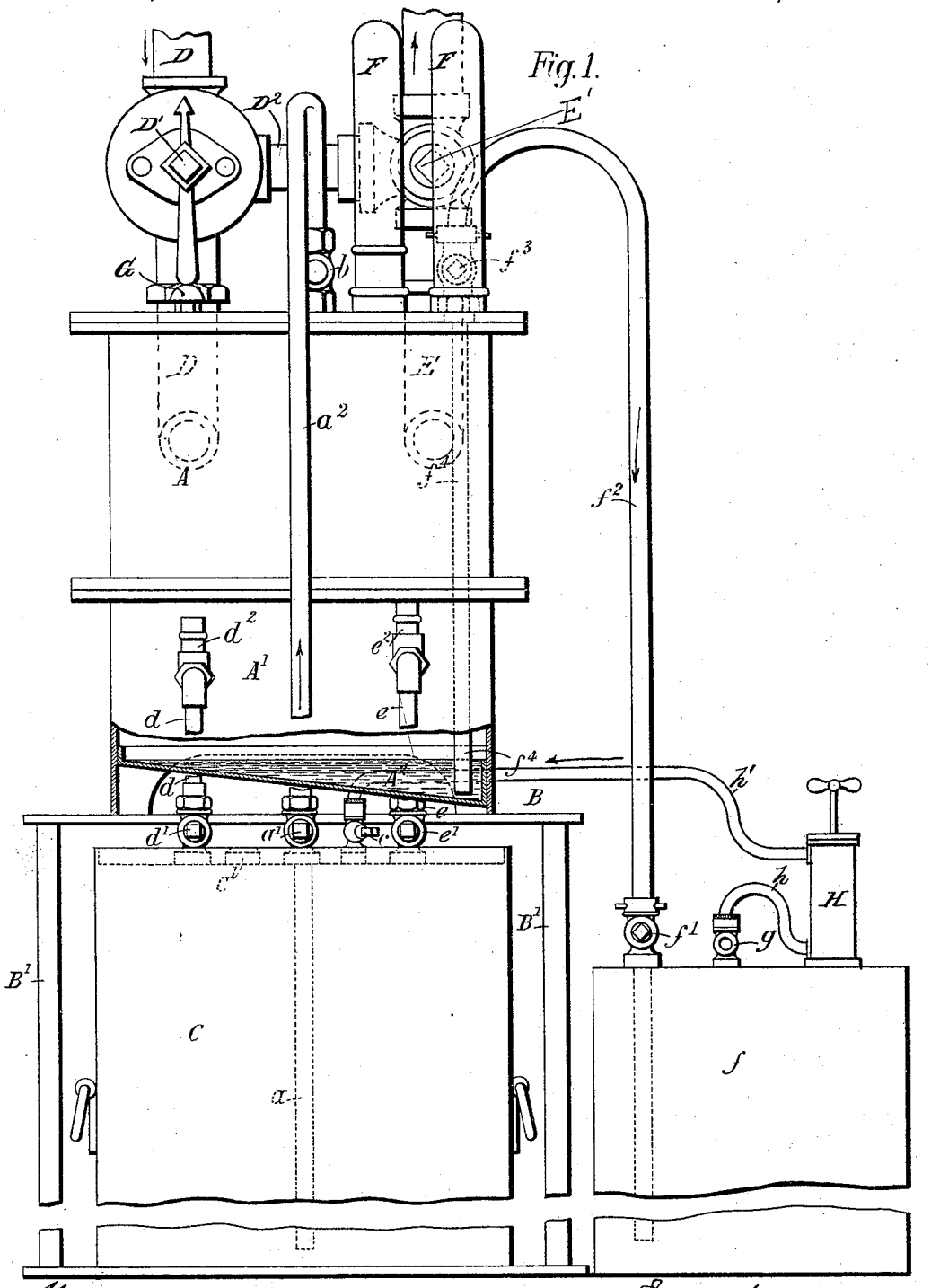
(No Model.) 2 Sheets—Sheet 1.

J. LOVE.

APPARATUS FOR CARBURETING GAS OR AIR.

No. 490,972. Patented Jan. 31, 1893.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

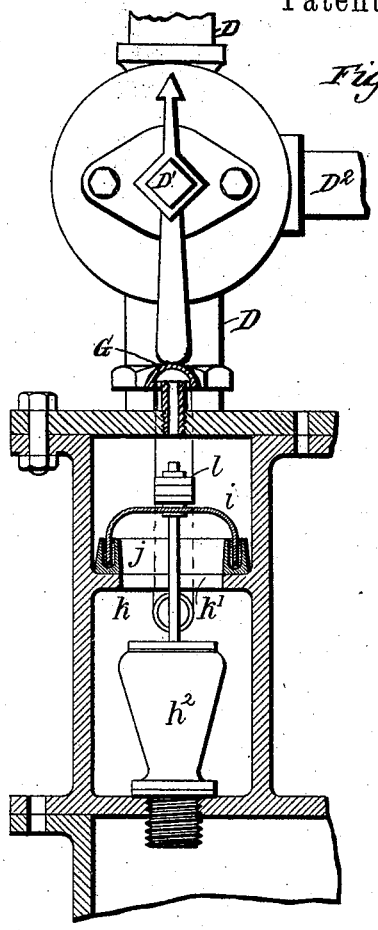
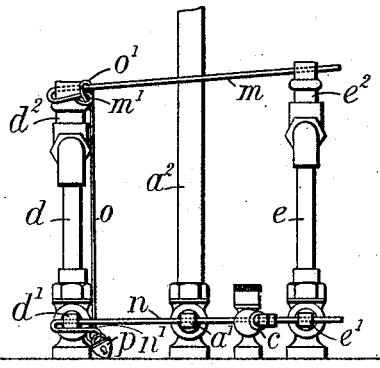


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES LOVE, OF BARKING, ASSIGNOR TO THE GAS ECONOMISING FOREIGN PATENTS, LIMITED, OF LONDON, ENGLAND.

APPARATUS FOR CARBURETING GAS OR AIR.

SPECIFICATION forming part of Letters Patent No. 490,972, dated January 31, 1893.

Application filed May 17, 1892. Serial No. 433,346. (No model.) Patented in France November 17, 1891, No. 201,341; in Belgium November 17, 1891, No. 97,231, and in Germany November 19, 1891, No. 51,730.

To all whom it may concern:

Be it known that I, JAMES LOVE, engineer, a subject of the Queen of Great Britain, and a resident of Barking, England, have invented certain new and useful Improvements in Apparatus for Carbureting Gas or Air, (for which I have obtained a patent in France, patent of addition to No. 201,341, dated November 17, 1891; in Belgium, patent of addition, No. 97,231, dated November 17, 1891, and in Germany, patent of addition to No. 51,730, dated November 19, 1891,) of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to apparatus for carbureting gas or air, more especially of the kind or class wherein a chamber or reservoir for the hydrocarbon, or other carbureting liquid and one or more carbureting chambers provided with cottons or wicks are employed, situated in the same box or case. Apparatus of this kind or class has been described in the specification of prior Letters Patent No. 440,486, dated November 11, 1890, and Reissue No. 6,070 granted to me September 29, 1874. In the present specification I confine myself to describing those parts of the apparatus which differ from and are improvements on, the apparatus described in the specification of the said prior Letters Patent where a general description, and the method of operation, of the apparatus are given.

One of the present improvements relates to the charging of the carburetor with carbureting liquid.

Another improvement relates to devices for preventing the surcharging of the lower chamber of the carburetor.

A third improvement relates to devices for purging the carbureting chamber of the heavy hydrocarbons or residual products.

A further improvement relates to the valves for controlling the flow of gas or air through the apparatus, and a still further improvement relates to locking gear for the various cocks or taps used in the said apparatus.

In the accompanying drawings: Figure 1 is a front elevation of a carburetor having the present improvements applied thereto, a portion of the lower chamber being shown in section to exhibit the inclination of the floor. Fig. 2 is a section through a portion of the said apparatus on a slightly larger scale showing my improved mode of suspending and governing the controlling valves. Fig. 3 is an elevation of the locking gear for the cocks hereinafter described.

A A′ are the upper and lower chambers of the carburetor. The carburetor is placed for convenience on a table B which is supported by legs B′ and beneath the said table is placed the charging tank C which contains the supply of carbureting liquid to be used for enriching the gas or air. The said tank C is closed to the atmosphere and is provided with a plug C′ which can be removed to permit of filling the tank.

The letter D indicates the gas inlet or supply pipe and E is the outlet or delivery pipe. The admission of gas through the inlet or supply pipe D is controlled by the three way cock or valve D′. The inlet or supply pipe is connected moreover to the outlet pipe E by another pipe D^2 and is provided with another three way cock or valve E′. The pipe D^2 thus forms a by pass through which more or less of the air or other gas may be delivered, if required, without having been carbureted or enriched, the quantity which is thus delivered being regulated very easily by means of the cocks or valves D′, E′.

F, F are outer cases which cover and protect suitable gages by means of which the level of the liquid in the carbureting chamber is ascertained.

For charging the carburetor, I provide the supply tank C with an internal pipe *a* which descends nearly to the bottom thereof and is connected through a stop cock *a*′ with one end of an external pipe a^2 that rises to the top of the apparatus and is coupled at its end to the charging cock *b*. Another cock *c* is provided on the tank C, said cock being adapted to receive or be connected to the discharge pipe of the air-pump H. On applying such a pump to the said cock *c* and then opening the cocks *c*, *a*′ and *b* and operating the pump so as to force air into the tank the liquid in the

latter is forced up the pipe a^2 and discharged into the carburetor.

For preventing the surcharging of the lower chamber A′ of the carburetor with carbureting liquid I provide the same with an overflow pipe d which leads from the said chamber at the level above which it is desired the liquid shall not rise, and conducts the overflow back to the supply tank C. Another communication is formed between the tank C and the chamber A′ by a pipe e that enters the latter chamber at a height a little above the level of the overflow outlet. This pipe e serves as a vent and allows of the escape of the air or gas displaced from the closed tank C by the overflow liquid as the latter flows into the tank. The said displaced air or gas mixes with the carbureted gas or air in the apparatus and passes out therewith to be burned. Suitable cocks d' d^2 and e' e^2 are provided for closing the pipes d and e when required. During the charging process one at least of the cocks in both the pipes d and e must be closed so as to prevent the escape of air therethrough. As soon as the charging is completed, the cock c is closed and the cocks d' d^2 e' e^2 are opened thereby allowing the air under pressure in the tank C to escape through the carburetor, and at the same time causing the column of liquid in the pipe a^2 to flow back into the tank.

For purging the carburetor of heavy hydrocarbons or residual products I provide a purge drum f closed to the atmosphere and having a cock f' which is connected by a pipe f^2 to another cock f^3 on the carburetor. To the cock f^3 is attached another pipe f^4 that descends through the upper carbureting chamber A to the bottom of the lower chamber A′. The floor A^2 of the chamber A′ is inclined toward one end as shown and preferably curved in the transverse direction so as to form a well in which the heavy hydrocarbons will collect. The pipe f^4 is arranged to descend to the bottom of this well. On the purge drum is provided another cock g which is adapted to be attached to the suction pipe of an air pump. I prefer to extract or remove the heavy hydrocarbons from the carburetor and re-charge the carburetor with fresh liquid by one operation, as follows: I attach the suction pipe h of the air pump H to the cock g of the purge drum and the delivery pipe h' to the cock c of the supply tank. I then open the said cocks c and g, and also the cocks f' and f^3 and commence to operate the pump. The air is thus exhausted from the purge drum and forced into the supply tank, compressing the air in the latter. The rarefaction produced in the purge drum when sufficiently advanced causes the residual products to be sucked up from the well of the chamber A′ through the pipe f^4 and discharged through the pipe f^2 into the purge drum, while the air under pressure in the supply tank operates as above described to force the liquid into the carburetor. Should the carburetor not be fully charged with fresh liquid when all the residual products are extracted the suction pipe of the air pump is disconnected from the cock g and the pump is then operated again, this time ordinary atmospheric air being forced into the supply tank. This mode of purging and recharging the carburetor is very advantageous as it avoids exposing the inflammable materials to the atmospheric air, thereby avoiding the risks attendant upon other methods of charging where the hydrocarbons are exposed to the atmosphere and also avoiding the disagreeable smells given off by such materials. In some cases especially for large apparatus I prefer simply to allow the heavy products which collect in the bottom of the chamber A′ to flow out by gravity into a closed tank placed underneath or near to the said chamber A′. Moreover in large apparatus I prefer to make the bottom of the chamber A′ of a pyramidal shape, with the apex pointing downward, and into which apex is fixed the discharge cock. In this case the overflow pipes deliver into this closed tank instead of into the storage tank as in the arrangement previously described.

The regulating valves for governing the supply of gas or air to be carbureted are contained in the valve chambers h^2 one of which is shown in Fig. 2. Each valve instead of being supported by a flexible diaphragm as heretofore is now suspended from a bell-shaped vessel i constructed preferably of glass and arranged to float in mercury contained in an annular trough j. For supporting the said troughs I provide a partition wall k which is made with a hole k' under each bell i. The valve spindle is extended above the top of the bell for the purpose of receiving weights l by means of which the bell is loaded to any desired degree to cause the bell to sink more or less in the mercury. The area of the valve opening is by this means conveniently regulated to suit the requirements at any particular time. It will be seen that this method affords a ready means of governing the position of the valves in the chambers h, as the floating bells i will be very sensitive and will rise and fall with the increase or decrease of pressure of the air or gas beneath the same due to any excess or scarcity of the supply as compared with the requirements. I provide a vent i' by means of which the air in the space above the bell i can escape when the said bell is raised, or enter when the bell is lowered.

In order to insure that the cocks of the overflow, vent and charging pipes shall be set in their proper working positions after the apparatus has been charged, I provide as follows, that is to say, I form eye-holes in the squares of the said cocks so arranged that a suitable rod may be passed therethrough, the same rod passing through at least two of the cocks and thus locking them together. For instance m Fig. 5 is a rod adapted to be passed through holes in the eyes of the cocks d^2 e^2 which rod when passed through the said holes locks the

taps and prevents their being turned. n is another rod adapted to be similarly passed through and to lock the three cocks a' d' and e'. The said rods m n are bent at one end as shown and are provided with eyes m' n'. For locking the said rods m n together I provide a third rod o which has a hook o' at one end and an eye at the other. This last named rod is passed behind the rod m and its hooked portion o' is passed through the eye m'. The eye of the rod o is then locked to the eye of the rod n by means of a padlock p. It is obvious that when the rods m n o are placed in position as above described, and the rod o locked by the padlock, the five taps a' d' c' d^2 and e^2 will be locked so as to prevent accidental or malicious turning thereof. The eyes in the squares of the said cocks are so formed that the cocks d' e' d^2 e^2 are locked in the open position, and the cock a' is locked in the closed position.

What I claim is:—

1. An apparatus for carbureting gas or air comprising the carbureting chambers A, A', the tank C containing the supply of carbureting liquid and connected by pipes a, a^2 with the chamber A, the purge drum f for receiving the heavy hydrocarbons or residual products of the carburetor connected by pipes f^2, f^4 with the chamber A', and a pump H by pipes h h' connecting the drum f with the tank C, all arranged in a closed system so that when the pump is operated the carburetor is charged with fresh liquid and at the same time the residual products are withdrawn therefrom, substantially as described.

2. The combination of the carbureting chambers A, A' the feed tank C connected with the chamber A by pipes a, a^2, the purge drum f connected with the chamber A' by pipes f^2, f^4 and with the drum C by pipes h, h', and pump H, the overflow pipe d leading from chamber A' to tank C, and the vent pipe e also connecting the chamber A' with the tank C but having its mouth at a higher level than that of the pipe d, substantially as described for the purpose specified.

3. In a carbureting apparatus the combination of the carbureting chambers A A', feed tank C, overflow cocks d', d^2, vent cocks e', e^2, feed cocks a', and interlocking rods m, n, o, passing through holes in the squares of the said cocks for locking the same, substantially as described.

In witness whereof I have hereunto set my hand this 2d day of May, 1892.

JAMES LOVE.

Witnesses:

JOHN POLLOCK,

F. H. HORNE.