

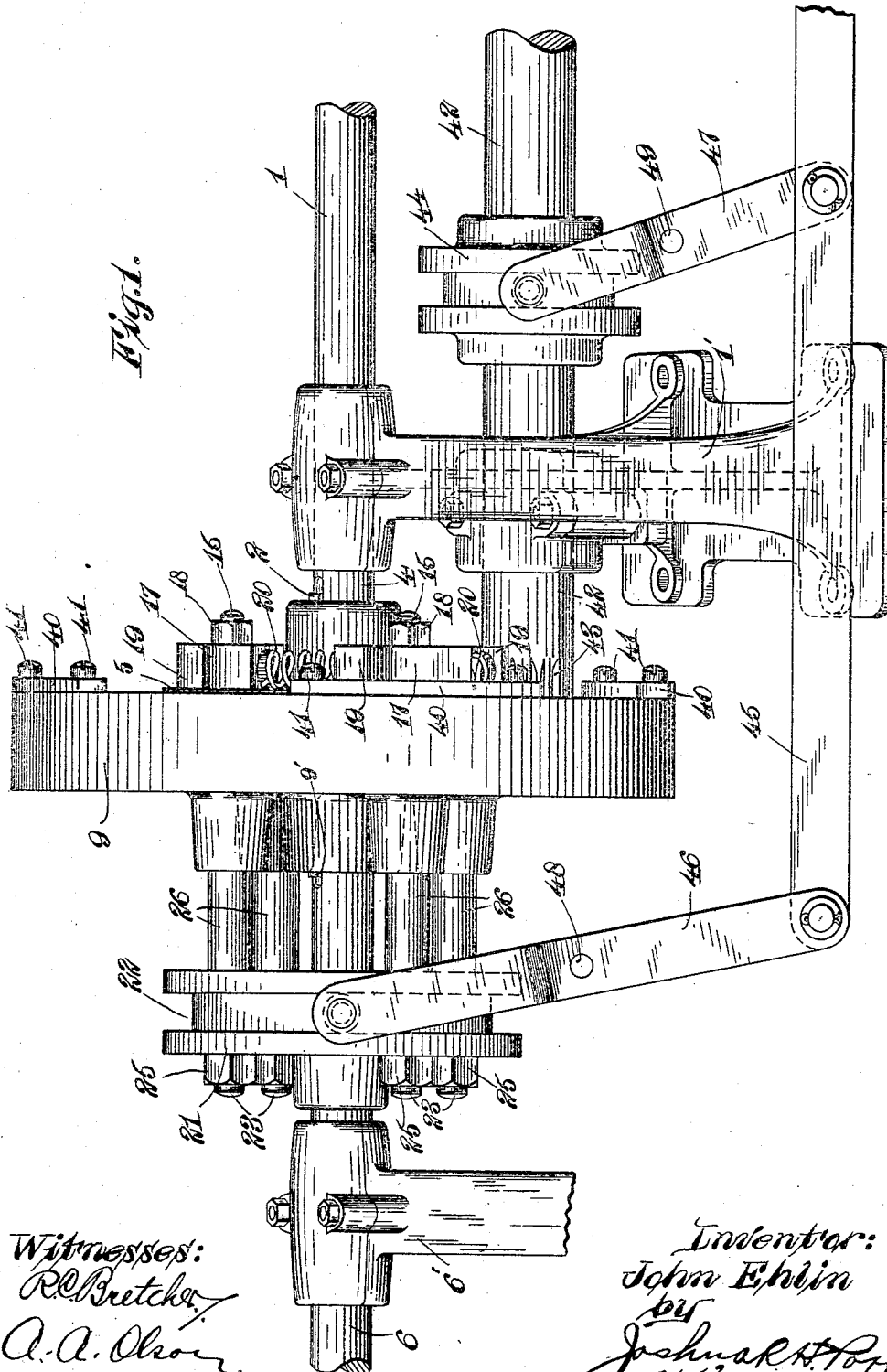
J. EHLIN.
GEARING.

APPLICATION FILED NOV. 4, 1908.

931,850.

Patented Aug. 24, 1909.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

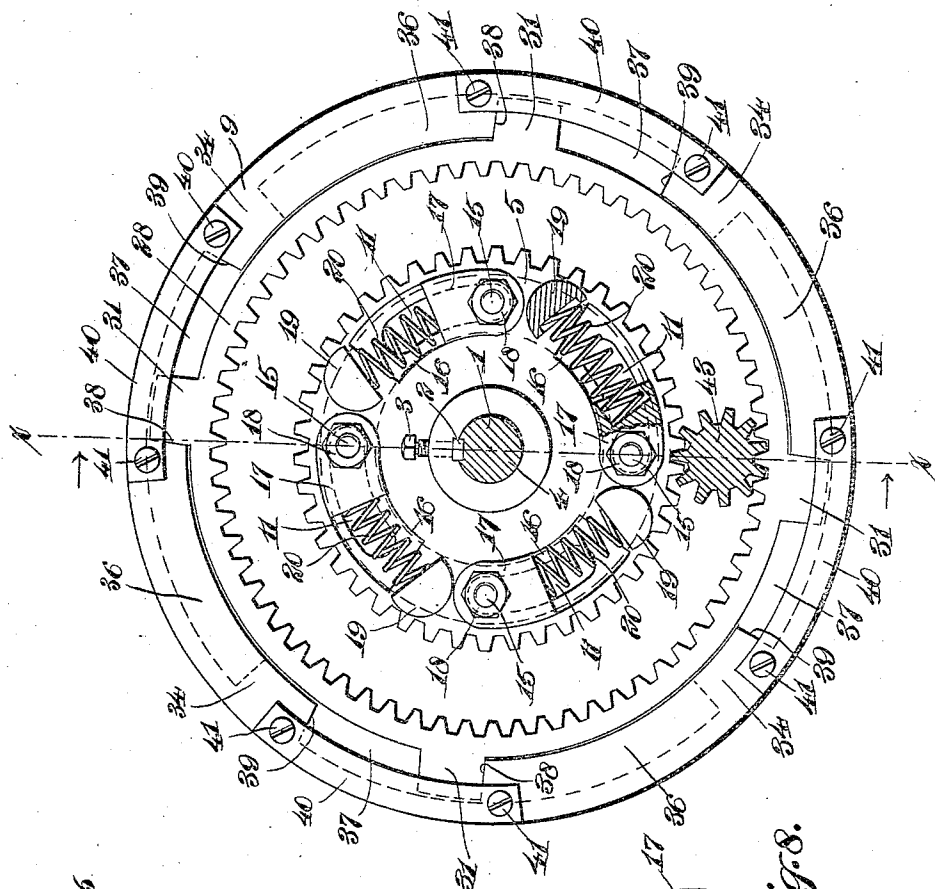


Fig. 8.

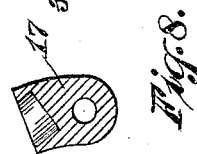


Fig. 7.

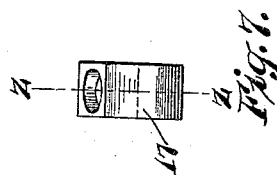


Fig. 6.



Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 4.

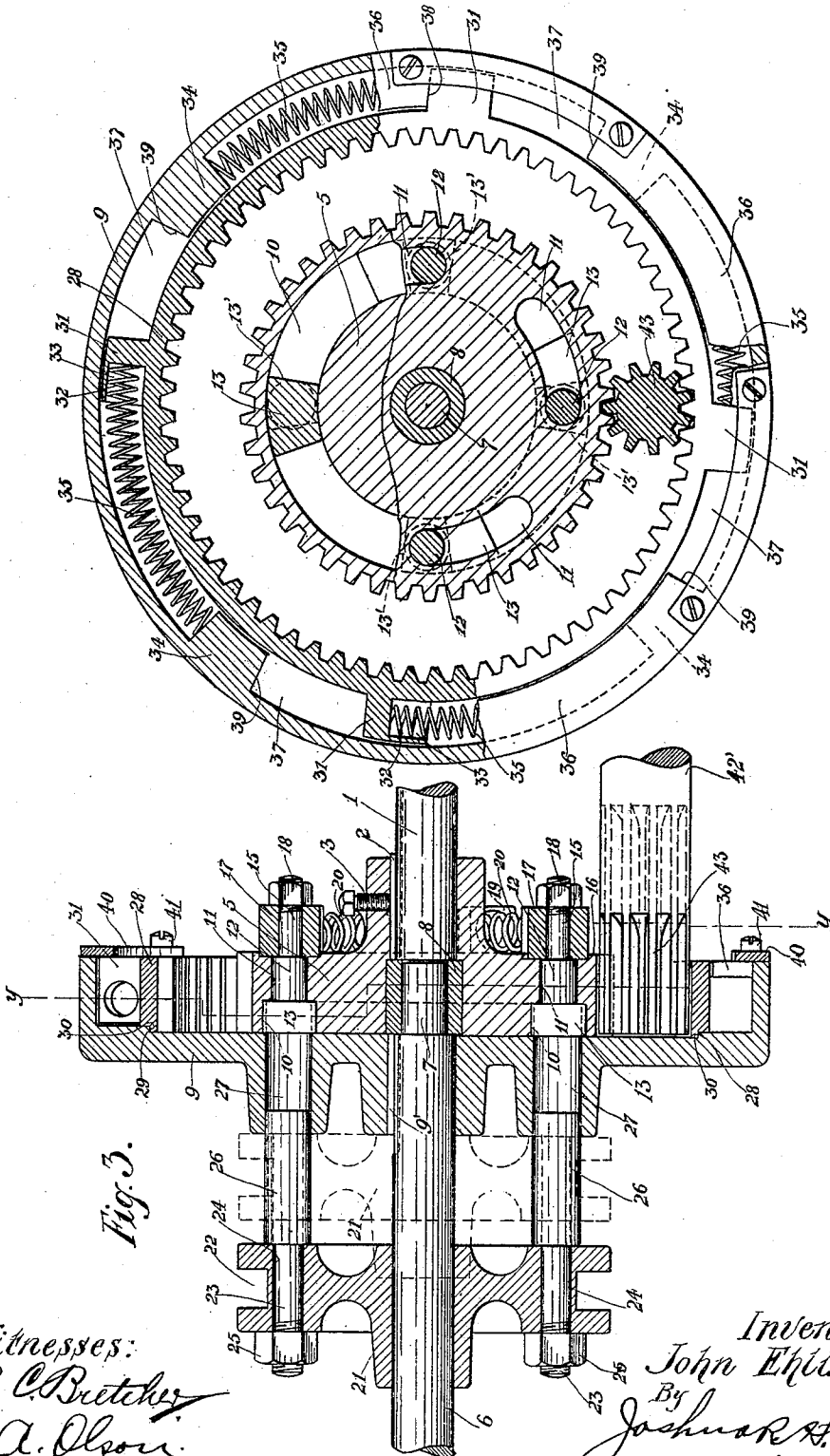


Fig. 3.

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GEARING.

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To all whom it may concern:

Be it known that I, JOHN EHLIN, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Gearing, of which the following is a specification.

My invention relates to gearing, and the object of the same is to provide a device of the character mentioned which will be of such construction as to be adapted to impart either direct or reverse motion from a drive-shaft to a driven-shaft.

A further object of my invention is to provide a gearing of such improved construction that the same will not readily get out of order, and one which will be of the highest possible efficiency.

A still further object of my invention is to provide a device which will be comparatively simple of construction, hence, of low cost to manufacture.

Other objects will appear hereinafter.

With these objects in view, my invention consists in a gearing device characterized as above mentioned, and in certain details of construction and arrangement of parts all as will be hereinafter fully described and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is an oblique elevation of the preferred form of my device taken at an angle of substantially 30 degrees, Fig. 2 is an end elevation thereof, portions of the same being broken away so as to better illustrate the construction, Fig. 3 is a vertical longitudinal section taken substantially on the line $x-x$ of Fig. 2, Fig. 4 is a vertical transverse section taken substantially on the line $y-y$ of Fig. 3, Figs. 5 and 6 are front and side elevations, respectively, of one of the dog members embodied in my invention, Fig. 7 is a side elevation of one of the slidable spring seat-forming members embodied in my invention, and Fig. 8 is a transverse section taken on the line $x-x$ of Fig. 7.

Referring now to the drawings, 1 indicates a drive-shaft which may be mounted in any suitable bearing, but preferably as I have shown, in a bearing bracket 1', said shaft being driven by any suitable means. Suitably fixed, preferably by means of a key 2 and a lock-screw 3 to the end portion

4 of said shaft 1, is a gear-wheel 5. In axial alinement with the shaft 1, and mounted in a suitable bearing 6', is a driven-shaft 6, the end portion 7 of which is journaled in a bushing 8 provided in the gear-wheel 5. Suitably fixed, preferably by means of a key 9' to the shaft 6, adjacent to the gear-wheel 5, is a cup member 9. The gear-wheel 5 is provided, upon the face thereof adjacent to the cup member 9, with an annular groove or channel 10, the same being arranged therein concentric with the shafts 1 and 6. Equally spaced apart in the gear-wheel 5 and in alinement with the groove 10 provided therein, are arcual slots 11, preferably four in number, the same being of a width slightly less than that of the groove 10, for reasons that will be obvious as the description proceeds. Slidably resting in said groove 10, the reduced shanks 12 thereof slidably resting in the slots 11, are heads 13 of the dogs 14. The end faces 13' of said dog heads 13 are radially disposed, the opposite end portions of said heads being tapered, as clearly shown in Fig. 6 of the accompanying drawings, for a purpose as will be hereinafter stated. Secured to the reduced portion 15 of each of said shanks 12, the same resting in shallow arcual grooves 16 provided for the reception and guidance of the same are spring seat-forming members 17, the same being held in position upon said shanks 12 by lock-nuts 18 threaded upon said end portions 15 of said shanks 12. Interposed between, that is, having their end portions resting in said members 17 and seat-forming projections 19, preferably formed integrally with the gear-wheel 5, are compression-springs 20, said construction and arrangement of parts being clearly shown in Fig. 2.

Loosely mounted upon the shaft 6 adjacent to the cup member 9 is a channel-wheel 21, 22 indicating the peripheral channel therein. Equally spaced apart upon said channel-wheel 21, the reduced shanks 23 thereof being rigidly held in position in circular slots 24 provided for the reception of the same in said gear-wheel 21, preferably by means of lock-nuts 25 threaded upon said shanks, are cylindrical pins 26, preferably four in number. Said pins are so disposed that the axes thereof are parallel with and equi-distant from the axis of the shank 6. The outer end portions of said pins 26 slidably rest in circular slots 27 provided for

the reception of the same in the cup member 9, said end portions being adapted when the channel-wheel 21 is laterally moved by the shaft 6 toward the cup member 9 to enter the groove 10 provided in the gear-wheel 5, that is, in the direct path of the dog-heads 13 resting in said groove.

28 indicates an internal gear-wheel, the same being loosely, that is, rockingly mounted in the cup member 9. An external shoulder 29 formed upon the inner surface of the gear-wheel 28, said shoulder resting against an internal shoulder 30 formed in the member 9, forms a bearing for the gear-wheel 28. The periphery of the gear-wheel 28 is provided at points equally spaced apart thereon, with slotted radially projecting lugs 31, preferably four in number. Having their end portions 32 resting in the slots 33 provided in said lugs 31, the same being interposed between the latter and inwardly projecting lugs 34 preferably formed integrally with the cup member 9, are compression-springs 35, said member 9 being also provided with integral inwardly projecting flanged portions 36, to facilitate holding said springs in position. Said flanged portions 36 are of such lengths that intervals 37 of equal lengths remain between the extremities 38 thereof and the face 39 of the lugs 34, in which intervals the lugs 31 of the internal gear-wheel 28 rest, as clearly shown in Fig. 4. In order to facilitate locking said internal gear-wheel 28 in position, or against any lateral movement in the cup member 9, I provide sectoral plates 40. Said plates span the intervals 37, the same secured to said member 9 upon the outer surface thereof, preferably by means of screws 41, obviously serving the purpose stated. Slidably mounted in any suitable manner, but preferably as shown in the drawings, in the bearing bracket 1' is a lay-shaft 42. Formed upon the inner end portion 42' of said shaft 42 is an idler-gear 43 adapted to mesh with and transmit motion from the gear-wheel 5 and the internal gear-wheel 28. Fixed to said shaft 42 is a channel-wheel 44. By means of a double switch-fork 45 the single fork arms 46 and 47 of which engage, respectively, the channels of the channel-wheels 21 and 44, said arms being pivoted at 48 and 49, simultaneous movement of the pins 26 and the shaft 42 is facilitated, the advantage of such simultaneous movement being hereinafter fully described.

In the employment of my device, when direct motion is desired, the switch-fork and the wheels 21 and 44, by the arrangement as shown in the drawings, are thrown to the right, thereby forcing the pins 26 and the idler-gear 43 to the right, in which event, the end portions of said pins 26 are obviously forced into the grooves 10, said idler-gear being forced out of engagement with

the gear-wheels 5 and 28, said position of such parts being shown in dotted lines in Fig. 3. Now as the gear-wheel 5 is revolved the surface 13' of the dogs 13 will abut the end portions of said pins 26, thereby imparting rotary movement to said pins and hence, to the cup member 9. The latter being fixed to the shaft 6, said shaft is thus directly driven from the drive-shaft 1. By the provision of the compression springs 20, as the pins 26 are thrown into engagement, that is, as the dogs 13 abut said pins, the drive-shaft being in motion, the jarring which naturally will result because of the inertia of said pins and the parts fixed thereto, will be obviated, it being obviously taken up by said springs, the latter acting in the capacity of cushions. By forming the end portions of the dogs 13 tapering in construction, as before stated, if for any accidental cause the shaft 6 should be caused to revolve in a reverse direction, the pins 26 will obviously be forced out of engagement with said dogs automatically, resulting in an obvious advantage.

If reverse motion is desired, the switch-fork is thrown in the opposite direction, in which event, the pins 26 will obviously be forced out of the groove 10, hence, out of engagement with the dogs 13, the idler-gear 4 being thrown into mesh with the gears 5 and 28, such position being clearly shown in full lines in Fig. 3. Through the medium of the idler 43, the internal gear 28 will be caused to revolve in a direction opposite to that of the gear-wheel 5, or the shaft 1. Said internal gear-wheel 28 because of the lugs 31 abutting the end surfaces of the flanged portions 36 of the cup member 9, obviously cause the latter, and hence the shaft 6 to be revolved in the same direction as said gear-wheel 28, hence, reverse motion may be obtained. The springs 35, when the switch-fork is thrown for reverse motion, that is, when the idler-gear 34 is thrown into mesh, serves a purpose similar to that of the springs 20, as before described. Said pins 26 and the idler-gear 43 are so positioned with relation to each other, that when the switch-fork is in an intermediate position, both will be in a position just out of engagement, hence, my gearing will be in neutral position, neither direct nor reverse motion in this case being transmitted.

By the provision of gearing as described, it is evident that direct or reverse motion may be transmitted from a shaft driven in one direction, and that with the least possible jarring or jolting of the parts.

While I have shown what I deem to be the preferable form of my device, I do not wish to be limited thereto, as there might be many changes made in the details of construction and arrangement of parts without departing from the spirit of my invention.

Having now described my invention what I claim as new and desire to secure by Letters Patent, is:

1. The combination with a drive-shaft, of
5 a gear-wheel fixed to the extremity of said shaft, a second shaft in axial alinement with said drive-shaft, a cup member fixed to said second shaft adjacent to said gear-wheel, cushioned means adapted to operably connect
10 said gear-wheel and said cup member, an internal gear mounted in said cup member in cushioned connection with said cup member, and means adapted to be thrown into mesh with said first-mentioned gear-wheel and said internal gear-wheel whereby
15 the latter will be driven in a direction opposite to that of the former, substantially as described.

2. The combination with a drive-shaft, of
20 a gear-wheel fixed to the extremity of said shaft, a second shaft in axial alinement with said drive-shaft, a cup member fixed to said second shaft adjacent to said gear-wheel, slidable cushioned means adapted to operably connect said gear-wheel and said cup
25 member, an internal gear-wheel mounted in said cup member, and means simultaneously slidable with said first-mentioned cushioned means adapted, when the last-mentioned means are thrown out of operable connection
30 to be thrown into mesh with said first-mentioned gear-wheel and said internal gear whereby the latter will be driven in a direction opposite to that of the former, substantially as described.

3. In a device of the class described, the combination of a drive-shaft, of a gear-wheel fixed to the extremity of said shaft, said gear-wheel being provided with an annular
40 groove and a plurality of arcual slots leading from said groove, dogs slidably secured in said slots the head thereof resting in said groove, spring means adapted to normally keep said dogs at the forward extremities of
45 said slots, a second shaft in axial alinement with said drive-shaft, a cup member fixed to said shaft adjacent to said gear-wheel, said cup member being provided with a plurality of slots in alinement with the annular
50 groove in said gear-wheel, pins longitudinally slidable in the slots in said cup member, the end portions of said pins being adapted to enter said annular groove in said gear-wheel, a sliding gear, and cushioned
55 means adapted to be coupled to said gear wheel by said sliding gear to drive said cup member in a direction opposite to that of said drive shaft, substantially as described.

4. In a device of the class described, the
60 combination with a drive-shaft of a gear-wheel fixed to the extremity of said drive-shaft, said gear-wheel being provided with an annular groove and a plurality of arcual slots leading from said groove, dogs, the
65 shanks thereof being slidably secured in

said slots, the heads thereof resting in said annular groove, compression springs interposed between said dogs and seats provided upon said gear-wheel, said springs being adapted to normally keep said dogs at the forward extremities of said slots, a second
70 shaft in axial alinement with said first-mentioned shaft, a cup member fixed to said shaft adjacent to said gear-wheel, means slidably mounted in said cup member adapted to enter said annular groove, a sliding gear-wheel, and cushioned means adapted to be coupled with said first-mentioned gear-wheel to drive said cup member in a direction opposite to that of said drive-
80 shaft, substantially as described.

5. In a device of the class described, the combination with a drive-shaft of a gear-wheel fixed to the extremity of said shaft, dogs slidably mounted in a plurality of
85 arcual slots provided in said gear-wheel, spring seat-forming members secured to the externally projecting end portions of the shanks of said dogs, compression springs interposed between said seat members and seat-forming projections provided upon said
90 gear-wheel, said compression springs being adapted to normally keep said dogs at the forward extremities of said slots, a second shaft in axial alinement with said first-mentioned shaft, a cup member fixed to said shaft adjacent to said gear-wheel, a wheel loosely mounted upon said second shaft, pins projecting longitudinally from said wheel the projecting end portions of said pins slidably resting in slots provided in said cup
100 member, said pins being adapted to be slid into the circular path of the heads of said dogs, a sliding gear-wheel adapted to be slid into mesh with said first-mentioned gear-wheel, cushioned means adapted to mesh with said sliding gear-wheel for driving said cup member in a direction opposite to that of said drive-shaft, and shifting means connecting said sliding gear-wheel
110 and the before-mentioned pin-supporting wheel whereby when one is thrown into engagement, the other will be thrown out of engagement, substantially as and for the purpose specified.

6. In a device of the class described, the combination with a drive-shaft of a gear-wheel fixed to the extremity of said shaft, a second shaft in axial alinement with said drive-shaft, a cup member fixed to said second
120 shaft adjacent to said gear-wheel, cushioned means adapted to operably connect said gear-wheel and said cup member, an internal gear mounted in said cup member, said internal gear being provided with radially projecting peripheral lugs and said cup member being provided with inwardly projecting lugs, said lugs lying interjacent each other, cushion means interposed between said lugs, means for locking said internal
130

gear against lateral movement in said cup member, and a sliding gear adapted to simultaneously mesh with said first-mentioned gear-wheel and said internal gear, substantially as described.

7. In a device of the class described, the combination with a drive-shaft, of a gear-wheel fixed to the extremity of said shaft, a second shaft in axial alinement with said drive-shaft, a cup member fixed to said second shaft adjacent to said gear-wheel, slidable means adapted to form connections between said gear-wheel and said cup member, an internal gear rotatably mounted in said cup member, said gear being provided with spring seat-forming peripheral lugs radially projecting therefrom and said cup member being provided with inwardly projecting lugs, said last-mentioned lugs lying

interfacient said first-mentioned lugs, compression springs interposed between said lugs, means for holding said springs in position between said lugs, a sliding gear-wheel adapted to simultaneously mesh with said gear-wheel and said internal gear, and means connecting said slidable gear and said first-mentioned slidable means whereby when one of said elements is thrown into engagement, the other will simultaneously be thrown out of engagement, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN EHLIN.

Witnesses:

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HELEN F. LILLIS.