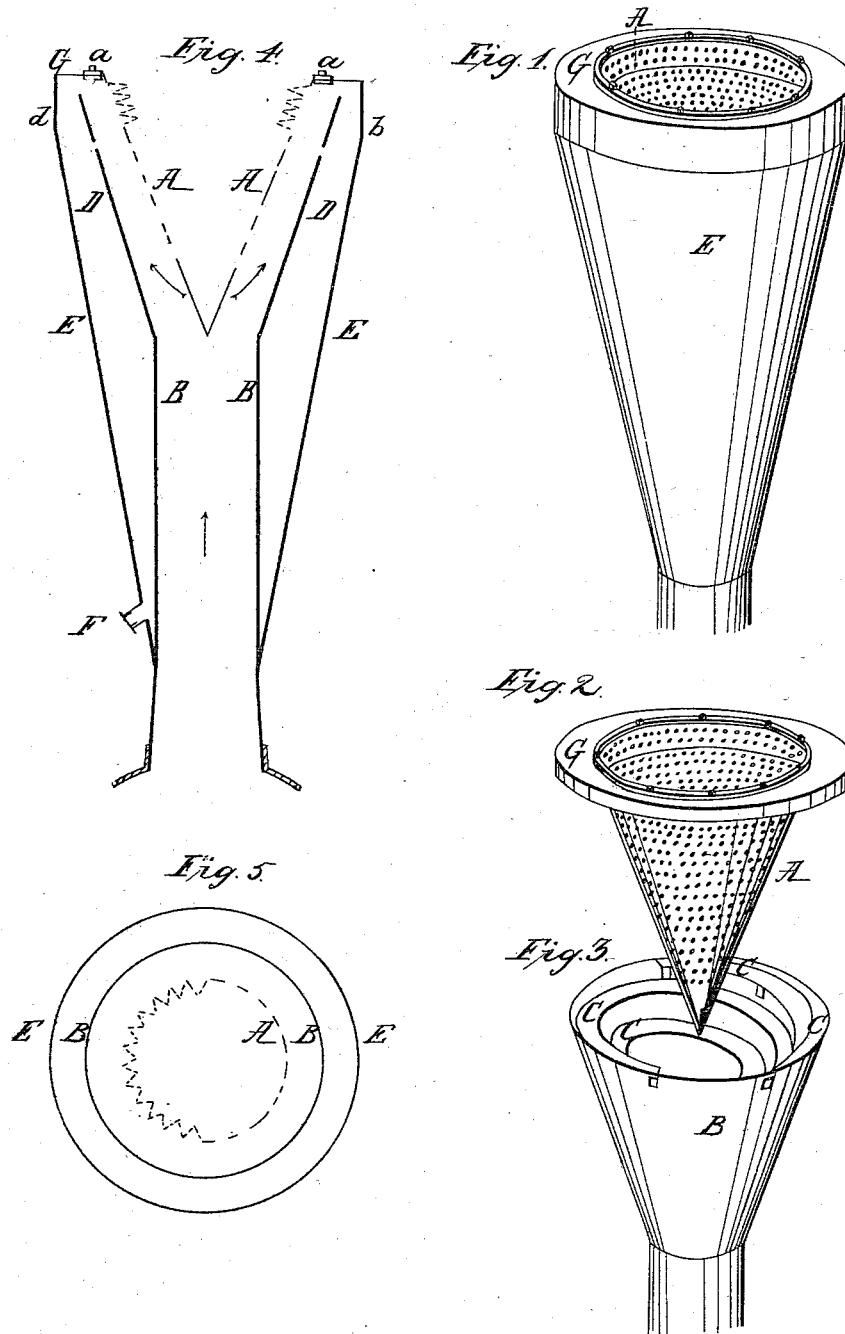


W. C. GRIMES.
SPARK ARRESTER.

No. 4,046.

Patented May 13, 1845.



UNITED STATES PATENT OFFICE.

WILLIAM C. GRIMES, OF PHILADELPHIA, PENNSYLVANIA.

SPARK-ARRESTER.

Specification of Letters Patent No. 4,046, dated May 13, 1845; Antedated January 1, 1845.

To all whom it may concern:

Be it known that I, WM. C. GRIMES, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in the Construction of Spark-Arresters; and I do hereby declare that the following is a full and exact description thereof.

To arrest, and separate the coals, sparks, and ignited particles, from the gaseous current that rushes from the chimneys of locomotive steam engines, various methods have been contrived, and numerous devices essayed, the best of which however have been but partially successful. Screens formed of woven wire or perforated plates of sheet metal have been most generally employed and when so arranged as to present a sufficiently extended surface have partially answered the purpose and have been generally adopted. But when used as mere screens, or in the absence of any other device, it is only the larger or coarser particles that are retained, as the meshes or perforations to prevent being choked with soot or bituminous matter, are made of a size that allows a dangerous shower of fire to escape.

In my improved spark arrester though a screen or perforated surface is used, it is so formed and combined with a spiral thread, or segments of a spiral thread or threads within the chimney, that the smoke, steam, &c., are made to revolve spirally as they ascend the chimney, and thereby exert a centrifugal force which becomes the principal agent in separating the sparks or other solid particles from the gaseous fluid. Hence no particle however minute escapes the action of the force employed to separate them from the gaseous current. The arrangement of parts by which I obtain this end may be variously modified but the arrangement now to be described, consists in placing an inverted perforated cone A in the upper part of the chimney B. That part of the chimney corresponding in form with the inverted cone. Within this part of the chimney I place a broad spiral thread or segments of threads C, C, formed of sheet iron or other material. These are attached firmly to its inner surface, and when continuous, it somewhat resembles the Archimedean screw. It commences at the lower part of the inverted cone, or that of the funnel part of the chimney, and reaches

near to the top, traversing through the space or chamber between the walls of the chimney and the perforated cone or screen. The thread or threads at first rise nearly vertical or parallel with the axis of the chimney, but soon decline and become more and more horizontal or divergent as the chimney widens, until at last it becomes very nearly horizontal. Thus one or more spiral flues are formed whereby the gaseous current and sparks as they ascend, are made to revolve around the perforated cone or central screen. The centrifugal force thus acquired, tends to throw all the sparks, ashes, &c., outward from the center and off the central screen, around which they spirally revolve, till reaching the top of the chimney or apertures made in the side of it, they fly off into an exterior space or chamber D, formed by the case or jacket E, that incloses the same. The outer case E, and the inverted cone A rise two or more inches above the chimney to leave the necessary space for the sparks to escape into the chamber D, where by their own gravity they fall to the bottom thereof. From this chamber they are discharged as occasion requires through the spout or opening F. A broad flat ring or cap G covers the space or chamber D, and connects the outer case with the inverted cone, or control screen, it being riveted to the former and attached by screws *a a* to the latter, a broad flanch being turned out upon the upper end of the cone for that purpose. The lower part of the cone is left imperforate, the better to resist the violent action of the exhaust steam against it.

In order to increase the area of the perforate surface and consequently the area of aperture (so essential in obtaining a good draft) I sometimes give to the surface of the cone a ridged or corrugated form the ridges and furrows running either longitudinally, or around the cone; when in the former direction, they resemble the plaits or folds of a lady's fan when half opened, as represented in the transverse section Figure 5.

When the grooves or folds run in the other direction the exterior appearance is that of a cone with deep sharp grooves or furrows turned into it, see longitudinal section Fig. 4, where the upper part of the cone has this form given to it.

The manner of making or forming such a grooved or corrugated cone or screen, is too

obvious to require much description. When the grooves are longitudinal it may be formed simply by folding the perforated sheet continuously back and forth after the manner of a fan as before stated. When the furrows or folds run around the cone it may be made up of a series of flat rings of the perforated sheet iron, these being made slightly convex are attached to each other by riveting alternately at their inner and outer edges.

In the drawings annexed, Fig. 1, is a perspective view of the chimney stack with a portion of the lower part removed. Fig. 2, is a perspective view of the inverted cone, as being raised out of the chimney, with the cap D and a portion of the exterior case attached to it. Fig. 3, is a perspective view of the chimney proper showing a part of the spiral threads as attached to the inner surface of the upper and enlarged part of the chimney. Fig. 4, is a vertical section through the center of the entire stack. Fig. 5, is a horizontal section of the same at, *d, d*.

Having thus fully shown and set forth the structure and principle of my improvement in spark arresters, I would further observe, that I do not mean to confine myself to the precise form or modification described, but intend to vary the same as experience may

suggest, so long as the principle of construction and mode of operation remains unchanged. I do not claim the perforated cone, or the spiral thread taken separately or individually as they have long been known. But the placing of a spiral thread within the chimney proper, and combining it with—so as to form spiral flues around—a perforated cone or screen, I verily believe to be features of novelty, as they are of utility.

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

The giving to the gaseous current a rotary motion around a central, conical, or other formed screen, by means of a spiral thread, or threads combined therewith, which traverse the chamber and form spiral flues around the same; whereby the sparks and other solid particles floating in the gaseous current acquire a centrifugal force, that throws them off through proper openings into an exterior chamber, while the gases escape through the central screen, as hereinbefore set forth.

WM. C. GRIMES.

Witnesses:

ARMON DAVIS,
WM. GANQUES.