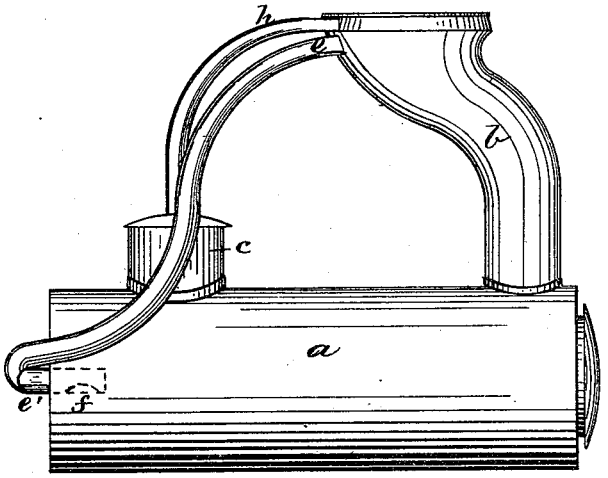
D. R. PROCTOR.

Spark-Arrester.

No. 164,393. Patented June 15, 1875.

Fig. 1.



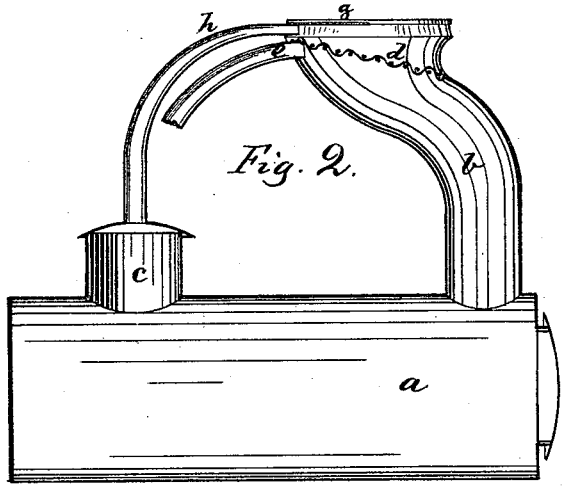


Fig. 2.

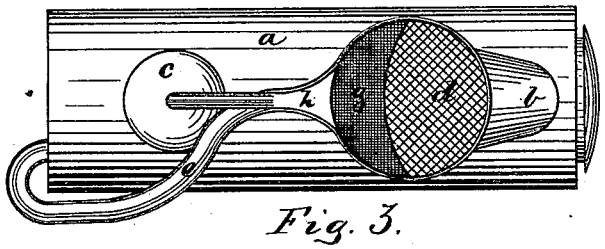


Fig. 3.

WITNESSES.

John R. Heard.

Joseph Storey

INVENTOR.

David R. Proctor.

by Urban Andrew
his atty.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

DAVID R. PROCTOR, OF GLOUCESTER, MASSACHUSETTS, ASSIGNOR TO THE PROCTOR SPARK-ARRESTER COMPANY, OF SAME PLACE.

IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **164,393**, dated June 15, 1875; application filed April 28, 1875.

To all whom it may concern:

Be it known that I, DAVID R. PROCTOR, of Gloucester, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Spark-Arresters; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements on the patent granted to me on the 19th day of December, 1871, No. 122,058, for spark-arresters; and consists in providing a curved smoke-stack with two screens at or near its upper end, in combination with two return-pipes or conductors for the sparks and cinders. The mouth of the first return-pipe is located at the rear of the stack and a little below the first screen. This return-pipe leads to the furnace, and serves to convey the larger sparks and cinders that are capable of being utilized as fuel back again to the furnace to be there consumed. The second return-pipe is also located at the rear of the smoke-stack, and enters the latter between the first and second screens, and serves for the purpose of conveying the fine particles of sparks and cinders, that are incapable of being again used as fuel, and which have passed through the first screen, to the sand-box or any other suitable receptacle, or to be delivered on the track, as may be desirable. The first screen is made coarse, so as to allow fine sparks and cinders to pass through it, and to arrest and convey only the large ones to the furnace, whereas the second screen is made so fine as to arrest nearly all the cinders that have escaped through the first screen, and to convey them to the sand-box or other convenient receptacle. The first screen, being coarse, covers the whole area of the stack where it is located, and this may be done without diminishing the draft very materially; but the upper fine screen may, if so desired, be made to cover only a part of the stack at or near the place where the cinders would be likely to strike, whereas the remainder of the area of the stack may be left open and unobstructed, so as not to interfere with the draft. The gentle curve of the stack and of the return-pipes for the cinders assists very materially in conducting the sparks and cinders to the furnace, and the sand-box or other required place, without interfering with the draft; and, furthermore, the draft in the furnace creates, as it were, a partial vacuum in the pipe leading from the stack to the furnace, by which the large cinders are drawn as well as propelled to the furnace from the stack. A part of the exhaust steam that escapes through the stack is conducted to the furnace, and, being there decomposed into its elementary gases, increases the combustion in the furnace.

On the accompanying drawings, Figure 1 represents a side elevation of my invention. Fig. 2 represents a central longitudinal section, and Fig. 3 represents a ground plan of the same.

Similar letters refer to similar parts wherever they occur on the different parts of the drawing.

a represents an ordinary locomotive or other boiler. *b* is the smoke-stack, and *c* is the sand-box. The smoke-stack *b* is curved in an **S** shape, as shown, and provided, first, with a coarse screen, *d*, that covers the whole of the area of the smoke-stack at the place where said screen is located. An aperture is made in the rear of the stack, directly below the coarse screen *d*, leading into the flue or pipe *e*, the rear of which enters the furnace at *e'*, and projects into the furnace, where an aperture, *f*, is made on the under side, so as to deposit the cinders that are conveyed from the smoke-stack directly onto the grate in the furnace. Above the coarse screen *d* is a secondary finer screen, *g*, located as shown, which screen may be made to cover the whole or part of the top of the smoke-stack. Between the screens *d* and *g* is made an aperture at the rear of the stack, leading into the pipe *h*, through which the fine cinders that have passed through the first screen *d* are conveyed to the sand-box *c* or other desired place.

It will thus be seen that by the employment of a coarse and a fine screen in the stack, and their respective return-pipes, I am able to di-

vide the cinders into coarse and fine parts. The coarse ones, being capable of recombustion, are returned to the furnace, whereas the finer ones are arrested and conveyed to the sand-box or other suitable receptacle.

I am aware that a patent was granted on the 21st day of May, 1872, to J. R. Moffitt, for spark-arresters, in which two screens and two pipes are used, the said pipes, however, being united together, and thereby conveying both coarse and fine sparks and cinders through one final delivery-pipe. This is not my invention, and I do not claim such an arrangement; but

What I wish to secure by Letters Patent and claim is—

In combination with the smoke-stack *b* and its screens *d* and *g*, the independent pipe *e*, leading from an aperture in the smoke-stack below the screen *d* to the furnace, and the independent pipe *h*, leading from an aperture in the smoke-stack below the screen *g* to the sand-box *c* or suitable receptacle, as and for the purpose herein set forth and described.

In testimony that I claim the foregoing as my own invention I have affixed my signature in presence of two witnesses.

DAVID R. PROCTOR.

Witnesses:
EDW. G. HIGHT,
ALBAN ANDRÉN.