(No Model.)

E. C. SENDELBACH & J. N. WILKINS.

JOURNAL BEARING.

No. 527,026. Patented Oct. 2, 1894.

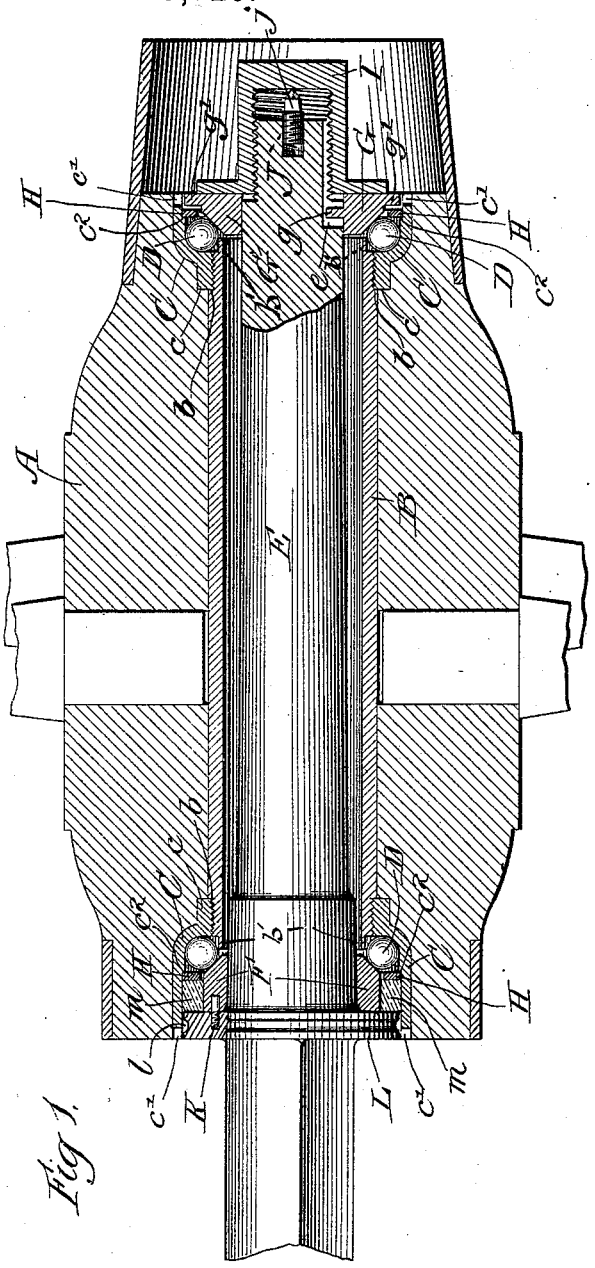

Fig 1.

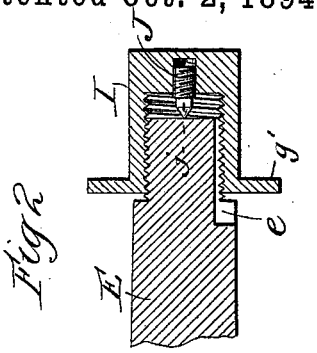

Fig 2.

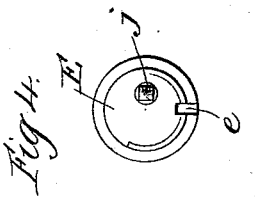

Fig 4.

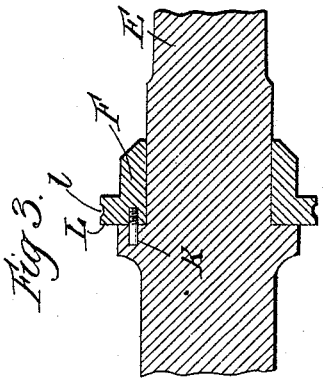

Fig 3.

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UNITED STATES PATENT OFFICE.

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JOURNAL-BEARING.

SPECIFICATION forming part of Letters Patent No. 527,026, dated October 2, 1894.

Application filed October 14, 1893. Serial No. 488,166. (No model.)

To all whom it may concern:

Be it known that we, EDWARD C. SENDELBACH, residing at Chicago, and JOHN N. WILKINS, residing at Ravenswood, county of Cook State of Illinois, citizens of the United States, have invented certain new and useful Improvements in Journal-Bearings, of which the following is a full, clear, and exact specification.

Our invention relates to improvements in journal bearings generally, in which anti-friction devices such as balls, cones or rollers are interposed between the wearing parts; but is more particularly designed for use in connection with the journals or axles of vehicles, and it is shown in the accompanying drawings as applied to the hub and axle of an ordinary carriage or buggy wheel.

The improvements have more especial reference to features of construction in the means for holding the boxes for the anti-friction devices or balls, in the hub; and also to the means for holding such balls or anti-friction devices in their said boxes.

Our invention consists in certain features of novelty hereinafter described with reference to the accompanying drawings and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a longitudinal section of a buggy hub and axle provided with our improvements. Fig. 2 is a sectional view of one end of the axle or journal illustrating certain modifications hereinafter explained. Fig. 3 is a sectional view of the rear end of the axle or journal illustrating a modified form of sand box and bearing-cone or collar hereinafter described, and Fig. 4 is a detail view showing a modification hereinafter explained.

Like signs of reference indicate like parts throughout the several views.

In applying our improvements to an ordinary carriage or buggy wheel, the hub A is provided with the usual central bore or passage in which, heretofore, the ordinary axle box was usually inserted, but in lieu of such axle box we employ a cylindrical tube or sleeve B which is preferably constructed of steel tubing and is provided at each end with screw threads by means of which the interiorly threaded neck or flange *c* on each of the ball-boxes C is securely connected to the sleeve. Preparatory to forming the threads on the ends of the sleeve B such ends are first turned down to a smaller diameter so as to form an abutment shoulder *b* as shown in Fig. 1, against which the inner end of the neck or flange *c* abuts and thus limits the inward movement of the box C when being screwed onto the sleeve; and such shoulders perform the further useful functions of slightly binding the boxes C on the ends of the sleeve when once screwed forcibly into place; and still further of determining the exact length of the device from box to box, and resisting the impact of the neck *c* when the sleeve is being driven into the hub, thus preventing any liability of stripping the threads on the sleeve.

After the hub has been bored out as described, the ends of the bore are reamed out so as to receive and be complementary in shape to the contour of the boxes C. After one of the boxes has been screwed firmly into place on the end of the sleeve B, such sleeve is then driven home into the hub, after which the remaining box C may be screwed on the other end of the sleeve until its neck *c* comes against the abutment shoulder *b*, each of the boxes being provided in their outer edges with notches or sockets *c'*, for the application of a suitable wrench, and the screw threads being right and left whereby the motion of the wheel will tend to tighten both boxes.

The anti-friction devices which we have shown in the drawings and prefer to employ consist of the balls D arranged in the boxes C against their inner ends or walls. When the hub is in place on the journal or axle E the balls will be held against displacement by means of their bearing collars or cones F, G, but in order that the balls may be held from dislodgement when the wheel is removed from the axle, we confine them on one side in each of the boxes C by means of a collar or ring H which may be forced into the box and held therein by frictional contact or otherwise, but in order that it may be impossible for the ring to become jammed against the balls, it is desirable to provide each of the boxes with a slight shoulder c^3 for limiting the inward movement of the collar H, such shoulder be-

ing conveniently formed by reaming out the outer end of the box, or it may be formed in any other well known way. The balls are confined on the other side by means of a projection b' on each end of the sleeve B, which protrudes slightly into each of the boxes C in the form of an annular flange, and its proximity to the collar or ring H is such that the balls will be held against dislodgment while at the same time they will be afforded sufficient contact with their bearing collars or cones F, G; and when bearing against such cones will be held out of contact with the rings H and flanges b', whereby danger of injury to these parts and the production of unnecessary friction will be avoided. If desired the flanges b' may be dressed as shown, to provide smoother surfaces for the balls. This exact adjustment of the flanges b' with relation to the balls and collars H is accurately determined by the abutment shoulders b which are so disposed with reference to the ends of the sleeve and the depth of the necks c that the flanges b' will be projected the requisite distance when the necks come against such abutments.

It is of course very obvious that with but slight alteration in the form of device already described, the balls D might be made to bear directly against the axle or journal E in the ordinary way, but inasmuch as these axles are ordinarily constructed of malleable steel owing to the liability of crystallization and fracture from the rough usage and jar to which they are subjected, and this malleable steel does not form an adequate bearing surface for the steel balls, it is desirable to interpose between the journal and the balls the bearing collars or cones F, G, which may be formed of hard steel and if broken may be replaced at much less expense and with greater convenience than would be the case were it necessary to replace the entire axle.

The outer or end bearing-cone or collar G is sleeved loosely over the end of the axle or journal and is held against rotation by means of a pin or lug g which fits in a groove e formed longitudinally in the end of the axle or journal. This cone is held up to its work against the balls by means of the end nut or tap I, which is screwed on the end of the axle in the ordinary manner, and when it is removed, the cone may be readily slipped off by pulling it outward without the necessity of unscrewing it.

As shown in the drawings the groove e is of sufficient length to permit the cone to be forced still farther inward in order to compensate for wear and tighten both bearings, when desired, but in order that the cone G may not be forced inward too far by ignorant persons, we provide a stop which is preferably adjustable, which will limit the inward movement of the tap or nut I with reference to the cone G and thus enable the nut G being screwed up with the requisite force to prevent it working off, without bringing undue pressure against the cone. This adjustable stop may consist of a screw J which may be threaded in either the axle in the manner shown in Fig. 1, or in the inner end of the tap or nut I as shown in Fig. 2; and in order that the rotation of the nut I in turning it up, may not tend to disarrange the adjustment of the screw, the latter may be provided with a squared or prismatic end j for the application of any suitable wrench for adjusting the screw with reference to the part in which it is screwed, such prismatic end terminating in a point or taper as shown, for reducing the friction between it and the nut I, or the end of the axle, as the case may be. If desired however, any danger of altering the adjustment of the screw J through the rotation of the nut I may be absolutely avoided by giving such screw an eccentric position with relation to the axis of the nut as indicated in Fig. 4, and in that case the tapered end on the screw is unnecessary, and in its stead an ordinary screw head may be employed if preferred. The inner cone or collar F may likewise be sleeved loosely upon the axle and held against rotation by means of a pin or lug K engaging in a suitable perforation formed in the flange L in which the ordinary sand arrester or groove l is cut.

In order to form a further safeguard against the admission of sand and grit to the inner bearings we extend the inner box C over the sand arrester L' as shown in Fig. 1 so as to fit reasonably close to the flange L; and if desired the space between the flange L and the ring H may be occupied by a washer m for still further guarding against the admission of grit. The end or outer bearing may be sufficiently guarded by a flange g' formed on the collar or cone G and overlapping the ring H, such flange g' and the flange of the nut I substantially filling the end of the outer box C.

If desired the sand arrester L' may be formed internally with the bearing cone F as shown in Fig. 4 and the whole held against rotation by means of the pin K as before described, engaging in a perforation in a suitable shoulder formed on the axle. The advantage of this latter construction is that the sand arrester may be formed of hardened steel and thus be less liable to reduction in diameter by the grinding of sand between it and the extension on the box C.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. In an axle or journal-bearing, the combination with a removable box and anti-friction devices arranged therein, of a continuous fixed sleeve B whose end is projected into said box and thereby retains said anti-friction devices upon one side, and means for retaining said anti-friction devices on the opposite side, substantially as set forth.

2. In an axle or journal bearing, the combination with a removable box and anti-fric-

tion devices arranged therein, of a fixed sleeve projecting into said box and upon which sleeve said box is adjustably secured whereby the extent of protrusion of said sleeve into the box may be varied, said projected end of the sleeve serving to retain the anti-friction devices upon one side, and means for retaining said anti-friction devices upon the opposite side, substantially as set forth.

3. In an axle or journal bearing, the combination with a removable box and anti-friction devices arranged therein, of a fixed sleeve secured to and projecting into said box and thereby retaining the anti-friction devices upon one side, said sleeve being provided with a shoulder for limiting the extent of its protrusion into the box, and means for retaining the anti-friction devices upon the opposite side, substantially as set forth.

4. In an axle or journal-bearing, the combination with a removable box and anti-friction devices arranged therein, of a continuous fixed sleeve B whose end projects into said box and thereby retains the anti-friction devices upon one side, and a removable retaining ring secured in said box on the other side of said anti-friction devices, substantially as set forth.

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