M. CULLEN.

Steam-Generator.

No. 204,203. Patented May 28, 1878.

Fig. 1.

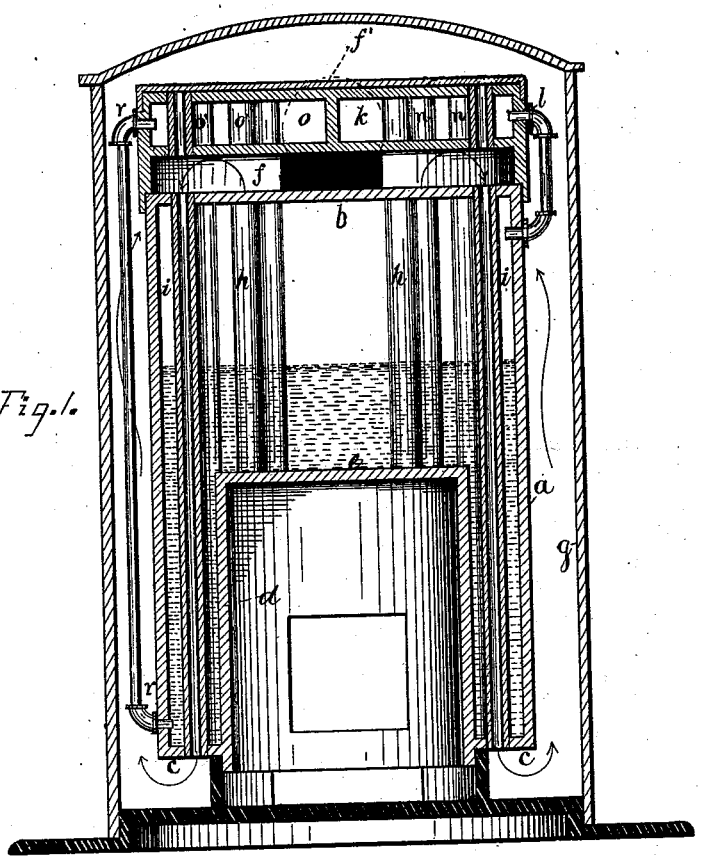
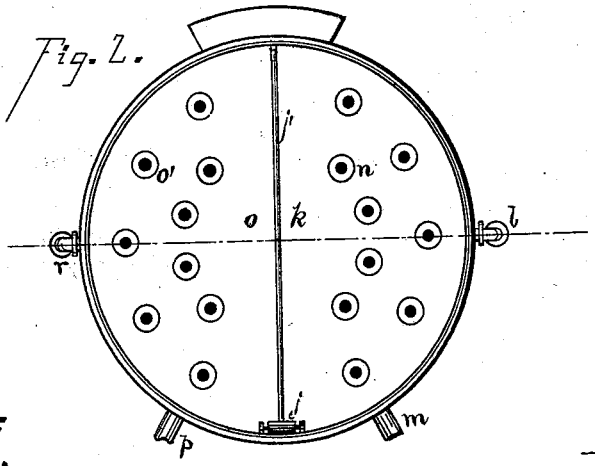


Fig. 2.



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UNITED STATES PATENT OFFICE.

MICHAEL CULLEN, OF HARTFORD CONNECTICUT, ASSIGNOR OF ONE-HALF HIS RIGHT TO MATTHEW HOGAN, OF SAME PLACE.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **204,203**, dated May 28, 1878; application filed March 20, 1878.

To all whom it may concern:

Be it known that I, MICHAEL CULLEN, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements pertaining to a Steam-Generator, of which the following is a specification, reference being had to the accompanying drawings, where—

Figure 1 is a view of a generator embodying said improvements, in central vertical section, looking toward the front. Fig. 2 is a detail view of the boiler-cap detached from the boiler and turned bottom upward.

The letter *a* denotes the cylindrical part or case of the boiler; *b*, the top plate of the boiler; and *c*, the bottom plate.

The letter *d* denotes the side or cylindrical part or case of the fire-box, rising from the bottom plate *c* of the boiler; and *e*, the crown-sheet of the fire-pot.

The letter *f'* denotes a cap sitting on the upper end of the boiler; *g*, a jacket outside the boiler. There is a smoke-pipe leading from this jacket (not seen in the drawings) to conduct smoke to chimney.

I will here give the function and operation of the parts just described, premising that there are smoke and hot-air tubes *h* running from the crown-sheet of the fire-box to and through the top plate of the boiler, and another set of smoke and hot-air tubes, *i*, running from the top plate of the boiler to its bottom plate.

The smoke, gases, and heat generated in the fire-box pass up through the pipes or tubes *h*, and, being prevented from escape otherwise by the cap *f'*, pass down through the tubes *i*, thence up inside the jacket *g*, and off through the smoke-pipe to the chimney. When a direct draft is needed to kindle or freshen the fire, or the like, the damper *j* is opened by means of the rod *j'*.

I will now describe other parts of my generator. Within the cap *f'* is a compartment or box, *k*, for superheating the steam, which I will herein term the "superheater." Steam finds access to it from the boiler through the pipe *l* and exit through the pipe *m*. This superheater is, or may be, vertically traversed by the pipes *n*, which give greater area of heating-surface.

They are capable of serving an additional purpose, to wit: They are so located that each one stands directly over one of the tubes which perpendicularly traverse the boiler. The top plate of the cap *f'* is removable, and then, by a common straight swab or brush, the boiler-tubes can be reached and cleaned through the pipes *n*, thereby obviating the necessity for removing the whole cap and its contents.

Another feature: Within the cap *f'* is a compartment or box, *o*, for heating feed-water before it goes into the boiler. The water comes in through the pipe *p* and goes to the boiler through the pipe *r*. This feed-water heater is traversed by vertical pipes *o'* for giving increased area of heating-surface, and each is located over one of the boiler-tubes, so that the boiler-tubes can be cleaned with a straight brush through them without removing the whole cap and its contents.

I wish it to be distinctly understood (see first clause of following claims) that I do not claim, broadly, an arrangement which takes the heat, &c., from the top of the fire-box and conducts it by a return-flue to the bottom plate of the boiler; and I limit myself, in this particular, to pipes which run from the fire-box to the top of the boiler, where, by means of a cap, the heat, &c., is made to descend through boiler-tubes and out of the lower end of the boiler.

The pipe *r* conducts the feed-water to the bottom of the boiler.

It will be observed that the feed-water heater and the superheater are substantially duplicates in construction and arrangement, except that one part of the feed-water heater is connected to the bottom of the boiler. I therefore, in the following claims—in the first clause thereof—make specific claim to the superheater, only meaning thereby to claim the combination specified, whether used as feed-water heater or superheater.

I claim as my invention—

1. The boiler provided with hot-air tubes, the cap f', the pipes l m, and the superheater k, provided with tubes n, all combined and arranged substantially as described, and for the purposes set forth.

2. The boiler provided with hot-air tubes, the cap f', the pipes l m, the superheater k, provided with tubes n, the pipes p r, and the feed-water heater o, provided with the tubes o', all combined as described.

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