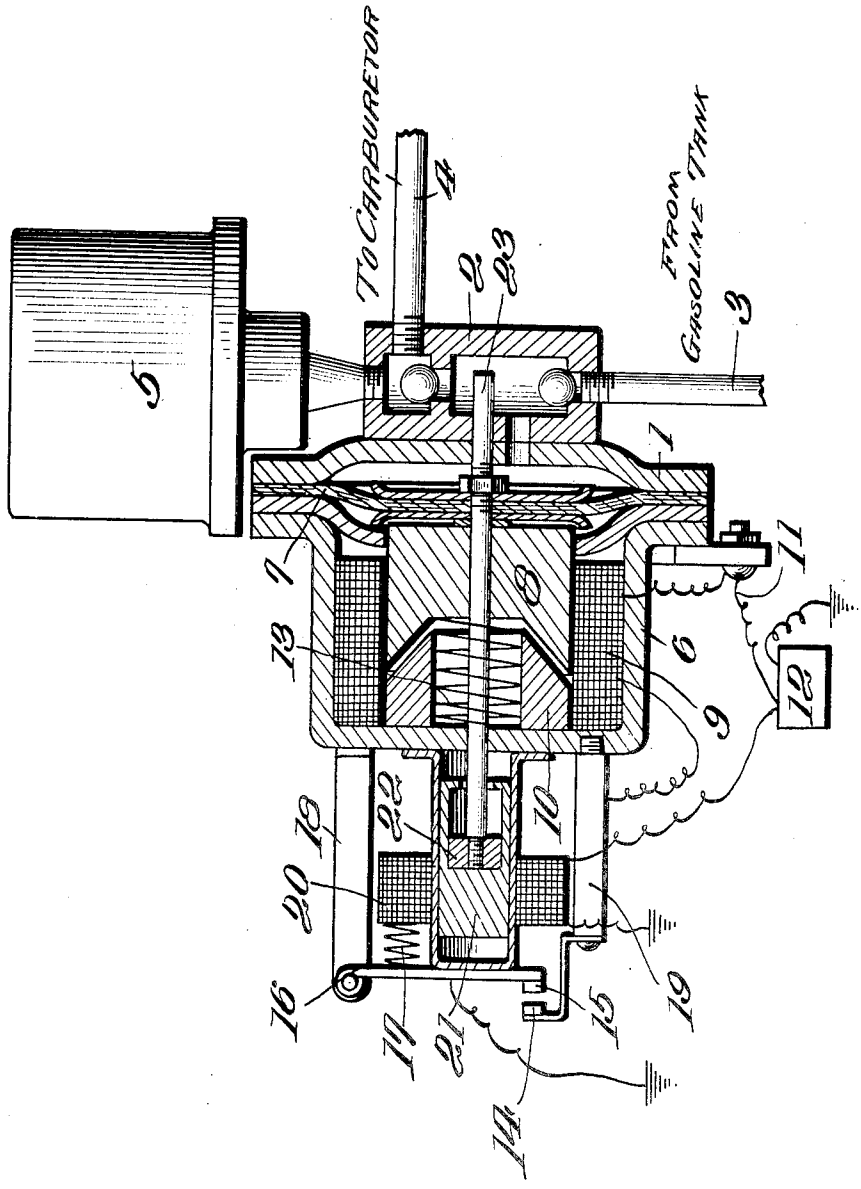
Nov. 26, 1929. A. G. REDMOND 1,737,388

ELECTRIC MOTOR

Filed May 18, 1925



Inventor

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By

Attorney

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UNITED STATES PATENT OFFICE

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ELECTRIC MOTOR

Application filed May 18, 1925. Serial No. 31,080.

This invention relates to certain new and useful improvements in fuel feeding systems for motor vehicles and is a companion application of my application filed even date herewith, the object being to provide a circuit maker and breaker in which a solenoid is employed for holding the contacts out of engagement with one another while the diaphragm of the pump is moving in a direction to discharge the fuel to the carbureter.

Another object of my invention is to provide a novel construction of solenoid and operating means whereby a movable core is moved into and out of the coil of the solenoid by the movement of the diaphragm so as to hold the movable contact out of engagement with the fixed contact and to release the same in order to allow it to be moved by the spring action into engagement with the fixed contact to complete the circuit through the main solenoid for operating the diaphragm.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawings I have shown a vertical section through a pump used in connection with my improved construction of fuel feeding system in which 1 indicates a diaphragm pump provided with the usual valve chamber 2 in which inlet and outlet valves are arranged controlling the flow of fuel from the low level tank to the carbureter and in the drawing I have shown a pipe 3 leading from the low level tank and a pipe 4 leading to the carbureter of the internal combustion engine to which my improved construction of fuel feeding system is applied. An air chamber 5 is provided for maintaining the fuel passing to the carbureter at constant pressure.

A casing 6 is secured to the diaphragm pump which is constructed substantially the same as shown in my companion application and has a flexible diaphragm 7 to which a fixed core 8 is secured surrounded by coil 9 arranged within the casing 6 and in which is a fixed core 10. The core 9 forming the solenoid is arranged within an electric circuit 11, the source of energy being in the form of a battery 12 and the diaphragm is adapted to be moved in one direction when the circuit is completed through the coil and forced into a reverse direction by a coil spring 13, the diaphragm on the suction stroke being moved by the solenoid and on its discharge stroke by the coil spring 13.

Arranged within the electric circuit 11 is a fixed contact 14 and a movable contact 15 which is carried by a pivoted arm 16 normally held in contact with the fixed contact by coil spring 17, said pivoted arm being mounted on a post 18 and the fixed contact is mounted on a post 19 carried by the casing 6.

Disposed against the end of the casing 6 is a casing 20 in which is mounted a movable core 21 which has a sliding connection through the head 22 with a rod 23 carried by the diaphragm 7 and the core 8 so that the movable core 21 will be moved back and forth within a coil 24 forming an auxiliary solenoid which is in electric circuit from the source of supply as clearly shown, said electric circuit being complete at all times so that when the core is within the coil, it will attract the arm 16 so as to hold the movable contact out of engagement with the fixed contact.

When the pump is in operation so as to lift fuel from a low level tank to the carbureter of an internal combustion engine, when the circuit is completed through the movable contacts 14 and 15, the diaphragm is moved to the left so as to suck fuel from the low level tank into the chamber of the pump and when the circuit is broken, the spring 21 forces the diaphragm to the right so as to discharge the fuel drawn therein and force it to the charge forming device.

In the drawing I have shown the contacts left open and the springs pushing the diaphragm to the right so as to discharge the fuel therefrom and as the diaphragm moves, the rod 23 carried thereby slides within the movable core 21 until it reaches the end of the exhaust stroke or approximately so where the movable core is drawn out from the coil 20, which releases the magnetic force which has held the contacts out of engagement with one another so that the movable contact by

the action of the spring will be forced into engagement with the fixed contact which completes the electric circuit through the main solenoid so as to return the piston or diaphragm of the pump in order to produce a suction stroke. This is repeated so long as the fuel is being consumed by the internal combustion engine and when the pressure in the feed line from the pump to the carbureter exceeds that exerted by the spring 13, the pump ceases to operate.

From the foregoing description it will be seen that I have provided an electric pump in which an auxiliary solenoid is employed having a core which controls the circuit maker and breaker so that the maker and breaker operate at the proper time in respect to the stroke of the piston in order to make and break the circuit to energize and deenergize the solenoid for operating the diaphragm of the pump.

What I claim is:—

1. A motor comprising a solenoid, an electric circuit in which said solenoid is arranged, a source of current, a circuit maker and breaker in said electric circuit, a second solenoid arranged in electric circuit having a movable core and a rod having a sliding connection with said movable core for intermittently moving said core into and out of said solenoid for making and breaking said electric circuit.

2. A motor having a reciprocating member, a spring for moving said member in one direction, a solenoid for moving said member in the opposite direction, an electric circuit in which said solenoid is arranged, a circuit maker and breaker in said electric circuit, a second solenoid arranged in electric circuit having a movable core, and a connection between said movable core and said reciprocating member for moving said core into and out of said second solenoid for operating said circuit maker and breaker.

3. A motor having a reciprocating member, a spring for moving said member in one direction, a solenoid for moving said member in the opposite direction, an electric circuit in which said solenoid is arranged, a fixed contact and a movable contact in said electric circuit, means for normally holding said contacts in engagement with one another and a second solenoid having a movable core operated by said movable member for holding said movable contact out of engagement with the fixed contact for breaking the electric circuit.

4. A motor having a reciprocating member, a spring for moving said member in one direction, a solenoid for moving said member in the opposite direction, an electric circuit in which said solenoid is arranged, a source of current, a circuit maker and breaker in said electric circuit, means for normally holding said circuit maker and breaker in closed position, and a second solenoid arranged in electric circuit having a movable core operated by said movable member for breaking said first named electric circuit.

5. A motor having a reciprocating member, a spring for moving said member in one direction, a solenoid for moving said member in the opposite direction, an electric circuit in which said solenoid is arranged, a source of current, a second solenoid arranged in electric circuit having a movable core, a rod having a sliding connection with said movable member and means operated by said second solenoid for breaking said circuit.

6. A motor having a reciprocating member, a spring for moving said member in one direction, a solenoid for moving said member in the opposite direction, an electric circuit in which said solenoid is arranged, a fixed contact and a movable contact arranged in said circuit, means normally holding said movable contact in engagement with the fixed contact, a second solenoid arranged in electric circuit having a movable core, a rod having a connection with said movable member and a sliding connection with said core for moving said core into and out of said solenoid for intermittently making and breaking said circuit.

7. A motor having a reciprocating member, a spring for moving said member in one direction, a solenoid for moving said member in the opposite direction, an electric circuit in which said solenoid is arranged, a source of current, a second solenoid arranged in electric circuit, a circuit maker and breaker, said second solenoid having a movable core, a rod carried by the movable member of said motor having a sliding connection with said core for intermittently moving said movable core into and out of said second solenoid for intermittently making and breaking said circuit.

8. A motor having a reciprocating member, a spring for moving said member in one direction, a solenoid for moving said member in the opposite direction, an electric circuit in which said solenoid is arranged, a circuit maker and breaker, said electric circuit comprising a fixed and a movable contact, a spring for moving said movable contact into engagement with said fixed contact and an electric magnet means for moving said movable contact out of engagement with said fixed contact, said electric magnet means being operated by the movement of said movable member.

9. A motor having a reciprocating member, a spring for moving said member in one direction, a solenoid for moving said member in the opposite direction, an electric circuit in which said solenoid is arranged, said solenoid being adapted to move said movable member in one direction, a spring for moving said member in a reverse direction, a

source of current, a circuit maker and breaker in said circuit, a second solenoid arranged in electric circuit with said first mentioned solenoid and means operated by said movable member for intermittently making and breaking the electric circuit of the first mentioned solenoid.

In testimony whereof I hereunto affix my signature.

ALBERT G. REDMOND.

CERTIFICATE OF CORRECTION.

Patent No. 1,737,388. Granted November 26, 1929, to

ALBERT G. REDMOND.

It is hereby certified that the State of Incorporation of the assignee in the above numbered patent was erroneously given as "Delaware", whereas said State should have been given as "Indiana", as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of January, A. D. 1930.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)