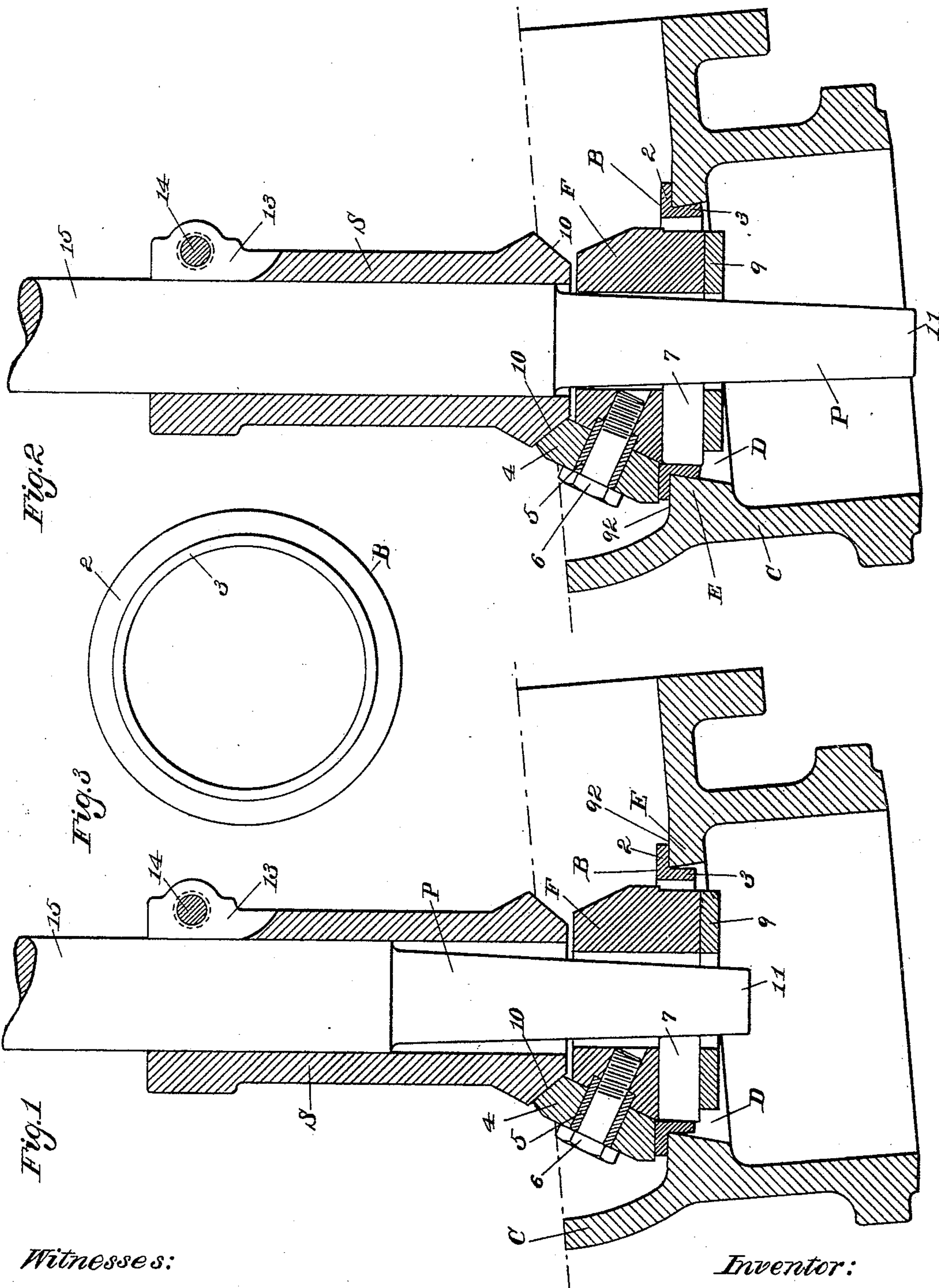


(No Model.)

F. H. RICHARDS.
PROCESS OF SEATING VALVES.

No. 500,214.

Patented June 27, 1893.



Witnesses:

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PROCESS OF SEATING VALVES.

SPECIFICATION forming part of Letters Patent No. 500,214, dated June 27, 1893.

Application filed July 11, 1892. Serial No. 439,689. (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 Processes for Seating Valves, of which the following is a specification.

This invention relates to processes for seating valves by securing the seat-ring in the valve-body by expanding the anchorage-flange of said ring into locking engagement with the seat-bearing of the valve-body; the object being to furnish a process whereby the seat portion of the seat-blank may be firmly bedded upon and held to its seat on the valve-body during the expansion of the anchorage-flange of the seat-ring, and whereby brass-seated iron valve-bodies may be manufactured of un-machined castings.

This invention is in the nature of an improvement on the process described in my application, Serial No. 439,688, filed July 11, 1892.

In the drawings accompanying and forming a part of this specification, Figure 1 is a sectional elevation of a portion of a valve-body together with a valve-seat blank set therein and a valve-seating tool in place for use; this view is illustrative of the earlier stage of the seating operation. Fig. 2 is a view similar to Fig. 1, illustrative of the later stage of the seating operation. Fig. 3 is a plan view of the under side of the seat-ring blank shown in section in Fig. 1.

Similar characters designate like parts in all the figures.

In the drawings in connection with the illustration of my present invention, I have shown in section one end of a valve-body casting, C, which corresponds substantially in form and construction to the ordinary double-gate straight-way valves commonly used for water-distribution. Said valve-body has the usual interior or cross wall E having therein the opening D for receiving the anchorage-flange 3 of the seat-ring 2, which has its bearing on the face-side, 92, of said wall E, as shown in Figs. 1 and 2. Said opening D is internally rimmed, being "under-cut," or formed tapering, as will be understood from the figures of the drawings, so that the seat-

ring may be securely anchored in place, as hereinafter more fully set forth.

The seat-blank consists of the disk-shaped seat-ring 2, of angle-section corresponding in size to the diameter of said opening D and having an anchorage-flange, 3, extending from one side of the inner edge of said seat-ring for some distance into said opening D. Said blank is to be made of cast-brass or other ductile metal, having its anchorage-flange adapted to be rolled to the point of flowage. In Fig. 1, said seat-blank, designated in a general way by B, is shown set in place in the valve-body, against the side 92 of the wall E, in position to be secured therein by the process of rolling, as hereinafter more fully set forth. In Fig. 2, the seat-ring is shown anchored in place. The seat-ring blank is to be cast of a metal somewhat more ductile than the metal of the valve-body, so that said blank will be adapted to be shaped and expanded by the rolling operation and firmly embedded on the uneven and granular surface of the valve-body casting.

An improved valve-seating tool suitable for carrying out my improved process 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 upon 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 two sets of rolls, of which one set is arranged for rolling the face of the seat-blank and the other for rolling the anchorage-flange of said blank. The face-rolls 4 (usually three in number, as shown in said application) are each held in place on the carrier by some suitable means, as for instance, the tubular studs 5 and the bolts 6. The other set of rolls, designated as the "expander-rolls" 7, are set in pockets, or recesses, formed in said carrier, the rolls being held in place in said recesses by a cap, 9, which may be formed integral with the roll-carrier, or, may be formed separately and secured to the carrier by means of screws not herein shown. Said face-rolls and the corresponding expander-rolls are located in the same radial planes, at substantially

equal distances around the roll-carrier. By reason of this combination of the rolls, when these are applied to the rolling-in of the seat-blank, this is simultaneously acted upon on both the disk and the flange in the same radial planes, thereby subjecting the entire cross-sectional area of said seat-blank to simultaneous reduction at the point thereof under the rollers; which point of action moves around the circumference of the seat-blank with the movement of the rollers thereon.

For driving these rolls, a driving-sleeve, S, is shown provided at the end thereof with 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. This peculiar arrangement is primarily for the purpose of reducing to a minimum the friction of the face-rolls upon the face of the valve-seat disk.

For the purpose of driving, and also of expanding, the expander-rolls 7 during the seating operation, I employ an expander-pin, designated in a general way by P, which pin is formed tapering so that its point 11 will enter between the expander-rolls when these stand within the anchorage-flange 3 of the seat-blank as shown in Fig. 1.

As a means for simultaneously driving the face-roll driver and the expander-roll driver, the former is shown split on one side thereof, at 13, and provided with a clamp-screw, 14, (not herein fully shown, but fully described in my aforesaid application,) by means of which the two drivers may be clamped the one upon the other with a moderate degree of force. By means of this construction and combination, the expander-pin P, being revolved, also revolves the driver S; also, when the expander-pin P is forced downward between the expander-rolls during the seating operation, the friction of the driver on the stem 15 of the pin P holds the driver S firmly against the face-rolls, and thus holds these rolls against the disk portion 2 of the seat-blank B. The seat-blank having been set in position against the wall E, with the anchorage-flange 3 thereof projecting into the opening D as shown in Fig. 1, the seating-tool, assembled as shown in Fig. 1, is then set in place upon the seat-blank. Power now being applied to the expander-pin P, and the driver S being properly and sufficiently clamped to the stem of said pin, and also the valve-body being suitably supported and held against rotation, said expander-pin is gradually forced down from the position shown in Fig. 1 to the position shown in Fig. 2. 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 92 of the wall E. As the expander-pin is forced downward as aforesaid, it forces outward the expander-rolls from the position shown in Fig. 1 to the position shown in Fig. 2, thereby subjecting the anchorage-flange 3 of the seat-blank to a heavy pressure and rolling action, expanding the same firmly within the bore D into rigid locking engagement with the wall E; this completes the operation of setting the seat-blank into the valve-body. The rolling action being carried to or beyond the point of flowage, the relatively ductile metal of the seat-blank flange is forced over and into all of the undulations and granulations of the scale-surface on which said flange is embedded. The rolling-in of the cast-metal seat-ring being effected as described by subjecting the same to a rolling action simultaneously on both its face and flange in the same radial planes, the integrity of the metal of the seat-ring is better maintained, and the disintegrating action of the rollers is reduced to a minimum; and the seat-ring is simultaneously expanded throughout its entire circumference into firm locking-engagement with the valve-body, with the least amount of distortion, and the avoidance of the warping action to which the ring would otherwise be subjected.

For use in the making of valve-bodies in accordance with my present invention, 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 similar grades of castings in the foundry cleaning-room, this finishing consisting of the usual "chipping" in the case of iron castings, and of the usual cleaning of the brass castings (of which the valve-seats are usually made) from the molding-sand; but neither casting need be machined or otherwise specially prepared for use.

Having thus described my invention, I claim—

The improved process herein described for seating a valve-body having in the cross-wall thereof an opening enlarged on one side of said wall, which consists in casting the seat-ring with an anchorage-flange projecting from one side of the inner edge of said ring, inserting the seat-ring in the valve-body with said flange projecting into said opening from the smaller end thereof, and simultaneously rolling the face of the seat-ring and the inner side of the anchorage-flange continuously in the same radial planes to bed the ring upon its bearing and to expand the flange into locking-engagement with the valve-body, substantially as described.

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