

(No Model.)

C. F. LAVENDER.  
BALL BEARING.

No. 422,232.

Patented Feb. 25, 1890.

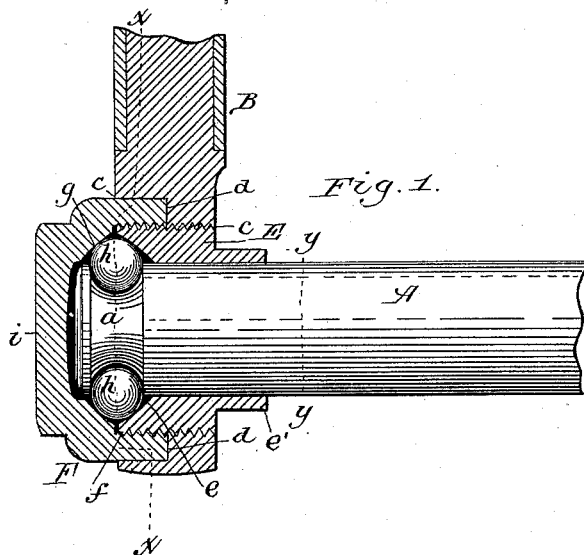


Fig. 2.

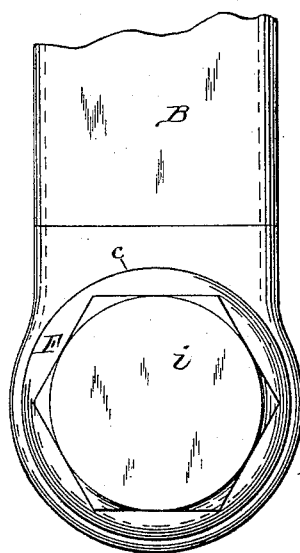


Fig. 3.

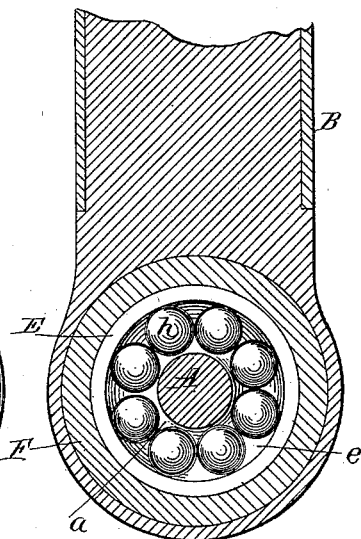
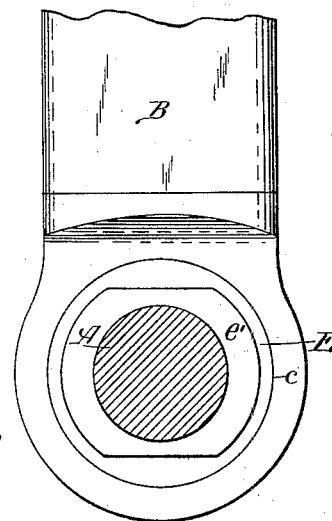


Fig. 4.



Chas. Buchheit  
Emil J. Neuhart.

Witnesses.

C. F. Lavender Inventor.

By Wilhelm H. Pomeroy.

Attorneys.

# UNITED STATES PATENT OFFICE.

CHARLES F. LAVENDER, OF TORONTO, ONTARIO, CANADA.

## BALL-BEARING.

SPECIFICATION forming part of Letters Patent No. 422,232, dated February 25, 1890.

Application filed December 11, 1889. Serial No. 333,315. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES F. LAVENDER, a citizen of the Dominion of Canada, residing at Toronto, in the county of York and Province of Ontario, have invented new and useful Improvements in Ball-Bearings, of which the following is a specification.

This invention relates to a ball-bearing for velocipedes, which is especially desirable for the class of machines known as "safety-bicycles," and for the rear wheel of an ordinary bicycle.

The object of my invention is to produce a bearing of simple construction having few parts, and which permits of a fine and ready adjustment of the parts, and is easily taken apart and replaced.

In the accompanying drawings, Figure 1 is a vertical section of my improved bearing, partly in elevation. Fig. 2 is a side elevation thereof. Fig. 3 is a vertical section of the bearing in line *x x*, Fig. 1. Fig. 4 is a similar view in line *y y*, Fig. 1, looking toward the left.

Like letters of reference refer to like parts in the several figures.

A represents the axle, which is provided at its outer end with an annular groove *a*, and B is the fork-arm, in which the bearing is arranged. The fork-arm is provided at its lower end with an annular opening *c*, the inner portion of which is screw-threaded. The outer smooth portion of the opening is made of somewhat larger diameter than the inner threaded portion thereof, so as to form an annular shoulder *d* within the opening at the junction of the enlarged and contracted portions thereof.

E represents an inner adjustable cone or sleeve surrounding the axle A, and provided with an external screw-thread, which engages with the inner threaded portion of the opening *c*. The adjusting-sleeve extends into the outer enlarged portion of the fork-opening, and is provided at its outer end with a conical or concave bearing-face *e*. The sleeve is provided at its inner end with a flat-sided collar or neck *e'*, whereby it may be turned by a suitable key or wrench.

F represents a cap or outer cone inclosing the outer end of the axle, and provided at its inner portion with an internal screw-thread *f*, which engages with the outer portion of the

externally-threaded sleeve or cone E. The rim of the cap F fits into the outer enlarged portion of the fork-opening *c*, and bears with its inner end against the annular shoulder *d*. The cap is provided with an internal annular bearing-face *g*, which, in conjunction with the annular groove of the axle and the bearing-face of the adjusting-sleeve, forms a groove in which the balls *h* are arranged. The cap F is formed at its outer end with a hexagonal or flat-sided projection *i* for turning it.

When the parts of the bearing are in place, the inner end of the cap F abuts against the annular shoulder *d* at the fork end, and thereby securely locks itself and the adjusting cone or sleeve E against turning in the opening of the fork. The screw-threaded portion of the cap extends into the latter a sufficient distance to prevent the inner end of the sleeve E from striking the bearing-face or offset *g* at the inner end of the screw-thread of the cap in any adjustment of the parts. Upon loosening the cap the adjusting-sleeve E may be screwed inwardly or outwardly to properly adjust the bearing, and after the sleeve is so adjusted the cap is again tightened to clamp the parts in position by screwing the cap inwardly against the shoulder *d*. A nice adjustment of the bearing is thus effected in a simple and convenient manner.

In assembling the parts the adjusting-sleeve E is placed over the end of the axle and the sleeve screwed into the threaded inner portion of the fork-opening from the rear side of the fork. The balls are then placed between the groove of the axle and the annular bearing-face of the sleeve, and the cap screwed upon the outer portion of the sleeve until it abuts against the shoulder *d*.

In my improved bearing the parts are locked in position by the cap itself, which forms a part of the bearing, thereby dispensing with bolts or other separate fastenings, simplifying the construction of the bearing and facilitating its adjustment.

As the grooved axle forms a part of the bearing, the usual grooved collar is rendered unnecessary, thereby reducing the diameter of the bearing and causing it to run easier and requiring a less number of balls.

The cap, while forming a lock for the parts of the bearing, incloses the end of the axle,

and thus excludes dirt and dust from the bearing.

My improved bearing is especially desirable for the rear axle of an ordinary bicycle, and for both the front and rear axles of safety-bicycles.

I claim as my invention—

1. The combination, with an axle having an annular groove and a fork-arm having a threaded opening, of an adjusting sleeve or cone surrounding the axle, and having an external screw-thread engaging with the threaded opening of the fork-arm, a cap inclosing the end of the axle and having an internal screw-thread which engages with the outer portion of the externally-threaded adjusting sleeve or cone, and balls interposed between the groove of the axle and the adjacent bearing-faces of the cap and adjusting-cone, substantially as set forth.

2. The combination, with the axle having

an annular groove and the fork-arm having an opening provided with an inner threaded portion and an outer enlarged portion forming an internal annular shoulder, of an adjusting sleeve or cone having an external screw-thread engaging with the threaded portion of the fork-opening and extending into the enlarged portion thereof, a cap having an internal screw-thread engaging with the outer portion of the externally-threaded sleeve and abutting against the internal shoulder of the fork-opening, and balls interposed between the groove of the axle and the adjacent bearing-faces of the cap and sleeve, substantially as set forth.

Witness my hand this 3d day of December, 1889.

CHARLES F. LAVENDER.

Witnesses:

THOMAS FANE,

HENRY W. BIRCH.