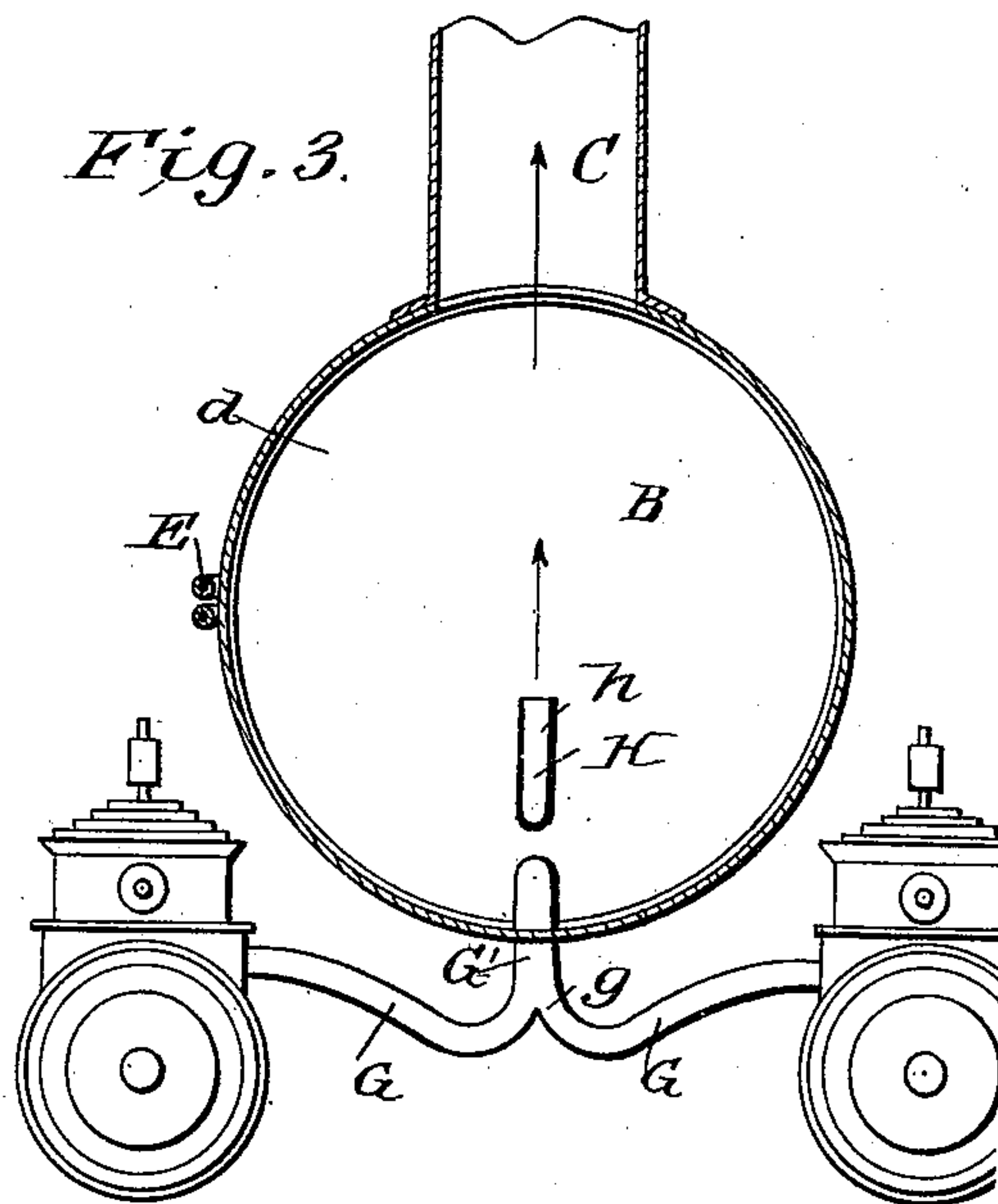
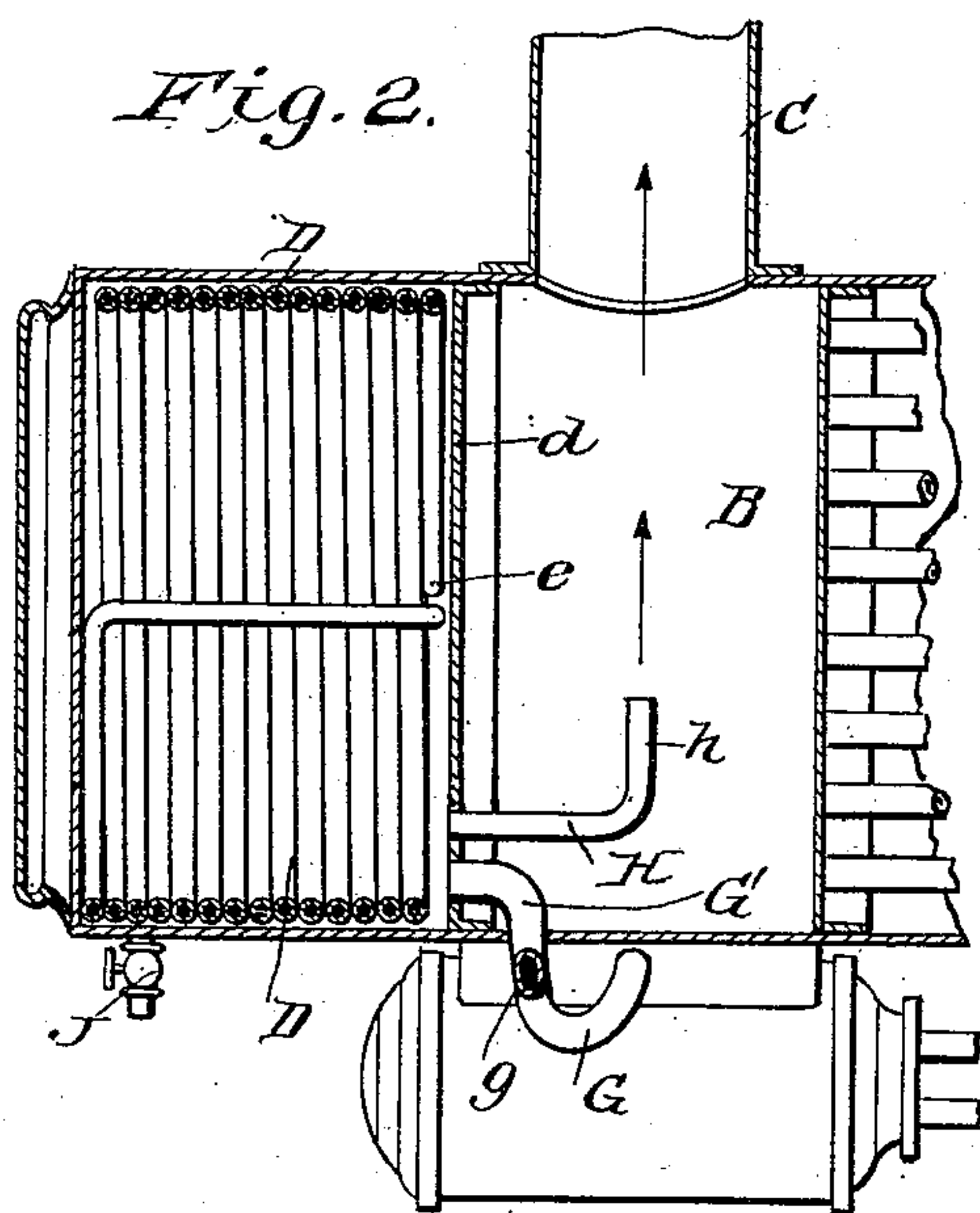
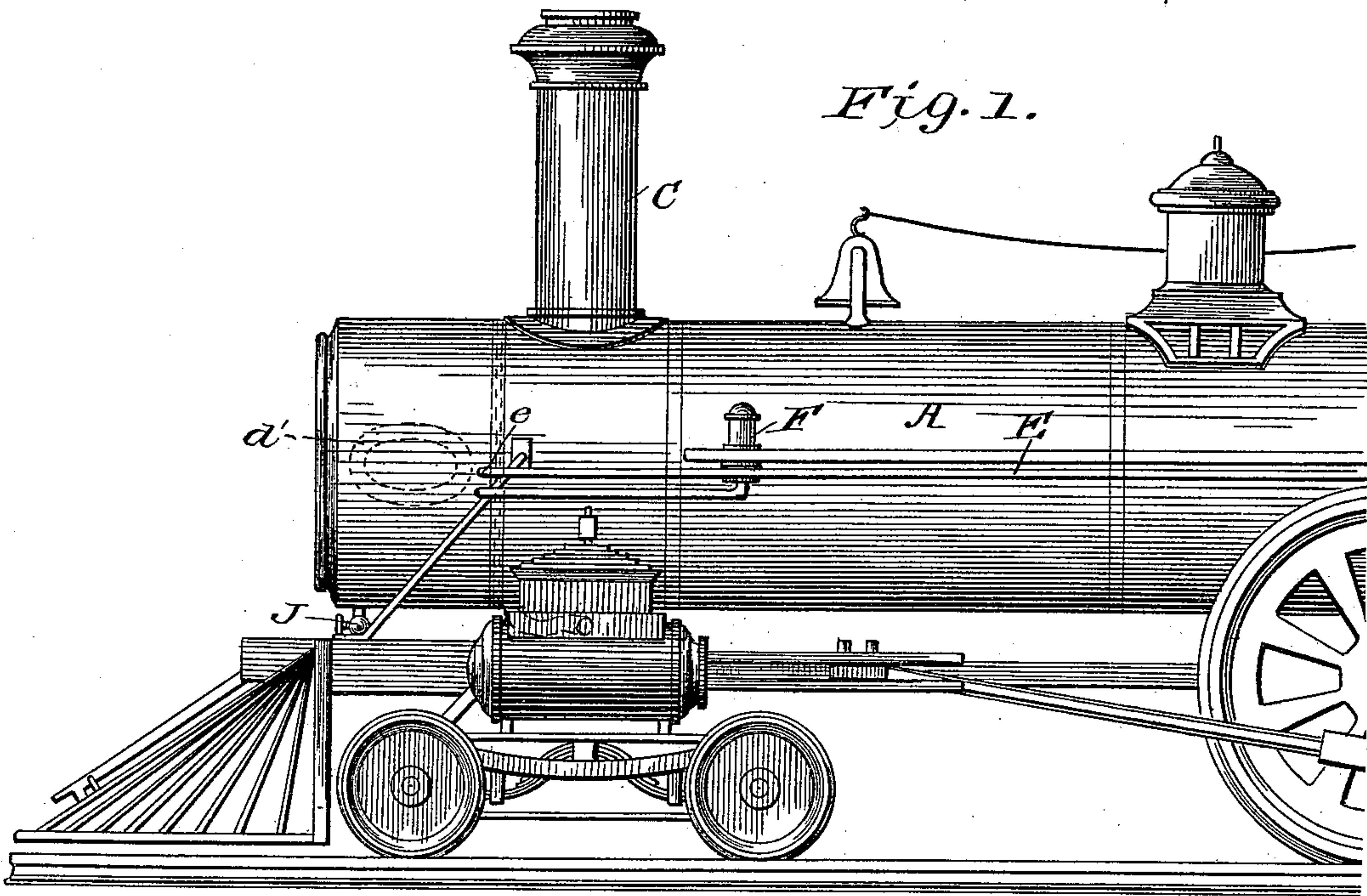


(No Model.)

L. NORTON.
FEED WATER HEATER.

No. 447,159.

Patented Feb. 24, 1891.



WITNESSES:
Fred G. Dieterich
W. D. Blondel

INVENTOR:
L. Norton.
BY *Munn & Co*
ATTORNEYS

UNITED STATES PATENT OFFICE.

LOVEATUS NORTON, OF ESCANABA, MICHIGAN.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 447,159, dated February 24, 1891.

Application filed July 15, 1890. Serial No. 358,805. (No model.)

To all whom it may concern:

Be it known that I, LOVEATUS NORTON, residing at Escanaba, in the county of Delta and State of Michigan, have invented certain new and useful Improvements in Feed-Water Heaters, of which the following is a specification.

My invention has for its object to provide simple and effective means for utilizing the exhaust-steam of locomotive-engines to heat the water before it enters the boiler; and it consists in the novel arrangement and the peculiar combination of the several parts, all of which will be hereinafter fully described in the annexed specification and particularly pointed out in the claim, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of a locomotive-boiler fitted with my improvements. Fig. 2 is a longitudinal vertical section, and Fig. 3 is a transverse section thereof.

In the accompanying drawings, A indicates the locomotive-boiler, and B the smoke-chamber, which are of the usual construction, and C indicates the stack, which communicates with the chamber B. In advance of the chamber B the locomotive-body A is formed with an extension, which is disconnected from the chamber B by the partition-wall *d*, whereby a supplemental chamber D is formed, and which is provided with a suitable man-hole or entrance *d'*, as shown. E indicates the feed-pipe, which extends along the outside of the boiler, as shown, its end *e* being extended and passed through the wall of the body of the boiler A into the chamber D, in which it is coiled, its end *e* passed through the body A, extended back, and connected with the check-valve F, as shown. By this construction it will be observed that the feed-water will pass through the supplemental chamber D before it enters the boiler proper.

G G indicate branch pipes, which connect with the exhaust-ports of the steam-chests, which are joined at *g* into a pipe G', which enters the lower wall of the boiler, passes into the smoke-chamber B through the lower portion of the wall *d*, and communicates with the chamber D. Located just above the pipe G' is a pipe H, which is of a smaller diameter than the pipe G', and which extends into the

chamber B, its end being turned upward, as at *h*, said pipe serving as an exhaust for the said chamber D, and also to lead the said exhaust upward into the smoke-stack.

J indicates a drip-cock located in the lower wall of the chamber D, which serves as a means of discharging the condensed steam when desired.

By the aforesaid construction, it will be observed, I am enabled to utilize the waste steam of locomotives, which, entering into the chamber D, will serve to heat the coiled pipe E as it circulates therein, and as it escapes through the exhaust H into the chamber B it will create a gentle updraft.

By arranging the inlet-pipe G' and the exhaust H in the manner described, and forming the pipe H of a smaller diameter than pipe G', I am enabled to provide for a regular and easy draft and entirely avoid the sudden puffs or blasts which are produced when the steam is injected into the chamber B in the ordinary manner by small jets. By thus avoiding the sudden and quick drafts and providing a steady blast of exhaust-steam into the stack, prevents the flues from being burned out quickly and becoming leaky, and by using a moderate and steady draft prevents the discharge of sparks, which are usually drawn through the flues by the sudden and quick drafts.

By the use of my invention it will be observed that after the locomotive has been at rest and is again started the products of condensation, instead of being forced up into and out of the stack over the engine, as is usually the case, will be forced into the chamber D, from whence they can be readily drawn through the drip-cock J, and by using an indirect exhaust from the cylinders through the pipes G and H into the smoke-chamber the back-pressure is greatly reduced and at the same time providing for a steady and gentle flow of the steam into the smoke-chamber.

It will be readily understood that when a boiler is constructed with my improvements applied the blower and pipe and other exhaust-pipes are led into the chamber D instead of the smoke-chamber B.

I am aware that it is not broadly new to utilize the exhaust-steam of engines to heat

the feed-water or to act as a means for creating drafts for the fire-flues. I therefore do not broadly claim the same; but

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

As an improvement in feed-water heaters, the combination, with the boiler A, a supplemental chamber D, arranged in advance of the smoke-chamber B thereof, the steam-exhaust inlets G G, arranged to communicate with the bottom of the chamber D, an exhaust-outlet H, connected therewith and arranged above the inlet G, said outlet H projected upward into the smoke-chamber, of the feed-

water pipe E, extended along the outside of the boiler, passed through the wall of the chamber D, coiled therein, its end passed through said wall, extended back to the outside of the boiler A, a check-valve F, connected with said end, said end then passed into the water-chamber of the boiler, all arranged substantially as and for the purpose described.

LOVEATUS NORTON.

Witnesses:

FRED G. DIETERICH,
SOLON C. KEMON.