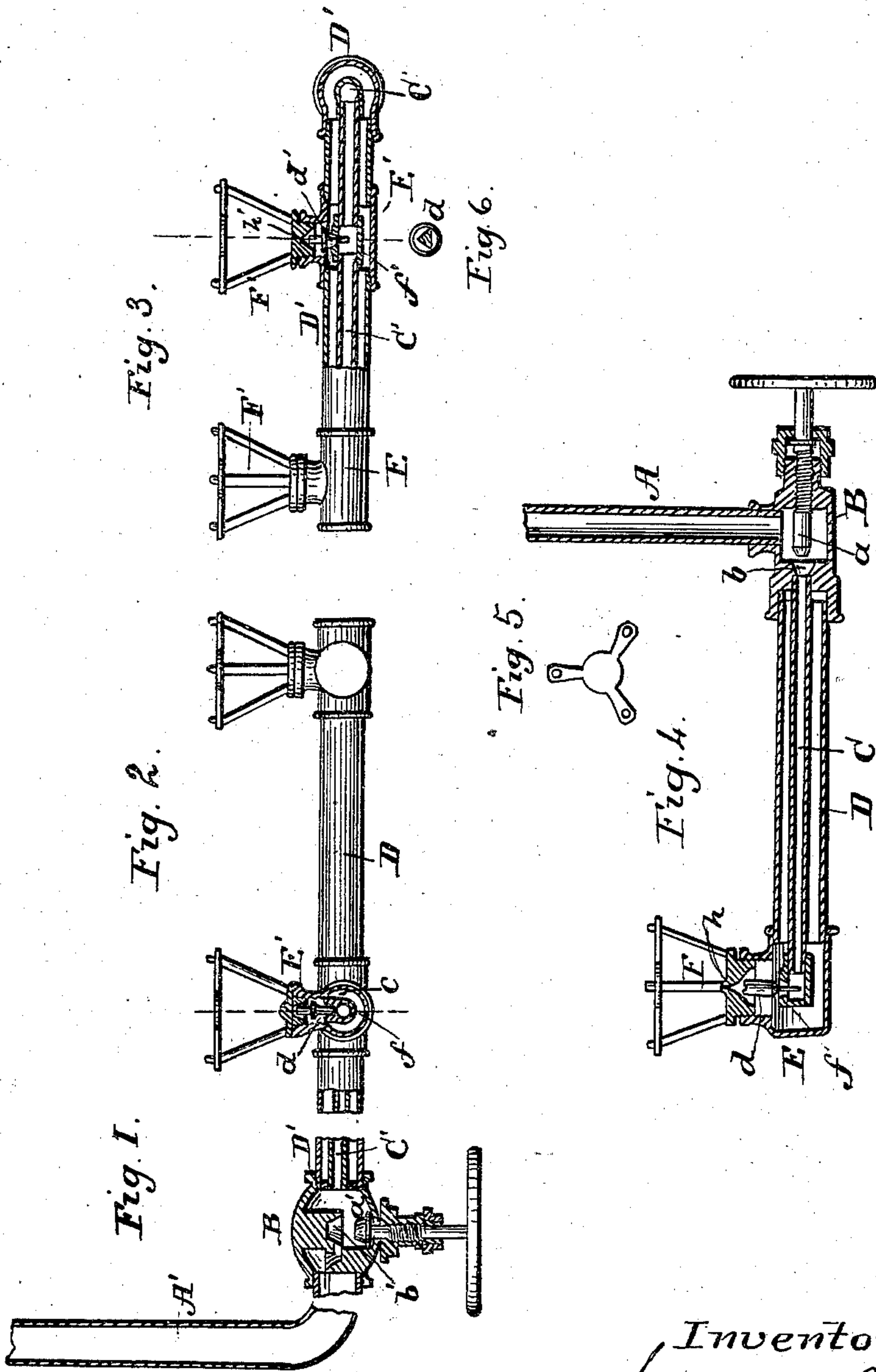


S. CHILD, Jr., & R. A. COPELAND.

Vapor Stove.

No. 68,045.

Patented Aug. 27, 1867.



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United States Patent Office.

SAMUEL CHILD, JR., AND R. A. COPELAND, OF BALTIMORE, MARYLAND,
ASSIGNORS TO SAMUEL CHILD, JR., OF SAME PLACE.

Letters Patent No. 68,045, dated August 27, 1867.

VAPOR-BURNERS FOR HEATING.

The Schedule referred to in these Letters Patent and making part of the same.

TO WHOM IT MAY CONCERN:

Be it known that we, SAMUEL CHILD, Jr., and R. A. COPELAND, of Baltimore, in the county of Baltimore, and State of Maryland, have invented certain new and useful Improvements in Vapor-Burners; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings.

Our invention relates to that class of burners used for cooking, heating, and other purposes, in which the vapor of petroleum, when mixed with atmospheric air, is used as a heating agent.

In apparatus of this kind the oil is generally supplied from a reservoir placed above the level of the burners, so that the oil may be forced, by hydrostatic pressure, to flow through the intermediate pipes and enter the retorts, where it becomes vaporized and issues from the burners in the form of gas.

Our invention relates more particularly to the arrangement of the pipes or tubes which conduct the fluid to the vaporizing-chambers and to the arrangement of the valves for regulating the supply of the fluid to the same; and it consists—

First. In locating the opening through which the oil flows from the supply pipe into the vaporizing-chamber so that it shall be above the level both of the valve which regulates the flow of the oil from the reservoir to the retort, and also of that portion of the supply pipe between the said valve and the retort.

Second. In the combination with one or more pipes, provided with openings arranged as described, of a regulating valve or stop-cock, located on the main supply pipe at any point below the level of the said openings, so that when the pressure of the column of fluid is cut off by the valve or cock the flow of oil from the said openings into the retorts shall instantly cease.

Third. In the combination with the main regulating valve or cock of one or more check-valves, placed in the openings through which the fluid enters the retort, as just described, under such an arrangement that by increasing or lessening the pressure of the superior column of fluid the check-valves shall operate automatically to open or close the openings in which they are respectively seated.

Fourth. In surrounding the pipe which conducts the fluid to the points where it is vaporized with a jacket or tube, in which the oil is vaporized and the vapor is held and supplied to the different burners.

By means of the arrangement of the supply pipes and valves above mentioned we are enabled to check or stop, almost instantaneously, the flow of the oil into the retorts or vaporizing-chambers; for, as the oil is forced through the openings or mouth of the supply pipes into the retorts by the pressure of the column of fluid contained in the upright reservoir pipe, the moment this pressure is removed by the closing of the valve the oil will cease to flow through the openings, for the reason that they are above the level of the pipes and valve, as above explained; and so, no matter how great the number of valvular openings, the flow of the oil from them may be checked by a single valve, located at any point between them and the reservoir, provided, always, that their position relatively to the valve and the pipes be substantially the same as above indicated.

By placing check-valves in these openings, which are formed so as to constitute seats for the valves, the further vaporizing of the fluid is checked after the main valve is closed, and the back flow of the gas or vapor into the pipe is prevented. The valves play loosely in their seats, and are made to rise and fall and to operate automatically by opening the main valve more or less, so as to graduate the pressure of the column of fluid upon them. Of course, as soon as the hydrostatic pressure is removed the valves fall back in their seats, closing the openings tightly. The supply pipe is surrounded by a tubular jacket, which at the same time constitutes the retort and the chamber for holding the vapor. We are thus enabled to keep the pipe comparatively cool, so as to prevent the fluid from becoming volatilized until it enters the retort; for the vapor by which it is surrounded, and which is interposed between it and the outer and heated jacket, checks to a great degree the transmission of heat to the supply pipe, and thereby prevents the vaporization of the fluid within the same.

To enable others to understand and use our invention, we will now proceed to describe the manner in which the same is or may be carried into effect, by reference to the accompanying drawings, in which—

Figure 1 represents a horizontal section of the main valve for regulating the flow of the oil from the reservoir.

Figure 2 is a side elevation of the main supply pipe, one of its branches being represented in section.

Figure 3 is a longitudinal vertical section of the branch shown in section in fig. 2.

Figure 4 is a longitudinal vertical section of a single burner; and

Figures 5 and 6 are views of detached parts.

The essential parts of our invention are shown in fig. 4. The upright reservoir pipe A and the supply or retort pipe C which conducts the oil to the vaporizing-chamber, are connected by an elbow-joint, B, to and in which they are screwed or otherwise suitably fastened. In rear of and on the prolongation of the axis of the supply pipe a conical opening or recess, *b*, is made in the joint, through which the fluid from the reservoir pipe A enters the supply pipe. This conical opening forms the seat of a similarly-shaped screw-valve, *a*, whose stem is taken out from the rear of the joint and revolves on the prolongation of the axis of the pipe C. Surrounding the supply pipe, and concentric with it, is a larger pipe or tubular jacket, D, one of the ends of which is attached to the elbow-joint B, the other end carrying the retort or vaporizing-chamber E. This chamber is of ordinary construction, and has screwed to its top the heater-cap F, in which is formed the orifice or burner *h* through which the gas generated in the retort escapes. The supply pipe C enters the retort, and has screwed over its end a cap, *f*, the top of which is somewhat higher than the level of the pipe. In the top of the cap an opening, *c*, is formed through which the oil from the pipe C flows into the retort E. A conical plug or check-valve, *d*, fits in this opening, being held in its seat by its weight alone. The supply pipe, as well as the cap *f*, is entirely disconnected from and independent of surrounding tube D and retort E; the pipe C and its jacket being both screwed to the solid joint D, which is pierced, as above mentioned, so as to open communication between the two pipes A and C. It follows, from this entire want of contact between the two pipes, that there is but little heat transmitted from the retort and jacket to the supply pipe, and the vapor which fills the annular space between the inner and outer tubes has the tendency to still further diminish the heat of the inner one, and to keep it at a sufficiently low temperature.

The apparatus is operated in the following manner: When the valve *a* is opened the oil, by reason of the superior pressure of the column of fluid in the upright reservoir pipe A, will flow through the pipe C, and forcing up the valve *d*, as shown in the drawing, will enter the retort E, where, being vaporized, it will gradually pass out through the burner *h*. During this process the annular space between the outer and inner pipes becomes filled with vapor, which, as above said, serves to keep the oil in the inner pipe at a sufficiently low temperature to prevent it from becoming too volatile.

The use of the check-valve *d* is productive of important results, for it not only gives great regularity and steadiness to the flow of the oil, and to its vaporization, by maintaining a constant equilibrium between the pressure of the oil and that of the gas, but it prevents any back flow of the vapor into the supply pipe; for if, at any time, the pressure of the gas should be excessive the valve will be forced back into its seat, thus closing the opening to the supply pipe; and it also effectually prevents the further vaporization of the fluid, or any possibility of its flow into the retort after the main valve *a* is closed.

In order to cut off the flow of the oil into the retort the valve *a* should be closed. As soon as this is done the oil in the supply pipe, being no longer impelled by the superior column of fluid in the pipe A, naturally ceases to run up through the opening in the cap *f*, which, as before said, is above the level of the supply pipe and its valve *a*, so that, although the oil still fills the pipe C, its further movement towards the retort is thus effectually stopped. As an additional safeguard against any escape of the oil from the pipe, the check-valve *d*, being no longer upheld by the fluid, drops in its seat and closes the orifice or opening *c* completely.

Instead of the arrangement for a single burner, shown in fig. 4, such disposition may be made of the pipes as to admit of any number of burners being formed on them, all of which can be regulated by a single valve located similarly to the valve *a*. The method of doing this is shown in figs. 1, 2, and 3.

The reservoir pipe A', as before, is secured to a joint or sleeve, B', which carries the valve *a'* and valve-seat *b'* for regulating the supply of oil to the various burners. The main supply pipe C' and surrounding jacket D' are also arranged with respect to each other and secured to the joint or sleeve B', as above described. The pipes, still preserving their relative positions to each other, branch at desired points, and have formed in them at intervals, orifices, over which sleeves E' and *f'* are fitted. The sleeves E' carry burners and heater-caps *h'* and F', which are arranged so as to be just above the orifices in the jacket D'. The sleeves *f'* have openings *c'* formed in their tops, which are placed over the openings in the supply pipe C', and have fitted to them check-valves *d'*, the openings *c'* being above the level of the pipe C'. In other words, the sleeves E' and *f'* are substantially the same with the retort E and cap *f* shown in fig. 4, and their functions are the same, the only differences being those of construction, so as to allow the supply pipe and its surrounding jacket to be extended in order that more burners may be formed on them. No matter how many branches are taken out from the main supply pipe, and how many burners are formed thereon, the main valve *a'* will regulate the supply of the fluid to all, and will cause the automatic movement of the check-valves *d'*, as above explained. The supply pipe and its surrounding jacket are disconnected and separate from each other throughout their entire length, whether in the main pipe or branches; and the jacket D' thus forms, as it were, a continuous retort, extending from the block or sleeve or joint B' throughout the whole length of the main and branches, the supply pipe being therefore surrounded from one end to the other by vapor, which effectually prevents it from being materially affected by the heat of the outer tube.

The apparatus I have described may be used in any connection in which wood, coal, or other ordinary heating agents are employed. It is peculiarly adapted for use with an ordinary steam-boiler, the cheapness of

the petroleum effecting an important saving in fuel; and it presents other advantages which need not here be detailed.

It will, of course, be understood that the openings *c* in the sleeve *f* or cap *f'* may be located in the sides as well as in the tops of the sleeves and cap, provided their position relatively to the pipes and main valve be unchanged, and the check-valves may consequently be placed horizontally instead of vertically.

Having described our invention, and the manner in which the same is or may be carried into effect, what we claim, and desire to secure by Letters Patent, is—

1. In apparatus, as herein described, we claim the method of regulating the supply of fluid to the retort by locating the opening through which the oil enters the retort so that it shall be above the level both of the valve for regulating the flow of the oil from the reservoir and of that portion of the supply pipe between the said valve and the retort, substantially as described.

2. In combination with one or more supply pipes, communicating with the retorts or vaporizing-chambers through openings arranged as described, we claim a regulating valve or cock, or equivalent device, placed at any point between the said supply pipes and the main or reservoir pipe, but so that it shall be below the level of the said openings, whereby the flow of oil to each and every retort may be simultaneously regulated, substantially as shown and set forth.

3. In combination with the pipes and main valve or cock, arranged relatively to each other as described, we claim the check-valves located in the respective openings through which the oil enters the retorts, so that by the movement of the main valves the said check-valves shall operate automatically to open or close the entrances to the retorts, substantially as herein shown and set forth.

4. We claim enclosing the supply pipe within a tubular jacket which carries the retorts, or itself constitutes the chamber in which the oil is vaporized, the said pipe and jacket being disconnected and separate, so as to form between them a continuous annular space in which the vaporized fluid is held, substantially as and for the purposes shown and set forth.

In testimony whereof we have signed our names to this specification before two subscribing witnesses.

SAMUEL CHILD, JR.,
R. A. COPELAND.

Witnesses:

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EDM. F. BROWN.