

D. HAWKESWORTH & H. COLFORD.
 SPARK-ARRESTER, HEATER AND SOOT-GATHERER.
 No. 175,704. Patented April 4, 1876.

Fig. 1.

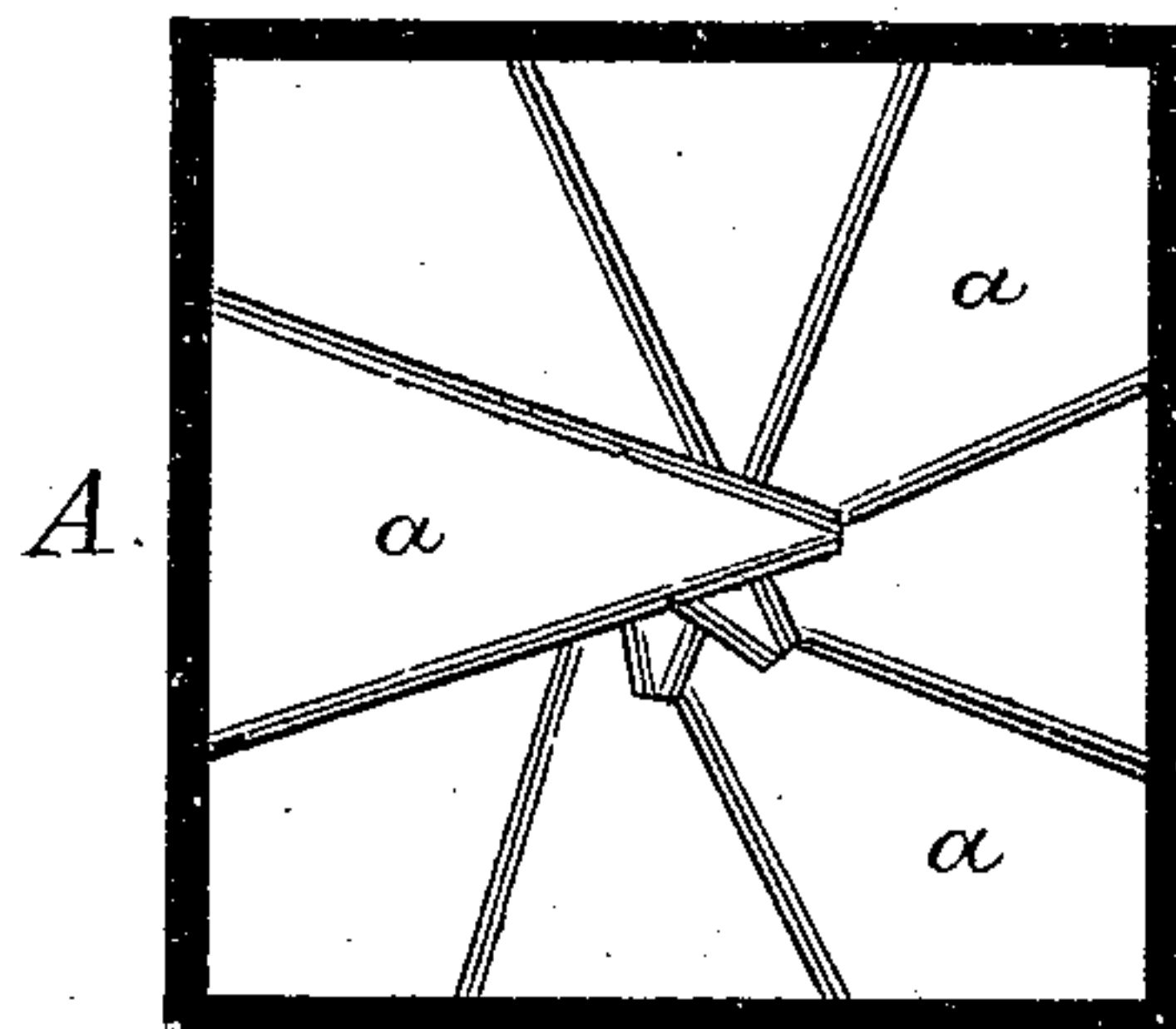


Fig. 2.

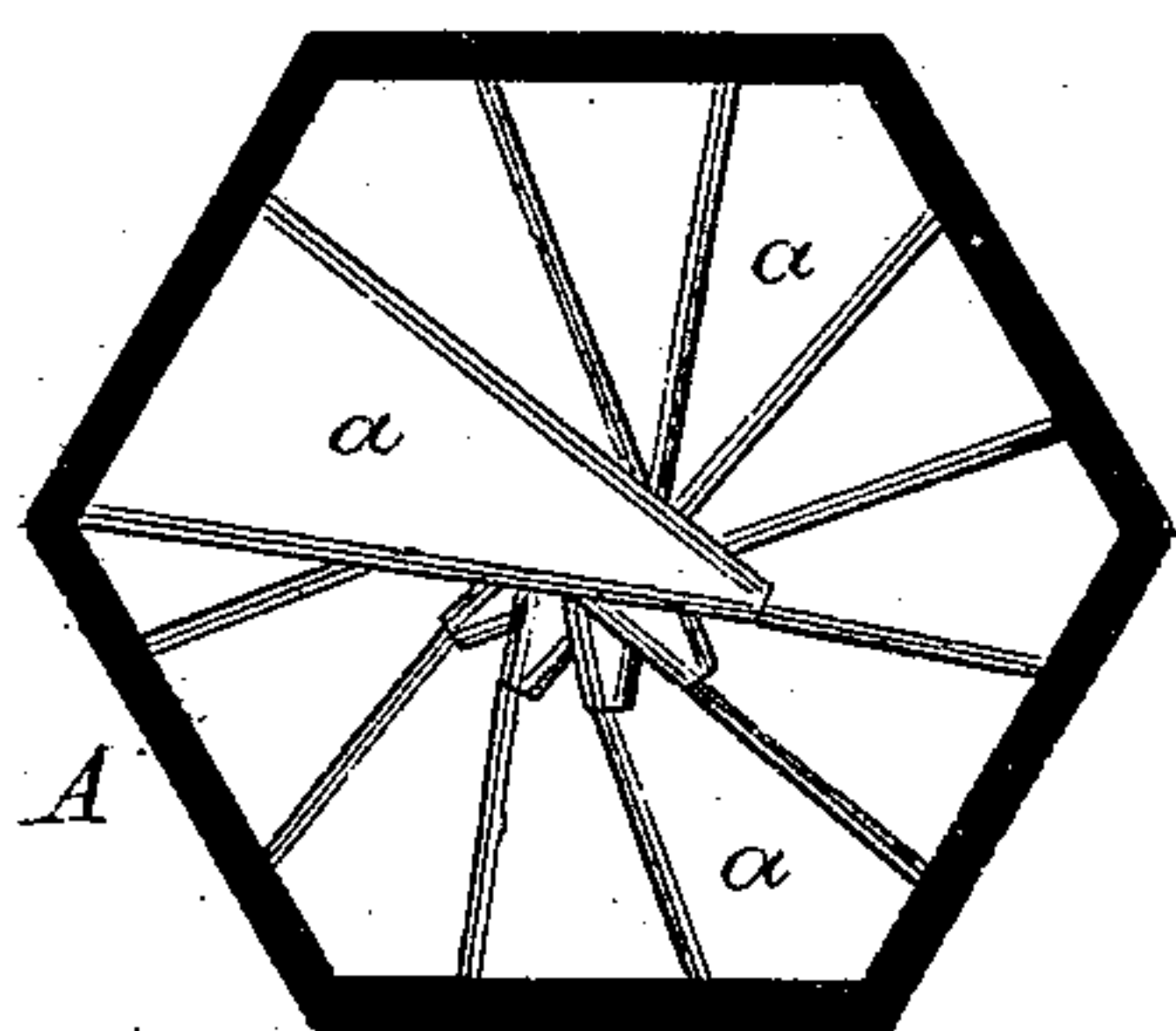


Fig. 3.

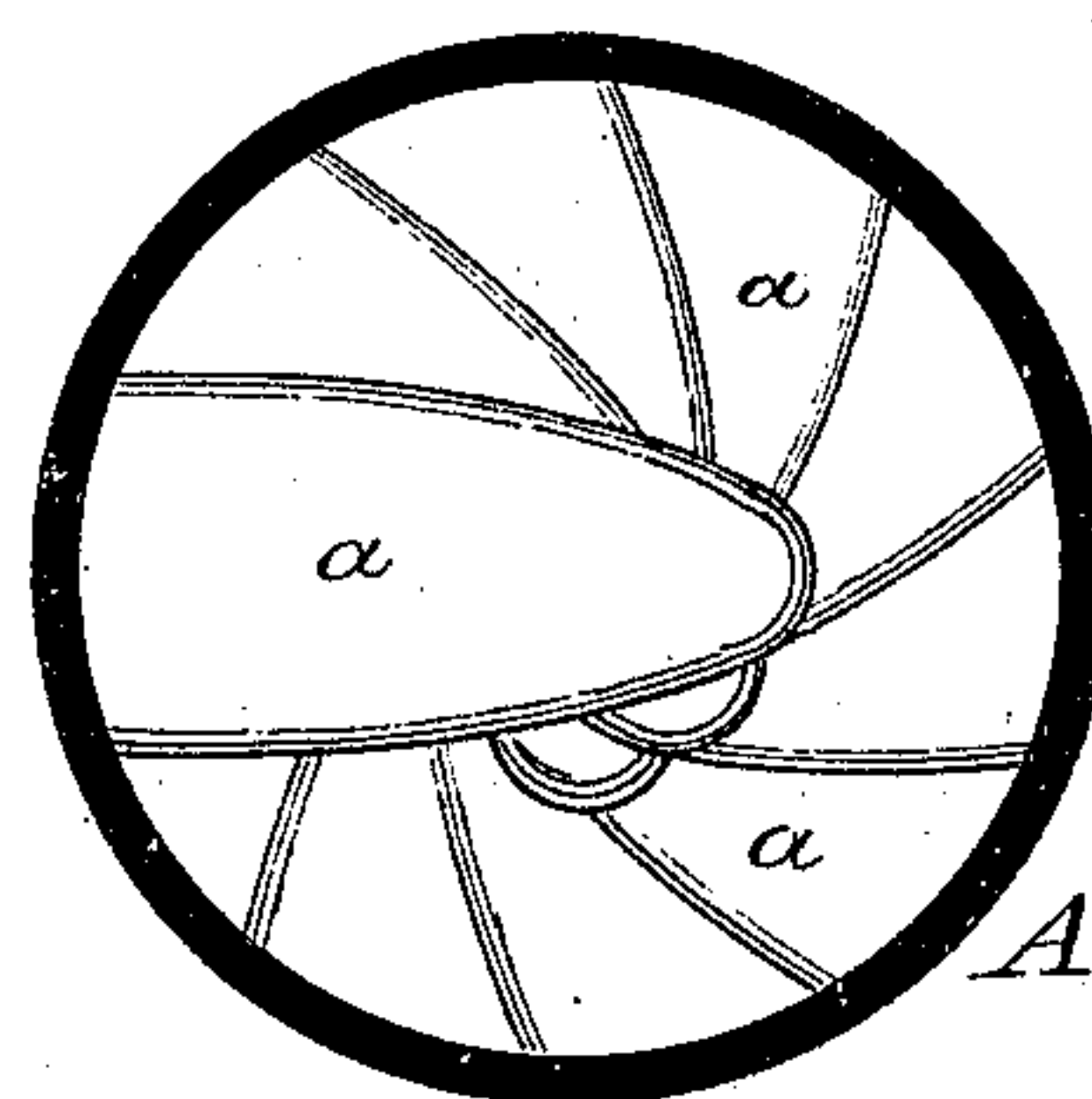


Fig. 4.

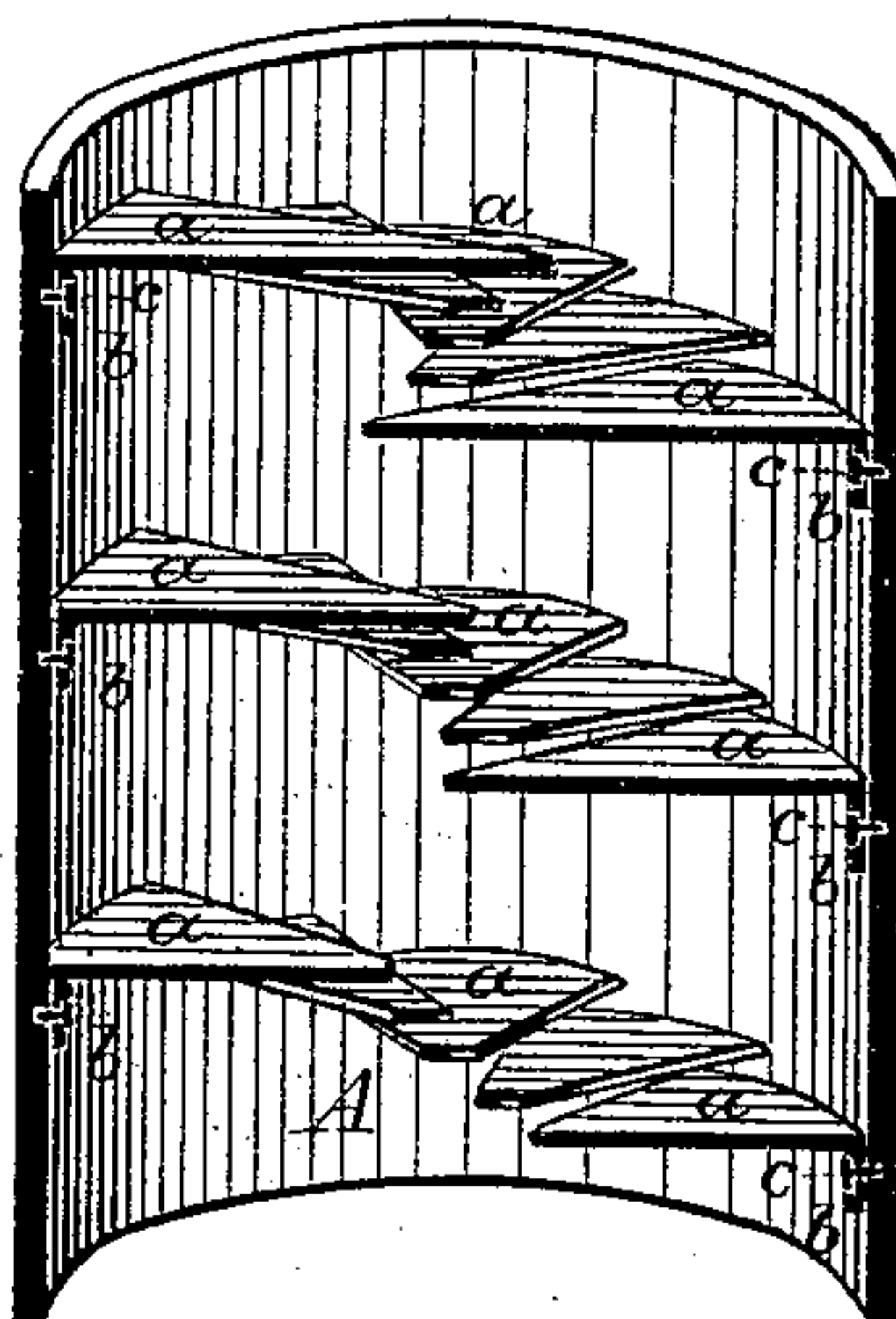
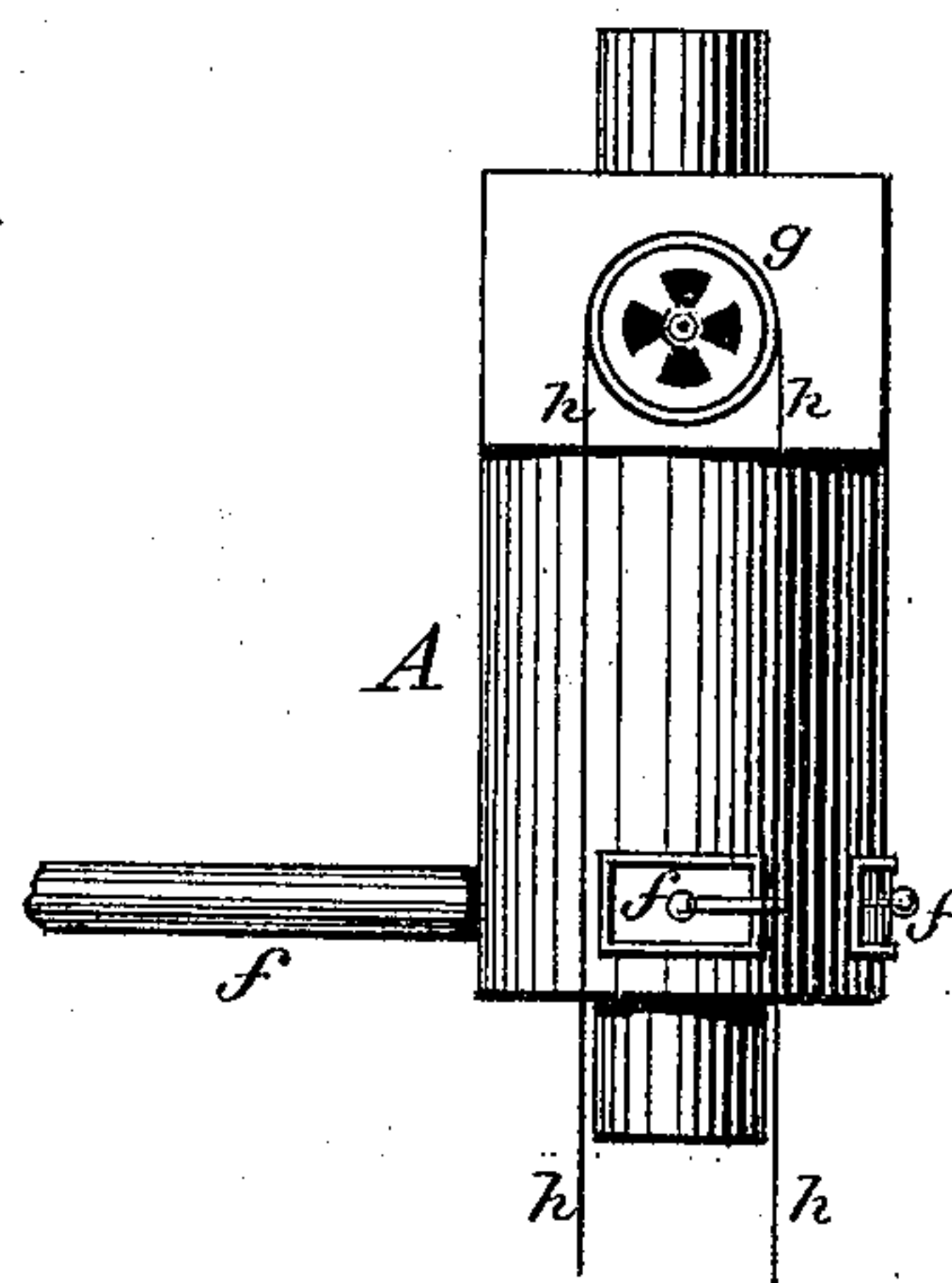
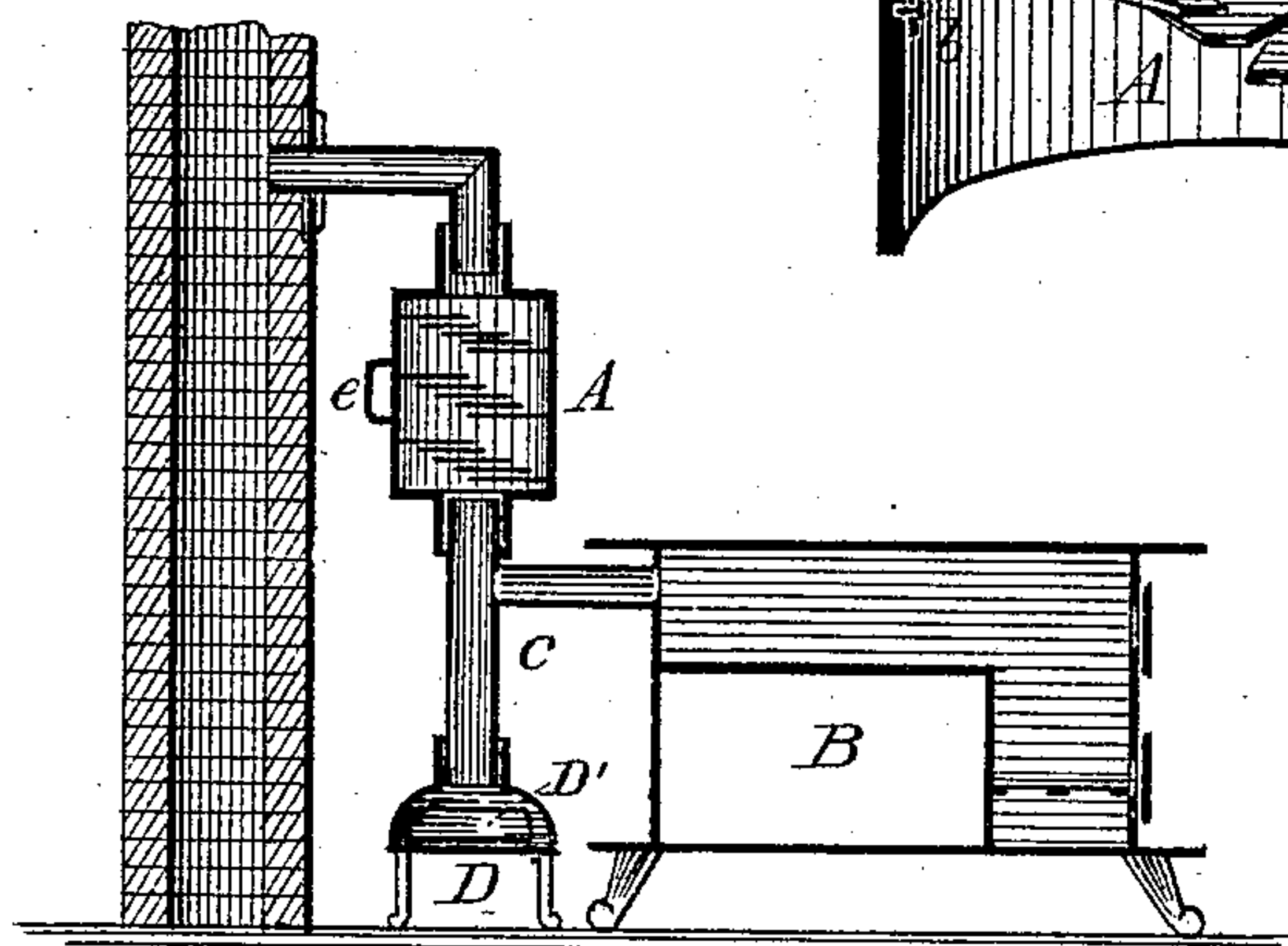


Fig. 5.



Attest:

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Daniel Hawkesworth and
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UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN SPARK-ARRESTERS, HEATERS, AND SOOT-GATHERERS.

Specification forming part of Letters Patent No. **175,704**, dated April 4, 1876; application filed
February 15, 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 Spark-Arresters, Heaters, and Soot-Gatherers combined; 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 certain modifications in the shape and construction of the invention as originally patented, by which it may be adapted to various other useful purposes, while, at the same time, its efficiency for the purpose for which it was originally intended may be increased by the addition of the improvements, as hereinafter described, and pointed out in the claims.

In Figure 1 on the drawings is represented a top view of a spark-arrester similar in construction to the one patented August 17, 1875, with the difference only that the plates *a* are arranged spirally within a square drum or box instead of a cylinder. Fig. 2 is a similar view of a spark-arrester, consisting of a hexagonal exterior tube or box having the plates *a* similarly arranged—that is, circumferentially and spirally with overlapping sides and points; and Fig. 3 represents a top plan of a cylinder with elliptical plates.

We have found by experiment that the configuration of the exterior drum or tube *A* may be varied to suit local conditions or architectural designs without affecting the operation of the invention, so that square or many-sided drums may be used as well as cylinders. We have also found that the shape of the interior plates is not material. Besides being made triangular they may be made elliptical, or of any

other suitable shape or outline. Nor is it essential that the plates should overlap each other at the points, although, for ordinary purposes, we prefer to use this construction as adding to the safety and aiding in the more perfect operation of the invention; but it is essential to the successful operation of this invention that the plates should be arranged spirally within the drum or box in such a manner as to overlap each other at the sides.

When this invention is to be adapted to the smoke-stacks of locomotives we prefer to arrange the plates as shown in the perspective sectional view, Fig. 4—that is, the plates *a* are shorter and narrower at the bottom *A'*, where the sparks and steam first meet the plates, gradually increasing in size toward the top. This is for the purpose of graduating the resistance to the steam and products of combustion, so that the draft will not be impaired by the escaping steam coming too suddenly or abruptly in contact with the flat surfaces of the lower plates.

In order to prevent soot from accumulating on the under sides of the plates, these are made detachable, as shown in Fig. 4. In this figure *b b* represent flanges or shoulder projecting from the interior walls of the drum or stack *A*, the plates *a* having projections which fit into the flanges *b b*, so that the plates may be readily removed, and again inserted after the soot has been scraped off. It sometimes becomes desirable to secure the plates, after they have been inserted, by means of set-screws *c*, or equivalent fastenings, to prevent their being loosened or blown out by the jets of escaping steam.

In Fig. 5 we have shown the application of this invention to a stove as a combined heater and soot-gatherer. *B* represents the stove, the pipe from which leads into a vertical pipe, *C*, which rests upon the soot-box *D*. The latter has a removable pan or reservoir, *D'*, and the drum *A* is affixed, removably, upon the pipe *C* in such a manner that it may readily be turned or shaken by means of the handle *e*, so as to shake the soot from off the plates within into the box *D* through the lower section of pipe *C*. Besides serving as a soot-gatherer, this device, when applied to stoves,

acts as a heater, the plates within delaying the passage of the heat. The heat imparted to these plates by the passing smoke will be communicated to the exterior drum A, so that nearly fifty per cent. of fuel may be saved in accomplishing the same results.

In Fig. 6 we have shown the manner in which this invention may be adapted as a ventilator. When used for this purpose the drum or smoke-box A is provided with doors *f* at the bottom, which communicate with flues or pipes that conduct the cold air from the outside. The air is heated in its passage through the drum, (or it may be heated by a furnace placed at some intermediate point between the outlet of the induct-pipes and the ventilator-drum,) and escapes at the top through a self-closing valve, *g*, operated by cords or chains *h*, by which the supply of fresh air may be regulated.

When used as a spark-arrester this device may be placed inside of the chimney, smoke-stack, or flue at any suitable point; or it may be placed upon the top of the chimney or smoke-stack in the usual manner. When used as a heater or soot-gatherer the drum or box containing the plates should be placed at some convenient point (preferably in an upright position) upon the pipe or flue leading from the stove into the chimney, substantially in the manner shown in Fig. 5. Whether used as a spark-arrester, heater, or soot-gatherer, this device effects a better combustion of fuel, it prevents too strong draft when the wind is high, thus serving as a draft-equalizer, and it may be readily applied to any ordinary chimney, smoke-stack, or stove at a comparatively

small outlay. When used as a spark-arrester this device will be found not only to effectually and absolutely prevent the escape of sparks, but the spiral or rotary motion imparted to the smoke by the circumferentially-arranged plates will improve the draft, so that this invention may be applied with advantage upon chimneys or flues that are defective in that respect. The drum or box A may be made of metal, earthenware, or any other suitable material.

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

1. In a spark-arrester, heater, or soot-gatherer, constructed substantially as hereinbefore described—that is, with a series of interior plates arranged circumferentially and spirally so as to overlap each other at the sides—the removable plates *a*, substantially in the manner and for the purpose herein shown and specified.

2. The combination of a smoke-stack or drum, A, with a system of circumferentially and spirally arranged plates that increase in size from the bottom upward, substantially in the manner and for the purpose herein shown and specified.

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:

HUGH MCD. HENRY,
P. J. COLFORD.