Dec. 9, 1924. 1,518,731

E. N. DICKINSON

CAGE FOR ROLLER BEARINGS

Filed Sept. 7, 1923

Fig. 1.

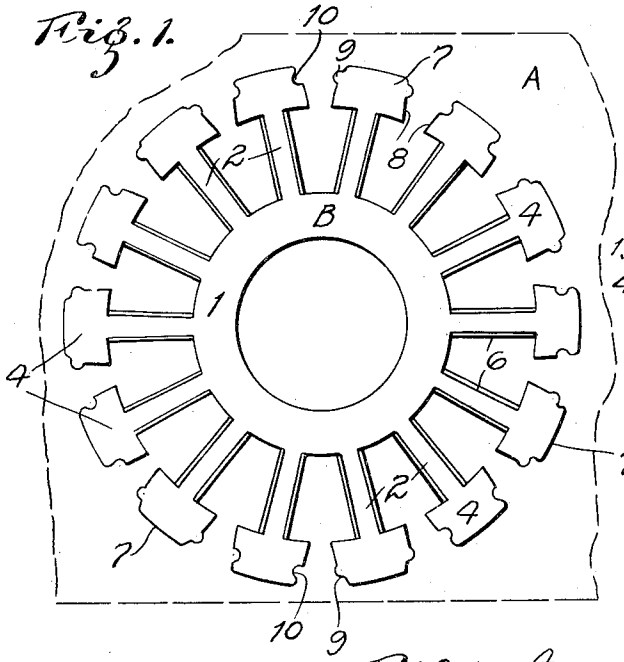


Fig. 4.

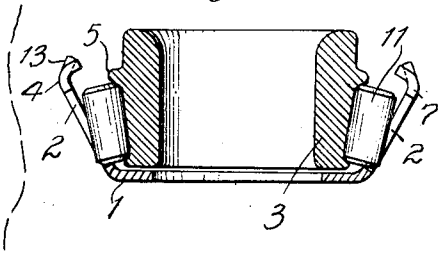


Fig. 5.

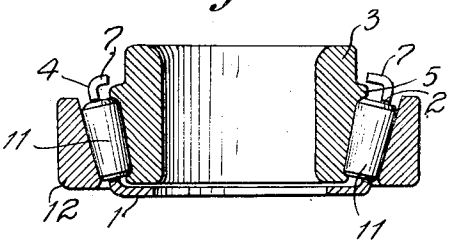


Fig. 7.

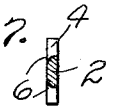


Fig. 2.



Fig. 6.

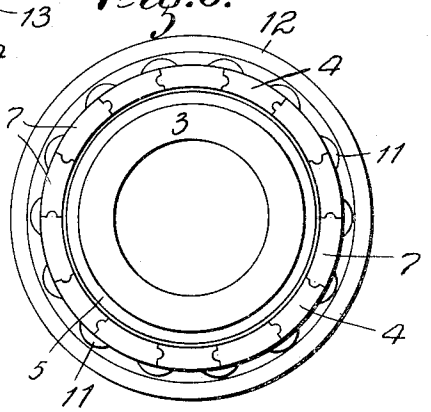
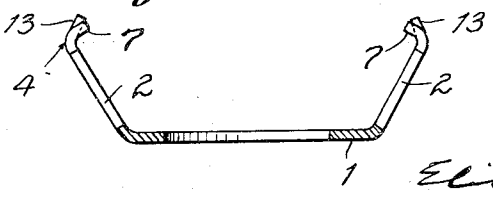


Fig. 3.



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by Cameron & Cameron,
His Attorneys

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UNITED STATES PATENT OFFICE.

ELISHA N. DICKINSON, OF CANTON, OHIO, ASSIGNOR TO THE TIMKEN ROLLER BEARING COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

CAGE FOR ROLLER BEARINGS.

Application filed September 7, 1923. Serial No. 661,347.

To all whom it may concern:

Be it known that I, ELISHA N. DICKINSON, a citizen of the United States, and a resident of the city of Canton, county of Stark, and State of Ohio, have invented a new and useful Improvement in Cages for Roller Bearings, of which the following is a specification.

My invention relates to cages for roller bearings and has for its principal objects to facilitate the assembling of the rollers, to provide for the removal and replacement of individual rollers and to obtain economy of manufacture. The invention consists principally in a cage made from a sheet metal stamping, said stamping or blank being in the form of a circular ring with spoke-like arms radiating therefrom and terminating in widened end portions. It also consists in the construction and arrangement of parts hereinafter described; and it also consists in the method of assembling the rollers as hereinafter described and claimed.

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

Fig. 1 is a stamping or blank made from a flat sheet of metal and representing the first step in the manufacture of my cage;

Fig. 2 is a section of the blank at the end of the second step in the manufacture of my cage, said blank having the outer margins of the widened end portions of the radial arms flanged or bent up;

Fig. 3 is a sectional view of the blank at the end of the third step in the manufacture of the cage, the outer margin of the circular ring being struck up at an oblique angle, carrying the radial arms therewith;

Fig. 4 is a section taken longitudinally of the axis of the bearing and representing the first step in the assembling of the parts, the cage being in the condition illustrated in Fig. 3 and the bearing cone and rollers being shown in process of assembly;

Fig. 5 is a longitudinal section of the complete bearing;

Fig. 6 is an end view of the bearing; and

Fig. 7 is a detail cross-section of one of the radial arms or bridge pieces.

According to the present invention, the cage is made from a sheet A of suitable metal (indicated by broken lines in Fig. 1). The first step in the operation is to stamp or punch out a blank B of the form illlustrated in Fig. 1. This blank consists of a circular or annular ring 1 with arms 2 projecting radially therefrom, the arms being uniform in length and width and evenly spaced apart. The inner diameter of the ring is slightly larger than the inner diameter of the bearing cone 3; and the outer diameter of the ring is slightly larger than the diameter of the cone formed by the axes of the rollers measured at the smaller ends of said rollers. In the completed cage, the radial arms constitute the sides of the roller pockets and are obliquely inclined relative to the axis of the cage so as to lie substantially parallel with the axis of the adjacent rollers respectively, that is, said arms lie beyond but close to the conical surface in which said axes lie. The end portions 4 of said arms are widened, shaped and flanged to engage with one another and form an annular end for said cage, the inner edge of this annular end being preferably of slightly larger diameter than the rib 5 of the larger end of the bearing cone. The longitudinal edges 6 of the radial arms that constitute the sides of the roller pockets are "broken down" in the stamping operation, that is, have their inner edges beveled, as illustrated in Fig. 7, so as to adapt said edges for better cooperation with the rollers.

The first step in the manufacture of the cage is to form the stamping or blank B illustrated in Fig. 1 and hereinbefore described. The next step in the manufacture is to strike up the outermost marginal portions 7 of the terminal enlargements of the radial arms or bridge members. During the operation of stamping, the edges 6 of the radial arms or bridge members are broken down as above described. Also during this operation, the members that are designed to constitute the sectional end members of the cage are blanked out. The side edge 8 of each of such enlargements 4 is the counterpart of the adjacent side edge of the next enlargement, such edges being so spaced, chamfered and shaped in the blank that in their final position in the assembled bearing they will lie in the same plane and preferably in contact with each other so as to form a substantially continuous sectional ring. Preferably the adjacent edges of adjacent arms are formed respectively with a tongue 9 and a groove 10 of proper size and position

to match so that, when engaged, they will increase the strength of the cage.

As indicated in Fig. 3, the bending up of the arms or bridge pieces is effected by flanging the central ring along a circle slightly inwardly from its outer diameter; and likewise, as indicated in Fig. 2, the bending down of the enlarged ends of the radial arms or bridge pieces is effected by flanging said enlargements along a line that is slightly outwardly from their inner edges. By this arrangement, the bridge pieces are left straight and integral with a continuous flange at the narrower end of the cage and integral with wide flanges on their terminal enlargements that interlock to form a sectional ring at the wider end of the cage.

The process of assembling the parts is illustrated in Fig. 4 wherein the radial arms or bridge pieces stand out at a more oblique angle than in their final closed-in position. With the cage in this open position and resting on its smaller end, the rollers 11 are set in its respective pockets and the bearing cone 3 placed endwise inside of the series of rollers. Thereupon, the parts thus assembled are placed in a cup or bearing ring 12 or suitable form and the arms or bridge pieces are then closed-in by any suitable mechanism. That is, the bridge pieces are bent so as to bring the side edges of their widened ends into contact with one another and thereby form a substantially continuous sectional ring. Where the tongue-and-groove engagement is provided for, it is preferable to have the tongues in one series of arms and the grooves in another series alternating therewith. In such case, the outermost margins of the arms of one series are bent only part-way to their final position (as indicated at 13) so that, when the arms are swung inwardly on their inner ends substantially parallel with the cones of the axis of the rollers, the end portions of the tongued arms will stand at a different angle from the terminal portions of the grooved arms; and when the arms are in this closed position, the end portions that were only partially deflected, are deflected the full way and thus cause the tongues and grooves to engage.

In addition to the obvious simplicity of my construction and the economy of manufacturing my cage, it has the great merit of facilitating the assembling of the parts and more particularly the great merit of permitting the easy removal and replacement of any one or more of the rollers. For the purpose of replacement, it is only necessary to bend out some one or more particular radial arms far enough to remove the roller or rollers and insert a new one and then bend said arm back into place.

What I claim is:

1. A sheet metal blank for a roller bearing cage comprising a central annular portion and arms extending radially therefrom and having their end portions widened and chamfered, and having tongue-and-groove elements in the sides of the endmost portions thereof.

2. A cage for roller bearings comprising an annular portion and spaced arms extending therefrom in the form of a cone, the end portions of said arms being widened and chamfered and having their endmost portions bent inwardly to form a continuous ring transverse to the axis of the cage.

3. A cage for roller bearings comprising an annular portion and spaced arms extending therefrom in the form of a cone, the end portions of said arms being widened and chamfered and having their endmost portions bent inwardly in the form of a ring transverse to the axis of the cage, said endmost portions of the arms having cooperating tongue-and-groove elements in their sides.

Signed at Canton, Ohio, this 31st day of August, 1923.

ELISHA N. DICKINSON.