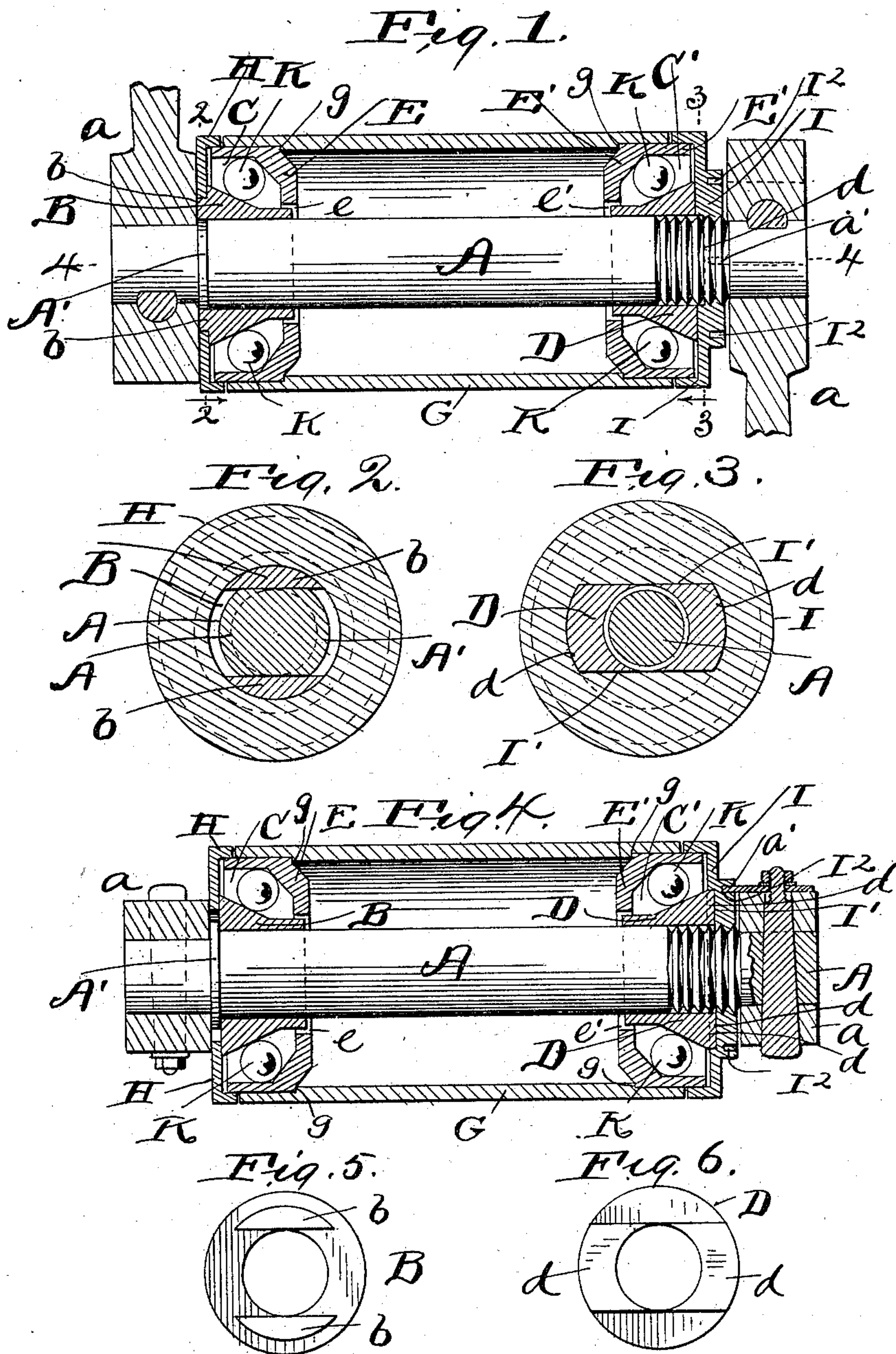


(No Model.)

D. S. HITCHCOCK.  
SHAFT BEARING.

No. 566,518.

Patented Aug. 25, 1896.



Witnesses:  
E. B. Gilchrist  
Ella E. Tilden

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# UNITED STATES PATENT OFFICE.

DAVID S. HITCHCOCK, OF CLEVELAND, OHIO, ASSIGNOR TO THE WHITE SEWING MACHINE COMPANY, OF SAME PLACE.

## SHAFT-BEARING.

SPECIFICATION forming part of Letters Patent No. 566,518, dated August 25, 1896.

Application filed November 21, 1895. Serial No. 569,599. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID S. HITCHCOCK, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Shaft-Bearings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in shaft-bearings, and more especially to the bearings on the operating crank-shaft in a bicycle; and it consists in certain features of construction and combinations of parts, hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of the crank-shaft of a bicycle, and shows the cone-bearings, ball-races, embracing-shell, and connected parts in central longitudinal section. Fig. 2 is a transverse section on line 2 2, Fig. 1, looking in the direction of the arrow. Fig. 3 is a transverse section on line 3 3, Fig. 1, looking in the direction of the arrow. Fig. 4 is an elevation, mostly in central longitudinal section, on line 4 4, Fig. 1. Fig. 5 is an outer end elevation of one of the cones, and Fig. 6 is an outer end elevation of the other cone.

Referring to the drawings, A designates a horizontally-arranged shaft that, in the case illustrated, constitutes the crank-shaft of a bicycle, and is provided at each end with a crank *a*.

B represents a cone mounted upon shaft A at the inner side of one of the cranks, and D designates a cone mounted upon shaft A at the inner side of, but a suitable distance from, the other crank of the shaft. Cones B and D are bored centrally to render them capable of snugly embracing the shaft, and the surrounding walls of the bores through the cones are ground exactly concentrically with the axis of the shaft, and the shaft is ground externally and exactly concentrically with its axis where it extends through the cones, so as to nicely engage the ground surrounding walls of the bores of the cones. The two cones are arranged so that their smaller ends constitute their inner ends.

The conical surface of cone B forms the inner wall of a ball-race C, and the conical surface of cone D forms the inner wall of a ball-race C'. The outer wall of ball-race C is formed by the internal surface of a suitably-shaped cap E, that is perforated centrally at *e* and embraces the inner end of cone B. The outer wall of ball-race C' is formed by the internal surface of a suitably-shaped cap E', that is perforated centrally at *e'* and embraces the inner end of cone D. The two caps E and E' engage annular shoulders *g* formed upon and internally of the embracing-shell G. Cones B and D are caused to rotate with the shaft, as will hereinafter appear.

Cone B upon its outer end is provided with two segmental outwardly-projecting lugs *b b*, located a suitable distance apart and at opposite sides, respectively, of the shaft. The inner or opposing surfaces of lugs *b b* are straight, as shown more clearly in Fig. 2, and engage the flat or straight faces of flange or collar A', formed upon and externally of the shaft, by which construction it will be observed that cone B is caused to rotate with the shaft during the operation of the latter. The outer surfaces of lugs *b b* are concentric with the axis of the shaft, and a cap or dust-guard H is mounted upon the outer surfaces of lugs *b b* and closes or substantially closes the outer end of ball-race C, and also engages the outer end of cone B.

Cone D upon its outer end is provided with two outwardly-projecting lugs *d d*, as shown more clearly in Figs. 3, 4, and 6, and lugs *d d* engage pockets or recesses I' in the inner side of a cap or dust-guard I that is mounted upon the shaft at the outer end of cone D and has the surrounding wall of the hole centrally therethrough screw-threaded and engaging corresponding threads formed upon the shaft. Guard I closes or substantially closes the outer end of ball-race C', and excludes dust and dirt from said race. Guard I also constitutes a nut for the adjustment of the bearings, and any suitable means, such, for instance, as a pin or lug *a'* formed upon or supported by the adjacent crank of the shaft and engaging one of holes I<sup>2</sup> in said guard and nut, secures the latter in the desired adjustment. K designates the balls within the ball-races.



Both caps or guards H and I, at their external peripheries, are provided, respectively, with an annular and inwardly-projecting flange that is arranged in line with shell G and closes the outer side of the adjacent end of the ball-race.

In my improved construction hereinbefore described it will be observed that the cones are operatively connected with a shaft by means of the outwardly-projecting lugs formed upon the cones and interlocking, as it were, with other lugs revoluble with the shaft, and the joints between the cone and shaft are ground so as to make the cones exactly concentric with the shaft's axis.

What I claim is—

1. The combination, with a shaft, the cones B and D instrumental in the formation of the ball-races formed about the shaft, said cones being arranged substantially as indicated and provided, upon their outer ends, with outwardly-projecting lugs operatively connected with the shaft, and ground joints between the cones and shaft and exactly concentric with the shaft's axis, the two caps E and E' surrounding the different cones, respectively, antifriction-balls interposed between said caps and cones, and means retaining said caps in place, substantially as and for the purpose set forth.

2. The combination with the shaft, the cone B instrumental in forming a ball-race about the shaft, and having the bore therethrough, through which the shaft extends, ground exactly concentrically with the axis of and snugly engaging the shaft, and said cone, at one end, being provided with projecting lugs or members arranged at opposite sides of the shaft, respectively, and operatively connected with the shaft, the cone D provided with projecting lugs, and instrumental in the formation of the other ball-race about the shaft and hav-

ing the surrounding walls of the bore there-through ground concentrically with the axis of the shaft, and a dust-guard or cap for said last-mentioned cone and composed of a piece separate from said cone and provided with recesses or pockets engaged by the projecting lugs or members of said cone, the two caps E E' surrounding the different cones, respectively, antifriction-balls interposed between said caps and cones, and the shell G having shoulders or members *g* arranged to engage and prevent inward displacement of the caps, substantially as and for the purpose set forth.

3. The combination with a shaft provided near one end, with external lugs or flanges A' and threaded, near its opposite end, the cone B provided, at its outer end, with the outwardly projecting lugs *b b*, the cone D provided, at its outer end, with the outwardly-projecting lugs *d d*, and both of said cones embracing and connected with the shaft by ground joints and instrumental in the formation of ball-races about the shaft, the balls within said races, the shell G having internal shoulders *g g*, and the two caps E E' surrounding the different cones, respectively, and engaging the different shoulders, respectively, on the aforesaid shell, the cap or dust-guard H, the dust-guard I provided, upon its inner side, with recesses or pockets I', and mounted upon the externally-threaded portion of the shaft, all arranged and operating substantially as shown, for the purpose specified.

In testimony whereof I sign this specification, in the presence of two witnesses, this 9th day of November, 1895.

DAVID S. HITCHCOCK.

Witnesses:

C. H. DORER,

ELLA E. TILDEN.