Sept. 28, 1926. 1,601,252

C. H. LINES

METHOD OF ROUNDING THE EDGES AT THE ENDS OF CYLINDRICAL ROLLERS FOR ROLLER BEARINGS

Filed August 4, 1925

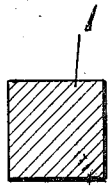


Fig. 2.

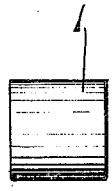


Fig. 1.

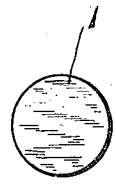


Fig. 3.

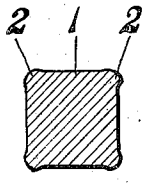


Fig. 5.

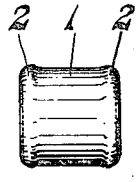


Fig. 4.

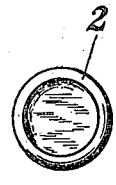


Fig. 6.

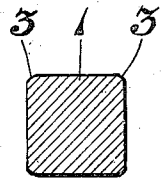


Fig. 8.

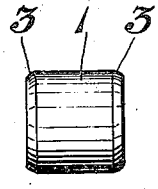


Fig. 7.

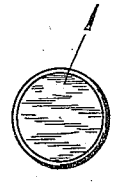


Fig. 9.

Charles H. Lines
Inventor,

C. A. Snow & Co.
Attorneys.

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UNITED STATES PATENT OFFICE.

CHARLES HENRY LINES, OF BIRMINGHAM, ENGLAND.

METHOD OF ROUNDING THE EDGES AT THE ENDS OF CYLINDRICAL ROLLERS FOR ROLLER BEARINGS.

Application filed August 4, 1925, Serial No. 48,091, and in Great Britain December 20, 1924.

This invention comprises certain improvements in or relating to the process of forming the corner radius or rounding the corners between the surface of revolution and the end faces of rollers for roller bearings, and it has for its object a novel process whereby the rollers or the like are radiused in a cheap and efficient manner.

According to the present improvements the rollers are, whilst the metal is advantageously in a softened condition, subjected to a severe knocking-up action so that the corners of the metal at the ends of the rollers are knocked-up and spread to form a corner radius and so that the diameter of the knocked-up ends is larger than the diameter at the centre of the roller in the case of a cylindrical roller. This knocking-up and spreading action is conveniently effected by giving repeated blows to the corners. The blows are conveniently given by elevating the rollers to an effective height (in proportion to size of rollers) and allowing the rollers to drop in a rotating knocking-up or bumping barrel, into which also may be added such articles as hardened steel balls. The rollers are then hardened and afterwards ground in an open type scouring barrel to remove bumping marks. In this operation the knocked up portions at the corners prevent the cylindrical rollers from becoming barrel-shaped during the severe cutting or grinding in the scouring or grinding barrel, the rounded corner being also preserved.

Referring to the drawings:—

Figure 1 is a side elevation of a cylindrical block of metal adapted to form the roller of a roller bearing.

Figure 2 is a central longitudinal section of the cylindrical block shown by Figure 1.

Figure 3 is an end elevation of the block shown by Figure 1.

Figure 4 is a side view of the block shown by Figure 1 after such block has been run in a shaking barrel in the annealed condition.

Figure 5 is a longitudinal section of the block shown by Figure 4.

Figure 6 is a side elevation of the block shown by Figure 4.

Figure 7 is a side elevation of a finished roller.

Figure 8 is a central longitudinal section, and

Figure 9 is an end elevation.

In the case of steel ball bearing rollers, cylindrical blocks of metal 1, which may have been cut from a length of bar, are first annealed and are then placed in a knocking-up barrel, the barrel being preferably filled to one third its capacity with the soft rollers and with preferably hardened steel balls, the balls being of approximately the same diameter as the rollers. A suitable over size is allowed on the diameter and length of the soft roller. For rollers over half an inch in diameter an allowance of +.010 is given on the diameter and length of the rollers and for rollers under half an inch in diameter an allowance of +.006 on diameter and length. The knocking-up barrel may be of any convenient shape in order that the steel balls and rollers will knock against one another when the barrel is rotated, the rollers also sliding down the barrel and striking a surface thereof. The barrel may be octagon, square, or any polygon shape in cross section, or may be cylindrical with internal webs or flanges or of any other shape which will give a lifting and dropping action to the contents. The barrel may also be formed of cast iron, or other suitable material. The rollers may also be run in the barrel with the steel balls removed. The barrel is rotated at a suitable speed and for a sufficient length of time until the metal has been knocked-up and spread in at the corners 2 to a sufficient extent which will leave a rounded corner when the roller has been finished to the required size both diametrically and longitudinally. The barrel may be run for twenty to thirty hours and the rollers are removed from the barrel when they are +.003 diagonally above the required size. The rollers are then hardened, and such hardened rollers are placed with hardened balls into the usual type of ball reducing scouring or grinding barrel into which is placed a cutting agent such as aloxite and paraffin in proportion of half a pound of aloxite to one gallon of paraffin. The barrel is run until the rollers are free from bumping marks on the rounded corners and the rollers are of the required size diagonally with the rounded corner formed to size and shape, when they are polished in the usual ball polishing barrel. The rollers can then be ground to the required diameter and also ground flat at the ends to the re-

quired size, whilst leaving a rounded corner 3 at the junction of the flat and horizontal surfaces.

Rollers and sleeve pieces of aluminium, brass, or any other metal, may be similarly radiused, and in the case of sleeve pieces the radius may be produced both internally and externally.

Claims.

1. The process of forming the corner radius or rounding the corners between the surface of revolution and the end faces of a roller for roller bearings in which the said corners are subjected to a knocking or bumping up action so that the rounded ends of the rollers, where the metal has been knocked up and spread, project above the surface of revolution of the roller.

2. The process of forming the corner radius or rounding the corners between the surface of revolution and the end faces of a roller for roller bearings in which the said corners are subjected to a knocking or bumping up action so that the rounded ends of the rollers, where the metal has been knocked up and spread, project above the surface of revolution of the roller, after which the rollers are placed in a scouring or grinding barrel to remove the bumping marks.

3. The process of forming the corner radius or rounding the corners between the surface of revolution and the end faces of a roller for a roller bearing in which the said corners are subjected to knocks or bumps by being raised and dropped in a rotating barrel or an agitator so that the rounded ends of the rollers, where the metal has been knocked up and spread, project above the surface of revolution of the roller.

In witness whereof I have signed this specification.

CHARLES HENRY LINES.