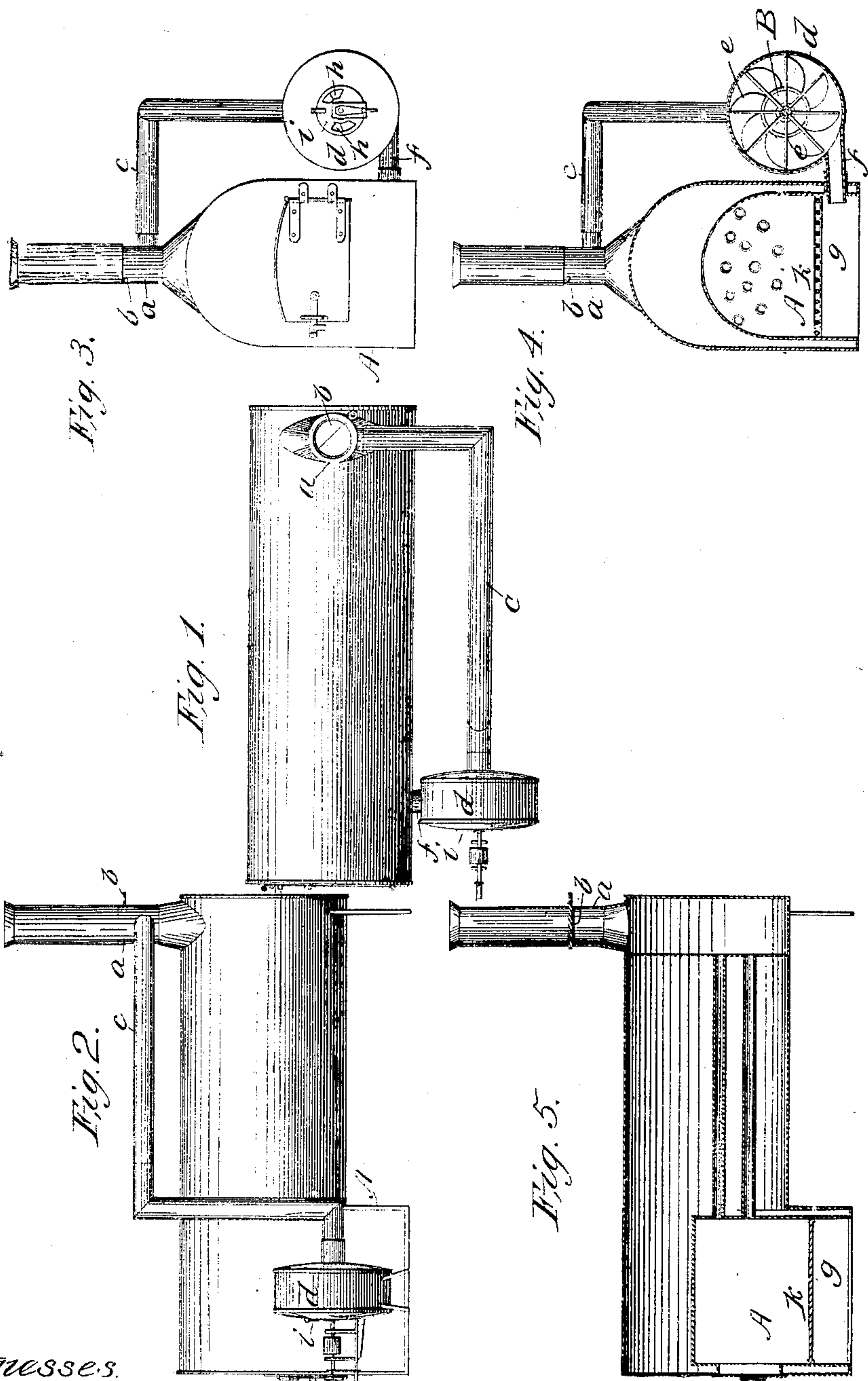


G. W. RAWSON.

# DEVICE FOR AIDING COMBUSTION IN STEAM GENERATORS.

No. 94,512.

Patented Sept. 7, 1869.



Witnesses:  
S. K. Piper.  
J. Brown

*Inventor*  
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# United States Patent Office.

GEORGE W. RAWSON, OF CAMBRIDGEPORT, ASSIGNOR TO HIMSELF AND MICHAEL HITTINGER, OF SOMERVILLE, MASSACHUSETTS.

*Letters Patent No. 94,512, dated September 7, 1869.*

## IMPROVED DEVICE FOR AIDING COMBUSTION IN STEAM-GENERATORS.

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

*To all persons to whom these presents may come:*

Be it known that I, GEORGE W. RAWSON, of Cambridgeport, of the county of Middlesex, and State of Massachusetts, have invented a new and useful improvement having reference to the combustion, in a furnace, of fuel, and the smoke and gases thereof; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view,

Figure 2 is a side elevation, and

Figure 3, a front-end elevation of a locomotive-engine, boiler, and furnace, with my invention applied thereto.

Figure 4 is a transverse section taken through the blower.

Figure 5 is a longitudinal section of the boiler and furnace.

In carrying out my invention, I provide the chimney or eduction-pipe *a* of a furnace, A, with a valve or damper, *b*, which I arrange over the mouth of a pipe, *c*, leading out of such chimney to the middle part of one end of the case *d* of a fan-blower, B, the blast or fan-wheel of which is shown at *e*.

The eduction-pipe *f* of such blower I lead into the ash-chamber *g* of the furnace A.

Furthermore, I provide the opposite head of the blower-case with one or more air-induction openings, *h*, having a register or closing-valve, *i*.

Under this state of things, if we suppose fuel to be in combustion on the grate *k* of the furnace, the damper of the chimney to be closed, the blower-wheel to be put in rapid revolution, and the air-register of the blower-case to be partially or properly opened, as the case may require, the smoke, gases, and light carbonaceous matters, which would otherwise escape by the chimney, will be drawn through the pipe *c* into the blower-case, and there be mixed with air, also drawn therein by the fan-wheel, and with such will be driven into the ash-chamber and up through the grate and into the mass of fuel therein.

The smoke and most, if not all the gases, and the lighter carbonaceous matters thus returned to the fuel will be burned thereby, and thus utilized, or made to contribute to heating the boiler, or whatever the furnace may be applied to.

This invention has been in operation with highly advantageous results with a glass-furnace, that is, a furnace used for producing glass in a molten state.

When the invention is in operation, it not only sup-

plies the furnace with the air necessary to the combustion of the fuel, but it causes the smoke and gases escaping from the fuel to be returned to it and forced in contact with or through it until they are finally consumed. There will be little or no smoke issuing from the top of the chimney.

The result of the application of my said invention to the glass-furnace has been that by the consumption of three tons of coal, I could heat the pots far more effectually than they could be by eight tons of coal used without such invention.

When the invention is in use, the furnace-doors are to be closed. Instead of the air being let directly into the blower-case, in manner as above explained, it may be let into the smoke-conduit leading into such case.

The advantages of introducing the air into the blower-case is that such air will abstract heat from the case and wheel, and thus operate to prevent them, of either of them from being burned by the hot smoke and gases. The heat so abstracted will be carried back into the fuel, and thus be utilized.

I do not claim the mere combination of a blower with a furnace, so as to blow air alone into it, or its ash-chamber; nor do I claim the arrangement of a blast-wheel within the smoke-chamber of a furnace, and providing such furnace and smoke-chamber with a conduit to lead from the smoke-chamber to the ash-chamber of the furnace, the whole being as represented in O. Hopkins' application for a patent rejected April 12, 1867.

I arrange my blower-case and its conduits wholly outside of and distinct from the furnace and its smoke-chamber, in consequence of which the blast-wheel is better protected from the action of the flame, and the furnace can be kept in operation while the blower-case is being opened for effecting repair of the wheel, or other purpose.

Besides the above, my improvement has other advantages.

I claim, therefore, the air-blast wheel and its case, *d*, as arranged outside of and separate from the furnace, and connected therewith by means of a conduit, *f*, opening into the ash-chamber *g*, and also by a conduit, *c*, opening out of the chimney or discharge-flue of the furnace, as set forth.

GEORGE W. RAWSON.

Witnesses:

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