(No Model.)

3 Sheets—Sheet 1.

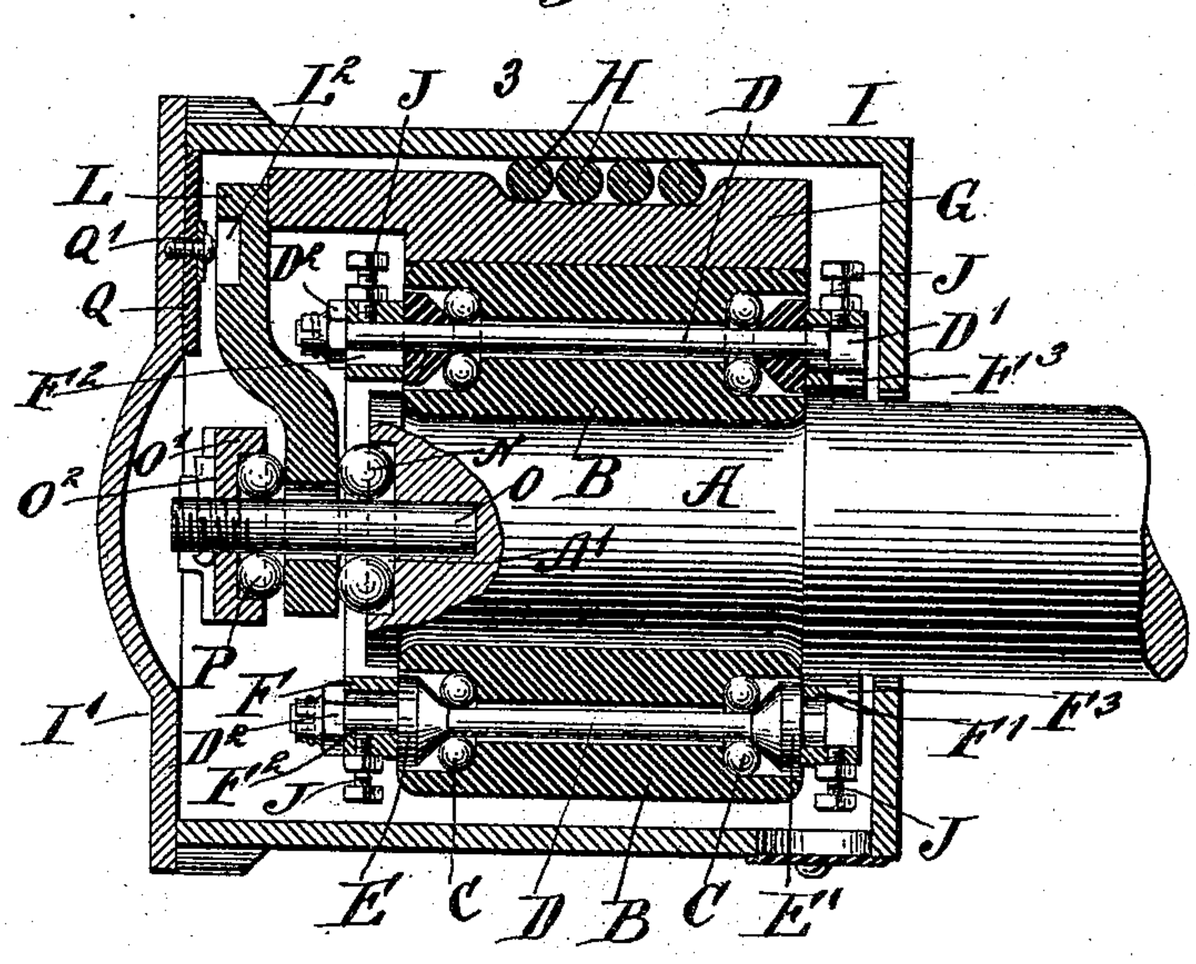
O. B. JACOBS.

CAR AXLE BEARING.

No. 501,790

Patented July 18, 1893.

Fig: 1.



3

Fig: 2.

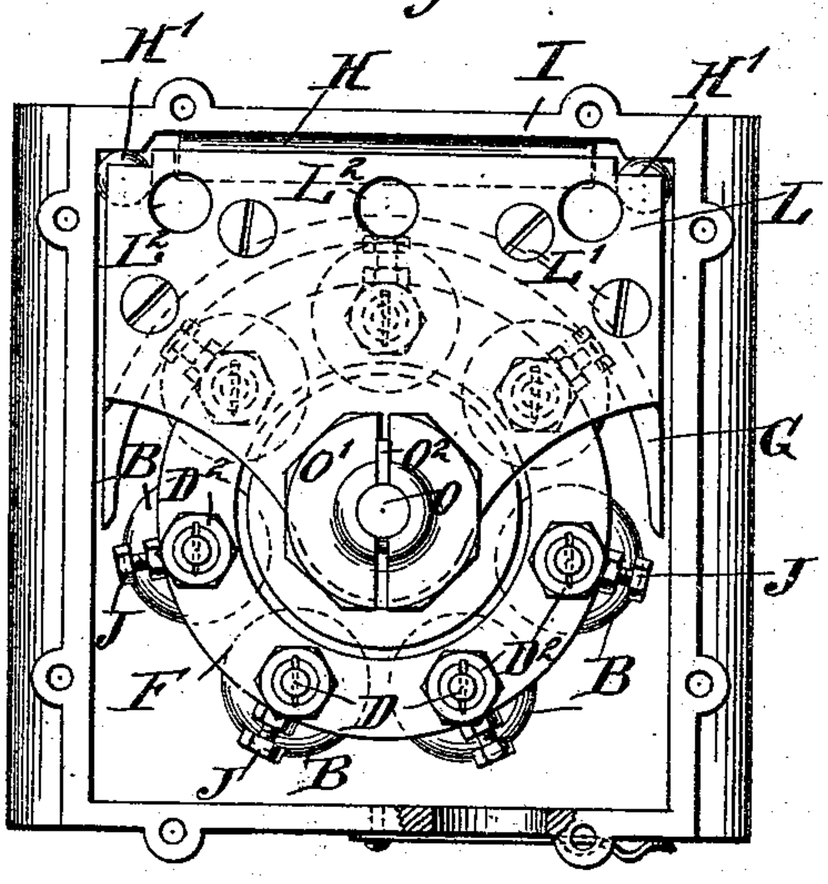
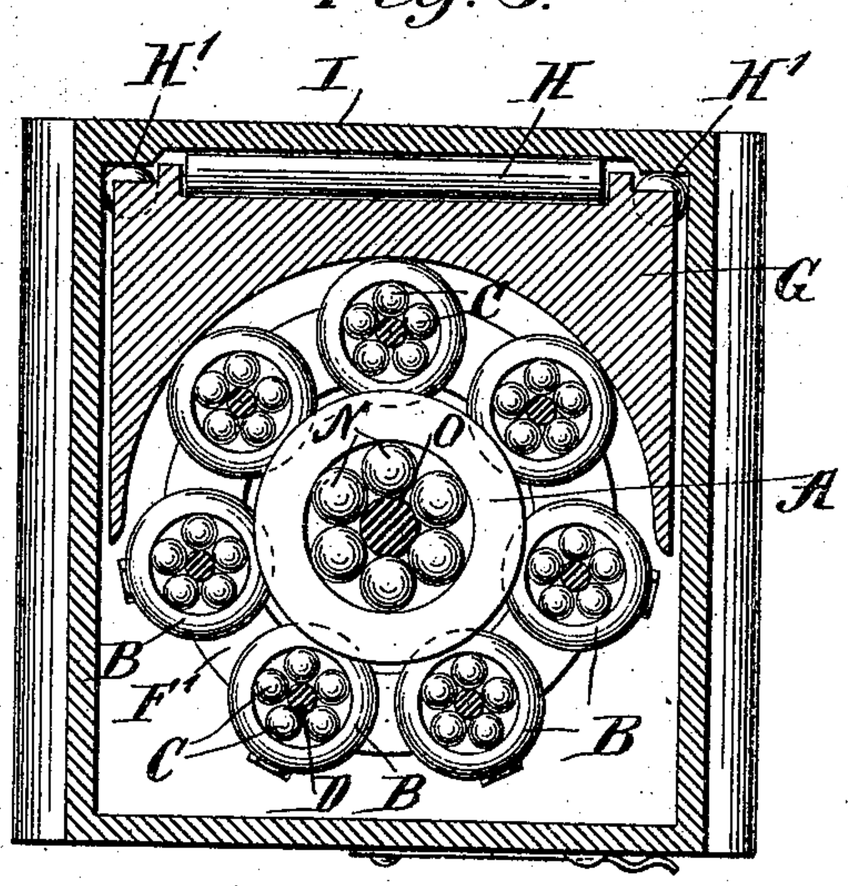


Fig: 3.



WITNESSES:

John A. Kennie.

C. Sedgwick

INVENTOR

O. B. Jacobs

BY

Munn & Co

ATTORNEYS.

(No Model.)

3 Sheets—Sheet 2.

O. B. JACOBS.

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Fig: 4

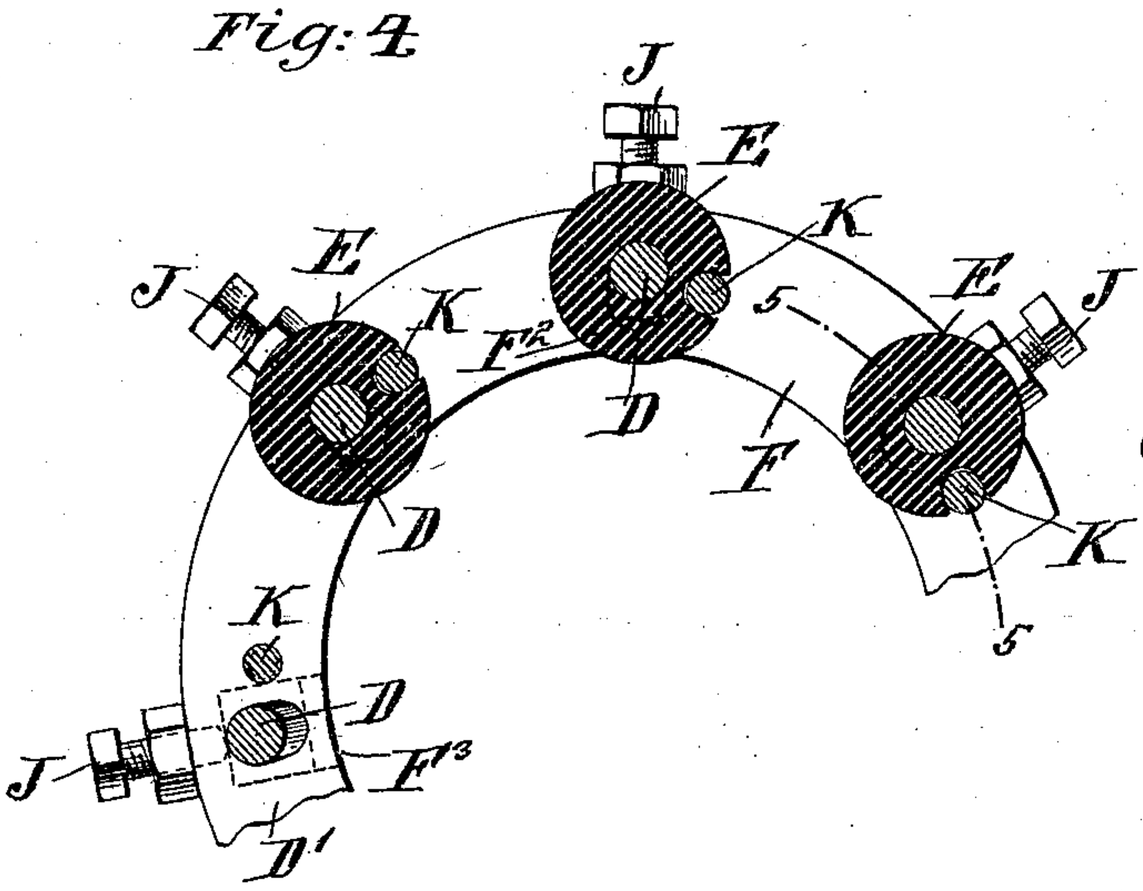


Fig: 5.

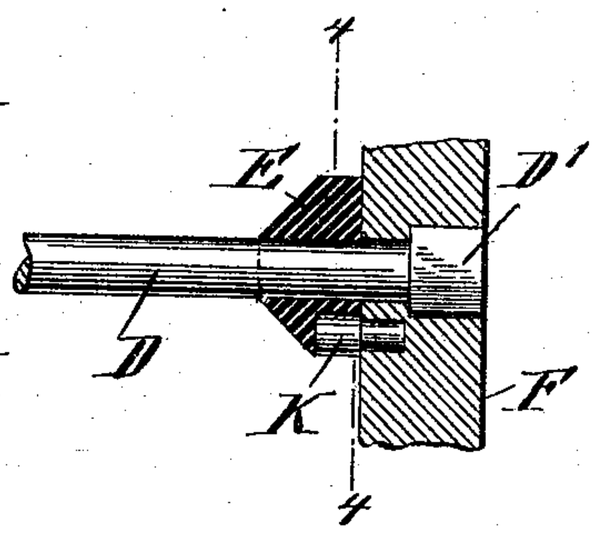
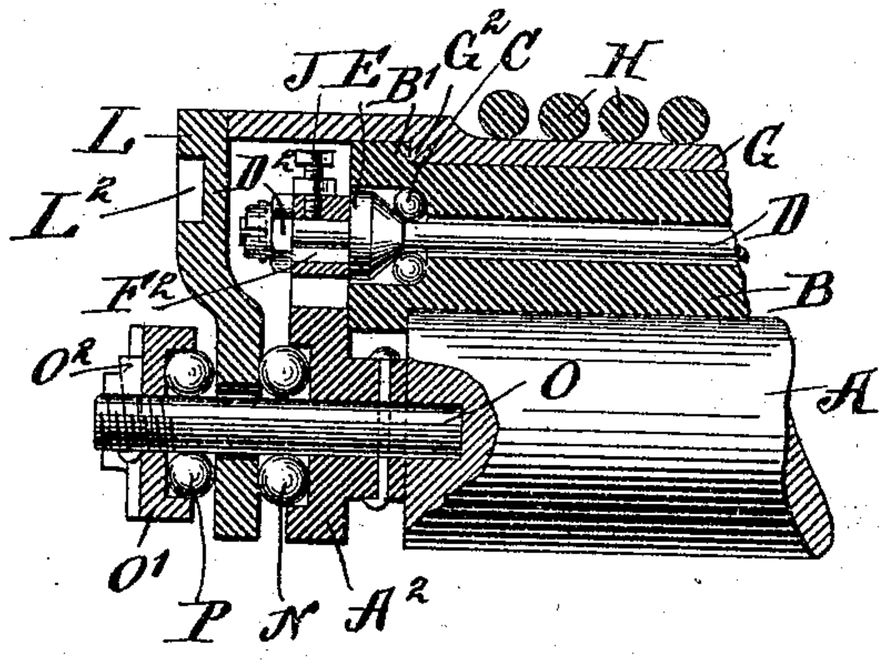


Fig: 6



WITNESSES:

John A. Rennie.

C. Sedgwick

INVENTOR

O. B. Jacobs

BY Munn & Co.

ATTORNEYS.

(No Model.) 3 Sheets—Sheet 3.

O. B. JACOBS.

CAR AXLE BEARING.

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Fig. 7.

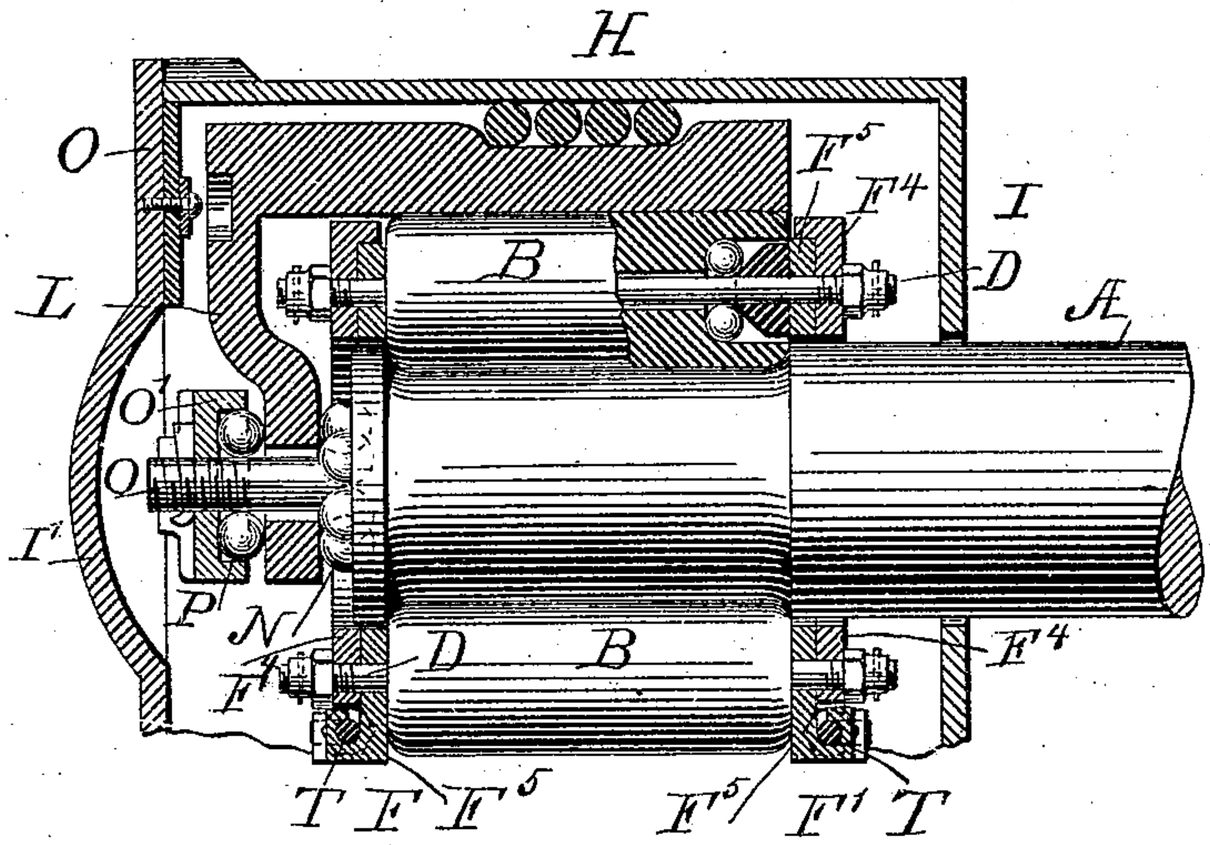
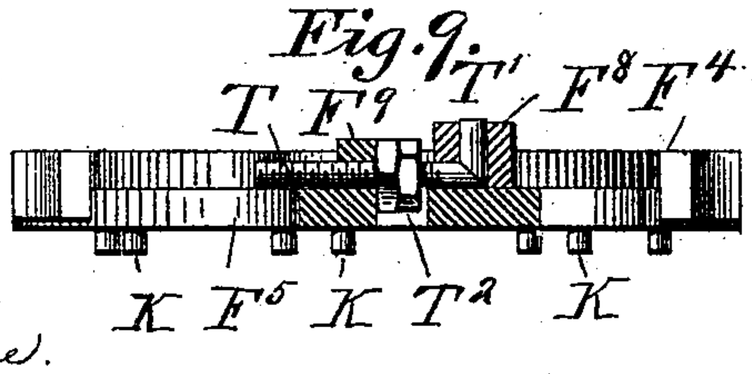


Fig. 8.

Fig. 10.

Fig. 9.



WITNESSES:

John A. Rennie.

C. Sedgwick

INVENTOR

O. B. Jacobs

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

OLAUS B. JACOBS, OF FREMONT, WASHINGTON.

CAR-AXLE BEARING.

SPECIFICATION forming part of Letters Patent No. 501,790, dated July 18, 1893.

Application filed November 14, 1892. Serial No. 451,920. (No model.)

To all whom it may concern:

Be it known that I, OLAUS B. JACOBS, of Fremont, in the county of King and State of Washington, have invented a new and improved Car-Axle Bearing, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved car axle bearing more especially designed for use in railway and street cars, and which is simple and durable in construction, and arranged to reduce the friction to a minimum, to eliminate friction from lateral and transverse thrusts, insuring longer wear, and which is easily applied and arranged to give the required strength within a small space.

The invention consists of a series of rollers adapted to travel on the axle and pass between the latter and the brass, the said rollers being mounted on ball bearing spindles held in rings.

The invention further consists of an end thrust plate held on the brass or box, and a ball bearing interposed between the plate and the end of the car axle.

The invention also consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a front view of the same with the lid of the box removed. Fig. 3 is a transverse section of the same on the line 3—3 of Fig. 1. Fig. 4 is an enlarged sectional front view of the ring and ball bearing spindles on the line 4—4 of Fig. 5. Fig. 5 is a sectional side elevation of the same on the line 5—5 in Fig. 4. Fig. 6 is a sectional side elevation of a modified form of the improvement. Fig. 7 is a sectional side elevation of a modified form of the improvement. Fig. 8 is a face view of the roller spindle ring for the modified form. Fig. 9 is a sectional plan view of the same on the line 9—9 of Fig. 8; and Fig. 10 is a face view of the rear roller spindle ring.

The axle A, of the usual construction is engaged at each end by a series of rollers B held on sets of balls C, each set surrounding a spindle D on cones E, E′ attached to the said ball bearing spindle D near each end thereof, the said cones fitting loosely into recesses formed in the end of each roller B, each recess containing a set of balls C. The spindles D are held in rings F and F′, and are placed suitable distances apart and arranged in a circle and the rollers B engage the axle A and roll off on the same, so that a series of such rollers are always interposed between the axle A and the brass G rounded at its under side, concentric to the axle.

On the top of the brass G are arranged rollers H, extending longitudinally at right angles to the axle and supporting on their top the box I, as plainly shown in the drawings. Bearing balls H′, are arranged at the corners of the brass G to abut against the sides of the box and part of the top, to reduce the friction of the brass within the box to a minimum. Each of the ball bearing spindles D is fitted to slide radially in radial slots F^2 and F^3, formed in the rings F and F′ respectively, the rear slot F^3 being partly formed square to receive the correspondingly-shaped head D′ of the respective spindle D, to prevent the latter from turning. The front threaded end of each spindle D is engaged by a nut D^2, screwing against the front face of the ring F so as to take up any wear on the balls C, the seats for the same in the rollers B and the cones E, E′, being formed on the respective spindle. In order to adjust each spindle D in the slots F^2 and F^3 set screws J are provided, screwing in the rings F and F′, and abutting with their inner ends on the spindles, as plainly shown in Fig. 1.

In order to securely hold the cones E, E′ in position on the spindles D and to permit the said cones to slide with the spindles when they are adjusted by the set screws J, I provide a pin K for each cone, the said pin being fastened in the respective ring F or F′ and projecting into a recess formed in the face of the base of the cone, as plainly shown in Figs. 4 and 5. The pin K will permit an inward sliding of the respective cone without disengaging the cone so as to hold the latter in place on the spindle for the respective set of balls C to travel thereon.

In order to take up any thrust of the axle

A or the box I, I attach to the brass G or to the casing, as shown in Fig. 6, a thrust plate L, fastened by countersunk screws or other means L′, to the brass G, as plainly shown in Figs. 1 and 2. This thrust plate L extends in front of the axle A and is engaged at its rear by balls N, arranged in a recess A′, formed in the outer end of the axle A. The balls N roll on a pin O, extending in an axial line from the axle A, the said pin passing loosely through an aperture in the thrust plate L, as plainly shown in Fig. 1. The front surface of this thrust plate is engaged by a second set of balls P, located directly opposite the balls N and held in a nut O′, screwing on the outer threaded end of the pin O. A key O^2, or other means serves to lock the nut O′ in place on the end of the pin O. The inner face of the nut O′ is recessed as illustrated in Fig. 1, to receive the balls P resting on the outer surface of the thrust plate L, as above described, so that any end thrust either in an outward or inward direction, is taken up by the sets of balls N and P, pressing on the thrust plate L on opposite sides thereof.

In order to prevent the upper end of the thrust plate from rubbing on the lid or cover I′ of the box I, I provide the inner surface of the said cover with a lining Q, preferably made of paper and in the shape corresponding to the upper part of the thrust plate L, so that when the latter moves outward it rubs against the lining instead of passing directly onto the lid or cover I′. This lining Q is secured in place by screws and washers Q′, each of which is adapted to pass into a recess L^2, formed in the thrust plate at the front face thereof, so that when the thrust plate rubs against the lining, the head of the screw and the washer pass into the respective recess L^2 to prevent the head and washer from coming in contact with the metallic face of the thrust plate.

As illustrated in Fig. 6, the set of balls N is not arranged in the recess A′ of the axle A, but in a separate cup A^2, secured on the pin O at the end of the axle A, as shown, the said cup extending about in line with the ring F. In this modified form the rollers B are formed on each end with an annular flange B′, which fits between the cup A^2 and the axle A, and also abuts against the shoulder G^2, formed on the brass G. Thus lateral displacement of the roller B on the axle A is prevented.

In Figs. 7, 8, 9 and 10 is illustrated a modified form of spindle supporting rings F F′, arranged for conveniently adjusting the roller spindles D radially. For this purpose each ring F or F′ is composed of an outer and an inner ring F^4 and F^5 respectively, of which the inner ring F^5 is provided with radially extending slots F^6 for the passage of the spindles D and the outer ring F^4 is provided with obliquely arranged slots F^7 through which also pass the spindles D and which serve to move the spindles radially inward or outward on turning this ring F^4 on the other ring F^5. In order to turn the outer ring F^4 on the other ring F^5, I provide a screw rod T held with its head T′ in a lug F^8 of the outer ring F^4 and passing with its shank end through a lug F^9 on the other ring F^5. The nuts T^2 of the screw rod T abut on this lug to lock the rod and ring in place, and by turning the nuts the ring F^4 is turned on the other ring as the nuts press on the lug F^9.

It will be seen by the construction described, that the friction of the several parts is reduced to a minimum, the wear is very little, as the rollers B pass successively between the axle A and brass G and at the same time the end thrust is taken up by the sets of balls N and P, as above described. By adjusting the set screws J, the spindles D can be adjusted in the radial slots F^2 and F^3, of the rings F and F′, and by adjusting the nuts D^2 on the said spindles, the wear on the walls and seats of the balls in the roller B can be taken up at any time. It will be further understood that the thrust of the sets of balls C is at or nearly at right angles to the faces of the cones E, E′; hence wear on the cones is reduced to a minimum.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A car axle bearing comprising concentric rings, spindles held radially adjustable in the said rings, and provided with ball bearings, and a roller journaled on the ball bearings on the said spindles, substantially as shown and described.

2. A car axle bearing comprising concentric rings, spindles held radially adjustable in the said rings, and provided with ball bearings, a roller journaled on the ball bearings on the said spindles, and means, substantially as described, for radially adjusting the said spindles in the said rings, as set forth.

3. A car axle bearing comprising rings, spindles held in the said rings, cones held on the said spindles, sets of balls held on the said cones and on each spindle, and a roller journaled on the said balls on each spindle, substantially as shown and described.

4. A car axle bearing comprising rollers, each having cup-shaped recesses in its ends, balls held in each recess, a spindle for each roller, and cones held on each spindle, and extending into the roller recesses to engage the balls contained in the recesses, substantially as shown and described.

5. A car axle bearing comprising a box, a brass held in the said box, a series of longitudinally-extending rollers interposed between the top of the brass and the box, rollers interposed between the axle and the under curved side of the brass, and balls H′ interposed between the corners of the said brass and the sides and top of the box, as set forth.

6. A car axle bearing provided with an end thrust plate secured to the brass and extending in front of the car axle, and ball bearings

arranged on opposite sides of the said thrust plate and supported from the car axle, substantially as shown and described.

7. A car axle bearing provided with an end thrust plate secured on the brass and extending in front of the car axle, a set of balls on the front and rear of the said thrust plate, a pin supported from the axle and surrounded by the said sets of balls, and means for holding the latter in place on the said pin, substantially as shown and described.

8. A car axle bearing comprising rings, spindles held on the said rings and each mounted to slide in radial slots on the said rings, cones held on each spindle, and pins secured on each ring and engaging the base end of the corresponding cone, substantially as shown and described.

OLAUS B. JACOBS.

Witnesses:
GEORGE T. REICHENBACH,
A. J. TOURVILLE.