(No Model.)

C. M. KEMP.

MIXER FOR CARBURETED GAS AND AIR.

No. 302,912. Patented Aug. 5, 1884.

Fig. 1

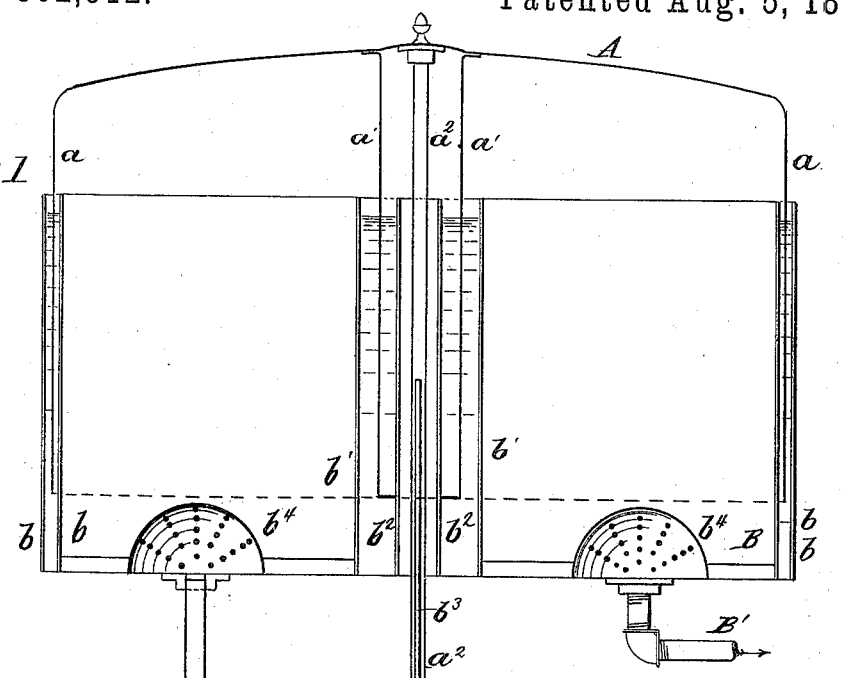


Fig. 3

Fig. 4

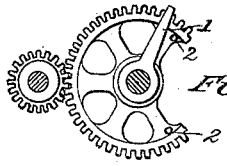
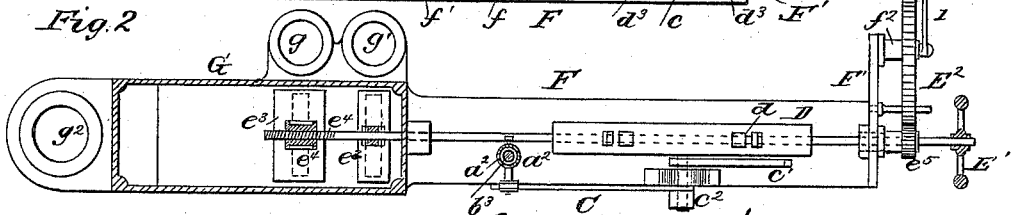


Fig. 2



Witnesses

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UNITED STATES PATENT OFFICE.

CLARENCE M. KEMP, OF BALTIMORE, MARYLAND.

MIXER FOR CARBURETED GAS AND AIR.

SPECIFICATION forming part of Letters Patent No. 302,912, dated August 5, 1884.

Application filed November 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE M. KEMP, residing at Baltimore city, Maryland, have invented certain new and useful Improvements in Mixers for Carbureted Gas and Air, of which the following is a specification, reference being had to the accompanying drawings, forming part hereof, in which—

Figure 1 is a side elevation, partly in section, of a gasometer and its attachments. Fig. 2 is a plan view of the valve-operating mechanism. Fig. 3 is a detached view of the arm for operating the valve-lever. Fig. 4 is a detached view of indicating devices.

My invention relates to devices for securing the admixture of air with carbureted gas.

The object of my invention is to provide an arrangement for insuring the operation of the valves automatically in consequence of the elevation and depression of the gasometer when filled or exhausted.

To these ends my invention consists in the combination, with a gasometer having a downwardly-extending tube, of a series of valves operated through certain peculiar connections engaging with the gasometer-tube by the elevation and depression of the gasometer. My invention also consists in the provision of certain hand-connections for regulating the throw of the air-valve, and also an indicating device for showing the position of adjustment to which the valve is set by the hand-connections.

Referring to the drawings, A designates the top of the tank of the gasometer, and B designates the holder or casing. The outer wall of this holder is made of two vertical concentric sections, *b b*, which form a water-jacket, the body of water being contained in the space between said sections. The sides *a* of the top A extend vertically downward within the water-space between the two sections. Centrally within the tank is a water-compartment, the walls *b'* and b^2 of which extend vertically to the level of the top of the outer wall, *b*, of the gasometer. Extending vertically downward from the center of the inside of the top A is a tube, *a'*, which telescopes into the central water-compartment of the holder B. Within the central water-compartment of the holder stands a tube, b^2, open at its top, which is flush with the top of the wall of the central water-compartment. This tube b^2 is placed centrally within the central water-compartment, and through it passes a tube, a^2, which is attached at its upper end to the under side of the top A at its center. The tube a^2 extends downward through the tube b^2, and carries two arms, a^6, (see Fig. 3,) attached to said tube each by a collar, a^5, and set-screw a^7.

b^3 designates a rod, which rests at its lower end upon the base F, (see Fig. 2,) and extends vertically upward within the tube a^2, for the purpose of guiding and stiffening the latter.

B' designates the discharge-pipe for the gas from the tank B, which extends to a connection with the main. The opening into the gasometer from this pipe is covered by a perforated dome, b^4.

F designates a bed-plate upon which the valves and valve-operating devices are mounted.

G designates the valve-box mounted at one end of the bed F; gas-inlet port *f*, air-inlet port *f'*, and mixed gas and air outlet port g^2 being formed in the end of the bed F within the box G, as shown. An air-supply pipe, *g*, from the air-pump connects with the outer end of the air port or channel *f'*. A gas-supply pipe, *g'*, connects from the generating apparatus with the gas-inlet port or channel *f*, and a mixed gas and air pipe, g^3, connects with the outlet port or channel g^2, and extends to the gasometer, the opening into same of this pipe g^3 being covered by a perforate dome, b^4, similar to that of the outlet-pipe B'.

E designates the valve rod or stem, which at one end extends into the valve-box G, and at its other end passes through a block, D, resting upon rollers d^3, mounted upon the bed F at the opposite end thereof from the box G.

The valve e^2, which covers the gas-port *f*, is secured to the stem E, as shown, to prevent longitudinal movement on the stem, while the valve e^3, which covers the air-port *f'*, is adjustably secured to said stem by an internally-threaded nut inserted between the vertical lugs of the valve, the stem E being screw-threaded at its end, which passes through the threaded bore of the nut.

A cross-bar or arm, *c*, is mounted upon the bed F, between the rollers d^3, and upon this rod are mounted two arms, C C', the former ad-

justable by means of a set-screw, and the latter rigidly fixed, which diverge V-like from their point of attachment to the bar *c*, as shown. The arm C is the longer, and terminates at its upper end at such a point as to lie between the arms a^6 upon the tube a^2, which arms a^6 thus engage by the rollers upon their ends alternately with the arm C as the holder A alternately rises and falls. The oppositely-divergent arm C′ carries a weight, *c′*, at its upper end, also adjustable, and also carries a roller, c^2, near its lower portion, which roller engages alternately with two projections, *d*, upon the upper side of the block D. The opposite extremity of the stem E from that which enters the box G passes through the block D, as before stated, and also through an eye in the upper end of a bracket, F′, attached to the corresponding end of the bed F, and carries a gear-pinion, e^5, and also a hand-wheel, E′. The gear-pinion e^5 meshes with a gear-wheel, E^2, loosely mounted upon a shaft, f^2, projecting from the arm or bracket F′. The shaft f^2 carries at its outer end a rigidly-attached pointer, 1, which indicates the exact position of the valve e^3, the wheel E^2 being provided with two studs, 2, which, by engaging with the pointer 1, limit the movements of the wheel to correspond with the extremes of adjustment of the valve e^3.

Before describing the operation of my structure it should be observed that in order to burn with proper brilliancy for illuminating purposes carbureted air must generally be mixed with pure air; but this mixture must be in proper proportions, dependent upon the richness of the gas, otherwise the flame will be of too little brilliancy or the combustion of the gas at the burner will be incomplete and produce smoke; hence devices for regulating the amount of air admitted for a given amount of carbureted air must be provided, and such amount of air should neither exceed nor be under a certain proportion of the carbureted air.

I will now proceed to describe the operation of my improved apparatus.

The parts, as shown in the drawings, are supposed to be in the relative positions which they assume when the holder, being nearly depleted of its contained gas, is about ready for the admission of a fresh quantity of gas. The top A of the tank is descending, and in so doing it will, through the medium of the upper arm, a^6, upon the similarly-moving tube a^2, depress the outer end of the arm C, which will bring the arm C′ to a point past the vertical position indicated by dotted lines in Fig. 1. The arm C′ will fall, assisted by its weight *c′*, to a position just opposite to that shown in full lines, and in so doing will strike by its roller c^2 the projection on the block D opposite to that projection *d*, against which it is shown (in full lines) as resting. This contact will throw the block D over to the limit of its movement toward the box G, and in so doing will carry the valve-stem E and its attached valves e^2 e^3 with it, the valve-stem moving freely through gear e^5, being splined therein, and the wheel being free to turn but fixed against longitudinal movement, thus opening the ports *f f′*, through which the carbureted and atmospheric air will flow into the valve-chamber G. From the valve-chamber G the mixed gas will enter the gasometer through the channel g^2 and supply-pipe g^3. As the mixed gas enters the gasometer its top A will rise, and in so doing will elevate the tube a^2. As the gasometer is being filled with gas the lower arm, a^6, on the ascending tube a^2, will engage with the under side of the arm C, and will raise it till the arm C′ has passed the vertical position indicated in dotted lines in Fig. 1, when the said arm C′ will drop over again to the position shown in full lines in Fig. 1. In so dropping over the arm C′ will engage by its roller c^2 the right-hand projection, *d*, of the block D, and will throw said block back to the right in the position shown in Fig. 1. This movement of the block D will produce a corresponding movement of the stem E, and thus close the valves e^2 e^3. When the gas begins to flow out of the gasometer through the discharge-pipe B′, the top A of the gasometer will begin to descend, and in so doing will reach the position shown in Fig. 1. Upon the continued descent of the top A the operations previously described will recur and the subsequent operations will successively follow.

In order to regulate the proportion in which the air and gas are combined, the valve e^3 is adjusted by turning the hand-wheel E′ on the stem E. By turning this hand-wheel in one direction the valve e^3 will be moved away from the valve e^2, so that when the two valves are thrown to the left, as above described, in order to open the ports, a greater or less portion of the valve e^3 will overlap the mouth of the port *f′*, and thus a greater or less amount of air will be admitted in proportion to a given amount of gas, no air being admitted if the gas does not demand it. By turning the hand-wheel in the opposite direction to that just indicated the valve e^3 will be drawn toward the valve e^2 with an evident effect upon the proportions of admixture of the air and gas. The revolutions of the stem E are communicated to the wheel E^2 through the pinion e^5, and the pointer 1, by remaining fixed, will indicate the position of adjustment of the valve e^3, the intermediate connections being so arranged that when the valve e^3 is at one limit of its adjustment one of the studs 2 will rest against the pointer, and when said valve is at the opposite limit of its adjustment the opposite stud 2 will rest against the pointer. The projections *d* on the block D are each faced by a smaller projection, so as to form a notch on each end of said block, in which the roller c^2 rests in order to hold the block and valves at the limits of their movements.

The devices for opening and closing the

valve may also be applied to a machine for generating gas from gasoline by heat. Instead of the moving gasometer the tube carrying the arms a^2 may be attached to the moving diaphragm of a gas-holder.

I am aware that gas-mixers having adjustable valves have been made and patented, which vary the quantity of air admitted and mixed, and consequently I do not claim any such devices, broadly, but confine my claim to the specific arrangement and combination of parts which I have devised for that purpose.

Having thus described my invention, I claim—

1. In a carbureted-air mixer, the combination, with a gasometer, of a series of valves attached to one stem of the adjusting devices, whereby the relative position of the valves may be changed, as set forth, and suitable connections between the valves and the gasometer, whereby the movements of the gasometer are caused to actuate the valves automatically with sudden positive movements, substantially as set forth.

2. The combination, in a gas and air mixer, of an air and a gas pipe communicating with a chamber having ports of fixed size and position, with a gas-valve fixed to a rod, and an air-valve adjustable on the same rod, whereby its position relative to the gas-valve may be regulated for the purpose set forth.

3. The combination, with the gasometer, the air and gas valves, connections for actuating said valves with sudden positive movements automatically, in consequence of the movements of the gasometer, and hand-connections to the air-valve for adjusting its position relative to the gas-valve, of suitable devices actuted by the said hand-connections for indicating the position of adjustment of the air-valve, substantially as set forth.

4. The float or top A, provided with the tube a^2, carrying the arms a^6, having rollers upon their ends, in combination with the bed-plate F, the valve-box mounted thereon, the rollers d^3, also mounted upon the bed-plate, the valve-stem E, carrying the valves e^2 e^3, and passing through the block D, and the divergent arms C C′, pivoted upon the bed F, the said arm C being engaged above and below by the arms a^6, and the arm C′ being weighted and arranged to engage with and move the block D with a sudden positive movement.

5. The holder or gasometer, in combination with the bed F, having the valve-box G, the channels or ports f f' g^2 formed in said bed at the valve-box end, and the air-pipe g, gas-pipe g', and the gas delivery and receiving pipes E′ g^3, covered by perforated domes b^4.

6. The bed F, with its valve-box G and ports f f', in combination with the stem E, carrying rigid gas-valve e^2, and adjustable air-valve e^3, and the hand-connection E′, substantially as and for the purposes set forth.

7. The combination, with the valve-operating mechanism, and the hand-connections for adjusting the air-valve, of the gear-pinion e^5, the gear-wheel E^2, mounted on the shaft f^2, and provided with the studs 2, and the pointer 1, substantially as and for the purposes set forth.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

CLARENCE M. KEMP.

Witnesses:
S. BRASHEARS,
H. B. HUMPHREYS.