

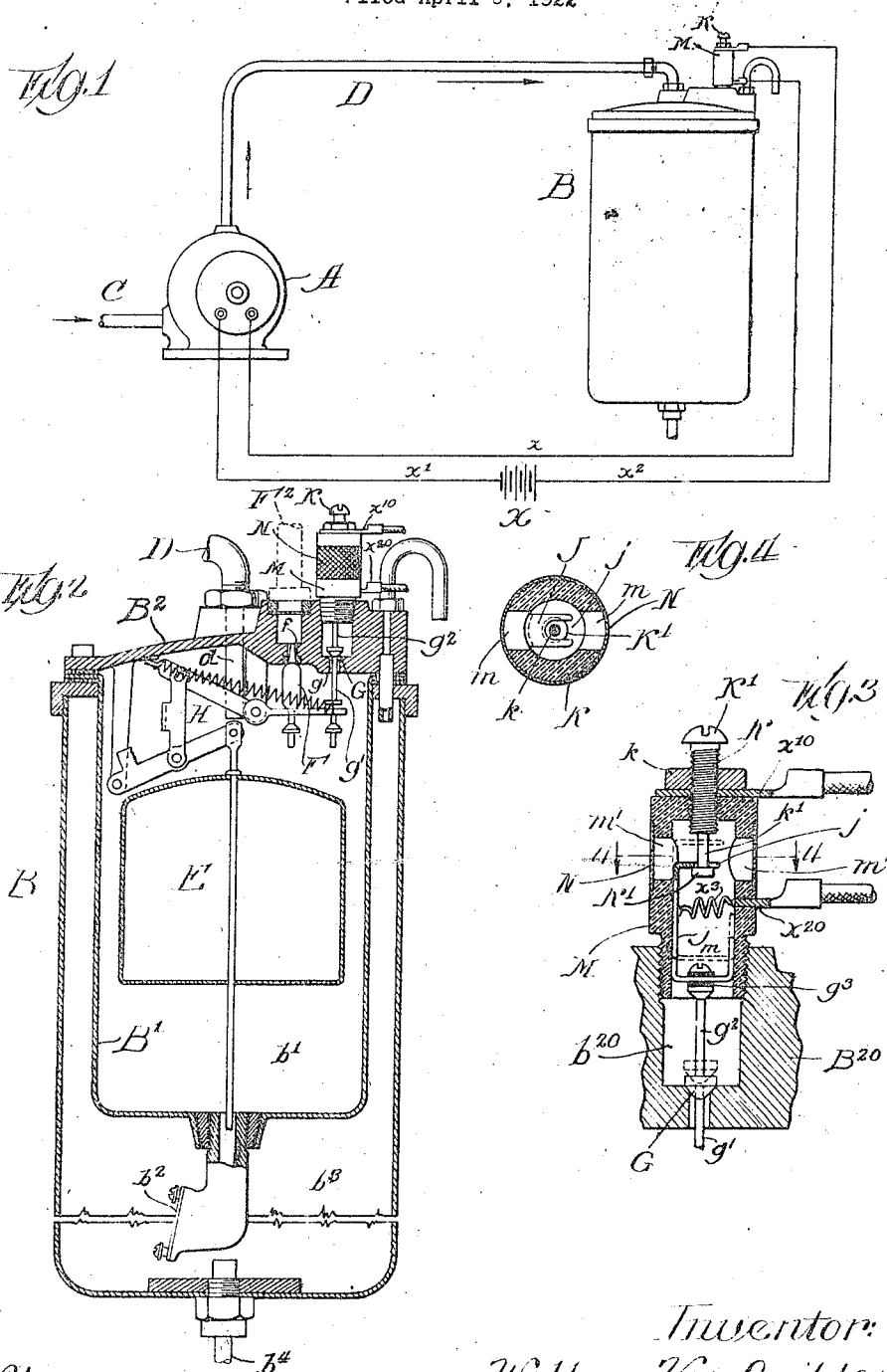
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W. VAN GUILDER

ELECTRIC PUMP OPERATED FUEL FEEDING DEVICE

Filed April 8, 1922



Witness:
Conrad M. Olsen

Inventor:
Walter Van Guilder.
By Burton Burton Atty.

UNITED STATES PATENT OFFICE.

WALTER VAN GUILDER, OF CHICAGO, ILLINOIS, ASSIGNOR TO STEWART-WARNER SPEEDOMETER CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF VIRGINIA.

ELECTRIC PUMP-OPERATED FUEL-FEEDING DEVICE.

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To all whom it may concern:

Be it known that I, WALTER VAN GUILDER, a citizen of the United States, residing in the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Pump-Operated Fuel-Feeding Devices, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved means for lifting liquid fuel from a low level source to an elevated receptacle from which it may flow by gravity to the carbureter of an internal combustion engine, the lifting means being an electrically operated pump, the energizing circuit of whose motor is open to interrupted pumping when the supply in the elevated receptacle reaches any desired maximum. It consists principally in the elements and features of construction for preventing the danger of ignition of vapor which may arise from the fuel by the electric spark at the making and breaking of the energizing circuit, and secondarily, the feature of construction for adapting the same device to be operated alternatively or simultaneously by the electric pump or by a vacuum producing suction connection to the receptacle, all as indicated in the claims.

In the drawings:—

Figure 1 is a diagrammatic view showing an assemblage of elements embodying this invention.

Figure 2 is a vertical axial section of the elevated receptacle.

Figure 3 is a detail section axial with respect to the air inlet passage in which the gap of the pump energizing circuit is located.

Figure 4 is a detail section at the line 4—4, on Figure 3.

In the construction shown in the drawings, A is an electric pump; B is the elevated receptacle; C is a conduit which leads from the low level reservoir, not shown, to the pump intake; D is the conduit leading from discharge of the pump to the receptacle, B, wherein its discharge is seen at *d*. The receptacle, B, is shown in the form of a familiar type of vacuum tank, so-called, partitioned by a partition, B¹, for creating a chamber, b¹, into which liquid fuel is

pumped by the pump, A, and from which it flows by gravity past the valve, b², into the outer and lower chamber, b³, from which it is supplied by gravity through the pipe, b⁴, to the carbureter, not shown. For the primary purpose of this invention, the partition, B¹, is not needed, as only one chamber is required; but the construction as comprising two chambers, with the valve, b², between them is taken over bodily from a familiar vacuum fuel feed tank construction, in order that the device of this invention may be operated either, alternatively by suction or by the electric pump, or, simultaneously by both suction and the pump, as will hereinafter more fully appear.

The float, E, in the chamber, b¹, operates in a well understood manner, the valves, F and G, controlling respectively the inlet ports, *f* and *g*, for opening said ports alternately, one at the low liquid level and the other at the high liquid level of the chamber, b¹. The parts are shown in Figure 1 at the high liquid level, the valve, G, being open and the valve, F, closed. The port, *f*, may be connected with a source of suction, F², shown in dotted lines. The port, *g*, terminates in an air inlet passage which is formed in part in a fitting, M, of insulating material, as fiber, having an axial bore, *m*, leading from its lower end and terminating short of the upper end, and a transverse passage, indicated by the aper res, *m*¹, *m*¹ which intersects the axial passage, constituting lateral branches thereof, a gauze wire sleeve, N, encompasses the fitting and spans the ports, *m*¹, *m*¹ serving as a gas and dust screen. An electrode screw, K, is screwed to the top of the fitting M and projects into its axial bore to the intersection with the cross passage, that is, through a point between the ports, *m*¹, *m*¹. One terminal, *x*¹⁰, of the pump-motor-energizing circuit, *x*¹ and *x*², is clamped onto the upper end of the fitting, M, by a nut, *h*, screwed onto the electrode screw, K. The other terminal, *x*²⁰, of the circuit is inserted through the shell of the fitting M, into the axial bore, and connected by a flexible coiled conducting wire, *x*³, to an electrode, J, which is mounted for sliding in the axial bore of the fitting, M, and is mounted on and insulated from the stem, *g*³, of the valve, G, which

stem extends above the valve for the purpose of carrying said electrode. The upper end of the electrode is forked, as seen at *j*, to span without contact therewith, the reduced neck, *k*¹, of the electrode screw, *K*, which is thus reduced in diameter below its threaded part to form this neck and carry the head, *K*¹, with which the fork, *j*, makes contact when the electrode, *J*, is at its lower position to which it is carried by the seating movement of the valve, *G*. In the diagrammatic view, *X* represents a source of current for energizing the pump motor.

The operation of the structure above described will be understood to be that when the chamber *b*¹, is empty of liquid, the float, *E*, being at its lower position, holds the valve, *G*, closed, that the familiar snap action operates to prevent change of the position of the valve until the float is submerged far enough to overcome by its buoyancy the tension of the spring and shift it past the fulcrum of the valve operating lever. At said lower closed position of the valve, *G*, as will be seen by consideration of Figure 3, the pump-motor-energizing circuit is closed by contact of the forked end, *j*, of the electrode, *J*, with the end, *K*¹, of the electrode, *K*, causing the pump to function for pumping the liquid from the low reservoir into the chamber, *b*¹. When the liquid rises in the receptacle, *b*¹, it will cause the float to reverse the position of the valves, the valve, *G*, being opened and the pump motor energizing circuit being broken, causing the pump to cease action until the withdrawal of fuel to supply the carbureter causes the lowering of the float, *E*, and the reversal of the valves back to their former positions. It will be observed that in the first position,—that is, with the valve, *G*, closed and the pump operating,—the port, *f*, is open for the free escape of the air, as is necessary to permit the chamber, *b*¹, to fill with liquid, and that the valve, *G*, being closed prevents any of this air which may be charged with liquid vapor from passing out through the air inlet passage leading to the valve, *G*, and in which the circuit gap is located. Upon the reversal of the valves, the valve, *G*, being opened, the valve, *F*, being closed, all the air that enters to permit the delivery of the fuel by gravity comes in through the air inlet passage leading to the valve, *G*, and this clean air from the outside flushes this passage and insures that it shall be free from any explosive gas at the circuit gap, where a spark is liable to be caused by the breaking of the circuit.

As above noted, the device may be connected with a source of suction at the port, *f*, and the suction may operate to assist the pump, or the pump may be operated to assist the suction, in filling the chamber, *b*¹; and neither of these filling means will inter-

fere with the operation of the other. When thus connected with a source of suction, it will be understood that it is necessary to provide the second chamber, *b*², with the check valve, *b*², closed by the suction to permit the device to deliver the fuel to the carbureter freely by gravity at all times, as in the ordinary operation of the familiar vacuum fuel feed device. It will be seen, therefore, that the construction described for employing an electrically-operated pump to lift the liquid can be applied to the familiar type of vacuum fuel feed devices without interfering at all with the operation of said devices under suction in the usual manner, and that when thus applied, the electrically-operated pump need be brought into service only when the suction available is insufficient for maintaining adequate supply. It will also be understood that without the partition, *B*¹, and without any suction connection, the electric pump is designed to be operated in the manner described as the sole means of maintaining the supply.

I claim:—

1. In a combination for the purpose of supplying fuel by gravity to the carbureter of an internal combustion engine from a fuel source at a lower level, an electrically operated pump having its intake connected with said fuel source; a fuel receptacle at a higher level with which the discharge of the pump is connected, said receptacle having above the liquid-containing space thereof two inlet ports, and means for opening them alternately, one at a high level and the other at a low level of liquid in the receptacle; an air inlet passage leading to the port which is opened at high level; a circuit in which the pump motor is energized extending in part in said passage, and having a gap therein, and means for opening and closing said gap which is moved for opening said gap by the movement for opening said last mentioned port.

2. In the construction defined in claim 1, foregoing, the air inlet passage in which the circuit gap is located, having its air entrance screened by flame stopping gauze.

3. In the construction defined in claim 1, foregoing, the air port which is opened at the low level being adapted for connection with a source of suction, and the receptacle comprising a chamber into which the chamber having the connection described delivers the liquid fuel by gravity flow; whereby the device may be operated alternatively or simultaneously by suction producing partial vacuum in the first chamber, and by the electric pump.

4. In the construction defined in claim 1, foregoing, the air inlet passage in which the gap in the electric circuit is located, comprising a fitting whose body is composed of insulating material, having an axial pas-

sage and a transverse passage intersecting the two electrodes being in the path of air entering through the transverse passage. In testimony whereof, I have hereunto 10
the said fitting axially with respect to said axial passage, a second electrode insulating-ly mounted upon the air inlet valve for movement into and out of contact with the other electrode, the position of contact of set my hand at Chicago, Illinois, this 4th day of April, 1922.

WALTER VAN GUILDER.