

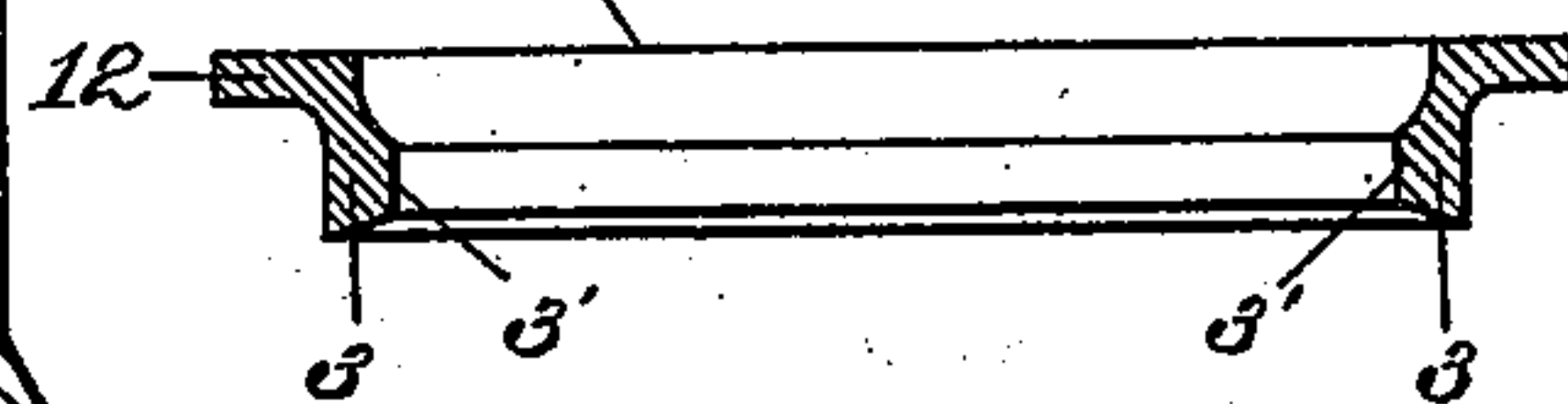
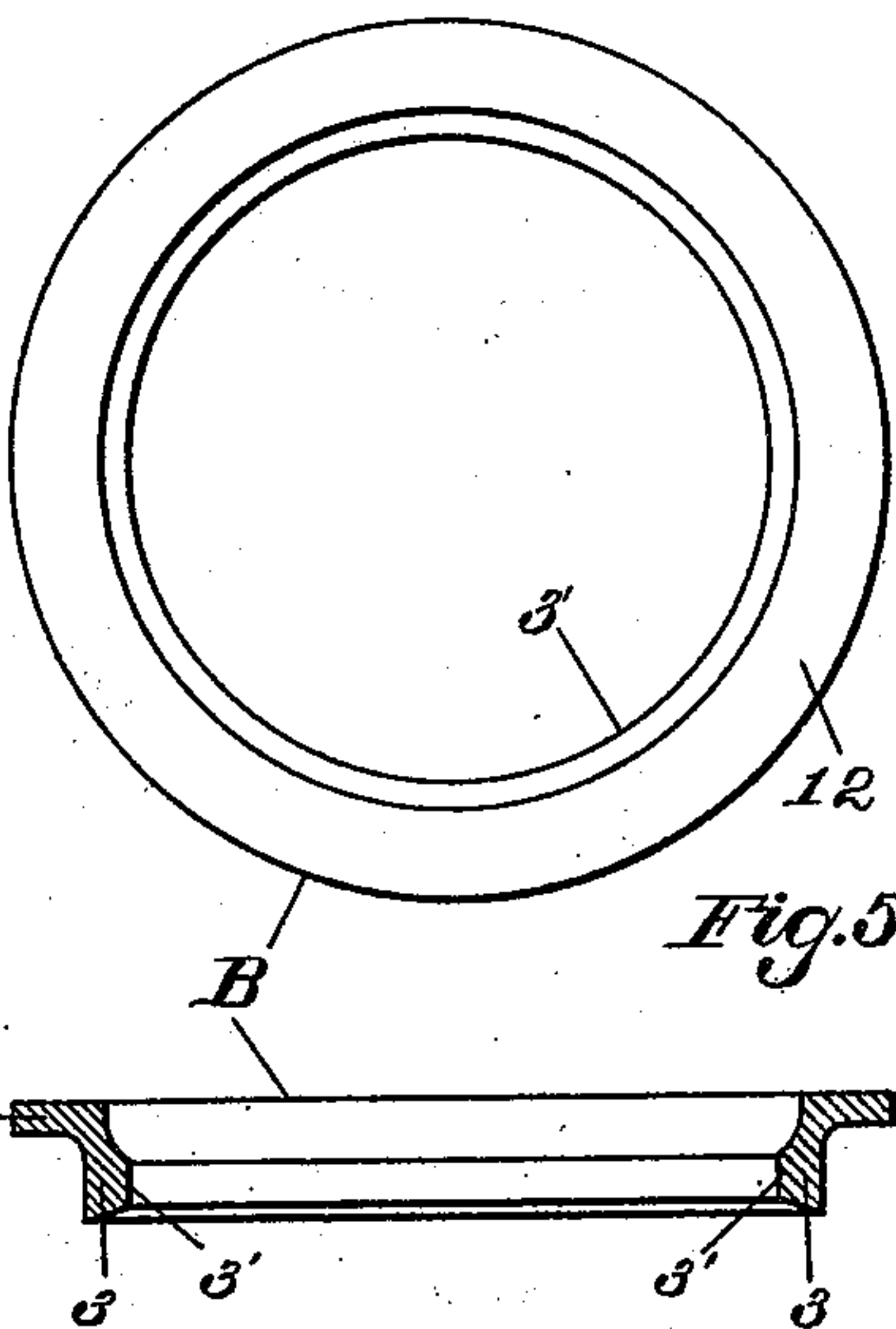
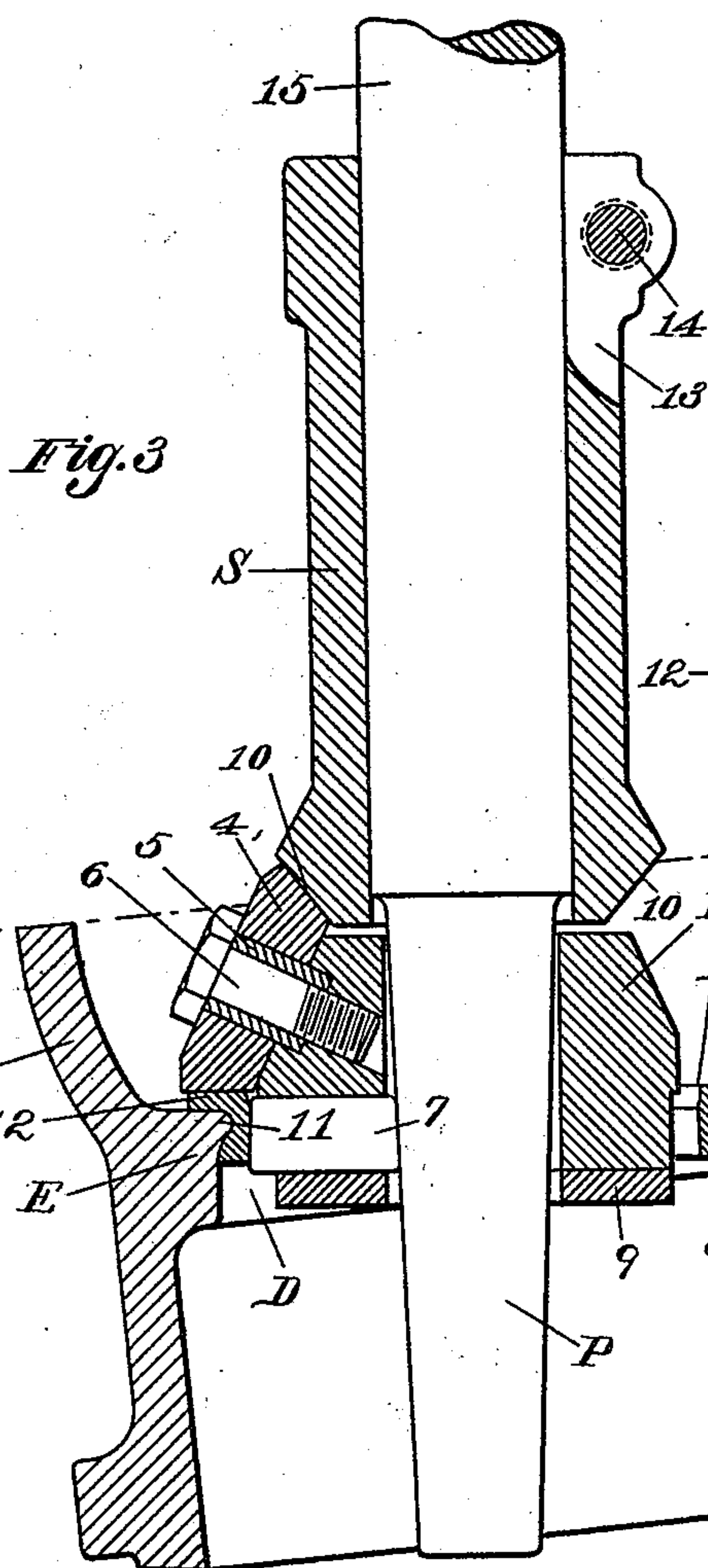
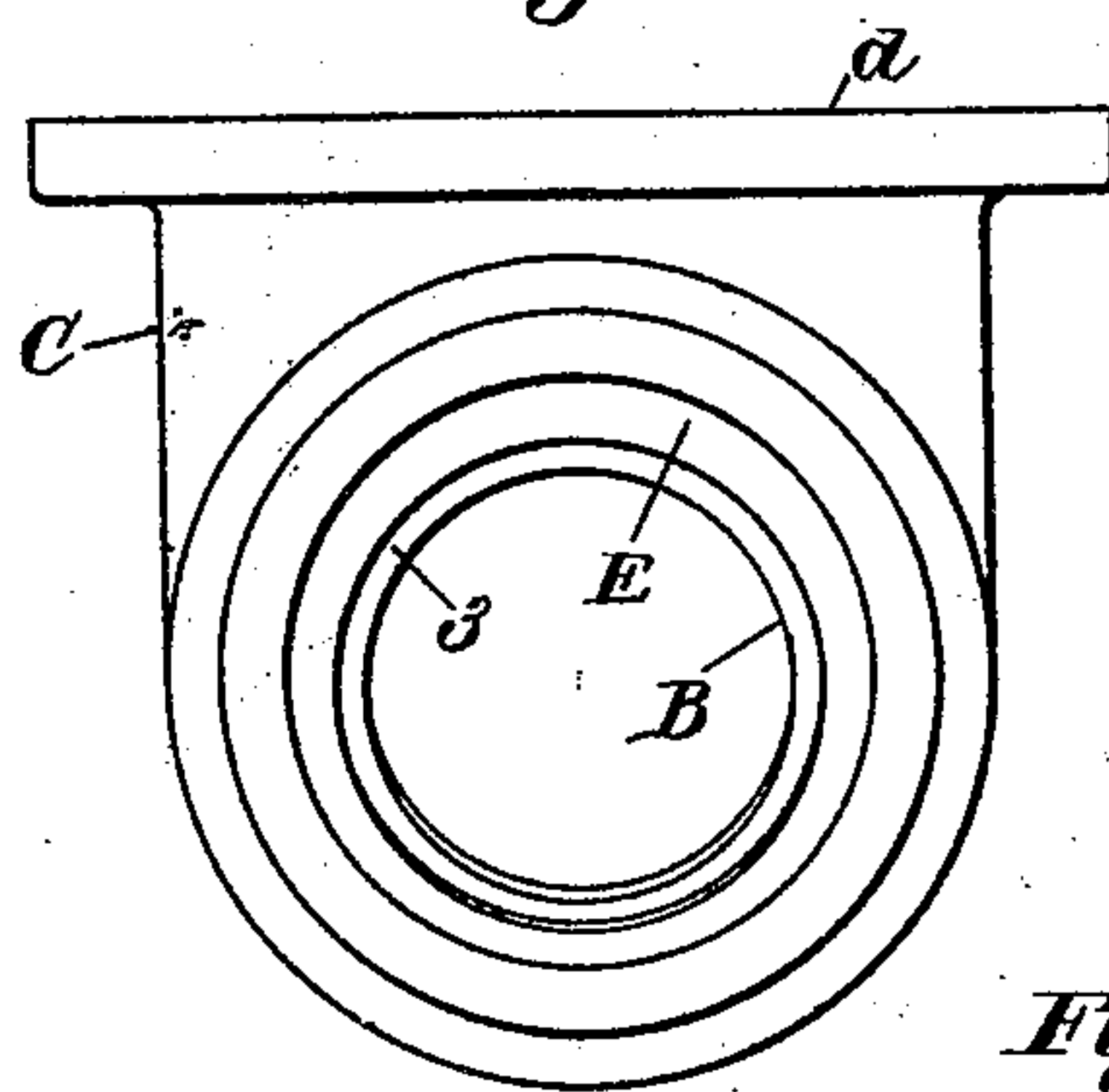
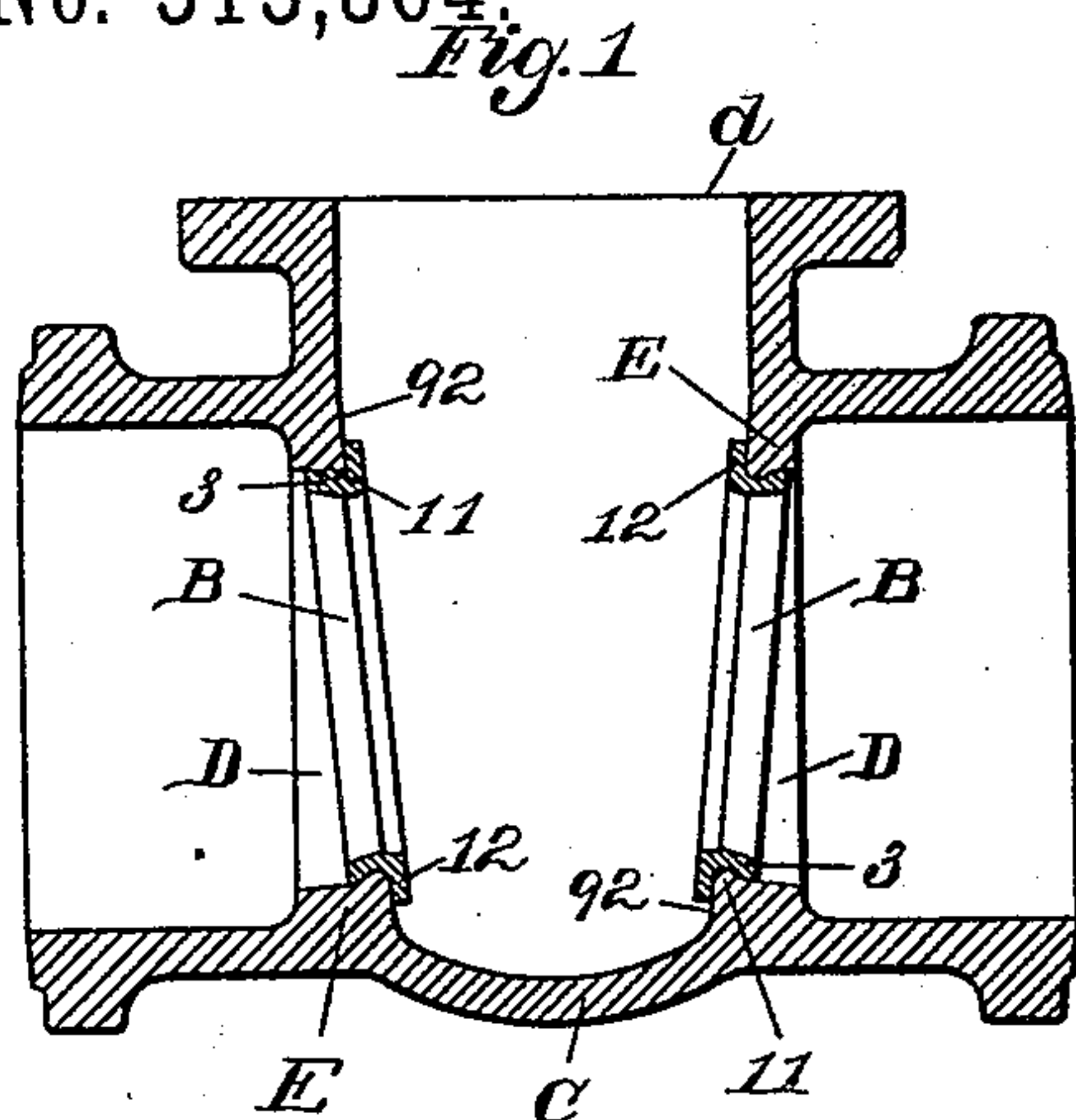
(No Model.)

2 Sheets—Sheet 1.

F. H. RICHARDS.
VALVE BODY.

No. 515,364.

Patented Feb. 27, 1894.



Witnesses:

Henry L. Rickard.
H. Mallon.

Inventor:

F. H. Richards

(No Model.)

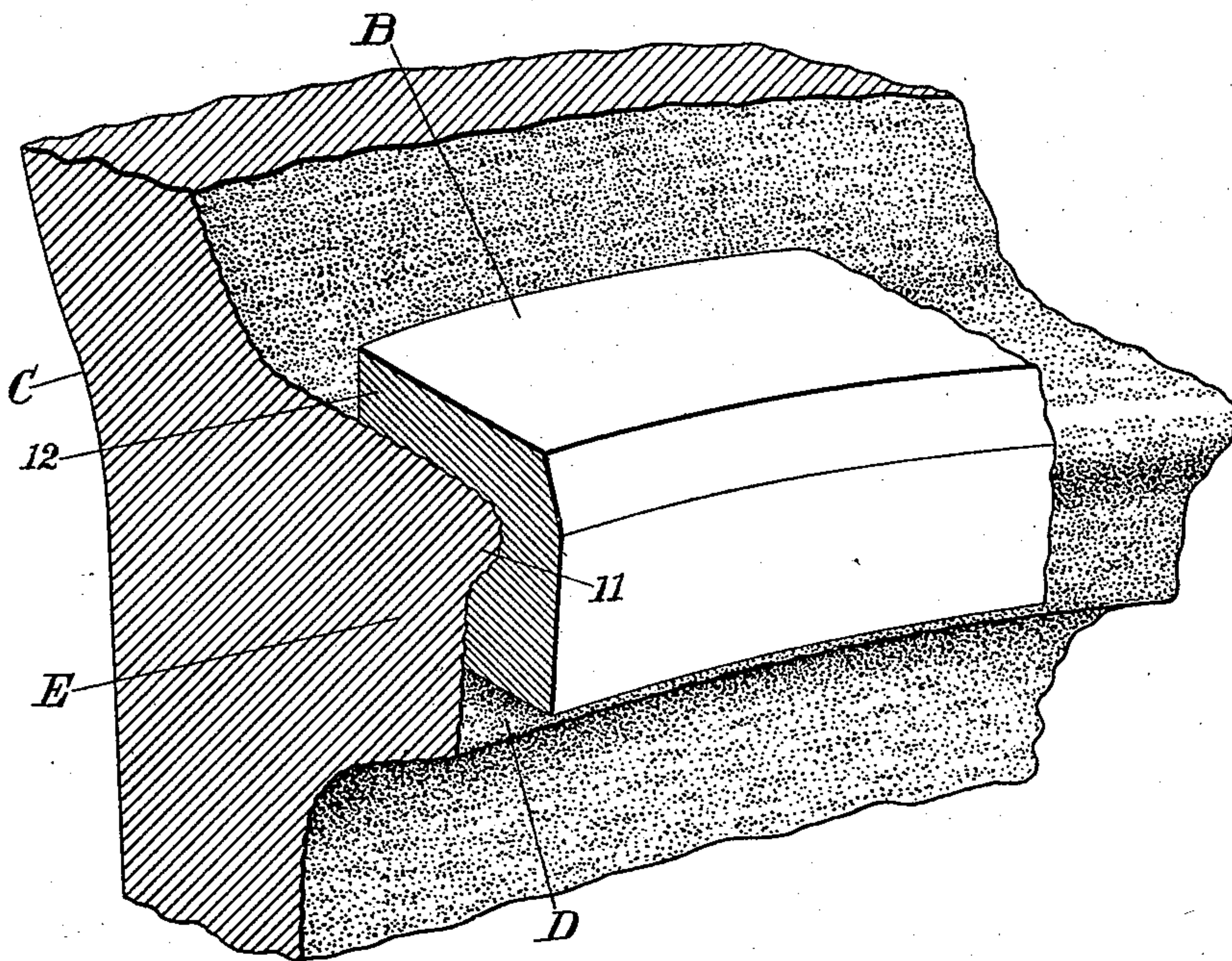
2 Sheets—Sheet 2.

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VALVE BODY.

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Fig. 6.



Witnesses.

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Inventor:

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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO WALTER WOOD, OF PHILADELPHIA, PENNSYLVANIA.

VALVE-BODY.

SPECIFICATION forming part of Letters Patent No. 515,364, dated February 27, 1893.

Application filed July 11, 1892. Serial No. 439,693. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Valve-Bodies, of which the following is a specification.

This invention relates to that class of valve-bodies used for the valves, or "gates," for water-mains and like service, in which the body-casting is formed with seat-bearings for supporting the brass, or other non-corrosive, seat secured thereto.

The object of my present invention is to furnish a seated valve-body of the class specified, having flanged seat-rings expanded into engagement with the flange-bearings and rolled into a state of expansive compression, whereby the seats are securely fixed in place and are held against the valve-body with a force sufficient to prevent leakage; and whereby the valve-bodies may be manufactured of a more reliable quality at a greatly reduced cost, owing to the entire absence of the machining operations heretofore required.

In the drawings accompanying and forming a part of this specification, Figure 1 is a longitudinal vertical section of a valve-body embodying my present improvements. Fig. 2 is an end elevation of the valve-body. Fig. 3 is an enlarged sectional view of one half of the valve shown in Fig. 1, together with the seating-tool in place as at the close of the seating operation. Fig. 4 is a plan view of the seat-blank. Fig. 5 is a sectional view of said blank. Fig. 6 is an enlarged sectional detail in isometrical perspective, of a portion of the valve-body (about full size of a twelve inch valve), with a portion of a seat-ring secured in place and constructed in accordance with my invention.

Similar characters designate like parts in all the figures.

In the drawings, I have shown, for the illustration of my present invention, a valve-body of the straight-way variety, and having two oppositely-disposed seats. The valve-body is designated in a general way by C, and consists of the usual tubular casting having an open extension, *d*, at one side thereof, through which the valve-gates may be inserted in a well-known manner, said extension being flanged for receiving the usual bonnet that

ordinarily carries the gate-actuating screw. These details, however, not appertaining to my present invention, are not shown herein. The body-casting, C, has one or more seat-bearings, E, of the general form of a perforated cross-wall. The seat-bearing proper consists of the inner surface, 92, of said wall, around the opening D therein. The inner side of the seat-bearing, or wall, E, is flanged or ribbed as at 11, being of the general form of a dovetail, or "under-cut," for the purpose of engaging the flange of the valve-seat. The valve-body in an unfinished state as it comes from the mold, as is well-known, is only approximately regular in form, and especially on the inner side thereof, it having undulating surfaces covered with scale and granulations such as oxide, sand, and the like. Heretofore it has been the common practice to true or finish the seat-bearing surfaces by machining the same, and also to turn the seat-ring to secure a perfect fit between the seat-ring and said surfaces.

In my present invention the undulations or roughened surfaces of the seat-bearing and seat-ring, in their natural condition, or as they come from the mold, are utilized to secure an intermeshing impingement, by embedding, through expansion, portions of the seat-ring into interstices in the bearing-faces of the seat-ring supporting-flange, which not only secures an undulating joint resistant to high-pressure, but also prevents the rotation of the seat-ring during the process of rolling and expanding said seat-ring to place.

The valve-seat, designated in a general way by B, consists of the seat-ring, or disk, 12, and, extending laterally from the inner edge thereof, the flange 3. When assembling the two parts of the valve-body, said flange 3 is inserted through the opening D, and is then subjected to a rolling operation whereby it is internally rolled and expanded into engagement with the flange E of the seat-bearing, and into a high state of compression.

The seat-blank shown in Figs. 4 and 5 is of the particular kind described and claimed in my application, Serial No. 439,692, filed July 11, 1892; which form of seat-blank has an anchor-age-flange, 3, whose projecting end is thickened on the inner side thereof at 3' for the purpose of supplying the metal required in the operation of rolling-in the seat-blank into the open-

ing D of the valve-body casting. When subjected to the rolling operation employed for inserting the seat-blank in the valve-body and for expanding said blank to form the finished valve-seat, the expander-rolls act first upon the reinforcement-portion, 3', of said anchorage-flange, and as this is rolled down extend their action over the whole inner face of said flange. During the seating operation, said anchorage-flange is gradually shifted and re-shaped from the position and form shown in Figs. 4 and 5 to those shown in Figs. 1 and 3. During the process of insertion, the seat-blank flange is expanded by subjecting the same to internal rolling carried on to the point of flowage, this being done in order to embed the more ductile metal of the flange upon the less ductile metal of the valve-body, and also to bring the metal of said flange, as hereinbefore mentioned, into a high state of compression, whereby it will be sufficiently expansive to maintain the required water-tight joint between the two parts of the completed valve-body.

The seating-tool partially shown in Fig. 3 is described and claimed in my application, Serial No. 439,691, filed July 11, 1892. Said tool consists, first, in a roller-head furnished with rollers for acting on the seat-blank disk and on the anchorage-flange thereof; and second, of devices for simultaneously driving said rollers. The roller-head consists of the body, or roll-carrier, F, constructed to receive the two sets of rollers, one set for rolling the face of the seat-blank and the other set for rolling the anchorage-flange of said blank. Each of said sets consists preferably of three rolls, only one of which is shown in the drawings in this case. The face-roll 4 is held in place on the carrier by some suitable means, as for instance, the tubular stud 5 and the bolt 6. The expander-roll 7 is shown set in a pocket, or recess, formed in said carrier, being held in place by a cap, 9, fixed to the under side of the roll-carrier. For driving these rolls, a driving-sleeve, S, is provided, having at the end thereof a conical track, 10, engaging upon and between the several rolls of the first set to drive these after the manner of frictional bevel gearing. For driving the expander-rolls, and also for forcing the same down during the seating operation, I use an expander-pin, P, which is formed tapering as shown, so that its point will enter between the expander-rolls when these stand together as at the beginning of the seating operation, and will during said operation gradually force the rolls apart as the expander-pin is driven downward to its position in Fig. 3. The driver S is driven from the stem, 15, of said pin P, by means of a clamping device only partially shown herein and consisting of the upper end of said driver slotted at 13 and having a clamp-bolt, 14, for closing the same upon said stem 15.

The process of inserting the seat-blank carried out by means of the seating-tool herein-

before referred to, is described and claimed in my application, Serial No. 439,689, filed July 11, 1892. According to this process, the seat-blank having been set in position against the wall E, with the anchorage-flange 3 projecting into the opening D, and the seating-tool assembled and set in place as in Fig. 3 but with the expander-pin drawn up so that its point only just enters between the expander-rolls, power is next applied to the expander-pin to revolve the same together with the driver S clamped thereto, and to gradually force said pin downward during the revolution thereof to the position shown in Fig. 3. During the first part of this movement, by reason of the clamping aforesaid of the driver S upon said pin, the face-rolls 4 of the roller-head are firmly held against the face of the seat-blank, which is thereby subjected to a rolling action until firmly embedded on the face of the wall E. As the expander-pin is forced downward, it forces outward the expander-rolls, thereby subjecting the anchorage-flange 3 to a heavy pressure and rolling action, and expanding the same within the bore D into a rigid locking engagement with the wall E; this rolling action being carried on to the point of flowage, whereby the ductile metal of the flange is forced over and into all of the undulations and granulations of the surface of the bore D.

For making my improved seated valve-body, I use the castings in the rough form in which the same come from the foundry, only giving them such finishing as is usually given to castings in the cleaning-room, consisting of the usual "chipping" in the case of the iron castings, and of the usual cleaning of the brass castings from the molding-sand; but neither casting need be machined or otherwise especially prepared for use.

By utilizing the roughened surfaces of the seat-ring and seat-bearing of the valve-body, I secure an undulating joint which is highly advantageous in resisting pressure and will greatly reduce the cost of manufacturing valve-bodies.

Having thus described my invention, I claim—

The herein described valve-body, it consisting of the body-casting, having the transverse walls with seat ring openings therein, and having in said openings the inward flanges contiguous to the inner sides of the walls, said wall and flange surfaces being of the described rough and unfinished undulating character, combined with seat-rings of L-shaped section having an external enlargement in locking engagement with the inward flanges of the valve-body walls, said engagement being made by an undulating joint of high-pressure resistance, as set forth.

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Witnesses:

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