(No Model.) 2 Sheets—Sheet 1.

A. J. SHAW.

ANTIFRICTION BEARING.

No. 528,617. Patented Nov. 6, 1894.

Fig. 2.

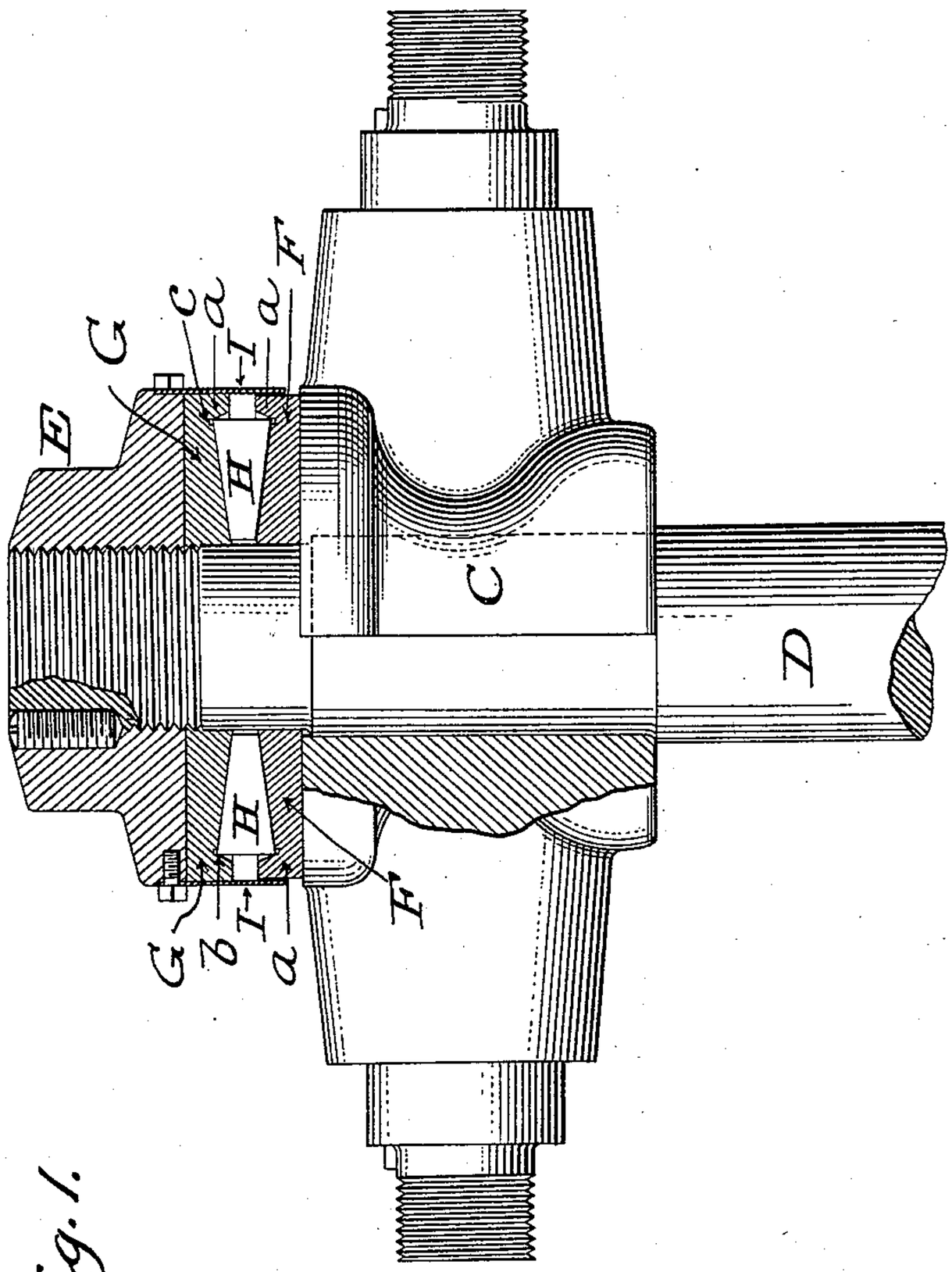
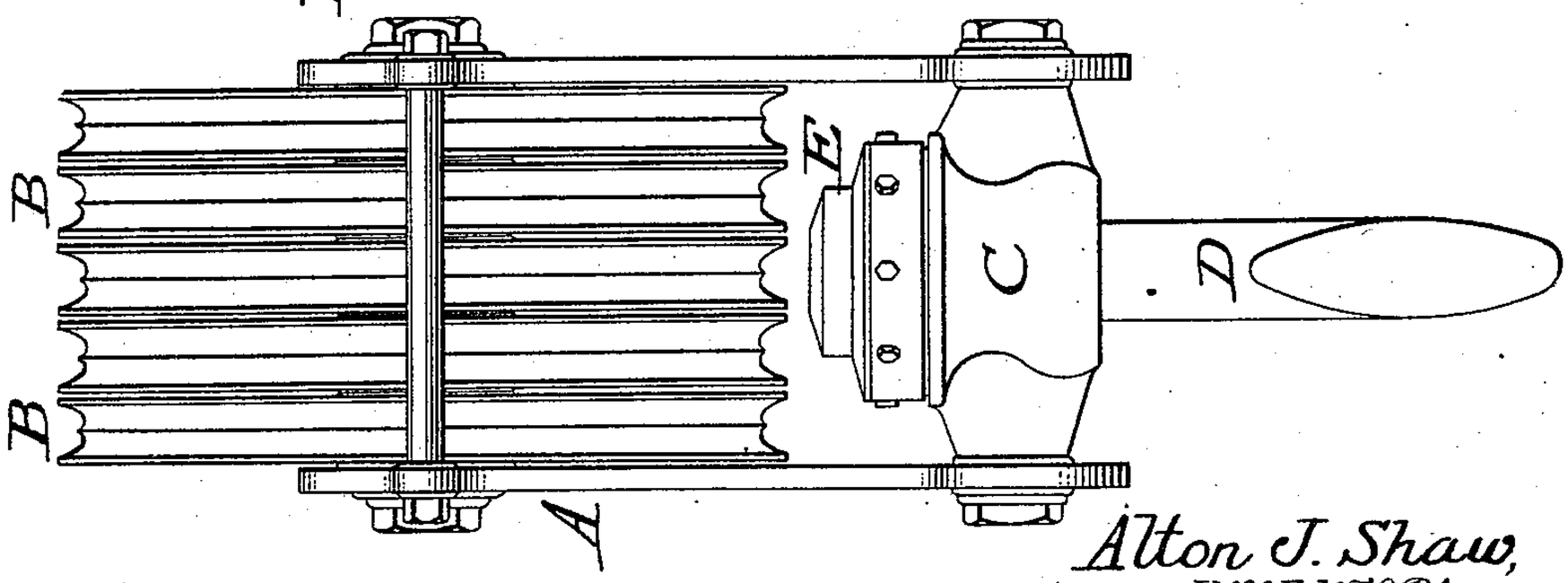


Fig. 1.



WITNESSES:

C. C. Burdine.
C. B. Bull.

Alton J. Shaw,
INVENTOR:

by Dodger & Sons
Attorneys.

(No Model.) 2 Sheets—Sheet 2.

A. J. SHAW.

ANTIFRICTION BEARING.

No. 528,617. Patented Nov. 6, 1894.

Fig. 3.

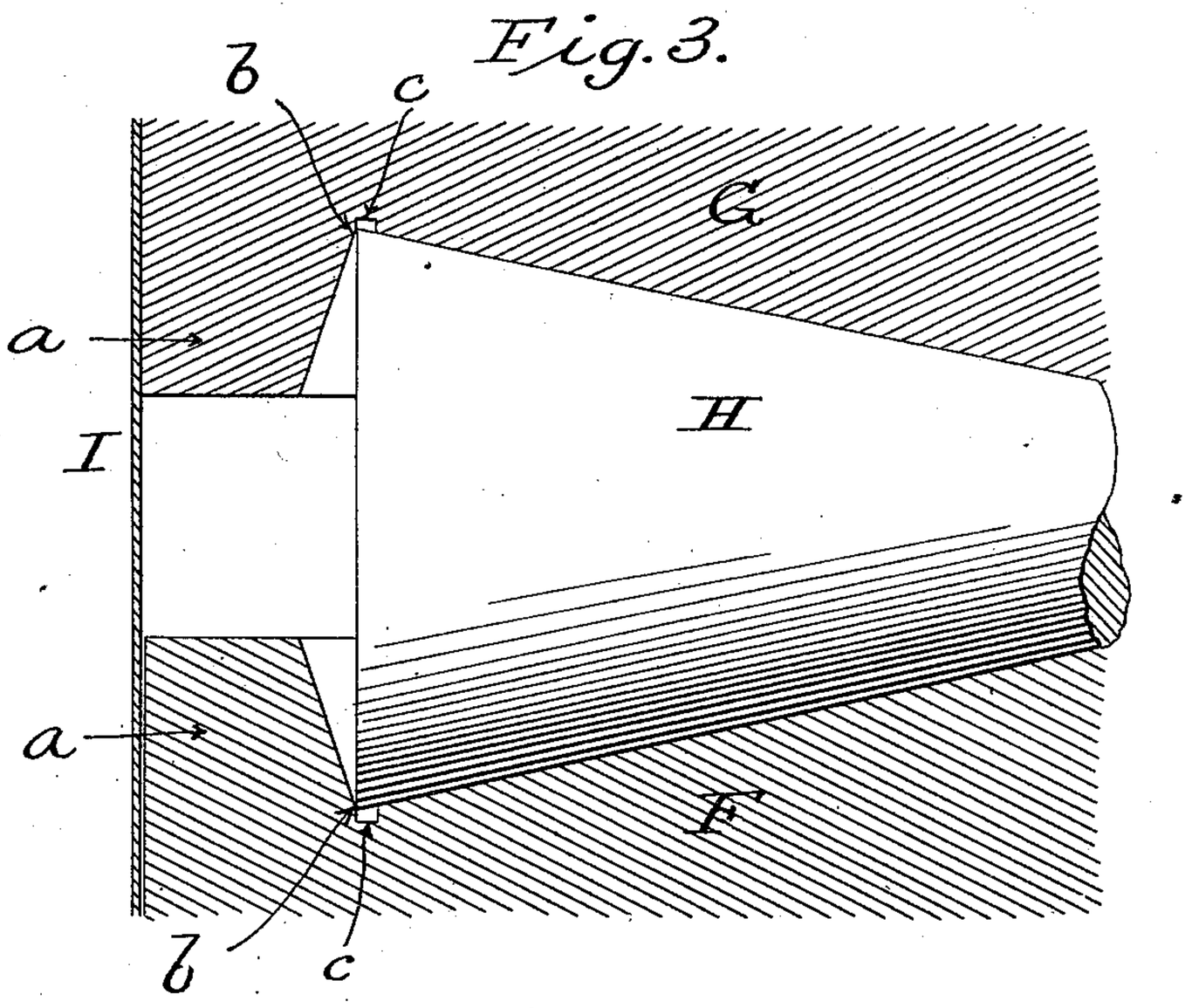
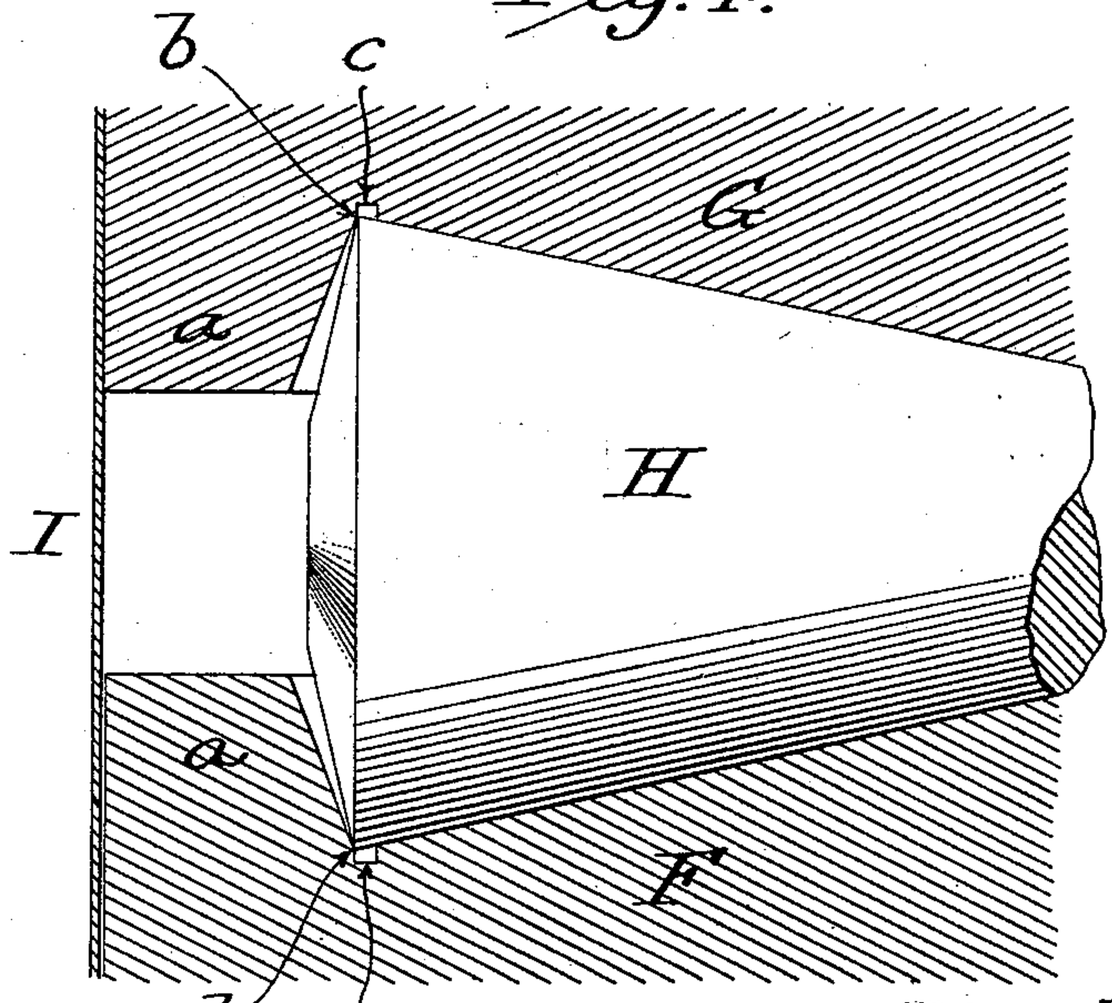


Fig. 4.



WITNESSES:
C. C. Burdine.
E. B. Bull.

Alton J. Shaw,
INVENTOR:
by Dodger & Sons,
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UNITED STATES PATENT OFFICE.

ALTON J. SHAW, OF MUSKEGON, MICHIGAN, ASSIGNOR TO THE SHAW ELECTRIC CRANE COMPANY, OF SAME PLACE.

ANTIFRICTION-BEARING.

SPECIFICATION forming part of Letters Patent No. 528,617, dated November 6, 1894.

Application filed June 7, 1894. Serial No. 513,847. (No model.)

To all whom it may concern:

Be it known that I, ALTON J. SHAW, a citizen of the United States, residing at Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Antifriction-Bearings, of which the following is a specification.

My invention pertains to antifriction bearings, and consists in a novel construction thereof, whereby end friction between the rollers and their containing shell is prevented.

The improvements are applicable generally where rollers of other than spherical form are employed to reduce friction; but are more especially designed for use with the conical rollers of heavy swivel hooks, such as are employed in connection with cranes and lifting machinery.

Figure 1 represents in elevation the lower or running block of a crane or hoisting apparatus, provided with a swiveled hook from which to suspend the load. Fig. 2 is a sectional view showing the construction of the swivel; and Figs. 3 and 4, enlarged views, designed to show more clearly the main feature of the invention and also to illustrate a detail thereof, Fig. 4 showing the roller in the form preferred in practice.

It is common at the present time to employ in various situations, rollers to reduce the friction of bodies movable relatively to each other, and where the motion is in a circular horizontal plane it is usual to make such rollers of conical form. Owing, however, to the weight or pressure brought upon the parts, and the tendency to force the rollers radially outward from the center about which they revolve, it is the practice to provide strong hoops or bands to retain them in place. These bands are sometimes perforated to receive journals formed upon the ends of the rollers; and in other cases a single outer band is used, which is merely placed between the upper and lower members of the structure, with its lower face resting upon the latter, and the outer ends of the rolls bearing against its inner face. When this second construction is adopted, the outer ends of the rolls are made in the form of a cone of slight axial measurement, the apex of which bears against the hoop or band, and produces very little friction. Under both of these constructions, however, there is produced a considerable and unnecessary amount of friction, either between the roll journals and their bearings in the hoops or bands; or between the hoop and the surface upon which it is supported and over which it is carried by the rolls in their travel. I obviate this friction by so constructing the rollers and the shell or chamber within which they are confined, that the end thrust is taken entirely at the circumference of the rollers, and a rolling, instead of a rubbing, friction results. This will be readily understood upon referring to Fig. 2 of the accompanying drawings, in which—

A indicates the yoke or frame of a pulley block, provided with a series of sheaves B, and with a cross head C pivoted in the yoke or frame, and carrying the swivel hook D. As shown, the hook is formed with a cylindrical shank or stem, which passes vertically through and turns freely within an opening in the cross head C, and it carries at its upper end a heavy nut E, between which and the cross head is interposed the antifriction device.

F and G indicate two disks, one resting upon the cross head C, and the other bearing against the lower face of the nut E; and H indicates a conical roller, of which a suitable number is provided, the rollers being interposed between the disks F and G as shown.

It is obvious that the separate disks are not essential, as the cross head and the nut may be formed with circular bearing faces suitably beveled or inclined to suit the rollers used; but by making the disks separate I am enabled to select material best suited to the purpose and to finish and temper them as required, without difficulty.

To reduce the angle or taper of the rolls as much as practicable, and consequently lessen their outward pressure, it is expedient to make them of comparatively small diameter, but I do not mean to restrict myself to any specific proportions whatever.

Each disk is formed with an annular flange or rim *a*, projecting from its sloping face, said rims or flanges being designed to receive

the end thrust of the rollers H, and to prevent outward movement thereof. In the drawings I have shown the outer or larger ends of the rollers H as having the form of a truncated cone, and this form is preferred, though not essential. Whatever be the form of the ends of the rollers, however, the inner wall or face of rim or flange *a* should touch it only at the periphery of the roller, and from that point should fall away from the end of the roller sufficiently to prevent any bearing between the end of the roller and said inner wall of the rim or flange. In other words, from the meeting point *b*, of the end and circumference of roller H, which is coincident with the meeting point of the inner face of rim *a* and the sloping face of the disk, the lines forming the inner wall of the rim and the outer end of the roll should diverge, as shown in Fig 2, and on a larger scale in Figs. 3 and 4.

In Fig. 3 the outer end of roll H is represented as perpendicular to the axis of the roll, this being done mainly for the purpose of more clearly illustrating avoidance of contact between the end of the roll and the face of collar or flange *a*. In order, however, to render the angle formed by the meeting of the circumference and the end of the roll obtuse, and thereby to prevent cutting of the flange or crumbling of the roll at the angle, I prefer to make the end of the roll in the form of a cone or of the frustum of a cone of slight axial measurement, as shown in Fig. 4.

With the parts thus constructed it is manifest that the end bearing of roll H is a mere line, theoretically without breadth, and practically unappreciable in extent. Hence there is and can be no rubbing friction at that point.

It is difficult in practice to cut the angle so clean and sharp between the face and rim of the disk as to insure a perfect bearing of the angle of the roll therein. Hence I find it expedient to make a very shallow cut or groove *c* in the face of the disk, or in other words, to extend the inner wall of the rim *a* slightly beyond the sloping face of the disk, as shown in Fig. 2. In this way I secure a perfect bearing at the point *b*.

I have described and shown, and prefer to employ, a rim *a* on both disks, but this is not absolutely necessary, as its presence on either disk will give the desired result; but it is advisable to provide both disks therewith to guard against accidents to one.

To exclude dust and grit, a guard I is carried across the space between the outer edges of the disks F, G, said guard being secured to the nut E or to either disk, as found convenient. The nut is of course secured against unscrewing, a threaded key being here shown for that purpose.

While I have here represented the bearing as applied to a swivel hook, I desire it understood that this is merely illustrative, and that the invention is applicable wherever conical rolls are used to reduce friction.

Having thus described my invention, what I claim is—

1. In a roller bearing, the combination of two opposing bearing surfaces, one provided with an annular rim or flange, and a series of interposed conical rollers, said rollers bearing against the rim or flange only at the angle formed by the meeting of their end and circumferential faces, substantially as set forth.

2. In combination with disks F, G, one or both provided with a rim *a*, conical rollers H interposed between said disks, the end faces of the rolls and the inner wall of the flange diverging from the point *b*, substantially as shown.

3. The combination with disk F provided with flange *a* and groove or channel *c*, of disk G, and conical rollers H interposed between the disks, substantially as described and shown.

In witness whereof I hereunto set my hand in the presence of two witnesses.

ALTON J. SHAW.

Witnesses:
F. W. BABCOCK,
T. C. AKIN.