No. 629,564. Patented July 25, 1899.

L. HORN.

BALL BEARING.

(Application filed Sept. 28, 1898.)

(No Model.)

Fig. 4.

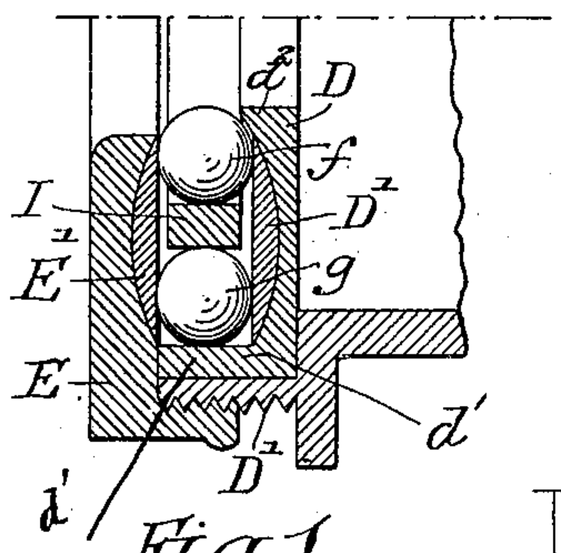


Fig. 1.

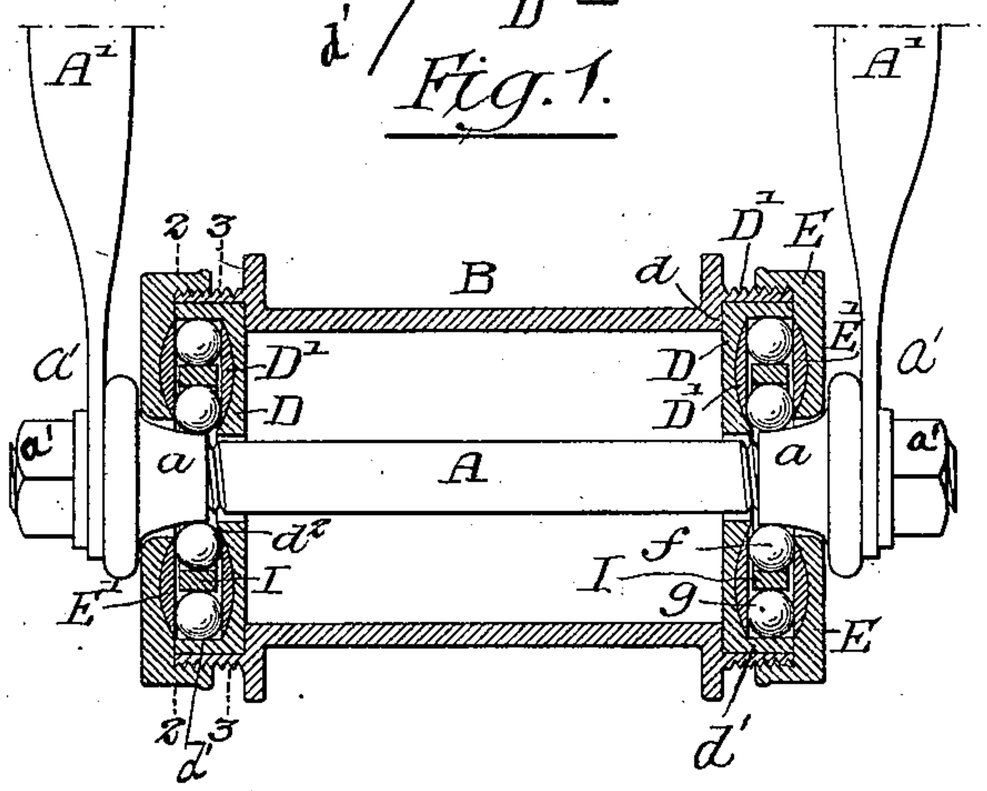


Fig. 2.

Fig. 3.

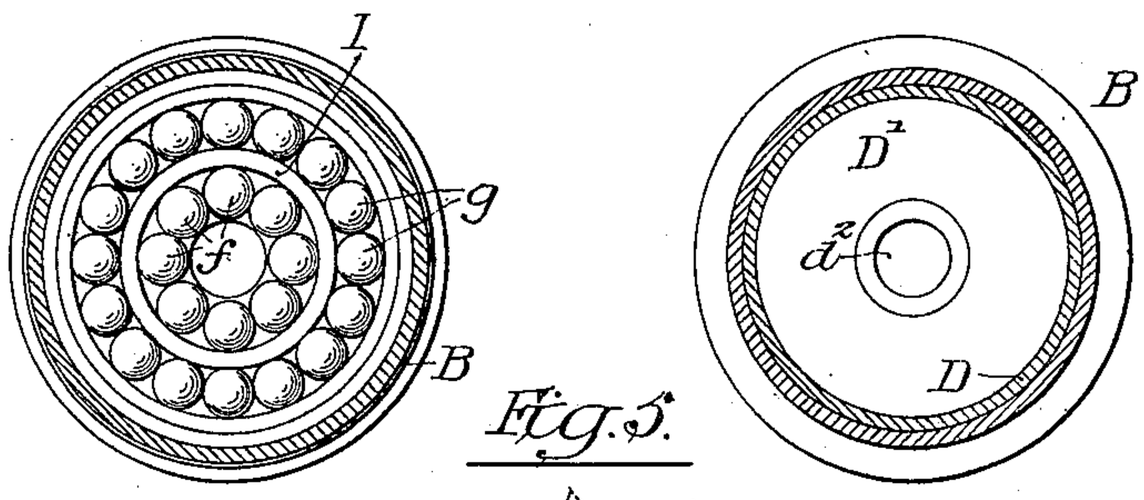
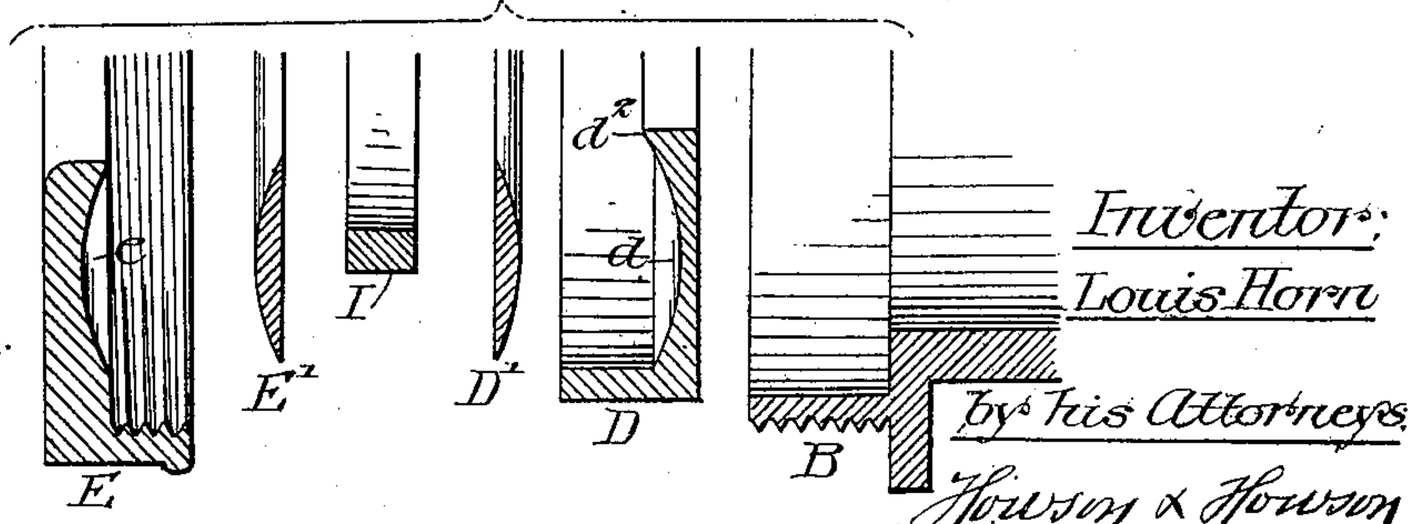


Fig. 5.



Witnesses:
Frank L. A. Graham.
Louis M. Whitehead.

Inventor:
Louis Horn
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

LOUIS HORN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF FIVE-SIXTHS TO MAX ZEITLER, ALFRED SCHELLONG, RUDOLPH EUGENE DRINHAUS, SAMUEL SALTER WENZEL, AND THOMAS PRATT MUMFORD, OF SAME PLACE.

BALL-BEARING.

SPECIFICATION forming part of Letters Patent No. 629,564, dated July 25, 1899.

Application filed September 28, 1898. Serial No. 692,098. (No model.)

To all whom it may concern:

Be it known that I, LOUIS HORN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Ball-Bearings, of which the following is a specification.

My invention relates to certain improvements in roller-bearings for use particularly in the hubs of bicycle-wheels and in the crank-hangers of the same, although it will be understood that my invention can be used anywhere where a roller-bearing of this type is required.

The object of my invention is to make a roller-bearing of simple construction which will be light-running and which can be removed without displacing the balls, as fully described hereinafter.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of my improved bearing. Fig. 2 is a transverse sectional view on the line 2 2, Fig. 1. Fig. 3 is a transverse sectional view on the line 3 3, Fig. 1. Fig. 4 is an enlarged sectional view of a portion of Fig. 1, and Fig. 5 is a view showing the parts illustrated in Fig. 4 detached.

A is the axle, secured in any suitable manner to the frame of the bicycle. Each end of the axle is screw-threaded in the present instance, and adapted to each screw-thread is a cone-nut *a* of the form clearly illustrated in the drawings. Back of these cone-nuts are the ordinary nuts *a'* and washers for securing the axle to the frame A'.

B is the hub, which may be either of the hollow form shown in the drawings or solid. The hub is recessed at each end, and adapted to each recess is a shell D. This shell has a concaved recess *d*, in which rests a sliding ring D'. This ring has a convex back and is free to slide within the annular concaved recess *d*. The central opening in the shell D is somewhat larger than the axle, so that the axle will not come into contact with the shell. In the present instance the outer portion of each end of the hub is screw-threaded, and adapted to the hub at each end is a cap E, having a concaved annular recess *e* similar to the recess *d* in the shell D, and in this recess slides a ring E', having a convexed back similar to the ring D'. Mounted in the space between the shell and the cap are two series of balls *f* and *g*, and between these balls is a ring I. This ring is somewhat less in width than the space, so that it runs freely between the two face-rings D' and E' and separates the series of balls, as indicated in the drawings. The balls *f* are in contact with the cone-shaped nuts *a* of the axle, as shown, and carry the load.

I considerably reduce the friction of the parts by locating the outer series of balls between the ring I and the flange *d'* of the shell D, and I form on the shell an internal flange d^2, as clearly shown in Fig. 4, which extends beyond the face of the ring D', so that the space between this internal flange and the edge of the cap is less in diameter than the ball and prevents the inner row of balls from becoming detached from the shell and cap when the axle and its nuts are removed, but will not interfere with the free rotation of the parts, as the flange does not touch the axle when the axle is in position within the hub.

By the means above described the balls and hub are free to rotate as well as the loose ring separating the two series of balls, and the side bearing-rings can slide within their bearings if the pressure of the balls is such as to cause them to move. I find by practical experiments that a bicycle provided with bearings of this type runs freely and the friction is greatly reduced. The bearing is simple in construction and can be readily and cheaply manufactured.

I claim as my invention—

1. The combination of a flanged and recessed shell, a slide-ring adapted to slide in said recess, a cap for the shell having an annular recess, a slide-ring adapted to said recess, a series of balls adapted to the space between the cap and the shell, and an axle on which the balls travel, substantially as described.

2. The combination of a flanged shell having an annular recess at the side, a slide-ring

adapted to said recess, a cap having an annular recess at the side, a slide-ring adapted to said recess, two sets of balls mounted between the cap and the shell, and a loose ring mounted between the two sets of balls, substantially as described.

3. The combination of a hub, two shells, one in each end of the hub, caps forming with the shells, ball-spaces, two series of balls in each ball-space, a separating-ring mounted between the two series of balls in each ball-space, an axle, and conical nuts adapted to the axle and against which the inner set of balls rest, substantially as described.

4. The combination of a shell having a central opening for the passage of an axle, a flange around the central opening, two sets of balls adapted to the shell, a separating-ring separating the two sets of balls, a cap for the shell having a central opening for the axle, the space between the inner edge of the cap and the flange on the shell being less than the diameter of the ball so that the balls cannot be detached on the removal of the axle, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS HORN.

Witnesses:
HENRY HOWSON,
JOS. H. KLEIN.