G. WINGATE.

Draft-Producing Apparatus for Locomotives, &c.

No. 147,214. Patented Feb. 3, 1874.

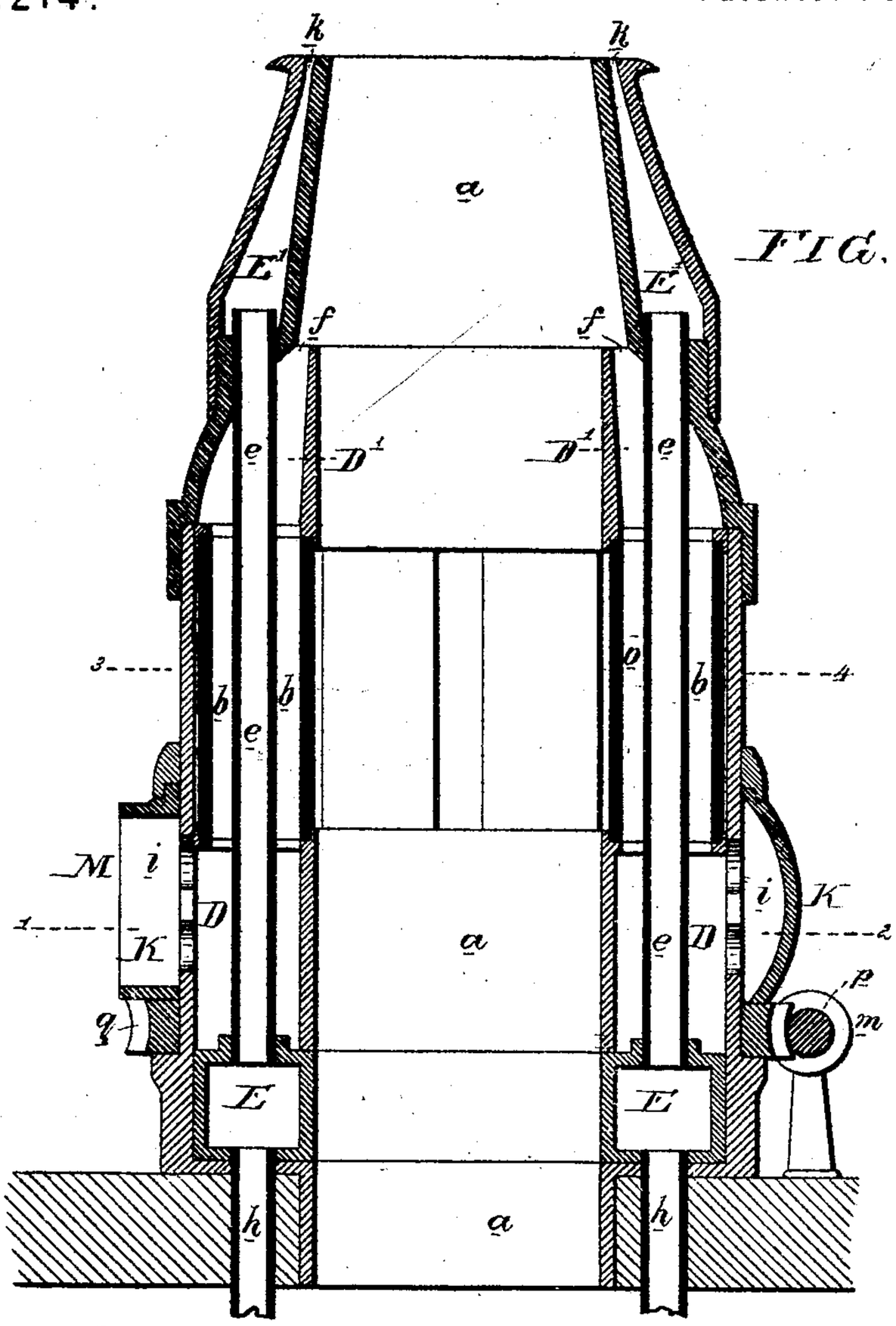


FIG. 1.

FIG. 2.

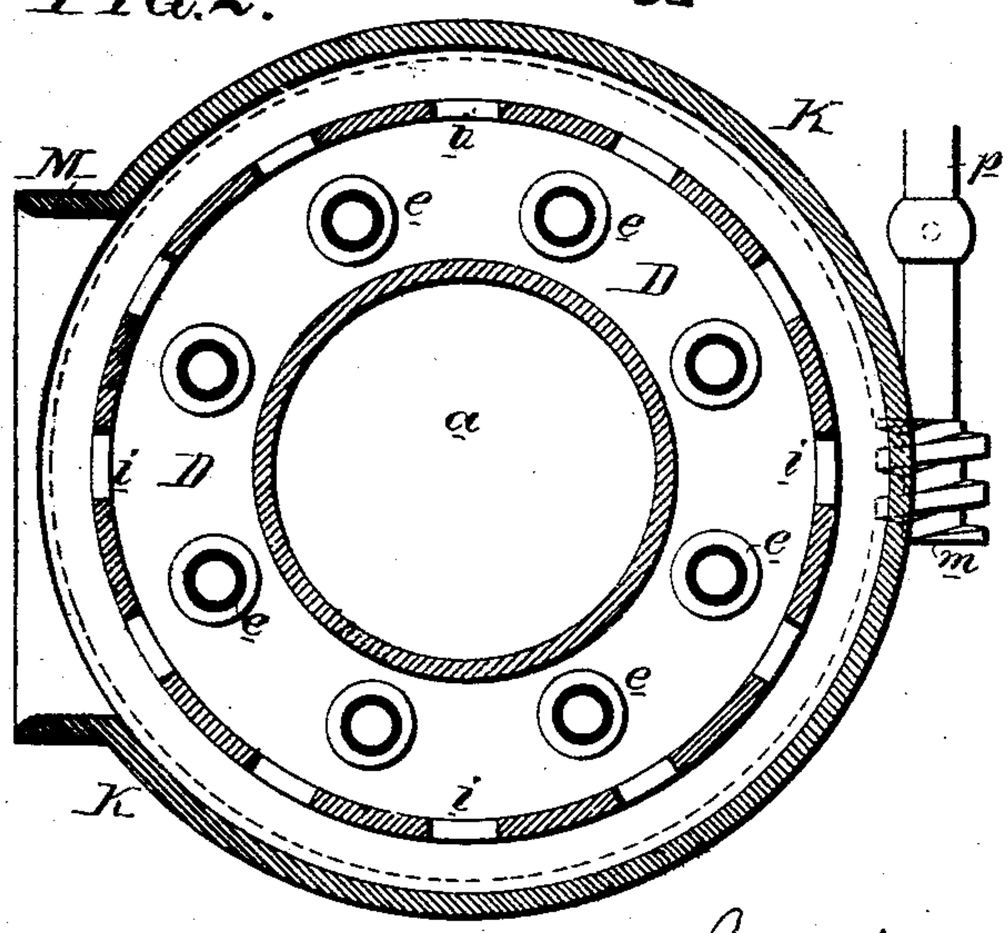
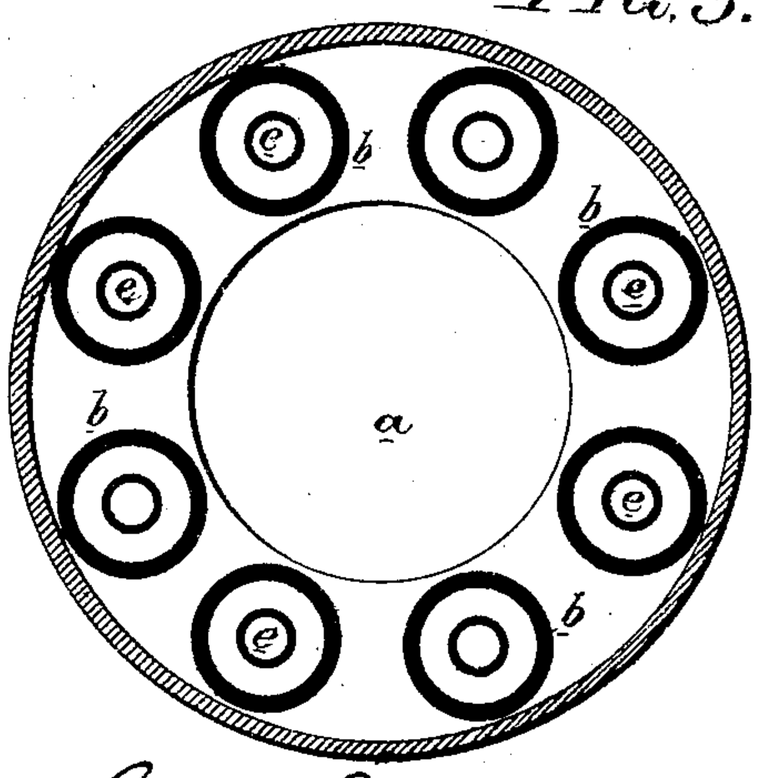


FIG. 3.



Witnesses, Harry Smith
Thomas McElwain

George Wingate
by his attys.
Howson and Son.

UNITED STATES PATENT OFFICE.

GEORGE WINGATE, OF CHARLESTOWN, MASSACHUSETTS.

IMPROVEMENT IN DRAFT-PRODUCING APPARATUS FOR LOCOMOTIVES, &c.

Specification forming part of Letters Patent No. **147,214**, dated February 3, 1874; application filed November 21, 1873.

To all whom it may concern:

Be it known that I, GEORGE WINGATE, of Charlestown, Middlesex county and State of Massachusetts, have invented an Improved Draft-Producing Apparatus, of which the following is a specification:

The object of my invention is to adapt the draft-producing apparatus for which Letters Patent were granted on the 11th day of November, 1873, to locomotives, steam fire-engines, &c.; and I attain this object by constructing the apparatus in the manner which I will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1 is a sectional elevation of the apparatus; Fig. 2, a sectional plan on the line 1 2, Fig. 1; and Fig. 3, a sectional plan on the line 3 4, Fig. 1.

The apparatus has a central passage, *a*, for the products of combustion, an annular steam-chamber, E, at or near its base, an air-chamber, D, an adjustable annular casing, K, communicating with the air-chamber through a number of openings, *i*, and having a large inlet, M, a series of vertical tubes, *b*, connecting the said air-chamber and an upper chamber, D′, which communicates at the top with the central passage *a* through a narrow annular opening, *f*, and a series of steam-pipes, *e*, which extend from the chamber E into and through the said air-tubes *b*. In these respects the apparatus is substantially the same as that for which said Letters Patent were granted.

The improved apparatus is intended as a substitute for the ordinary smoke-stack or chimney of a locomotive or steam fire-engine, to the boiler of which it is permanently secured in any suitable manner, the central opening *a* affording a free upward passage for the products of combustion. The whole of the exhaust steam from the engine is conducted through two pipes, *h h*, into the chamber E, and after circulating within the latter passes upward through the pipes *e* into an annular chamber, E′, with which all of the said pipes communicate at their upper ends. The chamber E′ terminates at the top of the stack in a narrow annular aperture, *k*, concentric with, and adjacent to, the passage *a*. The casing K can be so adjusted that its inlet can face the wind by a worm, *m*, on a rod, *p*, which gears into a worm-wheel, *q*, secured to or formed upon the exterior of the said casing K. On a locomotive, the rod *p* may be contained within or form part of the usual hand-rail which extends along the boiler from the engineer's cab to the stack. While the locomotive is in motion, the required blast for the products of combustion through the central passage *a* is produced and maintained partly by the exhaust steam and partly by forcible currents of air, which enter the casing K through its properly-directed inlet M. The steam, in escaping from the annular aperture *k* at the top of the stack, produces a partial vacuum immediately over the passage *a*, and thus induces a blast, and the air which, in passing from the chamber D through the tubes *b*, is heated and rarefied both by the steam and products of combustion, escapes, under considerable pressure, through the annular aperture *f*, into the stack, and thus likewise induces a blast.

If, in running the engine, it be found that the blast is too great, the inlet M of the air-chamber can, by manipulating the rod *p*, be turned partially or altogether away from the wind, which will materially reduce the force of the volume of air admitted, and consequently that of the blast.

The air-blast is especially valuable in getting up steam, or for maintaining the fire in the furnace in good condition, and the required pressure of steam in the boiler when the locomotive is not in motion, and when consequently there is no exhaust steam for creating a blast. In such case it has been usual to admit live steam from the boiler into the stack; but with my invention as good, or even a better, result is obtained without wasting steam, by simply turning the inlet M of the casing K to the wind, and thus admitting a volume of air, which, in its passage to the upper portion of the stack, is heated and rarefied, and its pressure increased, as before described. Even should there be very little wind, the heating of the air in its passage through the tubes *b* will produce sufficient blast to induce a draft for carrying off the products of combustion.

I have found that with my improved apparatus a continuous and uniform blast is produced, free from the usual puffs or pulsations, that there is a steady draft from the furnace

through the tubes of the boiler, and that the general result is uniformity of steam-pressure and economy of fuel.

I claim as my invention—

1. A chimney having at the top an opening, *k*, communicating with an exhaust-steam pipe, and within and below the mouth a contracted aperture, *f*, communicating with a channel, for the passage of heated air, substantially as set forth.

2. The combination, substantially as described, of the air-chambers D and D′, and their connecting-tubes *b*, with the steam-chambers E and E′, and their pipes *e*, extending through the said air-chambers and tubes, all substantially as specified.

3. The combination of the air-chamber D′, having a contracted annular outlet, *f*, within the stack, with the steam-chamber E′, having a similar outlet, *k*, at the top of said stack, all substantially as described.

4. The combination of the rod *p*, worm *m*, and worm-wheel *q* with the adjustable casing K, for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE WINGATE.

Witnesses:
J. H. COTTON,
C. W. QUIMBY.