J. GATES.

SPARK-ARRESTER.

No. 192,063. Patented June 19, 1877.

Fig. 1.

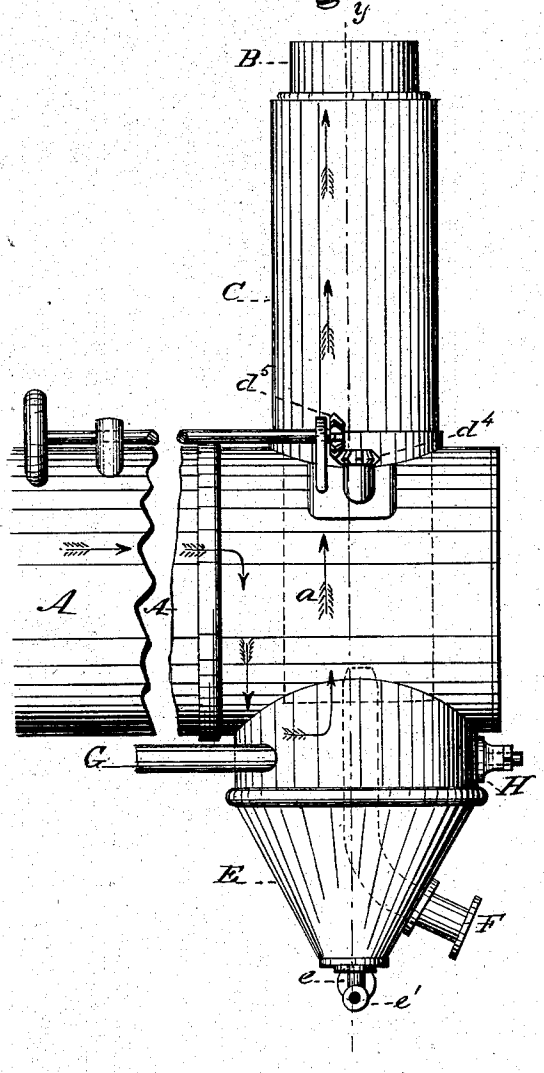
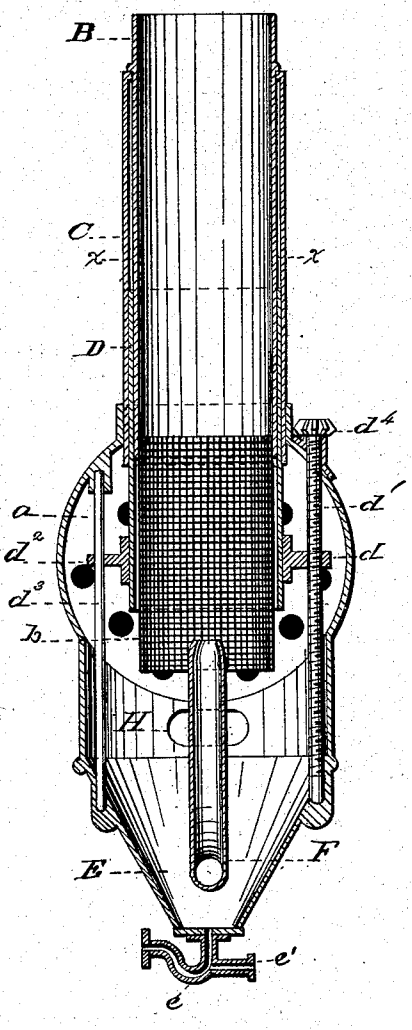



Fig. 2.




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# UNITED STATES PATENT OFFICE.

JOHN GATES, OF PORTLAND, OREGON.

## IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **192,063**, dated June 19, 1877; application filed April 11, 1877.

*To all whom it may concern:*

Be it known that I, JOHN GATES, of Portland, in the county of Multnomah and State of Oregon, have invented a new and useful Improvement in Spark-Arresters; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention consists, mainly, in the combination, with the combustion-chamber and smoke-stack of a boiler, of an intermediate cylindrical damper adapted to control the discharge of the products of combustion from the chamber to the stack.

It consists, further, in certain details of construction, which, in connection with the foregoing, will be fully described hereinafter.

In the drawings, Figure 1 represents a side elevation of my invention, and Fig. 2 a vertical section through the line *y y* of Fig. 1.

To enable others skilled in the art to make and use my invention, I will now proceed to describe fully its construction and manner of operation.

A represents a boiler of any proper construction, and *a* the chamber into which the products of combustion are discharged to enter the stack.

B represents the smoke-stack proper, consisting of a vertical cylindrical tube of proper diameter and length, which is rigidly fixed in its proper position by any suitable means. This may be made throughout its entire length of a solid plate, but, preferably, it is constructed with its lower portion perforated, a section, *b*, of wire-cloth or its equivalent, being employed as shown.

C represents an outer shell, rising from the top of the boiler, by means of which an intermediate space, *x*, is formed between it and the stack, for purposes hereinafter explained.

D represents a cylindrical damper, inclosing the smoke-stack, which is capable of movement in a vertical direction in the intermediate space *x*, as shown.

*d* represents an ear attached to the damper D, which is provided with a threaded opening, as shown.

$d^1$ represents a screw, fixed in proper bearings in the chamber *a*, which extends through the opening in the ear *d*, and is adapted, when properly revolved, to move the same in a vertical direction in the manner well understood.

$d^2$ also represents an ear, and $d^3$ a rod extending through the same, by means of which the damper is properly guided in its movements.

$d^4$ represents a bevel-wheel upon the upper end of the screw, and $d^5$ a corresponding wheel engaging with the same, which is fixed to a proper rod or shaft extending into convenient proximity for operation by the engineer.

E represents a conical chamber, which extends below the stack and terminates in a goose-neck discharge-pipe, *e*, having the blow-pipe connection *e'*, as shown.

F represents the exhaust-pipe, discharging into the stack, as shown.

G represents a supply-water pipe, by means of which a constant stream is obtained to carry off through the goose-neck the coals and sparks that fall into chamber E.

H represents a man-hole, by means of which ready access to the interior is obtained when desired.

The operation will be readily understood. The sliding damper is properly adjusted to increase or diminish the draft, according to the necessities of the case. The products of combustion entering chamber *a* are compelled to take a downward course, as indicated by the arrows, to enter the stack. An impetus being thus given in a downward direction, the coal and sparks are carried by gravity to the bottom of chamber, and are then swept out through the goose-neck by the constant stream of water entering through pipe G. The lighter products of combustion rise up through the stack and are discharged in the usual manner.

The damper may be adjusted, if desired, to permit the products of combustion to pass directly into the stack, or it may be shut down so as to entirely close the communication through it.

Some of the advantages of the described construction are as follows: The damper may be readily and accurately adjusted by the engineer without leaving his place. The sparks are thoroughly arrested and carried off, so that no accumulation takes place.

By the employment of the goose-neck a trap is obtained which effectually prevents the en-

trance of air to vitiate the exhaust. By the connection of the surface blow-off pipe the goose-neck can be cleaned out if by any means it becomes choked, and the mud and water go out of the same pipe with the coals.

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

1. In combination with the stack B having the perforated portion *b* and the conical chamber E, the damper D, adapted to shut down upon the conical portion and close the draft.

2. In combination with the perforated smoke-stack and the sliding damper, the chamber E having the water-pipe G, as described.

3. In combination with the perforated smoke-stack and the chamber E having the exhaust-pipe, the goose-neck and pipe G, as and for the purpose set forth.

4. In combination with the perforated smoke-stack and the damper D having ears $d\,d^2$, the vertical rod $d^3$, the vertical screw-rod $d^1$, having bevel-wheel $d^4$ and horizontal rod with bevel-wheel $d^5$, as described.

This specification signed and witnessed this 5th day of March, 1877.

JOHN GATES.

Witnesses:
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