F. M. STEVENS.
SPARK-ARRESTERS.

No. 194,382. Patented Aug. 21, 1877.

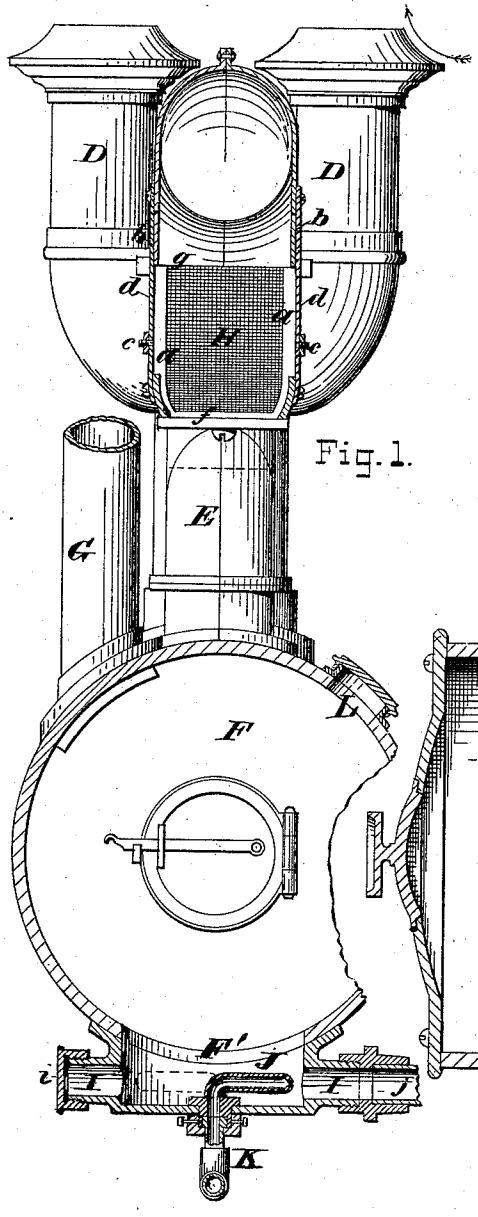


Fig. 1.

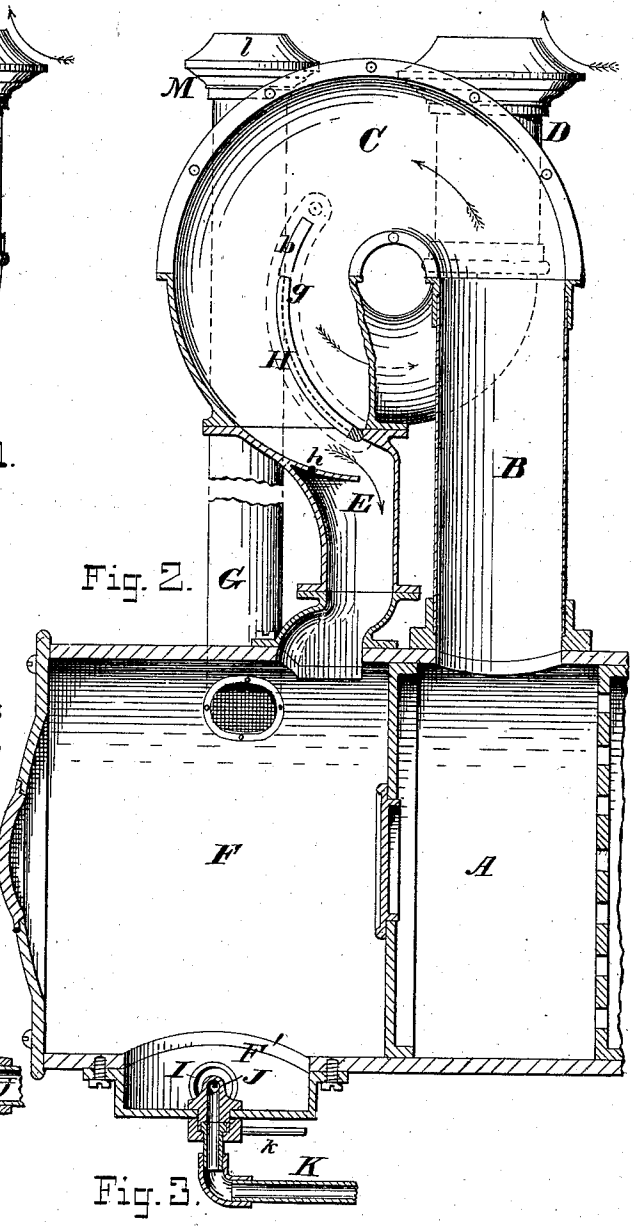
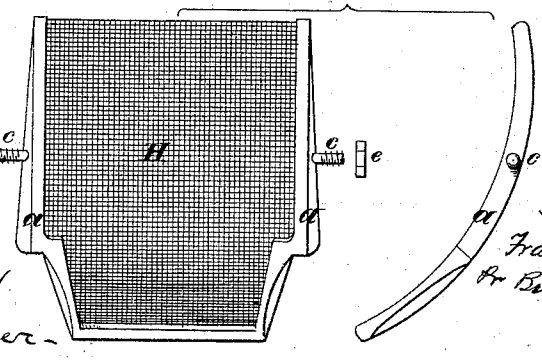


Fig. 2.

Fig. 3.



ATTEST:

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UNITED STATES PATENT OFFICE.

FRANK M. STEVENS, OF CONCORD, NEW HAMPSHIRE, ASSIGNOR OF ONE-HALF HIS RIGHT TO HENRY G. HOLMES, OF NEW YORK, N. Y.

IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **194,382**, dated August 21, 1877; application filed June 28, 1877.

To all whom it may concern:

Be it known that I, FRANK M. STEVENS, of Concord, in the county of Merrimack and State of New Hampshire, have invented certain Improvements in Spark-Arresters, of which the following is a specification:

The invention herein shown relates principally to improvements in the spark-arrester patented by me July 25, 1876, and numbered 180,283.

It consists essentially in a strainer or screen arranged within the separator in a way to prevent the escape of sparks into the smoke-educts, but offering no substantial obstacle to the free passage of the gaseous products of combustion into and out of the same.

Another feature consists in improved mechanism for expelling the sparks from the receiver, all as will be hereinafter set forth.

In the drawings, Figure 1 is a transverse sectional view illustrating my invention, and Fig. 2 is a longitudinal section of the same. Fig. 3 shows a back and edge view of the screen drawn to a larger scale. Herein I have shown my improvements as applied to the boiler of a locomotive steam-engine; but it may be applied to any boiler without material change.

Let A represent the smoke-box of a locomotive, and B the chimney or stack mounted thereon. C is the separator; D D, the two smoke-educts therefrom; E, the conduit leading from the separator; F, the spark-receptacle at which the conduit terminates; and G, relief-pipes or educts connected with the receptacle F. The general arrangement of these parts is similar to that shown in my former patent before mentioned.

H is a screen of some perforated material, preferably wire-gauze, having a frame, *a*, made of cast metal. This screen is preferably curved, as shown, to correspond approximately in curvature with the wall of the separator C, and is fixed in place by means of slots *b b* in the walls of the said separator, in which the sides of the frame rest, the studs *c c* in the edges of the frame engaging holes in the side plates *d d*, which are screwed fast to the separator-walls on the outside and serve to prevent the escape of any smoke or gas at the joints. Nuts *e e* are screwed onto the projecting studs, and assist in holding the screen firmly. The screen extends, as shown, from the point *f* at the back of the conduit to a point, *g*, sufficiently high to insure the division of the current of gases, one portion, bearing the sparks, passing on the outer side of the screen, where a free passage is open to the conduit, and the other inner portion, not bearing sparks, passing down on the inside of the screen and thence out at the educts D D.

The conduit E is provided with a sloping lip, *h*. This lip narrows the throat of the conduit, thus concentrating the stream of sparks and serving to prevent any reaction upward from the receiver F into the separator. This lip may be fixed or adjustable, but I prefer that it be fixed.

At the bottom of the spark-receiver F is an extension or recess, F′, which is provided with discharge-educts I I on opposite sides. These are threaded and arranged to receive screw-caps *i i* or a lengthened tube, *j*, indifferently. J is an angular steam-nozzle, swiveled in the bottom of the receiver in a line with the educts I I. To that portion of the nozzle which is on the outside a handle or lever, *k*, is attached, by means of which the said nozzle can be turned around and brought into line with either of the educts, as desired. This change is indicated by the dotted lines in Fig. 1. K is a steam-pipe, which leads from the boiler to the nozzle J, where it is connected by a steam-tight joint or gland. The object of this device is to enable the operator to discharge the sparks and other deposits in the receiver F at either side, as may be desired.

The operation is, briefly, as follows: While the receiver F is empty the nozzle J is turned by means of the handle *k* until it coincides with the proper educt. The sparks and cinders carried over by the draft collect in the receiver F, forming a more or less compact mass. When the receiver is full—or when it is desired to empty it—the cap *i* is removed from the educt on the side chosen for the discharge and the tube *j* screwed on in its place, if necessary. The steam being now let on from

the boiler through the pipe K the force of the jet from the nozzle J expels all of the deposits through the educt.

Should the packed deposit adhere to the walls of the receiver, as it is liable to do, it may be dislodged by inserting a rod or poker through a hole, L, in the shell of the receiver provided for the purpose. Ordinarily this opening is provided with a cap or cover.

As a matter of convenience I provide the receiver F with an extension, F′, as shown; but such extension may be omitted and the discharge-educts be arranged to open directly into the receiver.

To cause the column of smoke and gases issuing from the educts D D and G to rise higher above the tops of the same before breaking, I provide the said educts, at or near their tops, with bands M, having inclined, coned, or beveled deflecting surfaces *l l*, substantially as shown. The currents in the surrounding atmosphere, striking against these inclined surfaces on all sides, are deflected upward and tend to prevent the ascending column of gases from spreading until it has risen to a considerable distance above the chimney-tops and beyond the influence of the said currents.

Having thus described my invention, what I claim as new is—

1. In a spark-arrester, a spark-screen, arranged laterally within the separator in such a manner that it divides the outer portion of the rotated current of gases bearing the sparks from the inner portion not bearing sparks, the first-named portion being thereby cut off from exit at the smoke-educts without first passing through the said screen, but having free access to the spark-receiver, substantially as set forth.

2. In a spark-arrester, the receiver F, provided with two or more discharge-educts, I I, and a steam-nozzle, J, swiveled in such a manner that it may be turned to coincide with the apertures in either educt desired, substantially as set forth.

3. The combination of the separator C, having slots *b b* in its side walls to receive the screen, the screen H provided with studs *c c*, and the side plates *d d* arranged to be secured to the separator-walls, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FRANK M. STEVENS.

Witnesses:
J. MINOT,
E. H. WOODMAN.