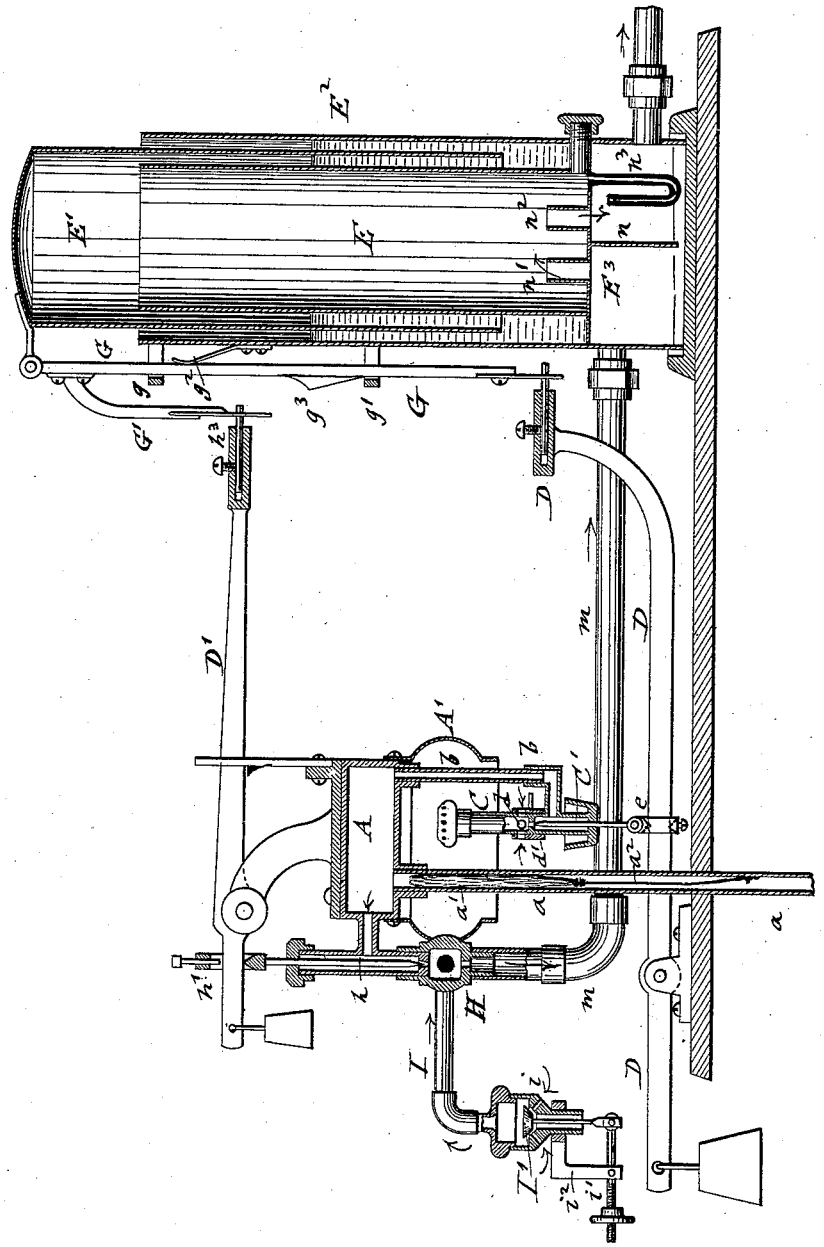
(No Model.)

J. S. WOOD.

GAS MACHINE.

No. 345,402. Patented July 13, 1886.



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GAS-MACHINE.

SPECIFICATION forming part of Letters Patent No. 345,402, dated July 13, 1886.

Application filed October 9, 1885. Serial No. 179,387. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH S. WOOD, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas-Machines, of which the following is a specification.

This invention relates to improvements in automatic gas apparatus of that class in which the vapors are generated from volatile hydrocarbons by the action of heat mixed with a suitable quantity of air in a mixing-chamber, and conducted from the same to a gas-holding drum, that regulates automatically by its rise and fall the generation of gas in the retort; and the invention consists, mainly, in a novel combination of parts for actuating the needle-valves of the mixing-chamber and of the retort-heating burner by the rise and fall of the gas-holding drum; and the invention consists, further, of several minor and novel combinations of parts, which will be more fully described hereinafter, and finally pointed out in the claims.

The accompanying drawing represents a vertical longitudinal section of my improved gas-machine.

A represents a gas-generating retort, of cylindrical or other shape, which is provided at its bottom with a downwardly-extending hood, A′, for protecting the burner-flame against draft or wind. The gas-burner C is arranged below the retort and supplied with gas by a pipe, *b*, that extends downwardly from the retort A. A vertical needle-valve, C′, opens or closes the gas-supply orifice in the throat of the burner, above which are arranged air-supply openings *d* and an exterior sleeve, *d′*, said sleeve having air-openings that register with the openings *d*, and a handle for turning the same to the right or left, so as to regulate the supply of air to the burner. The admission of a proper quantity of air produces the perfect combustion of the gas and prevents the smoking of the flame. I prefer to use a so-called "rose-jet" burner, as thereby a steady uniform heating-flame is obtained. At the lower part of the burner is arranged an alcohol-cup, by which the burner is heated in the usual manner when the gas-machine is to be set into operation. The lower end of the needle-valve C is pivoted to a keeper, *e*, that bears by knife-edges on a fulcrumed lever, D, which is weighted at one end and connected by an adjustable pin at its opposite upwardly-bent end, with a release-rod, G, that is hinged at its upper end to the gas-holder E. The retort A is supplied with oil through an oil-supply pipe, *a*, which is connected to the oil-tank, in which the oil is kept under pressure. A suitable packing, *a′*, is placed in the upper part of the oil-supply pipe *a*, the packing being made of cotton or asbestus wicking, or of fine wires, and looped around a wire, a^2, that is attached to the pipe *a*, so as to prevent the packing from being forced up into the retort and retard the flow of oil to the retort. The packing of the supply-pipe has the advantage that the oil is supplied evenly to the retort, so that a more uniform generation of vapors in the same takes place, and that thereby the so-called "jumping" of the flames caused by the irregular functioning of the retort is obviated. The retort A is connected at the upper part with a vertical mixing-chamber, H, having a needle-valve, *h*, which needle-valve is connected by a knife-edged keeper, *h′*, to a fulcrumed lever, D′, which is weighted at one end, and connected by an adjustable pin, h^3, with a fixed arm, G′, of the release-rod G. The tapering end of the needle-valve *h* is fitted into the conical throat of the mixing-chamber H in the usual manner, so as to regulate the supply of vapors to the same.

To the air-port of the mixing-chamber H is connected an air-supply pipe, I, having a check-valve, I′, and air-inlet openings *i*, by which the required quantity of air is drawn in, so as to be mixed with the vapors. The check-valve I′ is balanced by a weighted lever, *i′*, which is fulcrumed to a bracket-arm, i^2, of the casing of the check-valve and pivoted to the stem of the check-valve, which has the advantage that the check-valve is kept in a normal position at all times, so as to supply any desired number of burners, according to the position of the weight on the fulcrumed lever *i′*. This regulating arrangement is superior to the use of springs, as they are objectionable owing to the fact that in case of back-pressure in the machine, due to the sudden extinguishment of all the burners, gas may escape at the check-valve, and by ignition take out the temper of the spring, so that it becomes useless. The check-valve is instantly closed by the back-

pressure, so as to prevent in a reliable manner any escape of gas through the air-supply pipe. The vapors and air pass from the mixing-chamber through an ejection-throat to a gas-pipe, *m*, and are conducted by the same to a condensing-chamber at the lower part of the gas-holder E. The drum E′ of the gas-holder moves in a ring-shaped casing, E^2, formed of two concentric walls, which casing is partly filled with water, that forms a seal for the drum.

The condensing-chamber E^3 is divided by a partition, *n*, into two chambers, to one of which the gas-supply pipe *m* is connected, while the service-pipe is connected to the other chamber. The partition *n* does not extend entirely down to the bottom of the condensing-chamber E^3, but leaves an opening, which is closed by a water seal, so that the gas is compelled to pass from the first condensing-chamber by a short pipe, *n′*, to the gas-holding drum and the space inclosed by the inner cylinder, then by a short pipe, n^2, at the other side of the partition *n* to the second condensing-chamber. The condensation is collected in the first condensing-chamber and at the bottom of the inner cylinder of the gas-holder, and passed through a siphon-shaped drip-pipe, n^3, connecting with the bottom of the gas-holder, to the second condensing-chamber, from which it is removed from time to time.

The hinged release rod G of the gas-drum E′ is guided by means of slotted keepers *g g′*, and pressed outwardly by a spring, g^2. The release-rod G is provided with a tapering projection, g^3, that moves along the lower keeper, *g′*, when the drum is lowered, so as to swing inwardly and release thereby the lever D from the rod G and the lever D′ from the arm G′. The needle-valves of the burner C and mixing-chamber H close thereby the orifices of the burner and mixing-chamber and stop the machine. By the alternating rising and falling of the gas drum E′ the needle-valves of the burner and of the mixing-chamber are more or less opened, so as to generate a sufficient quantity of gas corresponding to the consumption by the burners.

The operation of the apparatus is as follows: The oil-tank is filled with oil under pressure, so that the oil can pass through the supply-pipe into the retort A. The burner of the retort is first heated up by means of alcohol for starting the apparatus. The oil in the burner is vaporized and forms a flame, which heats the retort and generates vapors in the same, which afterward supply the flame of the burner by the connecting-pipe *b*. The greater portion of the vapors is conducted to the mixing-chamber, where they are mixed with atmospheric air and passed through the pipe *m* to the gas-holder, from which the service-pipe and its burners are supplied with gas. The generation of vapors in the retort is diminished as the drum rises by the action of the intermediate levers, and increased when the drum falls and the gas therein is consumed by the burners.

The setting of the needle-valves of the burner and of the mixing-chamber by levers connected directly to said valves simplifies the construction of the gas-machine and produces the reliable and automatic operation of the apparatus.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a generating-retort, a burner connected by a gas-pipe to the retort, a needle-valve for said burner, a mixing-chamber connected to the retort, a needle-valve for said mixing-chamber, a gas-holder having a vertically-movable gas-drum, a gas-pipe leading from the mixing-chamber to the gas-holder, a release-rod hinged to said drum, and fulcrumed and weighted levers connected, respectively, to the needle-valves of the burner and mixing-chamber, and to said release-rod, whereby the generation of gas is automatically controlled by the rise or fall of the drum, substantially as set forth.

2. The combination of a generating-retort, a heating-burner connected by a gas-pipe to the retort, a needle-valve for said burner, a mixing-chamber connected to the retort, a needle-valve for said mixing-chamber, a gas-holder having a vertically-movable gas-drum, a gas-pipe leading from the mixing-chamber to the gas-holder, a spring-actuated release-rod hinged to the gas-drum, and having a tapering projection, a keeper for guiding said release-rod, and fulcrumed and weighted levers connected to the needle-valves of the burner and mixing-chamber, and to the release-rod, whereby the generation of gas is automatically controlled or entirely interrupted by the rise and fall of the drum, substantially as set forth.

3. In a gas-machine, a gas-holder formed of a jacketed casing, a movable drum, condensation-chambers at the bottom of the holder, pipes leading from the interior of the casing to said condensation-chamber, and a siphon-shaped drip-tube extending from the bottom of the casing into one of the condensation-chambers, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOSEPH S. WOOD.

Witnesses:
PAUL GOEPEL,
SIDNEY MANN.