

E. E. ARNOLD.  
 RETAINER FOR ROLLER THRUST BEARINGS.  
 APPLICATION FILED JULY 15, 1918.

1,330,158.

Patented Feb. 10, 1920.

FIG.1.

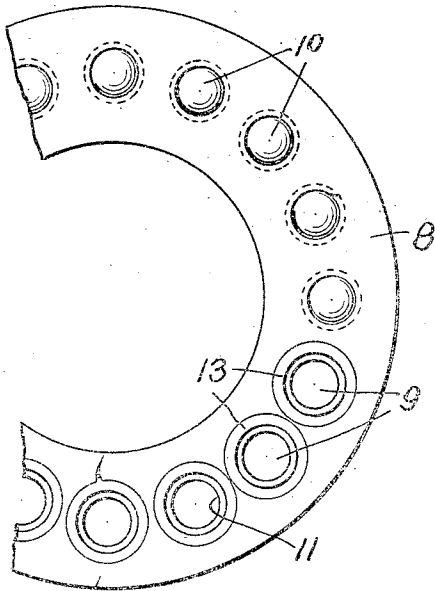


FIG.2.

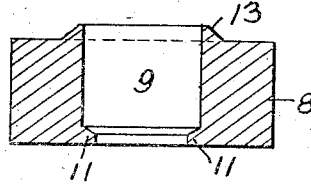


FIG.3.

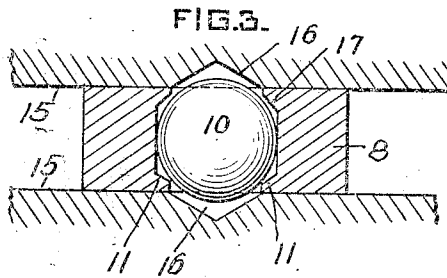


FIG.5.

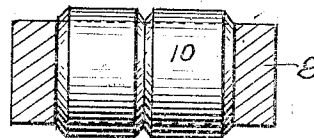


FIG.6.

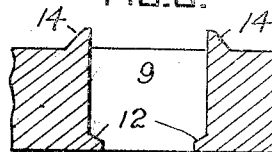


FIG.7.

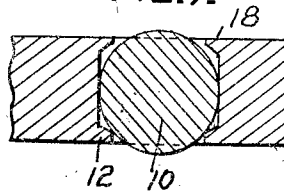
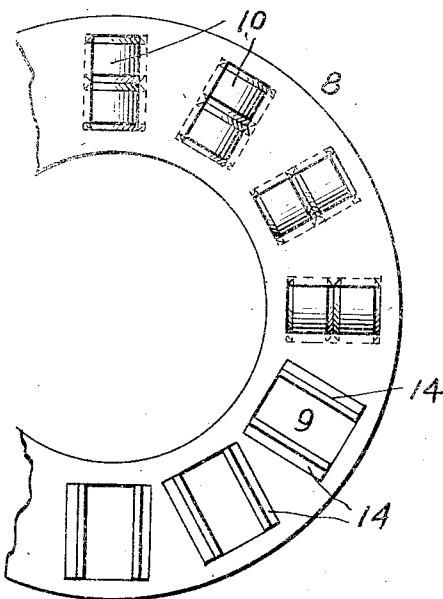


FIG.4.



WITNESSES

J. Herbert Bradley

INVENTOR

Edwin E. Arnold  
 by J. H. Brown  
 atty.

# UNITED STATES PATENT OFFICE.

EDWIN E. ARNOLD, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO IRON CITY PRODUCTS COMPANY, A CORPORATION OF PENNSYLVANIA.

## RETAINER FOR ROLLER THRUST-BEARINGS.

1,330,158.

Specification of Letters Patent. Patented Feb. 10, 1920.

Application filed July 15, 1918. Serial No. 244,957.

*To all whom it may concern:*

Be it known that I, EDWIN E. ARNOLD, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have made a new and useful invention in Retainers for Roller Thrust-Bearings, of which the following is a specification.

This invention relates to anti-friction bearings, and more particularly to retaining and spacing means for the anti-friction members thereof.

In the drawings accompanying and forming a part of this application and throughout which similar elements are denoted by like characters, Figure 1 is a fragmentary view of a device embodying this invention; in one portion of the view the device is illustrated in completed form and in the other in partially completed form. Fig. 2 is a view in sectional elevation of a retainer embodying this invention showing the same partially completed. Fig. 3 is a similar view to Fig. 2 showing the retainer fully completed. Fig. 4 is a view similar to Fig. 1 but instead of balls as employed in Fig. 1 for the anti-friction members rollers are employed. Fig. 5 is a view in sectional elevation taken through the retainer shown in Fig. 4 with a pair of the rollers in place. Fig. 6 is a cross sectional view of the portion of the retainer shown in Fig. 4 partially completed and Fig. 7 is a view similar to Fig. 6 but with the retainer completed.

In carrying out this invention an annular disk or plate 8 is preferably die cast from suitable malleable metal in such manner that pockets 9 are formed for the reception of the anti-friction balls 10 or for the reception of the anti-friction rollers as the case may be. These holes are suitably arranged and spaced apart one from the other as is now common.

The plate in thickness is less in diameter than the anti-friction members so that when said members are in place (whether they be balls or rollers) in the pockets they project as shown in Figs. 3, 5 and 7 beyond the opposite faces of the sides of the disks or plates.

Each pocket at one side of the disk or plate is provided with retaining lips or ledges 11. When the friction members consist of balls these ledges or lips will be an-

nular and will extend around the bore of the pocket and project inwardly so as to reduce the opening to the pocket on that side of the plate or disk. When the anti-friction member is a roller there will be two lips or ledges 12 for each pocket, each projecting inwardly from one longitudinal side of the pocket.

The opposite side of the plate or disk is provided with a mass of metal in the form of a ridge or lip located adjacent the pockets and projecting beyond the normal face of the plate or disk and this metal is adapted to be forced into the pockets to form retaining lips. In the case of balls the mass of metal will be in the form of an annular lip 13, Fig. 2, surrounding the ball pocket and in the case of rollers lips 14 project above the normal face of the plate along each longitudinal edge of the roller pocket as shown in Fig. 6.

After the anti-friction devices have been assembled in the disks or plates a filled plate 15 is placed between complementary sides 15, carried in a suitable press and provided with clearance pockets 16 registering with the anti-friction members. These pockets are of such shape and form as to clear the anti-friction members while they force the metal of the lips or ledges into the pockets as shown at 17, Fig. 6, and 18, Fig. 7. The anti-friction members are thus securely retained in place.

Retainers for anti-friction bearings in some respects similar to this have heretofore been manufactured but in those with which I am familiar no projecting lip or ledge was provided but the retaining lip corresponding to lips 17 and 18 was derived from the plate itself and spun into the pocket and this procedure necessitated a spinning operation for each individual pocket while with my invention all of the retaining lips for a single retainer may be formed in one and the same operation thereby materially reducing the expense and increasing the speed of manufacture and at the same time producing a more satisfactory retainer.

Having thus described my invention what I claim is—

1. A cage for anti-friction bearings, comprising an annular member of malleable metal having openings extending there-through with the area of said openings on

one side less than on the other side and ridges adjacent said last mentioned openings and projecting beyond the normal face of said member on the opposite side thereof from the smaller openings, said ridges being adapted to be forced into the adjacent openings to reduce the area thereof to retain the anti-frictional bearings.

2. The method of providing a plate retainer for end thrust ball bearings with balls locked therein, which consists in forming a plate from malleable metal having holes extending therethrough from side to side, said holes on one side being of less diameter than on the other and said plate on the side on which the holes are of greatest diameter being provided with annular lips or ridges extending beyond the normal plate plane, of placing balls in said pockets and then in applying pressure to said lips or ridges whereby the metal thereof is caused to flow into said pockets so as to decrease the diameter of the pocket openings on that side of the plate.

3. A cage for anti-friction bearings provided with bearing pockets, each of said pockets having a hole leading into it from one side of the cage of less diameter than the pocket leaving a retaining lip at that end of the pocket, each of said pockets being provided with a flange extending beyond the normal face of the opposite side of the cage and adapted to be compressed about the edge of its respective pocket to retain a bearing inserted therein.

4. A plate retainer for end thrust bearings provided with pockets for anti-friction members and having lips of metal projecting beyond one normal face of the retainer adapted to be forced into said pockets to form retaining lips for anti-friction elements inserted within said pockets.

5. A retainer for end thrust bearings, comprising an annular plate or disk provided with a series of pockets for anti-friction members and having a body of metal adjacent each pocket and projecting beyond one normal face of said plate or disk, and adapted to be distorted to form an inwardly projecting retaining flange for said pocket, each pocket adjacent the other face of said plate or disk being provided with an inwardly projecting retaining flange.

6. The method of providing a retainer for anti-friction bearings, which consists in forming an annular member of malleable metal having holes extending therethrough from side to side, said holes in one side being of less diameter than in the other and said annular member on the side on which the

holes are of the greatest diameter being provided with annular lips or ridges extending beyond the surface thereof, of placing anti-friction rolling members in said pockets and then in applying pressure to said lips or ridges whereby the metal thereof is caused to flow into said pockets so as to decrease the size of the pocket openings on that side of said member.

7. A cage for anti-friction bearings provided with bearing pockets, each pocket having a hole of less diameter than the pocket leading into it from one side of the cage and leaving a bearing retaining lip at that end of the pocket, the other side of the cage being provided around each pocket with flanges projecting beyond the normal plane of that side and adapted to be distorted to form bearing retaining lips.

8. In a cage for anti-friction bearings, a pocket having a hole leading into it from one side of the cage of less cross sectional area than the pocket and providing a retaining flange at that end of the pocket, the opposite side of said cage being provided with a flange surrounding said pocket and extending outwardly beyond the normal face of the cage side and adapted to admit a bearing element to said pocket and to be compressed to the level of said side and form a retaining lip for an admitted bearing element.

9. The method of providing retainers for anti-friction bearings with the same located therein, which consists in forming a cage from malleable metal having holes extending therethrough, said holes in one side being of less area than in the other and said cage on the side in which the holes are of the greatest area being provided with lips or ridges extending beyond the normal cage surface, of placing bearings in said pockets and then in applying pressure to said lips or ridges whereby the metal thereof is caused to flow into said pockets so as to decrease the area of the pocket openings in that side of the cage.

10. An anti-friction bearing cage of malleable material provided with bearing receiving openings, each opening extending through a continuous and integral portion of the material of said cage and having bearing retaining ridges at the ends thereof, the outer surfaces of each ridge being continuous with and a part of the cage surface interrupted by its opening.

In testimony whereof, I have hereunto subscribed my name this 3rd day of July, 1918.

EDWIN E. ARNOLD