J. FINDLAY.

COMBINED TAR-BURNER FOR GAS-RETORTS, &c.

No. 183,452. Patented Oct. 17, 1876.

Fig. 1.

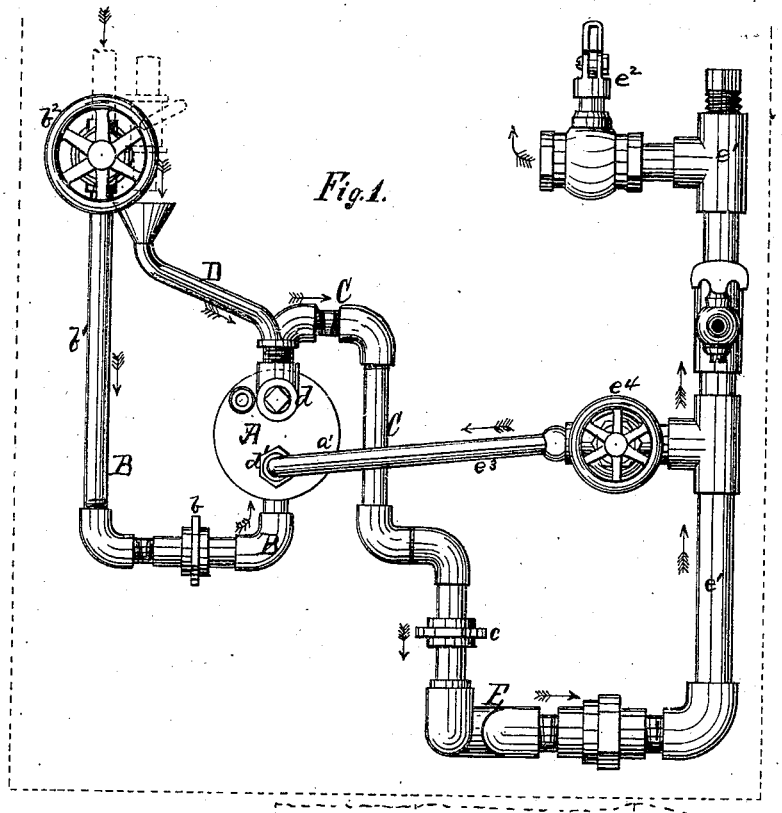


Fig. 3.

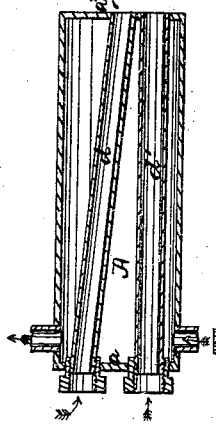
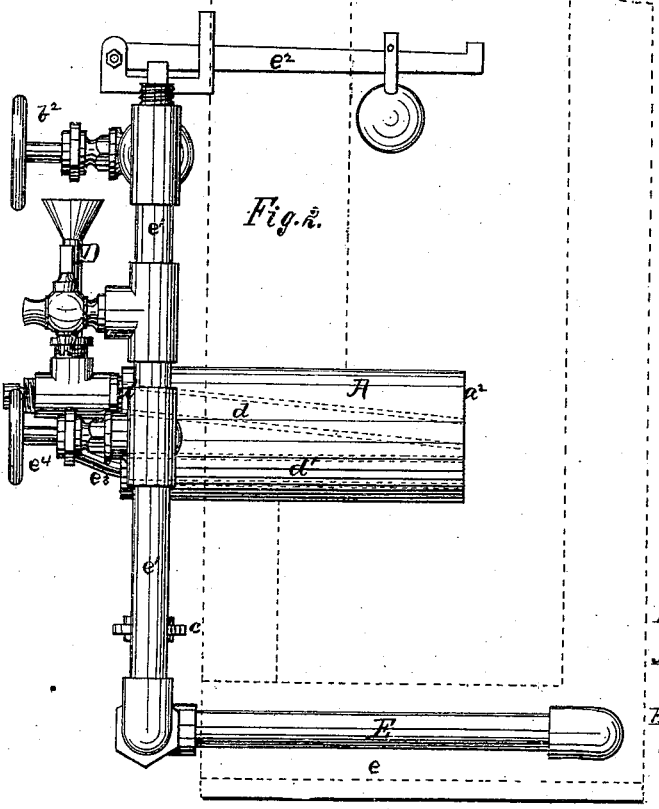


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN FINDLAY, OF OGDENSBURG, NEW YORK.

IMPROVEMENT IN COMBINED TAR-BURNERS FOR GAS-RETORTS, &c.

Specification forming part of Letters Patent No. **183,452**, dated October 17, 1876; application filed August 25, 1876.

To all whom it may concern:

Be it known that I, JOHN FINDLAY, of Ogdensburg, St. Lawrence county, in the State of New York, have invented an Improved Combined Tar-Burner and Steam-Generator for Gas-Retorts, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of tar-burners for gas-retorts in which the discharge-pipe through which the tar is conveyed from the hydraulic main to the furnace is surrounded with a water-compartment, and in connection with which discharge-pipe a steam or air spray is used to atomize the tar on its delivery to the furnace; and my invention consists, first, in a water-compartment, provided with an induction and eduction tube, arranged to project into the furnace, and having passing longitudinally through it, at a downward incline from its outer to its furnace end, a pipe for the conveyance from the hydraulic main to the furnace of the tar, and also passing longitudinally through it an air flue or passage which opens into the furnace just below the opening or end of the tar pipe or injector, whereby the heat of the water surrounding the tar-pipe will cause the tar to maintain a constant and even flow, while at the same time it will be prevented by the water from becoming coked upon or in the pipe, and whereby the air or draft passing through the underlying flue, whether assisted or increased in force by a steam-jet or not, will meet the flow of tar as it comes from the furnace end of the discharge-pipe, and throw it in a spray into the furnace.

My invention consists, second, in the combination, with the said water-compartment and its contained tar-discharge pipe and air-flue, of a coil or section of pipe connected with the eduction-tube of the said compartment, and arranged in one of the furnace-flues, whereby the water supplied to said compartment through its induction-tube and therein heated, and passed out through the eduction-tube, is made to become superheated steam, and may in that form be utilized to form or operate a jet to be played into and through the beforementioned air-flue, and also to drive or operate an exhaust for the retorts, thus obviating the necessity of employing detached or additional steam-generators, or operating a blower or fan for these purposes.

Figure 1 is a front elevation of the devices embodying my invention, showing the same as they would appear upon the front of a gas retort or furnace. Fig. 2 is a side elevation of the same, showing the projection of the parts into the furnace, and Fig. 3 is a longitudinal central sectional view of my improved water-compartment, and its contained tar-discharge pipe and underlying air-flue.

A is the water-compartment. This is made preferably cylindrical in shape, and with closed ends, and it projects into the furnace through the front wall of the same, as shown by the dotted lines *a*, the opposite or front end being exposed upon the front of the furnace or retort bench, as shown. An induction tube or pipe, B, opens into the said compartment at its under side on its front end, as shown, and this pipe is connected by a coupling, *b*, with a supply-pipe, b^1, provided with a valve, b^2, through which the supply of water passed into the compartment A is conveyed and regulated. An eduction tube or pipe, C, leads from the said compartment on its upper side, at its front end, as shown, and to this eduction-pipe is coupled, by the coupler *c*, the steam-generating device hereafter to be described. D is the pipe through which the tar is conveyed from the hydraulic main to the discharge-pipe *d*, the said pipe D coming down to the front end of the said compartment A, and being there joined to the discharge-pipe *d*, which extends through the front end or head a^1 of said compartment. The discharge-pipe *d* extends longitudinally through the compartment A from the upper part of the front head a^1 on a downward incline to, and opens through, the inner or opposite head a^2, as shown. By means of this arrangement of parts, the tar coming from the hydraulic main, will, by the heat of the water in the compartment A, (the temperature of the water being raised by the heat of the furnace into which the compartment projects somewhat,) be extremely liquefied so as to cause it to maintain a constant flow downward through the discharge-pipe *d*, while the

said tar will be prevented, by the jacket of water surrounding the said pipe, from coking or vaporizing in the said pipe, and the tar will be discharged at the lower opening through the head a^2, into the furnace.

Directly underneath the pipe d, and extending longitudinally through the compartment A, in a horizontal line, is arranged the air-flue d^1, opening through both heads of the said compartment, the opening in the head a^2 being just beneath the opening of the discharge-pipe d. By this means the tar discharged through the pipe d is caught by the draft coming through the flue d^1 at the moment that the said tar, in a highly liquefied state, makes its entrance into the furnace, and is, by the force of the draft, thrown in a spray, or atomized, into the furnace, and its complete and instantaneous combustion insured.

To the eduction pipe or tube C, by the coupler c, is connected the coil or section of pipe E, which is arranged in a convenient flue, e, of the furnace, while to the opposite end of said coil is attached the pipe e^1, which may connect the coil with an exhaust for the retorts, and is provided with a safety-valve at e^2, as shown, while a pipe, e^3, leading from the pipe e^1, is arranged to constitute a jet-pipe, to be introduced into the air-flue d^1, as shown, the said jet-pipe being provided with a controlling-valve, e^4. By means of this arrangement of parts the water passed into and heated in the compartment A, and passed out through the pipe C, is conveyed into the coil E, and is there made into steam, either wet or dry, as may be desired, and obtained by increasing or decreasing the supply of water admitted to the compartment A through the pipe B; and said steam, thus produced, may be utilized to operate the jet-pipe e^3, or, by being passed through the pipe e^1, to operate an exhaust for the retorts. The employment of a detached or additional steam-generator to operate the jet-pipe, or to operate a blower for said jet or the exhaust, is thus entirely obviated.

I am aware that tar-burners have been heretofore constructed with a discharge-pipe, into which opens an air-flue, or a steam or air jet, or both, at the outer end of said discharge-pipe, and that the tar has, by this means, been thrown in a spray through the said discharge-pipe. It is not my intention to claim herein broadly the atomization and discharge of liquid fuel into a furnace by a blast-injector, or when thus arranged, as I intend to limit my claim hereunder to the specific invention shown. I am also aware that the tar-discharge pipe has been heretofore surrounded with a water-compartment, and I do not intend to claim, broadly, this device; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the furnace of a gas-retort, of the water-compartment A, having the water induction and eduction tubes B and C, respectively, and traversed longitudinally by the tar-discharge pipe d and the air-flue d^1, when said pipe d has a downward incline from the head a^1 to the head a^2, and the air-flue d^1 opens into the furnace immediately under the opening of the pipe d, whereby, at the moment the tar, in a highly liquefied state, makes its entrance into the furnace, it is caught by the draft through the flue d^1, and is thrown, in a spray, into the furnace, as and for the purpose specified.

2. The combination, with the furnace of a gas-retort, of the water-compartment A, having its induction and eduction tubes B and C, and its longitudinal tar-discharge pipe d, and underlying air-flue d^1 of the coil E arranged in flue e, and provided with the pipe e^1 and jet-pipe e^3, all to operate as described, and for the purposes specified.

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