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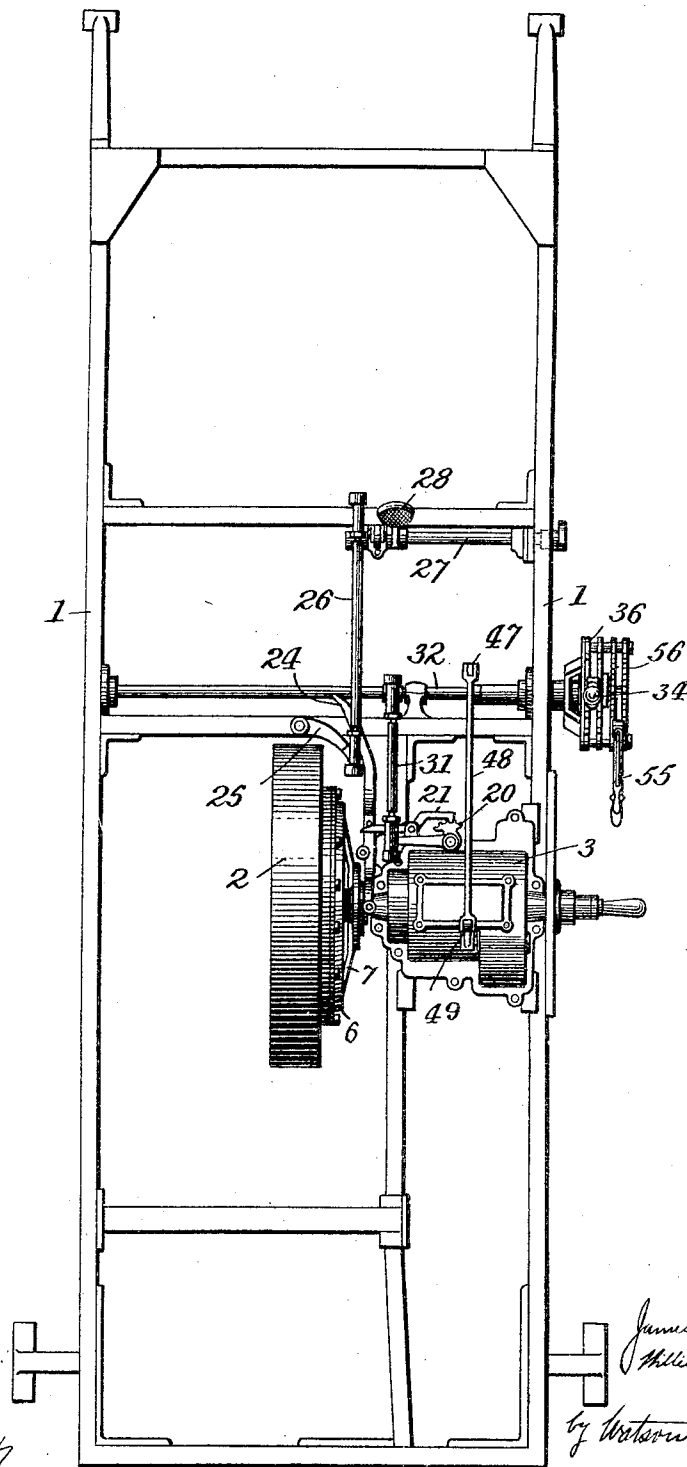
PATENTED NOV. 21, 1905.

J. W. PACKARD & W. A. HATCHER.
LEVER MECHANISM FOR MOTOR VEHICLES.

APPLICATION FILED NOV. 14, 1902.

5 SHEETS—SHEET 1.

Fig. 1.



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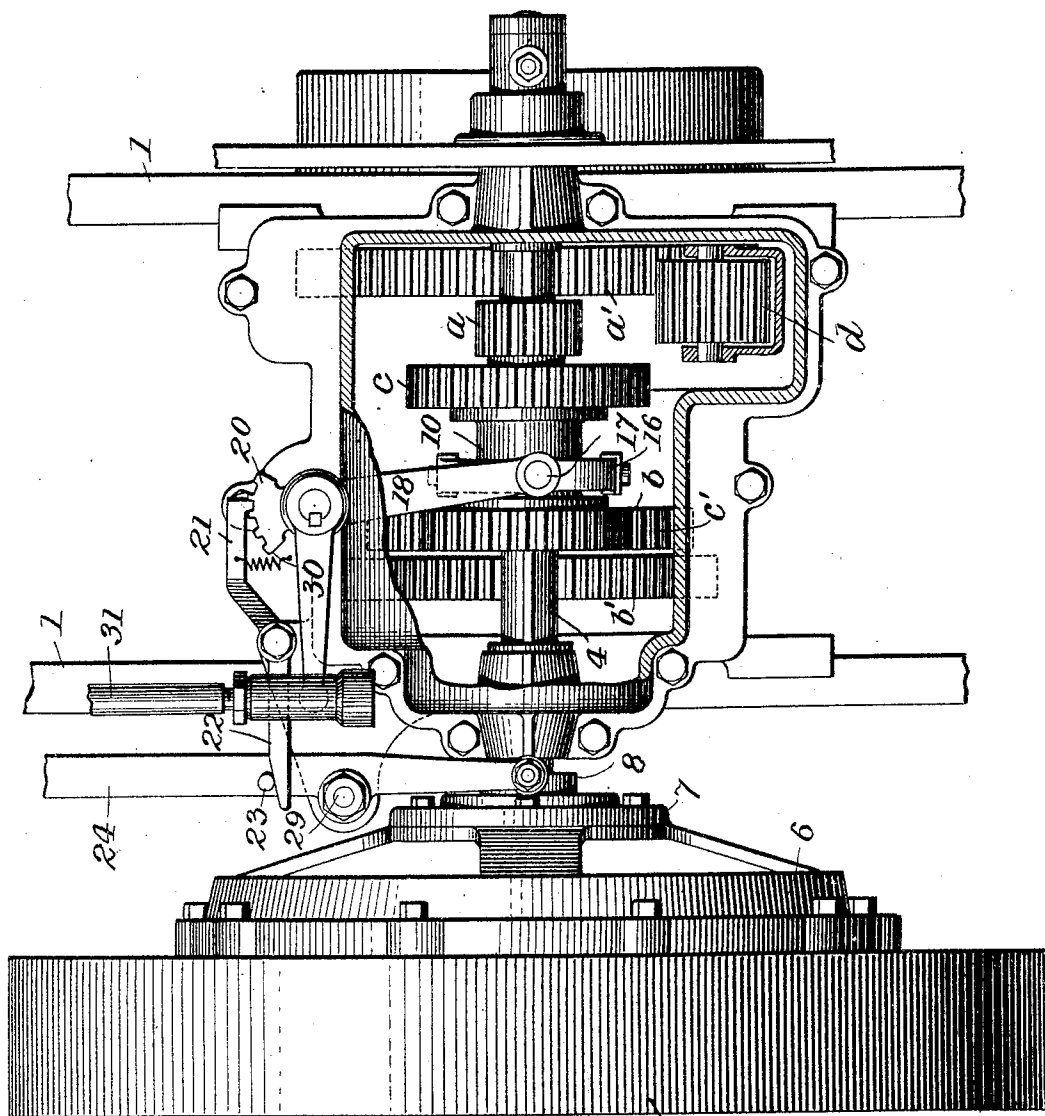
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Fig. 2.

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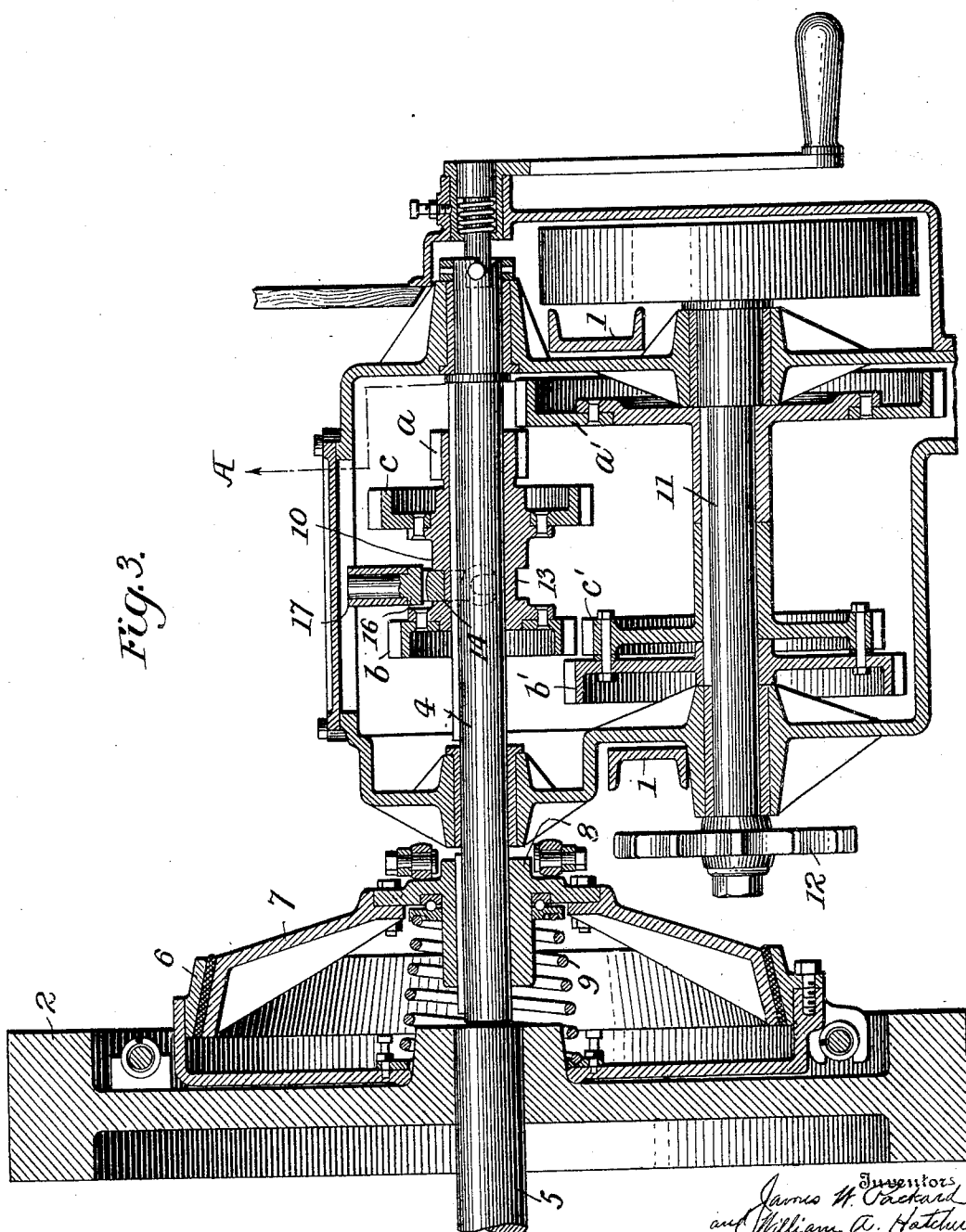
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5 SHEETS—SHEET 3.



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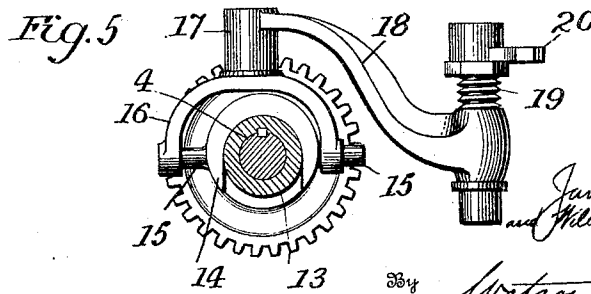
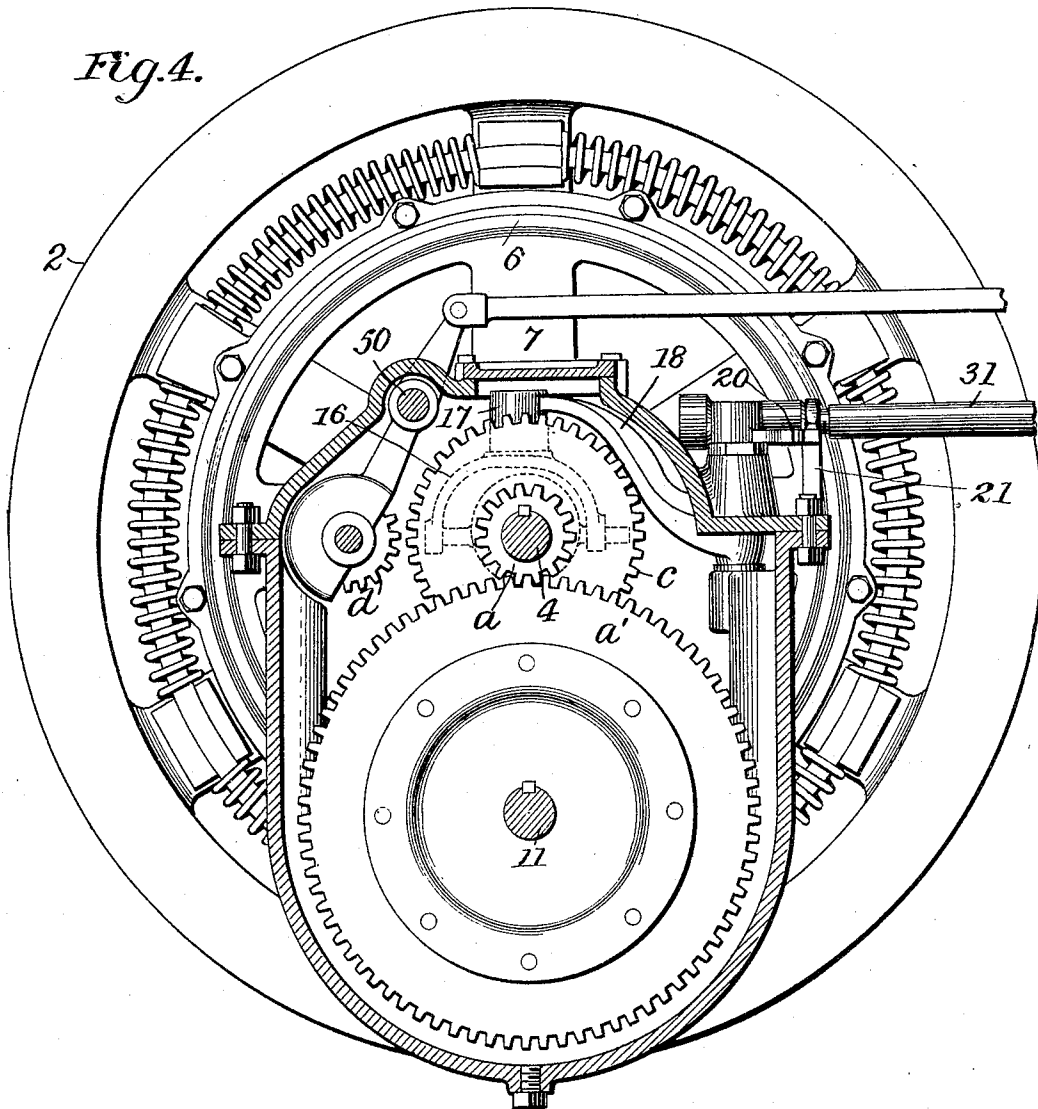
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5 SHEETS—SHEET 4.

Fig. 4.



Witnesses

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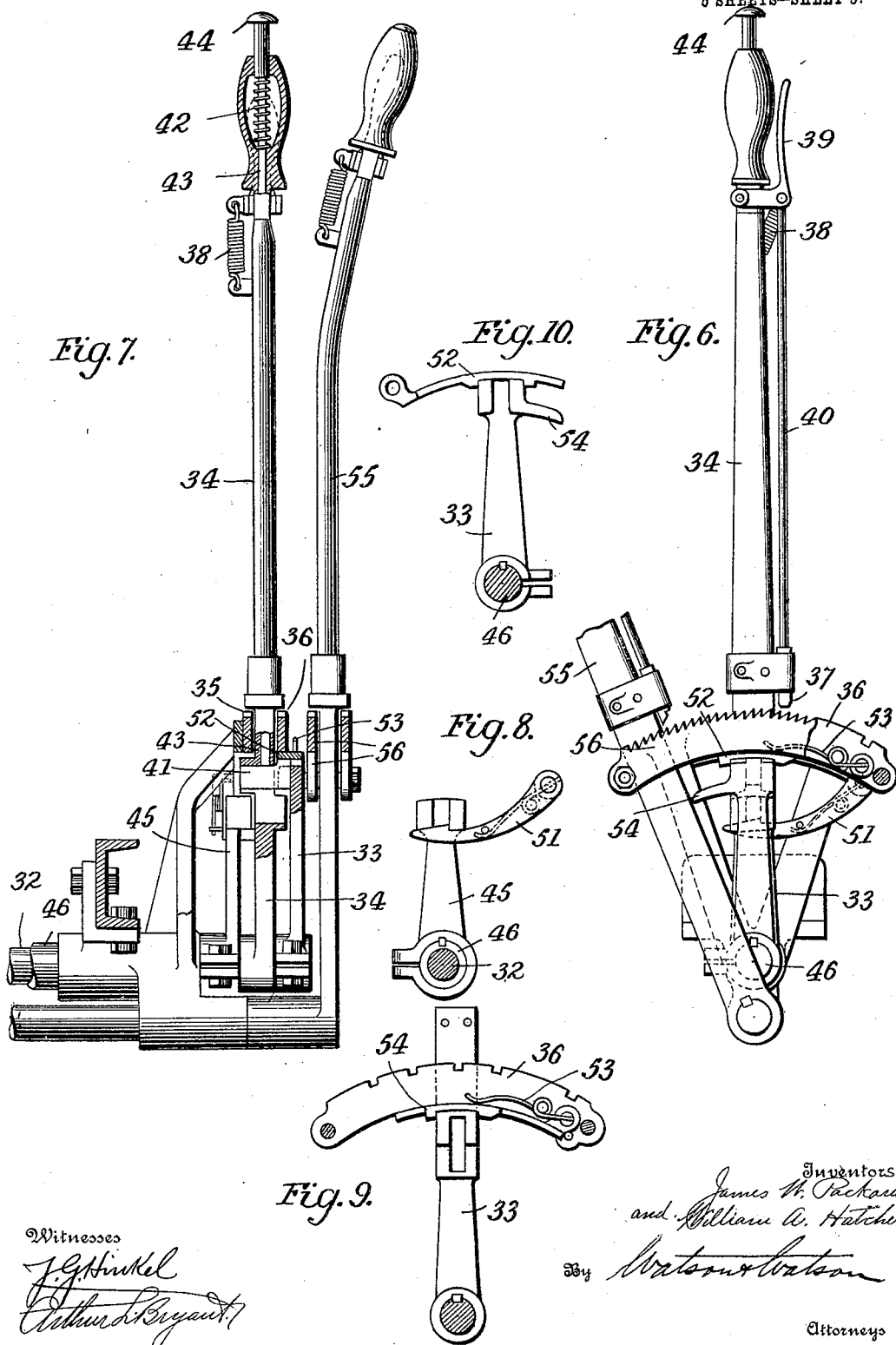
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

JAMES W. PACKARD AND WILLIAM A. HATCHER, OF WARREN, OHIO,
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LEVER MECHANISM FOR MOTOR-VEHICLES.

No. 804,971.

Specification of Letters Patent.

Patented Nov. 21, 1905.

Application filed November 14, 1902. Serial No. 131,327.

To all whom it may concern:

Be it known that we, JAMES W. PACKARD and WILLIAM A. HATCHER, citizens of the United States, residing at Warren, in the county of Trumbull, State of Ohio, have invented certain new and useful Improvements in Lever Mechanism for Motor-Vehicles, of which the following is a specification.

The present invention relates to improvements in motor-vehicles, and more especially to the devices for stopping, starting, and controlling the speed of such vehicles.

The object of the invention is to simplify and cheapen such constructions and to render them more durable and more effective in operation.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of so much of the driving and controlling mechanism of a motor-vehicle as is necessary to illustrate the present invention. Fig. 2 is an enlarged view of part of Fig. 1, the top of the gear-casing being broken away. Fig. 3 is a longitudinally-vertical section through the gear-casing. Fig. 4 is a sectional view about on the line A of Fig. 3. Fig. 5 is a detail of the gear-shifting devices. Fig. 6 is a side view of the brake and speed levers. Fig. 7 is an elevation of the brake and speed levers, parts being shown in section; and Figs. 8 to 10 are details of the same.

Referring to the drawings, 1 indicates the frame, which supports the body and the mechanism of a motor-vehicle; 2, the fly-wheel of the engine, and 3 the casing containing the speed and back gearing. The shaft 4 is mounted in the casing in line with the engine-shaft 5. One member 6 of a friction-clutch is mounted on the wheel 2, and the other member 7 is mounted on a sliding hub 8 on shaft 4. A spring 9 normally holds the clutch members in engagement, thus normally connecting the shaft 4 with the engine-shaft 5.

On the shaft 4 is a sleeve 10, carrying three gears *a b c* of different sizes, which are adapted to intermesh with corresponding gears *a' b' c'*, fixed upon a counter-shaft 11, which shaft carries the sprocket-wheel 12 for transmitting power to the driving-wheels. The gears *a b c* may be engaged successively with the gears *a' b' c'* to effect three forward speeds of the vehicle, or they may all be disengaged,

or the gears *a a'* may be engaged with a backing-gear *d*, Fig. 4, to effect a slow backward movement of the vehicle. The devices for effecting this adjustment of the gearing will now be described.

The gear-shifting devices and the clutch-operating devices are interlocked in such manner that the gears cannot be shifted when the clutch is closed. When the clutch is opened, the gears are automatically freed, so that they may be shifted to any desired position. As shown, this interlocking of the gears and the clutch is effected as follows: The sleeve 10, which carries the gears *a b c*, has a circumferential groove 13, which is engaged by a yoke 14, having pins 15 passing through eyes in a second yoke 16, which is pivoted in the free end 17 of a gear-shifting lever 18 Figs. 2 to 5. Upon the hub 19 of the lever 18 is rigidly attached a toothed sector 20, which is normally engaged by a spring locking-pawl 21, having a tail 22 in the path of a pin 23 on the clutch-shifting lever 24, Figs. 1 and 2. The lever 24 is operated by an arm 25, which is drawn forward by a link 26, connecting it with an arm on a shaft 27, which is operated by a foot-lever 28. When the treadle 28 is pressed forward, the lever 25 is thrown against lever 24, rocking the latter on its pivot 29 and throwing out the clutch. Simultaneously the pin 23 rocks the pawl 21 and unlocks the gear-shifting lever 18. On releasing the foot-lever the parts are returned to their normal position by suitable springs and the change-gears are again locked by the pawl 21.

The sleeve 10 is shifted by means of an arm 30 on the post 19, link 31, arm on shaft 32, and lever-arm 33 on said shaft. Upon the shaft 32 is loosely journaled a hand-lever 34, which is adapted to be swung back and forth between two notched sectors 35 36. The lever 34 carries a latch 37, which extends across the sectors and is normally pressed into engagement with them by a spring 38. The latch may be withdrawn by means of a lever 39 and connecting-rod 40. As shown, there are five notches in the sector-plates, the middle notch being a neutral point at which the lever stands when the gears are all out of mesh, the rear notch indicating the backing position and the other three notches three forward speed positions.

The lever 34 carries a sliding tongue 41, which engages with a notch in the arm 33 when the tongue is in its uppermost position, as shown in Fig. 7. The tongue 41 is normally held in this position by spring 42 surrounding the rod 43, which is connected to the tongue and passes up through the lever 34 to a push-button 44. When the parts are in this normal position, the lever 33 may be adjusted for each of the three forward speeds or to neutral position. It will be understood that these forward speeds are obtained by shifting the gears *a b c* by means of connections heretofore described. It will be understood that the main clutch must be thrown open before any change of gearing can be effected.

When it is desired to throw in the backing-gear *d*, lever 34 is brought to central position and the button 44 pressed down until the tongue 41 is disengaged from arm 33 and engaged with an arm 45 on a sleeve 46, surrounding the shaft 32. Sleeve 46 carries an arm 47, which is connected by link 48 with a lever 49, pivoted within the casing at 50 and carrying at its lower end the backing-gear *d*. When the tongue 41 is in engagement with the arm 45 and the lever 34 is then moved back to register with the rear notch in the sectors, the backing-gear will be thrown into engagement with the gears *a a'*, said gears being then in adjacent planes, as shown in Figs. 2 and 3.

Means are provided for locking the forward speed-gears in their normal inoperative positions, which is shown in Figs. 2 and 3, when the backing-gear is in use and for locking the backing-gear in its inoperative position when the forward speed-gears are in use. As shown, these means are constructed as follows:

A spring-latch 51, Figs. 6 and 8, engages the arm 45 and locks it in normal position, with the backing-gear thrown out, while the tongue 41 is in engagement with the arm 33. A latch 52 is provided with a notch adapted to engage the arm 33 and lock it in normal central position when the tongue 41 is out of engagement with said arm. The latch 52 has a curved portion overlying the tongue 41, and the spring 42, which elevates said tongue, is strong enough to overcome the spring 53, which operates the latch 52. Tongue 41 thus keeps 52 normally raised when said tongue is in engagement with the arm 33. When, however, the tongue is depressed into engagement with the arm 45, latch 52 engages and locks arm 33. One of the arms 33 and 45 must always be in normal central position, and the other arm must therefore be brought to normal central position to change from one to the other. In making the change to the backing-arm 45 tongue 41 pushes latch 51 out of engagement with said arm. On moving the lever rearward to throw in the backing-gear the outer edge of tongue 41 passes under the curved projection or guide 54, which is carried by the arm 33.

This prevents the tongue from springing up so long as the backing-gear is in use, thus relieving the operator of the trouble of keeping the button 44 depressed. When the backing-gear is thrown out and the lever 34 moved to central position, the tongue 41 is released from the guide 54 and is automatically thrown up into engagement with the arm 33 by the spring 42. The drawings show the brake-lever 55 and locking-sectors 56 for said lever; but the parts connected with the brake do not pertain to the present invention.

It will be seen that the foregoing invention provides means for throwing in and out the main clutch, for effecting three forward speeds and one backward speed, and that all of the parts are so interlocked that the speed-gears cannot be shifted while the clutch is operative, the forward speed-gears cannot be moved while the backing-gear is in operation, and the backing-gear cannot be moved while the forward speed-gears are connected with the operating-lever.

Having fully described the invention, what is claimed is—

1. In a motor-vehicle, having relatively movable speed-changing and reversing gears adapted to vary the speed and direction of the vehicle, a hand-lever, two arms for shifting different sets of said gearing arranged adjacent to said lever, and means mounted on said lever and adapted to connect said lever with either of said arms.

2. In a motor-vehicle, having relatively movable speed-changing and reversing gears adapted to vary the speed and direction of the vehicle, a hand-lever, two arms for shifting different sets of said gearing arranged adjacent to said lever, and a locking-tongue mounted on and movable longitudinally of said lever and adapted to connect the lever with either of said arms.

3. In a motor-vehicle, having relatively movable speed-changing and reversing gears adapted to vary the speed and direction of the vehicle, two arms mounted to rock about a common axis for shifting different sets of said gearing, a hand-lever mounted to rock about the same axis as said arms, and means adjustably secured to said lever and adapted to connect the lever with either of said arms.

4. In a motor-vehicle, having relatively movable speed-changing and reversing gears adapted to vary the speed and direction of the vehicle, two pivotally-mounted arms for shifting different sets of said gearing, and each provided on its inner face with a laterally-projecting member, a hand-lever, and a locking means adjustably mounted on said lever and adapted to be moved into engagement with the projecting member of either of said arms but not to engage both said members simultaneously.

5. In a motor-vehicle, having relatively movable speed-changing and reversing gears

adapted to vary the speed and direction of the vehicle, two arms mounted to rock about a common axis, for shifting different sets of said gearing, and each provided with a member projecting laterally toward the other arm, said projecting members being arranged at different distances from the axis of said arms, a hand-lever arranged between said arms, and means mounted on and movable longitudinally of said lever and adapted to engage the projecting member of either arm.

6. In a motor-vehicle, having two series of complementary gears, and a backing-gear, a lever-arm for shifting one series of complementary gears, a second lever-arm for shifting the backing-gear, and a hand-lever carrying a part movable relative to said lever into engagement with either of said arms.

7. In a motor-vehicle, having two series of complementary gears, and a backing-gear, a lever-arm for shifting one series of complementary gears, a second lever-arm for shifting the backing-gear, a hand-lever arranged between said arms and a sliding tongue carried by said hand-lever and movable into engagement with either of said arms.

8. In a motor-vehicle, the combination of an arm arranged to control the forward speeds of the vehicle, and a second arm arranged to control the backward movement of the vehicle, a hand-lever arranged between said arms and provided with a tongue arranged to slide into engagement with either arm as may be desired, a spring tending to normally hold the tongue in engagement with the forward speed-arm, and a guide adapted to hold said tongue in engagement with the backing-arm when said arm is moved from its normal position.

9. In a motor-vehicle, the combination of an arm for controlling the forward speed movements of the vehicle, and a second arm movable about the same axis as the first said arm for controlling the backward movement of the vehicle, a hand-lever adapted to turn about the same axis as said arms, means for engaging said hand-lever with either of said arms, and means for locking either arm when not engaged in its normal central position.

10. In a motor-vehicle, having relatively movable speed-changing gears adapted to vary the speed of the vehicle, a pivoted lever, arms mounted to turn about the same axis as said lever, guides for said lever and arms, locking means for locking the arms at times in a stationary position, and locking means for connecting one or the other of the arms to the lever so that it may be vibrated in unison therewith while the other arm remains stationary.

11. In a motor-vehicle, having relatively movable speed-changing gears adapted to vary the speed of the vehicle, a pivoted lever, arms mounted on opposite sides of said lever to rock about the same axis as the lever, guides for said lever and arms, means for holding the arms stationary, and locking means for connecting either of the arms to the lever so that it may vibrate in unison therewith while the other arm remains stationary.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES W. PACKARD.
WM. A. HATCHER.

Witnesses:

ARA C. HARRINGTON,
G. B. POST.