2 Sheets--Sheet 1.

JOHN B. FISH.

Improvement in Carbureters.

No. 127,039. Patented May 21, 1872.

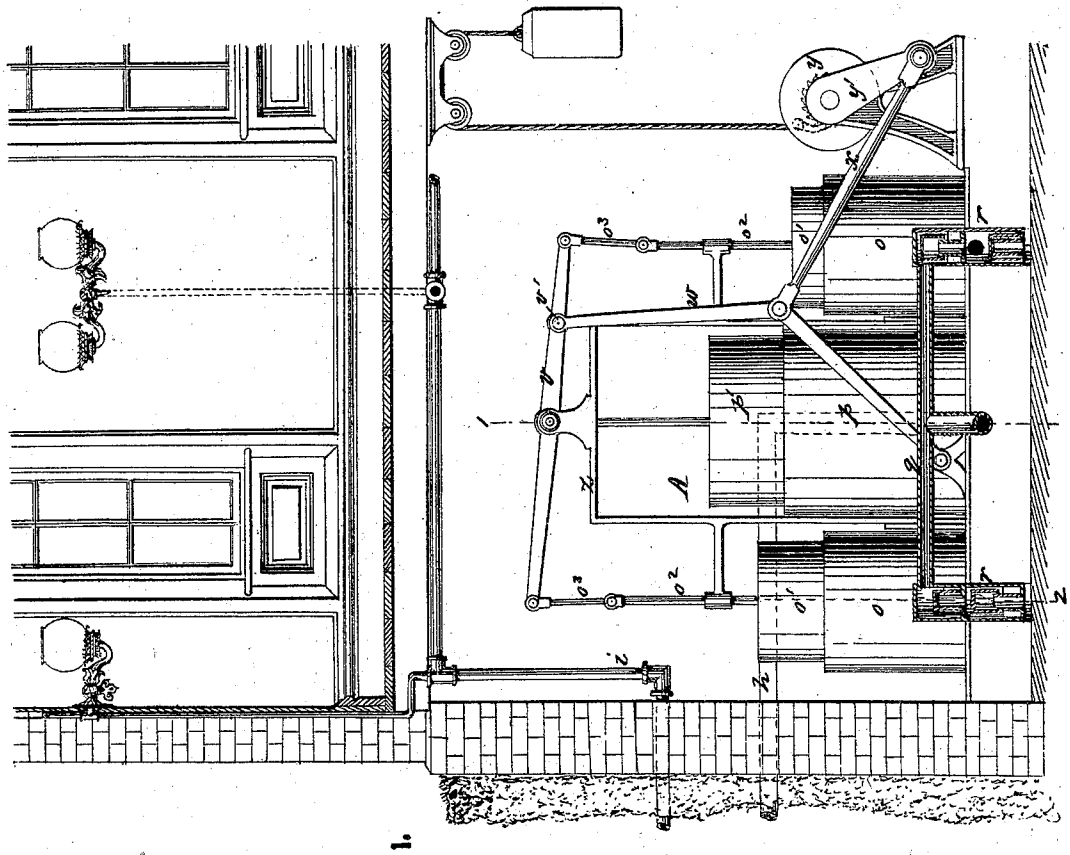
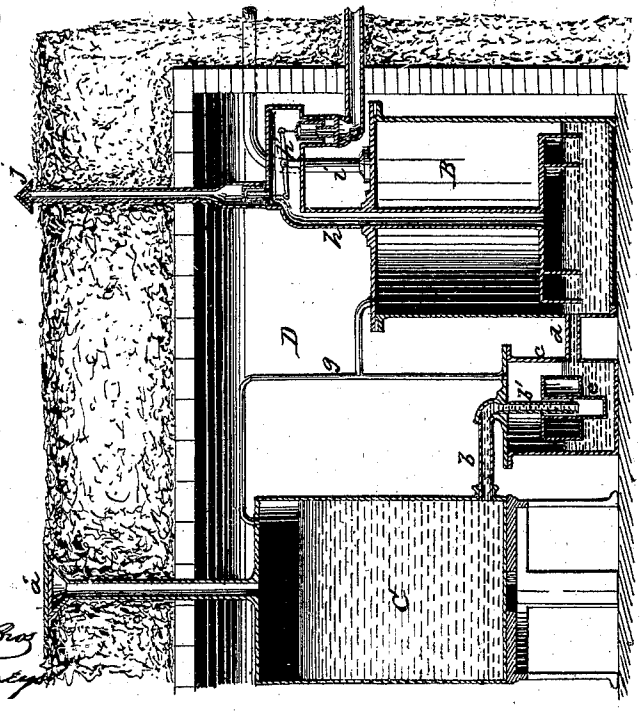


Fig. 1.



WITNESSES.

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2 Sheets--Sheet 2.

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Fig. 2.

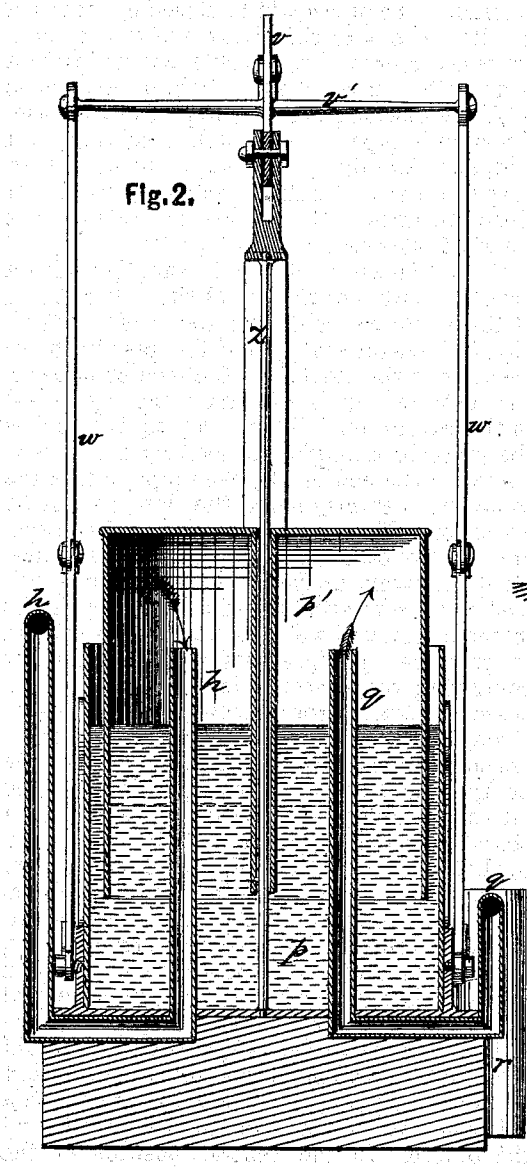


Fig. 4.

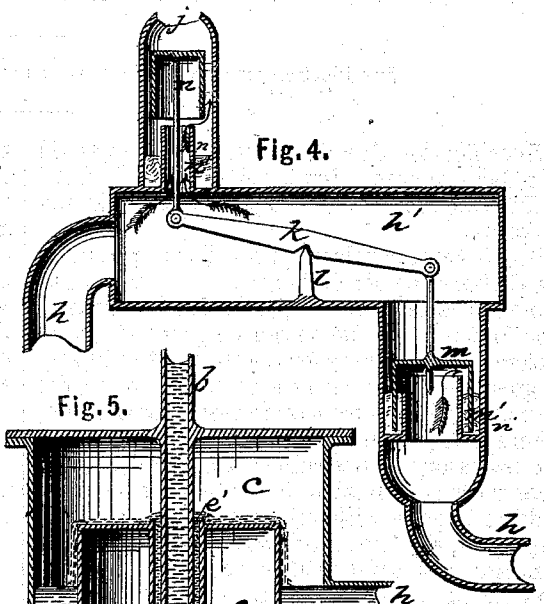
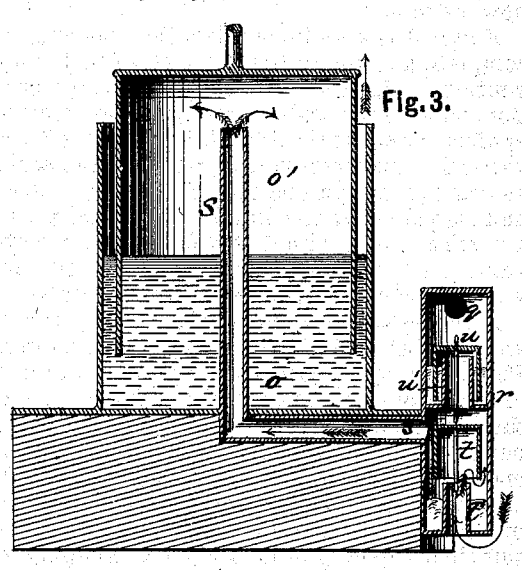


Fig. 5.

Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN B. FISH, OF PROVIDENCE, PENNSYLVANIA.

IMPROVEMENT IN CARBURETERS.

Specification forming part of Letters Patent No. 127,039, dated May 21, 1872.

Specification describing an Improvement in Air-Gas Apparatus, invented by JOHN B. FISH, of Providence, in the county of Luzerne, Pennsylvania.

The invention relates primarily to apparatus for carbureting air for lighting buildings; but some of the devices are applicable to other uses. The first part of the invention consists in an automatic feed-valve for regulating the supply of gasoline to the carbureter, or to govern the flow of any liquid from one vessel into another, where nicety of adjustment and reliable action are necessary or desirable; the same being a float with a central well containing a denser fluid to engage with and stop the end of the supply-pipe. The second part of the invention consists in a safety-valve, or automatic vent and check-valve combined, to prevent the gas from passing back from the carbureter in the air-pipe and through the air-pump, where there is danger of fire. The third part of the invention consists in a peculiar combination and arrangement of fluid-packed pump-valves, and in an arrangement for multiplying the strokes of the pump relatively to the rotation of the power-drum.

Figure 1 is a sectional elevation, showing a complete gas apparatus illustrative of this invention. Fig. 2 is a vertical transverse section, on a larger scale, through the air receiver of the pump at the line 1 1, Fig. 1. Fig. 3 is a vertical transverse section, on the same scale as Fig. 2, through one of the pump-cylinders and its valves at the line 2, Fig. 1. Fig. 4 is a vertical longitudinal section of the safety-valve on the same scale. Fig. 5 is a similar view of the automatic feed and its chamber.

A represents the pump; B, the carbureter and gas-reservoir; and C, the gasoline-tank. The latter parts, with their appurtenances, I prefer to bury in the ground at a distance from the house, as illustrated in Fig. 1, which has been heretofore practiced; and, in doing this, may inclose the apparatus in a chamber, D, as represented, or dispense with the latter, as preferred. The gasoline-tank C should be of sufficient capacity to hold one year's supply of gasoline or naphtha. The other apparatus may be of proportionate or any approved relative size. All the parts will be made of any suitable materials. *a* represents a pipe for filling the tank C; *b*, a pipe leading from the bottom of this tank into the feed-chamber *c;* and *d*, a pipe from this feed-chamber to the carbureter B. The pipe *a* will be closed by means of a suitable cock or shield, not shown. *e* represents my improved feed-valve, consisting of a float with central well *e'*, Fig. 5, concentric with the discharge end *b'*, Fig. 5, of the gasoline-supply pipe *b;* said well receiving said end, and containing a seal, *f*, Fig. 5, of mercury or other dense liquid, to engage with and close the same. The operation of this valve is clearly illustrated in Figs. 1 and 5.

Until the carbureter B is supplied with a proper quantity of the liquid the valve *e* floats at the low level, with the end *b'* of the feed-pipe *b* above the seal *f;* and the gasoline flows freely over the float into the feed-chamber *c*, as illustrated by Fig. 5, and thence by pipe *d* to the carbureter. When the liquid reaches the prescribed height the seal, coming in contact with the end of the feed-pipe, closes the same and instantly stops the flow, as will be apparent. The valve *e* may be quite large, and in any case would have great displacement relatively to the pipe *b b'*. This is utilized to force the seal *f* to the requisite height in the contracted well *e'* to balance the column of gasoline. *g* represents a union pipe for equalizing the pressure in the tank C, feed-chamber *c*, and carbureter B. The carbureter B may be of any approved construction. *h* represents the air-pipe entering the same from the pump A, and *i* the service-pipe running back into and through the house. *h'* represents a chamber in the air-pipe *h* at its highest point, so that the ends of the pipe shall drain from it; and *j*, a vent-pipe leading from this chamber to the open air at a safe point. Said chamber *h'* contains my safety-valve arrangement, for which see Fig. 4. The same consists of a bar, *k*, Fig. 4, delicately poised on a central pivot, *l*, and connected at its respective ends to the stems of valves *m n*, closing into liquid seals *m' n'* in the pump end of the pipe *h* and in the vent-pipe *j*, respectively; the valve *n* being of smaller size, so as to be controlled by the others. In the central position of the valves they both dip, and the valve *m* is readily lifted by the entering air. Should the pressure of gas at any time preponderate, the same acting on the top of the valve *m* would close it, and, in so doing, open the valve *n* and

give the gas vent through the pipe *j*, as illustrated by arrows in Fig. 4. Any escape of gas into and through the pump is thus prevented. The great nicety of adjustment and the character of the valves are necessary features in view of the light pressure of air desired, the same not exceeding two or three inches of water at the pump, the normal pressure of the gas being still less. The danger this appliance provides against is most likely to occur soon after filling the tank B, and to result from the expansion of the liquid, owing to the higher temperature therein, whether buried or in a chamber or cellar, the risk being even greater in the latter case. *o o* represent the cylinders of the pump A, and *o' o'* single-acting liquid-packed piston. *p* represents the cylinder, and *p'* the piston of a similarly-constructed receiver or equalizer arranged between the pump-cylinders *o*, and receiving the discharge of the same through T-pipe *q*, (see Fig. 2,) the air-pipe *h* leading therefrom to the carbureter. *r r* represent the valve-chambers, and *s s* pipes leading therefrom into the pump-cylinders *o*. These valve-chambers are vertical cylinders with inlet-openings at bottom, outlet-openings (into pipe *q*) at top, and intermediate openings into the pipes *s*, and with inlet and outlet valves *t u* with liquid-seals *t' u'*, as clearly illustrated in Figs. 1 and 3. The suction-stroke of a piston is illustrated in Fig. 3, and the alternate action of the two sets of valves in Fig. 1. The operation is common and requires no further description.

v represents a rock lever or beam connected, by links o^3, to the rods o^2 of the piston *o*; *v'*, Fig. 2, a cross-bar of the same; *w w*, a pair of toggles connecting said bar to the floor; *x x*, connecting-rods from the joints of said toggles; and *y'*, the crank-shaft of the power-drum *y*, which latter may be driven by cord and weight, and connected to its shaft by pawl and ratchet, as indicated in Fig. 1. This mode of connecting the power-drum and pump-pistons insures two strokes of each of the latter to every revolution of the former, but slightly irregular as to speed. *z* represents a frame supporting the fulcrum of the rocking beam *w*, and furnishing guides for the piston-rods o^3 and equalizer-dome or piston *p'*.

The liquid-packed valves, as constructed, arranged, and employed, constitute the most important parts of my invention, as furnishing the only sure and reliable means for properly closing the various air and gas passages at the light pressure desired, and for properly regulating the flow of the gasoline. I prefer to employ mercury at all the points, as furnishing a counterbalancing column of minimum extent; but other heavy liquid—such as glycerine, for instance—may be employed.

I am aware that such heavy liquids have before been proposed for valve seats or seals. I do not, therefore, broadly claim the same.

What I claim as new herein is—

1. An automatic feed-valve for regulating the flow of a liquid from one vessel into another, the same consisting of a float, with well *e'*, containing a seal, *f*, of heavy liquid, to engage with and close the end of the supply-pipe, substantially as herein shown and described.

2. A combined check-valve and vent arranged between a carbureter and its pump, constructed and operating substantially as herein described, for the purpose specified.

3. The valves *m n* and their liquid-seals *m' n'* in the described safety apparatus, for the purpose set forth.

4. The combination and arrangement of the pump-valve chambers *r* with their liquid-seals *t' u'* and valves *t u*, the pipes *s*, *q*, and *h*, liquid-seal pump-cylinders *o*, and pistons o^1, and liquid-seal equalizer *p p'*, constructed and operating substantially as specified, for the purposes explained.

5. The combination of the power-drum *y*, crank-shaft *y'*, connecting-rods *x*, toggles *w*, cross-bar *v'*, and rocking-beam *v*, as means for operating the air-pump pistons.

JOHN B. FISH.

Witnesses:
W. D. RUSSELL,
S. B. STURDIVANT.