(No Model.)

G. H. SHOEMAKER.

SPARK ARRESTER.

No. 421,872. Patented Feb. 18, 1890.

FIG. 1.

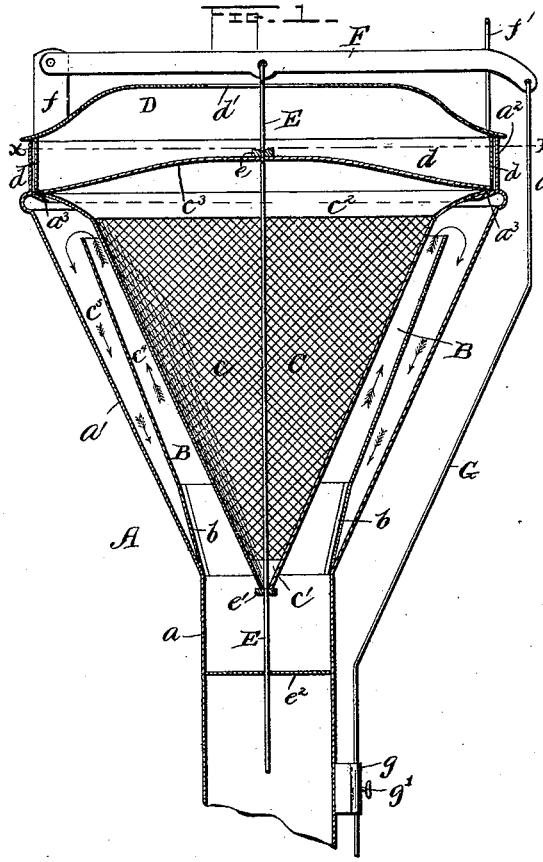


FIG. 2.

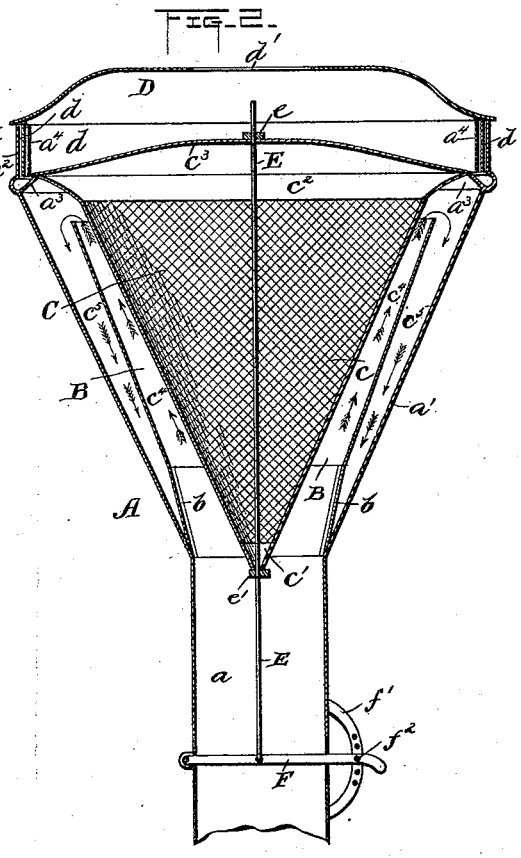


FIG. 3.

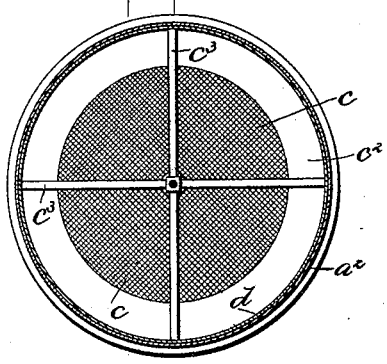
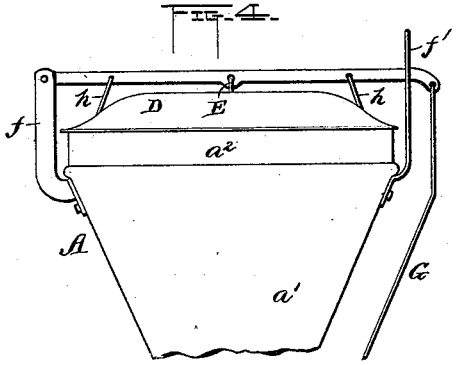


FIG. 4.



Witnesses:

Severance

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UNITED STATES PATENT OFFICE.

GEORGE H. SHOEMAKER, OF SOUTH BEND, INDIANA, ASSIGNOR OF ONE-HALF TO JOHN C. DECKER, OF SAME PLACE.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 421,872, dated February 18, 1890.

Application filed September 25, 1889. Serial No. 325,108. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. SHOEMAKER, a citizen of the United States, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented a new and useful Spark-Arrester, of which the following is a specification.

The invention relates to improvements in spark-arresters; and it consists in the construction and novel combination of parts hereinafter described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

In the accompanying drawings, Figure 1 represents a central vertical section of a spark-arrester embodying the invention. Fig. 2 represents a similar section of a modification of the spark-arrester shown in Fig. 1. Fig. 3 represents a transverse section on the line $x\ x$ of Fig. 1. Fig. 4 represents a side view of a second modification of the spark-arrester.

Referring to the drawings by letter, A designates the smoke-stack of a locomotive or other engine, which smoke-stack has the lower cylindrical part a, the reversed conical part a', and the cylindrical top portion a^2 above the said conical part.

a^3 is a circumferential flange standing inward and downward from the junction of the parts a' and a^2. The said flange may stand inward and upward, as shown in Fig. 2. In that case the stack is provided with the upstanding spring guide-rods a^4, surrounding said flange.

B is a reversed conical frustum-shaped guide-plate standing within the conical part of the smoke-stack, its lower edge being supported upon the upper ends of the bars $b\ b$, the lower ends of which are secured to the inside of the smoke-stack at the junction of the parts $a\ a'$. The lower edge of said guide-plate is about one-half inch from the opposite part of the smoke-stack, while its upper edge is about three inches from the part of the stack opposite thereto, so that the guide-plate is not so greatly inclined as the conical part of the smoke-stack within which it stands.

C is a screen of reversed conical shape, and composed of the body c, of woven wire or perforated metal, the conical sheet-metal apex c', to which the lower edge of the body is secured by rivets or otherwise, and the sheet-metal annular rim c^2, inclining upward and outward, and to which the upper edge of the body is secured. The said apex and rim are preferably made of two layers inclosing the adjoining edges of the body c between them, and secured together by rivets, the said apex being perforated at its point. The rim c^2 has secured across its top the curved bars $c^3\ c^3$, which are convex upward, cross each other at right angles, and are perforated at their point of crossing for a purpose hereinafter explained. The sides of the screen are parallel with those of the conical portion of the smoke-stack, so that the annular upward passage c^4, between the screen and surrounding guide-plate B is narrower at top than at bottom, while the similar passage c^5 between said guide-plate and the smoke-stack is narrower at bottom than at top.

D is a cap provided with a circumferential depending flange d, that fits within the top part a^2 of the smoke-stack, and with a central draft-opening d' of sufficient size.

E is a vertical rod standing in the axis of the smoke-stack and passing through the perforations in the cross-bars e^3 and the apex c' of the screen, which is secured upon said rod by the nuts $e\ e'$, respectively, above said cross-bars and below the apex, the rod E being threaded at those points to engage the nuts. The lower portion of the rod E passes through a guide-perforation in a transverse bar e^2, secured diametrically in the lowest part a of the smoke-stack. The upper end of the rod E passes through the draft-opening in the cap D and is pivoted to the middle portion of a lever F, one end of which is pivoted on an upright f, rising from the cap near its edge, while its other end extended beyond the cap is pivoted to the upper end of an operating-rod G, bent to conform to the adjacent side of the smoke-stack and with its lower portion passing through a sleeve g, secured to the cylindrical part a of the smoke-stack. By means of said rod the lever F can be raised and lowered and the screen consequently adjusted to different heights in the

guide-plate B, within which it stands. When so adjusted, it is held in place by a set-screw g', that passes through a threaded opening in the sleeve g and bears on the rod G.

f' is a guide-loop for the lever F, rising from the cap D.

In operation the draft passes up the smoke-stack through the meshes of the screen and out of the central opening in the cap D, while the sparks and cinders pass up on the outside of the screen in the passage c^4, the top of which being narrower than its bottom directs the updraft therein and increases it sufficiently to lift the sparks and cinders over the edge of the guide-plate, whence they fall down the passage c^5 between the guide-plate and smoke-stack and are consumed. When the screen is lifted by the described means, the draft is evidently increased as the passage c^4 is widened and the rim c^2 is lifted from the flange a^3. Should sparks or cinders then pass between said rim and flange, they will be deflected downward by the top of the cap D, which inclines downward from its central opening.

In the modification shown in Fig. 2 the lever F passes through slots in the cylindrical part a of the smoke-stack, has the lower end of the rod E pivoted upon it, and is held at different elevations by the perforated curved bar f' and the pin f^2 engaging in said perforations and in a registering perforation in the adjacent end of the lever.

In the modification shown in Fig. 4 the upright f and the guide-loop for the lever F are secured to the smoke-stack to permit the screen to be removed without disengaging the lever from the device.

Having described my invention, I claim—

1. In a spark-arrester, the combination of the smoke-stack having a reversed conical portion, the reversed concial frustum-shaped guide-plate within said portion of the smoke-stack, and the vertically-adjustable reversed conical screen within said guide-plate, substantially as specified.

2. In a spark-arrester, the combination of the smoke-stack having a reversed conical portion and a circumferential flange standing inward from the top of said portion, the reversed conical frustum-shaped guide-plate secured within said portion of the smoke-stack, and the reversed conical screen, vertically adjustable within said guide-plate and provided at its top with an annular rim inclining upward and outward and resting on the flange of the smoke-stack when the screen is fully depressed.

3. In a spark-arrester, the combination, with the smoke-stack having a reversed conical portion, and the reversed conical screen having its sides parallel with those of said portion of the smoke-stack, of the reversed conical frustum-shaped guide-plate secured within the conical part of the smoke-stack, forming therewith an annular passage wider at top than at bottom, and forming a similar passage with the screen wider at bottom than at top, substantially as specified.

4. The combination, with the smoke-stack having a reversed conical portion and a circumferential flange standing inward from the top of said portion, the reversed conical frustum-shaped guide-plate, and the reversed conical screen, of the rod passing axially through and secured to said screen, and means, substantially as described, whereby said rod is raised and lowered and the screen thereby vertically adjusted, substantially as specified.

5. The combination, with the smoke-stack having a reversed conical portion, the reversed conical frustum-shaped guide-plate, and the reversed conical screen, of the rod secured axially within said screen, the pivoted lever having the upper end of said rod pivoted upon it, and the operating-rod pivoted to the swinging end of said lever, substantially as specified.

6. The combination, with the smoke-stack having a reversed conical portion, the reversed conical frustum-shaped guide-plate, the reversed conical screen, and the cap fitting into the upper part of the smoke-stack and provided with a central draft-opening, of the rod passing axially through and secured to the screen, the lever pivoted at one end to an upright rising from said cap, near the edge thereof, and having the axial rod pivoted to its middle portion, the operating-rod pivoted to the free end of the lever, the sleeve attached to the smoke-stack, and the set-screw passing through a threaded opening in said sleeve and engaging the operating-rod, substantially as specified.

GEORGE H. SHOEMAKER.

Witnesses:
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