Cummings & Streat,

Spark Arrester.

No. 110,441. Patented Dec. 27, 1870.

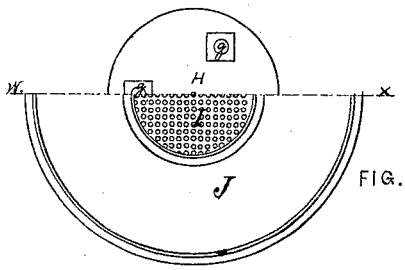

FIG. 1

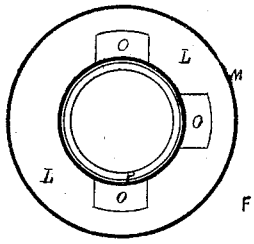

FIG. 2

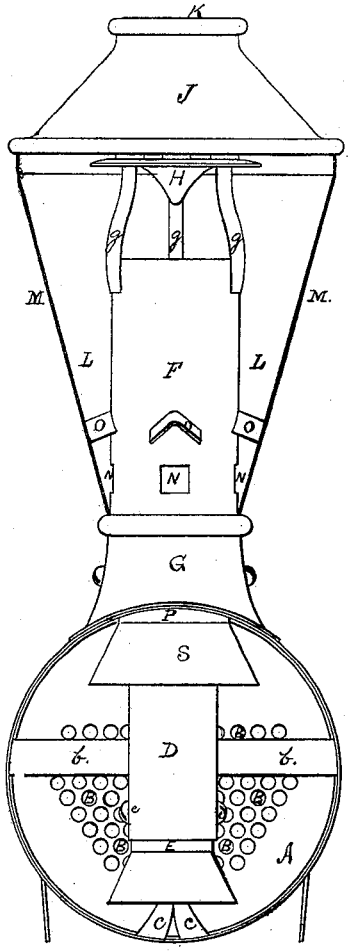

FIG. 3

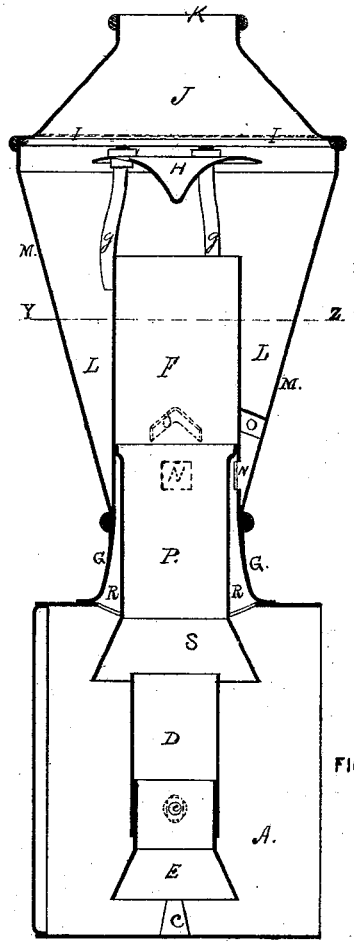

FIG. 4

WITNESSES

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Ransom Wright

INVENTORS

Samuel M. Cummings

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United States Patent Office.

SAMUEL M. CUMMINGS AND HENRY ISREAL, OF ALLEGHENY, PENNSYLVANIA, ASSIGNORS FOR ONE-THIRD THEIR RIGHT TO RANSOM C. WRIGHT, OF SAME PLACE.

Letters Patent No. 110,441, dated December 27, 1870.

IMPROVEMENT IN SELF-CLEANING LOCOMOTIVE SMOKE-STACKS.

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

To all whom it may concern:

Be it known that we, SAMUEL M. CUMMINGS and HENRY ISREAL, both of the city and county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in "Self-Cleaning Locomotive Smoke-Stack;" and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

The nature of our invention consists in the combination of a series of pipes with the smoke-stack and smoke-box of a locomotive, one of said pipes being provided with a series of openings, above which are arranged stop-plates or breakers, the whole being so constructed and arranged with relation to each other that "live sparks or cinders" will be prevented from being ejected from the smoke-stack, but returned to the smoke-box, broken into small particles, which are subsequently ejected from the smoke-stack with the smoke and other refuse of combustion.

Our invention also relates to the employment of the aforesaid pipes and openings in combination with the smoke-stack and box for the purpose of creating a reaction, whereby the draught on the furnace is equalized by being softened, and combustion promoted.

To enable others skilled in the art to make and use our invention, we will proceed to describe more fully its construction and operation.

In the accompanying drawing which forms part of our specification—

Figure 1 is one-half of an extreme top view of the stack, and also one-half top view of the stack's deflector or "cone."

Figure 2 is a horizontal section of the stack, at line Y Z of fig. 4.

Figure 3 is an extreme front elevation of the stack and smoke-box, except the outside taper body of the stack, which is shown in section at line W X of fig. 1.

Figure 4 is a vertical central section of the stack and smoke-box.

In the accompanying drawing—

A represents the smoke-box or extreme front end of the locomotive boiler.

B represents the tubes leading through the boiler from the furnace to the smoke-box A, and through which heat, smoke, dust, sparks, and other refuse of combustion are drawn from the fire.

C C represent the exhaust-pipes, which are connected with the steam-cylinders in the usual manner.

D represents a "lifting-pipe," the lower end, E, of which is arranged directly over the outlets of the exhaust-pipes C C, the whole being concentric to the pipe P, which is arranged concentric to pipe F, which is provided with a deflector, H, held in position through the medium of rods, *g g g*.

I represents the screen-guard or netting of the smoke-stack.

All the parts hereinbefore named are of ordinary construction, excepting that of pipe P and the pipe F, which is provided with openings, N N N, and stop-plates or breakers, O O O. These openings in and stop-plates or breakers on the pipe F, in connection with the functions performed by them, constitute the leading feature of our invention.

As the construction and arrangement of the several parts hereinbefore described and the relation which they bear to each other will be readily understood from the foregoing description and by reference to the accompanying drawing, we will therefore proceed to describe the operation of our improvement.

The exhaust steam passes from the cylinders of the locomotive through pipes C C, and is thrown upward through the smoke-box A into pipe D, and thereby causes a partial vacuum in the smoke-box A, and the heated air, gases, smoke, cinders, and other refuse of combustion will rush from the furnace through the tubes B to fill up the partial vacuum formed in the smoke-box A by the action of the exhaust steam. This rushing of heated air, gases, smoke, &c., through the tubes B increases the draught of the furnace and causes live cinders to be thrown up against the deflector H, and, passing out from under it, fall down into the space L, between pipes M and F, from which they are ordinarily conducted off through pipes; but, by our arrangement of parts hereinbefore described, the live cinders are thrown up through pipes D, P, and F, against the deflector H, and, passing out from under it, fall violently on the stops or breakers O O O, and are reduced to a powdered condition, and, dropping off from these stops or breakers, the powdered cinders pass through the openings N N N into the passages R, (formed by the saddle G and pipe P,) and, passing down through this passage, fall on the enlargement S of the pipe P, from which they fall outward into the smoke-box A, to be returned through pipes D, P, and F and thrown out through the fine meshes of the netting I of the stack J.

By the hereinbefore-described arrangement of the pipes D, P, and F and openings N N N the partial vacuum formed in the smoke-box A by the action of the exhaust steam is supplied in part with air from the smoke-stack; and this air, rushing down in the space L, and through the openings N N N into the space R, and down through it into the smoke-box A, this downward course of the air in the smoke-stack and through openings N N N will cause the live cinders to fall with violence on the stops or breakers O O O, and thereby reduce them to a powdered con-

dition, and will also counteract the violence of the draught on the furnace caused by the exhaust steam; and this counteraction of the draught will greatly promote combustion of the unconsumed gases in the furnace, and relieve the tubes B from wear and tear incident to the violence of the draught caused by the exhausting of the steam in the smoke-box A.

Having thus described the nature, construction, and advantages of our improvement,

What we claim as of our invention is—

1. The pipe F, provided with stops or breakers O O O and openings N N N, in combination with pipes P and D, substantially as and for the purpose described.

2. The openings N N N, in combination with the passages R, for counteracting the draught on the tubes B, which communicate with the furnace, substantially as herein described.

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HENRY ISREAL.

Witnesses:
RANSOM C. WRIGHT,
JAS. A. WILKINS.