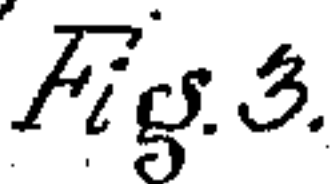
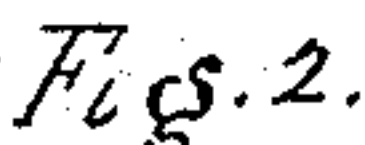
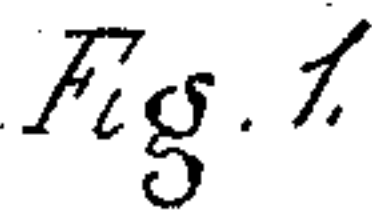


Spark-Arresters.

No. 150,650.

Patented May 5, 1874.



WITNESSES

E. C. Foster
James Q Kray

INVENTOR

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UNITED STATES PATENT OFFICE.

MICHAEL ZECK, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **150,650**, dated May 5, 1874; application filed March 16, 1874.

To all whom it may concern:

Be it known that I, MICHAEL ZECK, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Spark Arrester; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing forming a part of this specification, in which—

Figure 1 is a side view of my improved stack, the shell being cut away; and Figs. 2 and 3, detached views.

Like letters of reference indicate like parts in each.

My invention consists of an improved construction of spark-arrester, whereby I am enabled to thoroughly arrest, break up, and extinguish the sparks, and to effect a saving of fuel in the engine.

To enable others skilled in the art to make and use my invention, I will describe its construction.

a represents a stack, of a common form. Projecting downward from the enlarged portion *a'*, I make a stationary spiral flange or director, *b*, enlarging from the point *b*¹ upward. This flange is mounted on the arms *b*². Extending up from the point *b*² to the upper end of the stack, and there secured in a collar, *c*, supported by radial arms, is a rod, *d*. Upon this rod, each between two adjustable collars, are two rotating butterfly-disks, *e* and *e'*, the first one, *e'*, turning in one direction by the inclination of its wings *i*, and the other, *e*, turning in the opposite direction. The director *b* and the disks *e* and *e'* are preferably perfo-

rated. At *b*³ and *g* are two flanges, similar to those shown in the patent granted to me August 5, 1873; but in this case I have perforated them. The perforations in the director *b* are for the purpose of increasing the efficiency of the draft.

The draft of the engine causes the sparks to strike against the director *b*, to ascend through the stack in a spiral direction, and to be thrown against the butterflies *e e'*. These rotate in opposite directions, and the sparks are broken by them, and thrown against the sides of the stack.

The draft of the engine is materially increased by the rotating disks, and I am, therefore, enabled to increase the size of the exhaust-nozzle. The result of this is a great saving of fuel. As the exhaust is not so strong, it does not draw out from the fire-box cinders of a large size.

I find by experience that this spark-arrester entirely breaks up and destroys the sparks, and that engines, when fitted with it, consume less fuel than when without it.

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

A spark-arrester consisting of a spiral director, *b*, and one or more rotating butterfly-disks, *e'* and *e*, substantially as described.

In testimony whereof I, the said MICHAEL ZECK, have hereunto set my hand.

MICHAEL ZECK.

Witnesses:

JAMES R. HOLMES,
T. B. KERR.