

UNITED STATES PATENT OFFICE.

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STEERING-GEAR FOR MOTOR-VEHICLES.

SPECIFICATION forming part of Letters Patent No. 687,054, dated November 19, 1901.

Application filed June 22, 1901. Serial No. 65,706. (No model.)

To all whom it may concern:

Be it known that I, JOHN FRANKLIN McNUTT, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain
5 new and useful Improvements in Steering-Gear for Motor-Vehicles; 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 ap-
10 pertains to make and use the same.

This invention relates to the steering-gear of automobiles.

The primary object of the invention is to provide improved means for locking or hold-
15 ing the knuckle-levers and steering-wheels in any desired position and yet permit of their being freely and easily operated by a controlling-lever.

A further object is to insure against the en-
20 trance of dust or grit and provide for constant lubrication of the parts.

The invention will be hereinafter fully set forth, and particularly pointed out in the claims.

25 In the accompanying drawings, Figure 1 is a plan view with parts in dotted lines. Fig. 2 is a transverse sectional view. Fig. 3 shows the general outline of a motor-vehicle, indicating the location of the steering-gear case.

30 Referring to the drawings, 1 designates a gear case or box, and 2 the top or cover therefor tightly fitted thereto to prevent the entrance of dust or grit, the case being constructed so as to be thoroughly dust-proof.
35 It is located on the under side of the forward part of the carriage-body, as indicated in Fig. 3.

Through an opening in the top of the case is passed a shaft 3, to which a hand-wheel-
40 controlling lever 4 is connected by a universal joint 5. On the inner end of shaft 3 is pinned an arm 6, movable at right angles to the shaft. On a stud 7 depending from this arm are two pinions 8 and 9, the former being
45 of less diameter than the latter, said pinions meshing, respectively, with two gears 10 and 12 of differential diameters, that of the gear 10 being the greater. The gear 12 is non-rotary, being integral with a sleeve 13, fast in
50 an opening in the bottom of the gear-case. The pinion 10 has a depending shaft 14 projecting through and below the sleeve 13, and to it, beneath the gear-case, is keyed an arm

15. To the outer end of this arm is pivoted one end of a rod 16, forming the connection
55 to the knuckle-levers of the steering-wheels.

It will be noted that the actuating-shaft 3, leading from the controlling-lever, and the shaft 14 of the gear 10 are in axial line with each other and that while the pinions 8 and
60 9 are in mesh, respectively, with the gears 10 and 12 only the gear 10, carrying the shaft 14, is rotated when the arm 6 is caused to move through an arc of a circle.

In practice if the inner arm 6 be turned to
65 the left (see Fig. 1) the pinions 8 and 9 will be revolved around the gear-wheels 10 and 12, and the gear 12 being stationary and of smaller diameter than the gear 10 the latter
70 will have a movement in the same direction as the arm, but will travel a much lesser distance. In other words, by turning arm 6 from the position shown in Fig. 1 to the diametrically opposite point x the arm 15 will
75 travel only from the point shown in Fig. 1 to the point y , which is the limit of its movement to the left and sufficient to turn the course of the carriage. Should either of the front wheels strike an obstruction, the pressure brought to bear on arm 15 and tending
80 to turn it is resisted by the inertia and friction of the gear-pinions 9 and 8, the arm 6, and shaft 3 and also possibly by a very slight resistance on the hand-wheel of the controlling-lever.
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The advantages of my invention are apparent. It will be seen that by means thereof I obtain a high ratio of gear with but four gear-wheels and that while a high resistance is interposed to the pressure of the steering-
90 wheels yet there is the least possible resistance to the operation of the controlling-lever.

A further advantage lies in the fact that all the gearing is located within a dust-tight case, which is partially filled with lubricant,
95 and, aside from the parts being self-oiling, the entrance of dust and the formation of grit are avoided. It is obvious that should it be desirable to have the hand steering-wheel turn in the direction opposite to that contemplated by the arrangement shown and de-
100 scribed it would be necessary merely to reverse the sizes of the gears 10 and 12.

I claim as my invention—

1. The combination with the steering-
105 wheels, of a differential steering-gear compris-

ing an actuated shaft having an arm, a connection between said arm and the steering-wheels, an actuating-shaft in axial line with the actuated shaft, an arm carried by said
 5 actuating-shaft, and differential gearing between said arm and the actuated shaft, substantially as set forth.

2. The combination with the steering-wheels, of a differential steering-gear comprising an actuated shaft having an arm, a connection between said arm and the steering-wheels, a gear-wheel on said shaft, an actuating-shaft in axial line with the actuated shaft, an arm carried by said actuating-shaft,
 15 a gear-pinion mounted on said arm meshing with said gear-wheel, and means for retarding the rotation of said shafts, gear-wheel and pinion, substantially as set forth.

3. The combination with the steering-wheels, of a differential steering-gear comprising an actuated shaft having an arm, a connection between said arm and the steering-wheels, a non-rotary gear-wheel having concentric relation to said shaft, an actuating-shaft in axial line with the actuated shaft,
 25 an arm carried by said actuating-shaft, a gear-pinion mounted on said arm meshing with said non-rotary gear-wheel, and means actuated by the movement of said arm for rotating said actuated shaft as said gear-pinion meshes with and revolves around said gear-wheel, substantially as set forth.

4. The combination with the steering-wheels, of a differential steering-gear comprising an actuated shaft having an arm, a connection between said arm and the steering-wheels, a non-rotary gear-wheel having concentric relation to said shaft, a gear-wheel on said shaft of different diameter than that of
 40 the non-rotary gear-wheel, an actuating-shaft, and an arm thereon carrying two gear-pinions of differential diameter, meshing, respectively, with said gear-wheels, substantially as set forth.

5. The combination with the case having diametrically opposite openings, of the actuating-shaft extended through one opening, the lever secured to said shaft, a gear-wheel, an actuated shaft secured thereto fitted in the
 50 other of said openings, a connection between said actuated shaft and the steering-wheels of a motor-vehicle, means carried by said actuating-shaft for rotating said actuated shaft comprising, a gear-pinion meshing with said
 55 gear-wheel and a second set of intermeshing

gears aiding in holding said parts in their different positions, substantially as set forth.

6. The combination with the case having diametrically opposite openings, of the actuating-shaft extended through one opening, 60 the lever secured to said shaft, a non-rotary gear-wheel having a sleeve fitted in the other of said openings, a second gear-wheel of different diameter than the former having a shaft extended through said sleeve, an arm 65 on said shaft, a connection between said arm and the steering-wheels of a motor-vehicle, an arm on said actuating-shaft, and two gear-pinions having a common bearing carried by said arm, said pinions being of differential 70 diameter, the smaller meshing with the gear-wheel of greater diameter and the larger with the gear-wheel of lesser diameter, substantially as set forth.

7. The combination with the case having 75 diametrically opposite openings, of the actuating-shaft extended through one opening, the lever secured to said shaft, a non-rotary gear-wheel having a sleeve fitted in the other of said openings, a second gear-wheel of 80 greater diameter than the former having a shaft extended through said sleeve, an arm on said shaft, a connection between said arm and the steering-wheels of a motor-vehicle, an arm on said actuating-shaft, and two gear- 85 pinions having a common bearing carried by said arm, said pinions being of differential diameter, the smaller meshing with the gear-wheel on the actuated shaft and the larger with the non-rotary gear-wheel, substantially 90 as set forth.

8. The combination with a motor-vehicle having steering-wheels, of a differential gearing for controlling said steering-wheels comprising an actuating-shaft and an actuated 95 shaft, and differential gear wheels and pinions between said shafts whereby said actuated shaft will travel with, but at a slower speed than, the actuating-shaft, and the box or case, secured to the vehicle, inclosing the 100 gearing and having opposite openings for the passage of the actuating and actuated shafts, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscrib- 105 ing witnesses.

JOHN FRANKLIN McNUTT.

Witnesses:

W. R. WOOD,

OLIVER B. KAISER.