# F. M. STEVENS.

## SPARK-ARRESTERS FOR STEAM-BOILERS.

No. 180,283. Patented July 25, 1876.

Fig. 1.

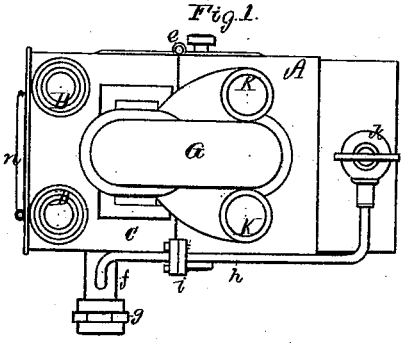


Fig. 2.

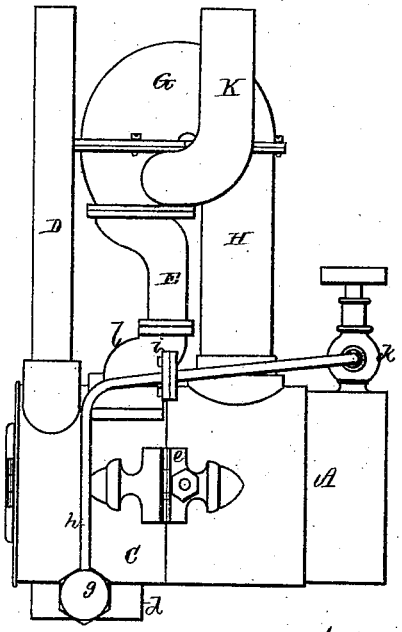


Fig. 3.

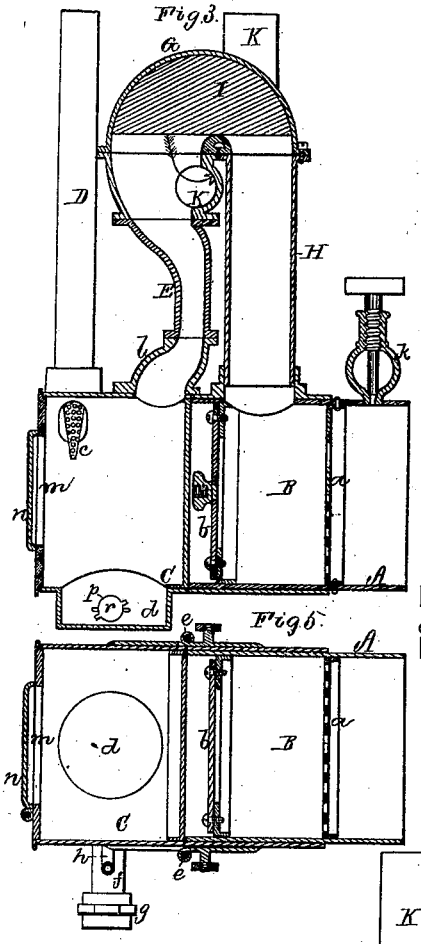


Fig. 6.

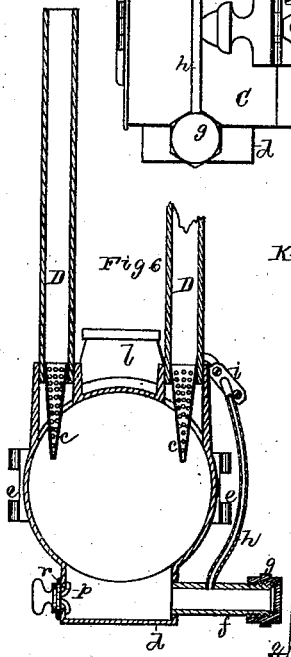


Fig. 4.

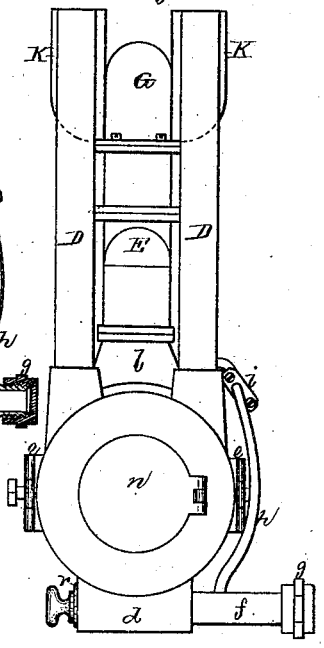
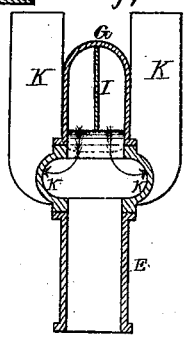


Fig. 5.



Fig. 7.



Witnesses.
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# UNITED STATES PATENT OFFICE.

FRANK M. STEVENS, OF CONCORD, NEW HAMPSHIRE.

## IMPROVEMENT IN SPARK-ARRESTERS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **180,283**, dated July 25, 1876; application filed April 24, 1876.

*To all whom it may concern:*

Be it known that I, FRANK M. STEVENS, of Concord, of the county of Merrimack and State of New Hampshire, have made a new and useful invention having reference to Spark-Arresters for Furnaces or Steam-Boilers; and do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a side elevation, Fig. 3 a longitudinal section, Fig. 4 a front view, and Fig. 5 a horizontal section, of a spark-arrester of my improved kind, applied to the smoke-box and chimney of the boiler of a locomotive steam-engine. Fig. 6 is a transverse section of the spark-receiver and its educt, and device for the discharge of sparks or cinders. Fig. 7 is a vertical and transverse section of the elbow and its partition and branch pipes.

My invention relates to a novel combination of an elbow-pipe, two branch educts, a partition, and a conduit, all applied to the chimney and spark receiver or box of a boiler, as hereinafter set forth; also, to a jet tube and cock, combined with the boiler and an eduction-tube of the spark box or receiver; also, to the spark-receiver, provided with a receiving-mouth separate from the conduit, for the discharge of sparks into it, and hinged to the smoke-box, open at its front end, or there provided with a separate cover to such end, all being substantially as hereinafter explained.

In the drawings, A denotes the advance portion of a boiler, of which *a* is the front head for supporting the tube-stack. B is the smoke arch or box, which I have open at its front end, and there provided with a cover or head, *b*, suitably applied so as to be removable, for the purpose of enabling ready access to be had to the smoke-box and to the tube-stack, as occasion may require, for clearing or repairing. In front of the said smoke-box B there is arranged, as shown, a spark-receiver, C, consisting of a cylindrical or other proper-shaped box, provided with one or more smoke-discharge pipes, D D, extending up from and out of it, as represented, the lower end of each of them being furnished with a foraminous cone or netting, *c*, to prevent the escape of sparks or cinders from the said receiver C. Such receiver, provided with an extension, *d*, at its bottom or lower part, as shown, is hinged, as represented at *e*, to the smoke-box, and arranged to cover its front end. Furthermore, there leads out of the extension *d* an exhaust-pipe, *f*, which, open at its outer end, is there provided with a cap or cover, *g*, screwed upon it. Into this exhaust-pipe a pipe, *h*, is led, and bent and arranged in the axis of the exhaust-pipe in manner as shown. This pipe *h* is composed of two pipes or sections, connected together by a coupling, *i*, arranged as shown, it being of such a character or construction as will enable the two sections to be connected together with a close joint, or of being separated, for the purpose of allowing the spark-receiver to be swung back from over the mouth of the smoke-box. The pipe *h* leads into a stop-cock, *k*, that communicates with the boiler. By opening the cock, steam may be discharged from the boiler through the pipe *h*, and into and out of the exhaust-pipe *f*, in order to create through and out of the smoke-box a blast sufficient to act on, and expel from it, any deposits, cinders, or sparks that may have collected in it, the cap of the exhaust-pipe being removed from such pipe preparatory to such employment of the steam.

There projects upward from the spark-receiver a mouth-piece, *l*, having its upper edge flush or even with, and directly underneath, the lower end of a conduit, E, leading down from a circularly-curved elbow, G, fixed at one end to and upon the upper end of the chimney H, leading upward from, and out of, the smoke-box. Within the elbow is a vertical partition, I, which runs longitudinally through it from the chimney, as shown. At or near its front end the elbow has two branch educts or pipes, K K, leading out of it in opposite directions, and upward, in manner as represented.

The partition serves to divide the column of smoke while being discharged from the chimney into and through the elbow, so as to cause the gaseous portions thereof to escape in two equal or nearly equal currents through the branch pipes K K, which open out of the elbow at the rear part of its discharging end, in or-

der that sparks by centrifugal force, in passing through the elbow, may separate from the main portions of the gases and enter the conduit E without escaping with such portions by the branch pipes.

There may be in the front end of the spark-receiver an opening, *m*, provided with a door or cover, *n*.

In the operation of my spark-arrester, the smoke and exhaust-steam, in going through the elbow, are revolved in a manner to throw, by centrifugal force, the sparks and cinders of the column into the conduit E, and large portions of the gases and vapor into the branch pipes or educts K K, the sparks, with the rest of the gases and steam, passing into the receiver C, wherein they will be deposited, and from which they may be subsequently removed by the means as set forth, or drawn for being utilized as fuel.

The steam and gases that may enter the spark-receptacle will be discharged therefrom through its educts or chimneys D D.

I provide the spark-receiver extension *d* with a port, *p*, and a closing-cap, *r*, therefor, such port being arranged opposite to the exhaust-educt of such box, and for the purpose of enabling access to be had to the educt for removing from it any sparks in case it may be clogged by them.

The movable smoke-receiver may be provided with a latch, lock, or other suitable means of aiding the holding it in place against the smoke-box when closed upon such.

I claim as my invention as follows:

1. The combination of the elbow-pipe G, its partition I, the two branch educts K K, and the conduit E, all constructed and arranged substantially in manner and for use with a chimney and spark-receiver, as set forth.

2. The steam-jet tube *h*, in two sections, coupled as described, and provided with a stop-cock, *k*, in combination with the boiler A and the spark-receiver C, hinged together and provided with the educt *f*, all being substantially as set forth.

3. The spark-receiver C, provided with a receiving-mouth, *l*, (separate from the conduit E, for the discharge of sparks into such receiver,) and hinged or applied to the open end of the smoke-box B, so as to be removable therefrom, and the conduit E, all essentially as set forth, such open end of the smoke-box being provided or not with a head, as specified.

4. The combination of the spark-receiver C and its discharge chimney or chimneys D with the smoke-box B, the chimney H, the elbow-pipe G, and its three educts E K K, all being arranged and to operate as set forth.

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Witnesses:

R. H. EDDY,

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