W. S. HUDSON.

SPARK ARRESTER.

No. 186,345. Patented Jan. 16, 1877.

Fig: 1.

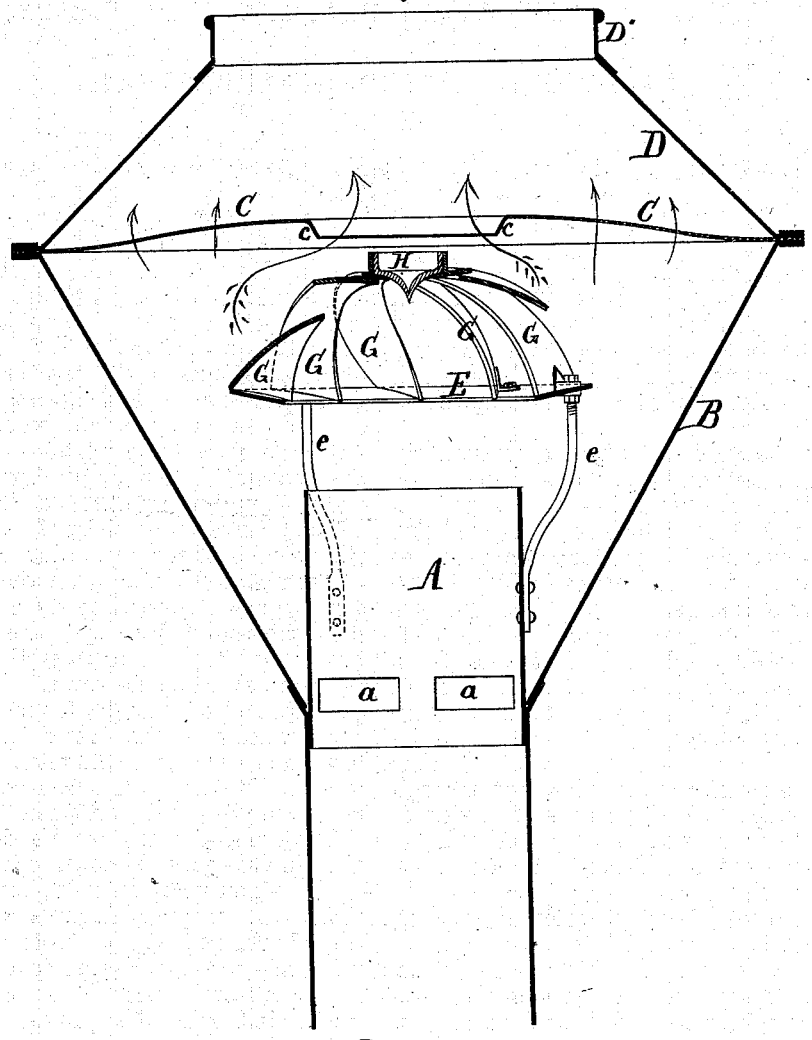
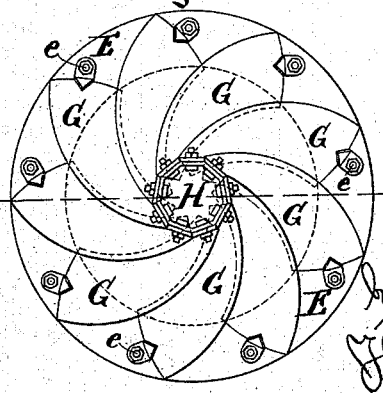


Fig: 2.



Witnesses:

A. Henry Gentner

C. C. Stetson.

Inventor:

W. S. Hudson

by his attorney

Thomas D. Stetson

New York.

UNITED STATES PATENT OFFICE.

WILLIAM S. HUDSON, OF PATERSON, NEW JERSEY.

IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **186,345**, dated January 16, 1877; application filed October 27, 1876.

To all whom it may concern:

Be it known that I, WILLIAM S. HUDSON, of Paterson, Passaic county, in the State of New Jersey, have invented certain new and useful Improvements relating to Spark-Arresters, of which the following is a specification:

My invention is designed more particularly for the chimneys of locomotives; but it may be available for other chimneys. I will describe it as used on a locomotive. It allows of being constructed with great lightness, yet substantially, and with great facility for alterations and repairs. In its most complete form it allows unusual freedom for the draft in kindling a fire, and in standing at stations.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a central vertical section through the entire stack, and Fig. 2 is a plan view of the central portion with the top removed.

Similar letters of reference indicate like parts in all the figures.

A is the internal chimney, or chimney proper, formed with holes *a;* and B is the flaring outside chimney, which performs its usual function of providing a liberal space, and of conducting the solid particles downward and introducing them again through the holes *a*. C is a strainer or netting of wire-gauze, in a slightly-crowning annular form, a rim, *c*, being turned down to form a hanging lip around the central opening. D is the ordinary contraction above the strainer, and D′ an ordinary top rim. Braces *e*, threaded near the top and equipped with nuts and beveled washers, as shown, support a ring, E, having a slightly-dishing or inverted conical form, and of an internal diameter a little greater than the chimney A. H is a small casting, mounted centrally over this ring, presenting a conical point downward, and a hollow main body above. G G, &c., are peculiarly-curved screw-blades, each secured by a bolt to the ring E at the bottom, and to the casting H at the top. The gaseous products of combustion, mingled with more or less small masses of coal in various conditions, are thrown violently upward through the cylindrical chimney A, and, striking in the hollow interior of the dome-like set of wings G, are thrown into a spiral motion without completely interrupting their upward motion. The solid matter is projected against the strainer C. A portion of the gaseous matter follows the same course, and another portion (and when the draft is moderate the greater portion) moves inward, and, passing under the lip *c*, moves freely upward through the open space in the center.

The sparks arrested by the strainer follow the obvious course, dropping downward and moving inward through the apertures *a*, to be again thrown upward by the current, and repeat the round until they are burned up or broken so small as to pass the strainer and be borne away by the draft.

In case of a necessity for repairs or alterations, taking off the nuts from the rods *e* allows the entire dome-like set of wings to be removed. If any blade burns out or otherwise fails it can be readily replaced.

The dome-like form of the set of wings, by allowing the gases to rise into it and move outward, not only horizontally, but also upward, and with varying degrees of inclination, spreads the gaseous products and the sparks uniformly through a large space. The distribution is from a spheroid instead of, as usual, from a disk or from a cylinder.

The ring E is dishing, to accommodate the escape of a portion of the products of combustion under the dome when there is a very strong current. That portion which, being retarded by the slow escape of the gases from the dome, is held back and deflected outward by the ring, is left without any spiral motion. Its motion is simply radial and slightly outward. The sparks thus deflected will be thrown against the outer casing B, and the pure gases will rise with more freedom than if a spiral motion had been imparted.

The hanging lip *c* tends to arrest sparks which, under the strong draft, strike the lower surface of the strainer and travel inwardly thereon. The open space within the lip is particularly useful in kindling fires when the draft is very moderate. The retardation due to a completely-closed strainer is thus a serious disadvantage. My open space allows a sufficiently free exit from the small quantity

of gases then passing, while the construction is also adapted to successfully work when the locomotive is performing with its fullest vigor, as in hauling a heavy train up a long incline.

By making the screw-blades G in the curved form represented, so that their aggregation forms a dome-like structure, with the gases and steam being received in the open base and thrown outward from a dome-like surface, I am able to make the distribution approximately equal over a large area with little weight or cost of apparatus. Making it stationary obviously compels a more tangential motion of the gases passing through it than where it is allowed to revolve.

I claim as my invention—

In combination with a locomotive-stack having an inside and outside chimney and suitable strainer, as specified, the series of stationary curved blades G, arranged to form a dome-like deflecting-screw, as and for the purposes herein specified.

In testimony whereof I have hereunto set my hand this 26th day of October, 1876, in the presence of two subscribing witnesses.

WM. S. HUDSON.

Witnesses:

A. HENRY GENTNER,

PHILLIPS ABBOTT.