

J. F. DONOGHUE.
DRAFT-EQUALIZER.

No. 177,107.

Patented May 9, 1876.

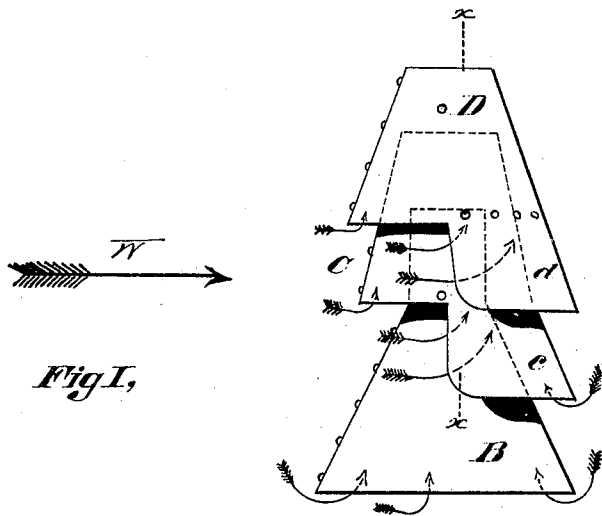


Fig I,

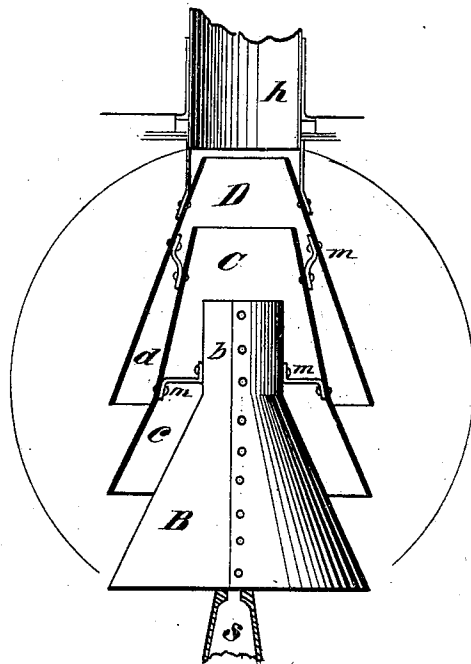


Fig II,

Witnesses,
[Signature]
W. A. Burwell

Inventor,
John F. Donoghue,
by his Att'y
R. F. Hyde,

UNITED STATES PATENT OFFICE.

JOHN F. DONOGHUE, OF SPRINGFIELD, MASSACHUSETTS.

IMPROVEMENT IN DRAFT-EQUALIZERS.

Specification forming part of Letters Patent No. **177,107**, dated May 9, 1876; application filed February 25, 1876.

To all whom it may concern:

Be it known that I, JOHN F. DONOGHUE, of Springfield, Massachusetts, have invented an Improvement relating to Locomotive-Engines, of which the following is a specification:

My invention consists in an improved petticoat-pipe for the smoke-box of a locomotive, and has for its object the equalization of the draft through the flues and the ability to modify the construction of the exhaust-nozzle opening into the petticoat-pipe, so as to permit slight compression of steam by it to always maintain a draft.

In the drawings, Figure I is a side elevation of my pipe, Fig. II being a section on the line *x x* of Fig. I.

The lower section B corresponds to that in ordinary use, except that the pipe part *b*, instead of extending to or nearly to the base of the smoke-stack, is shortened to form a neck to the part B. The part B has arranged above it the conical sections C D. These sections are arranged, as shown, to have their open apices form an uninterrupted smoke-passage from top of pipe *b* to the smoke-stack *h*, while having their sectional areas least at the top of the pipe *b* and apex of section C, to form a pipe of a series of nozzles, represented respectively by the parts B, C, and D, the bases of which nozzles shall divide the space between the top and bottom of the smoke-box of the locomotive, and shall equalize the draft, that has formerly been to the bottom of the pipe, through its length, and consequently in a more or less direct line with all of the flues, the great advantage of which is that whereas, with the ordinary petticoat-pipe, the lower flues are taxed to their utmost capacity, while the upper ones have little to do, with my pipe the draft is equal over all the flues, and any

increase of the blast through the exhaust-nozzle in equal proportions increases the capacity of the fire to make steam. And it follows also that as all of the exhaust is utilized to increase the draft, less pressure is required to run at high speeds than has heretofore been the case, and consequently the exhaust-nozzle can be formed to relieve the blast-pipe of excessive pressure.

In order that the products of combustion coming from the flues in the direction indicated by the arrow W may be directly carried into the pipe, when deflected or crowded from the smoke-space nearest it, and that a direct draft may exist at all elevations I provide the sections C D with the hoods *c d*, which are in effect as if the bases of the sections of which they form part were elliptical with the lowest and highest ends of the ellipse in the bases of the hood and section proper.

In Fig. I the small arrows show the course of the smoke and cinders. In Fig. II the sections are shown secured to each other by the riveted arms *m*, and the pipe is suspended in the usual way from the top of the smoke-box, while the nozzle of the blast or exhaust pipe is introduced beneath the section B.

Now, having described my invention, what I claim is—

The petticoat-pipe, consisting of the series of sections, constructed and arranged as shown and described, to form a reduced space between the nozzle of one and the wall of the succeeding section, and having the hoods *c d*, as and for the purpose set forth.

JNO. F. DONOGHUE.

Witnesses:

R. F. HYDE,
T. M. BROWN.