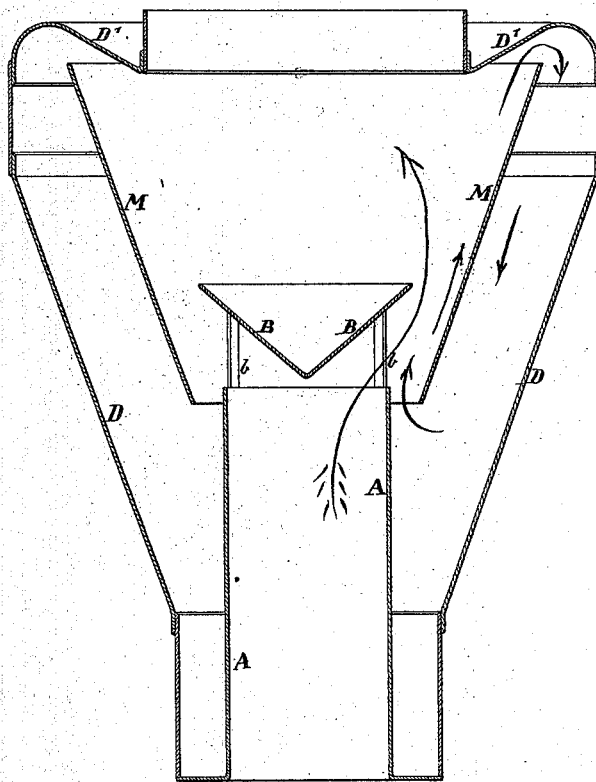


*J. G. Armstrong,*

*Spark Arrester.*

*No. 112,310.*

*Patented Mar. 7, 1871.*



Witnesses,

*A. Hoermann.*

*C. C. Livings.*

Inventor,

*J. G. Armstrong*  
*By his atty J. H. Stetson*

# UNITED STATES PATENT OFFICE.

JOSEPH G. ARMSTRONG, OF NEW BRUNSWICK, NEW JERSEY.

## IMPROVEMENT IN LOCOMOTIVE SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **112,310**, dated March 7, 1871.

*To all whom it may concern:*

Be it known that I, JOSEPH G. ARMSTRONG, of New Brunswick, county of Middlesex, in the State of New Jersey, have invented certain new and useful Improvements in Spark-Arresters for Locomotive and other Boilers; and I do hereby declare that the following is a full and exact description of the same.

My invention provides for throwing the sparks toward the periphery of the casing. There is an inverted conical casing mounted a little within the main casing, so that the current of gases circulates down the exterior face and up the interior face. This intermediate casing is open both at the top and bottom, so that the air or gaseous products of combustion with which the sparks are interspersed can move freely outward at the upper edge and inward at the lower edge; and the sparks may revolve in this manner upward and outward several times without much chance of being drawn inward again so far as to escape with the smoke. They are certain, on the contrary, to be deposited sooner or later in the angular chamber provided for them around the base of the stack.

In ordinary practice the sparks will rarely, if ever, rise again after coming down the exterior of the casing; but the gas which accompanies them will move inward across the bottom of the interior casing, and will rise with the current which rises on the inside.

I will proceed to describe what I consider the best means of carrying out my invention.

The accompanying drawing forms a part of this specification, and is a central vertical section through my improved spark-arrester detached from the locomotive, portable engine, or other boiler on which it may be used.

A is the ordinary cylindrical smoke-pipe. B is a conical deflector or director, mounted in an inverted position over the center of A, and supported by slender rods *b*. M is the intermediate conical casing or conductor, open at the top and bottom, to which I have referred. It is supported firmly in its place by rods or stay-bolts. (Not represented.) It is an intermediate position between the central pipe, A, and the exterior casing, D. This latter is clearly represented in the drawing. It provides an annular chamber around the base, in which the sparks and soot may lodge with or-

dinary hand-holes, (not represented,) to provide for clearing it out at intervals. Its lower portion is cylindrical; its middle height is conical. Above this it extends for a short distance cylindrical.

Above this is the arrester D', made in a separate piece, in the form of an inverted conical ring. Its function is to convey the sparks outward and deflect them downward outside of the casing M. Its center is extended upward a short distance cylindrically, as represented, and its exterior edge is curved downward to form a suitable junction with the upper edge of the outer casing, D, all as shown. There is no need of any netting over its top.

The smoke passes up the pipe A either steadily or in jets, and is deflected outward in all directions by the conical director B. After passing this latter the principal portion of the gaseous matter curves inward again toward the axial line, and pours out through an ample space in the center of the top; but the pieces of coal, soot, or the like solid matter, called generally by the collective name of "sparks," being more dense, are not so easily deflected inward by the draft. They continue their diverging motion, accompanied by a small portion of the gaseous matter, and flow upward to the upper edge of the casing M. Here they are arrested and again deflected outward by the arrester D', which is a conical casing fitted on the structure, and are thus compelled to move outward across the top of the casing M. The whole of the matter thus deflected, including all the solid sparks and a little gaseous matter, descends through the space between the casing M and the exterior casing, D, gradually separating. The sparks move down against the outer wall, and the gases move down against the inner wall of the space. The sparks continue to descend until they are deposited with the previously-collected sparks in the bottom of the chamber, and the gas turns inward and moves upward past the inner edge of the casing M.

My device is cheap to construct, involves little weight or complication, and is very effective as a spark-arrester. None are thrown out, while less resistance is offered to the escape of gas than by any other spark-arrester within my knowledge.

I will explain some further points to which

I attach importance, but have not considered them necessary to be shown in the drawing. One is the adjustability of the central director, B, up and down. I make the rods *b* to extend down on the outside of the pipe A, and secure them by bolts passing through long slots. By slackening these bolts, and again tightening them after raising or lowering the director, I can find, by a few trials, which is the best elevation for any given degree of coning form or for any given size of apparatus. It is desired to hold it so low as to be certain to throw the sparks outward under the arrester D'. Another point is the provision for obtaining ready access to the interior work generally. I rivet most of the joints; but the joint around the top, between the cylindrical part of the exterior casing and the part which I have marked D', is made by bolts and nuts, arranged preferably with the nuts outside.

It is a trifling labor to liberate and lift off the whole top and make any adjustment or repairs on the interior, and to return the parts and secure them firmly to their places.

The space between the casings M and D should be quite wide, so as to allow the gases to travel moderately in their descent between them, and thus better allow the sparks to fall

to the lower and outer side of the descending current.

I claim as my invention—

1. The spark-arrester herein described, having a wide space between the internal casing, M, and the outer casing, D, with provision, as specified, for inducing a descending current therein and throwing down the sparks, while the gases without sparks are drawn inward at the base of the casing M and carried upward again, as set forth.

2. The simply conical director or spreader B, turning the ascending current outward without turning it downward, when arranged as represented relatively to the casings M and D and to the top piece, D', the latter being formed as shown, to arrest and smoothly turn into the space between M and D the outer portion of the current rising near the axial line of the structure, as set forth.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

JOSEPH G. ARMSTRONG.

Witnesses:

THOMAS D. STETSON,

C. C. LIVINGS.