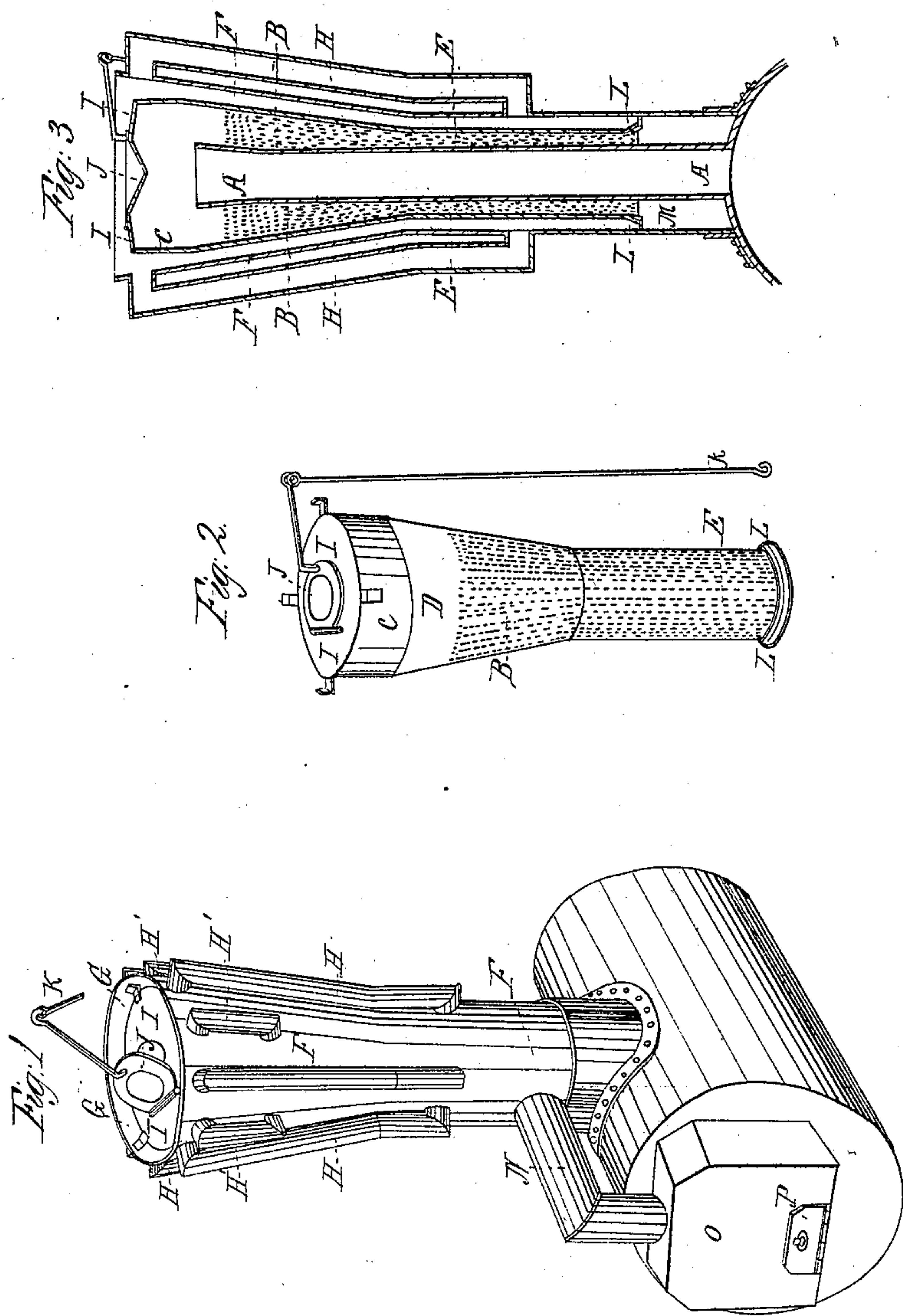


*L. Phleger,*  
*Spark Arrester,*  
*No. 1,778,*  
*Patented Sept. 10, 1840.*





# UNITED STATES PATENT OFFICE.

LEONARD PHLEGER, OF PHILADELPHIA, PENNSYLVANIA.

## SPARK-ARRESTER.

Specification of Letters Patent No. 1,778, dated September 10, 1840.

*To all whom it may concern:*

Be it known that I, LEONARD PHLEGER, of the city of Philadelphia, in the State of Pennsylvania, have invented a new and Improved Apparatus for Arresting Sparks, in Locomotive and other Steam Engines; and I do hereby declare that the following is a full and exact description thereof.

In the accompanying drawing, Figure 1, is a perspective view of the spark-arrester, surrounding the chimney of the locomotive, arising from the smoke box, in the usual way. Fig. 2, is a perspective view of a part of the apparatus, intermediate between the outer case and the ordinary chimney, and which intermediate part, for the sake of distinction, I will denominate the perforated cone, its middle portion being made conical. Fig. 3, is a sectional view of the principal parts of the apparatus taken vertically through the axis of the chimney. In each of these figures, where the same parts are represented they are designated by the same letters of reference.

A, A, Fig. 3, is the ordinary chimney, or flue.

B, B, is the perforated cone, which is formed of sheet metal, and has its lower part perforated with numerous holes. In the machine which I have essayed, this perforated cone is six feet in length, the perforated part being five feet long, leaving one foot at the top unperforated. The upper portion of this unperforated part is made cylindrical, as at C, and this may be eight or nine inches in length. The part D, is made conical, coinciding with the part B. The upper part C, may be thirty two or more inches in diameter; its lower end E, which is cylindrical, may be two feet in diameter, this cylindrical part extending about half the height of this intermediate appendage.

F, F, is the outer case of the apparatus, between which and the perforated cone there is a space of about two inches, which constitutes the flue at the upper end of which G, G, the heated air escapes, after having passed through the holes in the perforated cone. It has not been found best to make the space between the perforated cone and the outer case so large as to give free egress to this heated air, and I, therefore, increase this flue space by surrounding it with a number of elbow pipes, as shown at H, H, H', H'. The number of these pipes may be

varied, but I have used six, H, H, of about five feet in length, and six H', H', of about twenty inches, more or less, in length, said pipes being six inches in diameter; at their upper ends they all open into the flue space just above the upper edge of the exterior case.

The top of the perforated cone is inclosed, as at I, I, and it has a hinged cover J, the diameter of which should be equal, or nearly so, to that of the flue A, A; it has a rod K, attached to it by which it may be raised, and which also serves to hold it firmly down, when the engine is in action. This hinged cover is to be opened when it is desired to admit a direct escape to the draft. At its lower end L, L, the perforated cone joins the external case, but opens freely into the space M, at the upper part of which there is inserted an elbow pipe N, Fig. 1, the lower end of which opens into a spark receptacle O, which is a close box, furnished with a shutter P, for clearing out the ashes. The elbow pipe N, should be 8, or 9 inches in diameter.

When the engine is in operation, the cover J, is to be fastened down by means of the loop on the end of the rod K. The operation will then be as follows: After the heated air, sparks, and steam have passed up the flue, or chimney, A, A, the direction of the draft is turned downward between the chimney and the perforated cone; the sparks have but little tendency to pass through the perforations, but are driven down, with a portion of the steam, into the space M, and thence through the elbow pipe N, into the receptacle O, where, by the closeness of the receptacle and the action of the steam, they are soon extinguished. The gaseous products of combustion pass through the perforations into the flue space surrounding them, and through this, and the pipes H H, escape into the atmosphere. It has been found by practical, and continued, trial, that there is not, under this arrangement, any injurious diminution of the draft, nor is there any escape of such sparks as are capable of producing annoyance.

Having thus, fully described the manner in which I construct my spark arrester, and explained its operation, what I claim therein as constituting my invention, and desire to secure by Letters Patent, is—

1. The forcing of the sparks to descend between the flue A, A, and the perforated



cone, into the space M, and thence through the pipe N, into the spark receptacle O, in the manner, and in consequence of the combined operation of the respective parts constructed substantially as set forth.

2. I also claim the forming of the flue space on the outside of the perforated cone, constructed as described, by combining with

the space between said cone, and the exterior case, a number of pipes, or tubes, 10 H, H, in the manner, and for the purpose, herein set forth.

LEONARD PHLEGER.

Witnesses:

JOHN QUINN,  
I. WILSON WALLACE.