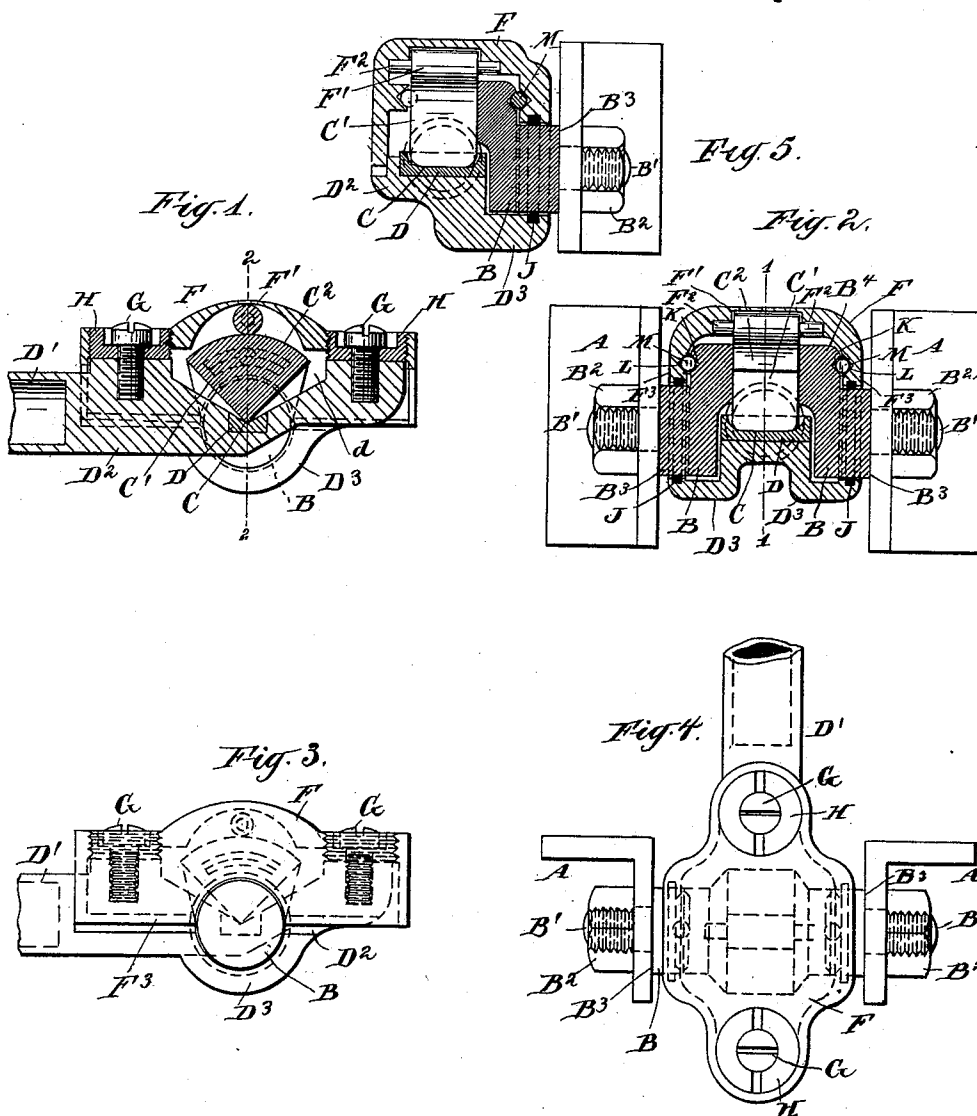


(No Model.)

L. G. BILLINGS.
ANTIFRICTION BEARING.

No. 581,530.

Patented Apr. 27, 1897.



WITNESSES:
Chas. E. Searle.
Shueyglone

INVENTOR
Luther G. Billings
BY
Charles R. Searle.
ATTORNEY.

UNITED STATES PATENT OFFICE.

LUTHER G. BILLINGS, OF CLIFTON, NEW YORK.

ANTIFRICTION-BEARING.

SPECIFICATION forming part of Letters Patent No. 581,530, dated April 27, 1897.

Application filed August 28, 1896. Serial No. 604,146. (No model.)

To all whom it may concern:

Be it known that I, LUTHER G. BILLINGS, a citizen of the United States, residing at Clifton, in the county of Richmond, in the State of New York, have invented a certain new and useful Improvement in Antifric-tion-Bearings, of which the following is a specification.

The invention relates to the class of bearings known as "knife-edge," in which the load is sustained by a member having a thin edge in contact with a properly-shaped bearing-block.

The invention consists of a stud or shaft having an offset analogous to a crank carrying a hardened wedge-shaped block, the thin edge of which coincides with the axial line of the stud and serves as the center of oscillation. The bearing-block receiving the wedge is provided with a V-groove of greater angularity than the knife-edge and is carried in a dust-proof casing completely inclosing the working parts. Antifric-tion balls and rollers are supplied to take the end thrust and also to hold the knife-edge to its seat on the bearing-block. Provision is made for adjusting the position of the holding-down roller relatively to the back face of the wedge, so that it shall be held in just sufficiently close contact therewith to avoid looseness without increasing the friction.

The accompanying drawings form a part of this specification and represent what I consider the best manner of carrying out the invention.

Figure 1 is a vertical longitudinal section on the line 1 1 in Fig. 2. It shows the working parts and so much of the adjacent portions of the frame as is necessary to the understanding of the invention. Fig. 2 is a vertical transverse section on the line 2 2 in Fig. 1. Fig. 3 is a side elevation corresponding to Fig. 1. Fig. 4 is a plan view. Fig. 5 is a section similar to Fig. 2, but showing a modified form of the invention.

Similar letters of reference indicate like parts in all the figures.

It will be understood that either the knife-edge or the bearing-block therefor may be carried on the fixed framing and the other on the moving part, as circumstances may dictate. In this description the knife-edge will be considered as fixed.

A A are flanged brackets forming portions of the framework. B is an arm or stud of hardened steel, certain portions of which will be designated by supernumerals, as B' B², extending across between the brackets. Screw-threaded extensions B', smaller than the main body of the stud, pass through holes drilled or otherwise produced in the brackets and hold the stud firmly in place by means of nuts B², clamping the brackets securely between them and the shoulders B³.

B⁴ is an offset, analogous to a double crank, in the arm B, and carries in one therewith a block C', wedge-shaped in section, tapering from above to a sharp marginal line C forming the knife-edge and coinciding with the axial line of the stud B. The upper face C² of the wedge C' is curved on a radius from the line C, so that it is concentric with the latter and with the stud.

D' is a movable arm adapted to be oscillated vertically. It carries a head D², having in its upper face a considerable cavity d, receiving the wedge C', and is provided with a rectangular bearing block or seat D, of hardened steel, fitted into a correspondingly-shaped groove in the head D². The upper face of the seat D is hollowed to form a shallow V-groove, the angle being enough greater than that of the wedge C' to allow the required motion.

The knife-edge C is held to the seat D by a roller F', lying upon the curved upper face C² of the wedge and turning on journals F² F², received in bearings formed on the under face of a follower F, matching to and lying upon the head, adjustable vertically thereon by means of screws G, one at each end, tapped into the head D² forward and rearward of the cavity d, and extending through screw-threaded washers H, set in correspondingly drilled and tapped holes in the follower. The washers are provided with nicks to receive a driver of proper shape.

The head D² has an extension or pocket D³ on each side to receive the stud B and provided with a flange reaching upward and having a semicircular opening in each matching closely to the adjacent surface of the stud and partially inclosing it. The follower F carries on each side a depending flange F³, having corresponding openings which complete the

inclosure when the parts are assembled. The edges of the flanges around the openings in both are grooved, as shown, to receive strips of packing J, making a close joint with the surface of the stud to exclude dust.

K K are segmental V-grooves formed on the sides of the offset B⁴ near the top and matched by similar grooves L L in the side flanges F³ of the follower F. Hardened-steel balls M are inserted in these grooves and serve the important function of receiving the end-thrust and transverse strains to which the parts may be subjected and reducing the resulting friction.

The sharp corners of the wedge on the line C are smoothly rounded off and the V-groove in the seat D is similarly finished, but on a curve of greater radius, as shown, the purpose being to produce a natural tendency of the wedge and bearing to assume a correct central position transversely relatively to each other.

It is important that the knife-edge C be held always in contact with the block D to avoid dulling the edge or marring the seat by "chattering" or looseness in these parts.

The screw-threaded washers H and screws G afford means of adjusting the downward pressure exerted by the roller F' upon the wedge C' with great nicety, and as the upper face C² of the wedge is finished on a true circle struck from the line C the small amount of friction due to compression is equal in all positions of the wedge and may be so small as to be practically inappreciable.

The flanges F³ on the follower F extend well down on each side of the head, fitting closely enough to prevent the entrance of dust through the joint, and as the line of oscillation is coincident with a line passing axially through the stud B, I am able to make the semicircular openings in the flanges and pockets concentric to the stud and match so closely thereto that by means of the packing-strips J these joints are also practically dust-proof.

The side strains, if any, are taken by the antifriction-balls M, traveling in the grooves K and L, and are not communicated to the knife-edge, thereby relieving the latter from all torsional strains liable to destroy the nicely-finished working edge or its seat.

Fig. 5 shows a modification in which the arm or stud extends outwardly from one side only. This form will serve well in some situations, and is particularly adapted to serve on one branch of a bifurcated connection, the other carrying a bearing the counterpart of the one shown.

Other modifications may be made. The screw-threaded washers H may be dispensed with, relying upon the screws G alone for adjustment, either with or without thin washers or the like inserted between the head and follower, and other means than the balls M may be employed to resist the side strains.

I have shown the wedge D as formed integrally with the stud B, but it may be formed

separately and secured in position in any approved manner.

I prefer the whole as shown.

I claim—

1. In an antifriction-bearing of the character set forth, a stud and a knife-edge thereon having its back face curved concentrically to its working edge, a head and a seat thereon for the said edge, said stud and head arranged to be oscillated relatively to each other on said edge and seat, in combination with a follower carried on the head and a roller mounted therein in contact with said curved face to hold the knife-edge to its seat, all substantially as herein specified.

2. In an antifriction-bearing of the character set forth, a stud and a knife-edge thereon having its back face curved concentrically to its working edge, a head and a seat thereon for said edge, the said stud and head arranged to be oscillated relatively to each other on said edge and seat, in combination with a follower carried on the head and vertically adjustable thereon, and a roller mounted in said follower in contact with said curved face to hold the knife-edge to its seat, all substantially as herein specified.

3. In an antifriction-bearing of the character set forth, a stud and a knife-edge thereon having its back face curved concentrically to its working edge, a head and a seat thereon for said edge, the stud and head arranged to be oscillated relatively to each other on said edge and seat, in combination with a follower carried on the head and a roller mounted therein in contact with said curved face to hold the knife-edge to the seat, and with antifriction-balls arranged between the ends of said knife-edge and the inclosing surfaces of the follower to reduce the friction due to end strains, all substantially as herein specified.

4. In an antifriction-bearing of the character set forth, a stud and a knife-edge thereon, the working edge of which coincides with the axial line of said stud, in combination with a seat for said edge carried in a head having openings matching to and partially inclosing the stud, and a follower fitted to the head to inclose said knife-edge and seat, and having openings matching to and completing the inclosure of said stud to exclude dust from the working parts, all substantially as herein specified.

5. In an antifriction-bearing of the character set forth, a stud and a knife-edge thereon having its back face curved concentrically to its working edge, a head and a seat thereon for said edge, said stud and head arranged to be oscillated relatively to each other on said edge and seat, in combination with a follower carried on the head, the screws G and screw-threaded washers H for adjusting the follower vertically, and a roller mounted in the latter in contact with said curved face to hold the knife-edge to its seat, all substantially as herein specified.

6. The cylindrical stud B and knife-edge

C', C, the curved back C², and segmental grooves K, K, in combination with a head D² and seat D thereon, pockets D³ having openings matching to and partially inclosing said
5 stud, the follower F having the segmental grooves L, L, the roller F' in said follower, the adjusting-screws G and washers H, the balls M traveling in said grooves K and L, and the flanges F³ having openings matching

to the stud and completing its inclosure, all as substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

LUTHER G. BILLINGS.

Witnesses:

J. P. FIRENG,

JOHN A. DELVES.