No. 778,710. PATENTED DEC. 27, 1904.

J. H. ROBINSON.

STEERING DEVICE.

APPLICATION FILED JULY 11, 1904.

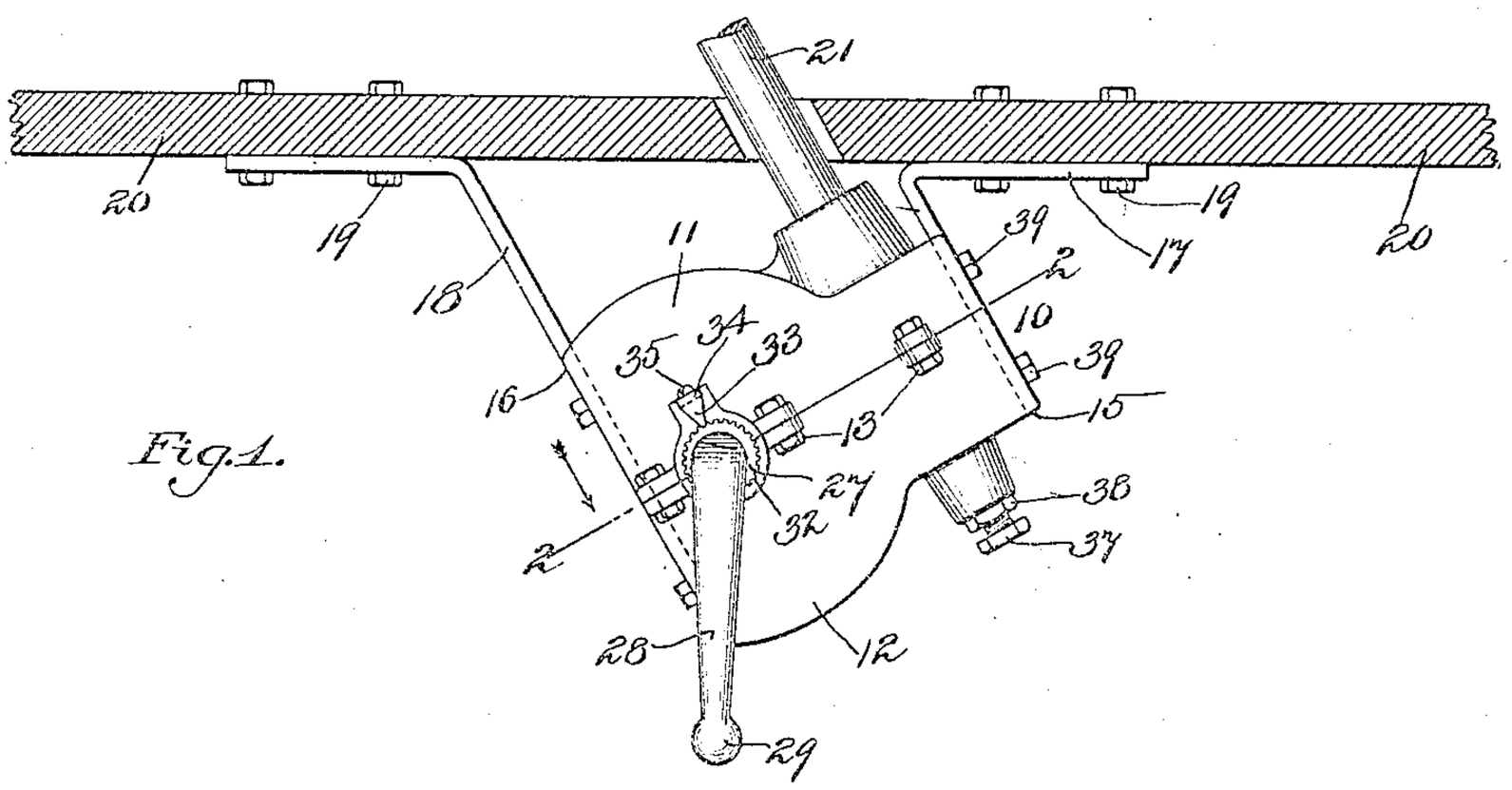

Fig. 1.

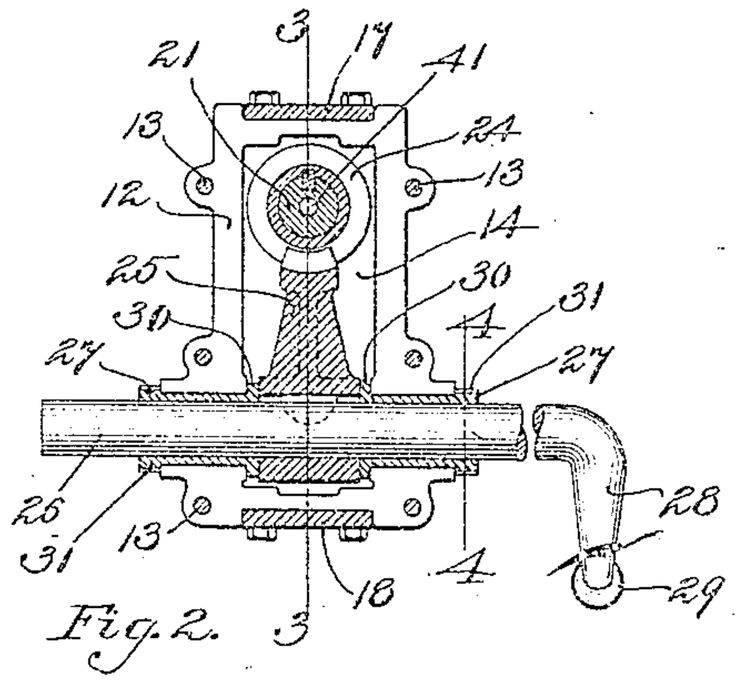

Fig. 2.

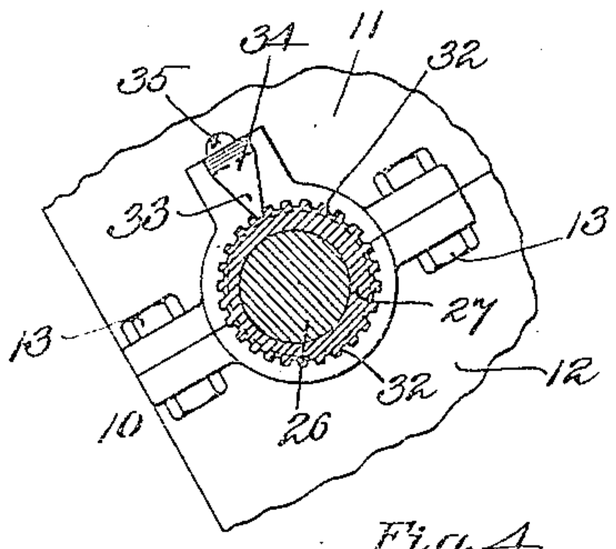

Fig. 4.

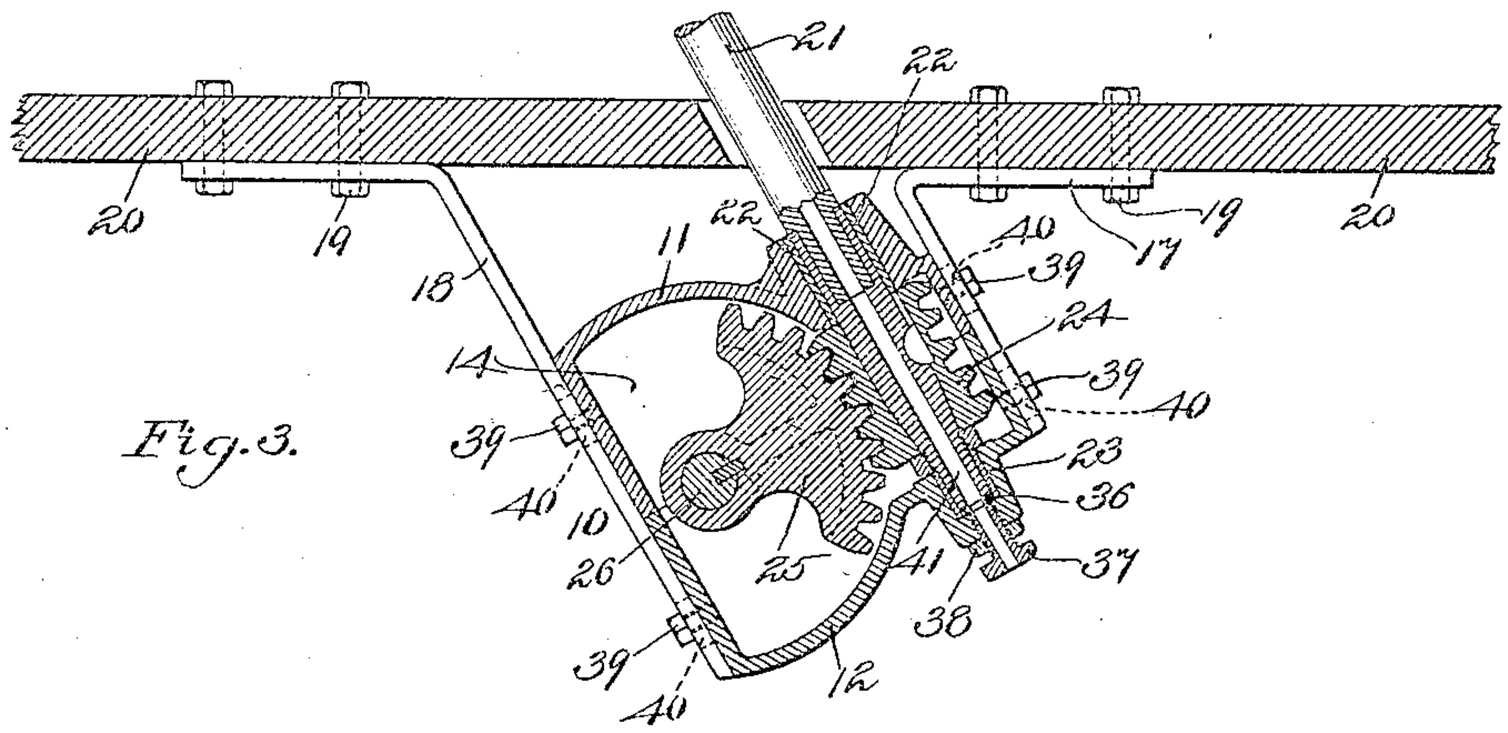

Fig. 3.

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Charles S. Fooding.

No. 778,710. Patented December 27, 1904.

UNITED STATES PATENT OFFICE.

JOSEPH H. ROBINSON, OF QUINCY, MASSACHUSETTS, ASSIGNOR TO FRANK BURGESS, OF QUINCY, MASSACHUSETTS.

STEERING DEVICE.

SPECIFICATION forming part of Letters Patent No. 778,710, dated December 27, 1904.

Application filed July 11, 1904. Serial No. 215,994.

To all whom it may concern:

Be it known that I, JOSEPH H. ROBINSON, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Steering Devices, of which the following is a specification.

This invention relates to an improved steering device for motor-vehicles, the object of the invention being to provide a compact, cheap, and strong device for the purpose hereinbefore set forth which shall be free from backlash in the working parts thereof and so constructed that said working parts shall be at all times thoroughly lubricated and protected from dust; and, further, the object of this invention is to provide a mechanism in said steering device which shall constitute a back lock, or, in other words, a lock against accidental displacement of the forward or steering wheels of the vehicle.

The object of the invention is, still further, to provide a convenient and practical means for adjusting the gears with relation to each other in order to take up wear.

One of the principal objects of the invention is, further, to provide a device of the character specified which may be readily adapted and fitted to conform to the varying styles, shapes, sizes, and conditions of motor-vehicles now on the market without change in any of the working parts of the device.

The invention consists, in a device of the character specified, of steering mechanism inclosed within a casing, said casing adapted to be adjusted and supported upon various forms of motor-vehicles, as set forth in the following specification, and particularly pointed out in the claims thereof.

The invention further consists in certain improved means for adjusting the relative location of the gears one to the other.

The invention finally consists in the improved construction and combination set forth in the following specification, and particularly pointed out in the claims thereof.

Referring to the drawings, Figure 1 is a side elevation of my improved steering device, the steering-rod being broken away to save space in the drawings, the device being shown attached to the bottom of a motor-vehicle body. Fig. 2 is a section, partly in elevation, taken on line 2 2 of Fig. 1 looking in the direction of the arrow in said figure. Fig. 3 is a section taken on line 3 3 of Fig. 2. Fig. 4 is an enlarged transverse section, partly in elevation, taken on line 4 4 of Fig. 2.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 10 is the casing of my improved steering device divided into two parts 11 and 12, said parts being joined together by bolts 13 13 in such a manner as to form a gear-chamber 14 in the interior of said casing, which is dust-proof, the parts 11 and 12 at their meeting edges forming a close fit, so that said gear-chamber may contain oil in order that the gears located therein may at all times be thoroughly lubricated. The casing 10 is provided upon its exterior with two grooves 15 and 16 at opposite ends, respectively, of said casing, said grooves being parallel to and located upon opposite sides, respectively, of the steering-rod 21, and into these grooves project, respectively, the brackets 17 and 18, formed, preferably, of steel or wrought-iron, so that the same may be bent to fit varying conditions or shapes of vehicle-bodies to which they are to be attached. The steering-rod 21 is provided with a hole 41, extending longitudinally therethrough for the convenient reception of electric wires and the like. The brackets 17 and 18 are fastened by bolts 19 to the under side of a vehicle-body 20.

The steering-rod 21 is journaled to rotate in bushings 22 23, fitted in the parts 11 and 12, respectively, of the casing 10. Said steering-rod is keyed to a worm 24 and meshes into a worm-gear sector 25, fast to a steering-shaft 26, eccentrically journaled in bushings 27 27 in the casing 10. The steering-shaft 26 has a crank-arm 28 integral therewith, provided with a ball 29 upon its lower end, by means of which said arm may be connected in the usual well-known manner to the steering-wheels. Each of the bushings 27 is provided at the opposite ends thereof with flanges 30 and 31, respectively, the flange 30 being adapt-

ed to bear against the interior of the casing 10 and the flange 31 against the exterior thereof, said flanges thus serving to prevent any longitudinal movement of the bushings with relation to the casing. The flange 31 is provided with serrations 32 around the periphery thereof, and into said serrations projects a finger 33, formed upon a locking-plate 34, fast to the upper part 11 of the casing 10 by means of a screw 35.

When it is desired to move the worm-gear sector 25 toward or away from the worm 24, either when the parts of the device are first assembled or subsequently to take up backlash caused by wear of the gear-teeth, the locking-plates 34 are unscrewed and the fingers 33 removed from said serrated flanges, and by means of said serrated flanges the bushings 27 are rotated sufficiently in the desired direction to move the gear-sector 25 the desired amount with relation to the worm 24. The locking-plates 34 are then screwed to the casing, with the fingers 33 projecting into the serrations 32, as before, thus locking the bushings 27 in position.

The lower end of the steering-rod 21 rests upon a hardened-steel washer 36, Fig. 3, which in turn rests against the upper end of an adjusting-screw 37. Said adjusting-screw has screw-threaded engagement with the casing 10 and receives the end thrust from the steering-rod 21, which is imparted thereto by the worm 24 and worm-gear 25. Any wear between the lower end of the steering-rod 21, the washer 36, and the upper end of the adjusting-screw 37 is taken up by turning said adjusting-screw, the same being locked in position with relation to the casing by means of a set-nut 38.

It will be noted that the casing 10 is fastened to the brackets 17 and 18 by means of cap-screws 39 39, which project through slots 40, provided in the brackets 17 and 18, and thus provide means whereby the steering device as a whole may be adjusted upwardly or downwardly, as may be desired, with relation to the body 20 of the vehicle. It will be noted that in the design of my improved device I employ concave hob-teeth in the worm and gear which present a very large bearing-surface, thus reducing to a minimum the necessity of adjustment by reason of wear between the worm and gear. It will be seen and understood that the brackets 17 and 18 may be easily bent to fit varying forms of body or that different forms of brackets may be attached to the casing 10, as may become necessary, and also that the casing may be reversed from the position shown in the drawings, thus making it possible to use right or left hand gearing with the same casing.

The operation of my improved device is as follows: Assuming the parts to be assembled in the casing 10 and said casing fastened to the brackets 17 and 18, said brackets being in turn fast to the under side of the body of the vehicle, the steering-rod 21 is rotated by means of a handle or hand-wheel in a manner well known to those skilled in this art, thus imparting a rotation to the worm 24, worm-gear 25, and steering-shaft 26, and through said steering-shaft a rocking motion may be imparted to the arm 28, and from said arm, through appropriate connections, the steering-wheels may be turned toward the right or left, as may be desired. If the wheels strike an obstruction upon the road in such a manner as to tend to cause said wheels to be turned out of the proper position, they will be held in said proper position through said connections by the arm 28, gear-sector 25, and worm 24, it being evident that the gear 25 cannot be rotated except by rotation of the worm 24 and steering-rod 21.

While my improved steering device has been described in the preceding specification as particularly applied to motor-vehicles, it is evident that the same may be applied to boats, launches, and the like without departing from the spirit of my invention.

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

1. In a steering device for a motor-vehicle, a casing provided with a groove in its exterior and a bracket projecting into said groove fast to said casing and adapted to be fastened to the body of said vehicle.

2. In a steering device for a motor-vehicle, a casing in two parts provided with grooves upon its exterior at the opposite ends thereof, respectively, and brackets projecting into said grooves, fast to said casing and adapted to be fastened to the body of said vehicle.

3. In a steering device for a motor-vehicle, a casing provided with a groove in its exterior and a bracket projecting into said groove, adjustably fastened to said casing and adapted to be fastened to the body of said vehicle.

4. In a steering device for a motor-vehicle, a casing, a steering-rod journaled therein, said casing provided upon its exterior with two grooves parallel to, and upon opposite sides, respectively, of, said rod, and brackets fast to said casing, projecting into said grooves and adapted to be fastened to the body of said vehicle.

5. In a steering device, a casing in two parts, a steering-rod journaled in said casing, a worm fast to said steering-rod, a steering-shaft journaled in said casing, a worm-gear meshing directly into said worm, two bushings rotatably supported in said casing upon opposite sides, respectively, of said gear, means fast to said casing and engaging said bushings to prevent said bushings from rotating, and a steering-shaft journaled eccentrically in said bushings and fast to said worm-gear.

6. In a steering device, a casing in two parts, a steering-rod journaled in said casing, a worm

fast to said steering-rod, a steering-shaft journaled in said casing, a worm-gear meshing into said worm, two bushings adjustably fastened to said casing upon opposite sides, respectively, of said gear, each of said bushings projecting outside said casing and serrated upon the periphery thereof, and locking-plates fast to said casing and projecting into the serrations upon each of said bushings, respectively.

7. In a steering device, a casing in two parts, a steering-rod journaled in said casing, a worm fast to said steering-rod, a steering-shaft journaled in said casing, a worm-gear meshing into said worm, two bushings adjustably fastened to said casing upon opposite sides, respectively, of said gear, each of said bushings provided with a flange upon the opposite ends thereof, respectively, said flanges bearing against the inside and outside of said casing, respectively, the outer of said flanges provided with serrations in its periphery, and a locking-plate fast to said casing and projecting into the serrations upon each of said bushings, respectively.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOSEPH H. ROBINSON.

Witnesses:
CHARLES S. GOODING,
ANNIE J. DAILEY.