(No Model.)

B. F. RICHARDSON.

VEHICLE AXLE.

No. 382,902. Patented May 15, 1888.

Fig. 1.

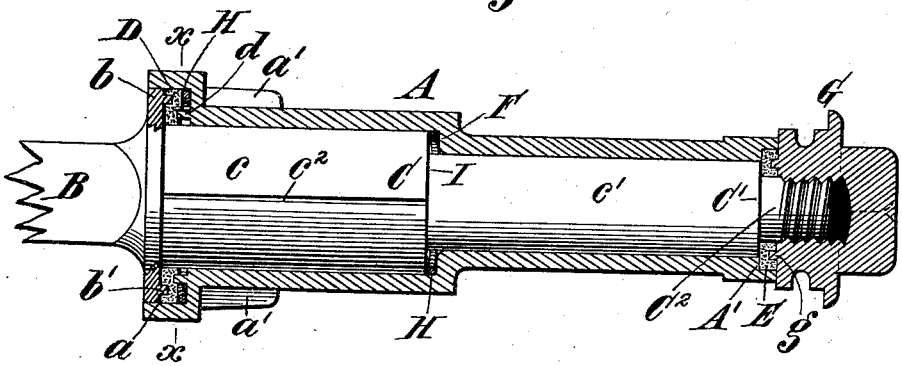


Fig. 2.

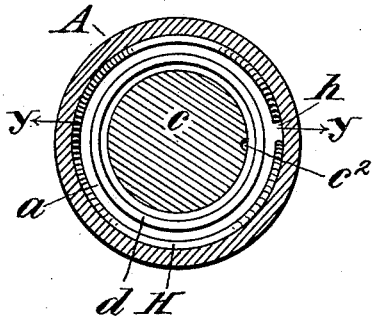


Fig. 3.

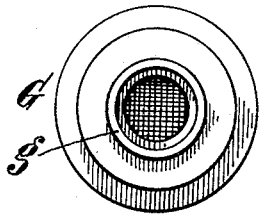


Fig. 4.

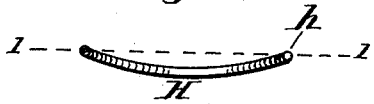
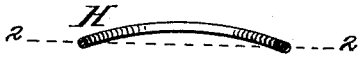


Fig. 5.



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UNITED STATES PATENT OFFICE.

BENJAMIN F. RICHARDSON, OF CINCINNATI, OHIO.

VEHICLE-AXLE.

SPECIFICATION forming part of Letters Patent No. 382,902, dated May 15, 1888.

Application filed October 27, 1887. Serial No. 253,532. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. RICHARDSON, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Vehicle Axles and Wheels, of which the following is a specification.

My invention relates to improvements more especially in the class of axles and wheels for which United States Letters Patent Nos. 174,091 and 183,706 were granted to me February 29, 1876, and October 24, 1876, respectively.

My invention consists, in the first part, in the provision, in connection with an axle-box, of a resilient wire ring having an opening or blank space in its circumference and hollowed or dished diametrically in two lines, one line being at right angles to the other and inserted in the chamber or socket at the inner end of said axle-box to lie intermediate the lubricating-washer and the bottom of said chamber, or in said special form of axles and wheels between the offsetted portion of the axle-arm and its corresponding shoulder in the axle-box, or both, whereby the endwise thrusts of the axle, occasioned by any lateral movements of the vehicle body or wheels, are cushioned, and all disagreeable metallic sounds, rattling, rumbling, and sudden shocks and strains avoided.

My invention further consists in providing the bottom of the chamber at the inner end of the axle-box with a circular ridge or elevation, and also the inner face of the axle collar or flange with a similar elevation, both of which elevations lie intermediate the inner and outer edges of said chamber-bottom and flange-face, respectively, and sink or embed themselves into the substance of the lubricating-washer from opposite sides thereof, thereby forming effective guards or wards to oppose the outward escape of the lubricant, and at the same time exclude grit, in the shape of dust and dirt, from the bearing-surfaces.

My invention further consists in the combination, with the washer-chamber at the outer end of the axle-box, of an axle-nut whose inner face is provided with a circular ridge or elevation, which on the turning home of said nut sinks into the substance of the lubricating-washer in said chamber, thereby forming a guard at the outer end of the axle and box, whereby the lubricant is effectually prevented from escaping without and dust and dirt entering within.

Other features of my invention will be fully set forth in the following description of the accompanying drawings, in which—

Figure 1 is a longitudinal section of the axle-box, showing the axle in place therein in elevation, the flange or collar partly in section, the nut and take-up rings in section, and the spurs or wings on the axle-box in elevation; Fig. 2, a cross-section of the inner end of the axle-box and arm on line *x x*, Fig. 1, showing the resilient open take-up ring in place in the chamber of said box; Fig. 3, an elevation of the inner face of the axle-nut; Fig. 4, a transverse sectional elevation of the dished take-up ring, taken on the line of its circumferential opening, as shown at *y y*, Fig. 2; and Fig. 5, a similar view to Fig. 4 of the dished ring, taken on a line at right angles thereto.

A represents the axle-box; B, the axle-body, (shown broken off,) and C the axle arm or spindle. These parts are constructed similar to those shown and described in the above-mentioned Letters Patent, and they are of the form to which I prefer to apply my present improvements, although it will be seen from the following description and by reference to the accompanying views in the drawings that they are equally well adapted to the plain, tapered, or any offsetted form of axle-arm and box in common use.

a represents the chamber at the inner end of the axle-box for containing the flange or collar *b* on the axle-arm and the annular lubricating-washer D.

a' a' are the customary spurs or wings on the axle-box to hold it in position against rotation within the wheel-hub.

A' is a smooth-faced socket at the outer end of the axle-box, containing lubricating-washer E.

F represents a shoulder or offset in the axle-box intermediate its ends, and *c* the corresponding enlarged or offsetted portion of the

axle-arm, c' representing the smaller portion thereof.

c^2 is a longitudinal groove along the rear side of large part c of the axle-arm, for conducting the lubricant.

C′ is a shoulder at the outer end of the axle-arm, in line, or thereabout, with the inner face of socket A′.

C^2 is the screw-threaded stud or tip of the axle-arm, receiving nut G, whose inner face abuts against the rim of chamber A′, and thereby prevents any frictional wear of the washer E on account of end-pressure.

g is a circular ridge or elevation on the inner face of nut G, which on the turning home of the nut sinks or embeds itself deeply into the substance of washer E, and thus forms a guard or ward to prevent any egress of the lubricant or ingress of dust and other foreign matter.

d represents a similar circular ridge or ward in the bottom of chamber a at the inner end of the axle-box, and b' a similar ridge or elevation on the inner face of the flange or collar b of the axle, which elevations on the seating of the axle in place in said box also sink or embed themselves into the substance of washer D, thereby preventing any egress of oil or ingress of dust and dirt at the inner end of the axle-arm.

H represents a resilient wire ring dished or hollowed diametrically in two lines, one line being at a right angle to the other and formed with a blank space or opening, h, between the opposite ends of the wire composing it. The said ends of the wire in ring H are preferably rounded off, as shown in Fig. 2, to prevent any scratching or abrasion of the faces of the contiguous parts.

Ring H is inserted in the chamber or socket a of the axle-box preparatory to the placing of the wheel on the axle-arm, and when said wheel is in place lies intermediate washer D and the socket-bottom, and when my said special form of offsetted axle is used one of such wire rings is inserted in the offsetted chamber of the axle-box, so that when the wheel is in place on the axle said ring lies intermediate the shoulder I of the offsetted portion of the axle-arm and shoulder F in the box, as clearly shown in Fig. 1. When the rings have been inserted in the chambers stated and partially compressed by the turning of nut G into place, they serve to steadily maintain the wheel on the axle-arm against either wabbling or chucking, and at the same time act as take-ups or cushions for any side thrusts or plunges of the vehicle, and the consequent end-thrusts of the axle, thereby preventing any disagreeable rattling or rumbling sounds in the box or axle-arm and sudden jolting shocks or strains.

The opening h is provided in ring H to permit its opposite ends to creep toward or approach each other on its compression, and especially so in boxes having tapering chambers, either on inserting it in place in the box ready for use, or in the side motions of the vehicle from time to time after the wheel has been placed on the axle. The ring is made to fit snugly within the chamber of the axle-box, and is also made slightly larger in diameter than said chamber, so that when it has been inserted it spreads out or expands into frictional contact with the inner periphery of said chamber, and cannot therefore be accidentally displaced either on the removal of the wheel from the axle-arm or otherwise.

The dotted lines 1 1 and 2 2, Figs. 4 and 5, indicate the extent of diametrical dish or hollow in ring H, both said lines being at right angles to one another.

A ring, H, in the socket a, or one on the inside of the box lying between the shoulders F and I, as described, may be used separately or both together, (as shown in the drawings,) or one of them singly in chamber a only, in connection with an axle of common form, or any one having an offset therein.

I claim—

1. A resilient wire ring, H, having an opening or blank, h, in its circumference, and hollowed or dished diametrically in two lines, one line being at right angles to the other, substantially as herein set forth.

2. The combination, with axle-box A, having chamber a at its inner end and circular ridge or elevation d on the bottom of said chamber, of an open resilient wire ring, H h, hollowed or dished diametrically in two lines, one line being at right angles to the other, substantially as herein set forth.

3. The combination, with a chambered or shouldered axle-box, A a, of an open resilient wire ring, H h, hollowed or dished diametrically in two lines, one line being at right angles to the other, substantially as herein set forth.

4. The chamber or socket a at the inner end of the axle-box, having a circular ridge or elevation, d, on its bottom, substantially as herein set forth.

5. The combination, with chamber or socket a at the inner end of the axle-box, having the circular ridge or elevation d, of a washer composed of leather or other similar suitable material, substantially as and for the purpose specified.

6. An axle-arm having a collar or shoulder, b, and a circular ridge or elevation, b', constructed on the front face of said collar, intermediate its inner and outer edges, substantially as and for the purpose specified.

7. The combination, with collar b on the axle-arm, having the circular ridge or elevation b', of a washer, D, composed of leather or other similar suitable material, substantially as and for the purpose specified.

8. The combination of an axle-box having at its inner end a chamber or socket, a, provided with a circular ridge or elevation, d, and an axle-arm having collar b and circular

elevation b', said ridges or elevations embedding themselves in the substance of the lubricating-washer D on the turning home of the nut on the axle-arm, substantially as and for the purpose specified.

9. The combination of axle-box A, having a socket or chamber, A′, at its outer end, the axle-arm C, nut G, having a circular ridge or elevation, g, on its inner face, and a lubricating-washer, E, constructed, arranged, and operating substantially as herein set forth.

In testimony of which invention I have hereunto set my hand.

BENJAMIN F. RICHARDSON.

Witnesses:
JOHN E. JONES,
JOHN ADAM.