(No Model.) 2 Sheets—Sheet 1.

W. J. LLOYD & W. PRIEST.

TRICYCLE.

No. 346,208. Patented July 27, 1886.

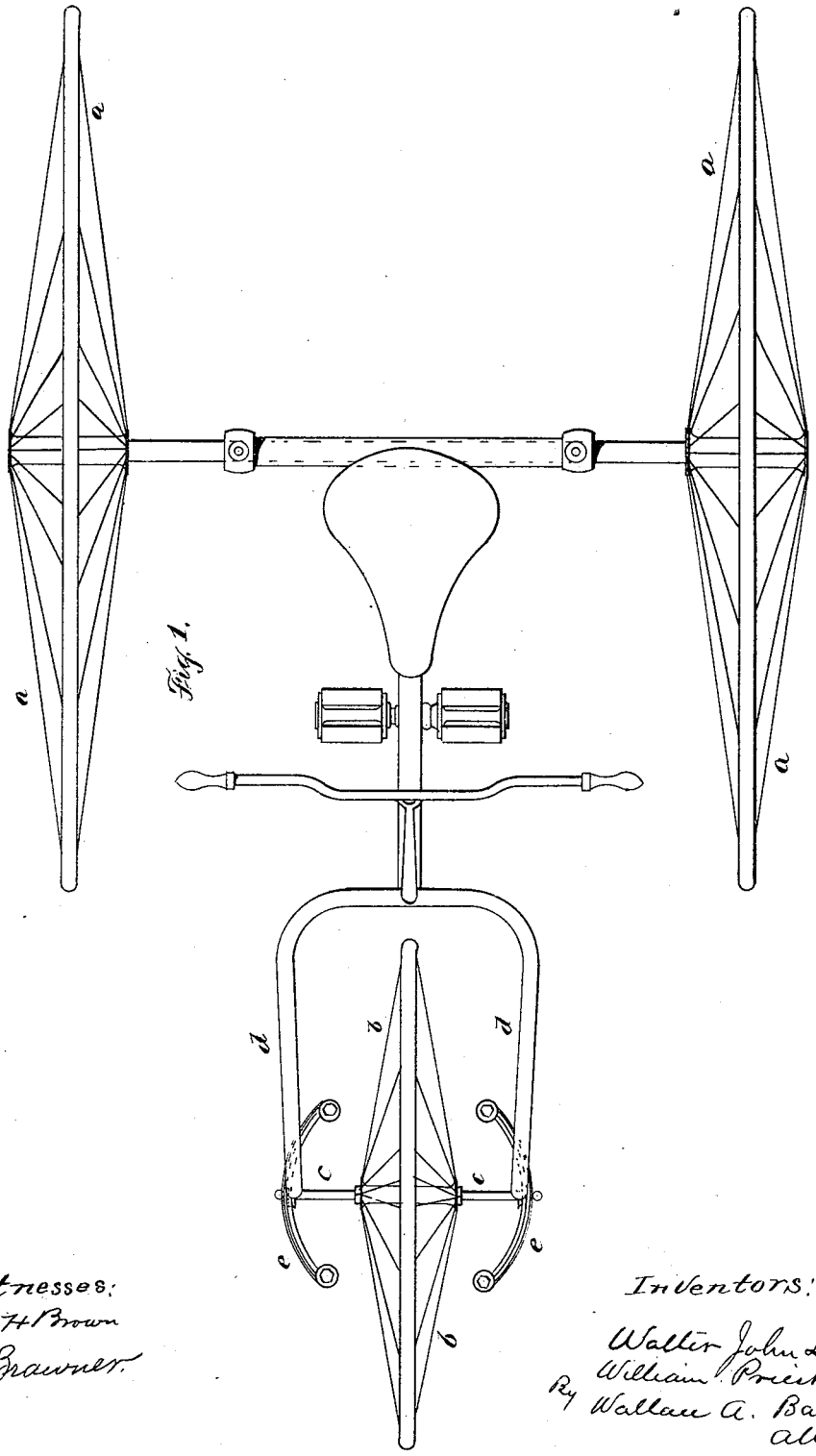

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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TRICYCLE.

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Fig. 3.

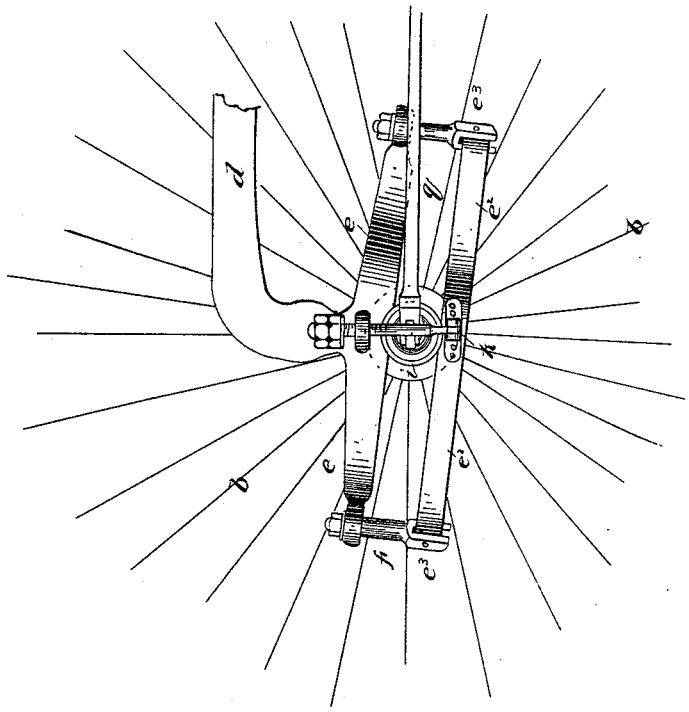

Fig. 4.

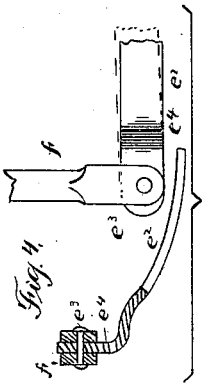

Fig. 2.

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UNITED STATES PATENT OFFICE.

WALTER JOHN LLOYD AND WILLIAM PRIEST, OF HARBORNE, COUNTY OF STAFFORD, ENGLAND.

TRICYCLE.

SPECIFICATION forming part of Letters Patent No. 346,208, dated July 27, 1886.

Application filed May 22, 1886. Serial No. 202,982. (No model.) Patented in England November 22, 1884, No. 15,413.

To all whom it may concern:

Be it known that we, WALTER JOHN LLOYD and WILLIAM PRIEST, residing at Harborne, in the county of Stafford, England, have invented certain new and useful Improvements in Tricycles, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to tricycles; and it consists in certain improvements in the construction and combination of parts of such vehicles, as hereinafter pointed out.

This invention is specially an improvement on the patent of W. J. Lloyd, No. 295,257, dated March 18, 1884.

The present invention is patented in England, No. 15,413, dated November 22, 1884, and published July 29, 1885.

In the United States Patent hereinbefore referred to there is described a steering mechanism for tricycles and other velocipedes, consisting, essentially, of curved slotted or open-sided bearing-plates for the bearing-blocks of the axle of the steering-wheel to slide in. As the motion of the said bearing-blocks is principally upon the middle parts of the bearing-plates, in consequence of the small angle through which the axle of the steering-wheel is constantly moving when the velocipede is in use, the wear is practically confined to the middle parts of the said bearing-plates; and the object of the present invention is to compensate for the said wear, and thereby avoid the rattling or jarring motion of the bearing-blocks upon the bearing-plates, and the production of noiseless steering mechanism for tricycles and other velocipedes. For this purpose we construct and arrange the said bearing-plates and parts connected with them in the following manner: Instead of making the lower curved bearing-plate fixed, as described in the patent before referred to, we make the lower bearing-plate capable of approaching the top bearing-plate, so as to compensate for the wear of the said plates. We effect this object by hinging the ends of the lower bearing-plate to the bottoms of the pillars or distance-pieces between the pair of bearing-plates. The said bottom bearing-plate is thereby made capable, by turning on its hinges, of a limited motion vertically to and from the top bearing-plate. In order to make the hinged bearing-plate self-adjusting, a spring is made to operate upon its middle and press it upward, so as to cause it to take a close seat against the bearing-block, and thus avoid the rattling or jarring motion of the bearing-blocks before referred to; or the position of the hinged bearing-plate may be adjusted by a screw-rod and lock-nuts.

Figure 1 of the accompanying drawings represents in plan a front-steered tricycle provided with steering mechanism constructed according to this invention, parts being omitted. Fig. 2 represents in front elevation, partly sectioned, and Fig. 3 in side elevation, the steering-wheel and steering mechanism of the tricyle. Fig. 4 represents one of the joint ends of the lower bearing-plate, as hereinafter described.

a a are the traveling wheels, and *b* the front steering-wheel, of the tricycle.

c is the axle of the steering-wheel, and *d* is the forked frame within which the steering-wheel works. The said frame *d* also supports the slotted or open-sided bearing-plates for the bearing-blocks of the axle *c* of the steering-wheel *b* to slide in. Each pair of slotted or open-sided bearing-plates is marked $e\ e^2$, the upper bearing-plate of each pair being marked *e*, and the lower bearing-plate being marked e^2. The upper bearing-plate, *e*, is fixed, and the lower bearing-plate, e^2, is capable of a limited vertical motion to and from the fixed plate *e*, to compensate for the wear of the said plates. This is effected by hinging or jointing the ends of the lower bearing-plate, e^2, to the forked bottoms of the fixed pillars or distance-pieces *f* between the pair of bearing-plates $e\ e^2$. The joints of the bearing-plate e^2 are made in the manner seen in the horizontal section and front elevation of one end of the plate represented in Fig. 4—that is to say, each end e^4 of the bearing-plate e^2 is bent at right angles to the body of the plate, and the said bent ends e^4 are passed into the forked bottoms of the pillars *f* and hinged or jointed thereto by the cross joint-pins e^3. The ends of the plate e^2 swivel or turn upon the said pins e^3, the said plate performing a

vertical or slight curvilinear motion upon the said joint-pins when it is raised or lowered.

The bearing-blocks on the axle *c* of the steering-wheel *b* may either be fixed on the axle and slide between the bearing-plates *e* e^2 or the said bearing-blocks may be loose upon the axle *c* and roll upon the bearing-plates when the steering-wheel is moved, so as to reduce the friction between the parts.

In the accompanying drawings we have represented the bearing-blocks made in the form of wheels or rollers for rolling between the bearing-plates.

Each end of the axle *c* of the steering-wheel is provided with two loose bearing wheels or rollers, *h i*, the upper fixed plate, *e*, bearing upon the wheel or roller *h*, and the lower adjustable plate, e^2, working against the other wheel or roller, *i*. The peripheries of the bearing rollers or wheels *h i* are V-shaped, or nearly V-shaped, and the engaging edges of the upper and lower bearing-plates, *e* e^2, have a corresponding figure for taking into the said wheels or rollers, as best seen in the right-hand end of Fig. 2.

The hinged or jointed lower bearing-plate, e^2, of each pair of bearing-plates is supported and adjusted in the following manner: At the middle of the said lower bearing-plate, e^2, is a horizontal arm, *k*, to which the bottom of the screw-rod *l* is jointed. The said screw-rod passes freely through an eye on the end of the horizontal arm *m*, fixed to the upper bearing-plate, *e*, and is supported in its place by the strong helical or spring washer *p*, the upper part of which takes a bearing against the lock-nuts *n* on the rod *l*, and the lower part of the said spring-washer bears against the eye part of the arm *m*. The lower adjustable bearing-plate, e^2, is thus connected to the upper fixed plate, *e*, by an elastic connection, whereby the said lower bearing-plate is made capable of slightly yielding when strain is put upon it.

In order to keep the bearing-surfaces of the upper and lower plates *e* e^2 in close contact with the bearing blocks or wheels *h i*, it is only necessary from time to time to slightly raise the supporting screw-rods *l l* by adjusting their lock-nuts *p p*. By thus raising the screw-rods *l l* the top edge of the lower bearing-plate, e^2, of each pair of plates is made to approach by a slight curvilinear motion the fixed upper bearing-plate, *e*, and the bearing-plates are thus made to seat themselves closely against the bearing blocks or rollers *h i*, and thereby avoid the rattling or jarring motion of the bearing-blocks upon the bearing-plates.

The hinged bearing-plate e^2 may be made self-adjusting by causing the said plate to be pressed upward by a spring supported from the fixed upper bearing-plate, *e*.

The axle *c* of the steering-wheel *b* has jointed to each end of it a steering connecting-rod, *q*, through which the steering-wheel is operated.

We claim—

1. In a tricycle, the axle of the steering-wheel having bearing-surface, combined with curved guiding-plates adjustable relatively to said bearing-surface to take up wear.

2. In combination with the axle of the steering-wheel having a bearing-surface, as described, two curved guide-plates bearing on said surfaces, one of said guide-plates being pivotally supported and adjustable relatively to the other plate and to the axle-bearing, as set forth.

3. The combination, with the bearing on the axle of the steering-wheel, of curved guide-plates for said bearing, said guide-plates being drawn toward the bearing on the axle by spring-pressure, as set forth.

4. In a tricycle, the combination, with the axle of the steering-wheel, of the curved guide-plates *e* and e^2, one of said guide-plates hinged to the distance-pieces *f*, the rod *l*, jointed to a projection on one of said plates, and the projection *m* and nut engaging a screw on said rod *l* by which the plates may be drawn together, as set forth.

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

WALTER JOHN LLOYD.
WILLIAM PRIEST.

Witnesses:
H. GODWIN PRIEST,
ARTHUR RICHARD ALBERT.