H. CORWIN, JR.

DRIVING MECHANISM FOR AUTOMOBILES.

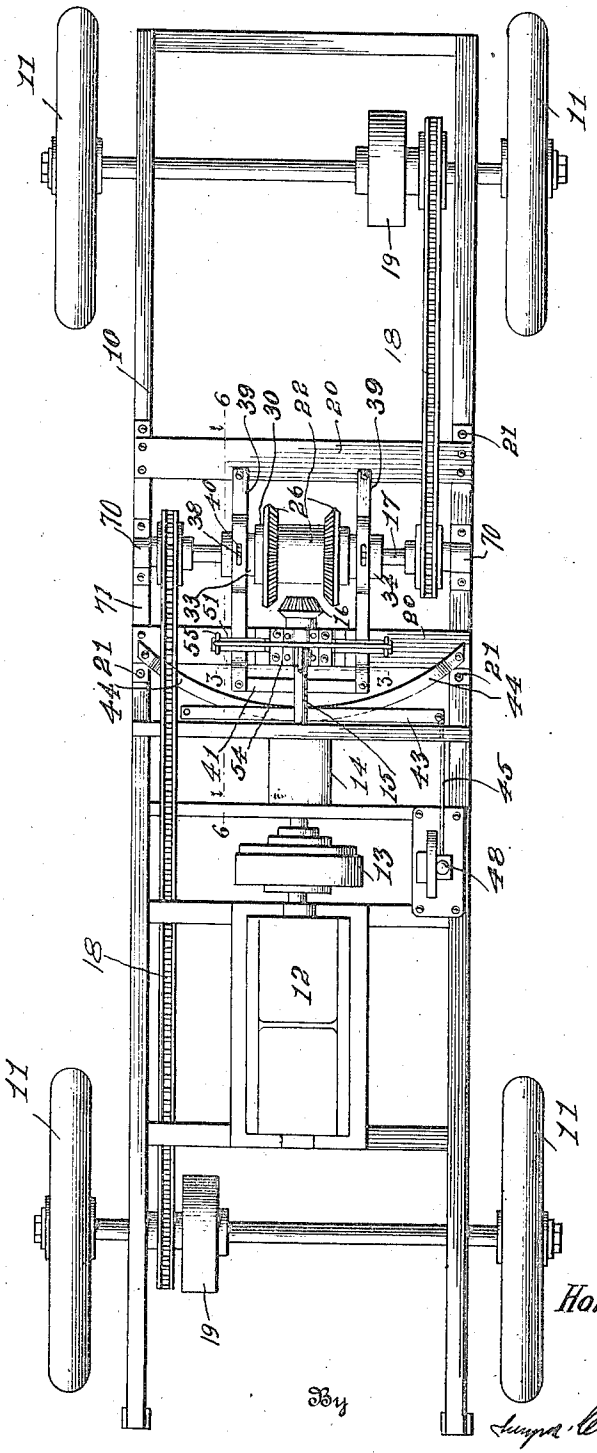
APPLICATION FILED JULY 3, 1917.

1,247,229.

Patented Nov. 20, 1917.

4 SHEETS—SHEET 1.

FIG. 1.



Witness

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4 SHEETS—SHEET 2.

Fig. 2.

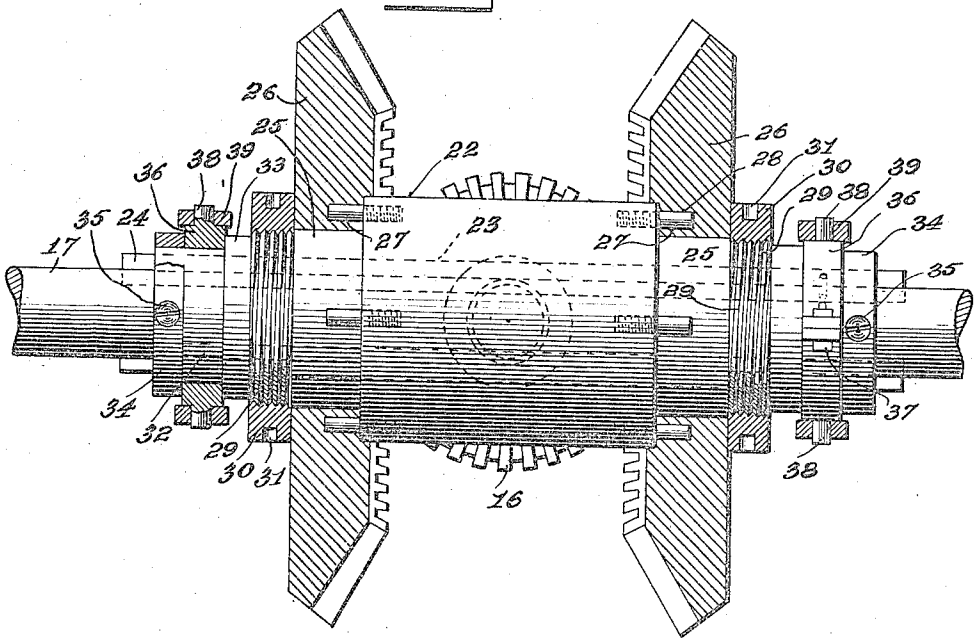


Fig. 3.

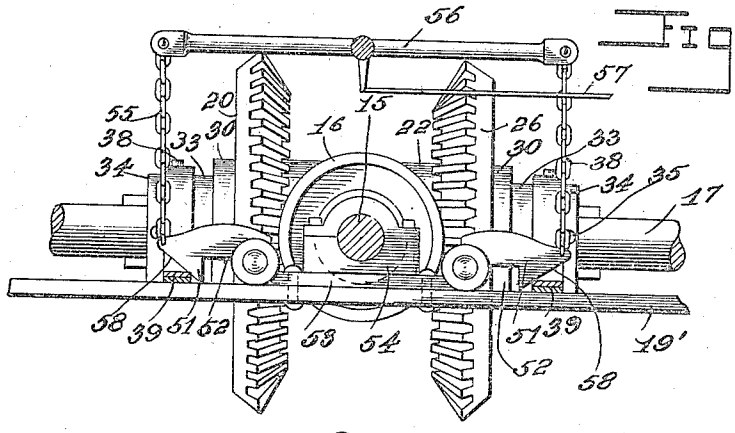
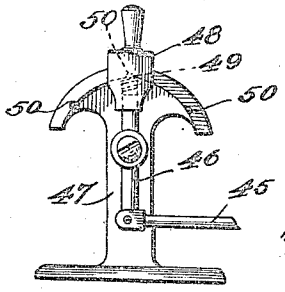


Fig. 10.



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4 SHEETS—SHEET 3.

Fig. 4.

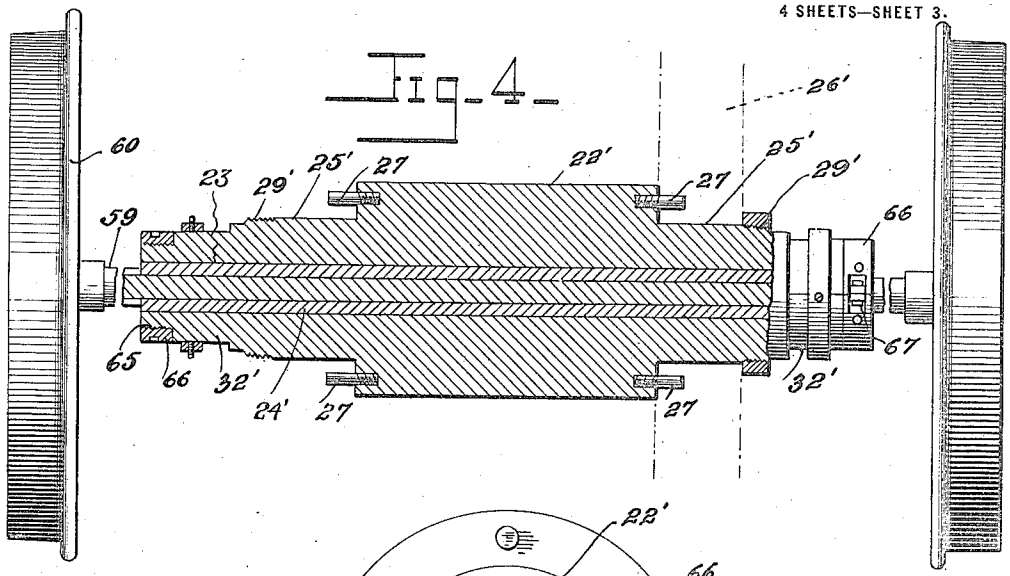


Fig. 5.

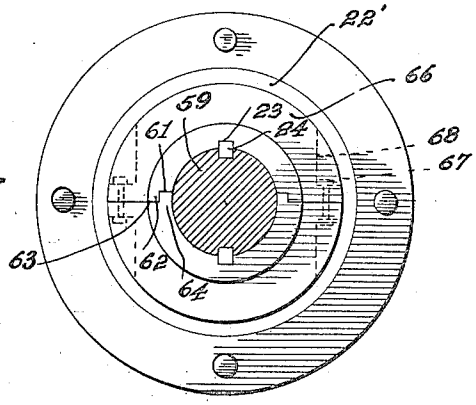
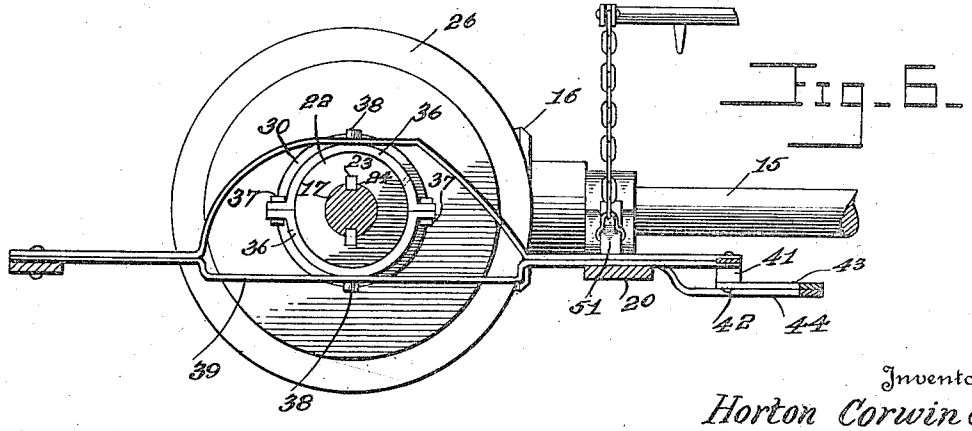


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 7.

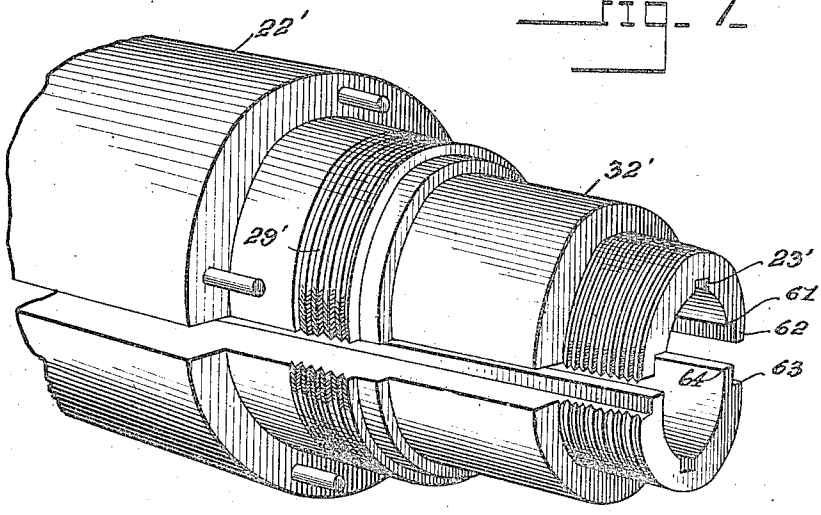
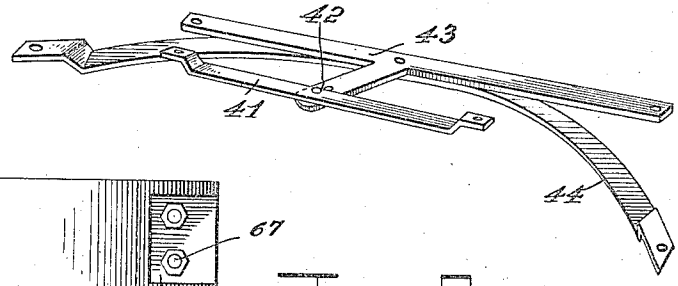


Fig. 8.



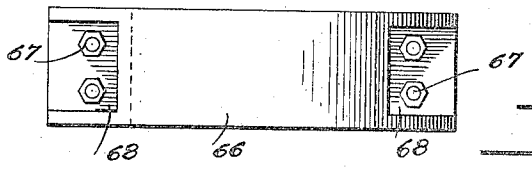


Fig. 9.

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UNITED STATES PATENT OFFICE.

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DRIVING MECHANISM FOR AUTOMOBILES.

1,247,229. Specification of Letters Patent. Patented Nov. 20, 1917.

Application filed July 3, 1917. Serial No. 178,390.

To all whom it may concern:

Be it known that I, HORTON CORWIN, Jr., a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Driving Mechanism for Automobiles, of which the following is a specification.

This invention relates to transmission mechanism for vehicles and has particular reference to reversing gears for controlling the direction of movement of the vehicle to which they are applied.

The objects of my invention are to provide reversing gears for controlling the direction of motion of the vehicle to which they are applied without reversing the direction of motion of rotation of the motor or engine, or affecting the position of the drive shaft thereof; to provide a reverse gearing which comprises a relatively few number of parts and which is very simple in construction and efficient in operation; and, generally, to provide a reverse gearing which is strong and durable so that it will withstand the strains to which it is subjected, and the necessity of frequent renewal or repair of parts is done away with.

I am aware that it is broadly old to provide a pair of oppositely disposed reversing gears upon a shaft and means for shifting said gears so as to bring one of them into mesh with the gear or pinion of an engine or drive shaft when it is desired to proceed in a forward direction, and to bring the other reversing gear into mesh with the drive gear when proceeding in a rearward direction, and I make no broad claims to this construction of parts.

My invention consists in certain details of construction which go to make up a more compact and efficient arrangement of parts and these improvements are clearly illustrated in the accompanying drawings and described in the following specification.

In the said drawings:

Figure 1 is a top plan view of an automobile to which my invention is applied, the body of the automobile being removed.

Fig. 2 is a sectional view taken longitudinally through the reverse gearing.

Fig. 3 is a transverse view taken on the line 3—3 of Fig. 1.

Fig. 4 illustrates my invention applied to the car axle of a usual type.

Fig. 5 is an end elevational view of the sleeve shown in Fig. 4, the axle being shown in section.

Fig. 6 is a view taken on the line 6—6 of Fig. 1.

Fig. 7 is an exploded view showing in perspective the parts of the sleeve which are adapted to carry the reversing gears.

Fig. 8 is an enlarged perspective view of the mechanism for shifting the gears.

Fig. 9 is a top plan view of a ring for maintaining the parts of the sleeve shown in Fig. 7 in assembled relation.

Fig. 10 is an outside elevational view of a lever mechanism for shifting the reversing gears.

Referring to the drawings wherein like numerals designate like parts in the several views, 10 designates an automobile frame of any suitable construction mounted upon wheels 11 and carrying an engine 12, a fly wheel 13, and a speed transmission mechanism 14. 15 designates the drive shaft of the engine which carries a bevel gear or pinion 16. In the embodiment shown in Figs. 1 and 2, I have illustrated all four wheels of the vehicle as being driven, the front and rear axles being connected with a driven jack shaft 17 by means of chains 18. The chains pass about sprocket wheels connected to differential mechanisms, housed within the casings 19 so that the wheels may be revolved at different speeds when the vehicle is turning at an angle.

It is to be understood that, while I have shown, in the present instance my invention as applied to an automobile, my improvements are equally applicable for use in traction engines, logging cars, and in fact, any self-propelled vehicle. My invention may be applied to a vehicle in which only two wheels are driven. The transmission mechanism housed within the casing 14 is of the speed-changing type, that is, by properly shifting the gears therein the vehicle may be thrown into high, intermediate, or low speed.

The jack shaft 17 is carried by bearings 70, bolted or otherwise secured to the rectangular frame comprising the end members 71 and transverse members 20. The rectangular supporting frame carries all parts of the gear-reversing mechanism so that the entire mechanism may be readily secured to or removed from any motor vehicle. The

supporting frame is preferably secured to the side sills of the vehicle frame 10 by means of bolts 21.

Surrounding the jack shaft 17 and preferably located intermediate the ends thereof is a sleeve 22 the through-opening or bore of which is provided with key ways 23, which receive the longitudinally disposed keys 24 secured to the shaft 17 as clearly shown in Fig. 6. By this arrangement the jack shaft is caused to rotate when the sleeve is driven and at the same time the longitudinal or sliding movement of the sleeve relative to the jack shaft is provided for.

The sleeve adjacent its opposite end is provided with gear receiving portions 25 which are of reduced diameter, and over these portions oppositely disposed bevel gears 26 are adapted to be slipped. Extending outwardly from the ends of the central portions of the sleeve are dowel pins 27 which are received by correspondingly spaced recesses or openings 28 in the inner or opposed faces of the bevel gears 26 so that the sleeve and gears will rotate in unison. The dowel pins are preferably screwed into threaded portions in the body portion 23. The outer ends of the gear receiving portions 25 of the sleeve 22 are threaded as at 29 and, preferably, the screw threads at the opposite ends of the sleeve run in the same direction.

30 designates retaining rings having on their internal peripheries threads of the same pitch as the threads 29 so that the rings may be screwed upon the threaded portions of the sleeve and against the bevel gears to retain the latter in place. The rings 30 have recesses 31 for the reception of a spanner wrench or other suitable tool.

At each end of the sleeve 22 is a cylindrical portion 32 having a shoulder 33 at its inner end. Adapted to fit about the outer end of each of the cylindrical portions 32 of the sleeve is an annular ring 34 secured in place by means of a set screw 35. Between the ring 34 and shoulder 33 is a groove which receives a strap 36, this strap being in the form of a ring composed of two parts secured together by bolts 37. The sleeve rotates within the straps 36. It is to be noted that by making the straps 36 in two parts they may be readily inserted in place, and that the rings 34 may be readily adjusted lengthwise of the sleeve so as to take up any loose motion due to wear of the parts. Each of the straps 36 is provided with a pair of diametrically disposed radially extending studs or gudgeons 38.

The means for shifting the sleeve 22 together with the gears carried thereby comprises, in part, shipper levers 39. As shown in Fig. 6, these levers are each composed of two strips of metal bent outwardly intermediate their ends so as to provide loops which receive the straps 36. The shipper levers have slots 40 which receive the studs 38 of the straps 36. The shipper levers are in parallelism with each other and are pivoted at their rear ends to the transverse member 20 of the supporting frame. The forward or free ends of the shipper levers 39 are connected together by means of a cross-rod 41 and, preferably, the opposed faces of the forward ends of the strips of the shipper levers are rabbeted so as to provide recesses which receive the ends of the rod 41 as is clearly shown in Fig. 6. It will be seen from Fig. 3 that the forward ends of the shipper levers rest and slide upon the forward transverse member 20 of the supporting frame.

The cross-rod 41 is connected by means of a pin-and-slot connection 42 to the arm of the bell crank lever 43. The lever 43 is in the form of a T and is pivoted, where its arms intersect to a supporting bar 44 carried by the supporting frame and extending beneath the drive shaft 15. One of the ends of the transverse member of the T-lever 43 is connected by means of a rod 45 to a lever 46 pivoted intermediate its ends to a standard 47, (see Fig. 10). An operating handle 48 is provided with a longitudinal bore at its lower end into which the upper end of the lever 46 projects, and within the bore and engaging at one end against the upper end of the lever 46 is a spring 49 for normally urging the handle 48. The handle 48 carries a detent or finger which is adapted to engage in the notches 50 of the segmental portion of the standard for the purpose of locking the reversing gears in adjusted position. In the present instance three such notches are illustrated so that the reversing gears 26 may be locked in forward, central and reversed positions respectively. It is understood, of course, that the hand operating mechanism illustrated in Fig. 10, is shown by way of illustration only, and that any suitable lever mechanism may be employed. The rod 45 is connected to the left or right hand end of the T lever 43, depending on the position of the operating mechanism of the vehicle.

For the purpose of locking the reversing gears 26 in adjusted position and maintaining either of them in mesh with the drive gear 16, I provide a pair of oppositely disposed dogs or latches 51, each having a notch 52 for the reception of the forward ends of the shipper levers 39. The dogs are pivotally connected to the opposite ends of a plate 53 secured centrally of the forward member 20 of the supporting frame and, preferably, the plate 50 also carries a bearing block 54 for the drive shaft 15 of the engine.

The dogs or latches 51 are so disposed relative to the shipper levers that when the

reversing gears are in neutral position, that is, when neither of these gears is in mesh with the drive gear 16 of the engine, the shipper levers 39 lie outside of the notches 52 of the dogs. As there are no side thrusts on the reversing gears when in this position, the handle 48 is sufficient to retain them in adjusted position.

When it is desired to drive the vehicle in a forward direction one of the reversing gears, in the present instance the right-hand one, referring to Fig. 1, is thrown into mesh with the drive gear 16 by moving the handle 48 forwardly and thus rocking the T-lever 43 so as to swing the forward ends of the shipper levers to the left and move the right-hand shipper lever into position where it will engage in the notch 52 of the right hand dog 51. When the drive gear 16 is in mesh with one of the reversing gears 26 there is a tendency to force the reversing gear away from the drive gear, but by engagement of the shipper lever 39 within the notch 52, movement of the sleeve, together with the reversing gears carried thereby is guarded against. The shipper levers and the dog are made sufficiently strong to resist any strain exerted upon them. When it is desired to drive the vehicle rearwardly the handle 48 is moved rearwardly of the vehicle so as to move the left hand shipper lever 39 into registry with the notch 52 of the left hand dog 51.

When it is desired to release the shipper levers and for the purpose of lifting the free ends of the dogs 51, I have disclosed the dogs as being connected by means of chains 55 to the opposite ends of a pivoted bar 56. The bar 56 is connected by means of a rod 57, to a suitable hand operating mechanism, which may be similar in structure to the mechanism illustrated in Fig. 10. By rocking the bar 56 in the proper direction, the dog which is securing one of the shipper levers 39 may be lifted to permit shifting of the reversing gears. Preferably, each of the dogs 51 has a lower inclined surface 58 so that it is not necessary to raise both of the dogs simultaneously, as the shipper levers 39 when moving toward the pivotal points of the dogs automatically raise the latter.

In the embodiment of my invention disclosed in Figs. 4, 5 and 7, I have illustrated, for the purpose of showing one of the numerous applications of my invention of which it is susceptible, my improved reversing mechanism as applied to a car axle of the type to which the car wheels are fixed. 59 designates the axle head and 60 the car wheels fixed to the axle. The axle 59 is of reduced diameter intermediate its ends and about the reduced portion of the axle, the sleeve 22′ is mounted. In this embodiment of my invention, the sleeve 22′ is constructed of two complementary parts, and each of the parts has a key-way 23′ for the reception of keys 24′ carried by the axle. One part of the sleeve 22′ has its internal longitudinal edges rabbeted as at 61 so as to provide longitudinal ribs 62 along its outer peripheral edges and the other member is rabbeted adjacent its outer edges as at 63 so as to provide longitudinal ribs 64 adjacent its inner peripheral edges. The ribs 62 engage in the rabbeted recesses 63, and the ribs 64 in the rabbeted recesses 61, so that the parts are interlocked and can not become laterally displaced after they are properly secured together. The sleeve 22′ has an enlarged central portion, gear-receiving portions 25′, threaded portions 29′, and cylindrical extensions 32′. Reversing gears 26 are retained in place upon the gear-receiving portions 25′ by retaining rings threaded on the threaded portion 29′, as in the preceding embodiment. In this instance the outer ends of the cylindrical portions 32′ are of reduced diameter and are threaded at 65.

The two parts of the sleeve 25′ are secured together by means of rings 66 clearly shown in Figs. 4 and 5. These rings are made of two complementary parts and are secured together by means of bolts 67, the rings being recessed as at 68 so as to receive the heads of the bolts. The rings 66 are of such thickness that their outer peripheries are flush with the peripheries of the portions 32′ of the sleeve 22′ so that the straps 36 and the rings 34 may be slipped over the ends of the sleeve after it has been assembled on the axle 59.

It will be noted that by splitting the sleeve 22′ longitudinally into two semi-cylindrical parts, the sleeve may be readily applied to and removed from the car axle. If desired, each of the gears 26 may be made in two parts suitably bolted together. The split rings 66, primarily hold the parts of the sleeve together, and the gears 26, rings 34, and straps 36, reinforce the sleeve.

The sleeve 22′ disclosed in Figs. 4, 5 and 7, may be employed in the embodiment of my invention disclosed in Figs. 1 and 2, and my invention is susceptible to various modifications and changes which will be within the scope of the invention without departing from the spirit of the same.

What I claim as new is:—

1. In a gear mechanism, a driven shaft, a sleeve slidably mounted upon said driven shaft, a connection between said shaft and said sleeve permitting shiftable movement of said sleeve but causing the sleeve and shaft to rotate in unison, said sleeve having in its opposite ends the gear-receiving portions of reduced diameter, oppositely disposed bevel gears on said gear-receiving portions of said sleeve, interengaging means between said sleeve and said gears for causing

them to rotate in unison, said gear-receiving portions beyond said gears being threaded, retaining rings threaded on said threaded portions of said sleeve for maintaining said driven gears against movement relative to said sleeve.

2. In a gear mechanism, a drive shaft, a drive gear fixed upon the end of said drive shaft, a driven shaft at right angles to said drive shaft, a sleeve slidably mounted upon said driven shaft, a key on said driven shaft, a keyway in the central opening of said sleeve adapted to receive said key so that the driven shaft and sleeve rotate in unison, said sleeve having at its opposite ends gear-receiving portions of reduced diameter, oppositely disposed bevel gears on said gear-receiving portions of said sleeve, interengaging means between said sleeve and said gears for causing them to rotate in unison, said gear-receiving portions beyond said gears being threaded, and retaining rings threaded on said threaded portions of said sleeve for retaining said driven gears against movement relative to said sleeve.

3. In combination, a drive shaft, a drive gear fixed upon the end of said shaft, a transverse shaft, a sleeve slidably mounted upon said transverse shaft and having an enlarged central portion, gear receiving portions at opposite ends of said central portions and threaded portions outside of said gear-receiving portions, a connection between said transverse shaft and said sleeve permitting shiftable movement of said sleeve but causing the sleeve and shaft to rotate in unison, pins extending from the opposite ends of the central portion of said sleeve, a driven gear on each of the gear-receiving portions of said sleeve and oppositely disposed so that the teeth of said driven gears are adapted to be brought into mesh with said drive gear, recesses in the inner faces of said drive gears adapted to receive the projecting ends of said pins so that the sleeve and driven gears rotate in unison, retaining rings threaded upon the threaded portions of said sleeve against said driven bevel gears to retain the latter against longitudinal movement, and means for shifting said sleeve.

4. In a gear mechanism, a drive shaft, a gear fixed upon an end of said drive shaft, a transverse shaft, a sleeve mounted upon said transverse shaft and having an enlarged central portion, gear receiving portions at the ends of said enlarged portion, and threaded portions outside of said gear receiving portions, a key and key-way connection between said transverse shaft and said sleeve so as to permit of slidable movement of said sleeve relative to said shaft and cause the sleeve and shaft to move in unison, oppositely disposed bevel gears mounted in said gear-receiving portions and abutting against the ends of said central portion, retaining rings threaded upon the threaded portions of the sleeve for retaining the driven gears against lateral movement relative to said sleeve, a projection from the end of said sleeve having a circumferential groove, a ring rotatably mounted within said groove and a lever mechanism connected to said ring for shifting said sleeve together with the gears carried thereby.

5. In a gear mechanism, a drive shaft, a gear fixed upon an end of said drive shaft, a transverse shaft, a sleeve mounted upon said transverse shaft and having an enlarged central portion, gear-receiving portions at the ends of said enlarged portion, and threaded portions outside of said gear-receiving portions, a key and key-way connection between said transverse shaft and said sleeve so as to permit of slidable movement of said sleeve relative to said shaft and cause the sleeve and shaft to rotate in unison, oppositely disposed bevel gears mounted on said gear-receiving portions and abutting against the ends of said central portion, retaining rings threaded upon the threaded portions of the sleeve for maintaining the driven gears against longitudinal movement relative to said sleeve, cylindrical projections from the ends of said sleeve and each having a circumferential groove, a ring rotatably mounted within each of said grooves, a shipper lever connected to each of said rings, a connection between said shipper levers, and means swinging said levers so as to shift said sleeve and gears.

6. In a gear mechanism, a shaft, a sleeve mounted upon said shaft and having an enlarged cylindrical portion, gear-receiving portions at the ends of said enlarged portion, threaded portions outside of said gear-receiving portions, a connection between said transverse shaft and said sleeve permitting slidable movement of the sleeve relative to the shaft but causing the sleeve and shaft to rotate in unison, oppositely disposed bevel gears mounted on said gear-receiving portions and abutting the ends of said enlarged portion, retaining rings threaded upon the threaded portion of the sleeve for maintaining the driven gears against longitudinal movement relative to the sleeve, a cylindrical projection from one end of the sleeve having a circumferential groove, a ring or strap mounted within said groove, a shipper lever connected to said ring, and a dog or latch having a notch receiving said shipper lever for maintaining the same in adjusted position.

7. In a gear mechanism, a drive shaft, a gear fixed upon one end of said drive shaft, a transverse shaft, a sleeve mounted upon said transverse shaft, oppositely disposed bevel gears mounted upon said sleeve, straps

or rings about said sleeve, a pair of shipper levers each pivoted at one end, a connection between the shipper levers and said straps, and a dog or latch for each of said shipper levers for locking the same in adjusted positions.

8. In a gear mechanism, a drive shaft, a gear fixed upon one end of said drive shaft, a transverse shaft, a sleeve mounted upon said transverse shaft, oppositely disposed bevel gears mounted upon said sleeve, straps or rings about said sleeve, a pair of shipper levers each pivoted at one end, a pin-and-slot connection between the shipper levers and said straps, a dog or latch for each of said shipper levers for locking the same in adjusted positions, means for lifting said latches, and means for shifting said levers.

9. In a gear mechanism, a shaft, a sleeve mounted upon said shaft, a key and key-way connection between said shaft and said sleeve so as to permit of slidable movement of said sleeve relative to said shaft and cause the sleeve and shaft to rotate in unison, oppositely disposed bevel gears mounted upon said sleeve, cylindrical projections extending from the ends of said sleeve, a strap about each of said cylindrical projections and an adjustable ring upon each of said cylindrical projections for maintaining said straps in position, and levers connected to said straps.

10. In a gear mechanism, a shaft, a sleeve mounted upon said shaft, a connection between said shaft and said sleeve permitting of slidable movement of said sleeve relative to said shaft but causing the sleeve and shaft to rotate in unison, oppositely disposed bevel gears mounted upon said sleeve, a strap on each of the ends of said sleeve, and within which the sleeve is adapted to rotate, diametrically opposed pins or studs on said straps, shipper levers each having slots for receiving the studs of said straps, means for connecting the forward ends of said shipper levers, means for shifting said shipper levers, and means for locking the shipper levers in adjusted position.

11. In a gear mechanism, a shaft, a sleeve mounted upon said shaft and comprising two semi-cylindrical portions, each portion having a key-way, keys upon the shaft received by the key-ways of the sleeve, removable rings about the parts of the sleeve for maintaining the sleeve in assembled position upon the shaft, oppositely disposed bevel gears upon the sleeve, means for fixing the bevel gears upon the sleeve, and means for shifting said sleeve together with the bevel gears carried thereby.

12. In a gear mechanism, a shaft, a sleeve mounted upon the shaft and comprising two semi-cylindrical portions having inter-engaging ribs adjacent their edges, a key and key-way connection between the shaft and said sleeve, a split ring about each of the ends of the sleeve for maintaining the parts of the sleeve in assembled position, oppositely-disposed wheels upon the sleeve, straps upon the sleeve and within which the sleeve is adapted to rotate, and rings about the sleeve for retaining the straps in adjusted position.

13. In a gear mechanism, a shaft, a sleeve mounted upon said shaft, a connection between said shaft and said sleeve permitting of slidable movement of the sleeve relative to the shaft but causing the sleeve and shaft to rotate in unison, oppositely disposed bevel gears mounted upon the sleeve, a strap on each of the ends of the sleeve and within which the sleeve is adapted to rotate, shipper levers each pivoted at one end and each encircling one of said straps, a pin-and-slot connection between each shipper lever and its respective strap, means for connecting the forward ends of the shipper lever, and oppositely disposed dogs overlying the free ends of the shipper levers, each of said dogs having a notch for receiving one of the shipper levers.

14. In a gear mechanism, a shaft, a sleeve mounted upon said shaft, a connection between said shaft and said sleeve permitting of slidable movement of the sleeve relative to the shaft but causing the sleeve and shaft to rotate in unison, oppositely disposed bevel gears mounted upon the sleeve, a strap on each of the ends of the sleeve and within which the sleeve is adapted to rotate, shipper levers each pivoted at one end and each encircling one of said straps, a pin-and-slot connection between each shipper lever and its respective strap, means for connecting the forward ends of the shipper lever, oppositely disposed dogs overlying the free ends of the shipper levers, each of said dogs having a notch for receiving one of the shipper levers, means for shifting said shipper levers, and means for raising said dogs to release the levers.

In testimony whereof I have hereunto set my hand.

HORTON CORWIN, JR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."