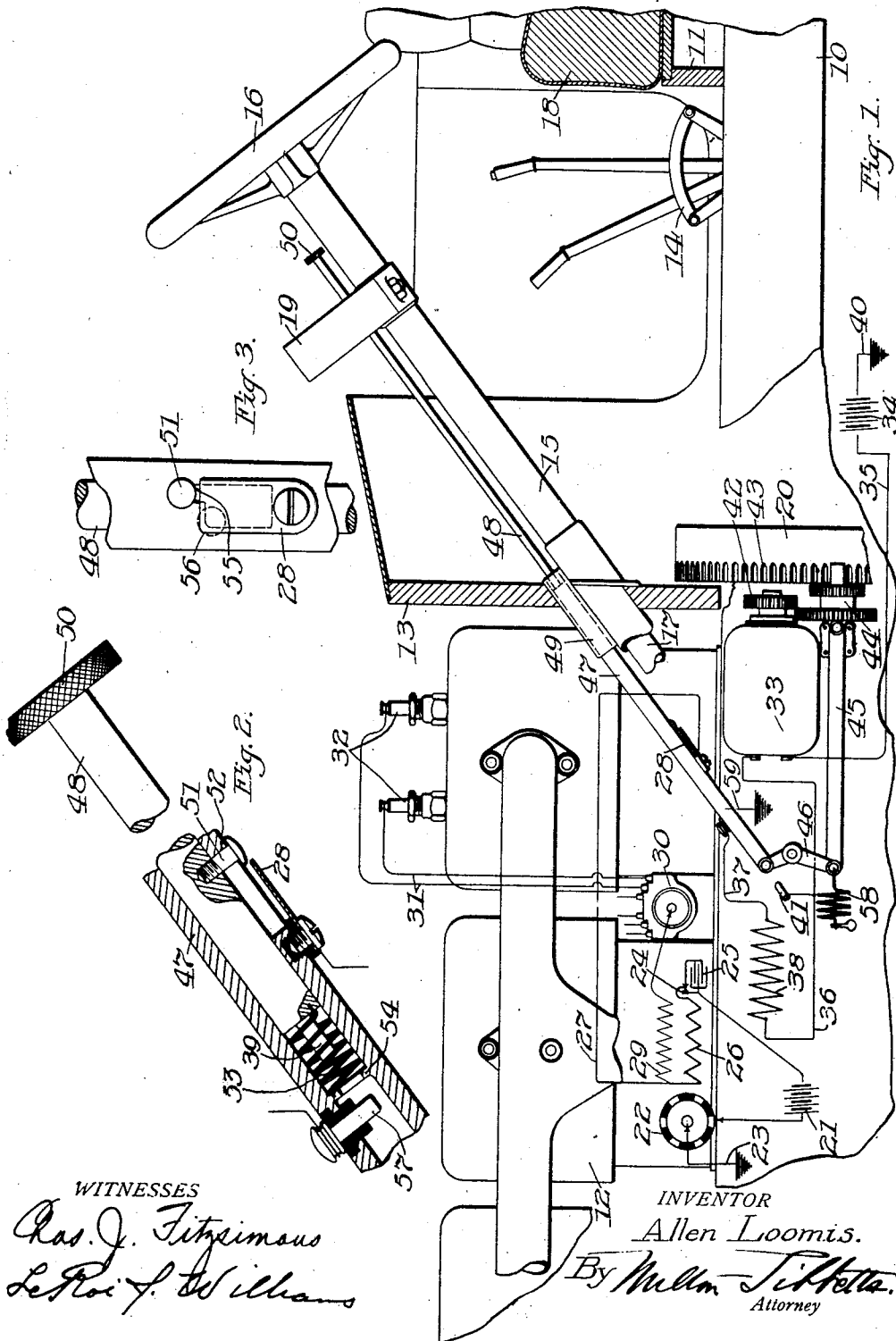


1,305,136.

Patented May 27, 1919.



UNITED STATES PATENT OFFICE.

ALLEN LOOMIS, OF DETROIT, MICHIGAN, ASSIGNOR TO PACKARD MOTOR CAR COMPANY,
OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

MOTOR-VEHICLE.

1,305,136.

Specification of Letters Patent. Patented May 27, 1919.

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To all whom it may concern:

Be it known that I, ALLEN LOOMIS, a citizen of the United States, and resident of Detroit, Wayne county, State of Michigan, have invented certain new and useful improvements in Motor-Vehicles, of which the following is a specification.

This invention relates to motor vehicles and particularly to the starting mechanism for the motor and the control of such mechanism.

One of the objects of the invention is to provide a motor vehicle with a starter and control means in which a single continuous movement of a shiftable rod or button or similar device will cause the motor starting mechanism to be brought into operation in proper order to start the vehicle motor and in some cases to keep it running until stopped by the operator.

Another object of the invention is to so arrange the ignition circuit and the starting motor circuit that they may both be controlled by a single manually operated device.

Another object of the invention is to so construct a device that controls the motor ignition circuit and the starting motor circuit that the ignition circuit may be closed before the starting circuit is closed in order that the motor may be started on the "spark" if it so happens that the motor is in condition to start in that manner.

Other objects of the invention will appear from the following detail description and claims taken in connection with the drawings which form a part of the specification, and in which,

Figure 1 is a side elevation and part sectional view of the forward part of a motor vehicle;

Fig. 2 is an enlarged sectional view of the controlling device; and

Fig. 3 is another view of the controlling device with parts broken away.

Referring to the drawings, 10 represents one of the side bars of the motor vehicle frame and upon this frame is mounted a body 11, a motor 12, shown as a six-cylinder motor, a dash 13, and control levers 14. Secured to the dash 13 or otherwise mounted on the vehicle frame is a steering column 15 at the upper end of which is the steering wheel 16 which operates the steering post 17, the steering wheel being arranged ad-

jacent the operator's seat 18, as is well understood. On the steering column 15 is preferably mounted a control board 19 upon which may be arranged the various control devices for the motor, lights, etc., of the vehicle.

The vehicle motor illustrated in the drawings is of the internal combustion type and is provided with a fly wheel 20. It is also provided with an ignition system which may be of any preferred form but is shown as a battery system in which the current passes from the battery 21 to a timer 22 operated by the motor, and from the timer through a conductor 23 to the ground. The other pole of the battery 21 is connected through vibrator 24 and condenser 25 through the primary winding 26 and conductor 27 to a grounding switch 28, hereinafter more fully described. The secondary winding 29 of the induction coil may be grounded through the conductor 27 and connected to a distributor 30, operated by the motor, where high tension conductors 31 will lead the current to the spark plugs 32 mounted in the cylinders of the motor.

It will be understood that as long as the switch 28 is grounded, current will flow from the battery 21 through the primary winding 26 of the induction coil which will induce a current in the secondary winding 29 of said coil and cause a spark at each of plugs 32 in the well known manner. When the switch 28 is opened the current will cease to flow and the motor will stop.

It will be further understood that in case the motor has been stopped with a charge in the cylinder that is about to fire, it may be started again by simply closing the switch 28 which will cause a spark in that cylinder and fire the charge. But if the motor has been standing idle for any length of time or is otherwise not in fairly good running condition, it cannot be started in this manner and it is then necessary that the crank shaft should be rotated several times perhaps in order that a charge may be drawn into the cylinders and the motor started on its usual cycle of operations. This turning of the crank shaft or "cranking" may be done by hand but in the present invention an electric starting motor is employed for this purpose and this starting motor may be connected to the vehicle motor by any suitable gearing such as that

shown in the drawing. Of course the starting motor should not be permanently connected with the vehicle motor as it is unnecessary that the former should operate 5 after the latter has started, and when sliding gears or sliding clutches are used to connect the two motors it is desirable that the starting motor should be given an initial spin or operating slowly before the 10 gears or clutches are engaged in order that the latter may slide into mesh without difficulty. After the motor and engine are connected it is desirable that the full working voltage of the battery should be passed 15 to the starting motor in order to give a proper starting torque.

The present invention is designed along the lines just recited and in one form includes an electric starting motor 33 which 20 may be given an initial spin or operated slowly by a battery 34 with connections through conductors 35, 36 and 37, and resistance 38, this circuit being grounded through a switch 39 as will be more fully hereinafter 25 described. It will be understood that the opposite pole of the battery 34 is grounded as at 40.

For giving the motor a working energy for starting the engine, practically the full 30 voltage of the battery 34 may be sent through it, as by cutting out the resistance 38 by grounding the conductor 36 through a second contact 41 as will be shown hereinafter.

The starting motor 33 is shown as provided with a gear 42 and the fly wheel 20 of 35 the vehicle motor is formed with teeth 43. The two motors may therefore be mechanically connected at a considerably differing speed ratio by means of a pair of gears 44 40 which are permanently connected and which may slide into engagement with gears 42 and 43 respectively.

The sliding of the gears 44 may be accomplished through connecting rod 45, bell 45 crank 46 and the two parts 47, 48 of a manually operated device.

This manually operated device 47-48 may consist of a tubular portion supported to slide in a bracket 49 shown as mounted on 50 the steering column 15, and a rod which telescopes in the tubular portion. The upper end of the rod 48 may be formed with a knob 50 arranged above the control board 19 for convenient operation by the driver. 55 The rod 48 is provided with a stop 51 which limits its upward movement and the stop 51 is yieldingly held against the abutment 52 by a coil spring 53 between the lower end of the rod 48 and a flange 54 interiorly 60 of the tube 47. The spring 53, in addition to pressing the rod 48 upwardly, is so coiled that it tends to rotate the rod 48 relative to the tube 47 in a clockwise direction from a position looking down on the knob 65 50. This is accomplished by securing the

upper end of the spring 53 to the rod 48 and the lower end of the spring in the flange 54 as will be clearly seen from an inspection of Fig. 2, it being remembered that the coil spring 53 is under tension in the tube 47. 70

Stop 51 operates in a slot 55 which is of bayonet form and from the previous description it will be seen that when the rod 48 is pushed downwardly against the action of the spring 53, the stop 51 will move to the 75 position shown in dotted lines in Fig. 3, and indicated at 56, by reason of the rod 48 rotating under the uncoiling action of the spring 53. It will therefore be seen that in order to bring the stop 51 back to the position 80 shown in full lines in Fig. 3, it will be necessary for the operator to turn the knob 50 in a counter-clockwise direction until the spring 53 snaps it back into the upper part of the bayonet slot 55. 85

As hereinabove stated the conductor 27 is adapted to be grounded at 28 and this is accomplished by the downward movement of the stop 51 which causes it to engage with the grounding contact 28 which latter is insulated from and mounted upon the tube 47 90 and is connected to the conductor 27. It will be understood that this grounding of the contact 28 will close the ignition circuit of the vehicle motor and if the firing cylinder 95 is in proper condition ignition will take place and the motor will start. If the conditions are such that the motor will not start the rod 48 may be pushed still farther downwardly into the tube 47 until the switch 100 part or contact 39 at the end of the rod 48 engages with an abutment or contact 57 which is insulated from the tube 47 and is connected electrically with the conductor 37, hereinafter described. This engagement of 105 the parts 39 and 57 grounds the conductor 37 and closes the energizing circuit of the starting motor 33 through the battery 34 and the resistance 38, thereby giving the motor 33 an initial spin or causing it to revolve 110 slowly. A further movement of the rod 48 downwardly carries with it the tube 47, and through the bell crank 46 and the connecting rod 45 the gears 44 are caused to engage with 115 gears 42 and 43 respectively, whereby the starting motor 33 is connected through reduction gearing with the vehicle motor 12. As the gears 42, 43 and 44 become fully engaged the lower end of the tube 47 grounds the conductor 36 by engaging the contact 41 120 hereinabove described, thereby cutting out the resistance 38 and causing the current to pass to the motor 33 at a working voltage and thereby giving to the motor a working energy and torque for starting the engine. 125 This latter operation of the device 47-48 is against the action of the retracting spring 58, the tension of which spring is somewhat greater than that of the spring 53, so that the parts 39 and 57 will engage before the tube 130

47 is moved against the action of the spring 58:

It will be understood that as soon as the vehicle motor starts the device 47—48 will be released and the gears 44 retracted by the spring 58 thus disconnecting the starting motor 33 and the fly wheel 20, but the rod 48 will not return to its original position because the spring 53 has already caused the stop 51 to take the position shown in dotted lines in Fig. 3 and thereby keep the ignition circuit closed for continuing the operation of the vehicle motor. When it is desired to stop the motor the stop 51 is moved to the position shown in full lines in Fig. 3 which breaks the ignition circuit.

In connection with the various grounds made through the tube 47 it will be understood that the tube itself is grounded on the vehicle frame as shown in diagram at 59.

Having thus described my invention what I claim is:

1. The combination with an internal combustion engine, and an ignition circuit therefor, of an electric starting motor, an energizing circuit therefor, and a single manually operated device for closing said ignition circuit, for connecting said starting motor to said engine, and for closing the motor energizing circuit *seriatim*.

2. In a motor vehicle, the combination with the motor and the ignition system thereof, of a controlling switch for said ignition system comprising two members, one of which is adapted to slide and rotate in the other, a pin and bayonet slot connection between the two members, and a spring tending to hold the pin in either of the branches of the bayonet slot.

3. In a motor vehicle, the combination with the motor and the ignition system thereof, of a device for controlling the cir-

cuit of said ignition system comprising a tubular member, a push rod adapted to slide and turn in said tubular member, a pin and bayonet slot connection between said tube and rod, and a spring within the tube and connected to both the tube and the rod tending to hold the pin in either of two positions in said bayonet slot.

4. In a motor vehicle, the combination with gears, of a gear shifting and control device comprising a lever for shifting the gears, a tubular member connected thereto and adapted to operate the lever, a rod sliding in the tubular member yieldably held in normal position, a spring for retracting said gear shifting lever, said spring having greater resistance than the spring for holding said rod in normal position, and contact members on said rod and tube adapted to be brought into engagement by the movement of the rod from its normal position, and means whereby a continued movement of said rod carries said tube with it for operating said lever.

5. The combination with an internal combustion engine, an ignition circuit therefor, an electric starting motor, a battery circuit for said motor including a resistance, and sliding connecting means for said motor and engine, of a device for closing said ignition circuit, then closing said battery and motor circuit with the resistance in, then sliding said connections into operation, and then cutting said resistance out of said battery and motor circuit, *seriatim*.

In testimony whereof I affix my signature in the presence of two witnesses.

ALLEN LOOMIS.

Witnesses:

CHAS. J. FITZSIMONS,
LE ROI J. WILLIAMS.