

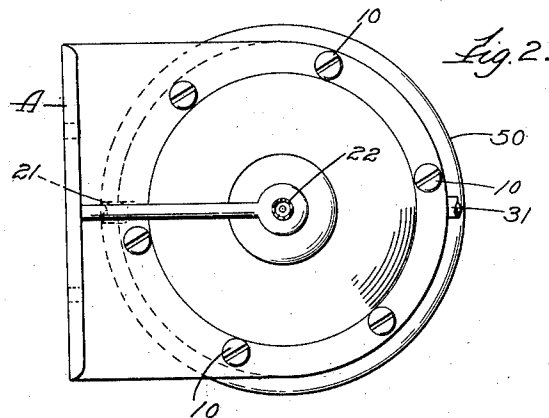
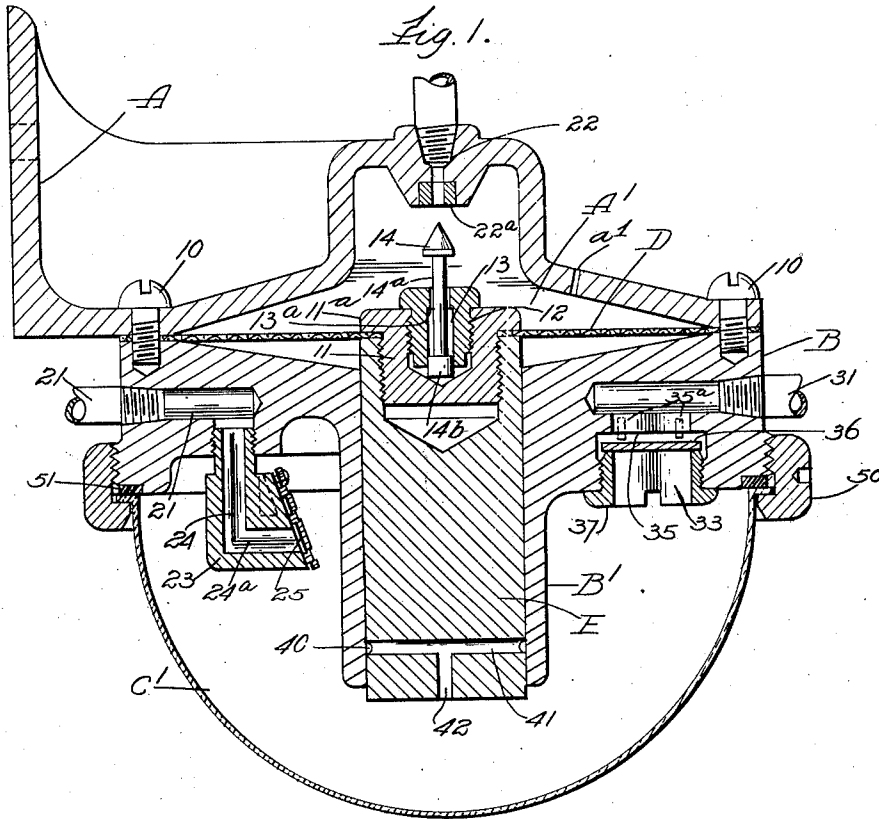
Jan. 16, 1934.

E. A. ROCKWELL

1,943,901

FUEL PUMP

Original Filed Nov. 16, 1929



Witness.
H. F. McKnight.

Inventor.
Edward A Rockwell.
by Burton & Burton
his Attorneys.

UNITED STATES PATENT OFFICE

1,943,901

FUEL PUMP

Edward A. Rockwell, Chicago, Ill.

Application November 16, 1929, Serial No.
407,598. Renewed May 29, 1933

6 Claims. (Cl. 103—44)

The purpose of this invention is to provide an improved construction of a vacuum fuel feeding apparatus for supplying fuel to an internal combustion engine in which a piston pumping apparatus has its piston operated by a diaphragm which forms a moving wall of the vacuum chamber. It consists in the elements and features of construction shown and described as indicated in the claims.

10 In the drawing:—

Figure 1 is a vertical axial section of a structure embodying this invention.

Figure 2 is a top plan view of the same, on a reduced scale.

15 The construction shown comprises a mounting bracket and diaphragm casing member, A, arranged to be mounted bracket-wise in any convenient position for delivering fuel by gravity to the carbureter, as, upon the forward side of the dash of the vehicle whose engine is to be served. This bracket has a recess in the under-
20 side of its horizontal extending portion, which forms the vacuum chamber, A¹, of which the lower wall is formed by a flexible diaphragm, D, clamped at the under side of the member, A, by
25 the pump casing member, B, the clamping being effected by bolts, 10, 10, set through the web of the bracket and diaphragm casing member, A, and screwed into the pump casing member, B.
30 The pump casing member, B, has a downwardly protruding axially hollow boss, B¹, which by its axial cavity forms the chamber for a piston, E, fitted and mounted reciprocally therein and secured at its upper end to the center of the diaphragm, D, said securement being effected by a
35 flanged plug, 11, screwed into the upper end of the piston, E, which is bored and threaded for that purpose, and by its flange, 11^a, clamping the margin of the central aperture in the diaphragm onto
40 the upper end of the piston, E. At its upper side the mounting bracket and diaphragm casing chamber, A, is arranged for connection with a source of vacuum, being bored as seen at 22, and counterbored at the lower end to receive a bush-
45 ing, 22^a, which constitutes the suction valve seat, as hereinafter explained, and counterbored at the upper end and threaded for pipe connection leading to a source of vacuum. In the plug, 11, which
50 secures the piston, E, to the diaphragm, there is mounted a valve, 14, arranged for seating upwardly to close the suction port at the lower end of the valve seat bushing, 22^a. This valve, 14, has its stem, 14^a, formed to operate as a dash pot
55 plunger for which the dash pot is afforded by a flanged plug, 12, screwed into the flanged plug,

11, which is centrally bored and threaded for that purpose, the stem, 14^a, of the valve, 14, having at its lower end a plunger head, 14^b, which is suitably dimensioned to operate as a plunger in the axial bore, 13, which forms the dash pot chamber in the plug, 12. A restricted air inlet port for the chamber, A¹, is seen at a¹.

The operation of the construction as thus far described may be understood to be that upon suction admitted through the suction connection
65 producing partial vacuum in the vacuum chamber, A¹, the diaphragm, D, is flexed upward, retracting the piston member, E; and that in that movement the valve, 14, becomes seated at the suction port, interrupting the suction; whereupon atmospheric
70 pressure admitted through the atmosphere vent port, a¹, relieving the vacuum, the diaphragm is retracted by the weight of the piston, tending to withdraw the valve, 14, from the suction port, but the suction hold on the valve delaying its
75 withdrawal until the plunger head, 14^b, of the valve stem, 14^a, is encountered by the shoulder, 13^a, formed at the upper end of the counterbore which constitutes the dash pot chamber in which
80 the plunger head operates, whereupon the valve, 14, will be forcibly and fully withdrawn from the suction port, re-admitting the suction and causing the cycle of movement to be repeated.

The remainder of the construction of the pump, of which the piston E, forms the pumping member, may be readily understood from the drawing, but may be further particularly described.

In the pump casing member, B, there is formed a fuel inlet passage, 21, arranged at its outer end for pipe connection with a source of fuel supply, and at its inner end for connection with a fitting,
85 23, having passages, 24, completing the fuel inlet passage to the fuel inlet port, 24^a, controlled by the inlet valve, 25, arranged to be normally seated by gravity and to be readily opened by the
90 inflow of the fuel. At its opposite side the pump casing member, B, has the fuel discharge passage, 33, leading upward from the lower side of the member, B, into the horizontally extending final
95 portion, 31, of said discharge passage, which at its outer end is threaded for pipe connection leading to the carbureter. The discharge passage, 33, is counterbored from its lower end, forming a
100 shoulder, 35, and threaded to receive a hollow bushing, 37, whose upper end constitutes the seat for the discharge valve, 36, which is stopped by
105 stop pins, 35^a, set in the shoulder, 35, preventing the valve from seating on said shoulder.

A fuel receiving chamber encompassing the fuel inlet passage ports and valves is formed by a bowl, 110

C¹, preferably made of transparent material, so that the condition of the fuel therein can be observed. This bowl is flanged at its upper end for being clamped to the margin of the under side of the pump casing member, B, by means of a flanged clamping collar, 50, for screwing interior the member, B, which is peripherally threaded for so receiving said clamping collar, a suitable gasket, 51, being interposed between the flange of the bowl and the downwardly facing margin of the casing member, B.

For ensuring lubrication of the piston, E, which may be effected by the fuel, it is formed with an annular encompassing groove, 40, a short distance from its lower end, with a diametrically positioned bore, 41, opening at opposite ends in the groove, 40, and an axially positioned bore, 42, from the lower end, connecting with the transverse bore, 41. By this means the fuel which will at all times occupy the fuel chamber formed by the bowl, C¹, up to the level of the discharge valve, 36, obtains access to the seat of the piston in its chamber and ensures its lubrication.

I claim:

1. A fuel pump comprising a casing, a flexible diaphragm clamped to said casing and supported in horizontal position, a piston secured to said diaphragm and guided for vertical reciprocation by a portion of said casing, check valve controlled fuel inlet and outlet passages in said casing adapted to be connected to a fuel delivery line and a bowl secured to said casing forming a fuel pumping chamber, said piston and the guiding portion of said casing extending to adjacent the bottom of said bowl below the openings of the inlet and outlet passages.

2. A fuel pump comprising a casing containing a pumping chamber, check valve controlled fuel inlet and outlet passages in said casing communicating with said pumping chamber and adapted to be connected to a fuel delivery line, a flexible diaphragm supported by said casing, said casing including an extension having an opening therethrough and a piston secured to said diaphragm guided for vertical reciprocation by said casing extension, said piston and said casing extension extending to adjacent the bottom of said pumping chamber below the openings of said inlet and outlet passages.

3. A fuel pump comprising a pair of upper and lower casing parts clamped together, a flexible diaphragm clamped between said casing parts, said lower casing part including a cylindrical extension, a piston secured to said diaphragm and

guided for movement by said extension, check valve controlled fuel inlet and outlet passages in said lower casing part, a pumping chamber member removably secured to the bottom of said lower casing part, forming a pumping chamber of which said piston constitutes a movable wall, the lower end of said piston extending below the inlet and outlet passages in order to be sealed by the fluid in the bottom of the pumping chamber.

4. A fuel pump comprising a casing, a flexible diaphragm clamped at its marginal edge to said casing and supported in horizontal position, a piston secured to said diaphragm and guided for vertical reciprocation by a depending portion of said casing, check valve controlled fuel inlet and outlet passages in said casing adapted to be connected to fuel suction and delivery lines and a bowl removably secured to the bottom of said casing forming a fuel pumping chamber, said piston and the guiding portion of said casing extending to adjacent the bottom of said bowl below the openings of the inlet and outlet passages.

5. A fuel pump comprising a casing containing a pumping chamber, check valve controlled fuel inlet and outlet passages in said casing communicating with said pumping chamber and adapted to be connected to fuel suction and delivery lines, a flexible diaphragm supported in horizontal position by said casing, said casing including a depending extension having an opening therethrough and a piston secured to said diaphragm guided for vertical reciprocation by said casing extension, said piston and said casing extension extending to adjacent the bottom of said pumping chamber below the openings of said inlet and outlet passages.

6. A fuel pump comprising a pair of upper and lower casing parts clamped together at respective marginal edges, a flexible diaphragm clamped between said casing parts, said lower casing part including a depending cylindrical extension, a piston secured to said diaphragm and guided for movement by said extension, check valve controlled fuel inlet and outlet passages in said lower casing part, a pumping chamber member removably secured to the bottom of said lower casing part, forming a pumping chamber of which said piston constitutes a movable wall, the lower end of said piston extending below the inlet and outlet passages in order to be sealed by the fluid in the bottom of the pumping chamber.

EDWARD A. ROCKWELL.