D. D. ORMSBY.

COMPENSATING GEARING.

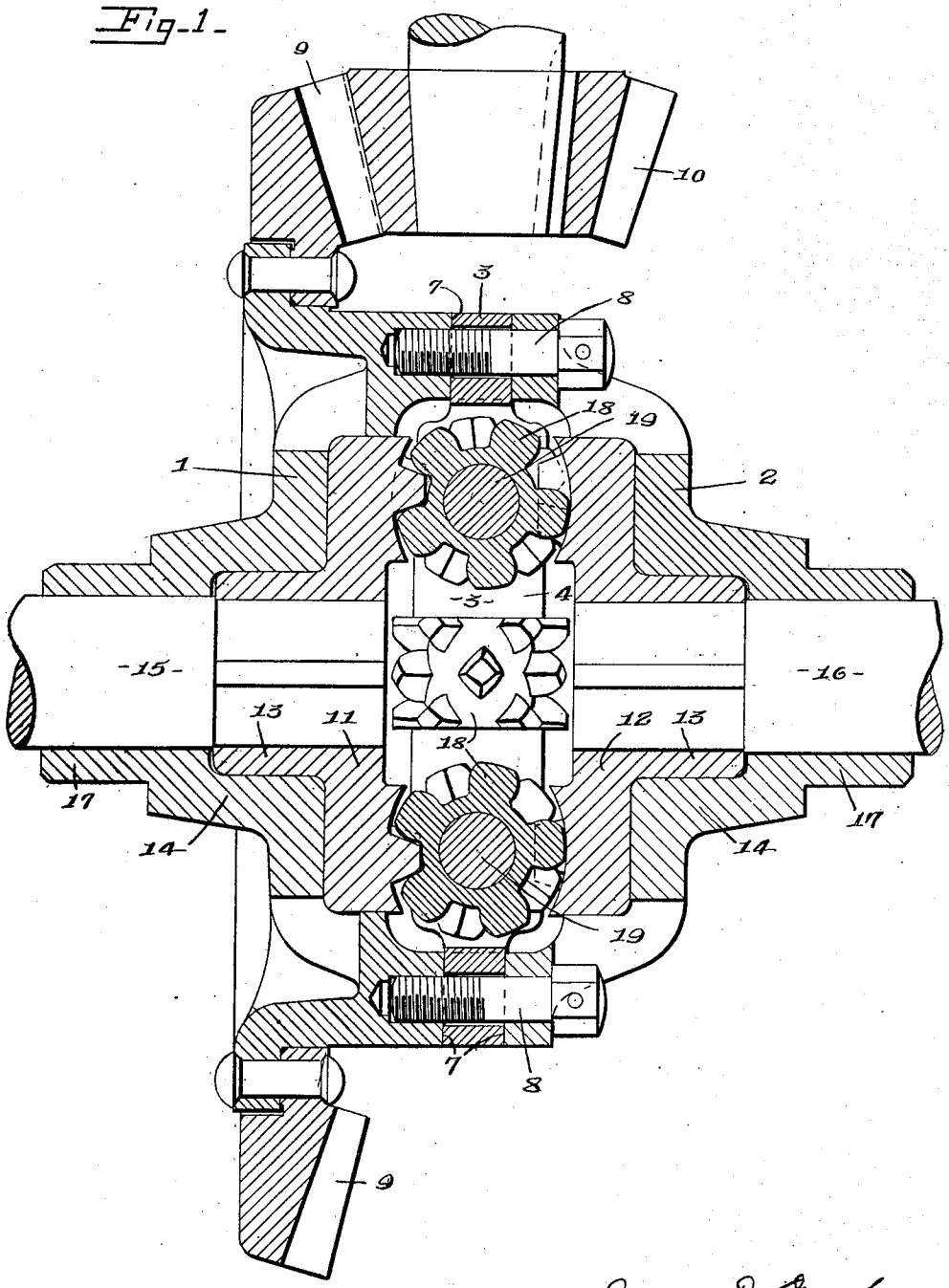
APPLICATION FILED MAY 18, 1914.

1,352,910.

Patented Sept. 14, 1920.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Chas. H. Young.

J. Glazier

Donald D. Ormsby
Inventor

Parsons Hall & Bodell

By Attorneys

D. D. ORMSBY.

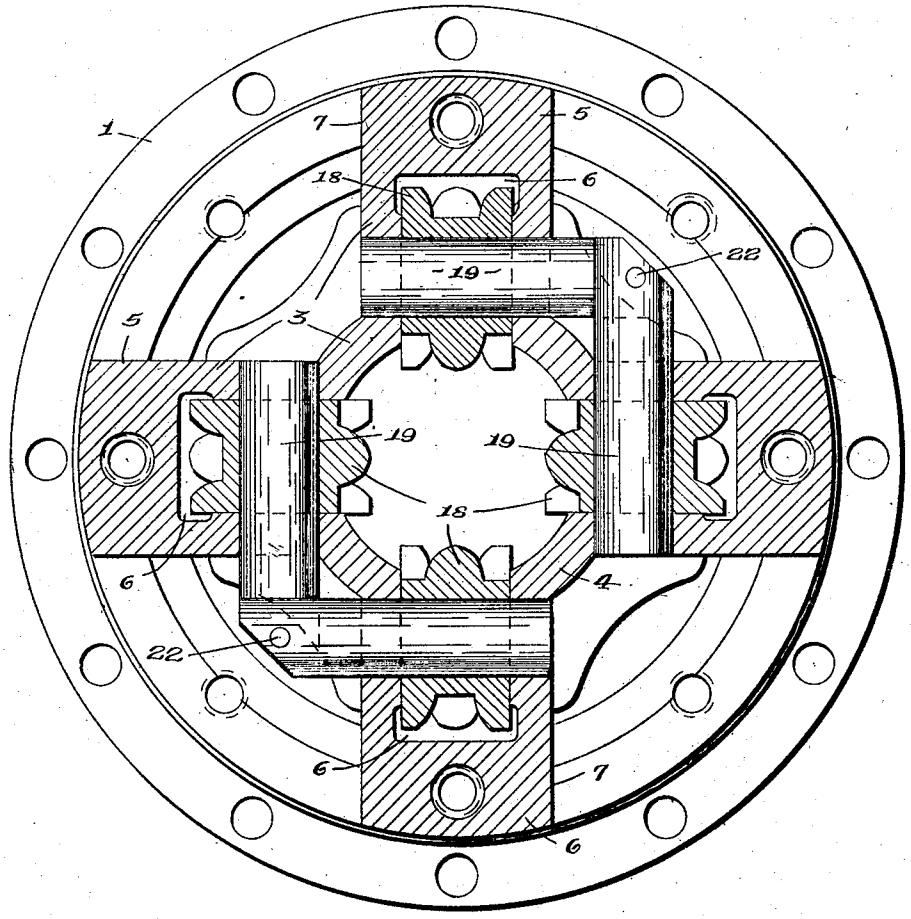
COMPENSATING GEARING.

APPLICATION FILED MAY 18, 1914.

1,352,910. **Patented Sept. 14, 1920.**

3 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
Chas. H. Young.
J. Shafer

Donald D. Ormsby
Inventor
Parsons Hall & Bodeen
By Attorneys

D. D. ORMSBY.

COMPENSATING GEARING.

APPLICATION FILED MAY 18, 1914.

1,352,910.

Patented Sept. 14, 1920.

3 SHEETS—SHEET 3.

Fig. 3.

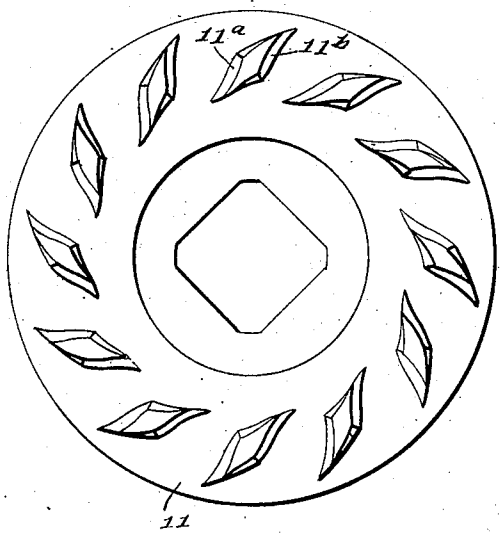


Fig. 4.

Fig. 5.

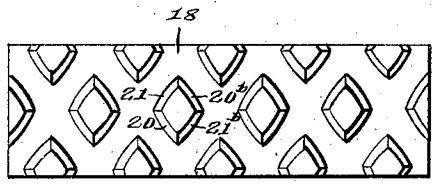


Fig. 6.

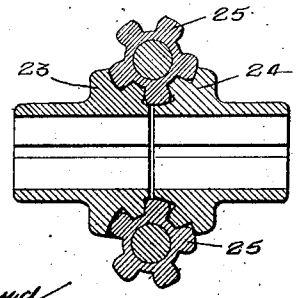
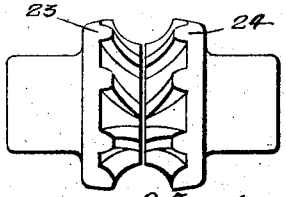


Fig. 7.



Witnesses:
Chas. H. Ormsby.
J. Glazier

Donald D. Ormsby Inventor
By Parmenter Hall & Brdeen
Attorneys

UNITED STATES PATENT OFFICE.

DONALD D. ORMSBY, OF SYRACUSE, NEW YORK, ASSIGNOR TO BROWN-LIPE-CHAPIN CO., OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

COMPENSATING GEARING.

1,352,910. Specification of Letters Patent. Patented Sept. 14, 1920.

Application filed May 18, 1914. Serial No. 839,359.

To all whom it may concern:

Be it known that I, DONALD D. ORMSBY, a citizen of the United States, and a resident of Syracuse, in the county of Onondaga and State of New York, have invented a certain new and useful Compensating Gearing, of which the following is a specification.

This invention relates to compensating gearing and has for its object a gearing in which the equalizing action is restrained in order that considerable propelling power will be delivered at all times to both driving members of a motor vehicle, so that at no time one driving member will receive all the power to the exclusion of the other, and it consists in the combinations and construction hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings, in which like characters designate corresponding parts in all the views.

Figure 1 is a horizontal sectional view through my compensating gearing, the contiguous part of the driving shaft and pinion thereon being also shown.

Fig. 2 is a sectional view taken at a right angle to Fig. 1.

Figs. 3 and 4 are, respectively, face views of the opposing gears of the gearing.

Fig. 5 is a developed view of the periphery of one of the compensating pinions.

Figs. 6 and 7 are detail views of modified form of my invention, Fig. 6 being a section through the opposing gears and the compensating pinions, and Fig. 7 a view of the periphery of the opposing gears.

This gearing comprises, generally, a driving element or casing, opposing gears, one having teeth inclining to the right and the other having teeth inclining to the left, and compensating pinions each having right and left helical teeth meshing with the teeth of said gears.

The gears here shown are what for convenience I have called a right crown spiral gear and a left crown spiral gear, and the teeth of each compensating pinion are formed by cutting right and left helices which intersect, so that each tooth is provided with right and left hand faces, that is, faces arranged in helices cut in opposite directions, said faces coacting with the teeth of the spiral crown gears respectively. This pinon is for convenience called a right and left helical pinion.

The casing includes opposing side sections 1, 2 and an intermediate section 3, the intermediate section 3 being in the form of a spider having a hub 4 and outwardly extending radial arms 5 formed with recesses 6, the ends of the arms 3 fitting into recesses 7, formed in opposing faces of the margins of the sections 1, 2 and the sections 1, 2 and 3 are held together by suitable means, as screws 8, extending through the margins of the sections 1, 2 and through the arms 5. The section 1 has secured thereto a suitable gear ring 9 which meshes with the driving pinion 10.

11 and 12 are the crown spiral gears which are in the form of disks having teeth on their opposing sides arranged in plane spirals, the teeth having faces 11^a and 12^a, the teeth of the gear 11 being right hand or progressing or inclining in a clockwise direction, and those of the gear 12 being left hand or progressing in an anti-clockwise direction. The faces 11^a, 12^a coact with the teeth of the compensating pinions when the vehicle is traveling forwardly and turning to the left, but when the vehicle is backing up and turning to the right so that the compensating gear is in action, faces 11^b, 12^b of the teeth coact with the teeth of the pinions. Each of the gears 11 and 12 is formed with a hub 13 which is journaled in a suitable bearing 14 in the section 1 or 2 and which receives the ends of a shaft section 15 or 16. The driving members of the motor vehicle are mounted on the outer ends of the shaft sections, as will be understood by those skilled in the art. The side sections 1, 2 of the casing are also provided with hubs 17 mounted on the shaft sections 15, 16, or on suitable bearings.

18 are what for convenience I have called, right-and-left hand helical pinions carried by the central section 3 of the casing within the recesses 6 and being arranged with their axes extending crosswise of the casing or of the gears 11 and 12, and as here shown, they are mounted upon spindles 19 extending through the recesses 6 and located midway between opposing faces of the gears 11, 12 and parallel to said faces and in circular series around the axis of the dif-

ferential gear, that is, the axis of the shafts 15, 16.

The faces of the teeth of each gear 18 are cut along two spirals or helices, as seen in the developed view in Fig. 5, which helices progress in opposite directions, thereby forming on the teeth, right and left hand faces 20, 21, the faces 20 coacting with the faces 11^a of the teeth of the gear 11 and the faces 21 coacting with the faces 12^a of the teeth of the gear 12. Each tooth of the helical pinions is also formed with rear faces 20^b, 21^b which, during rearward rotation of the gears 11, 12 and when the compensating gearing is in action, coact with the faces 11^b, 12^b of the gears.

Although the pinions are shown as mounted upon spindles 19, they may be mounted or supported in any other suitable manner. Usually, for the purpose of facilitating the holding of the spindles in position, the spindles are paired and the contiguous or meeting ends of each pair of spindles are lapped and secured together in any suitable manner, as shown at 22.

The inclinations of the teeth of the crown and spiral gears and the helical pinions, are such that the pinions do not lock but compensating action of the pinions takes place practically only when the vehicle is turning a curve and does not take place at all times when the ground wheels have unequal traction, as is the case in ordinary compensating gears. Instead of crown spirals, other gears having teeth inclining in opposite directions may be employed, as shown in Figs. 6 and 7, in which worm gears 23, 24 are shown, the teeth of which are inclined in opposite directions, and with which mesh teeth of a helical pinion 25 having right and left teeth.

This gearing is particularly advantageous in that it consists of a few number of parts, and that owing to the arrangement of the teeth of the crown gear and helical pinions, compensating action takes place, that is, the pinions transmit driving motion to the outside wheel of a vehicle, and owing to the fact that a right-and-left hand helical gear is used to mesh with the crown spiral gears, it is unnecessary to reverse the movement of the interposed pinions.

What I claim is:—

1. A compensating gearing comprising a casing including opposing side sections having opposing peripheral flanges, an intermediate section having a transverse recess therethrough and flanges extending between the peripheral flanges of the side sections, and means extending through the flanges of the side sections to clamp the same together onto the intermediate section, opposing gears located in the side sections, and a compensating pinion supported in the recess in the intermediate section and arranged with its axis extending crosswise of the axis of the opposing gears and of a line radial to the axis of the opposing gears, substantially as and for the purpose described.

2. A compensating gearing comprising opposing gears, compensating pinions meshing with the gears and interposed between the same, the compensating pinions being arranged with their axes substantially parallel to the opposing faces of the gears, spindles upon which the pinions are mounted, the spindles being arranged in circular series and in pairs, the spindles of each pair being arranged end to end, and having their meeting ends secured together, substantially as and for the purpose set forth.

3. A compensating gearing comprising a casing including opposing side sections and an intermediate section between the side sections including a hub and outwardly extending arms formed with recesses, opposing gears mounted in the side sections, compensating pinions mounted in the recesses, spindles upon which the pinions are mounted, the spindles extending between the gears and arranged in circular series and in pairs, and the spindles of each pair being arranged end to end and secured together, substantially as and for the purpose specified.

4. A compensating gearing comprising a casing including opposing side sections and an intermediate section between the side section, the intermediate section being formed with recesses, and fastening means passing through the margins of the side sections, and through the intermediate section, crown spiral gears mounted in the opposing side sections, and compensating helical pinions mounted in the recesses and having teeth formed with right and left faces for engaging with the teeth of the crown spiral gears respectively, substantially as and for the purpose set forth.

In testimony whereof, I have hereunto signed my name in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 25th day of April, 1914.

DONALD D. ORMSBY.

Witnesses:
S. H. Cook,
W. M. Evans.