(No Model.) 2 Sheets—Sheet 1.

W. M. SHUMWAY.

CAR AXLE BOX.

No. 552,205. Patented Dec. 31, 1895.

Fig. 1.

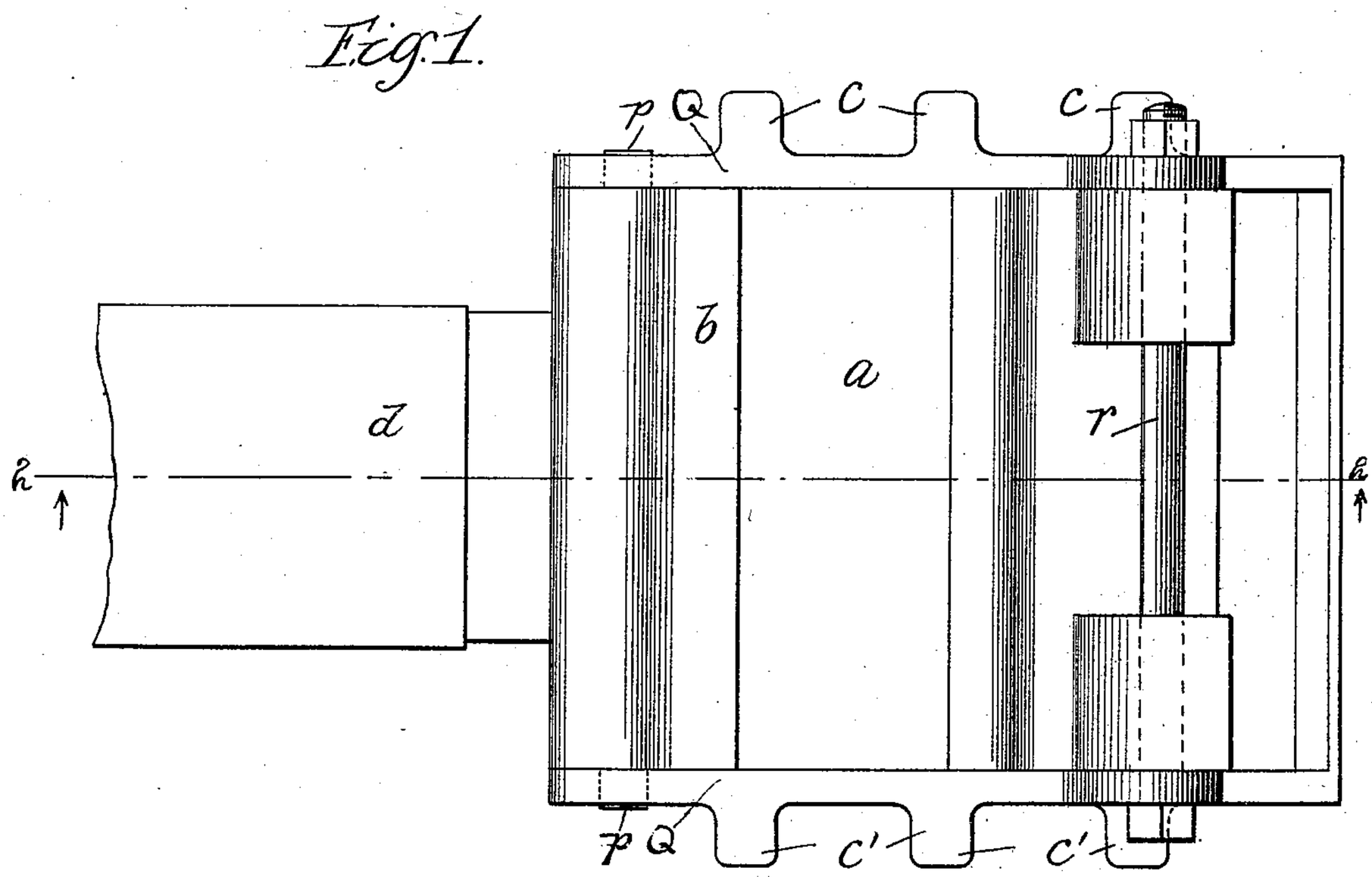
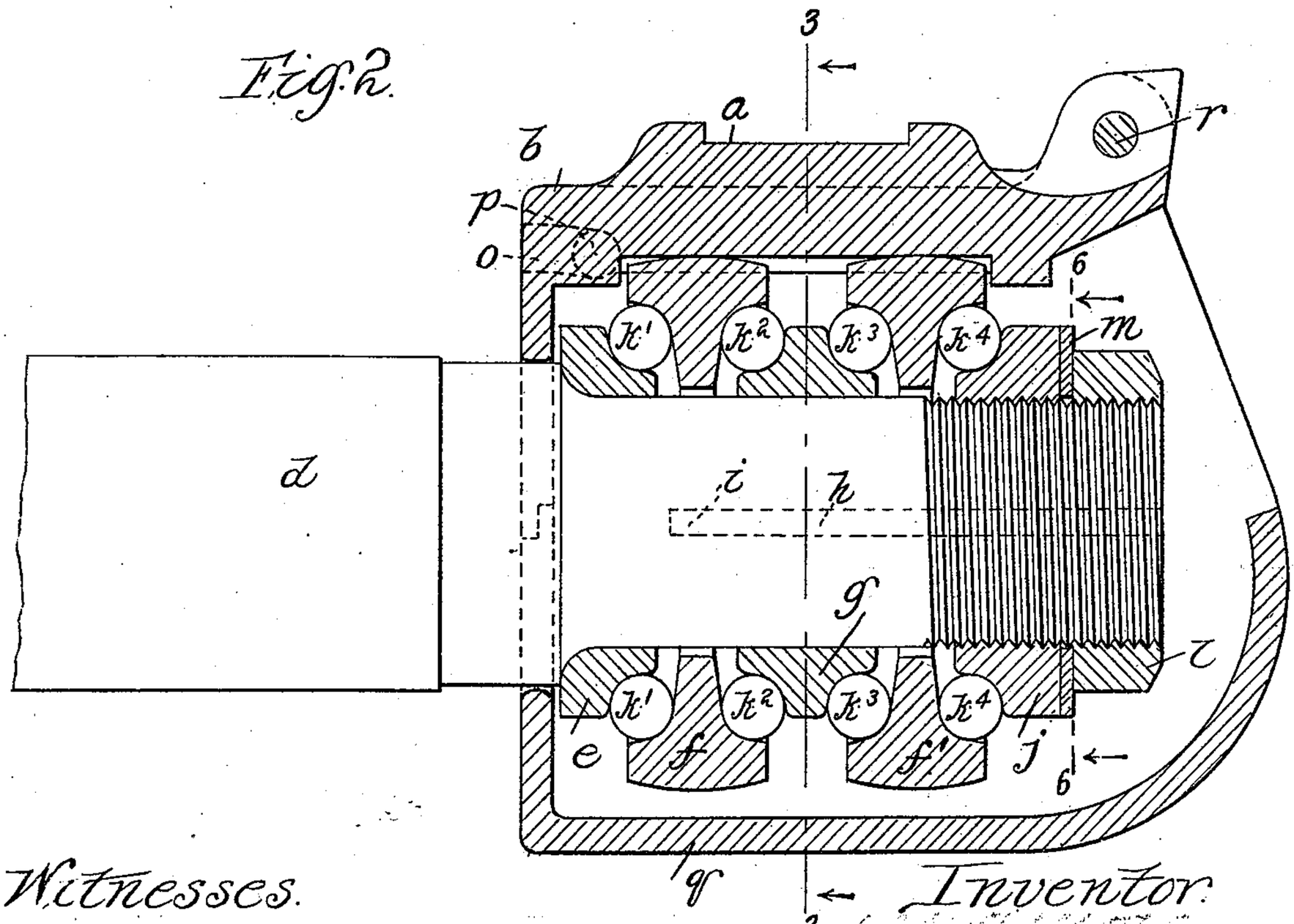


Fig. 2.



Witnesses.
Anna L. Oakes
Robt. H. Parkinson

Inventor.
Willis M. Shumway
by Albert G. Davis. Atty.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 6.

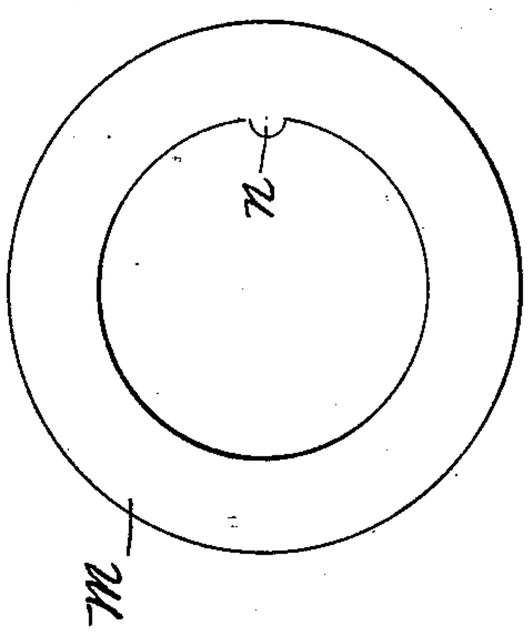

Fig. 5.

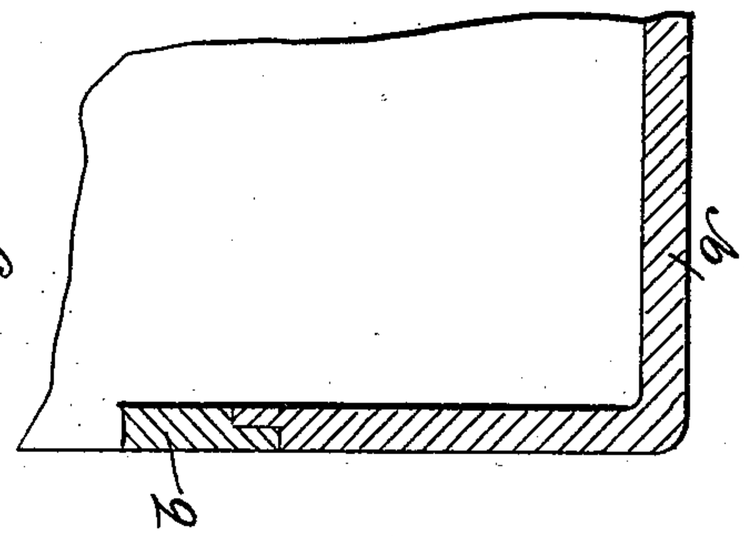

Fig. 3.

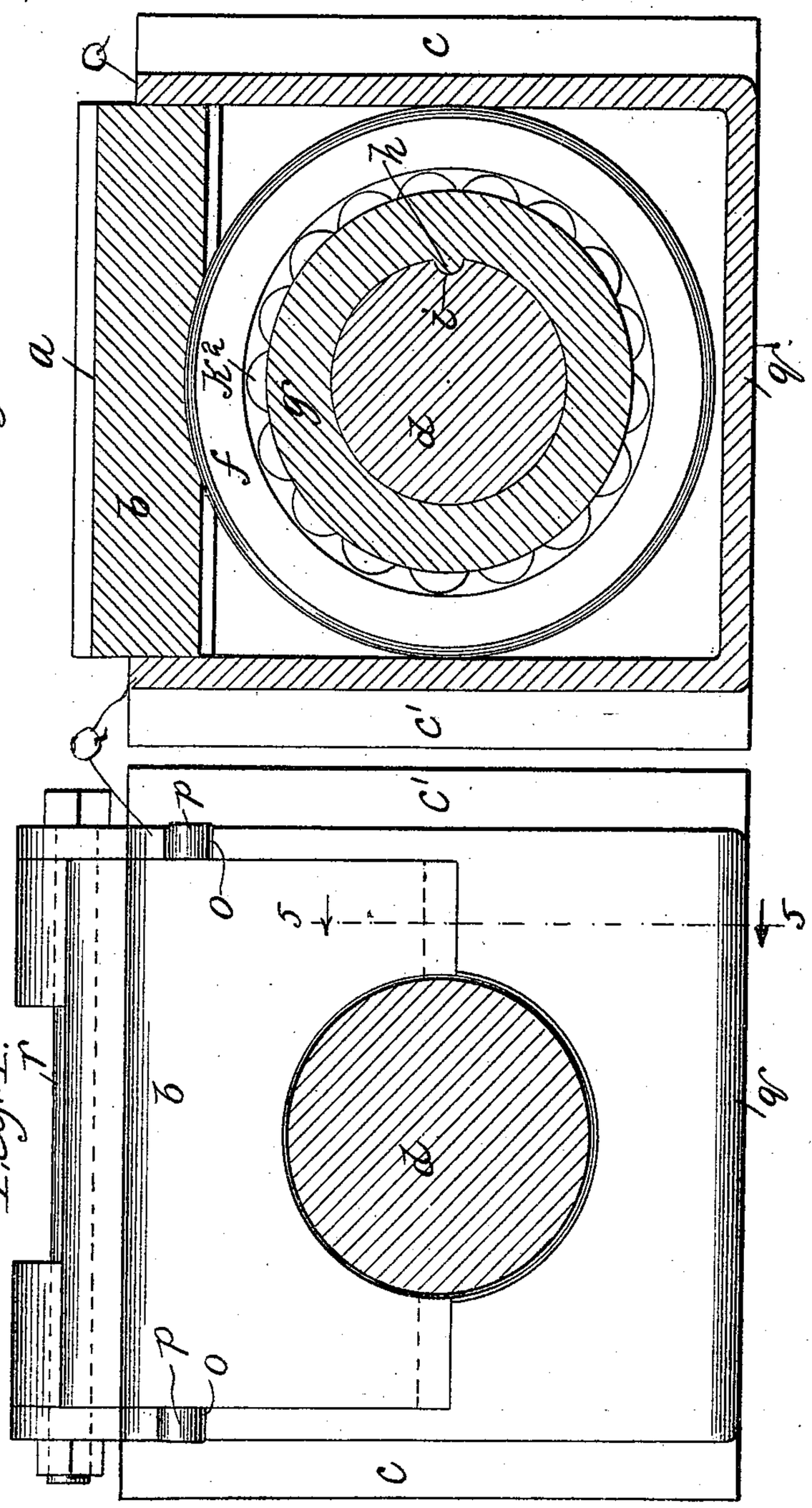

Fig. 4.

Witnesses
Anna L. Baker.
[illegible]

Inventor
Willis M. Shumway
by
Albert G. Baker,
Atty.

UNITED STATES PATENT OFFICE.

WILLIS M. SHUMWAY, OF OAK PARK, ILLINOIS.

CAR-AXLE BOX.

SPECIFICATION forming part of Letters Patent No. 552,205, dated December 31, 1895.

Application filed September 9, 1895. Serial No. 561,964. (No model.)

To all whom it may concern:

Be it known that I, WILLIS M. SHUMWAY, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Car-Axle Boxes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to a car-axle box, and has for its object the providing of a ball-bearing axle-box suitable for railway-cars or similar vehicles, which among other advantages shall be simple and economical in construction, and shall transfer the wear from the axle to parts easily and cheaply replaced, and in which ordinary angular variations or displacements of the box will not cause the axle to bind.

It consists essentially of one or more rings surrounding the axle, but loose from it and not rigidly secured to the box-casing, which receive upon the upper portion of their periphery the downward thrust of the weight carried, and sets of balls rolling between surfaces on these rings and collars on the axle.

It consists also in the combinations of the parts hereinafter described, and pointed out definitely in the claims.

The best embodiment and arrangement of my invention at present known to me is that shown in the drawings, in which—

Figure 1 is a top view of my improved axle-box, showing a portion of the car-axle. Fig. 2 is a vertical central section of the same, being taken on the line 2 2 of Fig. 1. Fig. 3 is a vertical transverse section of the same, taken on the line 3 3 of Fig. 2. Fig. 4 is an end elevation of the same, looking from a position under the car. Figs. 5 and 6 are detail views, being respectively a section on the line 5 5 of Fig. 4 and an elevation of the washer shown at 6 6 in Fig. 2.

The form shown in the drawings is especially adapted for use in the truck of an ordinary passenger-coach. On the seat *a* on the upper portion *b* of the axle-box casing rests the side bar of the truck, the arms of the ordinary yoke extending down in the grooves formed by the ribs *c c c* and *c′ c′ c′* on the sides of the casing. To the axle *d* is rigidly secured in any suitable manner the bearing-collar *e*. Loosely surrounding this axle are one or more bearing-rings *f* and *f′*. These rings bear against the upper portion of the casing and have their outer bearing-surfaces rounded off, so as to become a portion of the surface of a sphere instead of a cylinder. This prevents any binding and allows a considerable angular variation of the axle with respect to the casing of the box. Intermediate of the rings is the bearing-collar *g*, slidable longitudinally upon the axle, but compelled to rotating therewith by the feather *h* extending from said collar into the groove *i* in the axle. A collar *j* forms the last bearing-surface. This collar I prefer to make integral with the adjusting-nut, as shown, though it may be a separate collar, but compelled to rotate with the axle. In the races formed between the collar *e*, the ring *f*, the collar *g*, the ring *f′*, and the collar *j* circulate balls *k′*, *k²*, *k³*, and *k⁴*, which are preferably of hardened steel.

The form of the ball-races may be varied; but I consider it desirable to so make them that the thrust is transmitted at an angle of about forty-five degrees, thus securely holding the axle against longitudinal shifting and obviating bearing at any other points than on the surface of the balls. The bearings are adjusted by the nut *j*, which is securely locked by the jam-nut *l*, the interposed washer *m* (which is prevented from turning independently of the axle by the lip *n* lying in the groove *i*) preventing any displacement of the adjustment by the jam-nut.

It will be observed that although the rings *f* and *f′* do not touch the axle when the balls are in place and the nut properly adjusted and secured the rings and balls are interlocked, and the axle and the collars, rings and balls become self-contained and may be together removed from the casing without the displacement of any of them. The upper portion of the casing extends at the back only to the center of the axle to allow for this removal. I prefer to have the lower portion *q* of the casing carry the sides Q thereof, as shown. At the upper rear corners of these sides are curved slots *o*, which take over the pins *p* projecting from the upper portion of the casing. These, together with the bolt *r*, which runs through both the upper portion

and the sides, securely hold the lower part in place. After the yoke of the truck has been raised out of the way, the lower part of the casing may be removed by withdrawing the bolt *r* and tipping the outer end of said lower part downward until the slots in its sides come off the pins projecting from the upper part, there being play enough between the back of the lower part and the axle to allow for this tipping. This allows convenient access to the interior of the box and permits the removal of the axle. The width of the circular exterior opening of the ball-races is large enough to permit pieces of broken balls to drop out and fall down into the lower part of the casing. In running, it is desirable to have oil in the lower part of the casing to a height above the lower portion of the ball-races, which renders the box self-oiling. A cap of approved form may be secured to the front of the box by the bolt *r* or otherwise.

Under certain circumstances it may be desirable to have but one bearing-ring, in which case the intermediate collar would be left off and the end collar, ring, and adjusting-nut form the ball-races. Or, if the conditions require, more rings than two may be used, there being slidable collars between each two.

Although I believe the form of box-casing I have shown to possess special advantages, any other form may be used in connection with my improved bearing without departing in the least from my invention. The casing might, for example, be made in one piece with an opening in the end large enough to admit the axle, collars, and rings, suitable means being provided for closing the portion of the opening not occupied by the axle. In some cases it might perhaps be desirable to dispense with the casing altogether.

Other mechanical modifications or equivalents will readily suggest themselves to one skilled in this art, and I do not wish to be understood as limiting myself to the particular form shown or described further than is pointed out in the claims.

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

1. In a car axle-box, in combination, a casing containing one or more rings surrounding the axle but loose from it and not rigidly secured to the casing, said ring or rings receiving upon the upper portion of their periphery the downward thrust to be transmitted to the axle, collars on the axle, and sets of balls rolling between bearing surfaces on the rings and collars, for the purpose specified.

2. In a car axle-box, in combination, a collar mounted on the axle and rotating therewith, a ring surrounding said axle and loose both with respect to the axle and the exterior bearing surface supported by the ring, and two sets of balls rolling in races formed by a surface on said collar and a surface on said ring and a surface which normally revolves with the axle but which is capable of being moved longitudinally of the axle, thereby adjusting both ball races, for the purpose specified.

3. In a car axle-box, collars mounted on the axle and rotating therewith, and a ring receiving on the upper part of its periphery a portion of the downward thrust of the weight carried, said ring surrounding the axle and loose both with respect to the axle and to the exterior bearing surface which it supports and having its periphery rounded off crosswise whereby it may tip with respect to said bearing surface, in combination with balls rolling between said ring and said collars, for the purpose specified.

4. In a car axle-box, in combination, a casing, a ring therein surrounding the axle but loose from it and not rigidly secured to the casing, said ring receiving upon the upper portion of its periphery downward thrust to be transmitted to the axle and having two annular bearing surfaces for balls separated from each other by an annular rib on the interior of said ring, two collars on the axle, and two sets of balls rolling between said bearing surfaces on the ring and bearing surfaces on the collars, for the purpose specified.

5. In a car axle-box, in combination, a collar rigidly secured to the axle, a ring surrounding the axle but loose from it, a second collar upon the axle rotating with it but slidable longitudinally upon it, a second loose ring surrounding the axle, said rings operating to receive downward thrust of the weight carried and transmit it to the axle, a third collar normally rotating with the axle but capable of being moved longitudinally thereon, four sets of balls rolling in races formed respectively between the first collar and the first ring, the first ring and the second collar, the second collar and the second ring, and the second ring and the last collar, and means for moving said last collar longitudinally, whereby all the ball races are adjusted, for the purpose specified.

6. In a car axle-box, in combination, a pair of loose rings each having two bearing surfaces for balls surrounding the axle and bearing against but not rigidly secured to the upper portion of the box casing, a collar having a bearing surface for balls and secured to the axle on one side of the rings, a nut having a bearing surface for balls and secured to the axle by a thread on the other side of said rings, a collar having two bearing surfaces for balls and located intermediate of said rings and slidable longitudinally upon the axle but compelled to rotate therewith, four sets of balls rolling in the races formed by the four proximate pairs of bearing surfaces, for the purpose specified.

7. In a car axle-box, the collar *e* rigidly secured to the axle, the collar *g* on the axle and rotating with it but slidable along it, the nut *j* secured to the axle by a thread, the rings *f* and *f'* surrounding the axle but independent of it, the sets of balls k' k^2 k^3 k^4 rolling in

races formed between the collar *e*, the ring *f*, the collar *g*, the ring *f'*, and the nut *j*, in combination with the upper portion of the casing against which said rings bear, for the purpose specified.

8. In a car axle-box, in combination, the collar *e* rigidly secured to the axle, the collar *g* on the axle and rotating with it but slidable along it, the nut *j* secured to the axle by a thread, the rings *f* and *f'* surrounding the axle but independent of it, the sets of balls $k' k^2 k^3 k^4$ rolling in races formed between the collar *e*, the ring *f*, the collar *g*, the ring *f'*, and the nut *j*, the washer *m*, and the jam-nut *l*, substantially as described.

9. In a car axle-box, the casing formed in two parts, the upper portion including the top and back down to a line through the center of the axle, and the lower portion including the bottom, sides and back up to said line through the center of the axle, said sides and top being removably held together by pins in one projecting into slots in the other, and by a bolt passing through said upper portion and through the sides, whereby the lower part of the casing may be removed without disturbing the upper part or the axle, substantially as described.

WILLIS M. SHUMWAY.

Witnesses:
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LOUIS H. EVANS.