

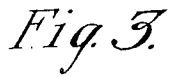
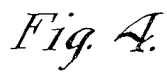
APPLICATION FILED SEPT. 30, 1915.

3 SHEETS—SHEET 1.

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1,182,971.

3 SHEETS—SHEET 2.



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 MEANS FOR COMPACTING SURFACES OF BEARINGS.  
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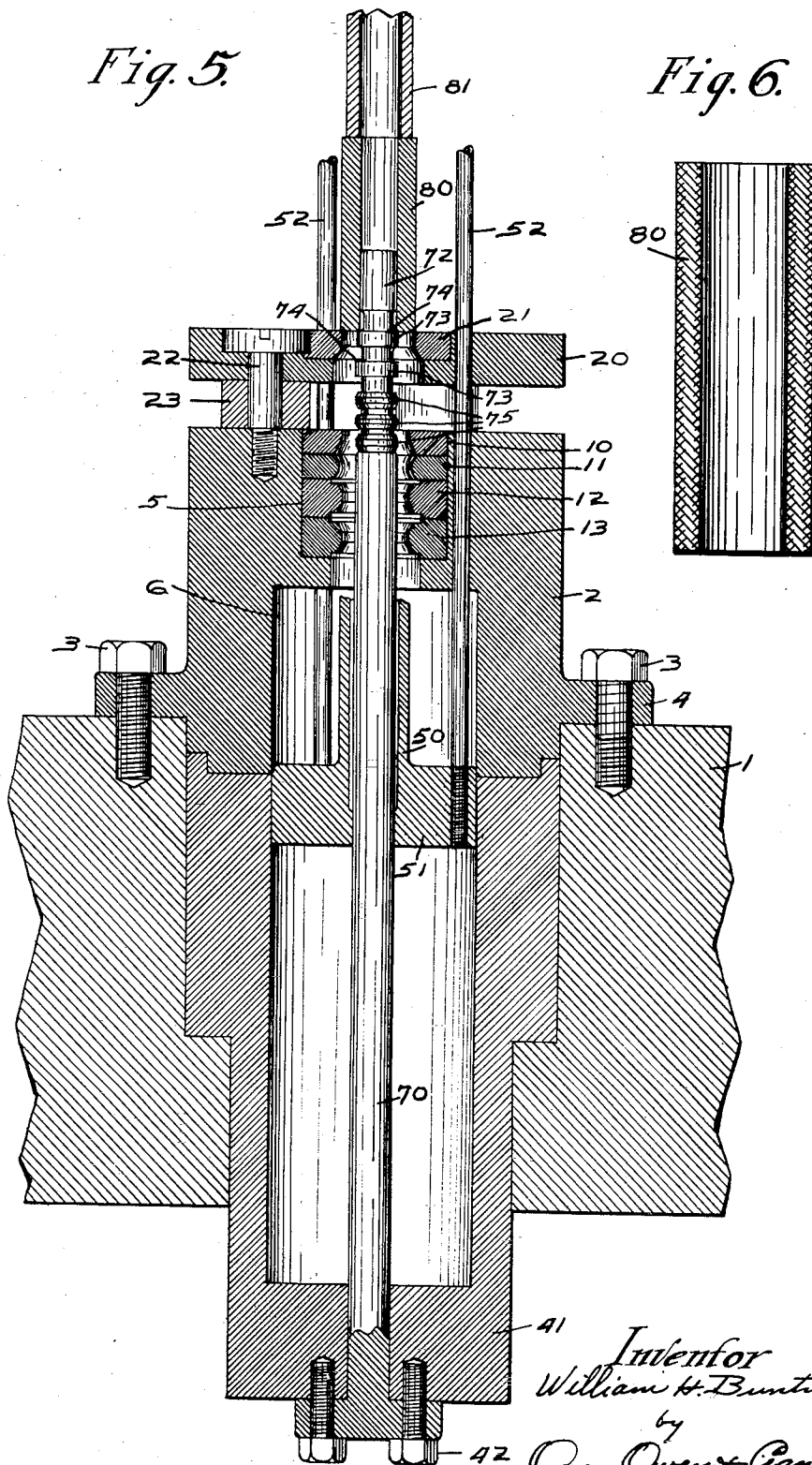
1,182,971.

Patented May 16, 1916.

3 SHEETS—SHEET 3.

*Fig. 5.*

*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

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## MEANS FOR COMPACTING SURFACES OF BEARINGS.

1,182,971.

Specification of Letters Patent.

Patented May 16, 1916.

Application filed September 30, 1915. Serial No. 53,413.

*To all whom it may concern:*

Be it known that I, WILLIAM H. BUNTING, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Means for Compacting Surfaces of Bearings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to means for forming bearings having compacted surfaces.

The object of the invention is to provide a means which will compact the surfaces of the bearings, making them exceedingly hard and perfect, wherein irregularities due to tooling will be entirely eliminated.

The invention may be contained in many forms of constructions usable for different purposes, all of which come within the purview of my claims hereinafter appended. To show the practicability of my invention, I have selected one of such constructions as an example and shall describe it hereinafter. The construction selected is illustrated in the accompanying drawing.

Figure 1 of the drawing is a sectional view of a part of a press for forming an outside bearing. Fig. 2 is a transverse sectional view of the part of the machine shown in Fig. 1. Fig. 3 is an enlarged view of the surfacing device illustrated in Fig. 1. Fig. 4 is a bearing in which is indicated the skin produced on the outer surface of the bearing. Fig. 5 shows a sectional view of a press-machine for forming a bearing having inner and outer bearing surfaces. Fig. 6 illustrates a bearing formed by the machine illustrated in part in Fig. 5.

1, Fig. 1, is a table or shelf of a press-machine, a block 2 is bolted to the table 1 by means of the bolts 3 which pass through a flange 4, formed near the lower end of the block 2. The block 2 is bored from the top and from the bottom, forming thereby a recess 5 and a chamber 6. The recess 5 and the chamber 6 are connected with an opening 7 located in the separating wall 8. A plurality of rings 10, 11, 12 and 13 of hardened steel are located in the recess 5. The inner

surfaces of the rings are beaded and so shaped as to operate on the outer surface of the cylindrical bearing.

The ring 10 is provided with a square edge which will cut the surface of the bearing as it is forced through the ring. The ring 11 is provided with a rounded inner surface which compacts the surface of the bearing, while the rings 12 and 13 are provided with flat compacting surfaces which perfect the surfaces of the bearing. The inner diameters of the surfacing parts of the rings decrease in succession from the first or top ring to the last or bottom ring, so that as the bearing is forced through the rings, each ring compresses more and more the bearing and smooths and compacts its surfaces and reduces the co-efficient of friction of the bearing surface to a minimum and increases the compressional strength of the bearing. Above the block 2 is supported a plate 20, having a cutting ring 21 embedded in its upper surface. The ring 21 is clamped in position by heads of the bolts 22 which extend through the plate 20 and spacing blocks 23 and into the block 2. The plate 20 is provided with an opening 24, through which the bearing may pass. Above the plate 20 is located the press plunger 30, in which is secured a plunger sleeve 31. The plunger sleeve 31 is provided with a head 32, which is placed in a recess in the lower end of the plunger 30, and is clamped in position by means of the plate 33 which is bolted to the plunger 30 by means of machine bolts 34. The plunger 30 is raised sufficiently to withdraw the plunger sleeve 31 from the cutting ring 21, and also to a height sufficient to enable the operator to place the bearing to be surfaced in axial alinement with the surfacing rings above the plate 20. The plunger sleeve 31 operates to drive the bearing through the surfacing rings in the surfacing operation of the bearings in the downward movement of the plunger 30.

A centering rod 40 is also located coaxially with the block 2 and the surfacing rings. The centering rod 40 operates to hold the bearing axially with the rings while it is being operated upon by the rings, and also forms a solid backing for the support of the bearing while it is going under the compression action of the rings. The centering rod 40 is bolted to a shell 41 by means of the bolts 42. The shell is located in a

recess formed in the table 1 and is locked within the recess by means of the block 2. The rod 40 extends up through the shell 41, the block 2 and the plate 20, and terminates preferably a short distance above the plate 20, and in a chamfered end 43. When the plunger 30 is down, the centering rod 40 also passes up through the plunger sleeve 31 and the bearing which is being surfaced. The bearings are placed over the end of the centering rod 40 and the plunger forces the bearing along the rod and through the surfacing rings.

The bearing is returned through the rings and is again operated upon by the lowermost surface ring 13, which further perfects the bearing surface by the reverse movement of the bearing produced by the machine. A second sleeve 50 is located so as to move along the lower portion of the centering rod 40. It is provided with a head 51, in which are threaded a plurality of rods 52. The rods 52 extend up and through the shell 41, through holes in the block 2, through the plate 20 and are connected to the plunger 30 and held in position by means of the plate 33 which clamps the heads of the rods 52 in position, and to the plunger 30. The sleeve 50 moves in advance of the bearing as it is surfaced by the surfacing rings and pushes the bearing upward upon the return movement of the plunger 30. It lifts the bearing so that it may be removed from the upper end of the centering rod 40 when the surfacing operation has been completed.

I have also provided a means for forming inner and outer bearing surfaces on the bearing which are exceedingly hard and of high compressional and tensile strength, and which are compacted and perfected to true cylindrical and regular surfaces. A machine containing the invention whereby inside and outside bearing surfaces may be formed on the bearings in a single operation, is shown in Fig. 5. For forming the exterior surface on the bearing, the parts are substantially like the parts of the machine illustrated in Figs. 1, 2 and 3. In the downward stroke of the plunger press, the inside surface of the bearing is compacted as well as the outside bearing surface. If desired, the inner surface may be compacted in advance of the compacting of the outer surface, or they may be compacted in the same period of the stroke of the press. The centering rod 70 is provided at its upper end with a pilot 72, cutting beads 73, having square edges 74, and compacting beads 75 formed of hardened steel. The cutting and compacting beads increase in diameter in succession from the pilot 72. The differences in their diameters vary according to the diameter of the bearing surfaces to be formed. A bearing surface having an inner diameter of about one inch is perfected and hardened by the

cutting beads and finishing beads which increase in diameter about one thousandth of an inch in succession from the pilot.

The bearing 80 is placed over the pilot 72 and beneath a plunger sleeve 81, which is connected to the reciprocating plunger of the press. The sleeve 81 forces the bearing 80 along the cutting and finishing beads 73 and 75 and through the rings 21, 10, 11, 12 and 13. The rod 70 is very nearly as large as the lower bead 75, so that the rod will form a supporting body to the bearings as they are forced through the surfacing rings contained in the block 2. In the return movement, the plunger 50 forces the bearing 80 upward and through the rings, and along the rod 70, and finally off the pilot 72.

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

1. The combination of plurality of surfacing rings, a centering rod extending through the surfacing rings, and a plunger sleeve for forcing a bearing along said rod and through the surfacing rings.

2. The combination of a plurality of surfacing rings, a centering rod extending through the surfacing rings, a plunger sleeve for forcing a bearing along said rod and through the surfacing rings, and a plunger sleeve for returning the bearing through the said rings.

3. The combination of a plurality of surfacing rings, a plunger, a pair of plunger sleeves connected to the said plunger, a centering rod located co-axial with respect to the plunger sleeves, the plunger sleeves adapted to force a bearing through the surfacing rings, first in one direction, and then in the other as the plunger reciprocates.

4. A surfacing device having cylindrical surfaces having square cutting edges and cylindrical compacting beaded surfaces, the diameters of the surfaces varying so as to operate upon the bearing as the bearing and the device are moved relative to each other, one set of surfacing surfaces being formed to operate on the inside of a bearing and the other set of surfaces being formed to operate on the outside of the bearing.

5. The combination of means for surfacing and compacting the exterior of a bearing, and means for surfacing and compacting the interior of the bearing and means for moving the bearing relative to the said surfacing means.

6. The combination of a plurality of bodies having cutting edges and beaded surfaces for cutting and compacting the inside and outside surfaces of a bearing and means for forcing the bearing over and through the said bodies.

7. The combination of a plurality of sur-

facing rings, a body having a plurality of surfacing beads, a plunger sleeve for forcing a bearing along said body and through the said rings.

5 8. The combination of a plurality of bodies having a plurality of surfacing beads for surfacing the inside and outside surfaces of a bearing and means for moving the bearing and the bodies relative to each  
10 other.

9. The combination of a plurality of surfacing rings, a centering rod located coaxially with respect to the said rings and having at its upper end a plurality of surfacing beads, a pair of plunger sleeves for forcing the bearing first in one direction and then in the other, and means for reciprocating the plunger sleeves.

10. A device for producing bearing surfaces on bearings, the said device having a circular cutting edge and a plurality of

compacting surfaces located on circular beads for compacting the bearing with great pressure and means for producing relative movements between the bearing 25 and the device to cut and compress the bearing.

11. A surfacing device for compacting bearing surfaces of bearings, the surfacing device having a cutting ring and a plurality 30 of compacting rings, the compacting rings having compacting surfaces located on circular beads extending centrally with respect to the rings for compacting a bearing with great pressure, and means for producing relative movements between the bearing and the device for cutting the bearing and compacting its surface. 35

In testimony whereof, I have hereunto signed my name to this specification.

WILLIAM H. BUNTING.