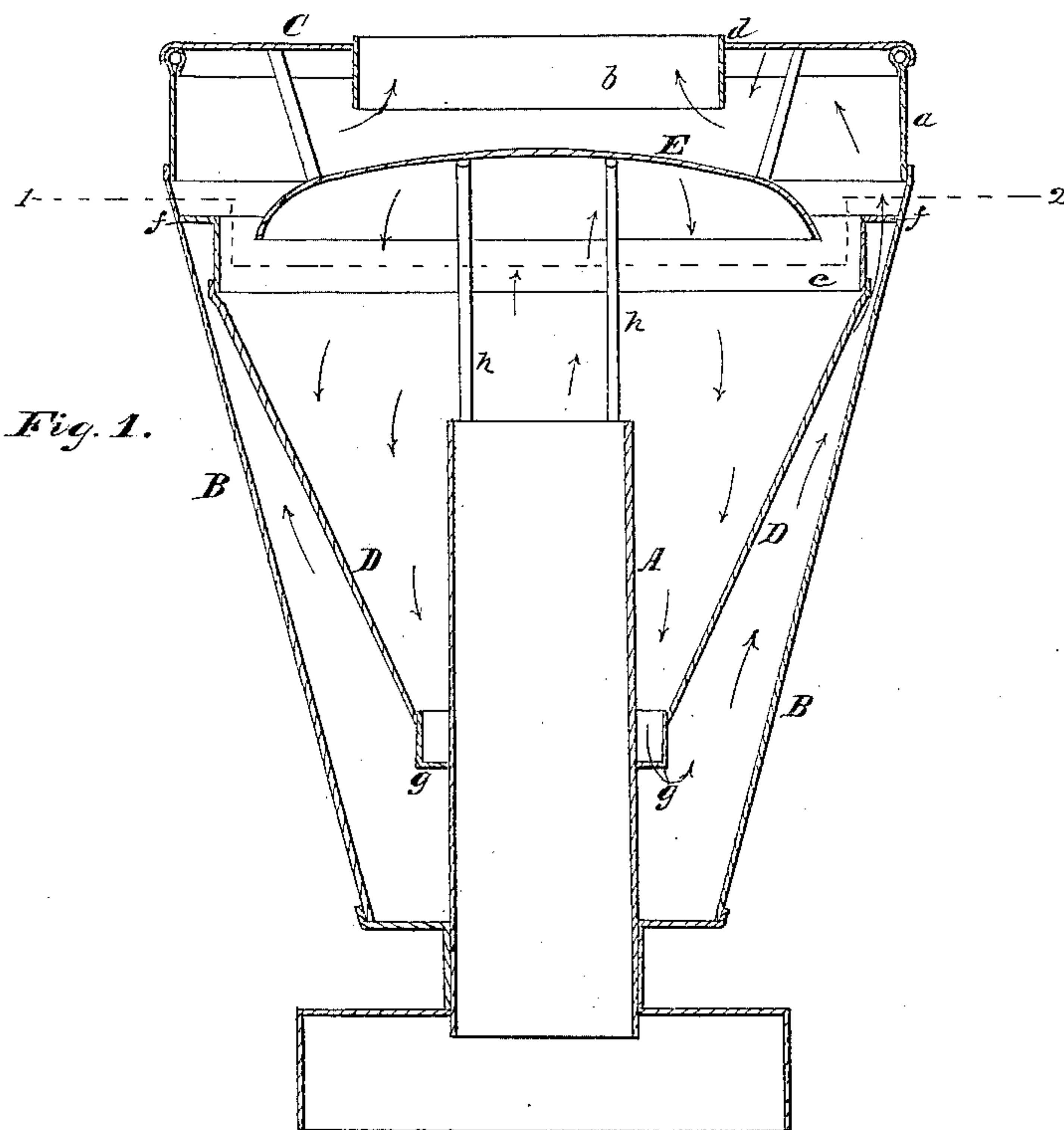


*S. Ham*

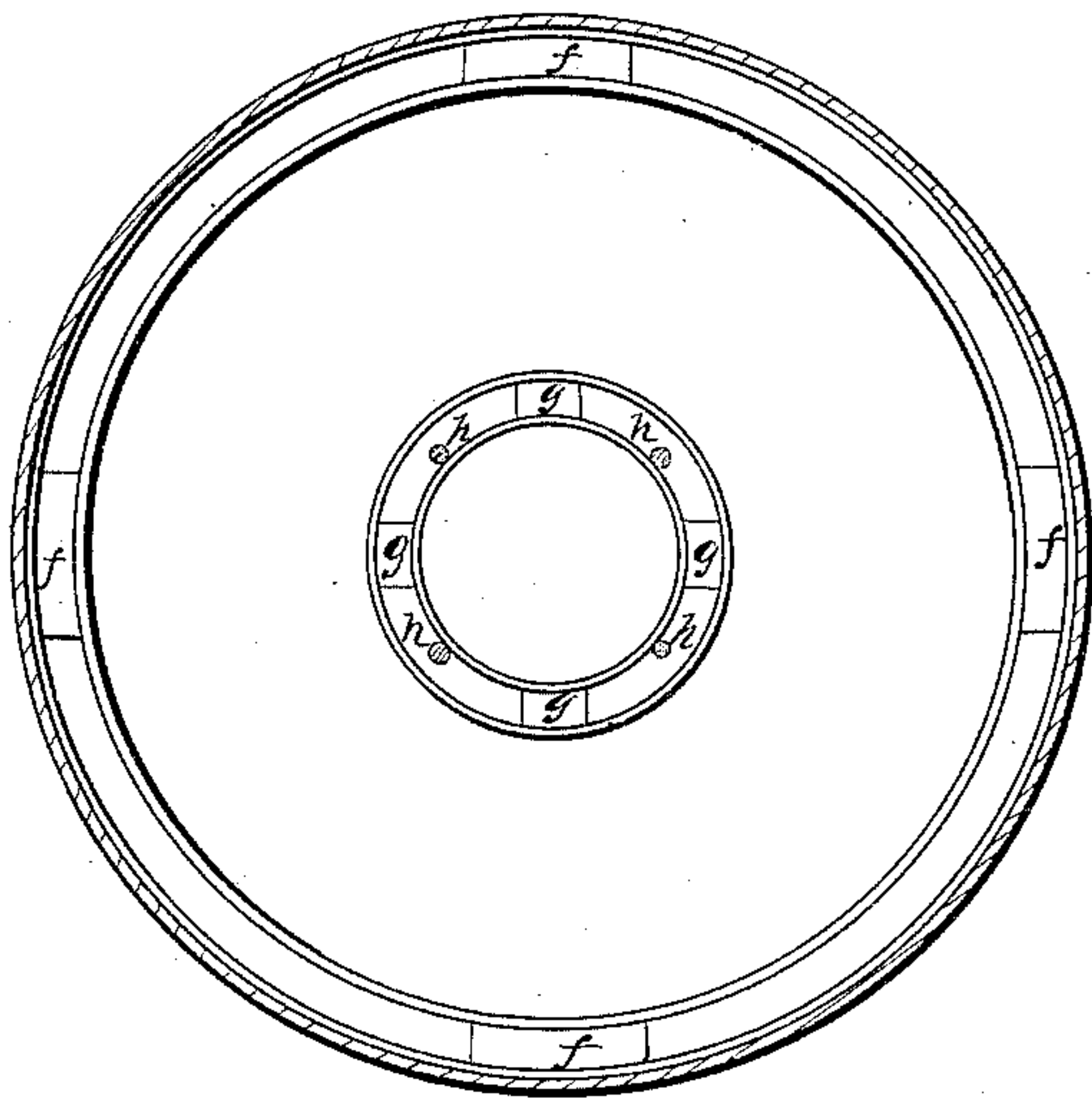
*Spark Arrester.*

*N<sup>o</sup> 45,204.*

*Patented Nov. 22, 1864.*



*Fig. 1.*



*Fig. 2.*

*Witnesses:*  
*Wm. Albert Steel,*  
*Wm. Delaney.*

*Inventor:*  
*H. Howson*  
*Atty for S. Ham.*

# UNITED STATES PATENT OFFICE.

SETH HAM, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF  
AND WILLIAM H. McCAFFERTY, OF ALEXANDRIA, VIRGINIA.

## IMPROVEMENT IN LOCOMOTIVE SMOKE-STACKS.

Specification forming part of Letters Patent No. 45,204, dated November 22, 1864.

*To all whom it may concern:*

Be it known that I, SETH HAM, of Philadelphia, Pennsylvania, have invented an Improvement in Locomotive-Stacks; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists, first, in a deflecting-plate and inner casing so formed and arranged in respect to the inner pipe and outer casing of a locomotive-stack, that the steam and products of combustion from the pipe will be directed first to the lower part of the stack, and then to the top of the latter, a uniform blast being thereby produced; secondly, in certain plates and an inner casing, formed and arranged substantially as described hereinafter, to arrest the sparks and prevent their escape from the stack.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a vertical section of my improved locomotive-stack, and Fig. 2 a sectional plan on the line 1-2, Fig. 1.

A is the inside pipe, which is secured to the locomotive in the usual manner, and is surrounded by a funnel-shaped casing, B, at the upper end of which is a vertical flange, *a*. The casing B is closed at the lower end, and to the top of the flange *a* is secured a plate, C, in the center of which is a circular opening, *b*, and round the edge of the latter extends a flange, *d*, for a purpose described hereinafter. Within the casing B, and surrounding the pipe A, is a funnel-shaped inner casing, D, open at its lower end, and having at the top a vertical flange, *e*, the latter being attached to the outer casing by stays *f*, the lower end of the casing D being connected to the pipe A by stays *g*.

The stacks heretofore used have been so constructed that a partial vacuum is formed within the stack after each discharge of the steam from the exhaust-pipes, the tendency of the vacuum thus formed being, for an instant, to greatly increase the draft, which, therefore, instead of continuing in an uniform current, consists of an irregular succession of puffs at greater or less intervals, as the speed of the engine diminishes or increases, the fire being caused to burn away more quickly in

some places than at others, creating sparks in such quantities that it is impossible to prevent large numbers from escaping from the stack.

In my improved stack the steam and products of combustion from the pipe A will be thrown against the under side of the plate E, and will be deflected downward by the latter until they strike the inner side of the casing D. Between this casing and the pipe A they will continue to pass downward and through the bottom of the casing, then upward (as shown by the arrows) between the casings D and B into the upper part of the stack, from which they escape through the opening between the plate E and the lower edge of the flange *d*, passing thence out of the stack through the opening *b*.

It will thus be seen that the steam and products of combustion, after escaping from the pipe A, are first carried to the lower part of the stack, and thence to the top, and that such particles of dust or sparks as may be thrown from the pipe A will be deflected downward by the plate E and deposited in the lower part of the stack, or will be carried upward between the casings B and D to the upper part of the stack, from which they will fall after striking against the top plate, C, on the flange *d*. I have found by experiment, however, that with a stack constructed in the manner above described but few sparks are produced, the steam and products of combustion being retained within the stack for such a length of time after their escape from the pipe A, that a uniform draft is created, the fire burning regularly over its entire surface, and giving off but few sparks.

I claim as my invention and desire to secure by Letters Patent—

1. The curved deflecting-plate E, and inner funnel shaped casing, D, arranged in respect to the inside pipe, A, and outer casing, B, substantially as and for the purpose specified.

2. The plate E, inner casing, D, and plate C, with its flange *d*, arranged in respect to each other and the inner pipe and outer casing substantially, as set forth, for the purpose described.

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

Witnesses: SETH HAM.  
CHARLES E. FOSTER,  
JOHN WHITE.