(No Model.)

A. BERNEY.

SPARK ARRESTER.

No. 304,987. Patented Sept. 9, 1884.

FIG. I.

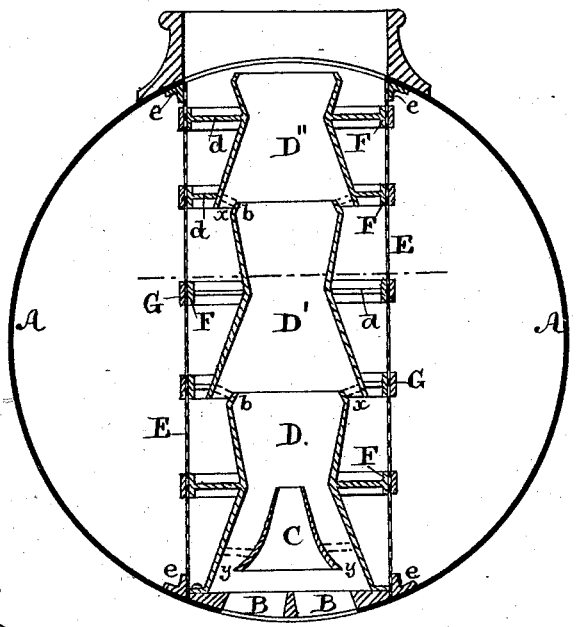


FIG. III.

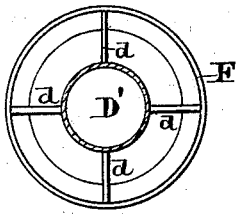


FIG. IV.

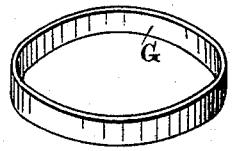


FIG. II.

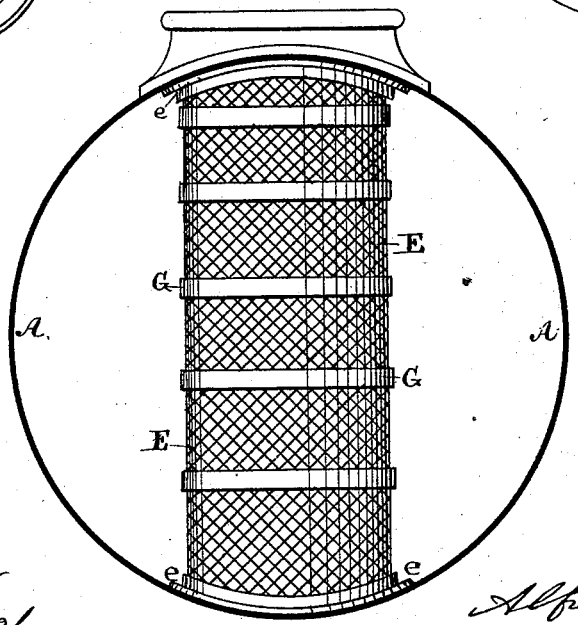
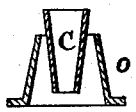


FIG. V.



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SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 304,987, dated September 9, 1884.

Application filed March 23, 1881. (No model.)

To all whom it may concern:

Be it known that I, ALFRED BERNEY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Spark-Arresters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to exhaust-tips and wire draft-pipes for locomotive or other boilers.

The objects of the improvements are to cause a greater vacuum in the smoke box or arch, with less back-pressure on the piston-heads.

The invention consists in the construction and arrangement of parts, as will be more fully described hereinafter, reference being had to the accompanying drawings and letters of reference marked thereon.

In the drawings, Figure I is a vertical cross-section of a smoke-arch with my improvement attached. Fig. II is a vertical cross-section of a smoke-arch, showing perforated draft-pipe with supporting-bands. Figs. III, IV, and V are detail views.

In the drawings, A is the shell of the smoke-arch of a locomotive-boiler, in which the exhaust-ports B B enter, and over them is arranged a contracting exhaust-tip, C. Around this tip is arranged a double conoidal or convex exhaust or jet pipe, D, having its upper and lower ends expanded, while its middle part is contracted. Over this tip are arranged two or more similarly-shaped tips, D′ D″, being gradually smaller toward the top. These tips are supported in the wire-netting draft-pipe E, which is secured at the top and bottom of the smoke-arch by suitable rings, *e e*. The tips have each one or more sets of braces, *d*, cast or otherwise secured to them, which extend to bands or rings F, which support the wire-netting draft-pipe and prevent it from collapsing. If desired, the upper orifices of the exhaust-tips may be slightly contracted, as shown at *b*. If desired, the rings, with the braces, may be made separate from the tips, and riveted or otherwise secured to them, and the tips secured together by braces on their inside, as shown by the dotted lines. On the outside of the wire draft-pipe are arranged rings G, which are preferably placed immediately opposite the bands F and secured to said draft-pipe. Any series of similar shaped exhaust-tips may be used without deviating from the spirit of my invention.

The draft-pipe may be made of perforated sheet metal. By slightly contracting the exhaust tips or cones D D′ D″, as shown at *b*, a greater impetus and force is given to the exhaust-steam, while at the same time it forms an annular passage, through which the smoke, &c., can enter toward the center of said cones, into which it is drawn by said steam.

The operation of my invention is practically as follows: The exhaust-steam passes out of the ports B B into the contracting tip C. The steam acquires more force and momentum by the contraction, and causes a greater vacuum. Any back-pressure is relieved by passages *y y*, the exhaust-steam being driven up through the independent convex or conoidal tips D D′ D″, and by their contracting and expanding shapes gives more momentum and power, which is added thereto by the gases, &c., drawn into them at the annular passages *x*. The tips D D′ D″ are preferably slightly contracted at their upper end by the inwardly inclined or beveled flanges *b b*, which tend to increase the draft and guide the gases, &c., upward into the center of the tips and chimney. The cylindrical draft-pipe is prevented from contracting or collapsing by means of the bands F and G, one or both being used.

I do not confine myself to the use of contracting tips or cones D to the mechanism, as shown here, as it can be used alone to secure greater draft; nor do I limit the use of the tips or cones D to mechanism described, as they could be used without the wire draft-pipe. The contracting tip C can be turned over, so as to cause the sharp blast to be on the outside of the tip O, as shown in Fig. V, and the contracting tip C may be used suspended over the plain common tip O, with the small end up.

I am aware that injectors and ejectors have been provided with a series of cones, and therefore disclaim such; but,

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

1. In exhaust mechanism, the combination of an exhaust-tip with a series of independent double conoidal tips of gradually-decreasing diameter, substantially as specified.

2. The combination of an exhaust-tip, C, and a series of conoidal independent cones having contracted mouths, with braces *d* and bands F, for supporting the draft-pipe E, substantially as shown and described.

3. The combination of an exhaust-tip, C, and a series of separate conoidal tips, D, having contracted mouths, with braces *d* and bands F, supporting the wire-netting draft-pipe E, having bands G, all arranged as and for the purpose specified.

4. In exhaust mechanism, the combination of an exhaust-tip, C, with separate conoidal tip D, having contracted mouth, as at *b*, and a wire-netting, E, as set forth.

5. The combination of a wire-netting supported by inner and outer bands and braces, connected to a series of conoidal independent tips having contracted mouths, as and for the purpose set forth.

ALFRED BERNEY.

Witnesses:
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CHAS. H. FOWLER.