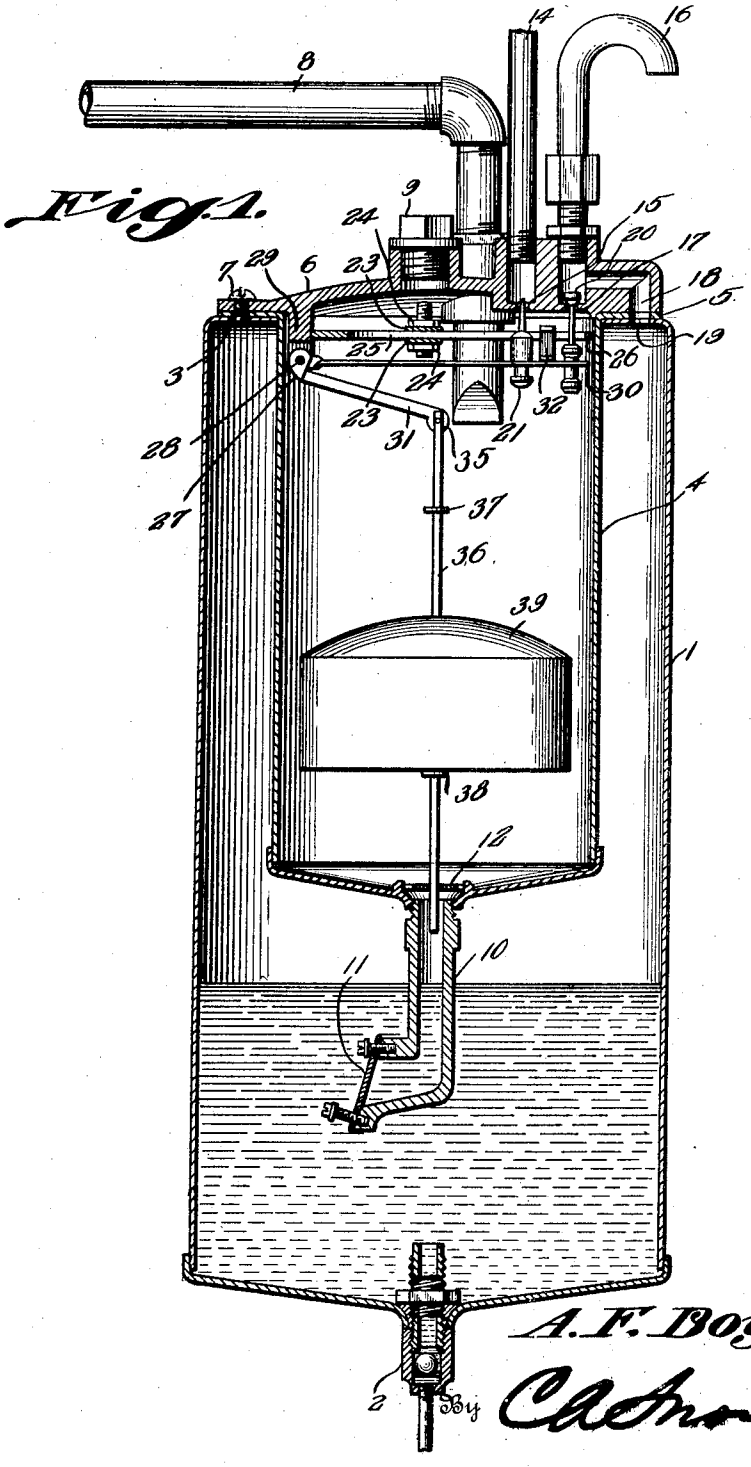
Dec. 30, 1924. 1,521,423

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VACUUM TANK

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Fig. 1.



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Fig. 2.

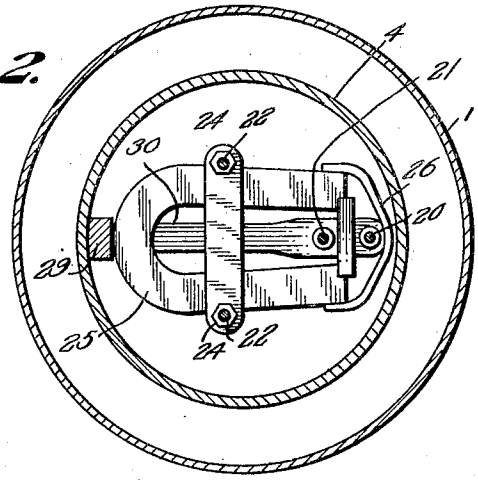


Fig. 3.

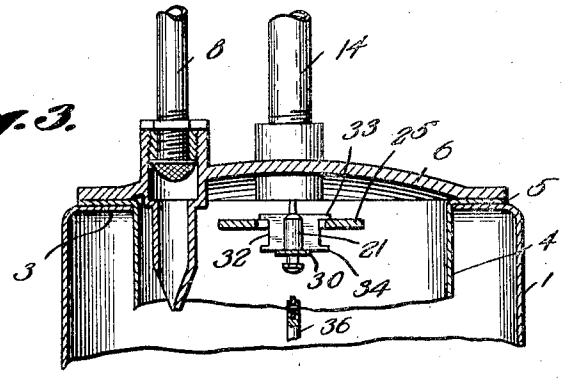
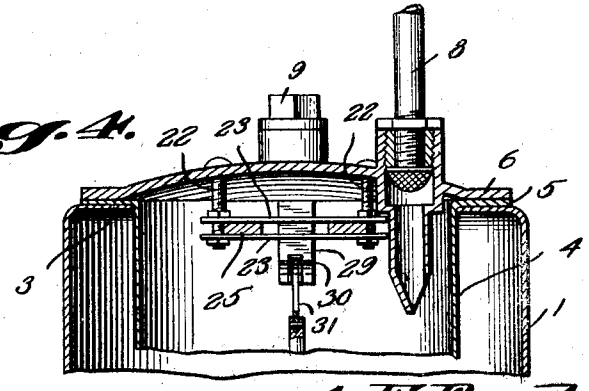


Fig. 4.



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UNITED STATES PATENT OFFICE.

AARON F. BOYLAN, OF DENISON, IOWA.

VACUUM TANK.

Application filed December 29, 1922. Serial No. 609,649.

To all whom it may concern:

Be it known that I, AARON F. BOYLAN, a citizen of the United States, residing at Denison, in the county of Crawford and State of Iowa, have invented a new and useful Vacuum Tank, of which the following is a specification.

This invention aims to provide a novel form of magnetic means for controlling the valves in a vacuum tank in the reserve fuel supply system of an internal combustion engine.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that, within the scope of what is claimed, changes in the precise embodiment of the invention shown can be made without departing from the spirit of the invention.

In the accompanying drawings:

Figure 1 shows in section, a device constructed in accordance with the invention, parts appearing in elevation; Figure 2 is a transverse section taken in a plane above the magnet; Figures 3 and 4 are fragmental longitudinal sections, taken through the top of the device, looking in opposite directions.

The numeral 1 denotes a main tank provided at its lower end with a valve-controlled outlet leading to the carbureter (not shown) of an internal combustion engine. At its top, the main tank 1 has an inwardly extended flange 3. An auxiliary tank 4 is located within the main tank 1 and has an outwardly extended flange 5 overlapping the flange 3 of the tank 1. The tank 4 is provided at its lower end with an outlet 10 discharging into the main tank 1 and under the control of a flap valve 11. A guide 12 is located in the bottom of the auxiliary tank 4. A lid 6 is superposed on the flange 5 of the tank 4 and is held in place by securing elements 7 engaging the lid and the flanges 3 and 5. A fuel inlet 8 communicating with the main supply tank (not shown) enters the lid 6 and discharges into the auxiliary tank 4. The lid 6 carries the usual closure plug 9 giving access to the tank 4 when it is desired to fill the tank by hand. The suction conduit is marked by the numeral 14 and is mounted in the lid 6, there being a seat 15 in the lid, at the inner end of the conduit. The vent is marked by the numeral 16 and is carried by the lid 6, there being a seat 17 in the lid, at the inner end of the vent. The lid 6 has a passage 18 communicating with the vent and permitting the liquid to flow from the tank 1 at atmospheric pressure, there being openings 19 in the flanges 3 and 5 which register with the passage 18. The vent 16 is controlled by a downwardly closing valve 20 cooperating with the seat 17. The suction conduit 14 is controlled by an upwardly closing valve 21 coacting with the seat 15.

Hangers 22 depend from the lid 6. Clamp bars 23 are held on the hangers 22 by nuts 24. A magnet 25 is located in the upper end of the auxiliary tank 4 and extends transversely thereof, the magnet 25 being gripped between the clamp bars 26 and although the magnet 25 has been shown in the form of a permanent horseshoe magnet, this form of magnet is not necessary. Any kind of a magnet may be used. The arms of the magnet 25 are connected by a keeper 26.

A vertically swinging bell crank lever 27 is fulcrumed at 28 on a lug 29 extended downwardly from the lid 6, the bell crank lever comprising an upper arm 30 and a lower arm 31. The valves 20 and 21 are loosely interengaged with the upper arm 30 of the bell crank lever 27. An armature 32 is mounted on the upper arm 30 of the bell crank lever 27 and operates between the side portions of the magnet 25, the armature having upper flanges 33 and lower flanges 34 overlapping the side arms of the magnet 25. The lower arm 31 of the bell crank lever 27 is pivoted at 35 in any suitable way, to a support or rod 36 slidable in the guide 12. The rod 36 has an upper stop 37 and a lower stop 38. A float 39 is located in the auxiliary tank 4 and is mounted for reciprocation on the rod 36 between the stops 37 and 38.

The operation of a vacuum tank in a device of the class described is well understood by those skilled in the art and the operation may be confined to those elements of the device which possess patentable novelty.

In Figure 1 the valve 21 is in open position and the valve 20 is in closed position.

If there is enough liquid in the tank 4, the float 39 will be raised off the stop 38, but the valve 21 will not close responsive to the suction in the conduit 14, because the bell crank lever 27 is held in the position of Figure 1 by the attraction of the magnet 25 on the upper flanges 33 of the armature 32 which is secured to the upper arm of the bell crank lever 27. The suction through the conduit 14 draws liquid into the tank 4 through the inlet 8. As the liquid accumulates in the tank 4, the float 39 raises, strikes the stop 37, raises the rod 36 and tilts the bell crank lever 27 until the valve 21 is closed and the valve 20 opened. The tank 4 is vented and liquid flows from the tank 4 into the tank 1 by way of the outlet 10. As the level of the liquid in the tank 4 falls, the float 39 moves downwardly away from the stop 37, but the valve 21 remains closed and the valve 20 remains open, because the upper arm 30 of the bell crank 27 has raised the armature 32, thereby breaking the attraction between the magnet and the upper flanges 33 of the armature, and rendering the lower flanges 34 of the armature responsive to the action of the magnet. Ultimately, the descending float 39 strikes the stop 38, moves the rod 36 downwardly, and restores the parts to the positions of Figure. 1.

The advantages of the device shown and described arise mainly out of the fact that the valves are controlled without resorting to springs or knuckle joints, as is common in the art.

What is claimed is:—

In a fuel supply system for an internal combustion engine, a vacuum tank having a suction conduit and a vent, a magnet in the tank, a bell crank lever fulcrumed in the tank and comprising upper and lower arms, valves carried by the upper arm of the lever and controlling the suction conduit and the vent, a float connected to the lower arm of the bell crank lever, and an armature carried by the lever, and responsive to the magnet, the distance between the armature and the fulcrum of the lever being materially greater than the distance between the fulcrum and the point of connection between the float and the lower arm of the lever, said lower arm slanting downwardly and inwardly, and the upper arm being disposed substantially at right angles to the axis of the tank.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

AARON F. BOYLAN.

Witnesses:

GEORGE STALEY,

BART HICKEY.