

1,030,738.

P. LORD.
GEARING.
APPLICATION FILED MAY 22, 1911.

Patented June 25, 1912.

3 SHEETS-SHEET 1.

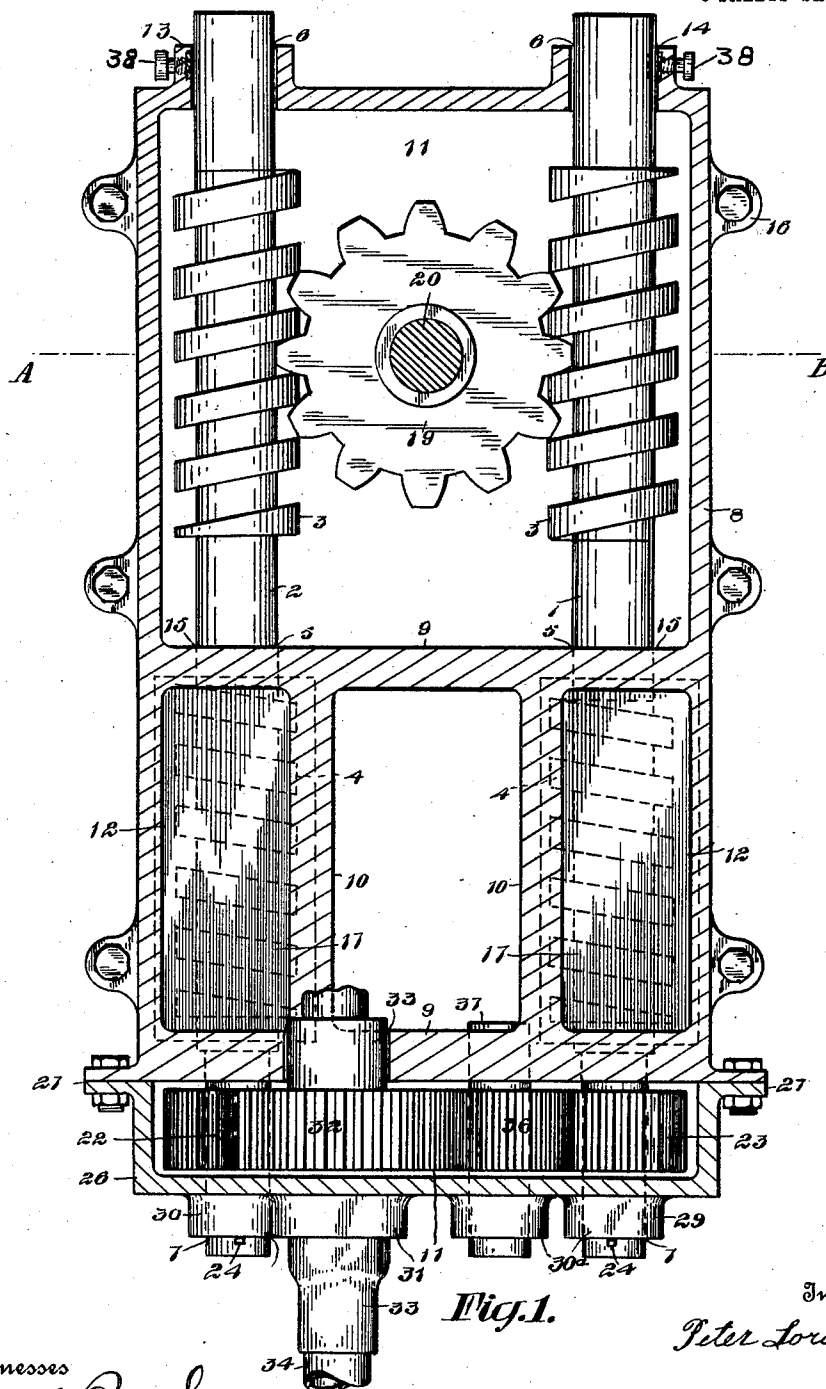


Fig. 1.

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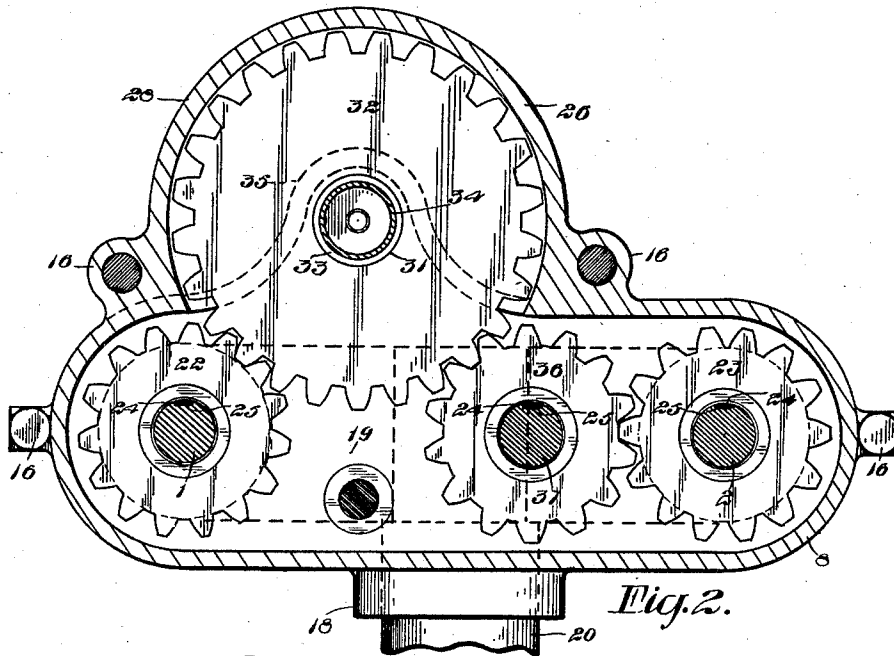


Fig. 2.

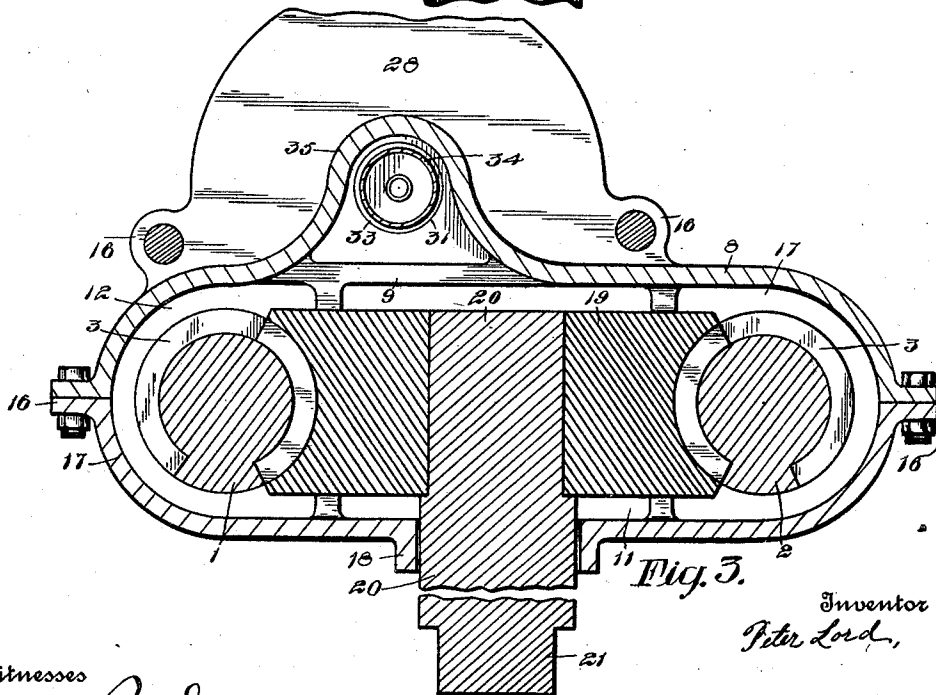


Fig. 3.

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3 SHEETS-SHEET 3.

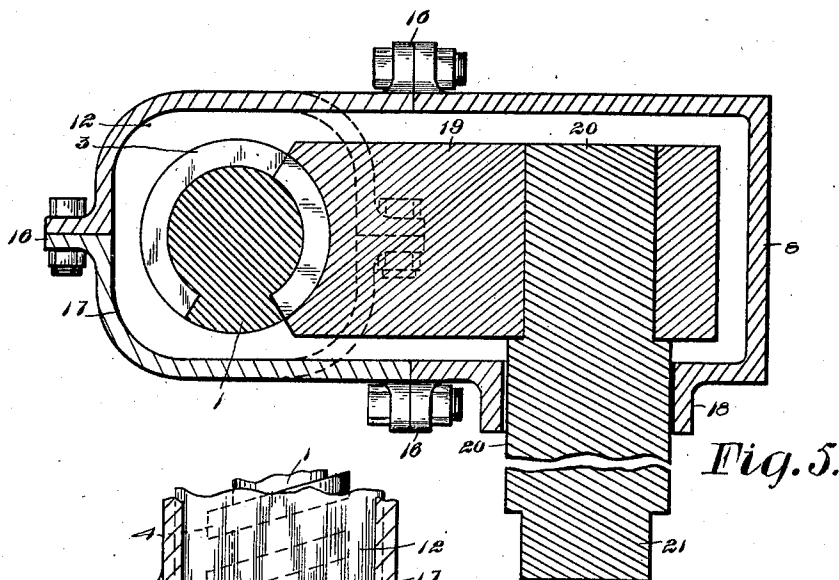


Fig. 5.

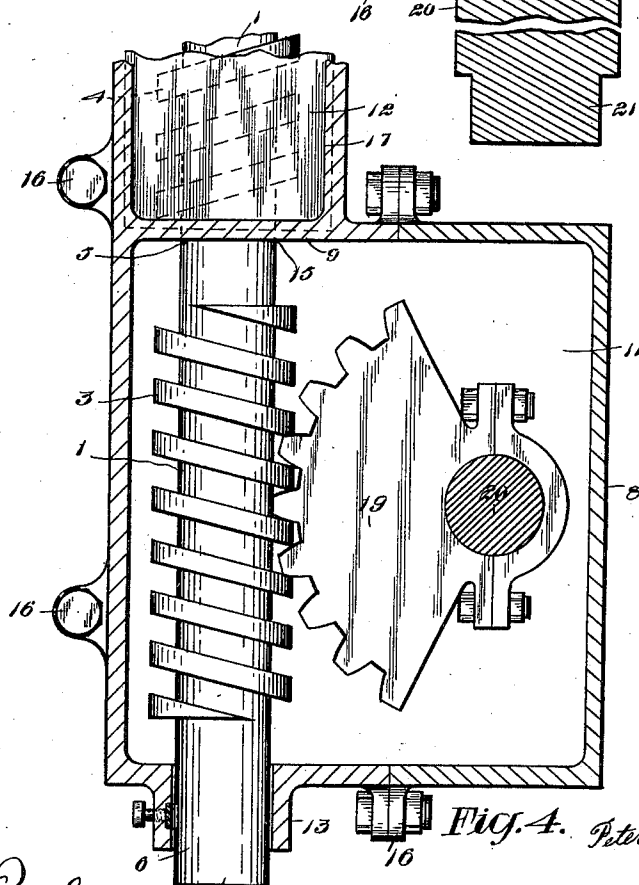


Fig. 4. Peter Lord, Inventor

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UNITED STATES PATENT OFFICE.

PETER LORD, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR OF NINE THIRTY-SECONDS TO JOSEPH ANTOINE HILAIRE HEBERT, FIVE THIRTY-SECONDS TO CHARLES LELUAU, FIVE THIRTY-SECONDS TO LOUIS ADHEMAR DELORME, AND FIVE THIRTY-SECONDS TO GUSTAVE ITZWEIRE, ALL OF MONTREAL, CANADA.

GEARING.

1,030,738.

Specification of Letters Patent.

Patented June 25, 1912.

Application filed May 22, 1911. Serial No. 628,884.

To all whom it may concern:

Be it known that I, PETER LORD, resident of 140 Berri street, in the city and district of Montreal, Province of Quebec, Dominion of Canada, a subject of the King of Great Britain, have invented certain new and useful Improvements in Gearing; and I do hereby declare that the following is a full, clear, and exact description of the same.

The invention relates to improvements in gearing, as described in the present specification and illustrated in the accompanying drawings that form part of the same.

The invention consists essentially in the novel construction and arrangement of parts, whereby a proportionately greater movement is imparted to a rotating gear than the longitudinal movement of the threaded operating shaft and the said gear locked in each position.

The objects of the invention are to devise a form of gearing, particularly useful for steering gear in vehicles, to avoid the dangers incident to the accidental operation of a steering gear, and generally to provide a compact, cheap and durable form of gearing for rotating shafts.

In the drawings, Figure 1 is a plan view of the arrangement of the shafts and gears. Fig. 2 is an enlarged end elevation, showing the actuating gears and the head of the casing, in cross section. Fig. 3 is an enlarged cross sectional view on the line A—B in Fig. 1. Fig. 4 is an enlarged end elevation of a modified form, showing a single longitudinal operating shaft and the head of the casing in cross section. Fig. 5 is a plan view, broken away, of the form of the invention illustrated in Fig. 4.

Like numerals of reference indicate corresponding parts in each figure.

Referring to the drawings, 1 and 2 are the threaded shafts, each of said shafts having formed or fixedly mounted toward one end thereof, the thread forming the worm 3 and toward the other end thereof, the screw thread 4, the spiral of the screw thread 4 being formed in an opposite direction to the worm 3, that is to say, each shaft toward one end has a right hand thread and toward the other end a left hand thread and between said threads, the journal portion 5

and beyond said threads, the journal portions 6 and 7.

8 is the casing, preferably of box shape and formed in halves, and in the interior thereof divided by the cross partition 9 and the longitudinal partitions 10 into the gear box 11 and screw box chambers 12 and having formed on the end walls, the shaft bearings 13 and 14 and the journal orifices 15 through the partition 9 and each of said parts to said casing having the lugs 16, by means of which they are bolted together.

17 are screw boxes or nuts of squared formation on the outer walls and mounted on the screw threads 4, said screw boxes 17 being placed in the chambers 12 and said shafts 1 and 2 being journaled in the bearings 13 and 14 and orifices 15. The shafts 1 and 2 are longitudinally movable in their bearings, though held from such movement until rotated in the screw boxes 17.

18 is a bearing formed in the wall and supported by the casing 8 centrally between the shafts 1 and 2 and the worms 3 and at right angles to the bearings 13 and 14.

19 is a worm gear wheel, fixedly mounted on the shaft 20, said shaft being journaled in the bearing 18 and terminating at the outer squared end 21, said gear wheel 19 being operated by its coaction with the worms 3 and the longitudinal movements of the shafts 1 and 2.

22 and 23 are spur gear wheels, slidably mounted on the shafts 1 and 2 beyond the screw threads 4 and the end wall of the casing 8 and secured from rotation on said shafts by the keys 24 in the key-ways 25.

26 is a recessed head, forming, with the end wall, of the casing, a gear box, and secured to said casing through the lugs 27 and corresponding lugs in said casing, said head 26 having the extension 28 for the main operating gear and the bearings 29 for the shafts 1 and 2, bearings 30 and the bearings 31.

32 is the main operating gear fixedly mounted on the hollow shaft 33, said hollow shaft being journaled in the bearings 31.

34 is a tube extending through the hollow shaft 33 and supported in the bracket 35 at the other end of the casing, said tube being for the purpose of containing the trans-

mission means for other purposes than the steering gear and having nothing whatsoever to do with this invention, except in its general arrangement in regard to the casing and other parts.

36 is an intermediate gear, mounted on the shaft 37, said shaft being journaled in the bearings 30 and corresponding bearings in the end of the casing and forming the transmission means between the main operating gear and the gear wheel 23, thus reversing the direction of rotation of said gear 23. The main operating gear 32 directly coacts with the gear wheel 22 and coacts with the gear wheel 23, as explained, through the intermediate gear 36. Therefore, on turning the shaft 33, and consequently the gear wheel 32, the shafts 1 and 2 are both turned and as they screw in and out through the screw boxes 17, a longitudinal movement is imparted to each of said shafts as they slide through the central orifice in the gear wheels 22 and 23 on the keys 24. The longitudinal movement of said shafts, one in one direction and the other in the other direction, assures the rotation of the worm gear wheel 19 and consequently the shaft 20, and as the shaft 20, at its outer squared end 21, is secured to a suitable member, the steering gear of the vehicle, be it motor car, boat or other form of passenger or freight vehicle, is operated according to the direction of rotation of said worm gear wheel, and, of course, the direction of rotation of the actuating gear wheel 32. The screw boxes 17, being fixed in their compartments in the casing, do not move, and thus the longitudinal movement of the shaft is secured and as the worm gear wheel 19 is balanced between said shafts, the amount of friction is at a minimum and the possibility of rattle or chatter absolutely avoided. In addition, the said shafts, screwing through the boxes 17, move forward longitudinally in an opposite direction to the worm threads 3, consequently coaction of said worms with said wheel imparts a movement to said wheel just double to that of the longitudinal movement of each shaft.

If desirable for adjusting purposes, the set screws 38 may be inserted through correspondingly threaded orifices in the wall of the bearings 13 in the outer sides thereof, said set screws coming in contact with the shafts to keep said shafts in close engagement with the worm gear wheel 19. The hollow shaft 33 may be connected up to any tubular shaft and steering wheel or in fact with any operating means in various ways.

In Figs. 4 and 5, the only difference is the elimination of the shaft 2, the gear wheel 23 and the gear wheel 36, together with that portion of the casing, and of

course, the casing is made much smaller, otherwise the construction is much the same and need not be further described, and for smaller vehicles, such as very light yachts and launches, the single shaft is sufficient, for the saving of friction by the balanced wheel is not so important.

What I claim as my invention is:

1. In gearing, a pair of shafts suitably journaled and longitudinally movable in opposite directions and parallelly arranged, each of said shafts having toward one end thereof a right hand thread and toward the other end thereof a left hand thread, the thread at one end forming the worm and at the other end a screw thread, a pair of screw boxes, each of said screw boxes being mounted on one of said screw threads and fixedly held independent of said shafts, means for simultaneously turning said shafts in said screw boxes, a worm gear wheel between said worm threads, and a shaft suitably journaled and fixedly secured in said worm wheel whereby said worms and worm wheel coact also as rack and pinion on the turning of said pair of shafts.

2. In gearing, a pair of shafts suitably journaled, longitudinally movable in opposite directions and parallelly arranged, each of said shafts having toward one end thereof a right hand thread and toward the other end thereof a left hand thread, one of said threads forming a combined worm and rack and the other of said threads forming a screw, a pair of screw boxes mounted on said screw threads respectively and fixedly secured independently of said shafts, gears slidably arranged on said shafts at one end thereof and held from rotation in relation thereto, operating gears coacting with said gears, a shaft suitably journaled between said worms, and a combined pinion and worm gear wheel fixedly mounted on the latter shaft and coacting directly with said worms.

3. In gearing, a pair of shafts parallelly arranged, longitudinally movable in opposite directions and suitably journaled, each of said shafts having toward one end thereof a thread forming a worm and toward the other end thereof a thread forming a screw, said screw being opposite in direction to said worm, a pair of gears, one mounted at the end of each shaft longitudinally slidable thereon and fixedly held from rotation in relation thereto, a main operating gear suitably journaled coacting directly with one of the aforesaid gears, an intermediate gear forming transmission means between said main gear and the other of the aforesaid gears, a shaft suitably journaled between said worms, and a worm gear wheel fixedly mounted on the latter shaft and coacting directly with said worms to receive a simultaneous worm and rack drive.

4. In a device of the class described, in combination, a casing having in the interior thereof a gear box and a pair of screw box chambers and in the walls thereof a plurality of bearings, a pair of screw boxes contained in said chambers respectively and a pair of shafts journaled in the end wall bearings and extending through said screw boxes, each of said shafts having a thread forming a worm at one end thereof and contained in said gear box compartment and a thread forming a screw turning in said screw boxes, a shaft journaled in the bearing in said casing between said worms, a worm gear wheel fixedly mounted on said shaft coacting with said worms, and means at the other ends of said shafts for simultaneously moving them longitudinally in opposite directions in their bearings through said screw boxes.

5. In a device of the class described, in combination, a casing having bearings in the end walls thereof, a cross partition therewithin, journal orifices through said cross partition and longitudinal partitions inclosing with said cross partition screw box compartments, screw boxes contained within said compartments and fixedly held from rotation, a pair of shafts journaled in the end wall and bearings extending therethrough at each end thereof and longitudinally movable therein, each of said shafts having toward one end thereof a thread forming a worm and toward the other end thereof a thread forming a screw, said screw being opposite in direction to said worm and said screw turning in said screw boxes, a head forming a gear box fixedly secured to one end wall and having bearings for said pair of shafts, a pair of gears fixedly held from rotation and longitudinally slidable on said shafts within said gear box in the head, a main operating gear suitably journaled within said head gear box and coacting directly with one of the aforesaid gears, an intermediate gear between said

main gear and the other of the aforesaid gears, a shaft suitably journaled in said casing between said worms, and a worm gear wheel fixedly mounted on the latter shaft and coacting directly with said worms.

6. In gearing, a main operating member, fixed screw boxes, a pair of intermediate operating members longitudinally movable in opposite directions having screw threads turning in said fixed boxes and oppositely arranged worm threads beyond said boxes, spur wheels operatively connecting said main operating member and both of said intermediate operating members and a worm wheel operatively arranged between said worms and directly coacting therewith.

7. In gearing, a main operating member, fixed screw boxes, a pair of intermediate operating members longitudinally movable in opposite directions having screw threads turning in said fixed boxes and oppositely arranged worm threads beyond said boxes, a worm wheel operatively arranged between said worms and directly coacting therewith, accelerating gears operatively connecting said main operating member with said intermediate operating members to rotate the latter in opposite directions, and set screws for adjusting said shafts into close engagement with said worm wheel.

8. In gearing, the combination of a driven shaft suitably journaled and having a worm thereon, means for imparting to said shaft a simultaneous longitudinal and rotary motion, and a worm wheel suitably journaled and meshing with said worm, whereby said worm wheel is rotated by said shaft at augmented speed.

Signed at the city and district of Montreal, Quebec, Canada, this twelfth day of May, 1911.

PETER LORD.

Witnesses:

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GEORGE L. ROCKWELL.