C. UPPERMAN.

Locomotive Spark-Arresters.

No. 155,687. Patented Oct. 6, 1874.

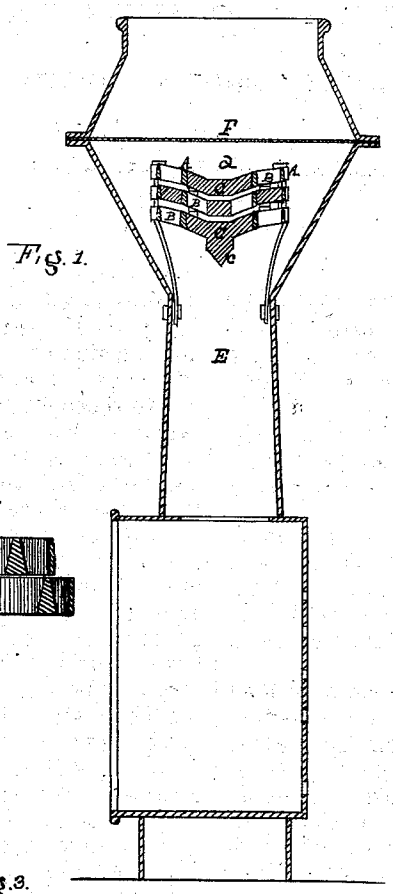


Fig. 1.

Fig. 5.

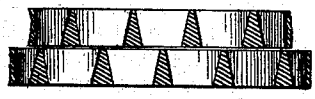


Fig. 3.

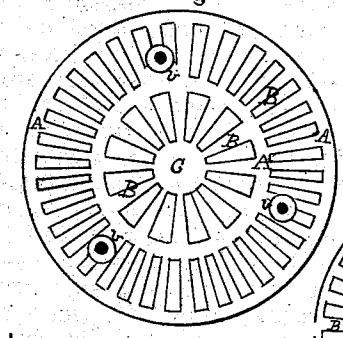


Fig. 2.

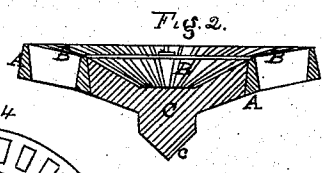
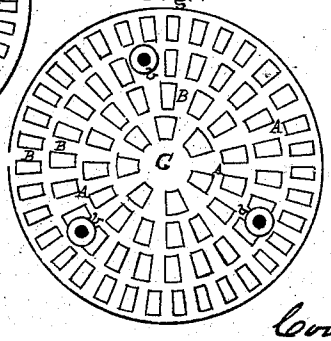


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

CONRAD UPPERMAN, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN LOCOMOTIVE SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **155,687**, dated October 6, 1874; application filed May 16, 1874.

To all whom it may concern:

Be it known that I, CONRAD UPPERMAN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Locomotive 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 vertical section of a smoke-stack and the conical gratings. Fig. 2 is a vertical section of the lower grating on an enlarged scale. Fig. 3 is a plan view of the upper grating. Fig. 4 is a modification, and Fig. 5 is a sectional view.

This invention relates to devices termed spark-arresters, which are used in connection with locomotive and other steam generators and furnaces, and has for its object the separation from the gaseous products of combustion, and any matter which may be caused to pass through the stack, of spark or solid products of the fuel which may be carried into the stack by the draft; so constructing the dished or conical gratings with radiating arms and concentric rings that when two or more are used the bars and spaces of one shall alternate or break spaces with another, whereby any cinders or sparks passing through the openings in the first grate must of necessity strike the grate above.

I will now proceed to describe my invention, so that others skilled in the art can make and use the same.

The smoke-stack is of the usual construction and material. Instead of the solid conical deflectors heretofore used, I form a dished or conical grating having concentric rings A, and a series of arms, B, radiating from the conical center or hub-piece C. The radiating arms are broader on the lower surface than the upper—that is to say, a cross-section of the rings and arms would represent the frustum of a cone. This shape presents a broader surface, against which the rising sparks impinge, and at the same time permits the gaseous product to escape readily. The center piece or hub of the first grating is, preferably, constructed cone-shaped, as at *c*, so as to present an inclined deflecting surface to the upward current. The remainder may be formed as illustrated in Fig. 3—that is to say, the hub-piece C need not terminate in a cone, but may be simply a plane surface. The concentric rings and radiating arms in form are similar to those for the lower grating. The arms radiating from the hubs C may be larger than those between the concentric rings, a greater number of radiating arms being used between the concentric rings on account of the greater space to be occupied. *b* indicates eyes for the passage of the bolts which secure the gratings. The eyes of the different gratings are arranged so that the arms upon the upper grating will come opposite the spaces in the lower grating. This is done that any sparks escaping between the arms of the lower grating shall strike the arms or concentric rings of the upper grating.

In Fig. 4 is shown a modified form of the grating. The same effect is obtained, the only difference in construction being that a greater number of concentric rings are used, and the radiating arms connecting the rings are shorter. The cross-section of the rings and arms in the modification are the shape of a frustum of a cone, as in the grating above described, and a series of these are used. The eyes for the passage of the bolts are arranged to bring the rings of the separate gratings one within the other, or alternating for the purposes, as specified. The gratings, constructed as described, according to the number used, are secured within the cone *d* of the stack or chimney E, in the manner shown—that is, by means of three or more supporting-rods or bolts passing through the eyes *b*, and secured by nuts, or in any other convenient manner. Immediately over the upper grating of the series is the wire-gage screen F, secured in the usual manner between the bases of two conical frustums forming the head of the stack. These gratings may be cast in the usual manner of forming castings, or the nest, composed of two or more, may be cast together, taking care that the rings, bars, and spaces shall be caused to alternate, as set forth, but the method of casting them in nests cannot be advantageously followed on account of the trouble in preparing the molds. Therefore, I generally prefer to cast them separately, and of the

form represented in the several figures, but they may be constructed without casting by any of the well-known ways, so that the object set forth shall be accomplished.

The operation of this arrester is as follows: The sparks and cinders, carried up with the gaseous products from the furnace, strike against the conical point *c* of the hub, and against the under sides of the arms B, are broken into pieces, and thrown back into the smoke-box, or such particles as pass the arms B strike against the arms of the second grating, or even the third of the series, falling back through the grating into the smoke-box. This they are enabled to do on account of the slope of the upper surfaces of the concentric rings and arms. The smoke passes between the arms and out through the stack in the usual way. The broad side or base of the arms being downward entirely closes the stack against the upward ascent of any solid particles, rising in a vertical line, while the spaces around their edges and between them permit the free passage of the smoke.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

In combination with a smoke-stack, conical or dished gratings, having a series of concentric rings and radiating arms broader below than above, and arranged so as to break spaces, substantially as specified.

In testimony whereof, I, the said CONRAD UPPERMAN, have hereunto set my hand.

CONRAD UPPERMAN.

Witnesses:

W. N. PAXTON,

JAMES I. RAY.