

## PATENT SPECIFICATION



Application Date: July 25, 1938. No. 21959/38.

509,962

„ „ Sept. 16, 1938. No. 27016/38.

One Complete Specification Left: Nov. 30, 1938.

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Specification Accepted: July 25, 1939.

### PROVISIONAL SPECIFICATION

No. 21959 A.D. 1938.

### Improvements relating to Power Transmission Mechanism of Motor Vehicles

We, WOLSELEY MOTORS LIMITED, a Company registered under the Laws of Great Britain, WILLIAM MILES WEBSTER THOMAS, British Subject, and HOWARD

5 SNOOK, British Subject, all of the Company's address, Drews Lane, Ward End, Birmingham, 8, do hereby declare the nature of this invention to be as follows:—

10 This invention relates to power transmission mechanism of motor vehicles wherein an electro-magnetic gear-box is employed embodying electro-magnets which transmit the power to and/or control the various gear trains, the desired

15 speed ratio being selected by the operation of a selector switch which excites the appropriate electro-magnets.

20 With an electro-magnetic gear-box it is found that if no engine clutch is employed the excitation of the magnets causes a snatch in the drive, more especially when the vehicle is started from rest, as very little slip of the magnets is permissible.

25 This snatch is eliminated by the use of a normal engine clutch, which gives a steady take-up of the drive, but on the other hand, a pedal-operated engine clutch seriously detracts from the simplicity of control provided by the electro-magnetic gear. Also, so long as the clutch remains engaged, the drive may be transmitted through the magnets while they are being excited and de-energised, thereby causing

30 the possibility of slip and wear on the magnet faces.

35 One of the objects of the present invention is to provide improved transmission mechanism embodying an electro-magnetic gear, wherein the normal simplicity of control provided by the electro-magnetic gear is retained or restored without the liability of snatch occurring in the drive, as when starting from rest, thus

40 permitting of the vehicle having a simple two-pedal control comprising accelerator pedal and brake pedal only.

A further object is to reduce wear on the magnet faces.

45 According to the invention, a motor

vehicle transmission mechanism comprises an electro-magnetic gear-box in combination with a suction-operated automatic clutch mechanism.

Thus, in carrying out the invention, the transmission embodies an electro-magnetic gear-box, of the well-known type having a plurality of electro-magnets which, when energised, serve to convey the drive to, or control the functioning of, the various gear trains included in the gear-box. Some of these magnets may be stationary and others revolving, the respective armatures being connected to gear elements, and when the magnets are energised they become coupled or clutched to corresponding gear-carrying elements. The desired speed ratio is selected by the operation of a suitably located selector switch which excites the appropriate electro-magnets to bring into operation or lock the different gear trains. In conjunction with this electro-magnetic gear-box a suction-operated clutch mechanism, of any well-known type, is employed. This mechanism includes a friction clutch between the engine and the input or driving shaft of the gear-box, the disengagable clutch member being operatively connected by mechanical means to a piston contained in a control cylinder which is connected by a suction pipe to the inlet manifold of the engine, so that when the throttle-valve is open and the suction in the manifold is small the clutch remains in engagement, whereas when the accelerator pedal is released to allow the throttle valve to close, the considerable suction which is then created in the inlet manifold is transmitted to the control cylinder, causing the piston to be operated and the clutch to be automatically disengaged.

Thus, no clutch pedal is needed, so that the vehicle can be controlled by two pedals only, namely, the accelerator pedal and the brake pedal. The provision of the clutch eliminates snatch in the drive when starting from rest, and, by reason of the clutch being automatically operated wear

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on the magnet faces is reduced, as on release of the accelerator pedal for changing speed no drive is transmitted through the magnets at the time they are being excited and de-energised, so that potential slip between the magnets and their co-

operating parts is reduced to a minimum.

Dated this 23rd day of July, 1938.

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24, Temple Row, Birmingham, 2, and  
88—90, Chancery Lane, London, W.C.2.  
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## PROVISIONAL SPECIFICATION

No. 27016 A.D. 1938.

### Improvements relating to Power Transmission Mechanism of Motor Vehicles

We, WOLSELEY MOTORS LIMITED, a Company registered under the Laws of Great Britain, WILLIAM MILES WEBSTER THOMAS, British Subject, and HOWARD SNOOK, British Subject, all of the Company's address, Drews Lane, Ward End, Birmingham, 8, do hereby declare the nature of this invention to be as follows:—

This invention relates to power transmission mechanism for motor vehicles, of the kind described in the Specification of patent application No. 21959 of 1938 (Serial No. 509,962) and comprising a variable speed gear of the electro-magnetic type combined with a suction-operated clutch control device. The object of the invention is to provide simple and efficient means for automatically operating the clutch control device to effect the disengagement of the clutch, particularly for the purpose of facilitating gear changing, or on engaging a gear prior to the starting of the vehicle from rest.

The invention consists essentially in the combination with an electro-magnetic variable speed gear and a suction-operated clutch control device of a valve actuated by a solenoid or an electro-magnet for placing the suction-operated clutch control device in or out of communication with the suction. The circuit of the valve-controlling solenoid or electro-magnet may be arranged to be completed and broken by the movement of the gear lever or gear control member, so that the valve is moved into an open position, in order that it does not prevent the clutch control device from being operated by the suction to disengage the clutch, when the gear lever or gear control member is moved into, or across, its neutral position, or into its neutral and first or second speed, or reverse positions. For this purpose a switch device may be provided comprising an electrical contact on a slidable and partly rotatable shaft carrying the gear lever or gear control member, the said contact being adapted to engage a relatively fixed contact or contacts, to com-

plete the circuit of the solenoid or electro-magnet controlling the valve, when the gear lever or gear control member is moved into the aforesaid position or positions. In addition to, or instead of, the gear lever controlled switch it may be arranged so that the valve is controlled by the speed of the engine, a cut-out or relay device being conveniently provided in shunt with the dynamo circuit, and adapted, when the voltage of the latter is below a certain amount, to close an auxiliary circuit controlling the valve, so that the latter is moved by the electro-magnet or solenoid into an open position to permit of the disengagement of the clutch.

Thus, in carrying out the invention, a motor vehicle is provided with transmission mechanism comprising an electro-magnetic gear box and a clutch having a suction or vacuum operated clutch control device, the latter is placed in communication with the induction manifold of the engine by suitable conduits connected to an intermediate housing containing valves one of which is operated by the movement of the gear lever, the said valves serving either to cut off the suction from the induction manifold or allowing it to actuate the clutch control, as required. Two valves are provided, one actuated by the accelerator pedal and the other actuated, as stated, by the gear lever, and the said valves consist of sliding necked rods extending across a passage in the valve housing, which communicates at its one end with a conduit leading to the induction manifold, and at its other end with a conduit leading to the clutch control device, the arrangement being such that the latter is placed in communication with the induction manifold, so that it is operated by the suction, and the clutch disengaged, when the necked parts of both valves lie within the communicating passage, but when the necked part of one or both valves is moved out of register with the said passage the suction is cut off and the clutch is automatically engaged. The valve operated by the

accelerator pedal is moved into an "open" position when pressure is removed from the pedal, but is moved into a position to close the communicating passage, and shut off the suction, when the pedal is depressed. The gear lever operated valve, on the other hand, is arranged to be moved into its "open" position, that is with the necked part in the communicating passage, when the gear lever is moved into and across its neutral position, and also when the said gear lever is in its first-speed position. During gear changing when the gear lever is moved into the said positions pressure is removed from the accelerator pedal, so that the other valve is moved into a similar position, and a free passage is provided which allows the suction to operate the clutch control, the latter automatically disengaging the clutch. When the gear lever is moved from a neutral position to one of its gear engaging positions (excepting first-speed position) the gear lever controlled valve is moved axially to close the passage through the valve housing, thus shutting off the suction and causing the clutch control to engage the clutch. When the gear lever is in its first-speed position, however, the clutch remains initially disengaged and the suction is not cut off until the accelerator pedal is depressed when the vehicle is started, the valve operated by the said pedal then closing the communicating passage.

The gear lever controlled valve is arranged to be actuated electrically by means of a solenoid surrounding the one end of the valve rod which projects from its housing, the solenoid when energised moving the rod axially into its "open" position against the action of a spring, with the necked part of the valve lying within the communicating passage. When, however, the solenoid is de-energised, by the breaking of the circuit, the spring automatically moves the valve rod back into its closed position. The solenoid may be energised from any suitable source, and the circuit is arranged to be completed and broken by the movement of the gear lever. The latter, which may be mounted in any convenient position, comprises a short arm working within a gate, having, for example, first, second, third and fourth speed notches, the said gate being carried by a tubular housing or bracket part through which passes a switch shaft upon which the gear lever or arm is mounted, the movement of the latter into the different speed positions causing the switch shaft to be partly rotated, or rotated and moved axially, in order to operate the gear box according to the speed ratio required. In order to complete the solenoid circuit to operate the valve and move it into its "open" position, the aforesaid switch shaft carries a spring contact which is adapted, when the lever is moved into certain positions, to engage and wipe over a metal contact mounted upon the inside of a sleeve of insulating material fitted within the tubular bracket and surrounding the switch shaft, the two contacts being arranged within the solenoid circuit, so that the solenoid is energised when the contacts are engaged together. The arrangement is such that the contacts are brought together each time the gear lever is moved into or across its neutral position to effect a change of gear, so that the solenoid-controlled valve is thus moved into its "open" position, and since the other valve is moved into a similar position by the release of the accelerator pedal the suction operates the clutch control which automatically disengages the clutch. The latter is also automatically disengaged when the gear lever is moved into its first speed position, since the contacts are arranged so that they are then still in engagement. The clutch is, however, moved into its engaged position by the depression of the accelerator pedal, which, as previously stated cuts off the suction through its respective valve. When the gear lever is moved past its neutral position into its second, third or fourth speed positions the contacts are separated, thus breaking the solenoid circuit and allowing the solenoid-controlled valve to be moved into its closed position by its spring thus shutting off the suction and causing the clutch to be engaged.

The contacts may be of any suitable size or shape, so as to delay the breaking of the solenoid circuit, and the engagement of the clutch, for any required time, whilst, if desired, the arrangement may be such that the solenoid circuit is also completed, and the clutch disengaged, when the gear lever is moved into second speed position, particularly if the vehicle is likely to be started in second speed. A separate switch may be provided to put the solenoid out of action if desired, the solenoid valve remaining closed. The said valve may then be arranged, so that it may be moved into an "open" position by hand.

The circuit of the valve-controlling solenoid may be broken automatically when the engine of the vehicle reaches a certain speed, so that the valve then remains closed, notwithstanding the position of the gear lever, and for this purpose a relay or cut-out device is connected across, or in shunt with, the circuit of the

dynamo or electric generator which is driven from the engine, the said relay or cut-out device controlling a switch disposed within the solenoid circuit, the  
 5 relay or cut-out device consisting, for example, of an electro-magnet having an armature connected to the switch, so that the latter is moved into its "open" position when the armature is attracted by the  
 10 magnet, on the voltage of the dynamo circuit reaching a certain predetermined amount, the armature moving away from the magnet below this voltage and causing the switch to close the solenoid circuit.  
 15 Thus, when the engine of the vehicle is moving slowly so that the voltage of the dynamo circuit is below the predetermined value, the relay switch is closed and, provided the gear lever switch is also  
 20 closed, the circuit of the solenoid controlling the valve is completed, the solenoid which is thus energised moving the valve into its "open" position, so as not to prevent the suction from acting upon the  
 25 clutch control device to effect the disengagement of the clutch. As soon, however, as the engine speed is increased sufficiently to cause the voltage of the dynamo circuit to exceed the value determined upon, the cut-out switch breaks the  
 30 solenoid circuit, and the valve is then closed by its spring, thus shutting off the suction and enabling the clutch to be engaged. The speed at which the relay or cut-out switch operates may be readily  
 35 varied according to requirements.

Dated this 15th day of September, 1938.  
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#### COMPLETE SPECIFICATION

### Improvements relating to Power Transmission Mechanism of Motor Vehicles

We, WOLSELEY MOTORS LIMITED, a Company registered under the Laws of Great Britain, WILLIAM MILES WEBSTER  
 40 THOMAS, British Subject, and HOWARD SNOOK, British Subject, all of the Company's address, Drews Lane, Ward End, Birmingham, 8, do hereby declare the nature of this invention and in what  
 45 manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to power transmission mechanism of motor vehicles  
 50 wherein a suction-operated clutch control device is employed, in combination with an electro-magnetically operated variable speed gear embodying or employing electro-magnets which control various gear  
 55 trains, the desired speed ratio being selected by the operation of a gear control member or arm actuating a selector switch which causes the appropriate electro-magnets to be excited.

60 The object of the invention is to provide improved means for enabling the clutch control device to be operated.

According to the invention a pair of valves are provided for placing the suction-operated clutch control in, or out of,  
 65 communication with the suction, the one valve being actuated by the throttle-control mechanism, such as by the accelerator pedal, and the other valve being independently controlled by a solenoid or by an  
 70 electro-magnet, which is rendered operative or inoperative according to the position of the gear control member or arm. The circuit of the valve-controlling solenoid or arrangement may be such that the solenoid-operated valve is moved into an open position, so that the clutch may be disengaged by the suction provided the accelerator is released, when the gear control member or arm is moved into its  
 80 neutral position, or into its neutral and first or second speed or reverse positions. The circuit of the electro-magnet or solenoid controlling the valve may, for example, include a switch comprising a pair of contacts normally closed but adapted to be formed apart to break the circuit when the gear control member is moved into certain positions, in order to control the valve according to requirements. If desired, the circuit of the valve-controlling solenoid or electro-magnet may be provided with a switch controlled by the engine speed, in addition to the gear-arm controlled switch.  
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We are aware that it has been suggested to provide suction-operated clutch control devices in combination with electrically-operated variable speed gearing, with a pair of valves, one actuated  
 100 manually and the other by the accelerator pedal, for controlling the suction for operating the clutch control device. It has also been suggested, in one such arrangement, to operate the  
 105 accelerator-controlled valve independently of the position of the accelerator pedal by means of a solenoid-actuated lever which

is automatically operated each time a change of gear is effected.

The accompanying drawing is a diagrammatic view of a solenoid-operated valve, and a valve actuated by the throttle mechanism, for controlling, in accordance with this invention, an automatic clutch control device (not shown) used in combination with an electro-magnetically operated gear-box, showing the circuits employed for operating the one valve by the gear control arm and also by a switch actuated by a cut-out device and by a separate voltage coil, the latter being indicated by dotted lines.

In carrying out the invention, a motor vehicle, having transmission mechanism which includes an electro-magnetically operated variable speed gear, and a friction clutch between the engine and the input or driving shaft of the variable speed gear, is provided with a suction-operated device for automatically controlling the clutch. The variable speed gear, indicated diagrammatically at 1 in the accompanying drawing, is of a well known type having a plurality of electro-magnets which, when energised, serve to convey the drive to, or control the functioning of, various epicyclic gear trains.

Some of these magnets may be stationary and others revolving, the respective armatures being connected to gear elements, and when the magnets are energised they become coupled or clutched to corresponding gear-carrying elements. The desired speed-ratio is selected by the operation of a selector switch 2 which excites the appropriate electro-magnets to bring into operation or lock the different gear trains. This selector switch 2 is actuated by a gear control arm 3 movable in a gate, according to the speed-ratio required, so as to bring into engagement the electrical contacts required for making the desired gear change.

The suction-operated clutch control device (not shown) which is used in conjunction with the electro-magnetically operated variable speed gear 1, is of any suitable or well known type, comprising a piston contained in a cylinder which is arranged to be placed in communication with the induction manifold of the engine of the vehicle by suitable conduits, and the latter communicate with an intermediate housing 4 containing valves 5 and 6, the said valves serving either to cut off the suction from the induction manifold or allowing it to actuate the clutch control piston, as required. The valve 6 is arranged to be actuated by the accelerator pedal, but the valve 5 is operated by the movement of the gear control arm 3, through electrical means, whilst each

valve consists of a sliding necked rod extending across a passage 7 in the valve housing, the said passage communicating at its one end with the conduit leading to the induction manifold, and at its other end with the conduit leading to the clutch control device. The arrangement is such that the latter is placed in communication with the induction manifold, so that it is operated by the suction, and the clutch disengaged, when the necked parts of both valves 5 and 6 lie, as shown, within the communicating passage 7, but when the necked part of one or both valves is moved out of register with the said passage 7 the suction is cut off and the clutch is then automatically engaged. The valve 6 operated by the accelerator pedal is automatically moved into an "open" position when pressure is removed from the pedal, but is moved into a position to close the communicating passage, and shut off the suction, when the said pedal is depressed. The valve 5 operated by the gear control arm 3, on the other hand, is arranged to be moved into its "open" position, that is with the necked part in the communicating passage 7, when the gear control arm 3 is moved into and across its neutral position, and also when the said arm is in its first-speed position but only provided the engine speed is below a predetermined value. During gear changing, with the engine running below this predetermined speed, when the control arm 3 is moved into the said positions pressure is removed from the accelerator pedal, so that the other valve 6 is also moved into an open position, and a free passage is provided which allows the suction to operate the clutch control, the latter automatically disengaging the clutch. When the gear control arm 3 is moved from a neutral position to one of its gear engaging positions (excepting first-speed position) the valve 5 is moved axially to close the passage 7 through the valve housing, thus shutting off the suction and causing the clutch control device to allow the clutch to engage, the said valve 5 being formed with a passage which, when the valve is closed, serves to place the clutch control device in communication with the atmosphere to destroy the vacuum in the control cylinder. When the arm 3 is in its first-speed position, however, the clutch still remains initially disengaged and the suction is not cut off until the accelerator pedal is depressed when the vehicle is started, the valve 6 operated by the said pedal then closing the communicating passage 7 and admitting air to the control cylinder.

The electrical means provided for

actuating the valve 5, as stated, comprises a solenoid 8 surrounding an armature or core 9 connected to or engaging one end of the said valve, the solenoid 8 when energised pushing the valve 5 axially into its "open" position against the action of a spring 10, with the necked part of the valve lying within the communicating passage 7. When, however, the solenoid 8 is de-energised, by the breaking of the circuit, the spring 10 automatically moves the valve 5 back into its closed position. The solenoid 8 is energised by a battery 11 and the circuit is arranged to be broken not only by the movement of the gear control arm 3, but also by a switch controlled by the dynamo cut-out or by a separate coil, this switch coming automatically into operation when the speed of the engine exceeds a predetermined value.

In order to control the energising of the solenoid 8 by the movement of the gear control arm 3 there is arranged in the solenoid circuit a pair of metal contacts 12 and 13 which surround the gear control arm, so that they are actuated and separated by the latter when the same is moved into certain positions. These contacts may be disposed beneath the gate within which the control arm 3 moves, and they may each be of a channelled or U-shape or section, being arranged with their concave faces towards one another as indicated in the drawing, the edges of the contacts normally engaging together, the contacts being pressed together either by their resiliency or by a suitably arranged spring or springs. Carried by the inside faces of these two contacts 12 and 13 are blocks 14 and 15 of insulating material, these blocks being arranged in such a manner that they extend across or beneath the second, third and fourth speed notches of the gate for the gear control arm. The arrangement is such that when the latter is in the first speed notch (that is in the position indicated in the drawing), or when it is in a neutral position, it lies quite clear of the contacts 12 and 13 and is likewise clear of the insulating blocks 14 and 15. The two switch contacts 12 and 13 consequently remain in engagement. When, on the other hand, the gear control arm 3 is moved into the second speed notch of the gate, or into the third or fourth speed notches, it comes into engagement with one or other of the insulating blocks 14 or 15 and the contact carrying the said block is moved outwards, the two contacts 12 and 13 being thus separated.

When the contacts 12 and 13 are separated by the gear control arm in this manner, the circuit containing the

solenoid 8 is broken and the solenoid de-energised. The valve 5 is consequently moved back into its closed position by the spring 10. The passage 7 leading to the induction manifold is thus closed thereby shutting off the suction from the clutch control device and admitting air to the latter. The clutch is consequently prevented from being disengaged by the clutch control device, even if the accelerator pedal is released, this being a definite advantage since it is undesirable for the clutch to be disengaged automatically each time the accelerator pedal is released, particularly when travelling at a high speed, for example, in top gear. When, on the other hand, the contacts 12 and 13 engage together, when the gear control arm is in first speed position, or in a neutral position, the solenoid circuit is completed and the solenoid is energised, the current passing from the battery 11 through an ammeter 16 and hand-controlled switches 17 and 18 to the solenoid 8, and from the latter to the switch contacts 12 and 13, passing back to the battery through the earth connection 23. The energising of the solenoid results in the opening of the valve 5, and each time the accelerator pedal is released, as it is during gear changing, or when the engine is idling, the clutch control device is operated by the suction, owing to the valve 6 being also opened. The clutch is thus disengaged automatically.

The solenoid coil 8 may be of a known type having a closed coil 8<sup>a</sup> which is thrown into circuit and causes a reduction in current consumption when the armature is moved axially by the other coil 8<sup>b</sup>, the contacts 19 being then separated.

The switch controlled by the speed of the engine (which is provided in addition to the gear control arm switch) for controlling the energising of the solenoid 8 comprises a pair of contacts 20 and 21, and when these contacts are closed the current from the battery 11 passes to the solenoid 8 through the hand switches 17 and 18, returning through the lead 22, contacts 20 and 21 to the lead 23. The switch contacts 20 and 21 are controlled by the coil 24 of the usual cut-out device 25, the coil 24, which is in shunt with the dynamo 28, causing the armature 26 of the cut-out to separate the contacts 20 and 21, through the part 27, when the speed of the engine and the voltage output exceeds a certain amount. The solenoid circuit containing the said contacts is thus broken and the solenoid 8 can only be energised above this engine speed by moving the gear control arm 3 into neutral or first speed positions. Below this speed, however, the solenoid 8 remains energised and holds the valve 5

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open, the automatic disengagement of the clutch being then effected each time the accelerator pedal is released. If desired, instead of, or in addition to, the above described cut-out control, the contacts 20 and 21 may be controlled by a voltage coil 29 (indicated by dotted lines) connected across the dynamo, the effect being the same as the cut-out coil, namely to separate the switch contacts 20 and 21 and break the circuit of the solenoid 8 when the engine speed exceeds a certain amount, the contacts otherwise remaining closed. The contacts 20 and 21 may be arranged to be automatically separated when any required speed is reached.

With the improved arrangement no clutch pedal is needed, so that the vehicle can be controlled by two pedals only, namely, the accelerator pedal and the brake pedal. The provision of the clutch eliminates snatch in the drive when starting from rest, and, by reason of the clutch being automatically operated wear on the magnet faces is reduced, as on release of the accelerator pedal for changing speed no drive is transmitted through the magnets at the time they are being excited and de-energised, so that potential slip between the magnets and their co-operating parts is reduced to a minimum.

Any form of solenoid or electro-magnet may be used for actuating the valve 5 and the latter may be of any suitable form, whilst it may be operated by the solenoid either by a push action or by a pulling action. Further it may be returned either by a spring or by another solenoid or electro-magnet.

The switch which is operated by the gear control arm may be of any other suitable construction, if desired. It may, for example, comprise a pair of contacts one upon the rocking and axially-movable shaft upon which the gear control arm is mounted and the other carried by a relatively fixed part, the contacts being brought into engagement when the gear control arm is in neutral and first speed position.

If desired, the switch contacts may be also arranged to be closed to energise the valve solenoid when the gear control arm is moved into second speed position.

The switch 17 shown in the drawing is for controlling the coil ignition system of the engine, the lead 30 being connected to the ignition coil, whilst the switch 18 controls the current to the solenoid 8 when the switch 17 is closed and enables the solenoid to be put out of action when required so that the valve 5 remains closed.

The switch controlled by the dynamo voltage or engine speed may be dispensed with, if desired.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. Motor vehicle transmission mechanism comprising an electro-magnetically operated variable speed gear and a suction-operated clutch control device, in combination with a pair of valves for placing the suction-operated clutch control in, or out of, communication with the suction, the one valve being actuated by the throttle-control mechanism, such as by the accelerator pedal, and the other valve being independently controlled by a solenoid or by an electro-magnet which is rendered operative or inoperative according to the position of the gear control member or arm.

2. Motor vehicle transmission mechanism, as claimed in Claim 1, in which the circuit of the valve-controlling solenoid or electro-magnet is completed and broken by the movement of the gear control member or arm, so that the valve is moved into an open position, in order that it shall not prevent the clutch control device from being operated by the suction to disengage the clutch, when the gear control member or arm is moved into, or across, its neutral position, or into its neutral and first or second speed or reverse positions.

3. Motor vehicle transmission mechanism, as claimed in Claim 2, in which the circuit of the valve-controlling solenoid or electro-magnet is provided with a switch comprising a pair of electrical contacts adapted to engage together to complete the circuit of the solenoid or electro-magnet, but adapted to be forced apart, to break the circuit, when the gear control member or arm is moved into certain positions, such as into second, third and fourth speed positions.

4. Motor vehicle transmission mechanism as claimed in Claim 3, wherein the switch contacts are of a channelled or U-section or shape and are arranged, with their concave faces towards one another, so as to surround the gear control member or arm in such a manner that they contact with one another, to complete the circuit when the gear control member or arm is in a neutral position and first speed position, the said contacts carrying insulated parts or blocks which are engaged by the gear control member or arm when the latter is moved into second, third or fourth speed positions, the arrangement being such that the contacts are then separated or pushed apart and the circuit broken.

5. Motor vehicle transmission mechanism, as claimed in any one of the pre-

ceding Claims, wherein the circuit of the valve-controlling solenoid or electro-magnet is provided with a switch controlled by the speed of the engine of the  
5 vehicle, so that the valve is automatically opened when the engine speed is below a predetermined amount irrespective of the position of the gear control member or arm.

10 6. Motor vehicle transmission mechanism as claimed in Claim 5, wherein the said switch is actuated by a cut-out device or by an electro-magnet.

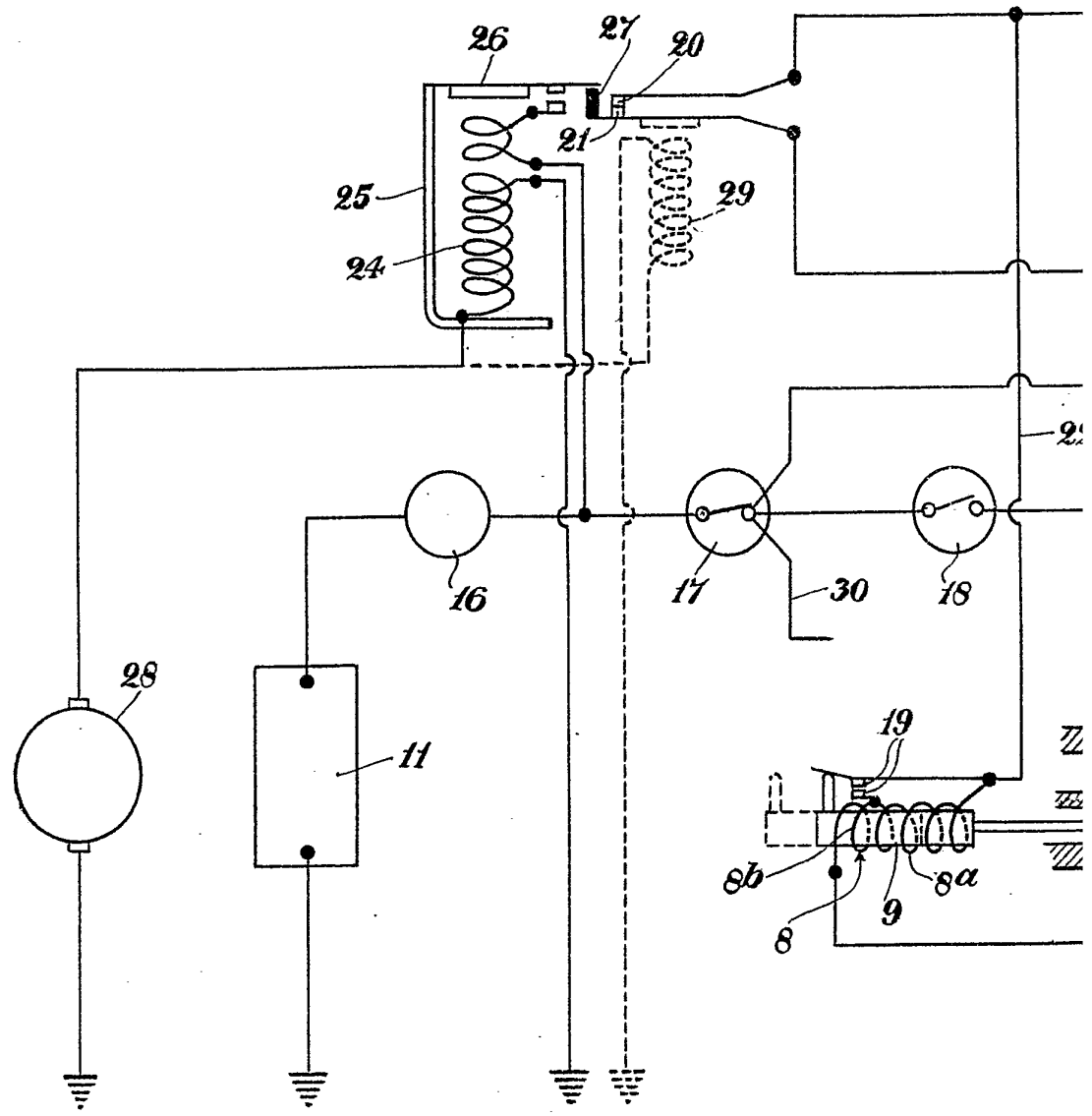
7. Motor vehicle transmission mechanism having an electro-magnetically  
15 operated variable speed gear and a clutch control device, with an electrically operated valve governing the clutch control device, substantially as herein described with reference to the accom-  
20 panying drawing.

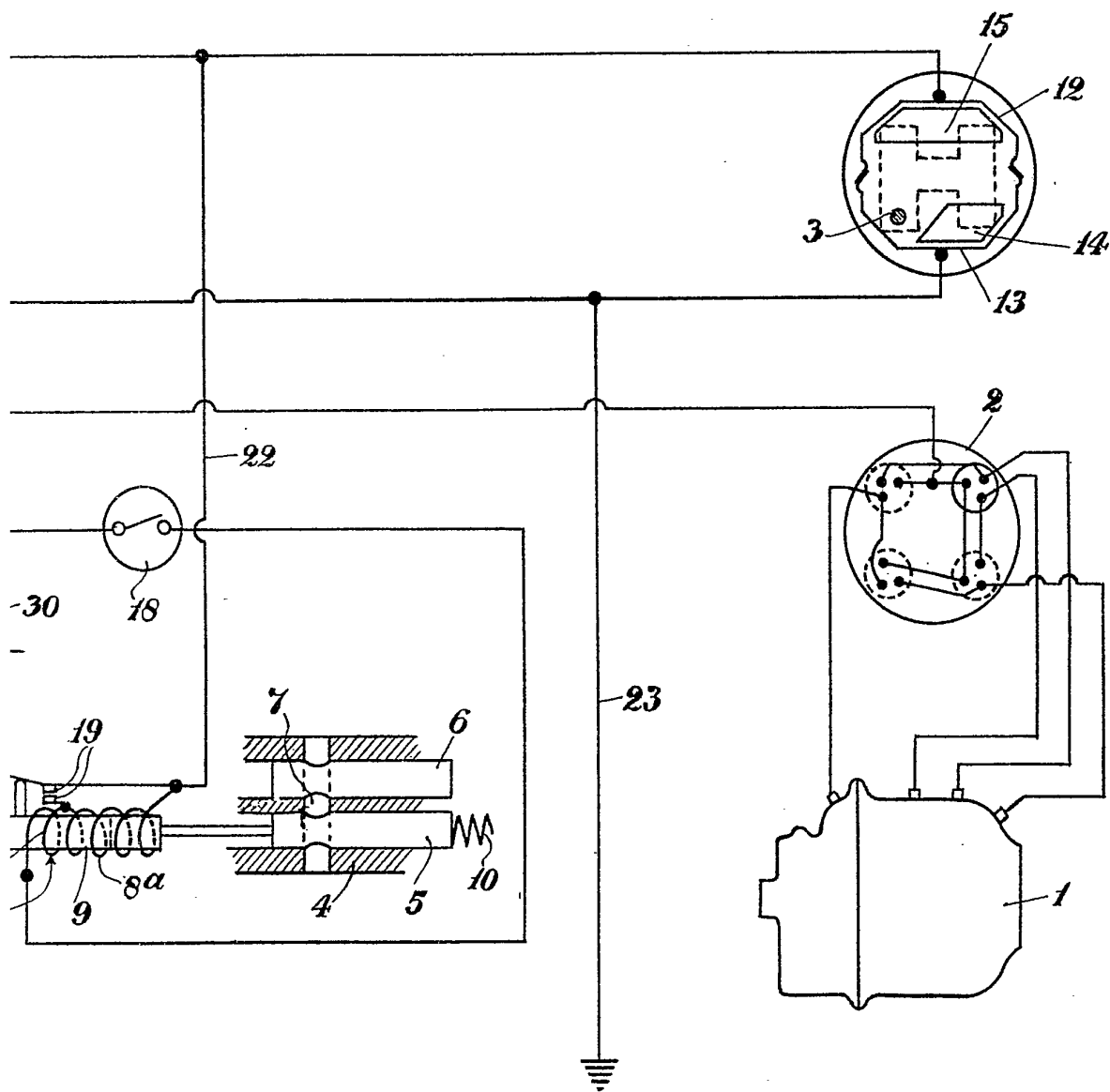
Dated this 29th day of November, 1938.

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