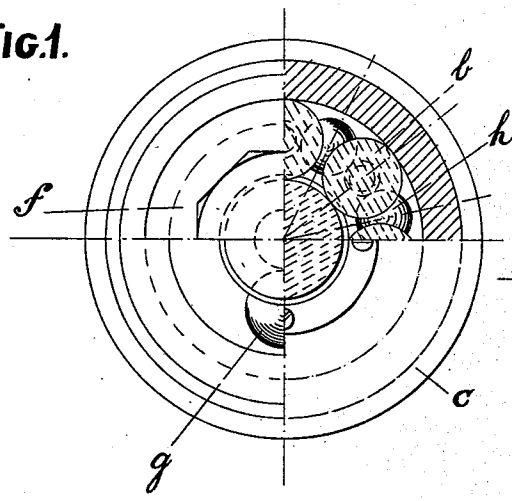
(No Model.) 2 Sheets—Sheet 1.

F. PURDON & H. E. WALTERS.

ROLLER BEARING.

No. 509,048. Patented Nov. 21, 1893.

FIG. 1.



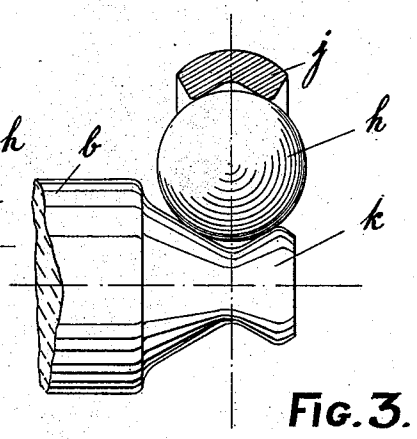
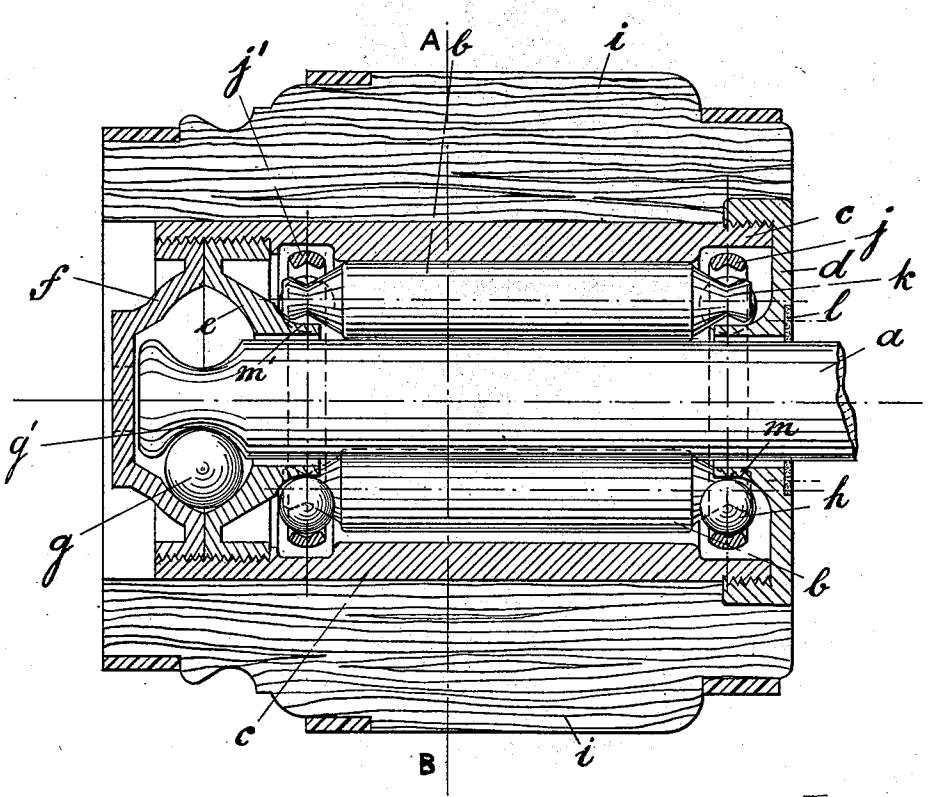


FIG. 3.

FIG. 2.



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(No Model.) 2 Sheets—Sheet 2.

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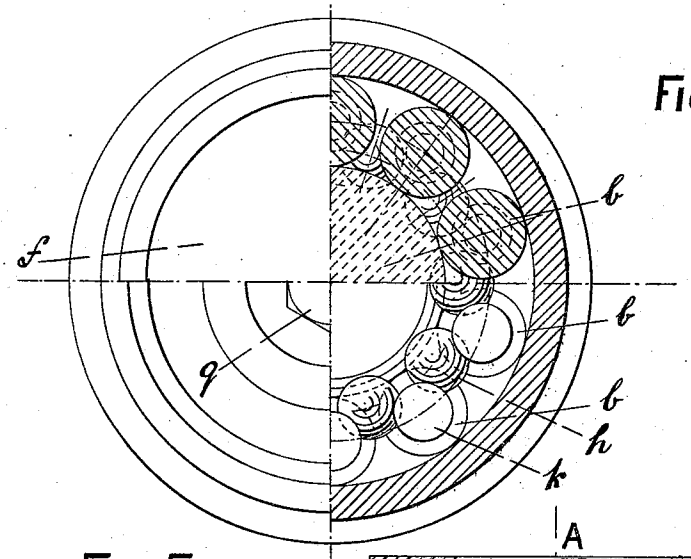
Fig. 4.



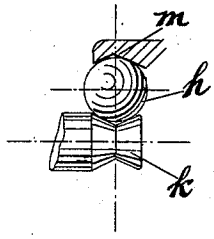
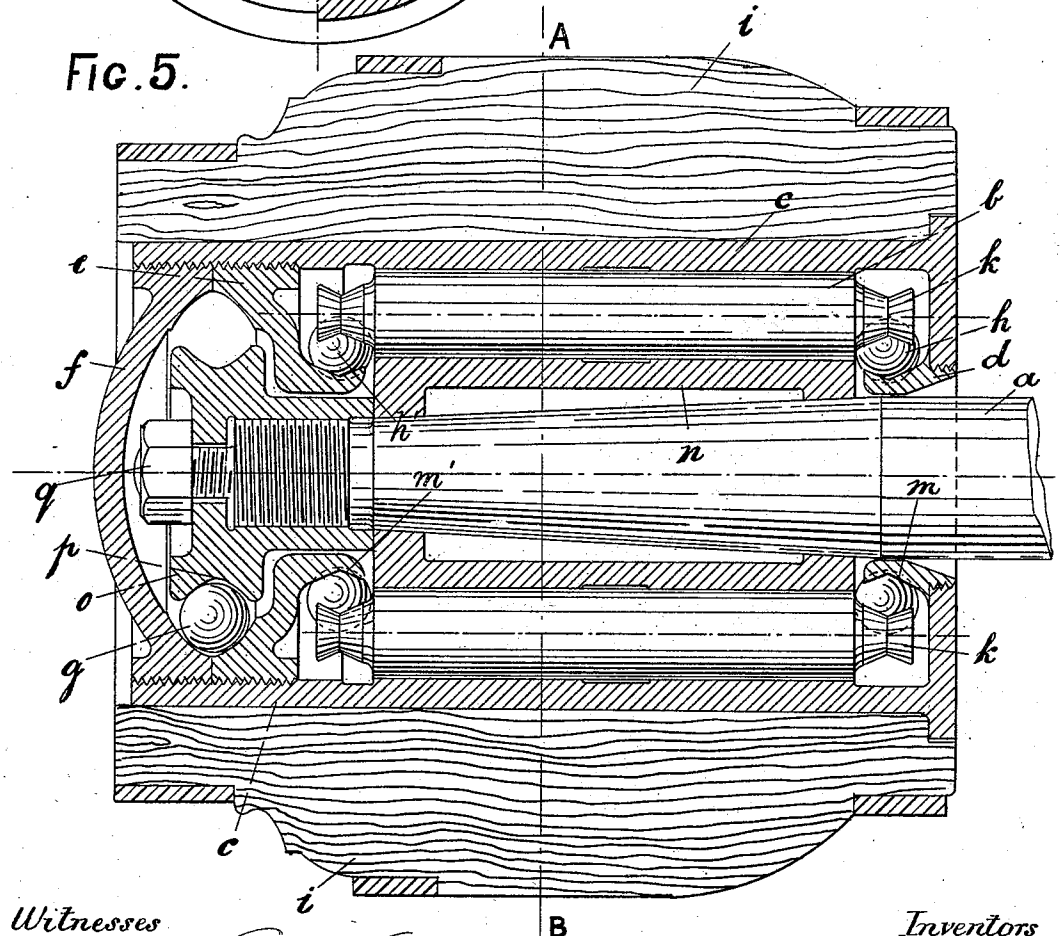


Fig. 6.

Fig. 5.



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UNITED STATES PATENT OFFICE.

FREDERICK PURDON AND HARRY ERNEST WALTERS, OF LONDON, ENGLAND.

ROLLER-BEARING.

SPECIFICATION forming part of Letters Patent No. 509,048, dated November 21, 1893.

Application filed March 15, 1893. Serial No. 466,149. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK PURDON and HARRY ERNEST WALTERS, residing at No. 2 Great George Street, Westminster, London, in the county of Middlesex, England, have invented new and useful Improvements in Roller and Ball Bearings for Road-Vehicles, of which the following is a specification.

Our invention relates to improvements in roller bearings; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the drawings: Figure 1 is an end elevation of which the top left hand quadrant is an exterior view, the top right hand quadrant is a section upon the line A—B, Fig. 2, the lower right quadrant is an end elevation of the inside of the bearing, and the left hand bottom quadrant is an end elevation from the exterior with the outside cap removed. Fig. 2 is a longitudinal section. Fig. 3 is a detail view of the ball, the end of the roller and the separating ring. Fig. 5 is a longitudinal section of an alternative method of constructing our invention. Fig. 4 is an end elevation, the top left hand quadrant being taken from the exterior, the top right-hand quadrant being a section upon the line A—B, Fig. 5, the lower right hand quadrant is an end elevation with the outer caps removed, and the lower left hand quadrant is an end elevation with merely the exterior cap removed. Fig. 6 is a detail view showing the ball, the end of the roller, and the path.

Similar letters refer to similar parts throughout the several views.

Referring to Figs. 1, 2 and 3, this design of bearing for road vehicles is intended for cases in which the shaft is cylindrical. *a* is the shaft the bearing of which is turned truly cylindrical. *b*, *b*, are rollers also cylindrical and preferably of hardened steel. *c* is a casing of cast iron or other suitable material which is bored out internally to a diameter equal to the diameter of the shaft *a* plus twice the diameter of one of the rollers *b*. The said rollers *b* are however free to revolve in the space between the shaft *a* and the casing *c* both upon their own axes and in a circle about the center of the shaft *a*. The inside end of the casing *c* is provided with a cover *d* which may be conveniently screwed upon the casing *c*. Dust is excluded by means of the leather washer *l* which may be held in position with screws. The exterior end of the casing *c* is closed first by means of the cap *e* and secondly by means of the cap *f*. The two parts *e* and *f* form together a suitable path upon which the ball *g* is free to roll and the end of the shaft *a* is formed with a curved path *g'* suitable for the ball.

Our object has been to prevent any two rollers from touching each other; we therefore provide between every two adjacent rollers a ball *h*, and in this particular instance the centers of the balls *h* lie upon the same circle as the centers of the rollers *b*. This however is not an essential feature and in some cases we prefer to place the balls with their centers upon a circle smaller in diameter than that passing through the centers of the rollers and in other cases upon a circle larger in diameter than that passing through the centers of the said rollers. It is obvious that some method must be used to keep the balls in their relative positions with regard to the rollers, and for this purpose live rings *j* and *j'* are used. The form of the end of the rollers *b* is shown most clearly in Fig. 3. The end *k* has a groove or curved path formed upon it and a similar curved and grooved path is formed upon the ring *j*. Between the two paths upon *k* and *j* the ball *h* is held. Upon the cover *a* is formed a curved path *m* by means of which the balls *h* are prevented from moving toward the center of the shaft, and similarly a path *m'* is formed upon the part *e* for a similar purpose.

The action of the bearing is as follows:—When the nave *i* of the wheel of the vehicle rotates it causes the casing *c* to rotate also; the load which is borne upon the rollers *b* or upon some of them is thus transmitted to the shaft *a;* free rolling motion is obtained between the casing *c*, the rollers *b*, the balls *h*, the shaft *a*, the rings *j*, *j'*, and the paths *m*, *m'*. As in the case of road vehicles there is usually some end play between the nave of the wheel and the axle; the ball *g* is designed to take up this end pressure, and it will be seen that if the axle *a* is stationary and the nave is

thrust inward, the cap *f* transmits the pressure through the ball *g* to the shaft *a*, and similarly the pressure in the opposite direction is transmitted from the part *e* through the ball *g* to the shaft *a*.

Referring to Figs. 4, 5 and 6, these illustrate the application of our invention to a taper axle; the axle itself is lettered *a* and a sleeve *n* is secured thereon to form the bearing of the axle. This bearing is turned truly cylindrical and its ends are bored so as to fit the taper part of the axle; the casing *c*, preferably of cast iron, is bored internally truly cylindrical of such a diameter as to be equal to the exterior diameter of the sleeve *n* plus twice the diameter of one of the rollers *b*; the rollers *b* which are cylindrical can therefore roll freely between the casing *c* and the sleeve *n*. The cap *d* is fitted into the casing *c* and is provided with a cylindrical path *m* upon which the balls *h* roll; the part *e* is screwed into the casing *c* and is provided with a path *m'* upon which the balls *h* roll; the cap *o* is screwed upon the axle *a* and is provided with a path *p* upon which the ball *g* is free to roll and a nut *q* retains the cap in its position. The cover *f* is screwed into the casing *c*. The interior of the cover *f* and the part *e* are turned to a curved form upon which the ball *g* rolls. In the present case the balls *h*, *h'* are placed in such a way that their centers fall upon a circle smaller in diameter than that passing through the centers of the rollers, and in this case we do not use a ring as shown in Figs. 1, 2, and 3. Owing to the taper of the shaft the sleeve *n* can be slipped into position after arranging the balls and rollers. The action is precisely similar to that described heretofore. The nave *i* revolves and with it the casing *c*. Pressure is transmitted through the rollers *b* to the sleeve *n* and thence to the shaft *a*. The balls *h* are merely used for the purpose of preventing contact between any two rollers. The ball *g* is provided to take up end pressure. The ends *k* of the rollers *b* are formed with a curved or grooved exterior in such a way that, as shown in Fig. 6, the ball *h* is held between *k* and *m*.

What we claim is—

The combination, with a wheel hub, of a cylindrical casing secured in the hub, the two caps *e* and *f* secured in the end of the casing and forming an annular groove, a ball *g* running in the said groove, a shaft provided with a cylindrical bearing and a grooved end portion engaging the ball *g*, a series of rollers having grooved ends and interposed between the cylindrical bearing of the shaft and the cylindrical casing, balls interposed between the grooved ends of the said rollers, and means for supporting the said balls, substantially as described and shown.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

FREDERICK PURDON
HARRY ERNEST WALTERS.

Witnesses:
WILLIAM B. CANDY,
JOHN P. O'DONNELL.