

(No Model.)

F. H. RICHARDS.
PROCESS OF SEATING VALVE BODIES.

No. 516,658.

Patented Mar. 20, 1894.

Fig. 1.

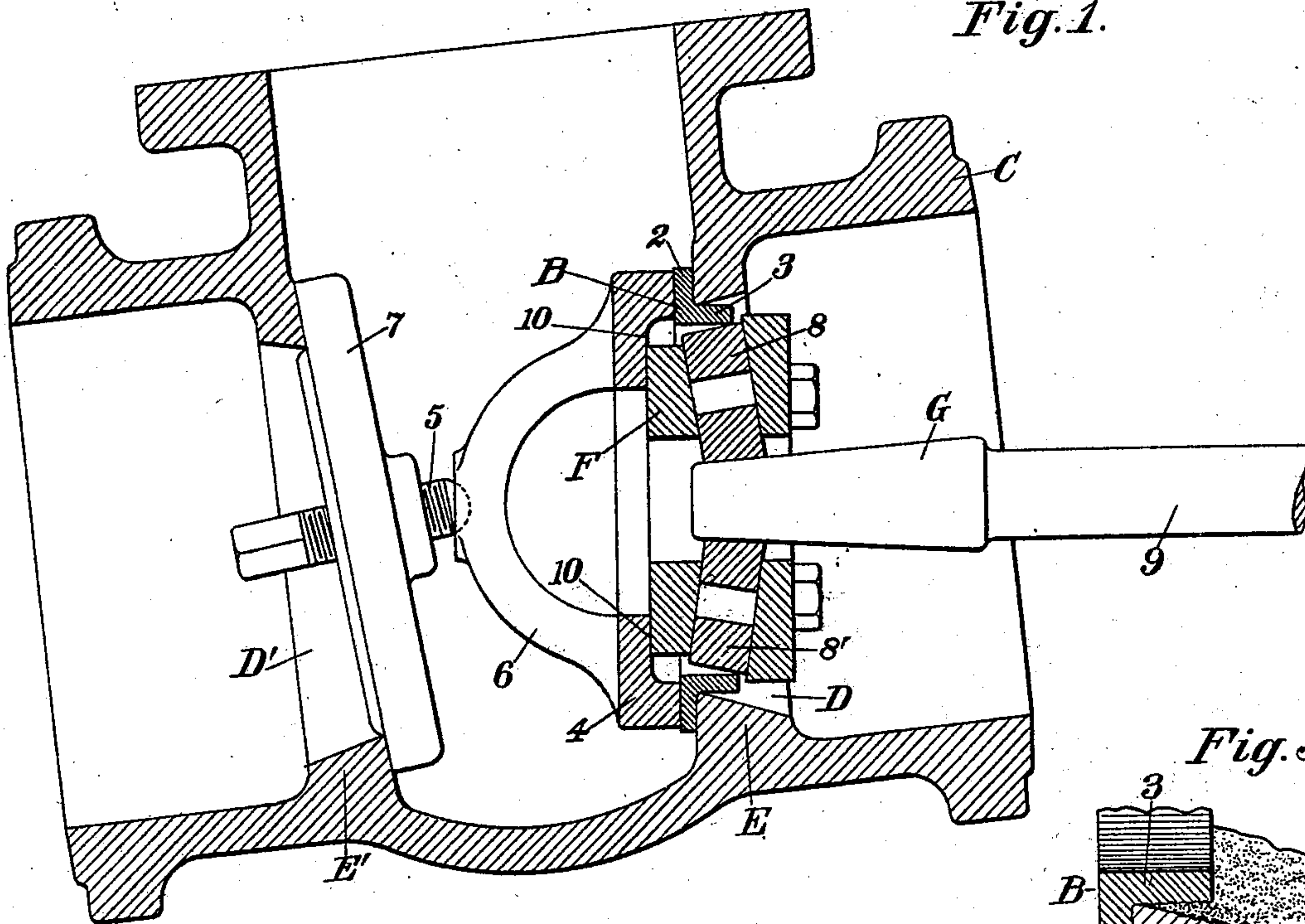


Fig. 2.

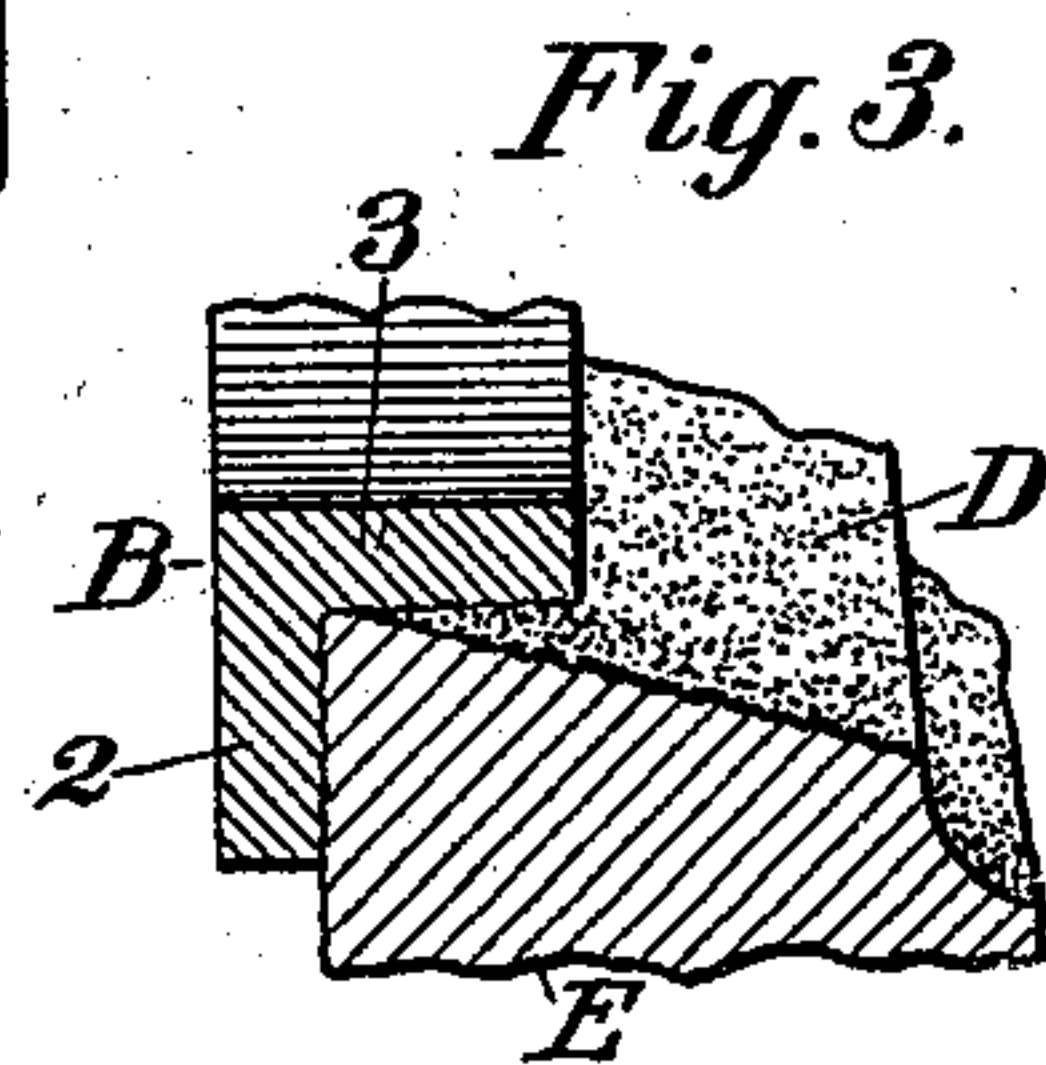


Fig. 3.

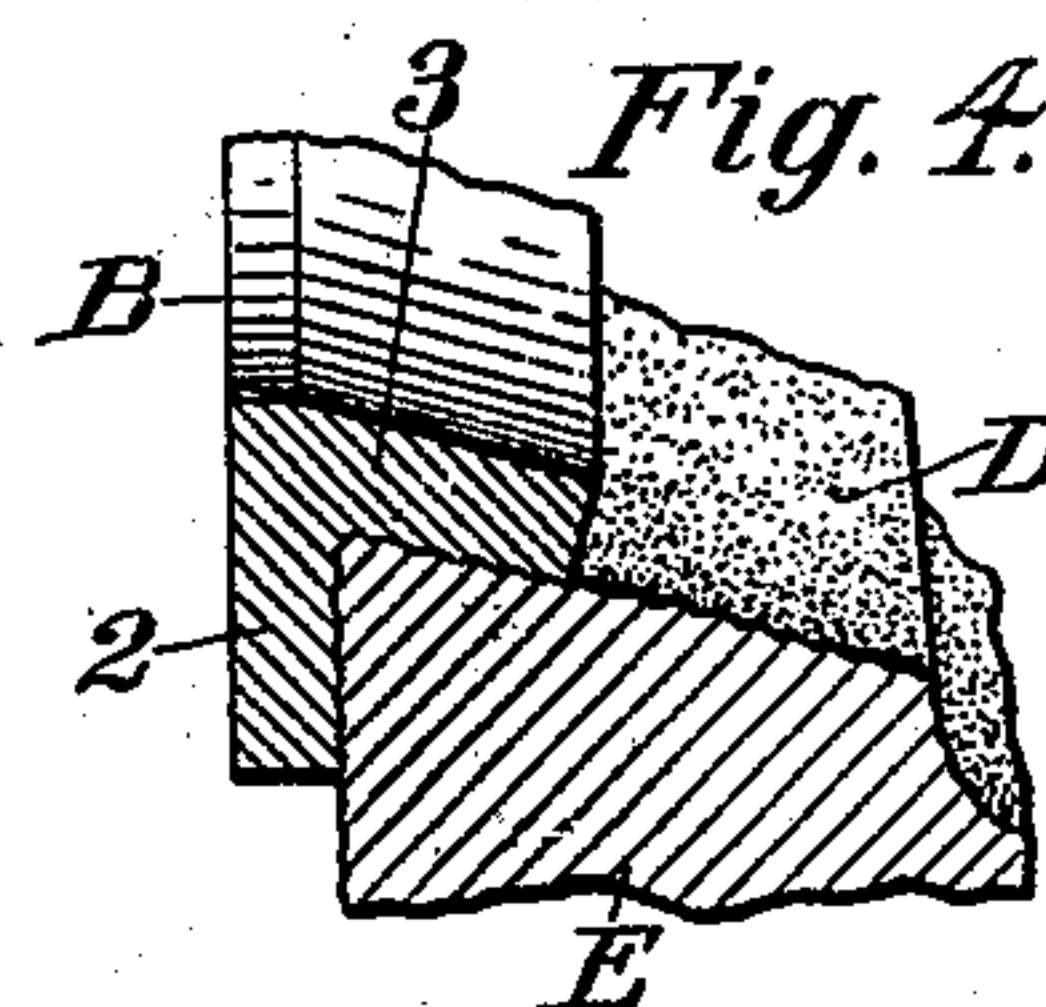
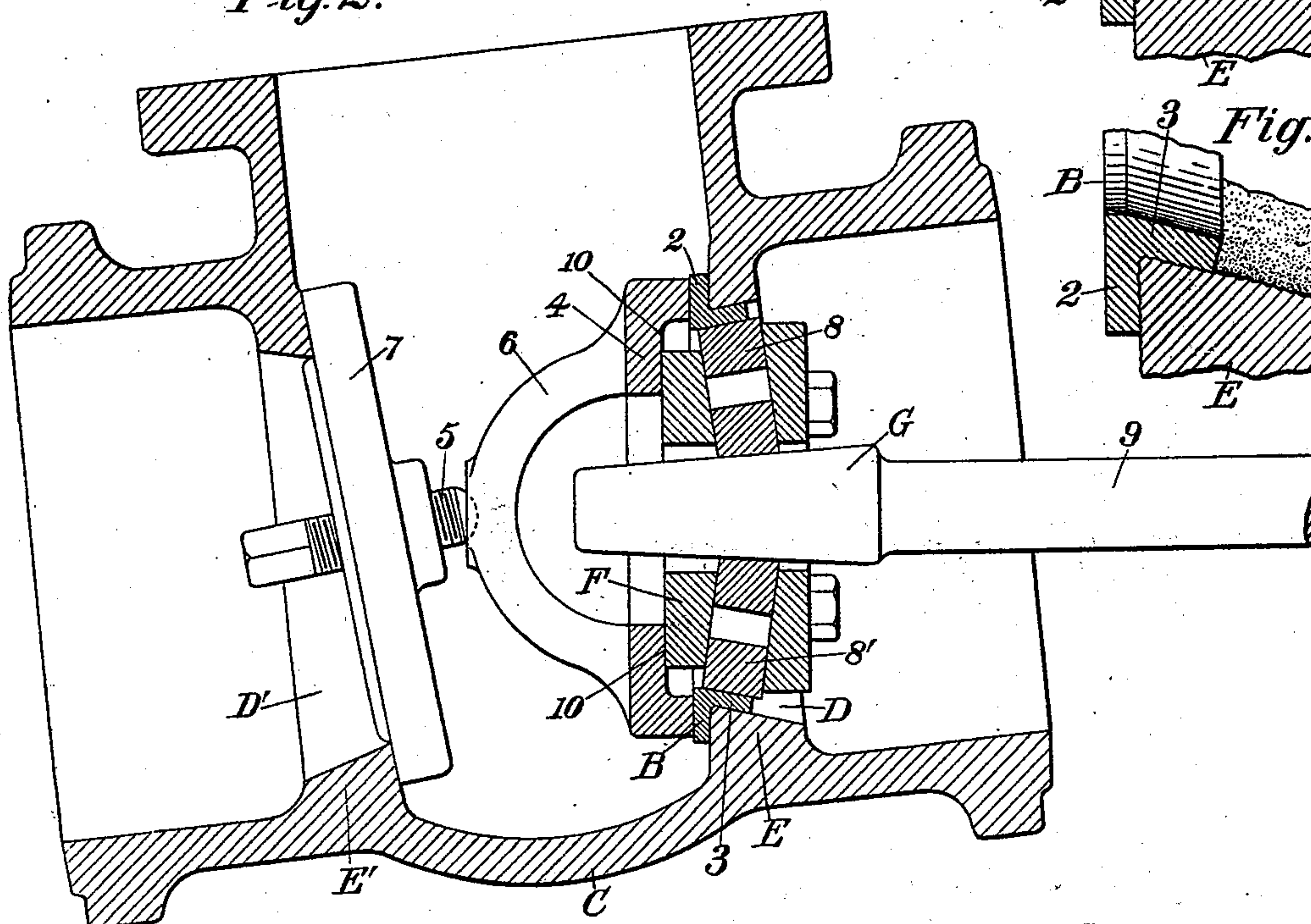


Fig. 4.



Witnesses:

J. L. Edwards Jr.
Fred. J. Dole.

Inventor:

Fr. W. Richards

UNITED STATES PATENT OFFICE.

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

PROCESS OF SEATING VALVE-BODIES.

SPECIFICATION forming part of Letters Patent No. 516,658, dated March 20, 1894.

Application filed July 11, 1892. Serial No. 439,688. (No specimens.)

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 Processes of Seating Valve-Bodies, of which the following is a specification.

This invention relates to processes for seating valve-bodies by expanding the seat-blank into engagement with the valve-body; the object being to provide a method whereby said process may be effectively carried into practice in connection with thin valve-seat blanks of L-shaped cross-sectional form.

In the drawings accompanying and forming a part of this specification, Figure 1 is a longitudinal section through a valve-body having a seat-blank in place ready for seating, together with apparatus for expanding the seat-blank; this view is illustrative of the first stage of the process. Fig. 2 is a view similar to Fig. 1, illustrative of the later stage of the process. Fig. 3 is an enlarged longitudinal section of a portion of the valve-body, showing a portion of a seat-blank constructed in accordance with my improved process in position for seating. Fig. 4 is a similar view, showing a portion of a seat-blank as secured in place in the valve-body.

Similar characters designate like parts in all the figures.

The valve-body C shown in longitudinal section in Figs. 1 and 2 is of the well-known double-gate type, it having the usual cross-walls E, E', or annular valve-seat flanges, in which are formed the openings D, D', for the passage through the valve of the fluid. For the purpose of furnishing means for anchoring the seat-ring in the valve-body, said openings D, D' are conically formed, they being smallest in diameter at the inner, or face, side of the cross-walls, as will be understood by comparison of Figs. 1 and 2.

The seat-blank consists of the disk-shaped seat-ring 2, having an anchorage-flange, 3, projecting at right angles, or substantially so, from the inner side of said seat-ring; which flange is of slightly less diameter than the diameter of the opening D of the valve-body, and is of sufficient length to extend some dis-

tance into said valve-opening. In Fig. 1, one form of said seat-blank, designated in a general way by B, is shown set in place in the valve-body in position to be secured thereto by a simultaneous clamping and rolling, as hereinafter more fully set forth. The seat-blank having been set in position against the wall E, with the flange 3 thereof projecting into the opening D, as shown in Fig. 1, the clamp-plate 4 is set against the face-side of said seat-blank disk 2, and is firmly clamped in place by some suitable means, as for instance by the screw 5 bearing against the yoke 6 which is shown formed on the clamp-plate 4, said screw being carried by a plate, or bar, 7, set against the opposite wall E' of the valve-body C. By turning the screw 5 with sufficient power, the seat-ring disks may be clamped firmly against the wall E, so as to prevent displacement thereof during the subsequent stages of the seating operation. The seat-blank having been set in place and clamped firmly in position as set forth, the expander-tool is next set in place within the anchorage-flange 3 of the seat-blank, as shown in Fig. 1, ready for internally rolling said flange to expand the same from the position shown in Fig. 1 to that shown in Fig. 2. One kind of expander-tool suitable for carrying out my improved process consists, as shown in the drawings, of the roller-head F having therein sockets adapted to receive the expander-rollers 8 and 8', and perforated for the passage through it of the expander-pin G, which pin has a stem, 9, whereby it may be driven from the spindle of a suitable lathe or other machine; the valve being held in the meantime in some suitable chuck or holder. Owing to the taper of the expander-pin P, the operative movement of said pin, which (in addition to the rotary movement thereof) is toward the left-hand in Figs. 1 and 2, naturally tends to force the roller-head out of place relatively to the seat-blank; for the purpose of resisting said tendency, the clamp-plate 4 is constructed with a face at 10 for receiving the pressure of the roll-carrier F, which is shown resting on said face in both of the figures of drawings.

One of the chief objects of my present invention is to provide a process by means of

which a seat-blank in its unfinished or roughened state may be applied to a seat-flange of a valve-body in its rough or unfinished state, and at the same time utilize the rough unfinished surfaces of the seat-bearing of the valve-body to secure an intermeshing and undulating joint between the two parts, which, in practice, is highly advantageous, as it forms a joint of extreme high-pressure resistance.

10 A valve constructed in accordance with this process was shown and described in a separate application, Serial No. 439,693, filed by me concurrently herewith, and to which reference may be had.

15 In carrying out my improved valve-seating process, the seat-blank casting B, of relatively ductile metal, as soft brass, or bronze or the like, is first set in place in the valve-body casting, as shown in Fig. 1, with the anchorage-flange 3 of said seat extending into the conical opening D. The seat-disk 2 of said seat-blank is now rigidly clamped against the seat-bearing or side of the wall E. Next, the anchorage-flange 3 is subjected to internal

25 rolling to re-form and expand the same into rigid engagement with the conical inner surface of said perforated wall E, thereby completing the operation of setting the seat-blank into the valve-body. As will be seen by reference to the drawings, the rolling-in pressure is exerted upon the anchorage-flange in a plane substantially at right angles to the plane of the inclined face of the seat-flange of the valve-body, or at an inclination to the plane of the face of the seat-ring. In other words, pressure is exerted upon the anchorage-flange in an outward inclined direction. During the operation of expanding the anchorage-flange by internal rolling as set forth,

40 the metal of said flange tends not only to flow in the direction of the roller-movement, but also to flow laterally of said movement in both directions, this lateral action being relatively slight in extent but of correspondingly great force. Except it be counteracted by rigid clamping as described, said flowage tendency will have the effect of lifting the seat-portion 2 of the seat-blank away from the wall E, so that when said disk is finished

50 off and the valve-gate is brought against the same when the valve is put into use, said disk, not being properly supported by the wall E, will spring away from the valve-gate, and a leaky valve be the result. By means of my present improvements, I am enabled to successfully insert a brass or soft bronze valve-seat into a cast-iron valve-body, and to do this using each of said parts in an unfinished condition: *i. e.* in the form in which the

60 parts come from the molds, without any machining or other special preparation other than the pickling and chipping usually done

in the cleaning-room of a foundry. In this condition, as is well known, the valve-body castings are only approximately regular in form, and, especially on the inner side thereof, have undulating surfaces covered with scale and granulations, such as oxide, sand and the like, into and over which the more ductile metal of the brass or bronze seat-ring must, according to the process carried out by my present improvements, be firmly bedded. According to my present invention, therefore, I subject the anchorage-flange not only to rolling sufficient to re-form the shape thereof, but sufficient to subject the metal thereof to flowage both circumferential and lateral of the flange, for the purpose, first, of conforming the same to the irregularities of the casting and filling all of the undulations thereof; and, secondly, to roll-harden the metal into a condition of greater resistance and into a high state of compression within the valve-body, for resisting the pressure of the fluids and preventing any leakage thereof.

Having thus described my invention, I claim—

1. The herein-described process of seating valves, which consists in first producing a valve-body with a rough or unfinished undercut seat-flange; second, producing an annular seat-blank of L-shaped sectional form and with roughened or unfinished surfaces; and third, securing said seat-blank to the seat-flange by in-rolling the seat-blank with its roughened faces bedded into the roughened faces of the seat-flange, whereby the seat-blank is re-formed and roll-hardened, and an undulating joint of high-pressure resistance is formed between said seat-flange and the seat-bearing, substantially as described.

2. The herein-described process of seating valves, which consists in casting the valve-body with an annular undercut seat-flange having rough or unfinished surfaces, making a seat-blank with a seat-ring and anchorage-flange having rough or unfinished surfaces, applying the seat-blank with the seat-ring resting upon the seat-face of the seat-flange and with the anchorage-flange projecting below said seat-face, and simultaneously pressing the seat-ring to its bearing and internally rolling the anchorage-flange outward on lines at an inclination to the plane of the seat-ring, and at the same time bedding the roughened faces of the seat-blank into the roughened faces of the seat-flange, to thereby form an undulating joint of high-pressure resistance, substantially as described.

FRANCIS H. RICHARDS.

Witnesses:

HENRY L. RECKARD,
HANS MALLNER.