

Feb. 12, 1929.

1,701,736

H. H. TIMKEN

MANUFACTURE OF ROLLERS FOR ROLLER BEARINGS

Filed Dec. 13, 1922

Fig. 1.

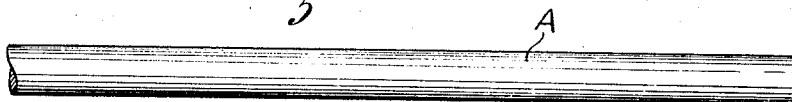


Fig. 2.

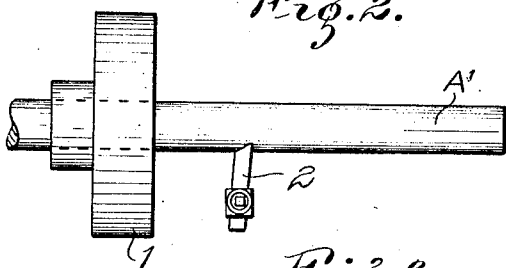


Fig. 3.

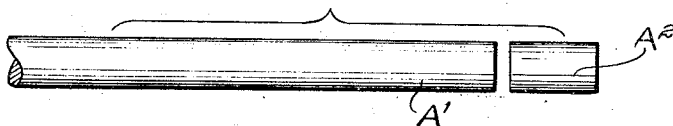


Fig. 4.

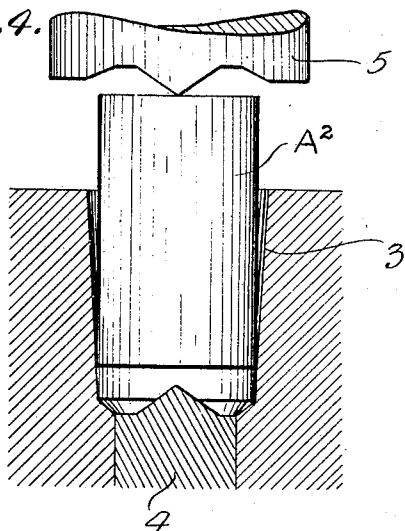
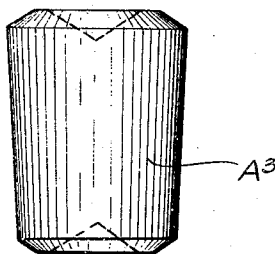


Fig. 5.



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Patented Feb. 12, 1929.

1,701,736

UNITED STATES PATENT OFFICE.

HENRY H. TIMKEN, OF CANTON, OHIO, ASSIGNOR TO THE TIMKEN ROLLER BEARING COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

MANUFACTURE OF ROLLERS FOR ROLLER BEARINGS.

Application filed December 13, 1922. Serial No. 606,739.

My invention relates to the manufacture of rollers for roller bearings and has for its principal object to provide a process of making such rollers that will obviate the necessity for some of the operations heretofore required and otherwise effect practical economies. The invention consists principally in removing the surface defects usually present in rods made by both hot-rolling and cold-drawing processes, cutting such rod into slugs of the proper mass for a roller and then upsetting said slugs in a heading die of the size and taper required for the roller.

In the accompanying drawing wherein like numerals refer to like parts wherever they occur

Fig. 1 is a view of a part of an elongated rod suitable for my process;

Fig. 2 is a diagrammatic view illustrating the operation of dressing the surface of said rod;

Fig. 3 is a diagrammatic view illustrating the operation of cutting the rod into slugs or sections;

Fig. 4 is a diagrammatic view illustrating the operation of upsetting a slug in a heading die and

Fig. 5 is a view of the roller.

According to the present invention, I start with a rod or bar A as it comes from the hot-rolling machine or the cold-drawing machine, as the case may be. A normal rod of this kind has surface defects that require to be removed, such, for instance, as scratches, seams, scales and other irregularities. The first step in the present process is to remove said defects by cutting or grinding away the surface portion of the rod. This step is preferably performed with a thread rolling machine of known type, which will cut away the outer surface of the rod throughout its full length to a depth necessary to give a sound and smooth cylindrical surface free from flaws and defects, such as indicated by the reference letter A¹. Instead of performing this step with a thread rolling machine, the defects could be turned off with a lathe or removed with a grinder or by drawing the rod through a cutting die, or otherwise. This operation is indicated diagrammatically by Fig. 2.

The second step in the operation is to cut off from the prepared rod A¹ slugs or sec-

tions A² of the mass required for the rollers, as indicated in Fig. 3 of the drawing.

The next step is to upset the slug in a tapered hollow die 4 of the size and taper required for the roller. For this purpose, it is preferable to use a machine of the kind commonly known as a header. Such machine is provided with a reciprocable plunger (not shown in the drawing) which is equipped with a punch or upsetting die 5 arranged in axial alinement with the conical hollow die 4 above mentioned and is otherwise arranged so as to bear against the end of the slug in the conical die and thereby upset said slug against the bottom and sides of said die. The slug thus takes the exact shape, size and taper of the die. As the surface defects have been removed by the first operation, the upsetting of the slug against the bottom and side of the conical die produces a tapered roller A³ with a sound surface and which is otherwise ready for carburizing.

Likewise, on account of the initial removal of the surface defects, the resulting soundness of the surface and body of the slug persists after the operation of upsetting such slug; and this fact, in connection with the fact that the circularity and compactness of the section minimize the tendency to distort during heat treatment, make it practicable to produce a hardened roller which may be used without the grinding formerly required. On the other hand, it is desirable to burnish the hardened rollers for the purpose of removing scale and smoothing the surface thereof. This burnishing operation is more rapid and economical than grinding and at the same time leaves the entire thickness of the hardened case, whereas the operation of grinding diminishes the thickness of the hardened case and frequently impairs the surface thereof.

While I have specified that the slug is upset in a tapered die, by which I mean that the slug is submitted to a forging operation wherein its diameter is increased at the same time that the slug is shortened in length, I do not wish to be limited to a forging operation wherein the slug is increased in width throughout its length. On the contrary, I wish the word "upsetting" as used herein, to be understood as including a forging operation wherein the forward end of the slug is

elongated by being forced endwise into a tapered die whose bottom portion is of narrower diameter than the initial diameter of the slug, while the rear end of said die is of greater diameter than said slug.

What I claim is:

1. The process of making rollers for roller bearings which consists in cutting away the surface portion of an elongated rod throughout its length to produce a smooth and sound surface thereon of circular section, cutting said rod into slugs of the mass required for the rollers, upsetting the slugs in a tapered die of the size and taper required for the roller, and then hardening and burnishing the upset slugs.

2. The process of making rollers for roller bearings which consists in producing a smooth and sound surface of circular section on an elongated rod by removing the entire surface portion thereof to the depth to which the surface defects extend, cutting said rod into slugs of a mass required for a roller, upsetting the slugs in a tapered die of

the size and taper required for the roller and then hardening and burnishing the upset slugs.

3. The process of making rollers for roller bearings which comprises cutting away the entire surface portion of an elongated rod to the depth necessary to secure a smooth and uninterrupted surface of circular section free from defects, cutting from said rod slugs of a mass required for a roller, upsetting the slugs in a tapered die and burnishing the upset slugs.

4. The process of making rollers for roller bearings which consists in turning off the surface portion of an elongated rod to the depth necessary to secure a smooth cylindrical surface free from defects, cutting said rod into slugs, upsetting said slugs in a tapered die and hardening and burnishing the upset slugs.

Signed at Canton, Ohio, this 8th day of December, 1922.

HENRY H. TIMKEN.