Oct. 4, 1949. J. S. ROUTEN 2,483,740

RANGE OIL BURNER APPARATUS

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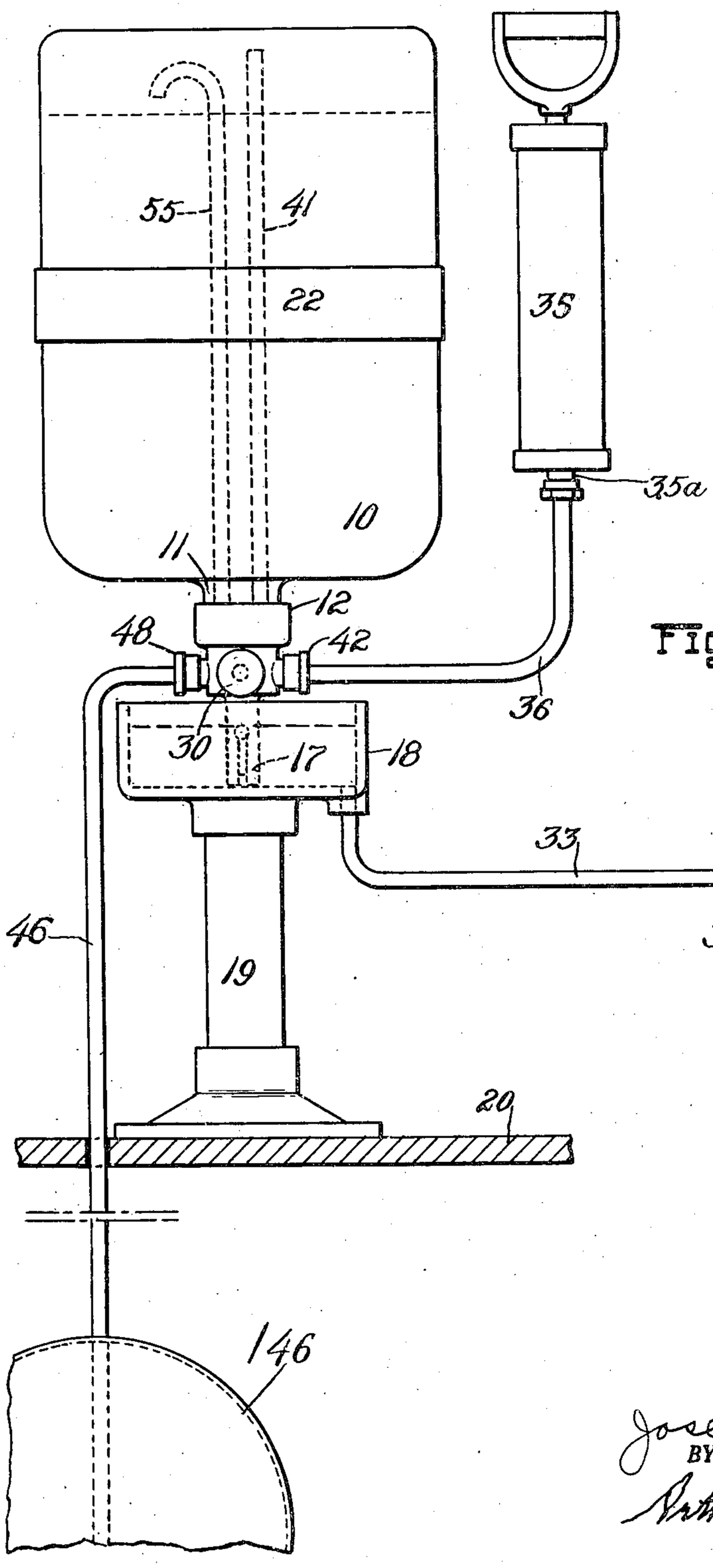

Fig. 1.

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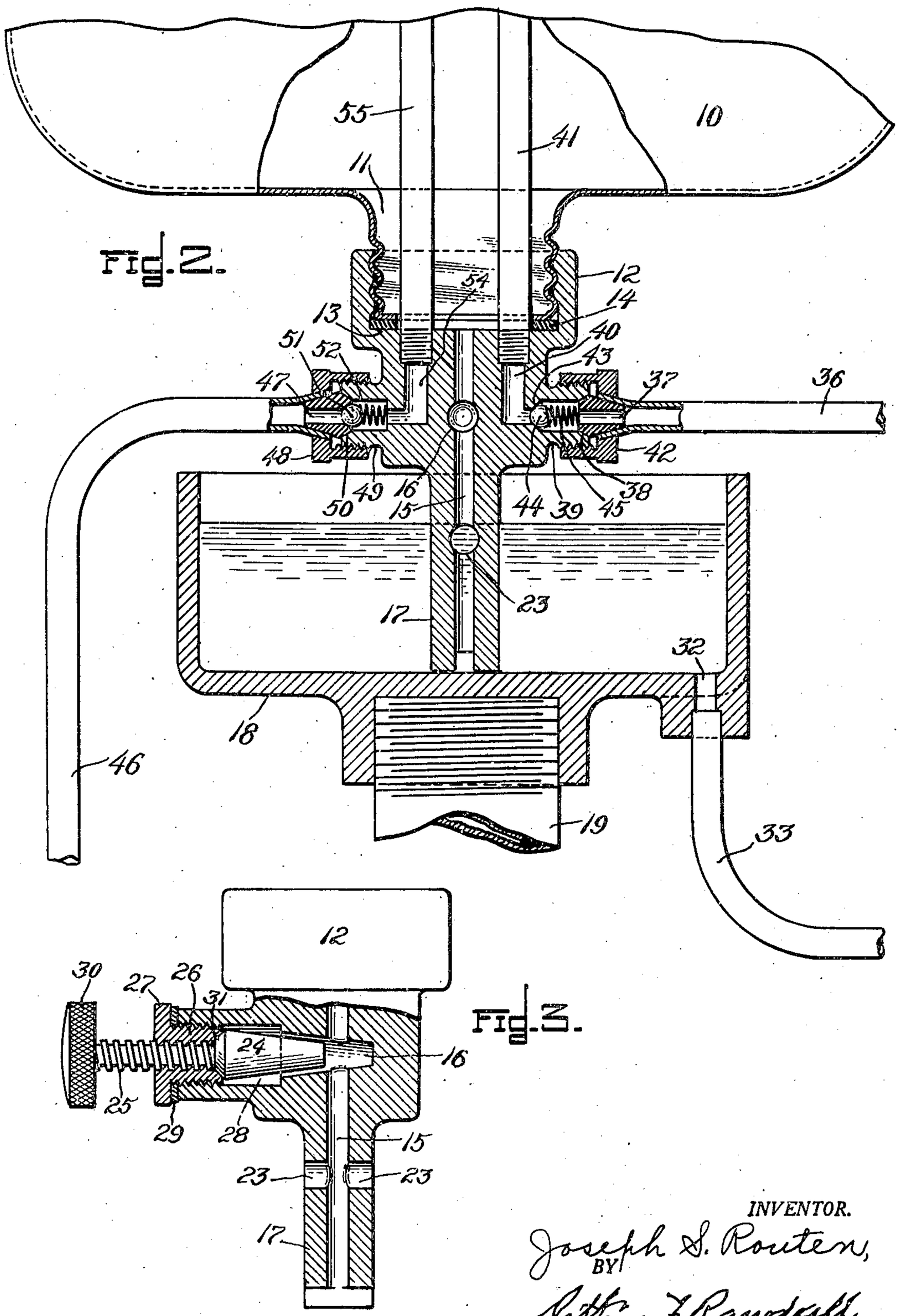

Fig. 2.

Fig. 3.

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RANGE OIL BURNER APPARATUS

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2 Claims. (Cl. 158—40)

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This invention relates to barometric-pressure liquid-feeding systems, and more especially to barometric-pressure fuel-oil supply systems for range oil burners.

A barometric-pressure fuel-oil supply system for range oil burners has heretofore been provided comprising a vacuum reservoir disposed in proximity to the range and having an outlet conduit at its bottom through which fuel-oil was automatically delivered intermittently by gravity into a relatively small trap in such manner as to maintain a supply of oil within the trap at or adjacent to a predetermined level, said trap having an outlet at its bottom that was connected with the burner of the range by a normally open conduit through which the fuel-oil was supplied to the burner by gravity so that the level of the oil within the latter was maintained horizontally opposite the level of the oil in the trap, or approximately so, thereby to avoid flooding of the burner. It is also old to provide a system of this type with a main storage tank disposed at a lower level than said vacuum reservoir and holding a supply of fuel-oil, said main storage tank being connected with the interior of the vacuum reservoir by a valve-controlled delivery conduit and means, including a pump, being also provided for exhausting air from the vacuum reservoir through a valve-controlled air conduit connected with said pump to cause the delivery of fuel-oil from the main storage tank into the vacuum reservoir through said delivery conduit by atmospheric pressure to replenish the contents of said vacuum reservoir when such replenishment was required.

The present invention has for its object to improve the construction and operation of systems of the class just described particularly with reference to the means for replenishing the contents of the vacuum reservoir. A further object of the invention is to provide improved valve means for controlling the outlet conduit or port of the vacuum reservoir, the oil delivery conduit and the air conduit by which the pump is connected with the interior of the vacuum reservoir.

To these ends I have provided an improved barometric-pressure oil-feeding system for range oil burners and the like characterized by the provision of a normally closed check valve in the oil delivery conduit between the supply tank and the vacuum reservoir which opens toward the latter; by the provision of a normally closed check valve in the air conduit between the vacuum reservoir and the pump which opens toward the latter, and by a normally open valve in the outlet conduit of the vacuum reservoir that is operable to close the latter only when the pump is operated to exhaust air from the vacuum reservoir.

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Other features of the invention are hereinafter described.

In the accompanying drawings:

Figure 1 is an elevation, more or less diagrammatic, showing an illustrative embodiment of the invention.

Figure 2 shows, full size, a portion of the apparatus of Figure 1 with parts thereof in section.

Figure 3 is a central vertical sectional view of the valve fitting hereinafter described taken at right angles to its showing in Figure 2.

The embodiment of this invention illustrated in Figs. 1, 2 and 3 comprises a vacuum reservoir **10** made at its lower end with a threaded nipple **11** on to which is tightly screwed the upper interiorly threaded end of a valve fitting **12**, said upper end being made interiorly with a shoulder **13** between which and the lower end of nipple **11** is provided a packing ring **14** of cork, leather or the like to provide a leak-proof joint.

Extending vertically and axially through the fitting **12** is an outlet port or conduit **15** within the upper portion of which is provided a transverse conical valve chamber **16**, while the lower portion of said outlet port is the interior of a tubular extension **17** provided at the lower end of the body of fitting **12**. This extension **17** may, as shown, rest upon the bottom of a trap or bowl **18** that is provided at the upper end of a stand **19** fixed in position upon a floor **20** which may also support a range **21** whose fire-box is equipped with an oil burner (not shown). A strap **22** surrounding the vacuum reservoir and fixedly attached to a post (not shown) projecting upwardly from stand **19** behind vacuum reservoir **10**, as usual, supports the latter in the vertical position shown.

Between the conical valve chamber **16** and the lower end of the tubular extension **17** the outlet port **15** is made with branch outlet ports **23** (Fig. 3) which are disposed below the level of the top of trap **18** as shown in Fig. 2.

Within the conical valve chamber **16** is arranged a biconoidal valve **24** whose outer end is made with a threaded stem **25** extending through and having threaded engagement with an interiorly threaded bushing **26** provided at its outer end with a radial flange **27**. The conical valve chamber **16** is closed at one end while its opposite end communicates with a cylindrical chamber **28** whose outer end portion is threaded to receive the bushing **26** which is exteriorly threaded and screwed tightly into the same with a packing ring

29 of leather or the like disposed between its flange 27 and the body of fitting 12 to provide a leak-proof joint. The outer end of the stem 25 is provided with a circular handle 30 by means of which said stem and its valve are manually rotated in one direction to seat valve 24 within its chamber 16 thereby to close outlet port or conduit 15, and in the opposite direction to open outlet port 15 and seat the outer conical end of the valve against a conical seat 31 provided upon the inner end of the bushing 26 thereby to prevent leakage of oil outwardly along the threads of the stem 25 while the valve occupies its normal open position.

The bottom wall of trap 18 is made with an outlet port 32 connected by a conduit 33 with the oil burner of the range 21, said conduit being provided with the usual shut-off valve 34 that remains in open condition while the burner is in operation.

During the operation of the burner within the range that is supplied from trap 18, the height of the level of the oil within the trap varies up and down so that when said level is above the outer ends of branch ports 23, 23, no air can be supplied to reservoir 10 and therefore no fuel oil will descend conduit 15 into the trap, but when said level descends far enough to uncover the outer ends of the branch ports 23, 23, either in whole or in part, air is free to pass up through conduit 15 into reservoir 10 with the result that oil descends through conduit 15 into trap 18 until the level of the oil within the latter rises far enough to again close the outer ends of the branch ports 23, 23, whereupon the flow of oil from the reservoir to the trap is stopped, for the reason that then there is no relief for the vacuum within the upper portion of reservoir 10. In this way the top of the body of oil within the trap is automatically maintained at or close to branch ports 23, 23, thereby avoiding flooding of the burner within the range and overflow from the trap.

Fixed in position upon any convenient support (not shown) adjacent to the vacuum reservoir 10 is a hand operated suction pump 35 whose inlet 35*a* has connected to it one end of a pipe 36 which constitutes a part of the air conduit referred to above. The opposite end of pipe 36 is flared as shown in Fig. 2 and fitted to the outer end of a biconoidal gland 37 whose opposite inner end is fitted against a conical seat 38 provided at the outer end of an exteriorly threaded nipple 39 projecting from the body of fitting 12. The seat 38 is provided at, and surrounds, the outer end of an angular port 40 formed in fitting 12 and the oppesite upwardly directed end of this port is threaded to receive the lower threaded end of a vertically disposed pipe 41 whose upper end is disposed close to the top of vacuum reservoir 10 so that it is always above the level of the oil within said reservoir. An interiorly threaded coupling member 42 is screwed tightly on to the exteriorly threaded nipple 39 and serves to securely clamp the flared end of pipe 36 against the outer end of gland 37, and the inner end of the gland 37 securely against the seat 38.

The port 40 is formed intermediate its ends with an outwardly facing seat 43 for a ball check valve 44, which is normally held on said seat by a coiled spring 45. Thus the check valve 44 normally closes the air conduit but is free to open toward the vacuum pump 35 when the latter is operated.

Located in a position well below the level of the vacuum reservoir 10, usually in the basement or cellar of the building, is a main storage tank 146 (Fig. 1) whose interior is connected with the interior of the vacuum reservoir 10 by the valve-controlled delivery conduit referred to above. This delivery conduit includes as a part thereof a length of pipe 46 whose lower end is disposed within tank 146 adjacent to the bottom thereof and whose opposite end is flared and securely clamped in position upon the outer end of a biconoidal gland 47 (Fig. 2) by a coupling member 48. This coupling member is interiorly threaded and screwed into position upon the threaded exterior of a nipple 49 that is part of the body of the valve fitting 12 and serves to hold the inner conical end of gland 47 tightly in position against a conical seat 50 provided at the outer end of nipple 49.

Nipple 49 is made interiorly with a valve chamber within which is provided a ball check valve 51 that is normally held closed against a conical seat provided upon the inner end of the gland 47 by a coiled spring 52, and this valve chamber is a part of an angular outlet port 54 having an upwardly extending inner end portion that is threaded to receive the lower threaded end of a vertical pipe section 55. The upper end of the delivery pipe 55 is closely adjacent to the upper end of the interior of the vacuum reservoir 10 as indicated by dotted lines in Fig. 1.

When the contents of the vacuum reservoir 10 is to be replenished valve 24 (Fig. 3) is first adjusted inwardly to close port 15 after which pump 35 is operated to exhaust air from the upper end of the interior of the vacuum reservoir and atmospheric pressure existing within the storage tank 146 forces oil from said tank upwardly through pipe 46, gland 47 (Fig. 2), past ball check 51, and through port 54 and pipe 55 into the vacuum reservoir 10.

Normally, however, the delivery conduit 46—47—54—55 is maintained closed by the spring pressed ball check valve 51 while the spring pressed ball check valve 44 normally maintains the air conduit 36—37—40—41 closed. Valve 24 normally occupies a position at the limit of its outward movement, as shown in Fig. 3, and is closed only temporarily during replenishing operations.

An apparatus constructed as above described is of simple, efficient and comparatively inexpensive construction and its several conduits are isolated each from the others at the valve mechanism so that the possibility of a "wet pump" is effectually avoided. Heretofore, the valve mechanisms of systems of this class utilizing a suction pump, have been so constructed that leakage occurred from one port to another and accumulated within the pump which was highly objectionable. The above described construction obviates this objectionable feature.

What I claim is:

1. In a range oil burner apparatus the combination with a vacuum reservoir of a fuel supply conduit having one end thereof communicating with the interior of said reservoir; a normally closed check valve in said supply conduit that opens toward said reservoir; a suction pump; an air exhaust conduit having one end thereof connected with the inlet of said pump and its opposite end communicating with the interior of said reservoir closely adjacent to the top thereof; a normally closed check valve within said air exhaust conduit that opens toward said

pump; a trap disposed below said reservoir into which fuel oil is intermittently fed barometrically from said reservoir, said trap having an outlet at its bottom adapted to be connected by a conduit with the burner of the apparatus through which fuel oil is fed by gravity to said burner; an outlet conduit through which fuel oil is delivered by gravity from said reservoir into said trap whenever the lower end of said outlet conduit is uncovered by the contents of the latter, one end of said outlet conduit communicating with the interior of said reservoir adjacent to the bottom thereof and the opposite end thereof communicating with the interior of said trap below the top thereof so that it is normally submerged in the contents of said trap; and a normally open manually controlled valve in said outlet conduit by which the latter is closed preparatory to operating said pump to replenish the contents of said reservoir.

2. A range oil-burner apparatus according to claim 1 wherein the bottom wall of said vacuum reservoir is made with a relatively perpendicular nipple; and wherein a valve fitting unit is fixedly coupled to said nipple that is made with three relatively isolated ports including a first port that

is part of said fuel supply conduit and within which said first-mentioned check valve is arranged, a second port that is part of said air exhaust conduit and within which said second-mentioned check valve is mounted, and a third port that serves as the outlet conduit and within which said normally open manually controlled valve is mounted.

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