Feb. 27, 1923. 1,446,447

J. BINGHAM

METHOD OF FORMING ROLLERS FOR ROLLER BEARINGS

Filed Oct. 4, 1917

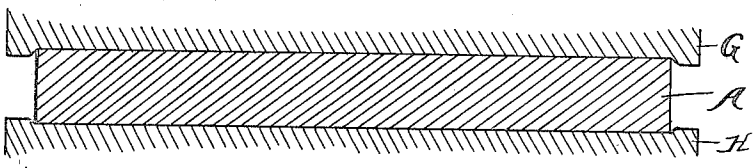


Fig. 1

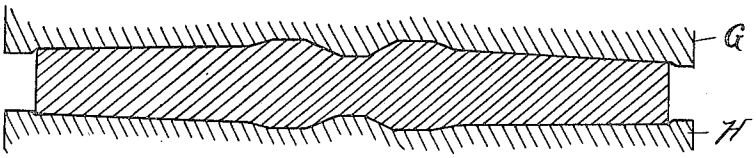


Fig. 2.

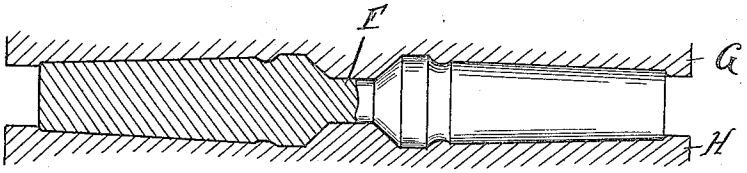


Fig. 3.

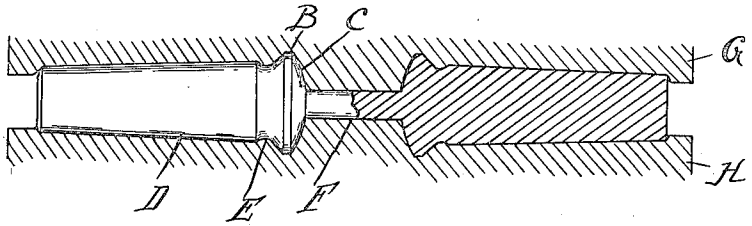
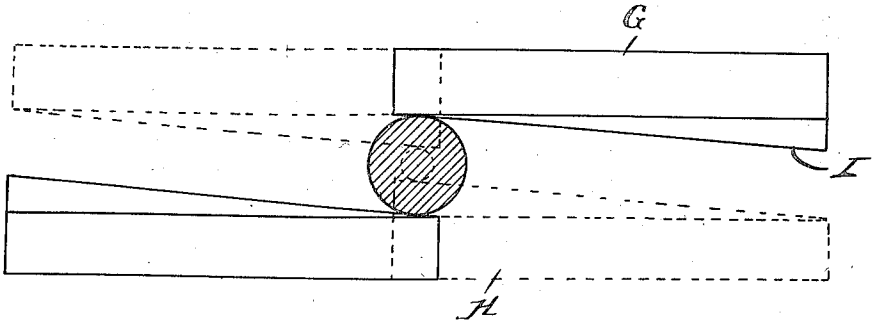


Fig. 4

Fig. 5.



Inventor
Jeremiah Bingham

By Whittemore, Hulbert & Whittemore

Attorneys

Patented Feb. 27, 1923. 1,446,447

UNITED STATES PATENT OFFICE.

JEREMIAH BINGHAM, OF TOLEDO, OHIO, ASSIGNOR TO THE BOCK BEARING COMPANY, OF TOLEDO, OHIO, A CORPORATION OF OHIO.

METHOD OF FORMING ROLLERS FOR ROLLER BEARINGS.

Application filed October 4, 1917. Serial No. 194,677.

To all whom it may concern:

Be it known that I, JEREMIAH BINGHAM, a citizen of the United States of America, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Methods of Forming Rollers for Roller Bearings, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to the manufacture of rolls for roller bearings and is more particularly adapted for use in the forming of rolls having both radial thrust and end thrust surfaces. It is the primary object of the invention to avoid the necessity of waste of stock through machining operations; further, to obtain a wearing surface having a greater density and homogeneity than where produced by machine; further, to facilitate the grinding and heat treatment of the rolls; and further, to obtain various features of improvement as hereinafter set forth.

In the drawings:

Figures 1 to 4 illustrate the successive stages in the development of a roll blank;

Figure 5 is a cross-section showing the apparatus for rolling and developing the blank.

While my invention is applicable to various types of rolls, it is particularly adapted to the forming of tapering rolls having enlarged heads for forming the end thrust surfaces. By the ordinary process of manufacture, it is necessary to start with stock which is large enough in diameter to form the heads of the rolls and to reduce the diameter of the tapered portion of the rolls by machining. This involves not only great loss of stock but also the expense of the machining operation. The rolls are always machined oversize and are then heat treated to produce the desired hardening, after which they are ground to exact size and form. With my improved method a cylindrical blank A, which may be cut from a stock bar to contain a predetermined mass of metal, is heated and is then rolled between relatively moving surfaces so fashioned as to gradually change the shape and distribute the metal to the desired form.

The initial step in the operation is illustrated in Figure 2, a further step in Figure 3 and the final form in Figure 4. It will be noted that the blank is refashioned to form a plurality of rolls, preferably two rolls, having their enlarged heads in proximity and their tapering portions extending oppositely outward. The heads are formed either by upsetting the metal to a larger diameter than the stock bar A or by maintaining substantially the same diameter and reducing the diameter of the tapering portions. Also the metal intermediate the heads of the two rolls is reduced in diameter so as to leave only a small section for shearing. Specifically the final product has a head B with a spherical end surface C and a tapering portion D separated from the head by an intermediate groove E. Between adjacent heads is the connecting portion of the blank F. The blank is rolled between plates G and H, and cam portions I of these plates are fashioned to gradually develop the form of the roll, as shown.

By the method just described the blanks may be rolled to the proper size for grinding, and this may be accomplished by a single reciprocation of the plates G and H. The fact that the tapers of the rolls extend oppositely will overcome any tendency to skew when rolling. It may in some cases be found advantageous to follow the hot rolling process with a cold rolling step, so as to develop a dense and homogeneous outer skin of metal for taking the wear. The blanks are then subjected to the heat treatment process and may be ground to exact size before severing the two sections from each other. This severing is preferably effected by a shearing operation and any roughness that may result can be removed by a finishing grinding.

What I claim as my invention is:

1. A roller for roller bearings, comprising a tapering body and enlarged head, having dense homogeneous rolled surfaces.

2. A roller for roller bearings, comprising a tapering body and enlarged head constituting respectively radial thrust and end thrust portions, the surfaces of said portions being dense and homogeneous, and being unmachined and ground.

3. The method of forming rollers for roller bearings, comprising the hot-rolling of a blank between opposed surfaces fashioned to gradually develop the desired form and the subsequent cold-rolling of the blank to secure a dense outer surface.

4. The method of forming rollers for roller bearings, comprising the hot-rolling of a cylindrical metal blank and gradually developing the desired form, and the subsequent cold-rolling of the blank to secure a dense outer surface.

5. A roller for roller bearings, comprising a tapering body, and an enlarged head provided with a spherical end surface, said head and body having dense homogeneous rolled surfaces.

6. A roller for roller bearings, comprising a body and a head connected thereto having dense homogeneous rolled surfaces.

In testimony whereof I affix my signature.

JEREMIAH BINGHAM.