

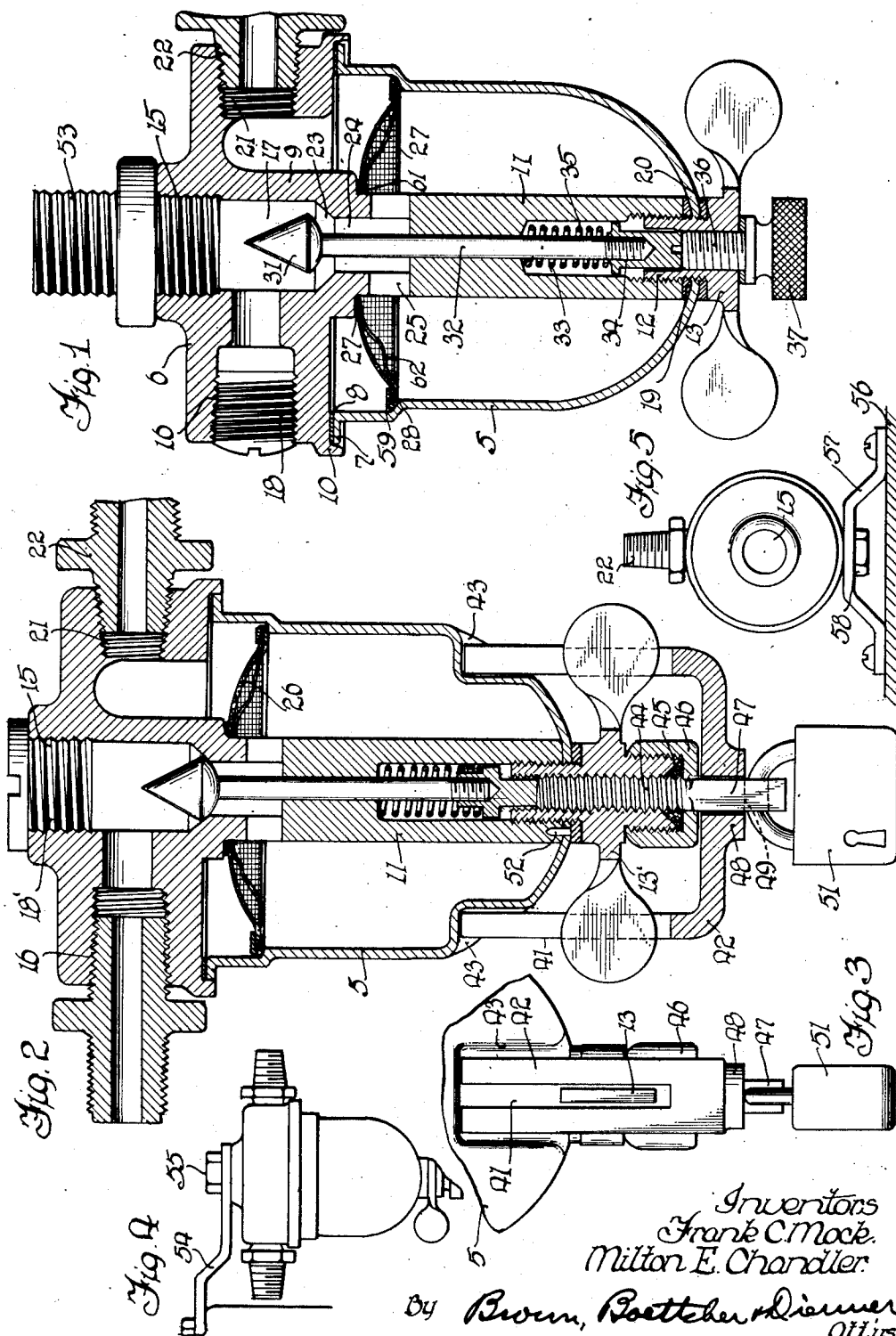
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FUEL STRAINER

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FUEL STRAINER.

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The present invention relates to fuel strainers, and has particular reference to that type of small strainer unit adapted to be interposed in the liquid fuel line extending from the fuel supply tank to the carbureter of an internal combustion engine. These strainers have their greatest field of utility in connection with automobile fuel supply systems, and are designed to separate or filter out all sediment, water or other foreign matter from the fuel before vaporization in the carbureter.

One of the particular objects of the invention is to provide a construction of strainer which can be opened or taken apart with maximum facility for the purpose of cleaning the device of accumulations of refuse matter.

It is desirable that the motorist be able to perform the above cleaning operation without removing the feeding pressure from the fuel line and without the necessity of turning off the fuel flow from the supply tank. Accordingly, it is a further object of the invention to provide a construction of strainer embodying novel valve means by which the flow of fuel entering the strainer may be interrupted preliminary to opening or dismantling the strainer. We also contemplate providing lock mechanism in connection with this valve so that the valve may be locked closed, whereby the device may also serve as a fuel lock for locking the car against theft.

Referring to the accompanying drawings: Figure 1 is a vertical sectional view of one form of the strainer, on an enlarged scale;

Fig. 2 is a similar view illustrating the valve locking mechanism associated with the strainer;

Figure 3 is a side elevational view of the yoke or staple for locking the valve; and

Figures 4 and 5 are side elevational and plan views respectively illustrating different methods of mounting of the strainer.

The strainer comprises a strainer receptacle 5 and a cap or head closing the top of the receptacle consisting of a casting 6. The strainer receptacle 5 is preferably of sheet metal, and is provided with a flange 7 at its upper edge which bears through a packing ring 8 against the bottom of the cap 6. This packing ring and the flange 7 are centered in a depending flange 10 which projects

downwardly from the cap 6. The packing ring is preferably shellacked to make it adhere to the cap 6. The cap 6 is formed with an interior central boss 9 from which extends a downwardly projecting stem 11 by which the bowl or receptacle 5 is held clamped to the head or cap 6. The lower end of the receptacle 5 is curved spherically to engage over the lower end of the stem 11. The shank 12 of a wing screw 13 passes up through an opening in the bottom of the shell 5 and threads into a correspondingly threaded opening in the lower end of the stem 11. The opening in the bottom of the shell is sealed against leakage by inner and outer washers 19 and 20. The inner washer 19 between the end of the stem and the shell is preferably composed of felt shellacked to the shell. The outer washer 20 between the shell and the hub of the wing screw is preferably fiber. The shell 5 is such length relative to the stem 11 that the act of screwing up the wing screw 13 will place a resilient compression on the end of the shell and firmly hold the upper flange 7 against the under side of the packing ring 8 and cap 6.

The fuel may be arranged to enter the device through either one of two separate inlets, 15 or 16. The fuel inlet 15 enters through the top of the cap 6 and opens into a valve chamber 17 in the boss 9, while the fuel inlet 16 opens laterally through the side of the cap 6 into this same valve chamber 17. The upper inlet 15 is particularly intended for making convenient connection with the outlet of a vacuum feed tank when the strainer is employed in vacuum feed systems, whereby the strainer unit may be conveniently supported below the vacuum feed tank. The lateral inlet 16 is adapted for connection in the ordinary pressure or gravity feed line, this inlet receiving the fuel from the supply tank. The inlet opening which is not used is suitably plugged by a removable plug, as denoted by the plug 18 in the vacuum feed installation shown in Fig. 1, or by the plug 18' shown in Fig. 2. In the arrangement shown in Figure 1 the inlet plug 53 may be screwed directly into the threaded outlet in the bottom of the vacuum feed tank for supporting the strainer and receiving the fuel. The outlet from the strainer unit is from the upper part of the strainer receptacle out through the outlet

passage 21 which is threaded for the reception of the conventional union connection 22.

The provision of the two interchangeable inlet openings has the added utility shown in Figures 4 and 5. In Figure 4 the top inlet opening 15 is not employed in the fuel circuit, the fuel entering through the lateral inlet. In the relation it is convenient to support the strainer from the engine block, crank case or frame adjacent the carbureter, by extending a supporting bracket 54 therefrom and passing an appropriate screw or bolt 55 down through the bracket into the upper inlet which is not used. Similarly in Figure 5 for mounting on the back of the dash 56 a yoke shaped bracket 57 may be screwed thereto and a screw or bolt 58 passed therethrough into the lateral inlet 16 which is not being used.

The fuel entering the valve chamber 17 flows downwardly over a valve seat 23 through a passageway 24 extending downwardly through the stem 11. From the passageway 24 the fuel is discharged outwardly through ports 25 into the straining receptacle below the straining screen 26. This screen is preferably of wire gauze and is cupped as shown so as to firmly engage at its inner edge against the shoulder 27 of the stem, and at its outer edge against the shoulder 28 on the shell 5. The outer edge of the screen is hemmed or embraced by a folded sheet metal flange 59 and the inner edge by a similar flange 61. These two flanges are joined by a plurality of spring arms 62 which add to the resiliency of the screen. The cupped curvature of the screen 26 and spring arms 62 is such that when the shell 5 and cap 6 are drawn together in firm engagement the screen and spring arms are placed under a resilient pressure between these shoulders 27 and 28, so that the screen is held therebetween without the necessity of any extraneous holding means.

When it is desired to disassemble the device for cleaning, entry of fuel down through the passageway 24 is blocked by the lowering of a tapered valve 31 upon the valve seat 23. This valve is supported on a stem 32 which passes down through a bore in the cap stem 11 and enters an enlarged bore 33 in the lower end of the latter stem. The lower end of the stem 32 receives a nut 34, and confined between this nut and the upper end of the counter-bore 33 is a compression spring 35 which normally tends to seat the valve 31. The valve is normally held in the raised position illustrated by the shank 36 of a secondary thumb screw 37 which screws into the wing screw 13 and abuts the lower end of the nut 34. When it is desired to clean the device the thumb screw 37 is revolved

low the valve 31 to seat under the action of the spring 35. Thereafter the wing screw 13 is screwed downwardly out of the lower end of the stem 11 and the shell 5 and screen 26 are withdrawn from over the stem 11 for cleaning. The manipulation of the wing screw 13 may serve both to lower the valve 31 and release the shell 5 without the necessity of separate manipulation of the thumb screw 37, but the latter is an advantageous addition for the reason that by its provision the valve 31 can be seated before the joint between the shell and cap 6 is broken, so that minimum loss of fuel occurs.

In the form shown in Fig. 2 the wing screw 13' is adapted to be locked against rotation by having the wing ends engage in slots 41 in the arms of a yoke 42. The arms of this yoke are adapted to engage in depressions in the lower portion of the shell 5, these depressions 43 interlocking the yoke 42 to the shell 5. A threaded rod 44 screws down through the shank 12' of the wing screw 13'. The wing screw 13' is provided with a suitable packing 45 and packing nut 46 for preventing leakage around this rod 44. The lower end of the rod is formed of square or polygonal cross section as shown at 47, and passes down through a correspondingly shaped hole in the hub 48 of the yoke 42. The end of this rod may be provided with any suitable extensions or handle means to permit of its convenient manipulation. The upper end of this rod is adapted to abut the nut 34 and hold the valve 31 in its raised position. For locking the valve 31 in closed position the yoke 42 is first removed and the rod 44 is screwed downwardly to allow the valve to seat. Thereafter the yoke 42 is replaced to lock the rod against rotation and the hasp of a suitable lock 51 is passed through a hole 49 in the rod below the hub 47. When so locked the rod 44 cannot be rotated to unseat the valve, and consequently the flow of fuel is positively locked until the lock 51 is removed and the yoke 42 dropped down to permit rotation of the rod. The shell 5 is held against rotation by a pin 52 or the like, projecting between the shell 5 and the stem 11.

It will be noted that as a result of the reciprocal or lift character of the valve 31, its conical formation, and the tapering form of the valve seat 23 practically no sediment or other foreign matter can accumulate on or around this valve and valve seat. All precipitations of water and sediment accumulate in the straining chamber shell 5 below the screen 26, this chamber being of sufficient capacity to hold a considerable quantity of foreign matter so that the filter does not have to be cleaned frequently.

We claim:

1. In a fuel strainer, the combination of a strainer receptacle comprising upper and lower separable casing sections, inlet and outlet ports in said upper casing section adapted for connection with the inlet and outlet pipes of the fluid line, a substantially horizontal screen extending transversely of said strainer receptacle, a stem carried by said upper casing section and extending axially downward through said screen, an inlet passageway extending through said stem and communicating at one end with said inlet port and at the other end with the interior of said receptacle below said screen, a valve adapted to bear on a valve seat in said inlet passageway, and means extending upwardly through said stem for normally holding said valve off its seat, but permitting the seating of said valve without leakage from said receptacle when said casing sections are separated.

2. In a fuel strainer, the combination of a strainer receptacle, a separable cap on the upper end thereof, an outlet port in said cap, a stem carried by said cap and projecting into said receptacle, a fuel passage in said stem, an inlet port opening into the top of said cap and communicating with said passage, a lateral inlet port opening laterally into said cap and communicating with said fuel passage, straining means in said strainer receptacle, said fuel passage opening into said receptacle below said straining means, and screw threaded means for clamping the lower end of said receptacle to said stem.

3. In a fuel strainer, the combination of a strainer receptacle, a cap closing the upper end thereof, inlet and outlet ports in said cap, a stem projecting downwardly from said cap into said strainer receptacle, a fuel passage in said stem communicating with said inlet port, a shoulder formed in said strainer receptacle, an abutment surface associated with said cap, a gauze strainer resiliently engaging at its outer edge on said shoulder and on its inner edge on said abutment surface, and a screw threaded member detachably connecting the lower end of said strainer receptacle to said stem.

4. In a fuel strainer, the combination of a strainer receptacle, a cap closing the upper end thereof, a stem carried by said cap and projecting downwardly into said receptacle, an upwardly facing shoulder formed in said strainer receptacle, a downwardly facing shoulder formed adjacent said stem, a curved gauze strainer resiliently compressed between said shoulders, the outer edge of said strainer engaging said first mentioned shoulder and the inner edge engaging said last mentioned shoulder, an outlet port opening into said cap above said screen, an inlet port opening into said cap, a fuel pas-

sage communicating with said inlet part and extending through said stem, said passage opening into said strainer receptacle below said screen, and a screw threaded member engaging the lower end of said strainer receptacle and having threaded engagement with said stem.

5. In a fuel strainer, the combination of a strainer receptacle, a cap closing the upper end thereof, an inlet port opening into said cap, a stem descending downwardly from said cap, a fuel passage in said stem communicating with said inlet port, a conical valve seat in said fuel passage, a conical valve controlling said valve seat, a valve stem extending downwardly through said first stem, a screw member engaging with the end of said strainer receptacle and having threaded engagement with said first stem, a second screw member extending through said first screw member and operable to engage said valve stem for holding said valve off its seat, and spring means normally tending to seat said valve.

6. In a fuel strainer, the combination of a strainer receptacle, a cap closing one end thereof, a fuel passage entering said cap, a valve controlling said fuel passage, straining means in said receptacle, said strainer receptacle and said cap being separable to provide access for cleaning said receptacle and said straining means, and means for locking said receptacle and cap against separation and for locking said valve in closed position.

7. In a fuel strainer, the combination of a strainer receptacle, a cap therefor, a stem carried by said cap, a fuel passage in said stem, fuel ports adapted to circulate the fuel through said strainer receptacle when communicating with said fuel passage, a valve cooperating with said fuel passage and moving axially of said stem, means tending to close said valve, and means operable from the end of said strainer receptacle for moving said valve axially to open position or to release said valve for closure without permitting leakage from said receptacle.

8. A unitary strainer and flow lock comprising, in combination, an enclosure having inlet and outlet passages therein, a valve in one of said passages, a threaded projecting member operating by rotation to control said valve, and a lock member adapted to engage the projecting portion of said member and prevent its rotation, said projecting member having an eye projecting through said locking member to receive a padlock.

9. A unitary strainer and flow lock comprising, in combination, an enclosure having inlet and outlet passages therein, a valve in one of said passages, a threaded projecting member operating by rotation to

control said valve, and a lock member adapted to engage the projecting portion of said member and prevent its rotation.

5 10. A unitary strainer and flow lock comprising, in combination, an enclosure having inlet and outlet passages therein, a valve in the inlet passage, a threaded projecting member operating by rotation to control said valve, and a lock member adapted to
10 engage the projecting portion of said control member and prevent its rotation.

11. In a strainer, in combination, a cap, a removable cup fastened below said cap, two external inlet ports and one outlet port
15 in said cap, one inlet port being axial and the other two ports lateral, both inlet ports opening into a common passageway, an ex-

ternally adjustable valve controlling said passageway, and a locking member engaging the valve to lock it against adjustment. 20

12. In a strainer, in combination, a cap, a removable cup fastened below said cap, two external inlet ports and one outlet port in said cap, one port being axial and the other two ports lateral, both inlet ports
25 opening into a common passageway, an externally adjustable valve controlling said passageway, and a locking member engaging the valve to lock it against adjustment.

In witness whereof we hereunto subscribe
30 our names this 19th day of December, 1921.

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