# H. C. PARMALEE & S. M. JOHNS.

## Spark-Arresters.

No. 145,232. Patented Dec. 2, 1873.

*Fig. 1.*

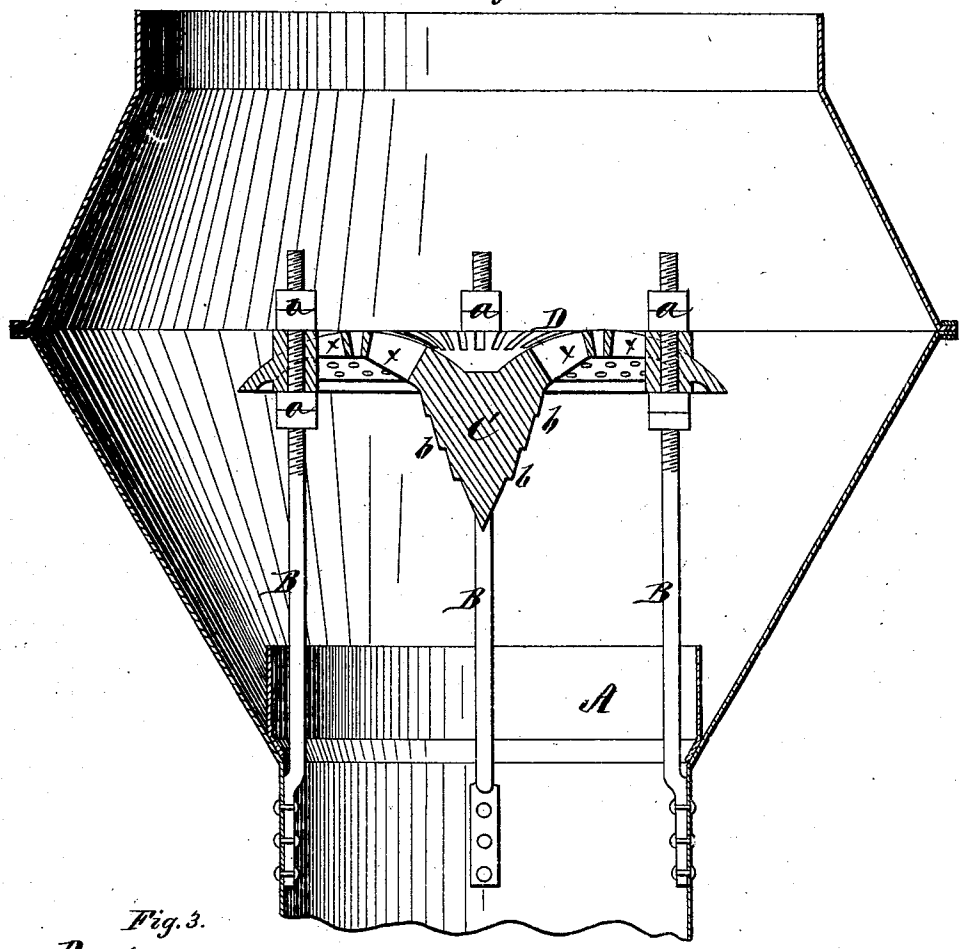



*Fig. 3.*

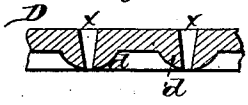
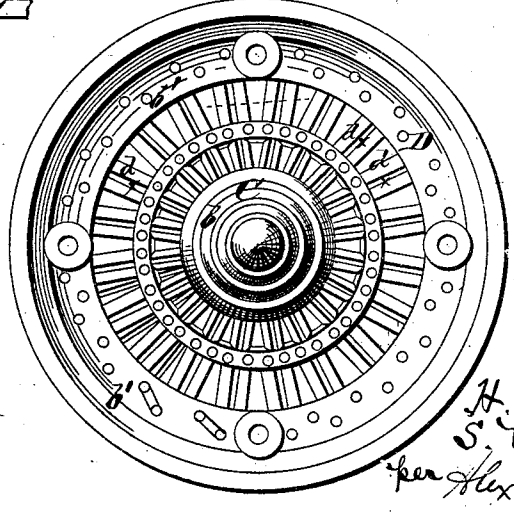



*Fig. 2.*

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# UNITED STATES PATENT OFFICE.

HENRY C. PARMALEE AND SAMUEL M. JOHNS, OF CLEVELAND, OHIO, ASSIGNORS OF ONE-THIRD THEIR RIGHT TO CHARLES D. EVERETT, OF SAME PLACE.

## IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **145,232**, dated December 2, 1873; application filed November 13, 1873.

*To all whom it may concern:*

Be it known that we, HENRY C. PARMALEE and SAMUEL M. JOHNS, of Cleveland, in the county of Cuyahoga and in the State of Ohio, have invented certain new and useful Improvements in Spark-Arresters; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of our invention consists in the construction and arrangement of a spark-arrester for locomotive smoke-stacks, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a longitudinal section of a locomotive smoke-stack with our spark-arrester. Fig. 2 is a bottom view of our spark-arrester, and Fig. 3 is an enlarged section of a part of the same.

A represents a smoke-stack for locomotives, constructed in any of the known and usual ways, and in the same are secured a number of upright rods, B B, having screw-threads on their upper ends. The screw ends of the rods B B pass through the spark-arrester, which is adjusted up and down by means of nuts *a a*. The spark-arrester is cast in one piece, chilled on its under side, forming an inverted cone, C, in the center, which cone is provided with circumferential shoulders or offsets *b b*. From the base of the inverted cone C it forms a shield, D, which is made concave on the under side, as shown, and extends beyond the edge of the vertical part of the stack, to prevent the coals of fire from passing beyond the outer edge of the spark-arrester. The shield D is perforated by a number of slots or holes, X X, which are made tapering, as shown particularly in Fig. 3, so as to increase in width from the under side upward, for the purpose of preventing the holes or slots from being choked up. The slots or holes X X are made in ribs *d d*, formed radially or otherwise on the under side of the shield, giving increased amount of metal just where it is most needed.

When the holes X are round, in place of the ribs nipples may be formed around them on the lower side of the shield. These ribs or nipples *d d* answer the double purpose of breaking up the coals of fire as they are thrown up by the exhaust steam, and also strengthening the shield, preventing it from wearing out so fast through the perforations, without increasing the weight as much as it would were the shield of uniform thickness throughout equal to the thickness at the ribs.

The perforations X X should be of such number and such size that their combined area shall be equal to or larger than the area of the smoke-stack at its smallest point.

The under side of the shield D is also provided with concentric shoulders *b' b'*, which, together with the shoulders *b b* on the cone C, assist in breaking up the cinders.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

The within-described spark-arrester, consisting of the inverted cone C having circumferential shoulders *b b*, and the shield D provided with ribs or nipples *d d*, with slots or holes X X, and the shoulders *b' b'*, all cast in one piece, substantially as and for the purposes herein set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 10th day of August, 1873.

HENRY C. PARMALEE.
SAMUEL M. JOHNS.

Witnesses:
W. L. CHAMBERLAIN,
A. M. BEMAN.