J. A. Cutting,

Spark Arrester,

No. 6,559 Patented June 26, 1849.

Fig. 3. B.

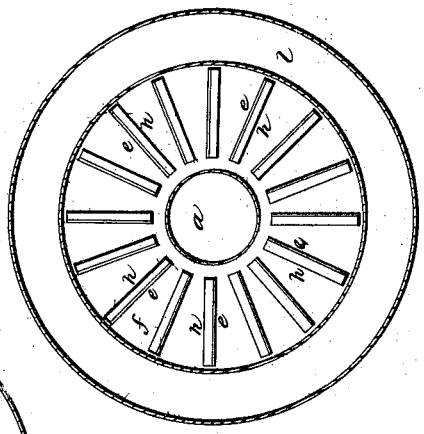


Fig. 2. A. a.

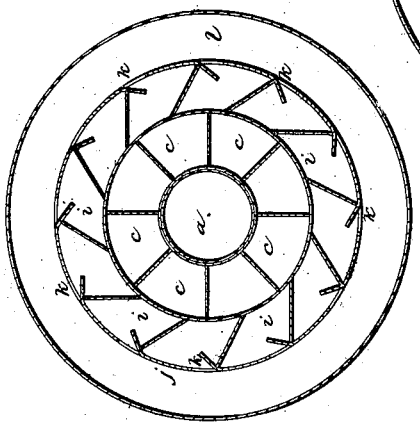
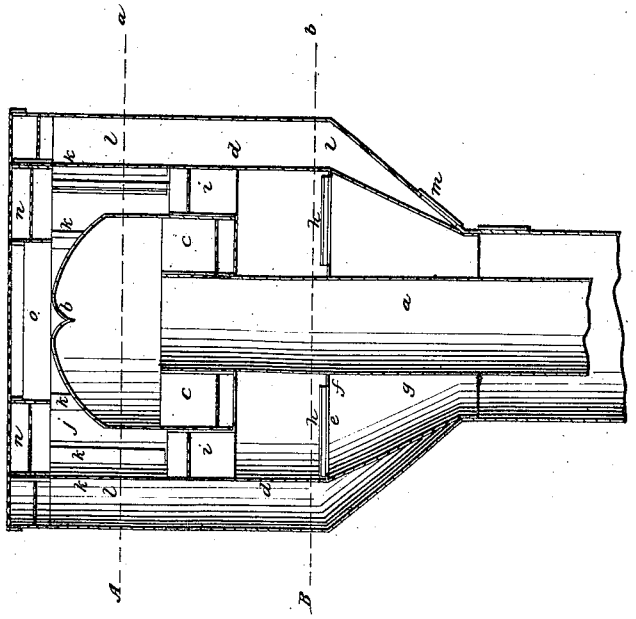


Fig. 1.



UNITED STATES PATENT OFFICE.

JAMES A. CUTTING, OF BOSTON, MASSACHUSETTS.

SPARK-ARRESTER.

Specification of Letters Patent No. 6,559, dated June 26, 1849.

To all whom it may concern:

Be it known that I, JAMES A. CUTTING, of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Spark-Arresters for Locomotive and other Chimneys, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section; and Figs. 2 and 3, horizontal sections taken at the lines (Aa) and (B, *b*) of Fig. 1. The same letters indicate like parts in all the figures.

The object of spark arresters, as may be inferred from the name, is to prevent the escape of sparks from the chimneys of steam and other furnaces, particularly for the use of locomotive steam engines, to prevent the escape of ashes and the solid particles constituting smoke.

Experience has shown that the use of wire gauze or other netting for chimney caps has only the effect to arrest the larger sparks; and as to the other plans which have been devised and essayed for this purpose none have attained the desired object. The cause in a great measure of the failure of most of the plans heretofore essayed is to be found in the irregularity of draft in the chimney induced by the discharge of the exhaust steam into the chimney, which acting by pulsations, occasions corresponding pulsations in the draft, which has the effect not only to force out of the furnace much more solid matter than would otherwise pass out, but at the same time to force through the arrester, no matter how arranged, a much greater quantity of solid matter than would otherwise escape. But although the discharge of the exhaust steam into the chimney has an injurious tendency as regards the escape of sparks, yet its usefulness in giving the required draft is too important to be abandoned, and therefore it is a matter of importance to devise some mode of checking this irregularity while the influence of the exhaust steam on the draft is retained, and so to apply this mode as to afford a better means of depositing the sparks and other impurities than by any mode heretofore known.

The object of my invention is to remedy these evils, and to this end the principle of my invention consists in placing above the top of the chimney a deflecting cap made in the form of an inverted funnel with the outer part bent down all around in a curve to reverberate the products of combustion and force them down, when this is combined with a series of radial and inclined or curved chutes or passages arranged below the deflecting and reverberating cap through which the products of combustion pass, and by which they are at the same time caused to take a revolving motion around the chimney, so that the sparks and other solid matter may be forced into a receptacle below through a series of radial apertures in a diaphragm—each of the said radial apertures being provided along one edge with an inclined flange the better to catch the sparks, etc., and cause them to be deposited,—while at the same time the passage of the currents through the series of chutes has the effect in part to exhaust whenever the force (such as a jet of steam) which impels the draft is momentarily suspended, and thus continue the draft during the pulsations of the jet of steam.

My invention also consists in combining with the reverberating cap and series of radial and inclined or curved chutes, an external series of radial and inclined or curved chutes, outside of the first series together with apertures in the casing leading into an outer receptacle, so that after the products of combustion have been carried around in one direction the current shall be caused to change its direction and also turn upward and outward to pass through the second series of chutes, and while revolving, force the solid particles through the apertures into the surrounding and outer receptacle—the reversing of the direction of the revolution below the two series of chutes having the effect to deposit the solid particles in the lower receptacle more effectually than would otherwise be the case.

In the accompanying drawings (*a*) represents the chimney or smoke pipe, centrally over which is placed an inverted funnel shaped deflector (*b*) which extends beyond the diameter of the smoke pipe in a curved form to reverberate the products all around in a downward direction. Below this and surrounding the smoke pipe there is a series of radial inclined or curved planes forming

a series of chutes (*c*) through which the products of combustion pass, and by which they are caused to revolve around the chimney and gradually to spread out toward the casing (*d*); but by this downward and rotative direction much of the solid matter is thrown down through a series of radial apertures (*e*) in a diaphragm (*f*), into a receptacle (*g*) below, the said apertures being each provided with an inclined flange (*h*) along one edge to facilitate the deposit of the sparks and other solid matter. But as there is no escape at bottom for the gases, they take by reason of the rotation an outward and upward direction to and through a second series of inclined chutes (*i*) formed like the first series, and on a level therewith but inclined or curved in such manner that the direction of the rotation of the gases is reversed so that below the series of inclined chutes there are two currents, an inner one, in one direction, and an outer and upward one in the opposite direction. The second series of chutes is surrounded by a casing (*j*) with vertical apertures (*k*) at given distances apart and extending from the upper part of the chutes nearly to the top of the apparatus, so that the circular motion of the outer current will force the remaining particles of solid matter through the apertures (*k*) into a surrounding receptacle (*l*), from which they can be removed through a door (*m*). At the top there is a series of chutes (*n*) extending over the series (*i*), and having a like inclination through which the gases escape, but as there is an open circular space (*o*) in the middle, such of the gases as are the lightest will be forced out there; and then, if desired, a wire gauze covering may be put over the whole.

The passage of the gaseous products of combustion through the various series of chutes by the force of the draft produced by the rarefaction of the jets of exhaust steam always employed for this purpose, will have the effect, during the momentary suspensions of the force of the jets of steam, to exhaust and thereby continue and equalize the draft, and thus avoid much of the evil effects of the pulsations pointed out.

I have stated above that the chutes are made inclined or curved because both modes will answer the purpose and produce to a certain e xtent the same result; but I prefer to make them curved, as represented in the drawings, as that more nearly corresponds with the direction of the currents.

What I claim as my invention and desire to secure by Letters Patent is—

1. The deflecting and reverberating cap and the chimney in combination with the first series of inclined or curved chutes, below the top of the chimney substantially as described.

2. I claim the perforated diaphragm below the chutes, in combination with the inclined chutes and cap, substantially as described.

3. I claim the second series of inclined or curved chutes in combination with the first series of chutes, the cap, and the chimney, substantially as described.

4. And finally I claim the surrounding apertures leading into a receptacle for sparks in combination with the two reversed series of inclined shutes, substantially as described.

JAMES A. CUTTING.

Witnesses:
C. S. BARTLETT,
S. R. GRIGGS.