C. S. LOCKWOOD.

PROCESS OF MAKING AN ANTIFRICTION ROLL.

APPLICATION FILED FEB. 6, 1914.

1,189,846. Patented July 4, 1916.

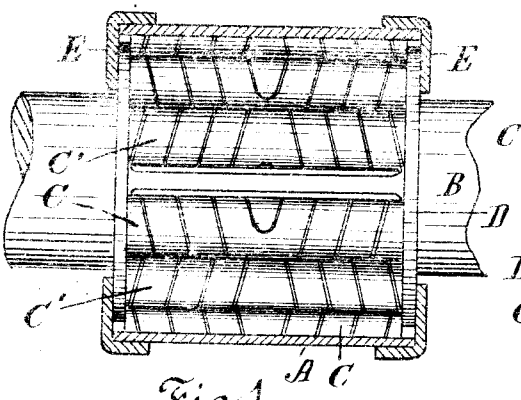


Fig. 1.

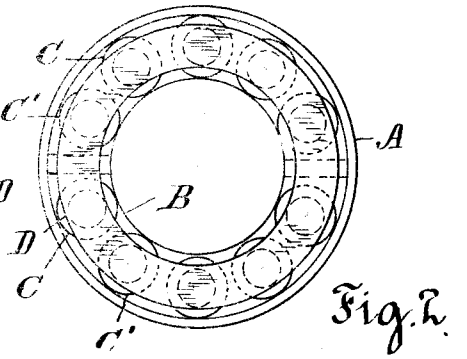


Fig. 2.

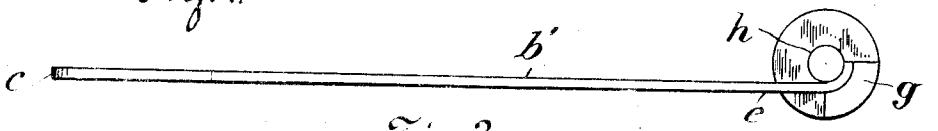


Fig. 3.

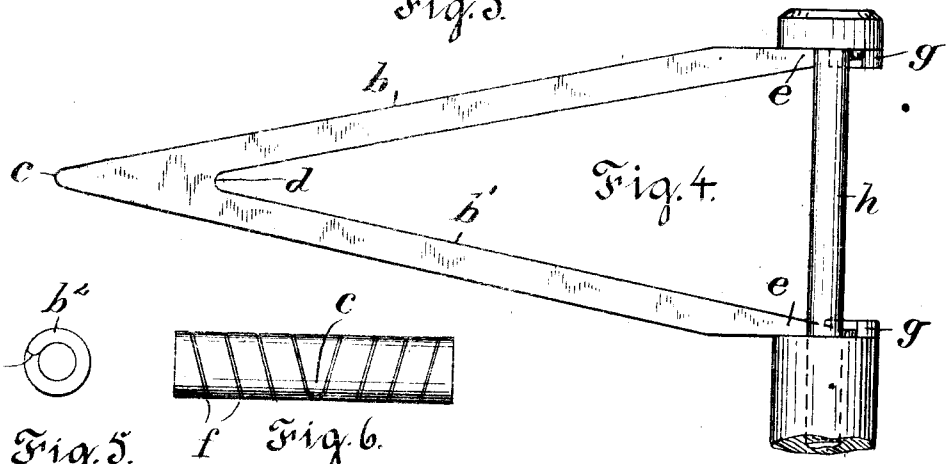


Fig. 4.

Fig. 5.

Fig. 6.



Fig. 7.



Fig. 8.

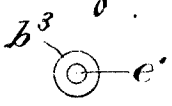


Fig. 9.



Fig. 10.

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UNITED STATES PATENT OFFICE.

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PROCESS OF MAKING AN ANTIFRICTION-ROLL.

1,189,846. Specification of Letters Patent. Patented July 4, 1916.

Application filed February 6, 1914. Serial No. 816,877.

To all whom it may concern:

Be it known that I, CHARLES S. LOCKWOOD, a citizen of the United States, residing at 289 Market street, Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Processes of Making an Antifriction-Roll, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to furnish an improved construction for such antifriction rolls as are formed from a V-shaped sheet-metal blank. Such anti-friction rolls possess coils wound spirally in opposite directions from the middle of the rolls' length, and are formed by stamping the blanks from sheet-metal and rolling them in a machine of small dimensions. This process of manufacture thus has a material advantage over the making of rolls by winding long strips into rolls of indefinite length to be afterward cut into the desired sections, as the winding of such long strips involves the use of a long machine, which unavoidably occupies very considerable space in a factory.

The present invention involves the use of a V-shaped blank having particular characteristics, and involves the process of making the same into a hollow roll for use in roller-bearings. The V-shaped blank in the present invention has two sloping parallel side-arms with straight edges upon their inner and outer sides, and the ends of such arms having tips of chisel-shape and the outer sides of the arms parallel with one another, so that when the blank is wound into cylindrical form the coils slope in opposite directions from the middle portion of the coil and the chisel-shaped ends form flat ends upon the finished roll, as they lie upon the straight edges of the arms.

The invention also furnishes means of making rolls with coils exceptionally thick in proportion to their diameter, and which could not therefore be wound directly upon a mandrel, which is effected by first making a roll with coils of the desired thickness and larger than the desired diameter, with broad open inter-spaces between the coils, and then reducing the diameter of such roll by swaging or analogous means which reduces its diameter, and at the same time stretches the coils and brings them into contact with one another. The flat ends desired upon the end of the roll could not be secured in such a mode of manufacture except the arms of the blank were pointed, as shown herein.

A bearing with the rolls operatively arranged is shown in the drawing with the coils inclined in diverse directions to distribute lubricant, but the rolls may be used in any other kind of bearing to which they are applicable.

The method of winding the blank into rolls is shown in diagrammatic form herein.

The invention will be understood by reference to the annexed drawing, in which—

Figure 1 is a longitudinal section where hatched, of a bearing containing the flexible rolls; Fig. 2 is an end view of the bearing with one of the casing-heads removed; Fig. 3 is an edge view of the blank for the flexible roll with part of the winding apparatus; Fig. 4 is a plan of the same parts; Fig. 5 is an end view, and Fig. 6 a side view of one of the flexible rolls. Fig. 7 is an end view, and Fig. 8 a side view of one of the rolls made with intermediate spaces between the strands, to facilitate reduction in diameter. Fig. 9 is an end view, and Fig. 10 a side view of such a roll reduced to its working diameter.

Figs. 1 and 2 show a cylindrical casing A with a shaft B therein and having friction-rolls C, C′ fitted between the shaft and casing. The rolls are shown provided with the usual cage D and the casing with heads E to keep the set of rolls therein. Such construction is only illustrative of one use of the rolls, which rolls may be used in any form of roller or thrust-bearing to which they are adapted.

One of the finished rolls is shown in Fig. 6 having coils sloping in opposite directions from the middle to opposite ends of the roll, such coils being formed from the parallel-edged arms b, b', of the V-shaped blank shown in Fig. 4. Such blank has a point or tongue c at one end and a notch d at the junction where the arms are united, and the arms also terminate in chisel-shaped ends e, the outer edges of which are parallel so as to form flat ends upon the finished roll.

In winding the blanks into coils, the points of the arms are shown in Fig. 3 bent into correspondence with the curvature of the intended coils, and such bent ends are

then fitted to suitable chucks or twisting-tools g which engage the bent ends of the arms in connection with a short mandrel h, and wind the arms simultaneously into coils, thus producing the roll shown in Fig. 6. The chucks are formed with collars upon their outer sides, and the twisting members g' of segmental shape projecting inwardly from the collars, and set at a suitable distance from the mandrel to permit the insertion of the bent points of the arms. As the collars are set at a fixed distance apart upon the mandrel, which is equal to the length of the intended roll and the width of the blank, these collars serve to wind the blanks into rolls of perfectly uniform length.

The angle of the arms in the blank shown in Fig. 4 is proportioned to the pitch which the arms assume when bent into the coils required for the intended roll, and the notch d is at such distance from the point c that when wound into a roll of the intended diameter the tongue fits within such notch and thus maintains an even cylindrical surface upon the roll, as will be observed upon the rolls C in Fig. 1. The roll thus formed has right and left hand coils f^2 extending from its middle toward its opposite ends.

Rolls of such character may be alternated in the position of their coils within the casing of the bearing, as indicated in Fig. 1, so that the coils upon one-half of the rolls C would carry the oil to the ends of the casing and the coils upon the intermediate rolls C' would carry the oil to the middle of the casing, thus constantly diffusing the oil, and maintaining a perfect lubrication of the casing and shaft.

It is found in practice impossible to wind upon a relatively small mandrel arms b, b', formed upon a thick roll-blank, and where a roll is desired with thick coils b^2 and a relatively small bore c', as shown in Fig. 9, the strip is first wound into coils larger than the desired diameter and with considerable interspace i between the coils, and then reduced to the desired diameter by compression between grooved rolls, which operate in the same manner as in reducing rods in a rolling-mill. Such operation extends the length of the coils and brings them into contact with one another. Such change in the disposition of the coils is evident by a comparison of Figs. 8 and 10, the coils b^2 making a greater number of turns upon the roll in the latter figure on account of their reduction in diameter, but retaining their thickness while the bore of the roll is materially diminished. The winding of the coils with considerable interspaces permits the formation of small coils with little if any interspace, by a subsequent compressing operation.

My improved construction for the flexible roll affords a special facility for making rolls of great thickness in relation to their bore, by winding the coils with interspaces, and afterward reducing the diameter.

Having thus set forth the nature of the invention what is claimed herein is:

1. The process of making an anti-friction roll, which consists first in forming a V-shaped blank of one piece of sheet-metal with two parallel sided arms joined at an angle and their free ends formed with parallel outer sides, second, bending the tips of the arms into the curvature of the intended roll in readiness to grasp the same for winding, and third, holding the tips at a distance apart equal to the length of the intended roll, and rolling both the said arms simultaneously into a cylinder of the diameter desired.

2. The process of making an anti-friction roll, which consists first in forming a V-shaped blank of one piece of sheet-metal with two parallel sided arms joined together at an angle and their free ends formed with parallel outer sides, second, bending the tips of the arms into the curvature of the intended roll in readiness to grasp the same for winding, and third, holding the tips at a distance apart equal to the length of the intended roll, and rolling the said arms into coils of such diameter as to form relatively broad interspaces between the coils, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES S. LOCKWOOD.

Witnesses:
ALPHY WAUGH,
THOMAS S. CRANE.