No. 647,404. Patented Apr. 10, 1900.

W. HAY.

DRIVING MECHANISM FOR MOTOR VEHICLES, &c.

(Application filed June 17, 1899.)

(No Model.)

Fig. 1.

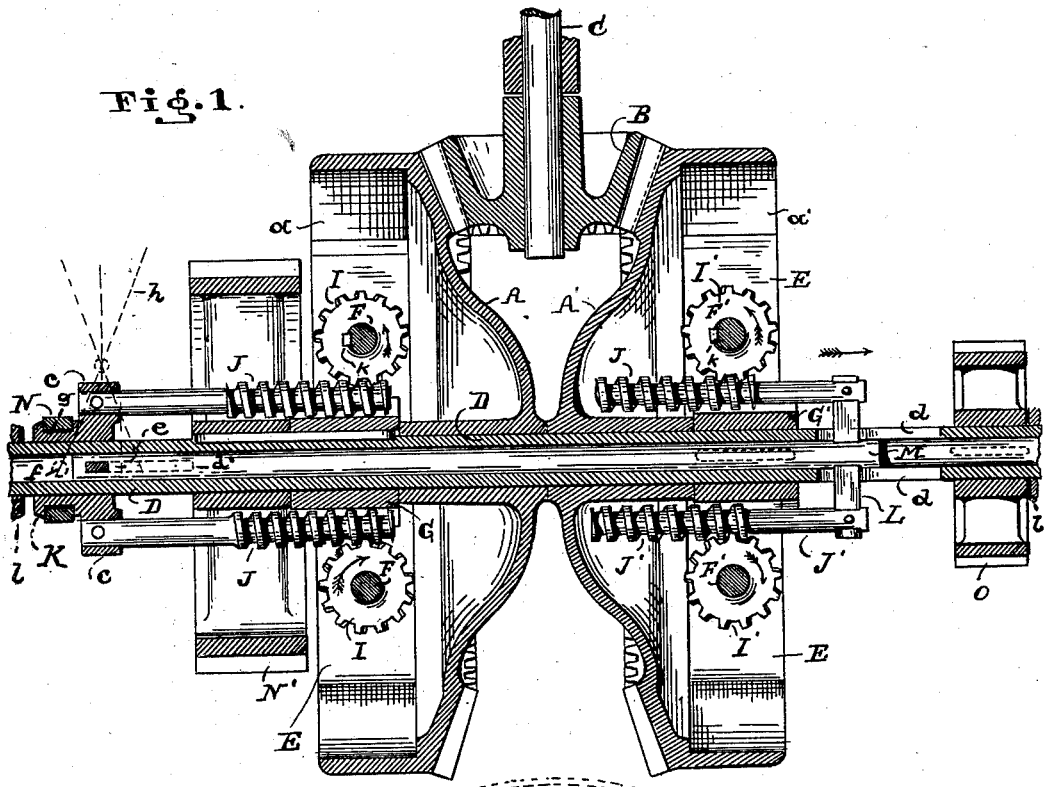
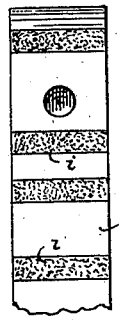


Fig. 3.



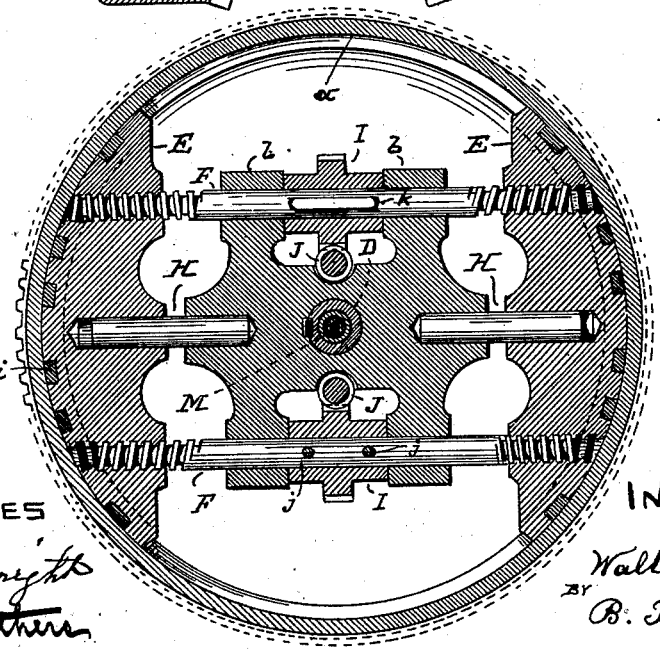
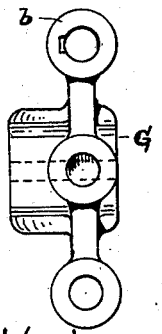


Fig. 2.

Fig. 4.



WITNESSES

John Enwright

James Mathers

INVENTOR

Walter Hay

BY B. F. Eibler Atty.

UNITED STATES PATENT OFFICE.

WALTER HAY, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO EMERSON M. HOTCHKISS, OF WATERBURY, CONNECTICUT.

DRIVING MECHANISM FOR MOTOR-VEHICLES, &c.

SPECIFICATION forming part of Letters Patent No. 647,404, dated April 10, 1900.

Application filed June 17, 1899. Serial No. 720,894. (No model.)

To all whom it may concern:

Be it known that I, WALTER HAY, a citizen of the United States of America, and a resident of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Driving Mechanism for Motor-Vehicles, &c., of which the following is a specification.

My invention relates to driving mechanism, particularly reversible mechanism, for motor-vehicles, boats, counter-shafting, &c.

The objects of my improvement are, first, to render such mechanism convenient for manipulation; second, to assure of a gradual, sensitive, yet powerful operation of such mechanism, and, third, to enable easy and proper adjustment of the working and wearing parts thereof. I attain these objects in a construction substantially as illustrated in the accompanying drawings, in which—

Figure 1 represents a central sectional view of said mechanism. Fig. 2 is a transverse sectional view of same, and Figs. 3 and 4 are side views of details hereinafter more fully described.

Like letters of reference denote like parts in the drawings and specification.

Substantially the mechanism consists of a set of driving-wheels, a friction gripping device for each of said wheels, means effecting alternately the action of one gripping device and inaction of the other, and a hollow shaft adapted for operative connection of all of these parts in the manner as presently set forth.

As shown, the driving-wheels A A′ are in geared connection with a beveled pinion B of a driving (motor) shaft C. However, belts or chains may be used for imparting motion to such wheels. Both of said wheels are adapted to revolve freely upon the hollow shaft D and are also provided with flanges or bands *a a′* to afford contact or bearing for the gripping-blocks E E E′ E′, which are formed to fit the inner surface of said bands. Each pair of blocks is connected by a set of spindles F F F′ F′, having right and left hand screw-terminals, and the spindles in turn extend through the guides *b b* of collars G G′, which are securely connected with the shaft D.

Center pins H H are provided to relieve the spindles of undue strains. However, said pins allow of a free movement of the blocks while or when being adjusted by means of said spindles.

Pinions I I′ are placed upon each spindle between the arms *b b*, (see Figs. 2 and 4,) and motion is imparted to said pinions by means of round racks J J and J′ J′. The racks J J are connected with the lugs *c c* of the grooved sleeve K, while the racks J′ J′ are secured to tie-plate L of the rod or tube M, which slides within the shaft D, the slots *d d* in the shaft D allowing of longitudinal movement of said plate L. Extending through the opposite terminal of said rod or connecting member is the key *e*, which is fastened to the sleeve K, and slots *d′ d′* in the shaft D admit of free movement of said key. A ring N, with pins *f*, as indicated in dotted lines engages the groove *g* in sleeve K, and retained in connection with said pins *f* is a lever (not shown) or equivalent means serving as a shifter for the racks above referred to. The position of the racks in relation to the pinions is such as to enable from one side of the wheels a simultaneous turning of all the pinions and spindles connected therewith. Thus it is simply a matter of arranging correspondingly the right and left screw connections of spindles and blocks in order to effect an expansion of one pair of blocks while the other pair becomes contracted.

In Fig. 1 it is presumed that the respective position of the racks has effected an expansion of the blocks E E and a contraction of the blocks E′ E′, in which instance the shifting-lever would assume about a position as indicated by the dotted line *h*. The blocks E E in becoming expanded will tightly grip or bear against the band of wheel A, and since the collars G G′ are securely connected with the shaft motion will be imparted to shaft D from the wheel A. Upon shifting the rod in direction of the arrow all the pinions are turned, which results in releasing the band of wheel A, also subsequently in gripping of the band of wheel A′. Thus evidently the shaft will be rotated in opposite direction as soon as the bearing strain of the

blocks E′ E′ is in excess of the resistance encountered in reversing the rotation of the shaft D. There is also an intermediate position for the rod M (respectively blocks) when the bands of both of the wheels become released, in which instance the wheels turn loosely upon the shaft as long as the pinion B is rotating or the driving-shaft is kept in motion. In Fig. 1 extra gear-wheels N′ O are shown, the larger one N′ being intended to mesh into forward gear of a vehicle, while the smaller gear is designed for the "backing-up" gear. To assure of a gradual smooth gripping action of the blocks, I provide for grooves in the faces of said blocks which are filled with a solid lubricant, graphite or the like. (See Figs. 2 and 3.) Owing to these lubricating-strips *i* the interior of the bands can be maintained in finely-polished condition, which is essential for a quiet starting of vehicles or friction driving mechanism generally. Furthermore, the racks in being of screw-spindle form admit of a proper adjustment thereof when worn. Simply by disconnecting said racks they may be turned and all parts can be adjusted to compensate for wear of the blocks, pinions, and racks. The pinions may be secured to the spindles by means of pins, as indicated at *j j*, Fig. 2, or a feather *k* may be used. In the latter instance all the blocks can bear with uniform pressure against the band-wheels without depending on a concentric setting of said blocks with shaft D. Blocks so connected or guided find at all times their natural bearings without causing any side strain upon the driven shaft D. In motor-vehicles said shaft may be considered as a counter-shaft, and bearings may be provided for same in about a position as indicated at *l l*. In boats, air-ships, &c., such a shaft may be a part of the propeller-shaft itself. Singularly such improved gripping mechanism may be applied with a band gearing or pulley of any line-shafting; or, as shown, this mechanism may be used generally for transmitting motion (power) in reversible direction.

What I claim, and desire to secure by Letters Patent, is—

1. A reversible driving mechanism comprising a set of band-wheels, a hollow shaft, blocks adapted and equipped to grip the band of said wheels, collars secured to said shaft for carrying said blocks, pinions mounted upon the adjusting-spindles of said blocks, racks arranged in pairs in inverse engagement with said pinions and a connecting member for said racks extending through said shaft to effect alternately the action of one pair of blocks and release of the other pair in the manner as and for the purpose set forth.

2. A mechanism for reversing rotary motion comprising a tubular shaft, a set of loose band-wheels being driven in inverse direction upon said shaft, a set of collars secured to said shaft, a rod within said shaft, a pair of racks extending toward each wheel and being carried by said rod, pinions with right and left hand screw-spindles carried by said collars in engagement with said racks, blocks fitting the inner face of said wheels and having screw connection with said spindles and suitable means for shifting said rod all constructed and arranged to effect interchangeably a gripping action of one pair of blocks upon its wheel and a release of the other pair of blocks from its wheel in the manner as and for the purpose set forth.

3. In a driving mechanism for shafting and the like the combination with a loosely-mounted band-wheel of a pair of blocks fitting the inner face of said wheel, a pair of right and left hand screw-spindles engaging said blocks, pinions upon said spindles, a fixed collar upon the band-wheel shaft carrying said spindles equidistant from its center, a pair of racks in engagement with said pinions and suitable means enabling a simultaneous movement of said racks to cause a concentric expansion or contraction of said blocks all constructed and arranged substantially as and for the purpose set forth.

4. In a driving mechanism for shafting and the like the combination with the shaft, loose band-wheel and friction-blocks of right and left hand screw-spindles engaging said blocks, a fixed collar carrying said spindles, pinions upon said spindles and racks engaging said pinions, the said racks being of screw-spindle form to admit of adjustment for wear of the blocks and their spindles in the manner as set forth.

5. In a friction driving mechanism for shafting and the like, the combination with the shaft carrying a fixed collar and a loose band-wheel, of blocks adapted for frictional contact with the inner face of said wheel, pinion-carrying screw-spindles guided in said collar and engaging said blocks, spiral racks engaging the pinions of said spindles and suitable means effecting a simultaneous movement in the manipulation of said racks all constructed and arranged substantially as and for the purpose set forth.

6. A reversible driving mechanism comprising a tubular shaft with fixed collars and a set of loose band-wheels being driven in opposite direction upon said shaft, a set of friction-blocks having lubricant-filled grooves adjacent the band of said wheels, screw-spindles, pinions and racks effecting interchangeably a gripping action of one pair of blocks and an inert condition of the other pair of blocks in the manner substantially as shown and set forth.

7. A friction driving mechanism comprising a tubular shaft a set of inversely-driven loose band-wheels and a set of collars fixed upon said shaft approximately in the transverse planes of the band of said wheels, friction-blocks fitting concentrically onto said bands, spindles carried by said collars and

effecting an expansion and contraction of the blocks, pinions upon said spindles, round racks engaging said pinions, and a connecting device for said racks extending in and through said tubular shaft all constructed and arranged substantially as and for the purpose set forth.

Signed by me at New Haven, Connecticut, this 12th day of June, 1899.

WALTER HAY.

Witnesses:
FRED H. PAGE,
EDW. B. HUME.