No. 675,975. Patented June 11, 1901.

# A. RIEBE.

## AXLE BEARING.

(Application filed Dec. 6, 1900.)

(No Model.)

Fig. 1

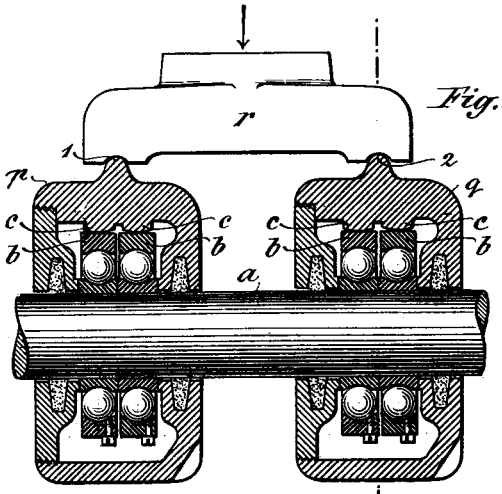



Fig. 2.

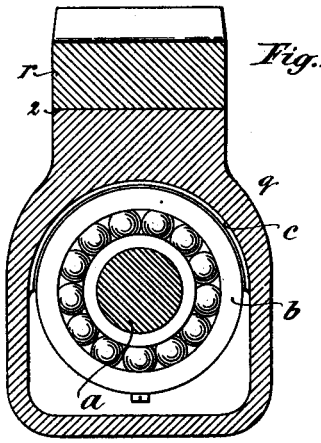



Fig. 3.

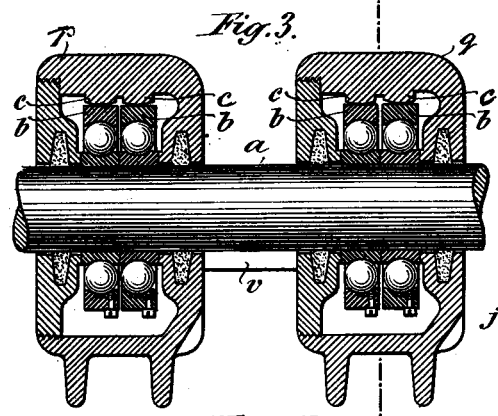



Fig. 4.

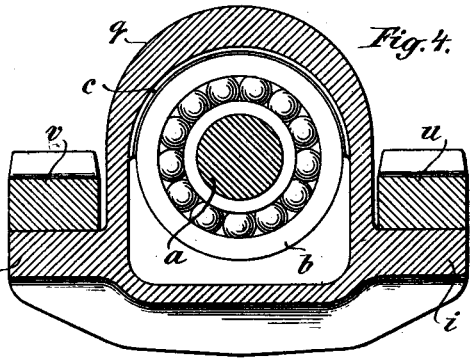



Fig. 5.

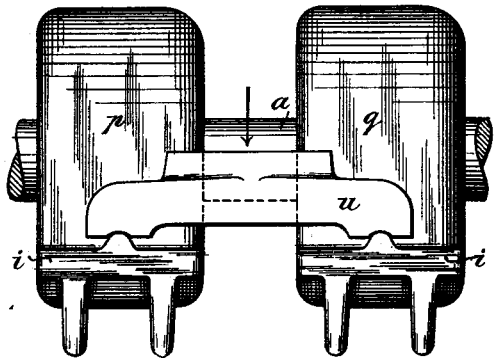
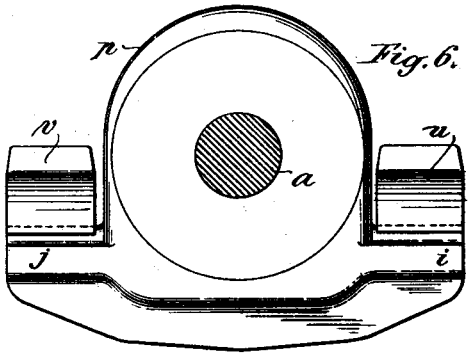



Fig. 6.

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# UNITED STATES PATENT OFFICE.

AUGUST RIEBE, OF BERLIN, GERMANY.

## AXLE-BEARING.

SPECIFICATION forming part of Letters Patent No. 675,975, dated June 11, 1901.

Application filed December 6, 1900. Serial No. 38,909. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST RIEBE, mechanical engineer, a subject of the King of Prussia, German Emperor, residing at 15[d] Zwinglistrasse, Berlin, Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Axle-Bearings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention consists of an axle-bearing comprising two or any number of pairs of ball-bearings, whereof each is inclosed in a separate frame or casing, and which, by means of a tilting beam or lever supported at the weight-receiving point, are maintained in such a relative position to each other as to result in an even distribution of the weight among the ball-bearings and the avoidance of any undue strain on either side. By reason of the strains being thus equalized or balanced the balls of each bearing, irrespective of any slight inequalities of size, are all caused to take a substantially equal share in the task of sustaining the weight—an object which is not attainable in the case of ordinary ball-bearings with two or more sets or tiers of balls.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a section of two ball-bearings adapted, in accordance with this invention, to serve as a substitute for an ordinary single axle-bearing and held in position by means of a transverse bridge-piece or yoke not unlike the beam of a balance. Fig. 2 is a cross-section of the ball-bearing arrangement illustrated in Fig. 1; and Figs. 3, 4, 5, and 6 are respectively a longitudinal section, a cross-section, a side elevation, and an end view of a modified form of the improved ball-bearing arrangement wherein two bridges or yokes secured to the cheeks of the bearings on either side are employed as compensating bearing-supports in lieu of a single yoke.

The peculiar characteristic of this type of bearing is the provision of a tilting transverse yoke or bridge acting after the manner of the beam or lever of a balance and so holding the two ball-bearings in position by externally engaging with their respective frames or cases as to secure their interdependence. As shown in the drawings, the arrangement consists of not less than two ball-bearings $p$ and $q$, each of which combines within a casing or frame all the requisite constituent parts of a ball-bearing—such, for example, as the two annular ball-races $b$ $b$. (Shown in Fig. 1.) Each ball-bearing case is, independently of the other, mounted upon the axle or shaft $a$, both being held in position by a transverse yoke or beam $r$ in the manner above stated, and the said beam, in order that it may tilt or swing as required for the purpose of balancing the bilateral strains, receiving adequate support at a point—on the spring suspension-plate, for example—where the weight is taken up. An arrow in Fig. 1 indicates this pressure-receiving point, at which the beam is enabled by knife-edge suspension to perform its tilting or swinging movements. To effect the engagement between it and the ball-bearing cases, the latter are provided with top lugs or ribs 1 2, which serve to form the desired knife-edge connection with the grooves in the ends of the beam $r$, and whereby any axial displacement and any spontaneous rotary motion on the part of the ball-bearings are at the same time obviated. It will be seen that in this arrangement the ball-bearings $p$ $q$ are made capable within the limits of their possible vertical displacement in relation to each other of exercising a mutual pressure-compensating influence, accommodating themselves to slight differences of size, whether of the balls themselves or of the ball-races, and thus avoiding a preponderance of strain upon either bearing of the pair. Any number of similarly-fitted pairs of bearings may be employed instead of one only.

In Figs. 3 to 6 a modification of the improved ball-bearing arrangement is represented. Instead of one balancing beam or lever placed over the top of the two ball-bearings two such levers $u$ and $v$ are here arranged, one on each side of the double bearing, the bearing-cases being to this end provided with arms $i$ and $j$, projecting from their lower parts and strengthened by ribs. The beams $u$ and $v$ respectively bear upon the pairs of arms $i$ $i$ or $j$ $j$, as the case may be, which are situated on the same side, projecting lugs 1 2, as in the arrangement first de-

scribed, being received in grooves provided in the ends of the beams. It will be readily understood, however, that these lugs instead of being formed on the bearings may project from the beams and coöperate with grooves provided in the arms *i j* of the bearing-cases. The two beams *u* and *v* are obviously intended to supply the place of the single cross-beam or bridge *r* of the arrangement shown in Fig. 1 as regards their action, which consists in permitting the relative displacement and mutual control of the ball-bearings *p q*, and thereby balancing the strain of each relatively to that of its companion.

Where ball-bearings, such as *p* or *q*, are constructed to act singly, provided each comprises more than one set of balls (there are here assumed to be two sets) in close proximity to each other, the same effect—viz., that an approximately equal share of the strain shall be assigned to each set of balls—may also be secured by causing the several sets to control each other through the agency of any suitable intermediate part or device equivalent in its operation to the tilting beam or lever above described. As an intermediate device which will prove effective in this respect in connection with the type of ball-bearings here shown the case or frame inclosing the balls may itself be utilized, each case being internally furnished with two projections *c c*, whose rounded convex surfaces shall bear upon the two ball-race rings *b b* on both sides in the same manner as do the ends of the double-armed tilting lever outside the ball-bearing cases in the arrangement first described. Assuming the bearing-case *p* or *q* to be made capable of tilting or swinging bodily on the fulcrum afforded by the top lug 1 or 2, the upper part of such case may, in fact, be said to supply the place of a balancing lever or beam of the kind indicated, as the same strain-compensating effects as above described will by such an arrangement be secured for both ball-races *b b*, for it is plain that the mobility of a bearing-case thus utilized as a substitute for the tilting cross-beam will in no way be affected by those of its accessory parts, which are placed loosely around the shaft or axle.

What I claim is—

1. The combination, with two antifriction-bearings, and a single shaft running in the said bearings; of means for supporting the load arranged parallel with the said shaft and pivotally supported by the said bearings, substantially as set forth.

2. The combination, with two antifriction-bearings, and a single shaft running in the said bearings; of two cross-beams for supporting the load, said cross-beams being arranged parallel with the said shaft and one on each side thereof and being pivotally supported by the said bearings, substantially as set forth.

3. The combination, with two antifriction-bearings, each comprising two ball-races, two sets of balls, and a casing having projections which are pivotally supported by the said ball-races; of a single shaft running in the said bearings; and means for supporting the load arranged parallel with the said shaft and pivotally supported by the casings of the said bearings, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUST RIEBE.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.