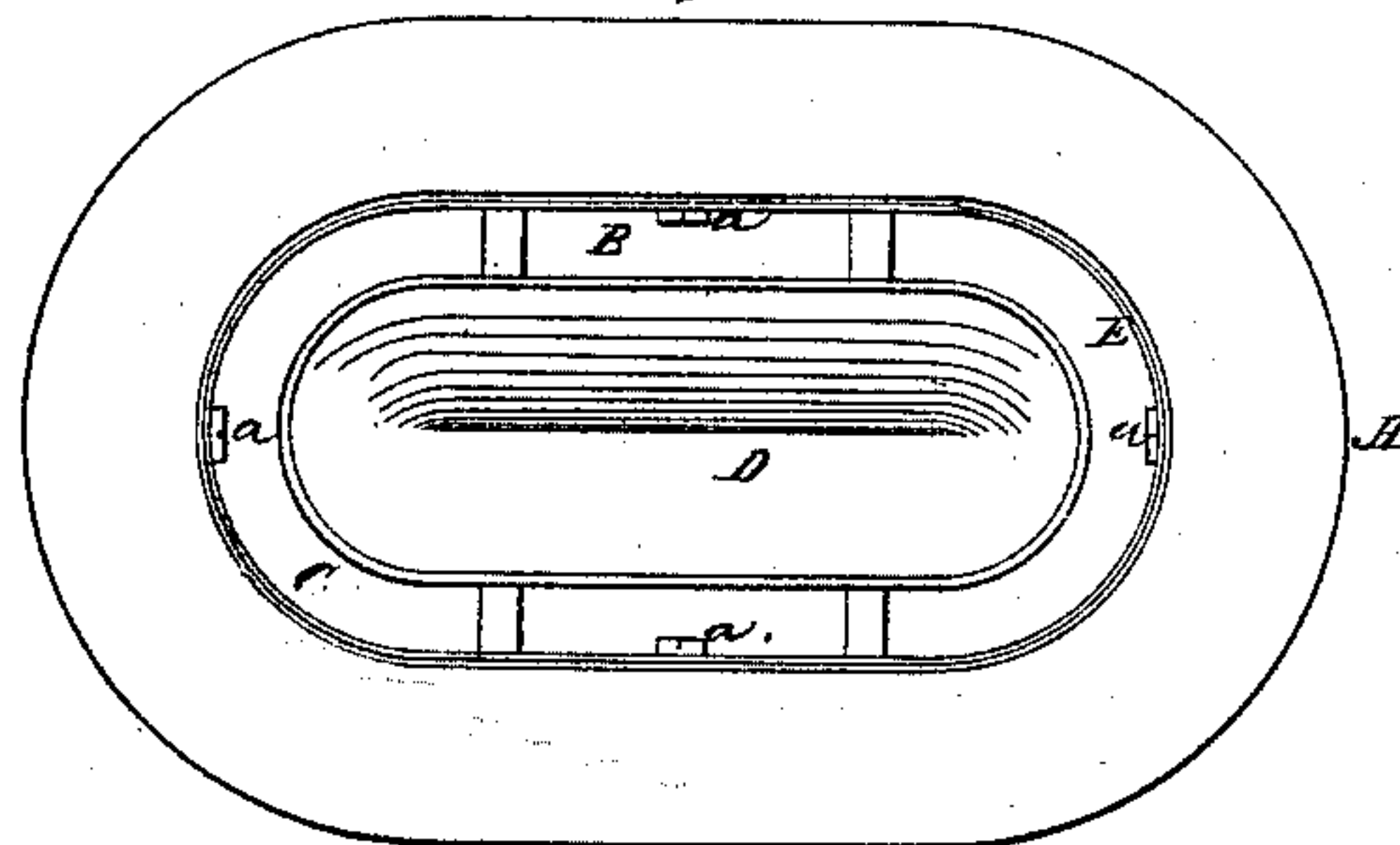
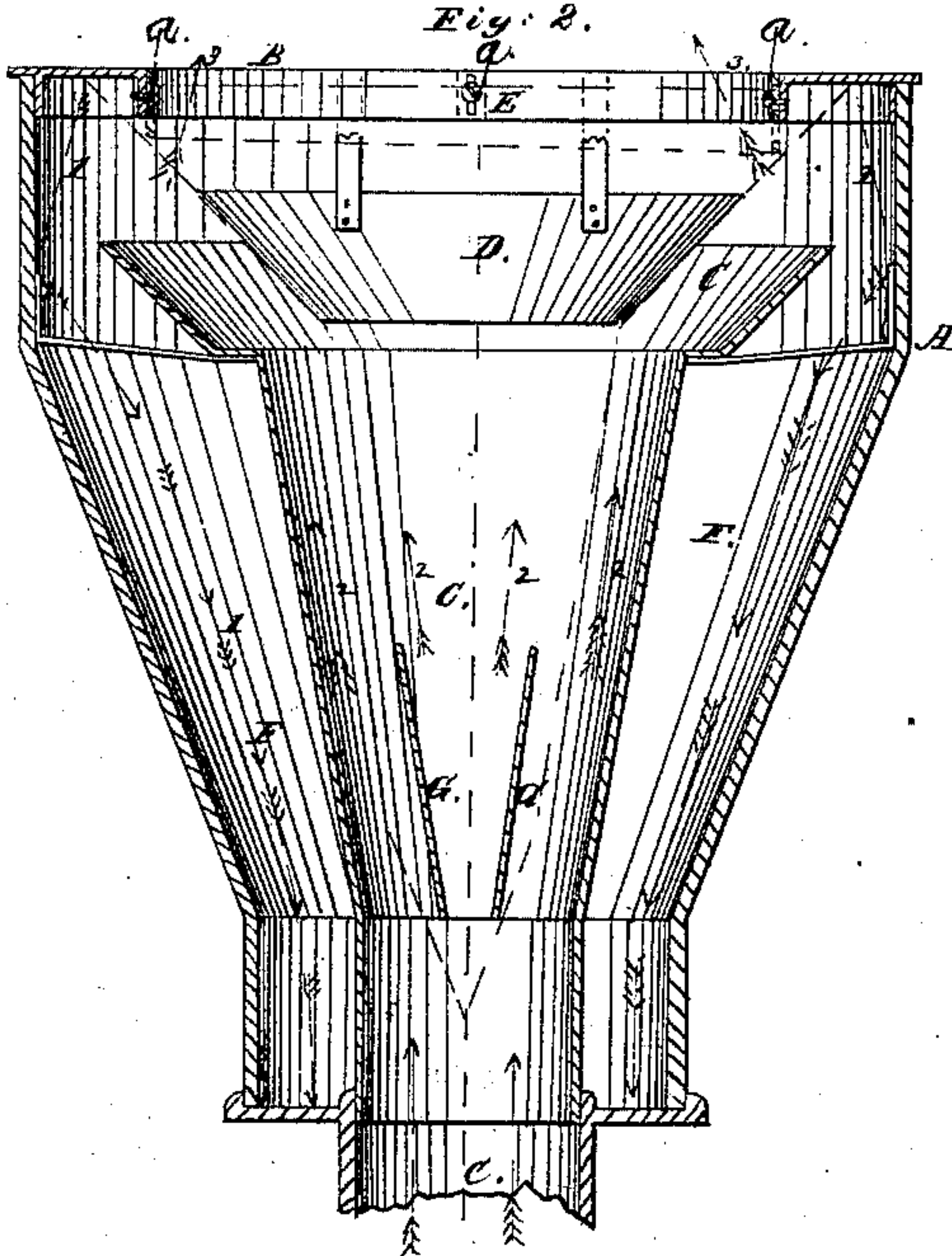


*Braer & Simonds,*  
*Spark Arrester,*  
*No 11,094,* *Patented June 13, 1854.*

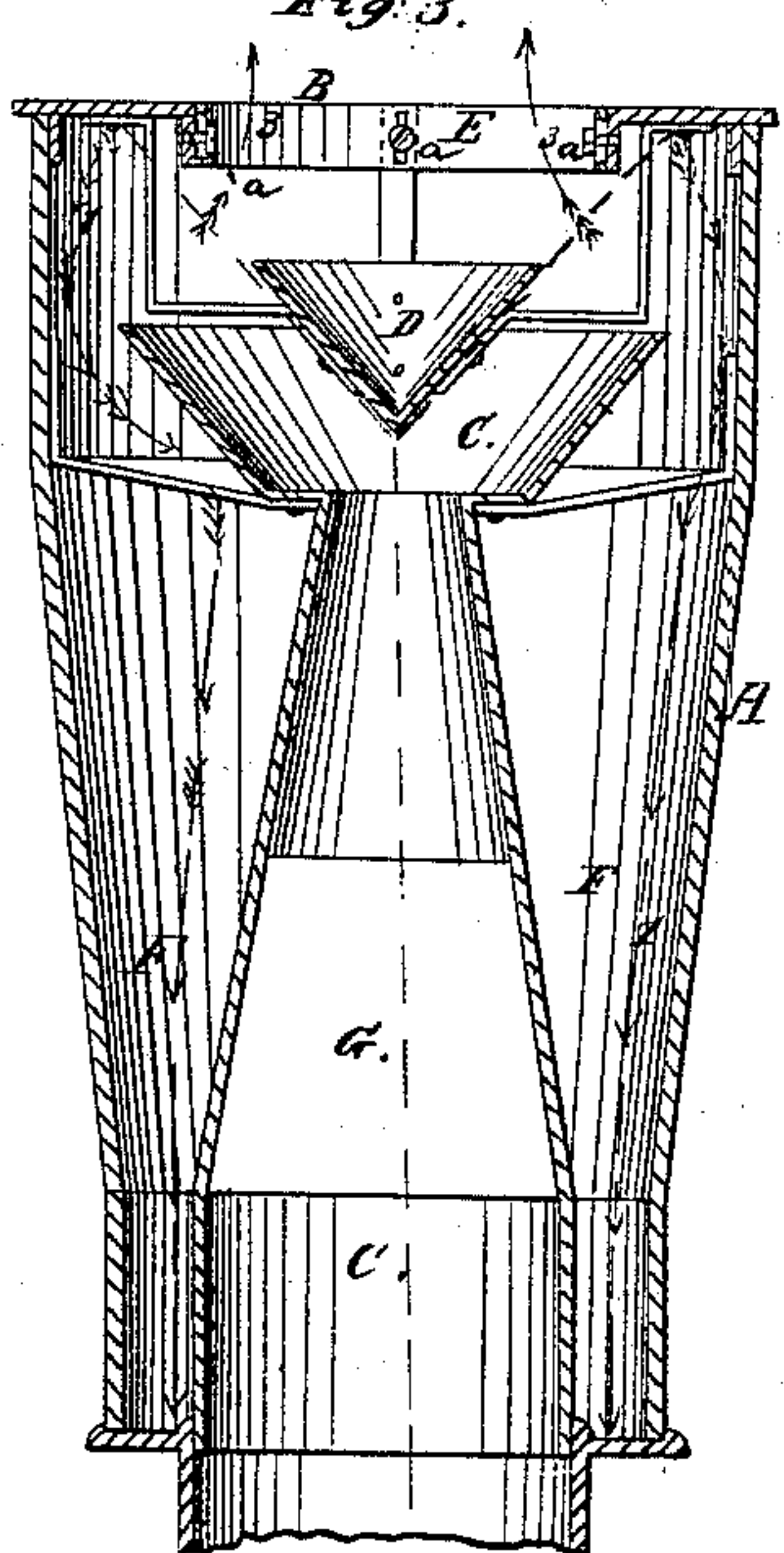
*Fig. 1*



*Fig. 2.*



*Fig. 3.*





# UNITED STATES PATENT OFFICE.

G. B. SIMONDS, OF NEW HAVEN, AND ABEL BREAER, OF SAUGATUCK, CONNECTICUT.

## SPARK-ARRESTER.

Specification of Letters Patent No. 11,094, dated June 13, 1854.

*To all whom it may concern:*

Be it known that we, G. B. SIMONDS, of New Haven, in the county of New Haven and State of Connecticut, and ABEL BREAER, of Saugatuck, in the county of Fairfield and State of Connecticut, have invented a new and Improved Spark-Arrester; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a plan or top view of one of our improved spark arresters. Fig. 2, is a vertical longitudinal section of the same. Fig. 3, is a vertical transverse section of the spark arrester.

Similar letters of reference in each of the several figures indicate corresponding parts. The nature of our invention consists in so arranging a conical deflector in the upper part of the case, and in relation to the flange which is around the draft opening, and extends down, inside, from the top of the case, that the exhaust steam will be made to act upon the sparks and force them into their chamber, and to form a screen between the inverted base of said cone and the lower edge of the flange, and thereby serve most effectually for preventing the sparks rising and escaping through the draft opening, when it is desired they should remain in the case.

Our invention consists, 2d. In increasing the capacity of the spark chamber and the size of the deflecting surface, and at the same time lessening the resistance of the stack and the quantity of air displaced in passing through the atmosphere, (and thereby avoiding the inconvenience and danger arising from a trail of smoke forming just behind the locomotive, and before the eyes of the engineer;) by making the stack or case of elliptical, or oblong form, and the deflecting cone of similar shape, and employing spreaders in the smoke or steam pipe, for spreading the steam and sparks, and causing them to come in contact with the entire surface of the cone.

It may be well known, that one of the great difficulties in all "sparkers" is, that they cannot conveniently, and with advantage, be made of sufficient capacity; owing to their being round, without causing great resistance, and forming a trail in passing through the atmosphere.

By making the stacks elliptical, their

capacity can be increased to a considerable extent, and their resistance lessened, and the danger of a trail of smoke forming, and the engineer not seeing objects before him, avoided, for they can be made very narrow, and nearly the full length of the locomotive, and arranged on top of the same, without any inconvenience or disadvantage, but to great advantage, owing to a larger space being secured for deflecting surface to be arranged in, and for sparks to fall into, and, at the same time, less resistance occasioned.

Our invention consists, 3d. In making the flange, round the draft opening, adjustable for the purpose of regulating the escape of the sparks. By having the flange adjustable, we can confine the sparks while passing through places where there is danger of firing buildings, and allow them to escape while passing over that portion of the track which runs through woods and other places where there are no buildings or objects to be injured by sparks, and thus a large portion of the sparks are kept out of the case, and all liability of its being filled and choked, avoided.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

A, represents the outer case or "stack." It is made of oval or oblong form, as shown in Fig. 1. B, is the draft opening in the top of the same, and E, is the flange round the same.

C, is the exhaust steam and smoke pipe—its lower end is of circular shape, and its upper end is made flaring and of elliptical form, as shown in the drawing, Figs. 2, and 3.

D, is the inverted elliptical shaped deflecting cone. It is arranged in the upper part of the stack, in such relation to the flange E, round the draft opening, that the steam is caused, as soon as it comes in contact with the sides of the cone, to pass in an unbroken sheet across the space between the flange and the base of the cone, and strike the top of the case, and act upon the sparks, and prevent them rising, or passing out through said space,—the steam, owing to its being constantly supplied, acts as a screen and prevents the sparks passing out. The flange and cone are arranged in such relation to each other, that a line drawn parallel with the angle of the cone



would just barely escape by the edge of the flange, as illustrated by the red dotted line, which is intended to show the manner in which the steam serves as a screen. After  
 5 the steam strikes the top of the case, as shown, it acts with great force upon the sparks, and causes them to fall into the chamber, F, as indicated by the red dotted arrows, I, I.

10 The flange, E, prevents the sparks and steam passing out directly through the draft opening. It is made adjustable by set screws, *a, a*, or otherwise, and can be moved down to the position shown in red, when it  
 15 is desired to prevent all possible chance of the sparks escaping, and up to the position shown in black, or, even higher, when it is desired to let the sparks escape. It being perfectly safe in traveling over some parts  
 20 of rail roads, to allow the sparks to escape, and it is of considerable advantage to do so, as it prevents too great an accumulation of sparks in the case, and thus saves time and trouble of cleaning the sparks out  
 25 of the case.

G, G, are the spreaders arranged in the exhaust steam or smoke pipe. They are set so as to have their lower ends come nearer together than their upper ends, so as to give  
 30 the steam and sparks a direction toward the ends as well as the center of the cone, as indicated by the red dotted lines in Figs. 2 and 3, and red arrows, No. 2.

By examining the drawing, the operation  
 35 will be clearly understood; the red dotted lines represent the manner in which the steam passes up through the exhaust pipe, and comes in contact with the cone, and forms a screen across the escape opening.  
 40 The dotted arrows, 1, 2, show the manner in which the sparks pass up with the steam, and are forced into their chamber. The arrows, 3, show the way in which the steam

continually passes off, after acting on the sparks.

By constructing "sparkers" after this plan, the use of reticulated hoods, or reticulated deflectors, &c. which are liable to corrode after being exposed to moisture, is dispensed with.

What we claim as our invention, and desire to secure by Letters Patent, is:—

1. So arranging the conical deflector, D, in the upper part of the case A, and in relation to the flange, E, which is around the draft opening, and extends down, inside, from the top of the case, that the exhaust steam will be caused to act upon the sparks, and force them into their chamber, and form a screen between the inverted base of said cone and the lower edge of the flange, and thereby serve most effectually for preventing the sparks rising and escaping through the draft opening when it is desired to retain them in the case, substantially as, and for the purposes herein described.

2. In the employment of the elliptical shaped cone, D, within the elliptical case, A, in combination with the spreaders, G, G, substantially as, and for the purpose described.

3. We also claim regulating the escape of the sparks by means of the adjustable flange, E, arranged round the discharge opening, substantially as, and for the purpose described.

G. B. SIMONDS.  
 ABEL BREAR.

Witnesses to signature of G. B. Simonds:

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E. I. SANFORD.

Witnesses to signature of Abel Breaer:

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