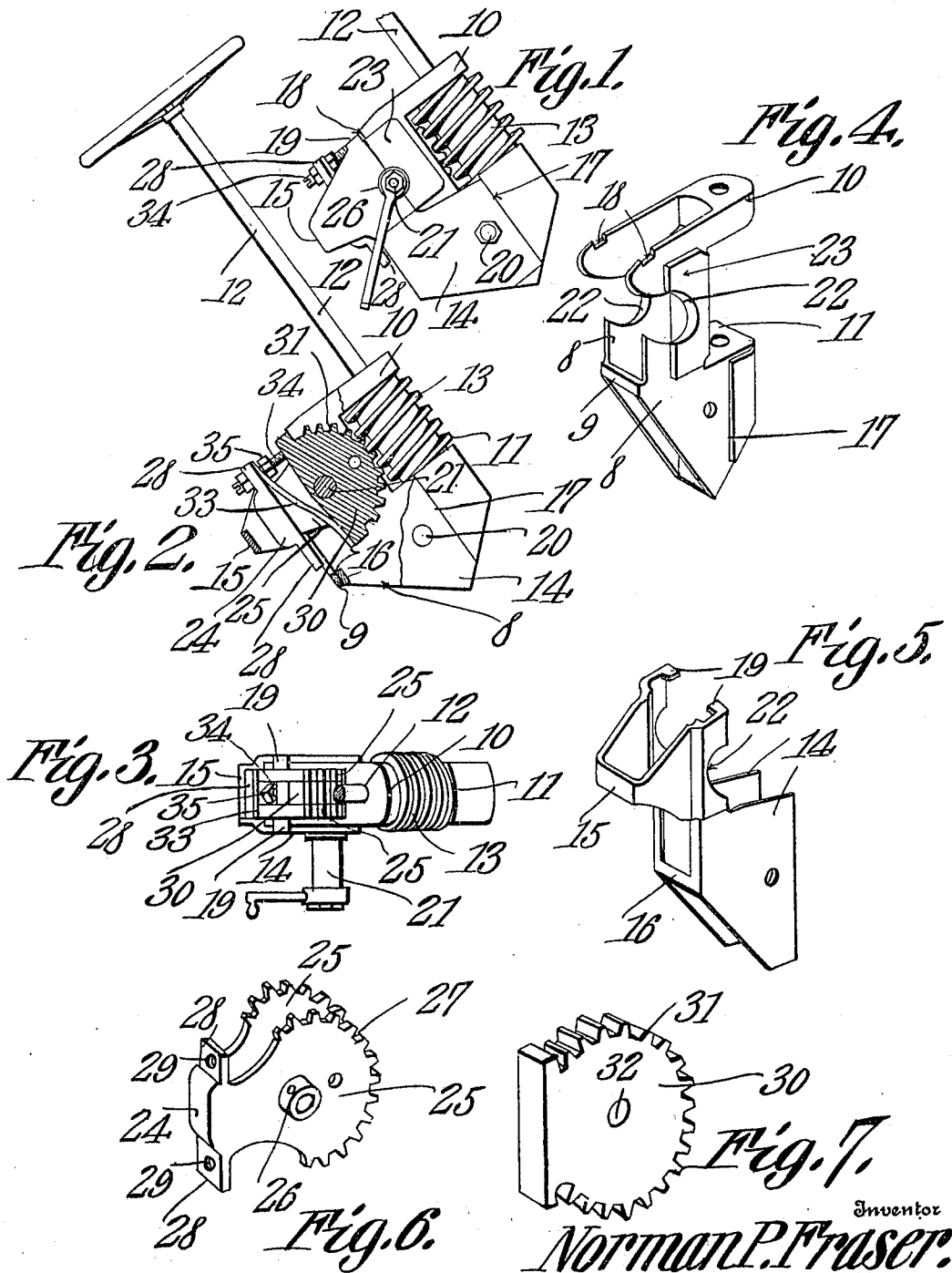


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GEARING.

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UNITED STATES PATENT OFFICE.

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To all whom it may concern:

Be it known that I, NORMAN P. FRASER, a citizen of the United States, residing at Carsonville, in the county of Sanilac and State of Michigan, have invented a new and useful Gearing, of which the following is a specification.

This invention relates to steering devices for motor vehicles in which a worm gearing is employed for transmitting the motion of the steering shaft to the steering mechanism.

The object of the invention is to provide improved means for automatically taking up wear of the gears, and with this object in view, the invention consists in the novel construction and arrangement of parts to be hereinafter described and claimed, reference being had to the drawing hereto annexed in which,—

Figure 1 is a side elevation of the invention. Fig. 2 is a central longitudinal section. Fig. 3 is a plan view. Figs. 4 and 5 are perspective views showing the two parts forming the support for the gearing. Figs. 6 and 7 are perspective views of parts forming the worm wheel.

Referring to the drawings, 8 denotes a pair of plates having one of their edges connected by a cross bar 9. At their opposite edges, the plates are connected by spaced upper and lower solid portions 10 and 11 having bearing openings in which the steering shaft 12 is supported, and between which said shaft carries the endless screw or worm 13, mounted on the shaft to turn therewith. Overlapping the plates 8 is a pair of plates 14 connected at their outer edges by cross bars 15 and 16, the latter fitting on the cross bar 9. A portion of the plates 14 abuts against a shoulder 17 on the outer surface of the plates 8. In the upper edges of the plates 8 are notches 18 which are entered by tongues 19 projecting from the corresponding edges of the plates 14. The plates 8 and 14 are fastened together by a transverse bolt 20.

In the overlapping portions of the plates 8 and 14, are bearing openings in which the shaft 21 of a worm wheel to be presently described, is supported. These openings are formed by means of recesses 22 in the edges of the plates 8 and 14. A portion of the recesses of the plates 22 is semi-circular, and said plates are thickened at this point as indicated at 23 to make a bearing of sufficient

length to properly support the shaft 21. The recesses 22 in the plates 14 are semi-circular, and are so located that they coincide with the similar portions of the recesses of the plates 8. The plates 14 adjacent to their recesses are also thickened for the same purpose as the plates 8, and the recessed edge of said plate 14 abuts against the shoulder formed by the thickened portion 23 of the plates 8.

By the construction thus described a simple and easily assembled support for the shafts 12 and 21 is had. In practice the support will be inclosed in a suitable housing which, for the sake of clearness, has not been shown.

The worm wheel hereinbefore referred to comprises a base 24 from which projects a pair of spaced parallel sector plates 25 provided with hubs 26 through which the shaft 21 passes, and to which shaft said plates are keyed or otherwise rigidly secured. On the arcuate edges of the plates are teeth 27 which are in mesh with the thread of the worm 13. At opposite ends of the base 24 are outstanding flanges 28 having screw-threaded apertures 29.

Between the plates 25 is a segmental plate 30 having teeth 31 which are also in mesh with the thread of the worm 13. This plate 30 is loosely mounted on the shaft 21, it being provided with an opening 32 for this purpose through which the shaft extends. The teeth 31 coincide with the teeth 27, the three plates thus forming a worm segment which is in mesh with the worm 13.

To one of the flanges 28 is secured a flat spring 33, the free end of which presses against the chord of the segment 30, and tends to turn the segment on the shaft 21. This turning movement is limited by a stop comprising a screw 34 threaded through one of the apertures 29. Said screw also passes through the spring 33 and serves to secure the same. Each end of the screw is provided with a lock nut 35, for securely holding the same at adjustment. One of the lock nuts is screwed against the spring and also serves to regulate the tension thereof.

By the hereindescribed sectional worm wheel, all wear is automatically taken up. Inasmuch as in steering devices employing a worm gearing there is more wear at the point where the parts are in straight ahead position than at any other point, it will be

evident that when the gears are turned to make a corner, the high or unworn parts will be in engagement, the spring permitting the segment to yield and thus permit the gear to work snugly without binding. By reversing the position of the spring wear on the other side of the gear is taken up. Two apertures 29 are provided to permit the reversal of the spring to be readily made. The spring can be adjusted so that it will have tension on the gear when first set up, if so desired, and by so doing it will automatically take up wear; or, it can be left merely to set the gear snug at the low point.

The invention herein described is not limited to steering gears, but may be successfully employed in connection with other mechanism in which a worm gear is used. It will also be understood that various changes in the structural details may be resorted to without a departure from the invention.

What is claimed is:—

1. The combination with a worm, of a gear in mesh therewith, said gear comprising spaced toothed plates in mesh with the worm, and a yielding toothed plate mounted between said plates and in mesh with the worm.

2. The combination with a worm, of a shaft, a gear on the shaft in mesh with the worm, said gear comprising a pair of spaced toothed plates fast on the shaft, and in mesh with the worm, a toothed plate loose on the shaft between the aforesaid plates and in mesh with the worm, and yielding means for turning the intermediate plate on the shaft independent of the first mentioned plates.

3. The combination with a worm, of a shaft, and a gear on the shaft in mesh with the worm, said gear comprising a pair of spaced toothed plates fast on the shaft, and in mesh with the worm, a spring carried by the first mentioned plate and engageable with the intermediate plate for turning the same

on the shaft, and a stop for limiting the turning movement of said plate.

4. The combination with a worm, of a shaft, and a gear on the shaft in mesh with the worm, said gear comprising a pair of spaced toothed sector plates fast on the shaft and in mesh with the worm, and said plate being provided with a base portion having outstanding flanges, a toothed segmental plate loosely mounted on the shaft between the aforesaid plates, and in mesh with the worm, a spring secured to the aforesaid base and engageable at its free end with the segmental plate for turning the same on the shaft, and a stop for limiting the said turning movement of the plate.

5. The combination of a pair of plates having connecting portions at one of their edges which are spaced and provided with bearing openings, a shaft mounted in said openings, the faces of said plates having shoulders, and a pair of plates overlapping said plates and abutting on said shoulders, means for securing said plates together, said plates having transverse openings, a shaft mounted in the openings, and gearing between the shafts.

6. The combination of a pair of plates having connecting portions at one of their edges which are spaced and provided with bearing openings, and said plates also having notches in one of their edges, a shaft mounted in the aforesaid openings, the faces of said plates having shoulders, a pair of plates overlapping said plates and abutting on said shoulders, and having tongues entering the aforesaid notches, means for securing the plates together, said plates having transverse openings, a shaft mounted in the openings, and gearing between the shafts.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

NORMAN PETO FRASER.

Witnesses:

G. A. H. DYSART,
G. C. FRASER.