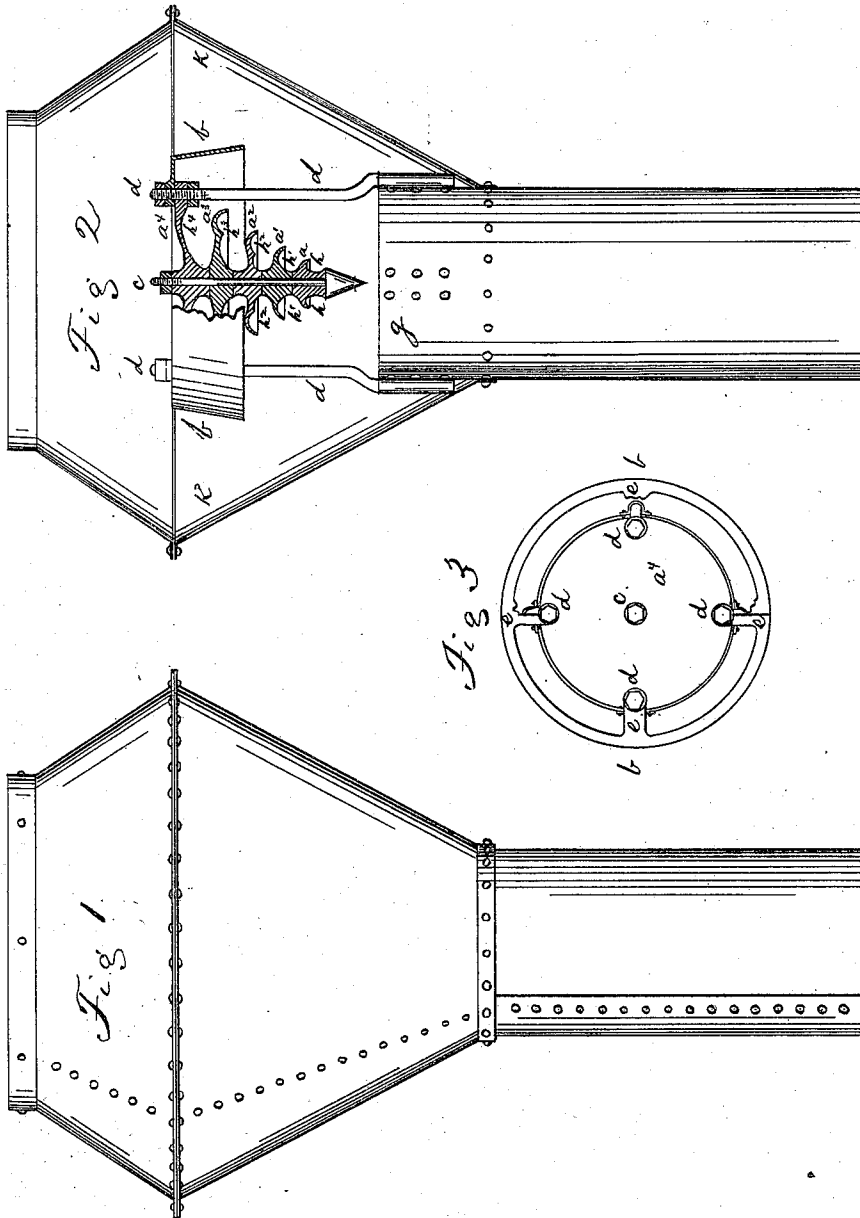


J. MACKENZIE.
LOCOMOTIVE SMOKE-STACK.

No. 173,412.

Patented Feb. 15 1876.



Witnesses
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JOHN MACKENZIE, OF HANNIBAL, MISSOURI.

IMPROVEMENT IN LOCOMOTIVE SMOKE-STACKS.

Specification forming part of Letters Patent No. **173,412**, dated February 15, 1876; application filed July 23, 1875.

To all whom it may concern:

Be it known that I, JOHN MACKENZIE, of the city of Hannibal, county of Marion and State of Missouri, have invented a new and useful Improvement in Smoke-Stacks for Locomotive Engine-Boilers; and I hereby declare that the following is a full, clear, and exact description and specification of the same, referring to the annexed drawings making part of the same.

The object of my improvements is to detain and beat up the lumps of ignited coal and sparks, which pass from the boiler-furnace of a locomotive-engine through the tubes so that they may leave the smoke-stack in a fine powder, and not hot enough to set fire to surrounding objects, and at the same time save the wear of the sides of the stack by preventing the sparks from striking against them, when the cone deflects the sparks from the center to the circumference under the influence of the exhaust-blast of the engine.

My invention consists, first, in a new spark-cone, composed of concentric disks of different diameters, placed one above another, so that their circumferences shall lie substantially in the periphery of a cone, with its apex inverted or pointing downward, each disk being cupped out on its under face by a circular groove near the outer edge thereof, for the purpose of checking and returning the sparks as they strike the lower surface of the disk, the curve directing them inward and downward toward the top of the disk, immediately below, and thus beating them to a fine powder before they pass from the stack.

Second, my invention consists in constructing the cone in separate disks cast in pieces, and held together on a central bolt, the upper disk being supported in the stack by bars or stays, and the bolt holding the lower disks suspended from the upper one.

Thirdly, my invention consists in the combination of a circular conical deflector with the stack and a cone, to prevent the sparks from striking the sides of the stack, and to compel them to pass between the cone and its inner surface in leaving the stack.

In order that persons skilled in the art may understand, make, and use my improvements, I will proceed to describe the construction I have adopted, referring to the annexed drawings, in which—

Figure 1 represents the exterior of the stack. Fig. 2 represents a vertical central section of the same. Fig. 3 is a top view of deflector and cone.

$a^1 a^2 a^3 a^4$ are the disks of the cone, held together by a central vertical bolt-rod, c , and the series composing the cone is supported in the smoke-stack k by the stays $d d d d$ attached to the stack below, and to the upper disk a at the top. The deflector b is also supported by the stays d , by means of the ears $e e e e$, which project inwardly from the upper edge of the deflector, and over the upper surface of the upper disk, leaving a space between the deflector and the circumference of the disk. These ears are punched with small holes, through which the bolts or stays d pass, and are held down by nuts.

The deflector b is conical, the larger diameter being at the lower edge, so as to guide the blast and sparks toward the center of the stack, and into the space between it and the cone.

The sparks are thrown by the blast up the straight portion of the stack g , and against the under surfaces of the disks, and into the cupped recesses $h h^1 h^2 h^3 h^4$. The recesses being curved the sparks are thrown in toward the center, and then downward toward the top of the lower disk. Those which strike the lower disk are sent toward the next disk above, when the same action is again repeated until they pass, broken, up through the deflector, and out of the stack.

My improved cone is much superior to those now in use, and effectually beats up the sparks before leaving the stack.

The sectional construction of my cone enables me to introduce a new disk when one is worn out, and thus save time and expense for repairs.

The combination of a cone with the stack and deflector enables me to use much lighter iron in the stack, as the constant wear of

the sparks against the sides of the stack, when the deflector is not used, soon renders it necessary to replace the upper portion of the stack.

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

The spark-cone for locomotive smoke-stacks, made up of parallel disks, with their under sur-

faces recessed out near their outer edges to return the sparks, as set forth.

JOHN MACKENZIE.

Witnesses:

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