

T. VAN KANNEL & L. D. TOWSLEY.

INJECTING APPARATUS FOR GAS MACHINES.

No. 175,213.

Patented March 21, 1876.

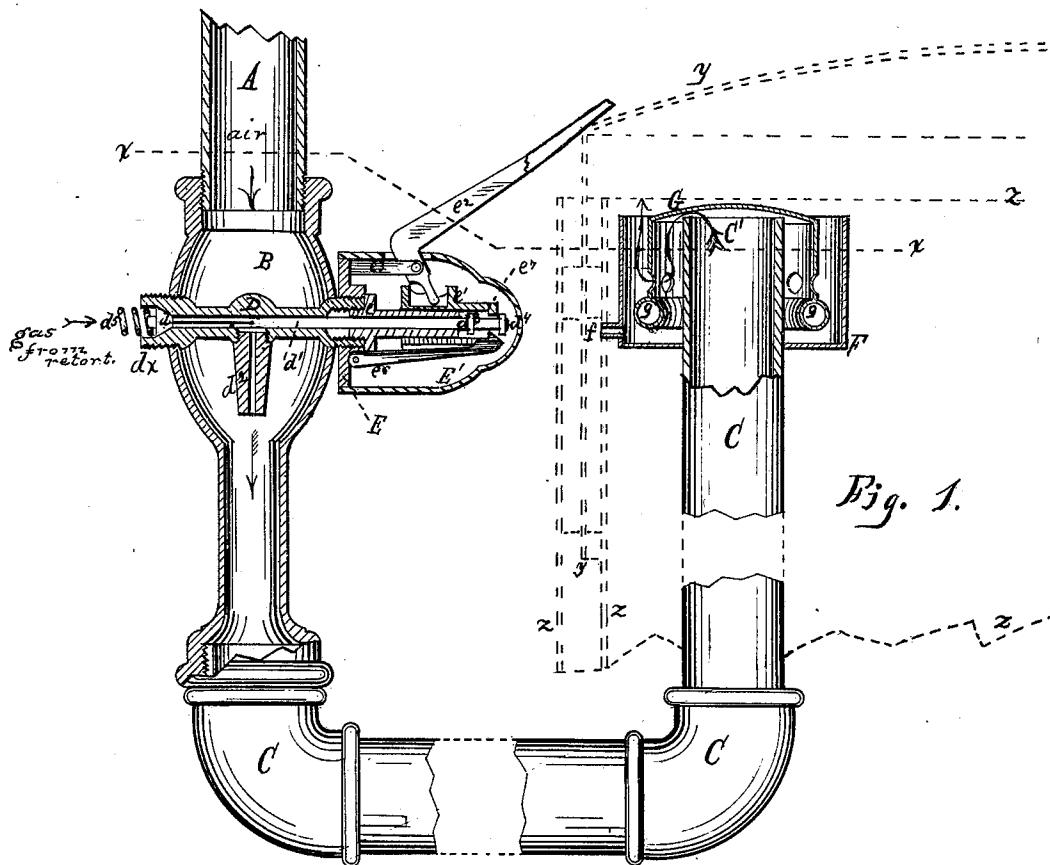


Fig. 1.

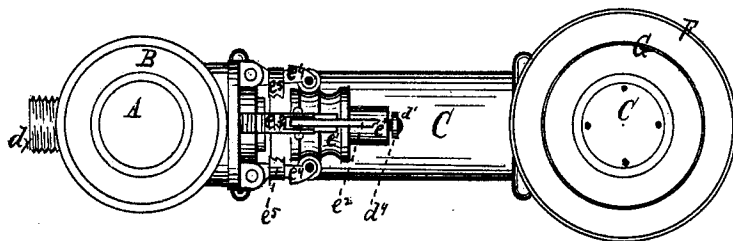


Fig. 2.

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IMPROVEMENT IN INJECTING APPARATUS FOR GAS-MACHINES.

Specification forming part of Letters Patent No. **175,213**, dated March 21, 1876; application filed September 2, 1875.

To all whom it may concern :

Be it known that we, THEOPHILUS VAN KANNEL and LOVIAS D. TOWSLEY, both of Cincinnati, county of Hamilton and State of Ohio, have invented a new and Improved Injecting Apparatus for Gas-Machines; and we do hereby declare that the following is a full, clear, and exact description of the same reference being had to the annexed drawings, making a part of this specification.

This invention relates to that class of gas-machines wherein the vapor of a light hydrocarbon, such as gasoline, is forced in a small jet, under high pressure, into a gas-holder, the vapor in its passage drawing with it, and mixing therewith a required quantity of air, acting with sufficient force to elevate the gas-holder.

The advantages of this apparatus are its simplicity of construction and operation, and its reliability and efficiency. In the main it consists of a bulb, transversely through which passes a fixed stem, containing a small valve which lets on and closes off the vapor alternately as the same is opened and closed by the falling and rising of the gas-holder operating through the mechanism for that purpose provided. It further consists of a check-valve within the gas-holder, which is automatic in its action, frictionless, and durable, a full description of which will be hereinafter given.

In the drawing, Figure 1 represents a vertical section, and Fig. 2 a top and partly sectional view, seen from the dotted line *x* of Fig. 1.

In construction our invention is as follows: A is a tube conducting air to the mixing-valve, and is screwed into bulb B. This, in its turn, is screwed over pipe C, which conducts the mixed air and vapor to the gas-holder. D is a stem placed through the body of bulb B. In one end is the ground-in vapor-valve *d*, and on the other the mechanism which, through rod *d'*, operates the valve *d*. This valve has the shank cut triangular to permit the vapor to pass to and through the nipple *d*². The tube leading to the retort in which the vapor is generated is attached to the end of the stem marked *d*^x. The valve mechanism consists of disk E, screwed over stem D, and is provided with a housing, E'. The rod

d' is surrounded by packing held in place by screw-plug *e*, which continues outward some distance to form a guide for the trip-slide *e*¹. A lever, *e*², in the post *e*³, has its short arm engaged with trip *e*¹, while its long arm engages with the gas-holder, which is represented in the drawing by dotted lines *y*, sealed by a fluid held within the double-walled vessel shown by dotted lines *z z*. At *e*⁴ *e*⁴ are seen two arms pivoted to the disk E by one end, while the free ends have two friction-rollers inserted, which drop alternately into the two concaves of the trip *e*¹, and are held together or against trip *e*¹ by the flat circular spring *e*⁵. The rod *d'* has at *d*³ a disk, and also one at *d*⁴, the latter of which is made removable, while the former is permanently attached. Between the disks *d*³ and *d*⁴ the trip *e*¹ is narrowed, so that the latter may engage with the former as it is moved backward and forward. The lever marked *e*⁶ is also pivoted in the disk E, and is held upward by a spring not shown in the drawing. The free end of lever *e*⁶ is formed into a hook, which engages with disk *d*⁴ when rod *d'* has been forced in, locking it, and holding it against the force of coiled spring *d*⁵, which applies its force on rod *d'* through the valve *d*, which valve it keeps tightly on its seat when closed. As the trip again moves outward it disengages the hook from the disk *d*⁴ when the trip has arrived at that point where the arms *e*⁴ complete their stroke.

The check-valve consists of the well F, the bottom of which surrounds the pipe C fluid-tight, but has communication with the main gas-well and the fluid used in it by means of a small tube, *f*, whereby the fluid-level of the main well and that contained in F will be at all times the same. Over the end of tube C, at C', is an inverted cup, G, acting like an ordinary gas-holder. This cup has a series of wires fitting the interior of pipe C, which guides the former in its vertical movement. The lower edge of said cup is turned into a float, *g*, of sufficient buoyancy to support the cup in such fluid as may be made use of, and just above the float a series of holes are punched for the escape of the gas from pipe C to the main gas-holder.

In operation our invention is as follows: Having a given vapor-pressure in the retort

the gas-holder, being up, gradually moves downward as the gas is withdrawn for consumption, while the small valve *d* is closed. In the downward movement of the gas-holder the lever *e*² attached to it presses the trip back from the position shown in the drawing. As the trip moves back the arms *e*⁴ are moved outward, compressing the spring until the center bead of the trip passes slightly beyond the center of the friction-rollers of arms *e*⁴, when the force of the spring moves the trip back, whereby its neck *e*⁷ engages with disk *d*³, moving the rod *d*¹ inward, at the same time forcing the valve *d* off its seat. The disk *d*⁴ having passed the hook on lever *e*⁶ it drops in behind said hook, preventing the spring *d*⁵ forcing the rod *d*¹ back when the trip starts back. The vapor now enters and escapes through nipple *d*², drawing and mixing with it a given quantity of air. The mixture then passes through the pipe C, lifting the cup G, when it enters the main gas-holder, which it elevates. In its upward movement the lever *e*² reverses the action of trip *e*¹. When it has moved back to a point slightly beyond the center of friction-rollers on arms *e*⁴ it releases the disk *d*⁴ from the hook of lever *e*⁶, and the trip moves outward, completing the stroke instantaneously by the force of the spring *e*⁵, withdrawing the rod *d*¹, allowing

the pressure of the vapor and the force of spring *d*⁵ to close valve *d*. It is obvious that this action will stop the passage of gas through pipe C. As soon as this is discontinued the pressure of the gas-holder depresses the cup G until the perforations therein are below the fluid-level, which prevents the gas returning. The gas-holder then descends as before, and the operation is continued indefinitely.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. As an improvement in injecting apparatus for gas-machines, the mechanism consisting of the valve *d*, spring *d*⁵, trip *e*¹, operated by lever *e*², rod *d*¹, locking-lever *e*⁶, and spring *e*⁵, substantially as and for the purpose described and set forth.

2. The valve mechanism, consisting of the valve *d*, spring *d*⁵, trip *e*¹, rod *d*¹, locking-lever *e*⁶, and spring *e*⁵, in combination with a check-valve, whereby the vapor under pressure is admitted into the holder, and confined there, substantially as and for the purpose described and set forth.

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Attest:

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