14^a on each of its ends, and these fit corresponding grooves 15^a in the journal-brass. In Figs. 9 to 11 the upper washer-section 10 is provided with a radial projecting lug 14^b, which fits in a groove 15^b, formed in the upper bearing member or cap 2. In this form of the invention the brasses are not provided with forward collars; but it is obvious that they may be

provided with such collars, if desired. In Figs. 12, 13, and 14 one of the washer-segments is made irregular in outline, as shown at 14^c, and fits a corresponding depression formed in the front end of the cap 2. Various other arrangements will suggest themselves for holding the washer against rotation.

When applied to the bearings for rollers of rolling-mill tables, the upper brass on its inner end preferably will be provided with a shield or hood 17, which projects into an annular groove 18, formed in the inner end of the roll, in order to prevent dirt and scale working into the bearing. When applied to worm-gear shafts, preferably a washer of the kind described will be provided between said gear and bearings on both sides thereof, as such worms when reversed will thrust first in one direction and then in the other. This is illustrated in Fig. 5.

In order to remove my washer, it is merely necessary to take off the cap or that portion which overhangs the washer. Then the top half of the washer can be lifted out and the bottom half can be shoved around the shaft and then lifted out. To replace a washer, the lower half is first slipped down around the shaft and underneath the same into place, after which the upper half is put in position and the cap secured in place. It is therefore possible to renew washers without in any manner disturbing the shaft or its gear, and this can be done very quickly and easily, thus being a distinct advantage over the old arrangement.

My sectional washer is applicable to all forms of gearing whereby an endwise thrust is imposed upon the shaft, and by the term "thrust-gear" in the claims I intend to include all forms of such gearing, whether bevel, worm, or other form. While my invention has been more particularly described with reference to rolling-mill tables, I do not wish to limit the same thereto, as it can be applied in any relation where bevel, worm, or similar gears are used. In case the gear is some distance from its bearing a collar may be applied to the shaft and the washer interposed between such collar and the bearings. Hence in the claims by the expression "between the gear and its bearing" I intend to include construction wherein the gear is not in direct contact with the washer, but where a collar or other shoulder on the shaft is in contact with the washer.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In journal-bearings for thrust-gear shafts, the combination with the shaft and its gear, of a bearing for the shaft, provided with a seat on its lower side, and a thrust-washer between the gear and the bearing and resting on said seat, said washer being made in sections whereby it can be removed or replaced without removing the gear or shaft.

2. In journal-bearings for thrust-gear shafts, the combination with the shaft and

its gear, of a bearing for the shaft provided with a seat on the lower side thereof at its forward end, a thrust-washer between the gear and the bearing and resting on said seat, 5 said washer being made in sections whereby it can be removed or replaced without removing the gear or shaft, and a portion at the upper part of the bearing overhanging said washer to hold it in place.

10 3. In journal-bearings for thrust-gear shafts, the combination with the shaft and its gear, of a bearing for the shaft provided with a seat on its lower side and having a removable cap provided with a projecting 15 portion, and a thrust-washer between the gearing and bearing and resting in the seat on the lower part of the bearing and lying underneath the projecting portion of the cap, said washer being made in sections whereby 20 it can be removed or replaced without removing the gear or shaft.

4. In journal-bearings for thrust-gear shafts, the combination with the shaft and its gear, of a bearing for the shaft, a thrust- 25 washer between the gear and the bearing, said washer being made in sections so that it can be removed or replaced without removing the gear or shaft, and cooperating projections and depressions on the washer and 30 bearing to prevent rotation of the washer.

5. In journal-bearings for thrust-gear shafts, the combination with the shaft and its gear, a bearing for the shaft provided with a seat on its lower portion, a thrust-washer

between the gear and the bearing, said washer 35 being made in two sections the lower of which rests in said seat, and cooperating lugs and depressions on the bearing and the upper washer-section to prevent the latter from rotating. 40

6. In journal-bearings for thrust-gear shafts, the combination with the shaft and its gear, of a bearing for the shaft including wearing members, a thrust-washer between 45 the gear and the bearing, said washer being made in sections whereby it can be removed or replaced without removing the gear or shaft, a seat or depression formed in the lower wearing member in which the lower 50 washer-section rests, and a lug formed on the upper washer-section and engaging a groove formed in the upper wearing member.

7. In journal-bearings for thrust-gear shafts, the combination with the shaft and its gear, of a bearing for the shaft including 55 brasses or wearing members, a thrust-washer between the gear and the bearing, said washer being made in sections, and the lower one being provided with a seat in which said washer rests, and a cap for the bearing provided with 60 a projecting portion overhanging said washer.

In testimony whereof I, the said ALEXANDER K. HAMILTON, have hereunto set my hand.

ALEXANDER K. HAMILTON.

Witnesses:

F. C. KAISER,

K. C. HOXIE.