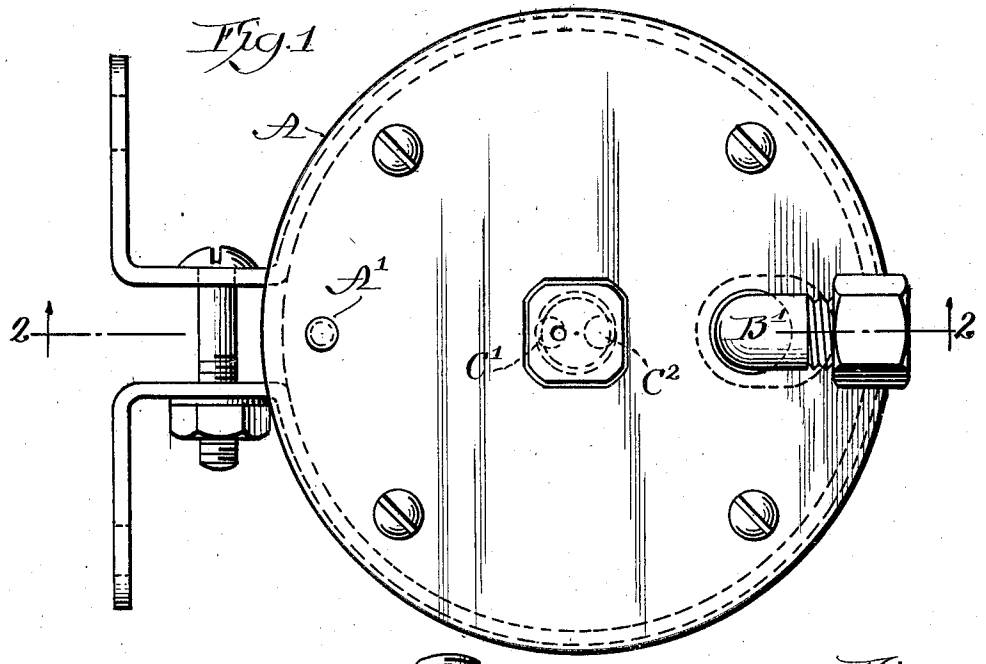
April 29, 1930. L. H. WHEELER 1,756,895

VACUUM TANK

Original Filed Aug. 27, 1926 2 Sheets-Sheet 1

Fig. 1



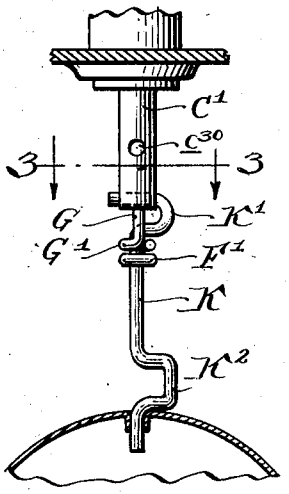


Fig. 4

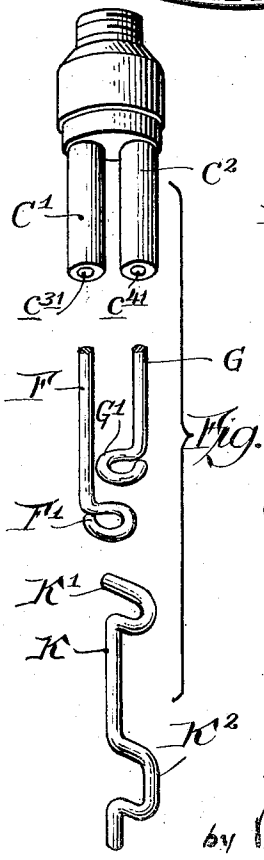
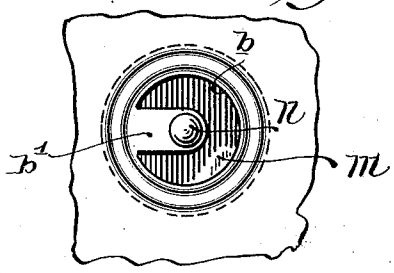


Fig. 5

Fig. 6



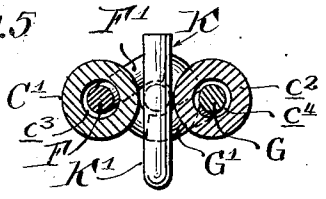


Fig. 3

Witness:
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April 29, 1930. L. H. WHEELER 1,756,895

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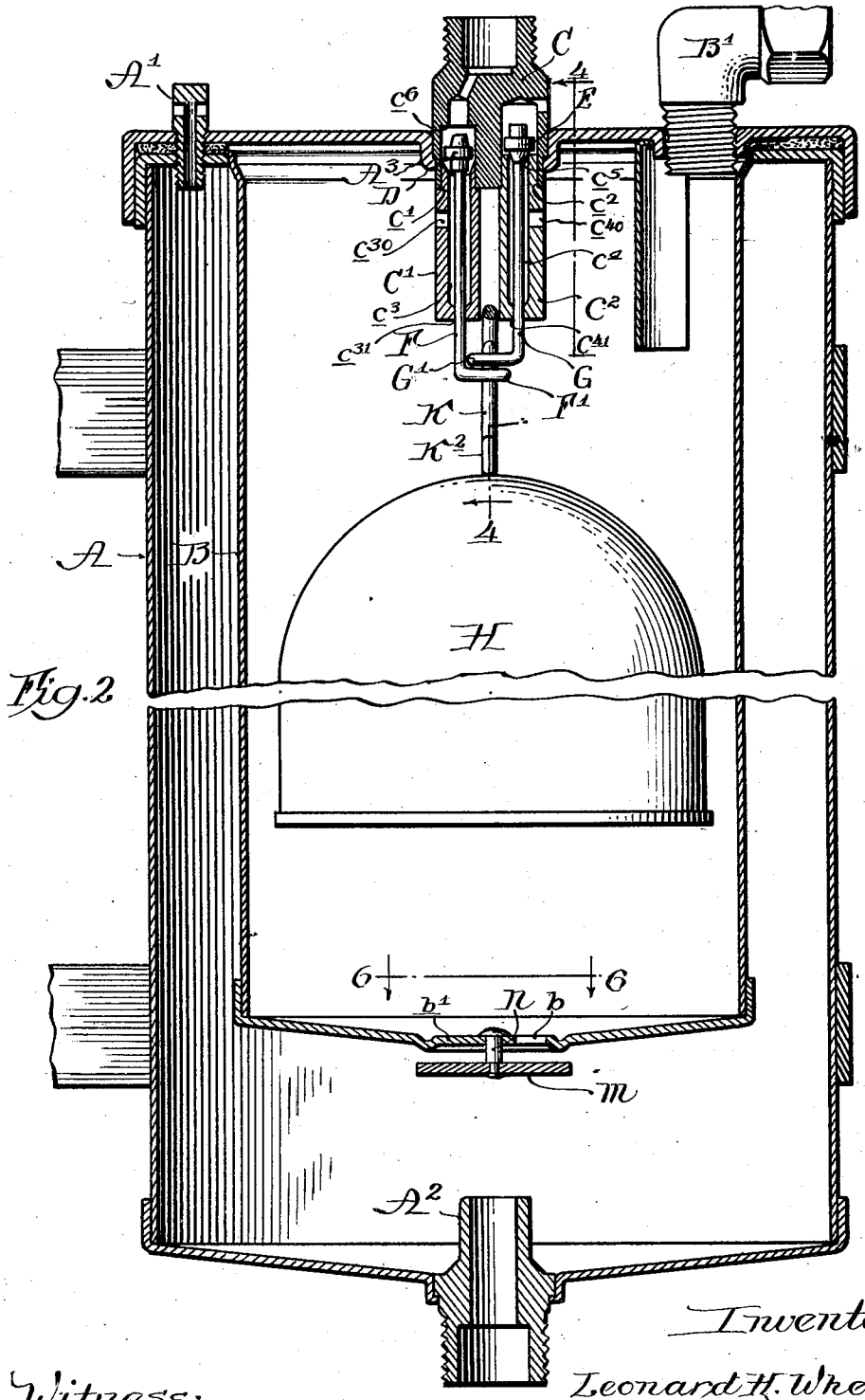


Fig. 2

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Patented Apr. 29, 1930 1,756,895

UNITED STATES PATENT OFFICE

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VACUUM TANK

Application filed August 27, 1926, Serial No. 131,861. Renewed April 18, 1929.

The purpose of this invention is to provide an improved construction of a vacuum fuel feeding structure, commonly called a vacuum tank, particularly in respect to the mounting of the several valves for controlling the inflow and outflow of the fuel. It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:—

Figure 1 is a top plan view of a vacuum tank embodying this construction.

Figure 2 is a vertical section at the line, 2—2, on Figure 1.

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

Figure 4 is a detail section at the line, 4—4, on Figure 2.

Figure 5 is a dissected perspective view of the fitting containing the atmosphere and suction connections and valves and the stems of the valves and the float.

Figure 6 is a detail plan view of the outlet from the vacuum chamber and the valve at said outlet.

In the drawings the main outer chamber of a vacuum tank is indicated at A. The inner or vacuum chamber is designated by B. B^1 designates the fuel supply connection leading for discharge into the vacuum chamber, B. A^1 denotes the atmosphere connection to the outer or fuel reserve chamber, A. A^2 denotes the discharge connection from the reserve chamber for supplying the carburetter. The suction and atmosphere valves D and E are mounted in a fitting which is intruded through the top of the vacuum chamber comprising a main member, C, and two similar tubular members, C^1 and C^2, which project from the lower end of the member, C constituting parallel prongs. The member, C, of the fitting is desirably made noncircular for being entered and fitting in a correspondingly shaped aperture formed through an inwardly-struck boss, A^3, the fitting member being adapted for drive fit in the depression and aperture in which it is mounted, and to be conveniently soldered therein, as will be understood from Figure 2. The member, C, has two longitudinally-extending and parallel bores, c^1, c^2, which receive the upper ends of the prong members, C^1 and C^2, which are tubular in form, having extending through them the suction and atmosphere passages, c^3 and c^4, and being inserted and made tight preferably by a drive fit in the bores, c^1 and c^2, into which said prong members extend for a short distance from the lower end of said bores, leaving above them adequate portion of said bore to constitute chamber for the suction and atmosphere valves, D and E, of which the atmosphere valve seats at c^5, at the upper end of the passage, c^4, in said prong member, while the suction valve, D, seats upwardly at the shoulder, c^6, constituting the valve seat formed by the reduced upper end portion of the bore, c^1, from which the duct, c^6, leads to the end of the fitting which is terminated suitably for connection with a pipe leading to a source of suction. The stems, F and G, of the suction and atmosphere valve respectively, extend down through the suction and atmosphere passages, c^3 and c^4, respectively, which have lateral apertures, c^{30} and c^{40} for communication with the vacuum chamber, the stems, F and G, having guide bearings at c^{31} and c^{41} at the lower ends of the prongs, C^1, C^2, from which respectively said stems extend for engagement with the stem, K, of the float, H, as hereinafter more particularly described. The float stem, K, is formed at its upper end by bending in the form of a horizontally open hook seen at K^1, the horizontally projecting end of which enters between the two prongs, C^1 and C^2, for guidance of the stem and float vertically, the range of vertical movement of the float being such that not only this horizontally projecting terminal but also the other side of the hook and the vertically extending portion of the stem moves up between the two prongs when the float rises to its upper limit. It will be seen that the engagement thus indicated of the float stem between the prongs, C^1 and C^2, is adapted to check the float as to its sideward movement only in one plane, and that for its complete guidance means must be provided for checking it in a transverse vertical plane. For that purpose the lower ends of the valve stems, F and G,—

which for their engagement with the float stem have their lower ends bent for extending horizontally crosswise of the float stem for encounter with the vertically spaced abutments on the float stem comprising the hook, K^1, and a C-shaped bend, K^2, immediately above the float,—are formed also for engagement with the float stem to check it laterally in planes transverse to that in which it is checked by the hook and between the prongs, C^1 and C^2, the form for this purpose consisting of closed loops or eyes, F^1 and G^1, as may be readily understood from the drawings.

In the operation of this construction in the usual manner of a vacuum tank, the float at its lowest position encountering by the lower side of the hook, K^1, the horizontally bent loop, G^1 of the atmosphere valve stem, G, operates for drawing the atmosphere valve down to its seat from which it is upheld by the engagement under said loop, G^1, of the loop, F^1, of the stem, F, of the suction valve, D, which is held to its seat above it by the suction. Correspondingly, when the float rises to its upper limit, determined by the spacing of the C-bend, K^2, downwardly below the hook, K^1, of the float stem, the said hook, K^1, encounters the transverse loop bend terminal, F^1, of the stem, F, of the suction valve, D, and lifting the latter lifts also the atmosphere valve, E, whose loop-bent end, G^1, stands immediately above the end, F^1, of the suction valve stem, the float thereby operating by its buoyancy to break the atmosphere valve away from its seat on which the suction, operating by virtue of the partial vacuum produced in the vacuum chamber while the suction valve, D, is open, tends to hold it. The action of the valves it will be understood, is therefore that which is customarily obtained by the so-called snap action, familiar in the construction of vacuum tanks, the above described construction being adopted for the advantage of its simplicity in comparison with the familiar snap action structure.

The effectiveness of the action similar to and having the purpose of snap action, which is obtained by the suction hold on the atmosphere valve holding the float against rising until its depression in the liquid develops buoyancy sufficient to overcome the suction on the valve, may be very little when the suction is low; and in such case there is liability of the tank coming to "balance" by the valves respectively opening and closing gradually, instead of snapping open and closed. This liability will be reduced by any means or expedient which adds abruptly to the buoyant effort of the float for operating the valves; and to obtain such comparatively abrupt addition is the purpose and effect of arranging the abutments on the valve stems which the float actuates them and by which they actuate each other, as seen most clearly in Figure 2, so that at the seated position of the atmosphere valve the abutments, F^1 and G^1, of the suction and atmosphere valve stems respectively are spaced apart a short distance. This distance is designed to permit the suction valve, D, to be lifted toward its seat for intruding its tapered end into the port, far enough to cause it to experience the suction tending to pull it to its seat, by the time the abutments, F^1 and G^1, are in contact for lifting the atmosphere valve. This suction pull on the valve, D, thus becomes an abrupt addition to the buoyant effort of the float for opening the atmosphere valve and tends to open it and seat the suction valve abruptly as with a snap instead of gradually.

Following the same intention of simplifying the construction, this vacuum tank is provided with a very simple outflow valve from the vacuum chamber to the fuel reserve chamber, said valve consisting of a simple flat disk, M, suspended at its center by a pin, N, carried by a spider arm, b^1, which projects from a periphery into the center of the outlet aperture, b, at the bottom of the vacuum chamber.

I claim:—

1. In a vacuum fuel feeding structure in combination with a vacuum chamber having a separable cover forming the top of the chamber, a unitary fitting removably secured in said cover intruding through the same and having longitudinally extended atmosphere and suction passages, each opening both within and outside of the chamber, said fitting being externally adapted for connection of the suction passage with a source of suction; a float in said chamber, valves in said passages seating respectively against suction outflow and against atmosphere inflow, independent stems carrying said valves respectively positively both in seating and in unseating directions, both stems extending from said unitary fitting inwardly with respect to the chamber, and having means for engagement respectively by the float at a predetermined limit of the rise and a predetermined limit of the fall of the float.

2. In the construction defined in claim 1, the float having an upwardly extending stem and the unitary fitting having a vertical guide-way for the upper end portion of said stem.

3. In a vacuum fuel feeding structure in combination with a vacuum chamber and float therein, a member mounted in the top of the chamber protruding thereinto and also protruding thereabove, said member having longitudinally extending bores and suction passages each opening both within and outside the chamber, said member being exteriorly of the chamber adapted for connec-

tion of the suction passage with a source of suction, valves in said passages seating respectively against suction outflow and against atmosphere inflow, and having independent stems extending for independent engagement by the float at predetermined limits of its rise and fall, said member at the part intruded into the chamber containing two side-by-side bores constituting side-by-side chambers in the lower end portion of said part, and two tubular members entered at their upper ends in said lower end portions of said side-by-side bores and by their upper ends forming respectively the seat and the limit stop for the suction and atmosphere valves, and by their proximate sides affording guidance for the float stem.

4. The construction defined in claim 3, said valves having for engagement with the valve stem horizontally bent lower end portions, the valve stem having vertically-spaced abutments for encounter with said horizontally-bent end portions at the upper and lower limits of the float movement, said horizontally bent ends being in vertical alignment, that of the suction valve stem being below that of the atmosphere valve stem.

5. In the construction defined in claim 3, said member at the part protruding into the vacuum chamber comprising two parallel tubular prongs extending down within the vacuum chamber, the atmosphere and suction passages being formed and the valve stems being guided in said prongs respectively and protruding at their lower ends, the float stem having a transversely extending upper end portion which engages and is guided between said prongs in the vertical movement of the float, the valve stems having their lower ends horizontally bent in loop form, the float stem being embraced in said loops for additional guidance of the stem in the up-and-down movement of the float.

6. In a vacuum fuel feeding structure having a suction controlling valve and an atmosphere inlet controlling valve, and a float having a stem by which said valves are operated for opening the atmosphere valve and closing the suction valve at a predetermined high level of the liquid content of the chamber, the two valves having their respective stems interlocked with the float stem by means of co-operating abutments on said stems, in such manner that the atmosphere valve is actuated in opening direction by the encounter with an abutment on its stem by an abutment on the suction valve stem due to the encounter of an abutment on the float stem with the suction valve stem, said abutments being located on said valve stems respectively so that at the seated position of the atmosphere valve and the open position of the suction valve, without encounter of the float stem, the abutments on said valve stems respectively are slightly spaced apart.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 23rd day of August, 1926.

LEONARD H. WHEELER.