

D. HAWKESWORTH & H. COLFORD.

SPARK-ARRESTER.

No. 177,833.

Patented May 23, 1876.

Fig. 1.

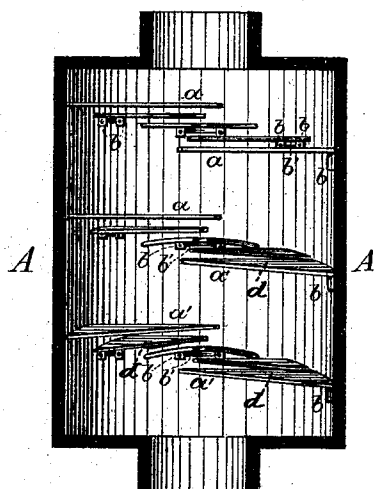


Fig. 2.

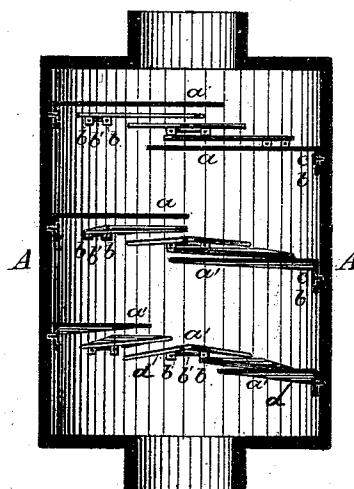


Fig. 3.



Fig. 4.



Fig. 5.



Attest:

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Daniel Hawkesworth and
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By Louis Bagger,
their Atty.

UNITED STATES PATENT OFFICE.

DANIEL HAWKESWORTH, OF DIGBY, AND HENRY COLFORD, OF HALIFAX,
CANADA.

IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **177,833**, dated May 23, 1876; application filed
April 22, 1876.

To all whom it may concern:

Be it known that we, DANIEL HAWKESWORTH, of Digby, and HENRY COLFORD, of Halifax, both in the Province of Nova Scotia and Dominion of Canada, have invented certain new and useful Improvements in Combined Spark-Arresters, Heaters, and Soot-Gatherers; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in the spark-arrester for which Letters Patent of the United States No. 166,870 were granted to Daniel Hawkesworth on the 17th day of August, 1875; and the said improvements consist in the combination, in the spark-arresting "stack" or "case," of one set of lower concave or bent plates with an upper set of flat plates, substantially in the manner and for the purpose hereinafter more fully described, and pointed out in the claim.

In the drawing, Figure 1 represents a longitudinal section of a spark-arrester showing this combination.

A is the exterior box or case, which may be of any suitable configuration, and *a* are the circumferentially and spirally arranged plates. Those plates in the lower part of the case A (denoted by *a'*) are bent so as to form concave recesses (denoted by *d*) at the under side, for the interception of soot and other solid products of combustion that are carried off by the draft. We continue these concave or bent plates only so high up in the drum or stack A as is necessary to intercept the solid matter which will be embedded in the cavities *d*; and above this set of bent plates we place a set of flat plates, similarly arranged, (denoted by *a*.)

By this arrangement we not only save material, (as it requires less material to make the flat than the bent plates,) but the draft is improved, because the flat plates in the upper part of the drum A do not offer the same resistance to the draft passing through as the bent plates in the lower part, which present a larger surface to the passing smoke or air.

The plates *a* and *a'* are fixed detachably to the inner sides of the drum or stack A by means of flanges *b*, affixed to the walls of the drum A, and projections *b'*, that fit into the flanges, or by equivalent devices, so that the plates may be readily removed whenever it is desired to clean them.

In Fig. 2 we have represented a modification of this combination of concave with flat plates. In this figure the lower concave plates do not reach to the axis of the drum A, within which they are placed, but increase in size upward, so as to overlap each other, until the upper set of flat plates are reached, which likewise increase in size, as shown in the drawing.

We prefer to use this construction in the smoke-stacks of locomotives burning Newcastle or other bituminous coal, this combination having the double advantage that the soot and all solid matter are intercepted by the lower bent plates *a'*, which are so short as not to offer any resistance to the jets of steam, while the upper long plates will effectually prevent the passage of any sparks that may pass by the lower short plates.

In Figs. 3, 4, and 5 we have shown various forms of the bent or concave plates used in combination with this invention. These plates may either be rounded or they may be bent at a sharp angle, the object being simply to provide a cavity or recess, *d*, on the under side, into which the soot and solid products of combustion may be deposited, and from which this may be readily removed, by a tool adapted to the purpose, after the

plates have been removed from the drum in which they are placed.

Having thus described our invention, we claim and desire to secure by Letters Patent of the United States—

In a spark-arrester, heater, or soot-gatherer, A, the combination of a lower set of removable concave or bent plates, *a'*, with an upper set of flat plates, *a*, both sets of plates being arranged circumferentially and spirally, substantially in the manner and for the purpose hereinbefore set forth.

In testimony that we claim the foregoing as

our own we have hereto affixed our signatures in presence of two witnesses:

DANIEL HAWKESWORTH.
HENRY COLFORD.

Witnesses to the signature of DANIEL HAWKESWORTH:

J. WM. ROOP,
W. H. AYMAR.

Witnesses to the signature of HENRY COLFORD:

FRED. H. BELL,
PATRICK J. QUIN.