T. I. ALBERDINGK.

Rendering Apparatus.

No. 204,471. **Patented June 4, 1878.**

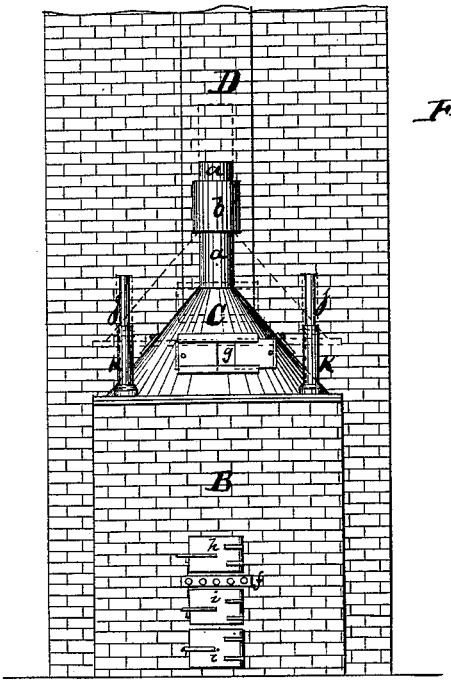

Fig: 1

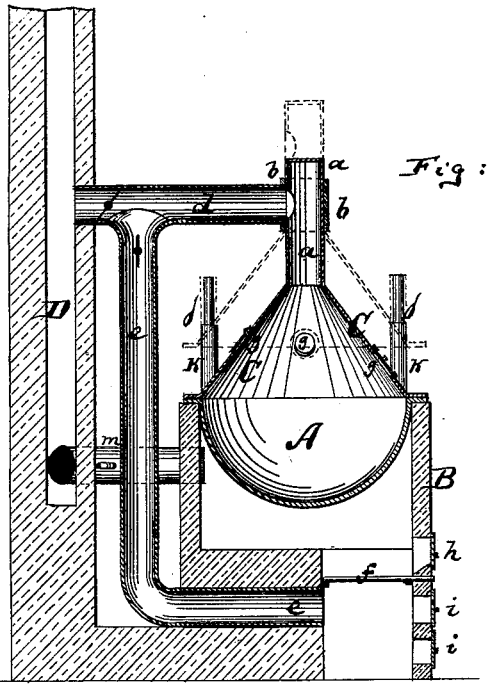

Fig: 2

Witnesses:
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UNITED STATES PATENT OFFICE.

TIMOTHEUS I. ALBERDINGK, OF AMSTERDAM, HOLLAND.

IMPROVEMENT IN RENDERING APPARATUS.

Specification forming part of Letters Patent No. **204,471**, dated June 4, 1878; application filed April 25, 1878.

To all whom it may concern:

Be it known that I, TIMOTHEUS IGNATIUS ALBERDINGK, of Amsterdam, Holland, have invented an Improved Vapor-Consuming Furnace, of which the following is a specification:

Figure 1 is a front elevation of my improved vapor-consuming furnace. Fig. 2 is a vertical longitudinal section of the same.

Similar letters of reference indicate corresponding parts in all the figures.

This invention has for its object to produce a furnace for the destruction of combustible noxious vapors and gaseous products that are created by the evaporation to greater or less extent of substances exposed to the action of heat.

The invention consists, principally, in so combining the boiler or vessel which contains the material to be heated or treated with a tight-fitting cover, and with a conductor or pipe leading from said cover back into the furnace, that the products of evaporation, when the same are noxious gases or vapors, may be conducted, by a special draft appliance, into the fire of the furnace, to be consumed by the same.

The cover is to be maintained on its seat as nearly air-tight as possible, and yet is movable away from its seat, so that in case of an explosion it may be lifted and moved on proper guides without difficulty, thereby preventing the usual injurious effects of an explosion of the contents of a boiler.

In the unaccountable event of ignition taking place, all pipes are shut in order to prevent a fire.

The temperature in the cover must be made dependent upon the liability to ignition of the emanations ascending in the cover. To that effect, a thermometer, which is not shown in the drawing, is provided in the cover to indicate the temperature within, which is regulated by leaving open or partially open, in addition to the main aperture, one or more small apertures for the entrance of cold air.

In the accompanying drawing, the letter A represents the body of the boiler. B is the furnace, over which the same is placed. C is a cover, of conical or other shape, fitted over the boiler, so as to close the same from above. From this cover a pipe, *a*, which is closed at its upper end, extends upward through a sleeve or guide-pipe, *b*, that attaches to a smoke-pipe, *d*, leading into the chimney D.

A branch, *e*, extends from the smoke-pipe *d* down into the furnace B, below the grate *f* of the same, as shown. This grate is constructed preferably of bars, that may be turned round, so as not to have to open frequently the furnace-front for stirring or moving the fire.

In cases where the furnace-front is required to remain open for an undue period, or for charging coals and stirring the fire, the supply of air through the cover should be temporarily reduced.

The cover C of the boiler or caldron has air-openings *g g*, which can be closed by suitable lids or slides, and which may be opened during operation for admitting air into the caldron or boiler.

The furnace is provided with tight-fitting doors *h i* to its fire-chamber and ash-pit, so that no air will be admitted to the flame when it is desired to consume the products of evaporation from the caldron or boiler.

The cover fits tightly upon the boiler, but has projecting tubes *k k*, that embrace fixed stems or posts *j j*, which project from the furnace, so that in case of an explosion the cover may be lifted and moved on the guide-posts *j*. The pipe *a*, which projects from the cover, will meanwhile move upward through the guide-pipe *b*.

For the cover I prefer the conical form, so that the products of condensation may slide down on the inclined sides instead of dropping down back into the boiler.

The supply of fresh air through the openings of the cover is regulated by the slides, so that a uniform draft may be obtained, and so that the temperature beneath the cover may be raised or lowered at will by these openings.

One of the openings in the cover may be a man-hole or hand-hole, to give access to the interior and afford facilities for scraping or moving the material under treatment, if required, and for cleaning, unless it is desired to lift the cover entirely for this purpose. This larger opening should be of a corresponding size to the air-hole of the ash-pit.

In fact, its dimension plays an important part in the process of combustion, and its size should therefore be regulated by means of doors or covers placed over it. Care should be taken to minimize the supply of cold air through the small apertures *g*, so as to avoid diminishing the intensity of draft through the main opening, which would cause an injurious escape from the apparatus. The pipe *a*, which projects from the top of the cover, must also be of at least equal capacity in cross-section to the size of the air-hole of the ash-pit. Only one pipe *a* is shown to extend from the cover in the manner stated; but more than one may be used, if desired. The length of the pipe leading from the cover into the ash-pit may be regulated at pleasure—the longer the more will it favor condensation to take place.

The construction of the furnace is not substantially different from ordinary furnaces, except that the doors to the fire-place and ash-pit should be kept closed as nearly air-tight as possible. The closer the contact the stronger will be the draft through the pipe from the cover, and the more completely, therefore, will the vapors which are generated within the boiler be drawn into the fire which heats the vessel, or of a special furnace, and which fires, being fed by such vapors, will, in turn, be kept alive. The inlet through the large opening in the cover is the only fresh-air supply for the fire, as the smaller ones usually better remain closed, and the cold air rushes, therefore, rapidly into said cover, and forces the warm air, which is combined with the vapors, up to the cover, and thence through the pipe or pipes, as the case may be, into the furnace, without permitting any escape of these gases into the interior of the building. This rush of cold air makes the surface of the material visible where its descending current is directed through the large opening of the cover, which is important for such substances as require continual attention and supervision. It is clear that by feeding the gases into the fire a saving of fuel takes place.

When the apparatus is to operate in the manner described to carry all the vapors from the boiler into the fire, it is, of course, necessary to interrupt the communication between the pipe *d* and the chimney, and also at the same time it may be necessary more or less to regulate the direct communication between the furnace and the chimney, which is established by means of a pipe, *m*. All these pipes are provided with suitable dampers or valves, with a view of accelerating the regulation of the currents that pass through them, and the damper in the pipe *e* which leads into the furnace is also of service in permitting said pipe to be closed whenever it is desired to reduce the heat in the furnace or extinguish the fire entirely. In the latter case the communication between the pipe *d* and the chimney should be opened for conveying away the vapors of the material.

I am aware that products of combustion of furnaces have been led back into the furnace for reconsumption. This I do not claim. Such furnaces are not capable of operating without direct air-supply.

I claim—

1. The combination of the caldron or boiler A with the perforated cover C, placed directly over said boiler, and with the pipes *a d e*, leading from said cover into the furnace B, the pipe *d* leading also into the chimney D, substantially as herein shown and described.

2. The combination of the movable cover C with the boiler A, and with the guide-posts *j j*, on which said cover is placed, which cover is made so as to be wholly removable from said boiler in case of explosion, substantially as specified.

3. The combination of the movable cover and its projecting pipe *a*, which is closed at its upper end, with the guide-tube *b* on the smoke-pipe *d*, and with the boiler A, substantially as and for the purpose herein shown and described.

4. The method herein described of destroying combustible vapors or gases of evaporation by leading them, together with fresh air from the boiler, which is open for the admission of air, and within which the vapors are created, into the fire-box of a furnace, said fire-box being meanwhile deprived of all air-supply except that which it obtains by the pipe that supplies it with the vapors or gases, substantially as specified.

TIMOTHEUS IGNATIUS ALBERDINGK.

Witnesses:

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