

(No Model.)

J. B. BOWDEN.
METHOD OF FORMING RINGS.

No. 400,541.

Patented Apr. 2, 1889.

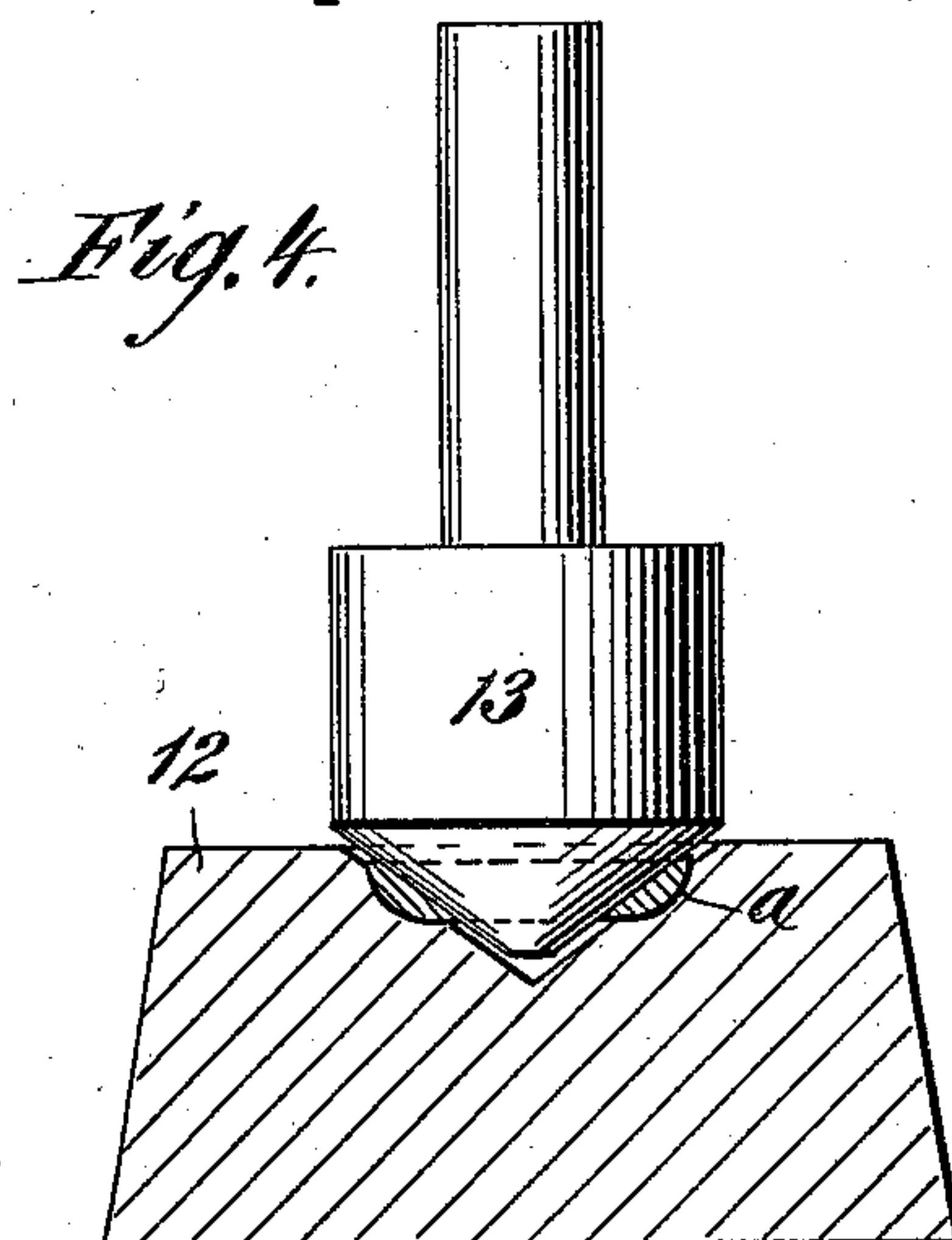
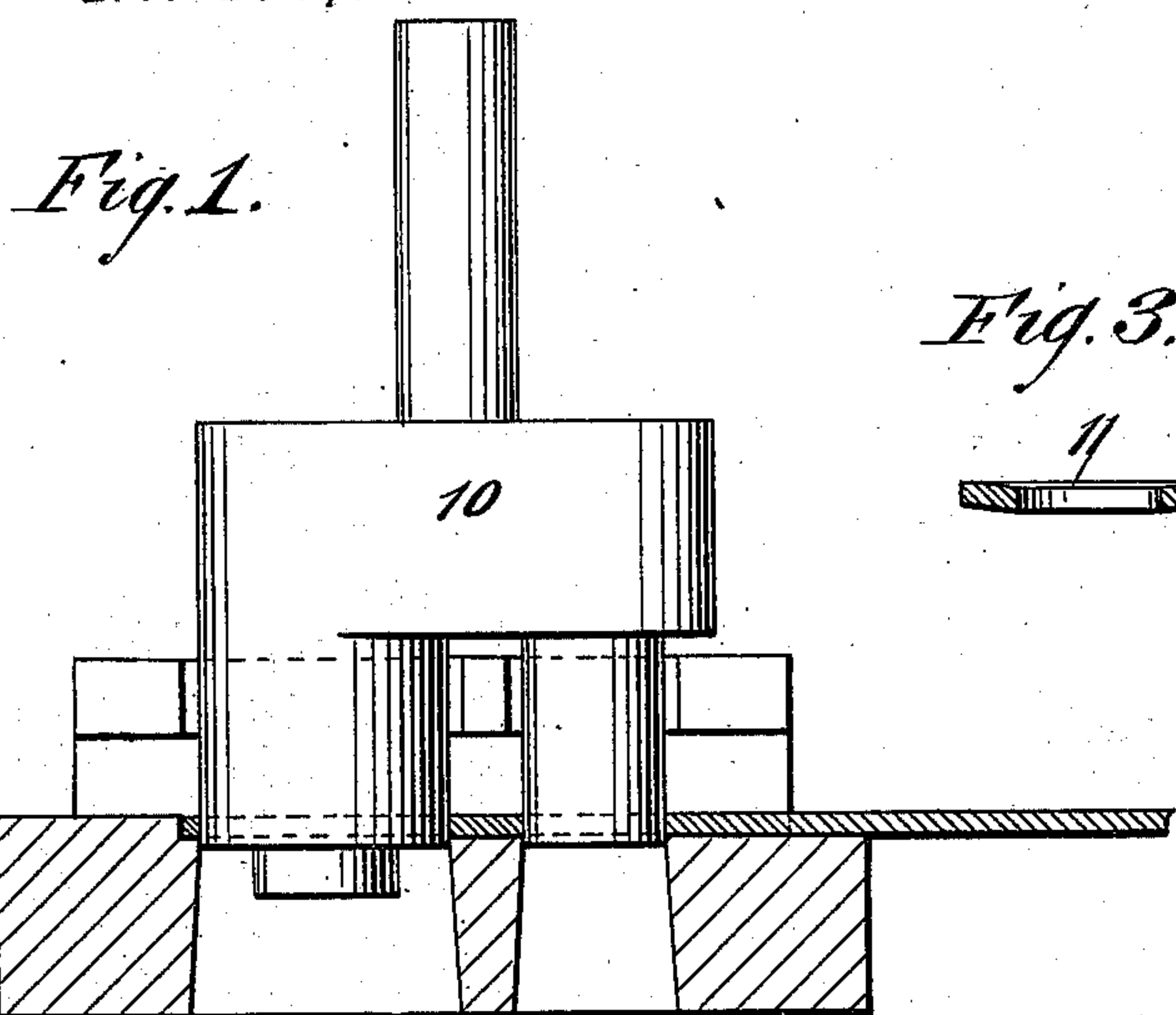


Fig. 2.

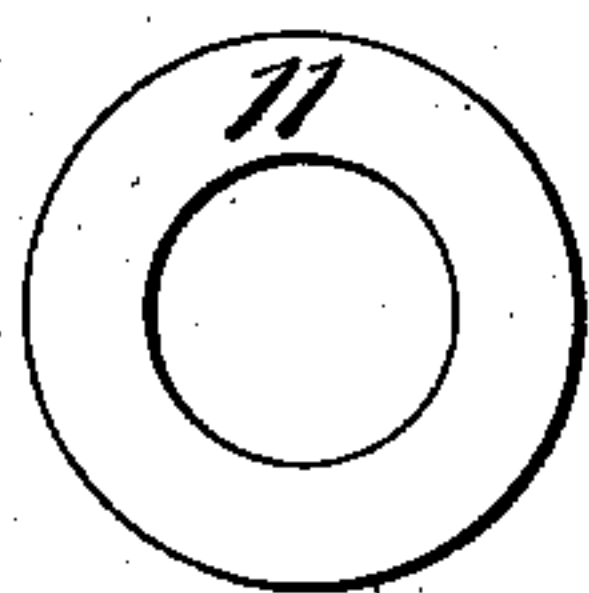
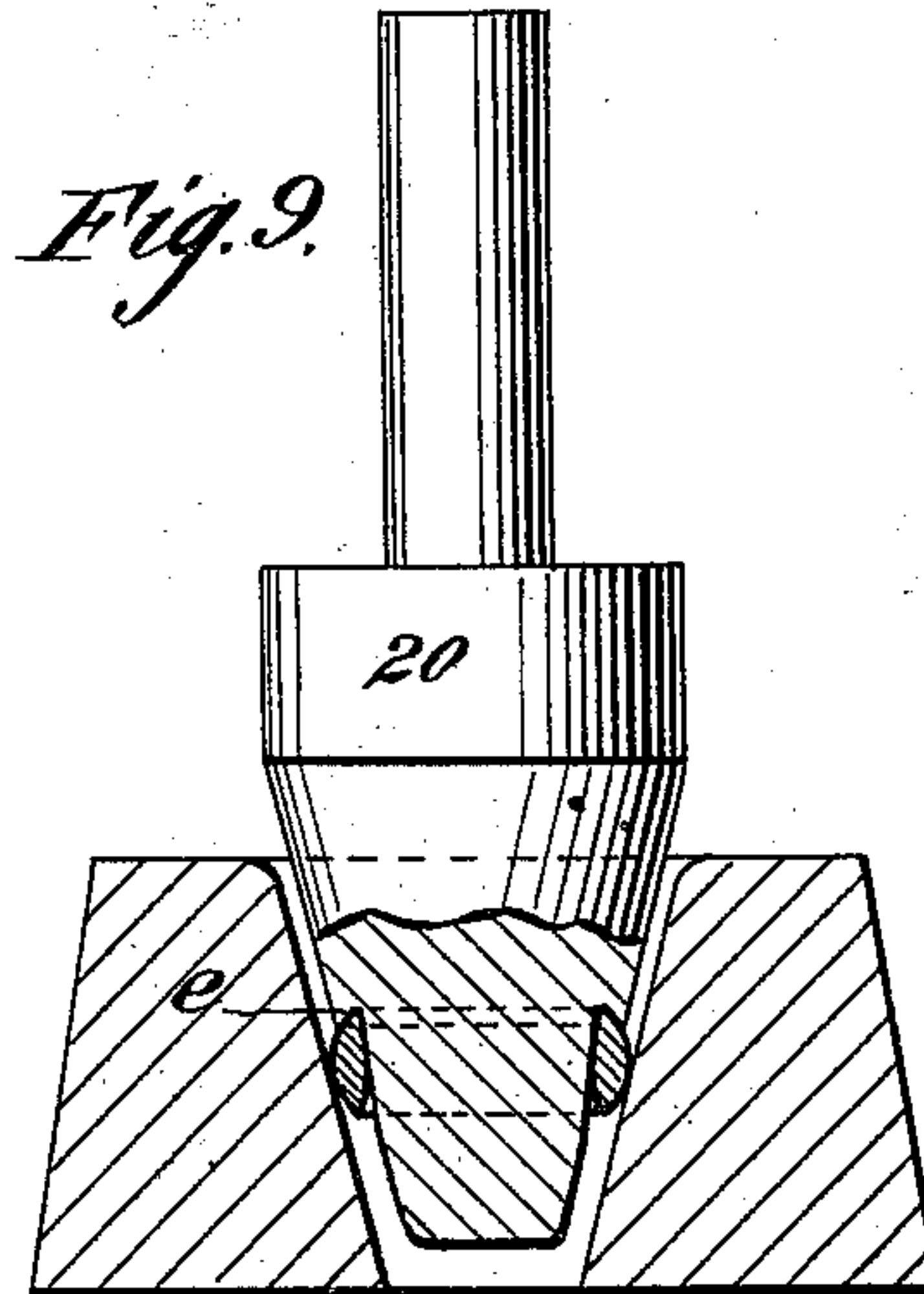
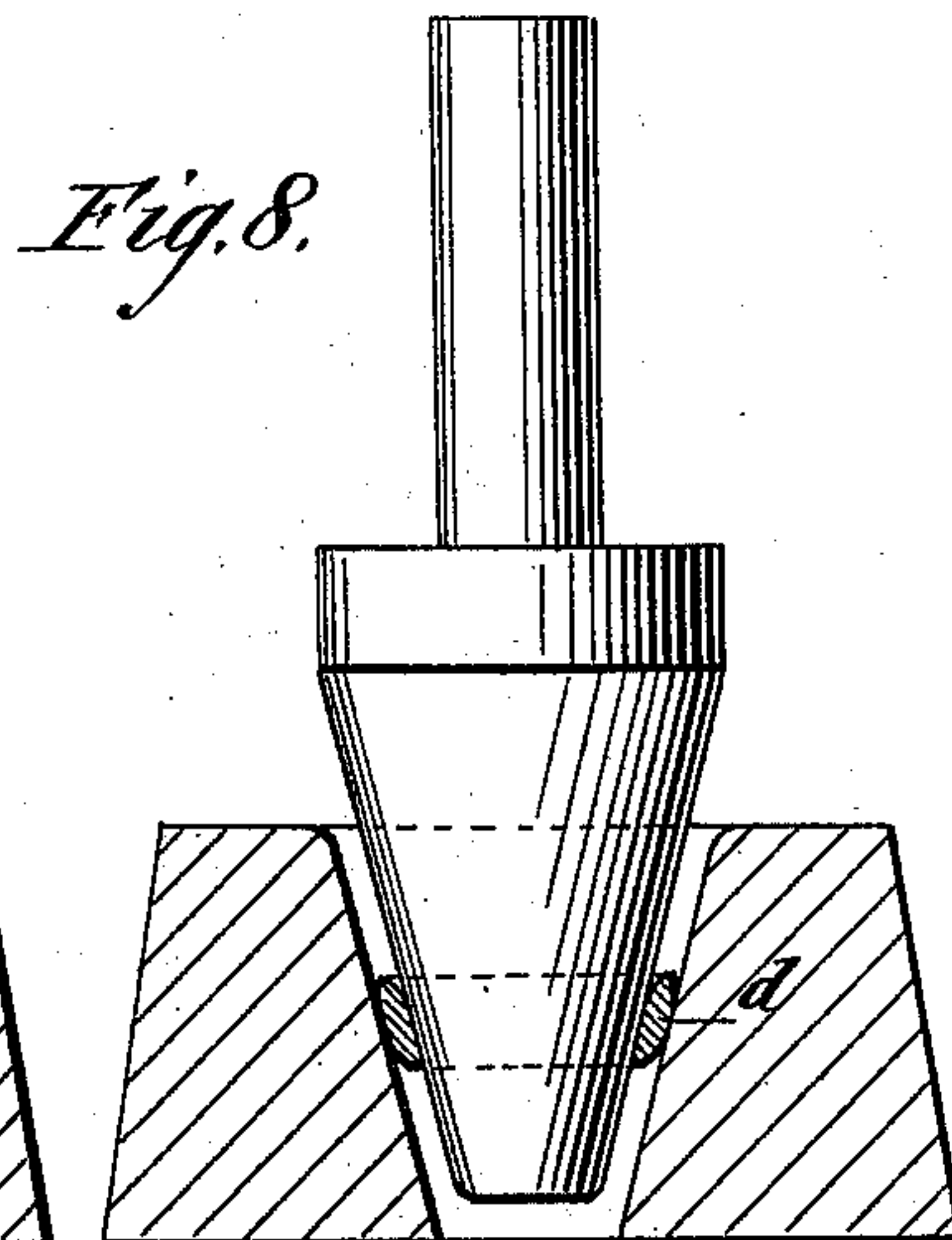
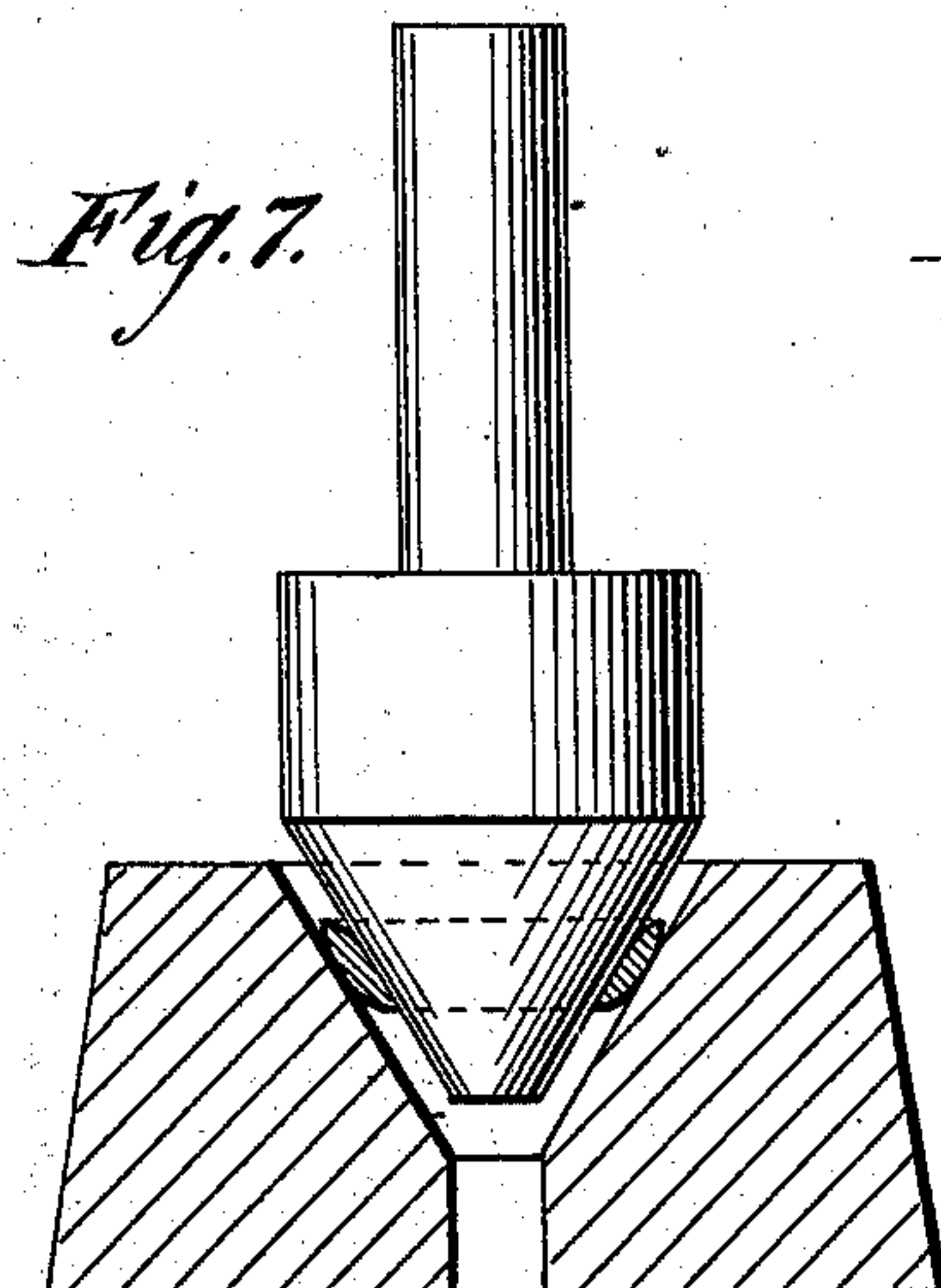
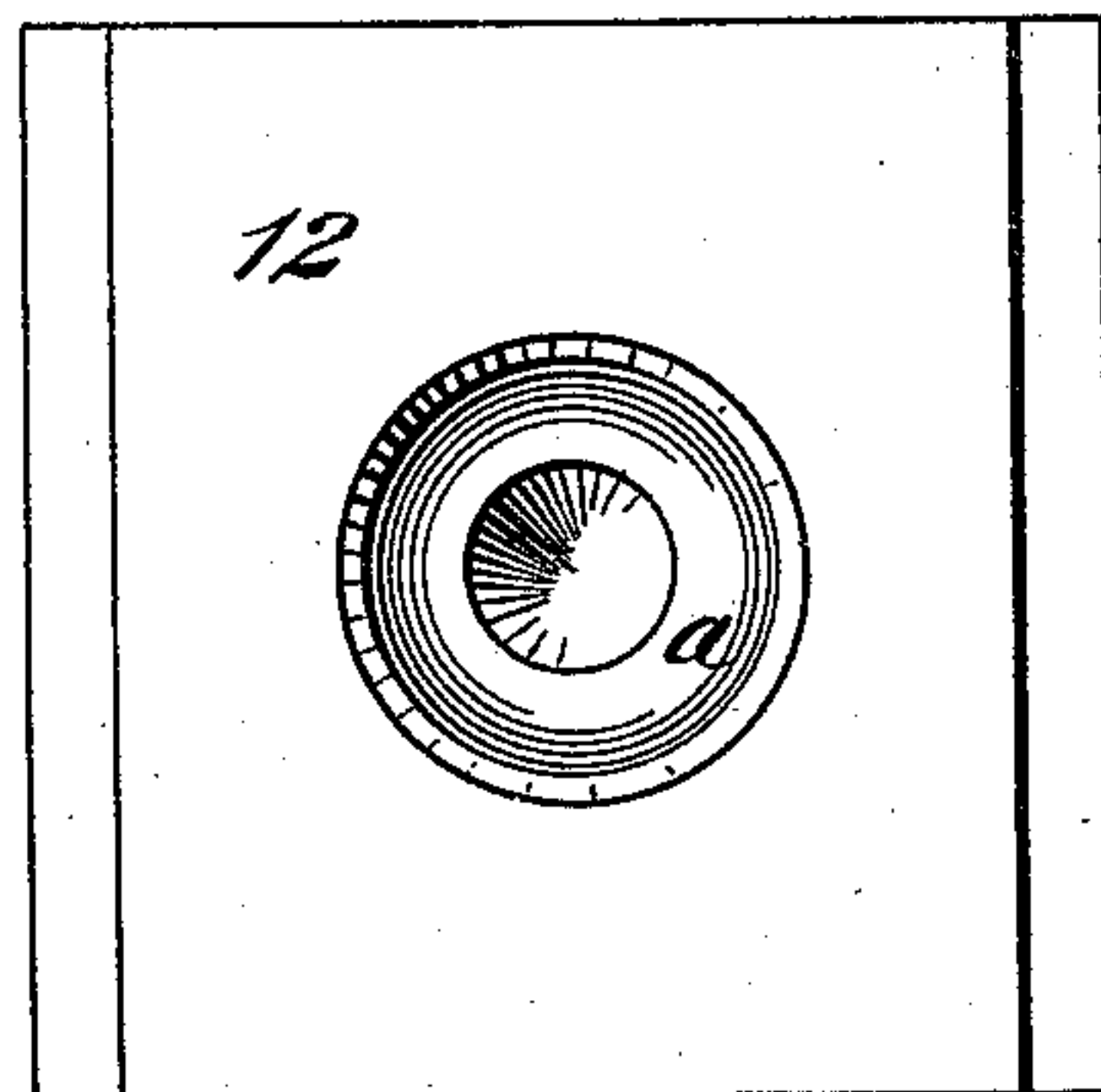


Fig. 6.



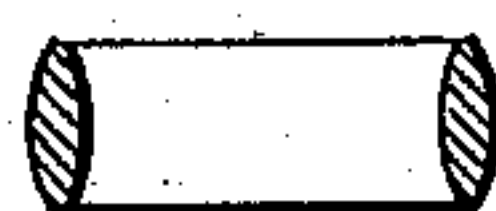
Fig. 5.



WITNESSES:

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Fig. 10.



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UNITED STATES PATENT OFFICE.

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METHOD OF FORMING RINGS.

SPECIFICATION forming part of Letters Patent No. 400,541, dated April 2, 1889.

Application filed January 14, 1889. Serial No. 296,311. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH B. BOWDEN, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved
5 Method of Forming Rings, of which the following is a full, clear, and exact description.

Prior to my invention it has been impracticable to form finger-rings from flat annular blanks, inasmuch as during the formation of
10 the ring the metal would be unduly compressed at one edge and unduly expanded at the other.

The object of my invention is to overcome the defects above referred to by producing a
15 ring of substantially uniform density; and this object I secure by first subjecting the blank to the combined action of an obtuse conical swage and a die having a concave annular recess, in then subjecting the blank to
20 the action of a series of graduated swages and dies, and in finally subjecting the blank to the action of a swage having an inwardly inclined or concave shoulder, all as will be hereinafter more fully described, and specifically
25 pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the
30 views.

Figure 1 is a side view of a punch adapted to produce the blanks from which the rings are made, the matrix being shown in section. Fig. 2 is a plan view of the flat annular blank
35 from which the rings are formed. Fig. 3 is a cross-sectional view of the blank. Fig. 4 is a view of the swage and die employed in the primary operation upon the blank, the die and the partially-formed ring being shown in
40 section. Fig. 5 is a plan view of the die shown in Fig. 4. Fig. 6 is a cross-sectional view of the partially-formed ring, representing the same as it appears after having been operated upon by the parts shown in Figs. 4 and
45 5. Figs. 7 and 8 are views of graduated dies and swages, the dies and the partially-formed rings appearing in connection therewith being shown in section. Fig. 9 is a view of the die and swage employed in the final operation,
50 the die being shown in section and the swage in partial section; and Fig. 10 is a cross-sectional view of the ring as it appears after it

has been operated upon by the parts shown in Fig. 9.

Referring now to the specific construction 55 shown in the drawings, 10 represents a double punch of ordinary form, by means of which blanks such as those shown at 11 in Figs. 2 and 3 are produced, these blanks being the ones from which the rings are to be formed. 60 The first step in forming the ring is to place the blank upon a die, 12, formed with an annular concave groove, *a*, said blank being arranged to operate in connection with an obtuse conical swage, 13, the action of the parts 65 producing a ring of the form shown in Fig. 6—that is, a ring having one convex side, *b*, and an opposing inwardly-inclined side, *c*. After the ring shown in Fig. 6 has been produced, it is subjected to the action of a series 70 of graduated dies and swages, such as those shown in Figs. 7 and 8, said swages increasing in acuteness and operating in connection with complementary dies, as many of these swages being employed as may be deemed desirable 75 or advisable, the swages and dies acting to gradually bring the ring to substantially the form in which it is shown at *d* in Fig. 8. After this form has been attained the ring is subjected to the action of a swage, 20, having an 80 inwardly-inclined concave-faced shoulder, *e*, which bears against the upper edge of the ring *d*, the ring being reversed, and holds said edge, the lower edge of the ring being carried inward as the swage descends, the action of 85 the swage and its die resulting in the production of a ring substantially like that shown in Fig. 10.

Having thus described my invention, I claim as new and desire to secure by Letters Patent— 90

1. The herein-described method of forming rings from flat annular blanks, which consists in first forming a ring having a convex outer side and an opposing inwardly-inclined inner side, in then manipulating the ring so that its 95 inner side will be more closely aligned with the axis of the ring, and in finally holding the upper edge of the ring and subjecting it to pressure, substantially as described.

2. The herein-described method of forming 100 rings from flat annular blanks, which consists in striking up the blank to form a flat inwardly-inclined surface on one side and a convex surface on the other side, then further

manipulating the blank or ring so that the flat surface shall assume substantially a plane at right angles to its position in the blank, with one edge of the ring shaped, and in then shaping the other edge without enlarging the diameter of the ring, substantially as described.

3. The herein-described method of forming rings from flat annular blanks, which consists in bending the blank and shaping the metal thereof at one step, so that one flat side of the blank is at an inward angle and the opposing side convex, in then further striking up the blank so that one edge of the ring is shaped and the inner periphery substantially in the line of the axis of the blank, and in then striking up the other edge to finish without enlarging the diameter of the ring, substantially as described.

4. The herein-described method of forming solid rings from flat annular blanks, which consists in swaging a flat annular blank at one operation to have a flat face at an angle to the axis of the ring and an opposing convex face, in then further swaging the same until one edge is shaped and the said flat face brought substantially to the line of the axis of the ring, and in then holding the other edge of the ring and subjecting it to pressure, substantially as described.

JOSEPH B. BOWDEN.

Witnesses:

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