

S. Swett, Jr.,
Spark Arrester.

No. 7,790.

Patented Nov. 19, 1850.

Fig. 1.

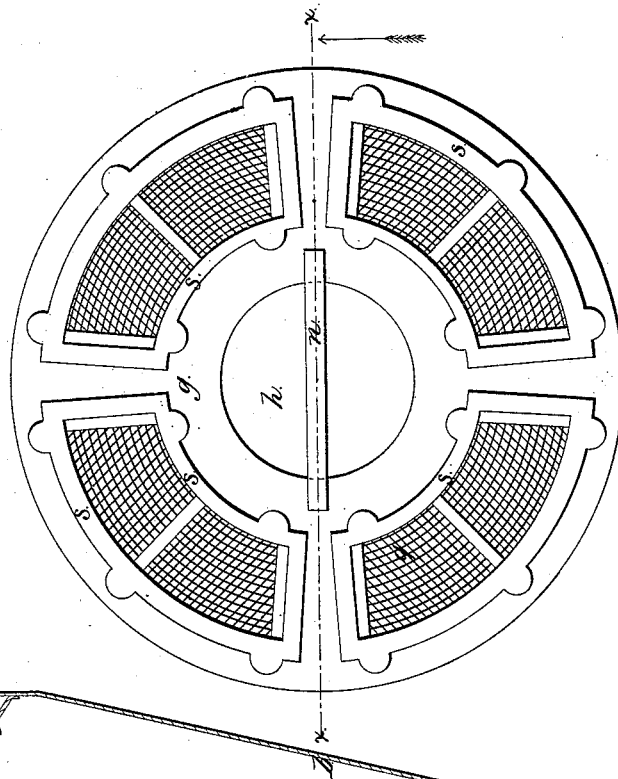
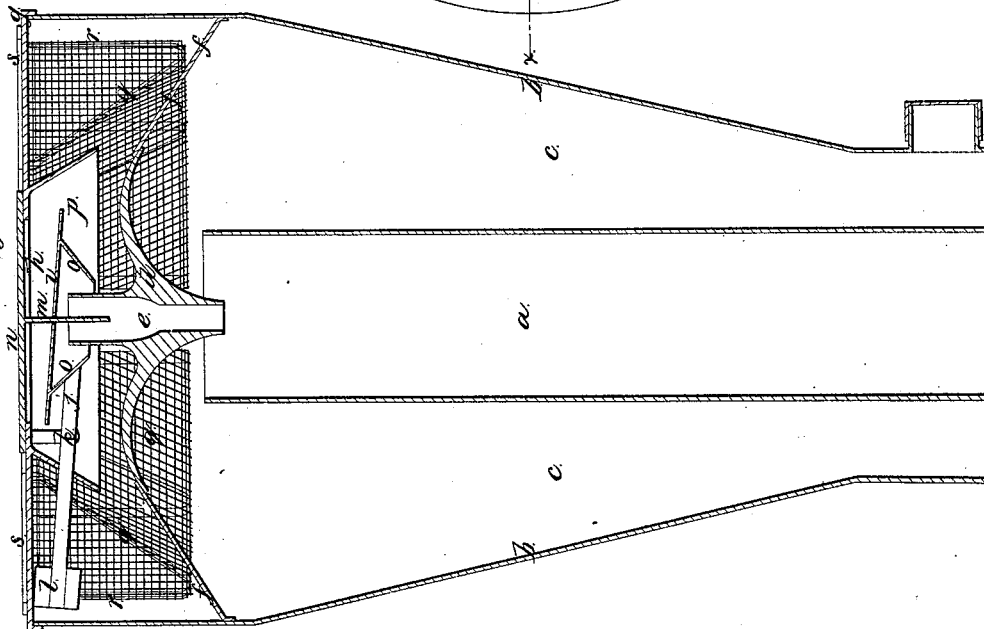


Fig. 2.



UNITED STATES PATENT OFFICE.

SAML. SWETT, OF NEW YORK, N. Y.

SPARK-ARRESTER.

Specification of Letters Patent No. 7,790, dated November 19, 1850.

To all whom it may concern:

Be it known that I, SAMUEL SWETT, of the city, county, and State of New York, have invented certain new and useful Improvements in Spark-Arresters for the Chimneys of Locomotives and other Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan and Fig. 2 a vertical section.

The same letters indicate like parts in all the figures.

It is well known that in the furnaces of steam boilers, particularly for locomotives, the draft is excited by the discharge of the exhaust steam within the chimney which produces a very active current carrying with it sparks from the furnace. To prevent the escape of these sparks caps made of wire gauze or finely perforated sheets of metal have been employed, arranged in various ways; but, so far, these have been attended with only partial success; and the want of success has been due in a great measure to two causes, viz: Before the exhaust steam is discharged into the chimney—which is always the case when the engine is not in action—there is not sufficient draft; and when the exhaust steam is discharged in the chimney the current thus induced is carried against the wire gauze with such force that the more minute sparks escape through the meshes or apertures of the cap, and the substance of which the cap is composed is greatly injured by the force and directness of the current.

The object of my invention is to avoid these defects.

The nature of the first part of my invention consists in combining with the chimney, the surrounding jacket and cap, a valve for governing an aperture in the top of the cap, so balanced or weighted that it shall open by gravity to allow the direct draft of the chimney, when the exhaust steam is not discharged into the chimney, and closed by the force of the current when the exhaust steam is discharged in the chimney, that the current may be compelled to pass through the apertures or meshes of the cap. And the nature of the second part of my invention consists in making the cap with the fine gauze or perforated plates arranged over the space between the chimney

and outer jacket, with the inner surface in the form of a hollow frustum of a cone or sections of conical frustra, when this is combined with a curved deflector provided with a central tube placed over the central tube or chimney, and a ring surrounding the apertures governed by the valve and made in the form of a hollow frustum of a cone, placed within and at some distance from the conical surface of the wire gauze, whereby the current which passes through the central tube of the deflector and strikes the valve is deflected downward and outward, causing the sparks and other solid particles to drop in the space between the chimney and outer jacket, instead of impinging against the wire gauze.

In the accompanying drawings *a* represents the chimney and *b* the surrounding jacket, leaving a space *c* between for the reception of the sparks and other solid matter carried over by the draft. Just over the upper end of the chimney and some distance above it, there is a deflector *d* with a central tube *e* concentric with the chimney. The lower part of this deflector is within the chimney, rises in a curve and then extends some distance beyond the outer periphery of the chimney in a downward curve. The edge of this deflector is sustained in its place by means of braces *f*, attached to the outer jacket. The whole is covered by a plate *g*—fitted by appropriate flanges, or in any other suitable manner, with the jacket,—and this plate has a central aperture *h*, of about the diameter of the chimney, to which aperture is fitted a disk valve *i* placed below it and just over the central tube *e* of the deflector. This valve is hung on one end of a lever *j*, turning on a fulcrum pin *k*, and provided with a counter weight *l*, at the other end, which weight should be so proportioned to the weight of the valve, say, half a pound less, that when the draft in the chimney is due simply to the rarefaction of the column, the valve shall preponderate and leave the aperture *h*, open for the direct draft, but when the draft is excited or increased by the discharge of the exhaust steam within the chimney according to the usual practice, the force of the current, acting against the lower face of the valve, shall overcome the weight and keep it closed.

I have found in practice that with a valve of 17 inches in diameter on a locomotive,

the weight of the valve should be half a pound greater than the counter weight. The valve is kept in a central position by flaying on a central rod *m* attached to a bar *n*, extending over the aperture *h* of the top plate. From the lower face of this valve and of less diameter projects downward a ring *o* in the form of an inverted frustum of a cone which fits over the central tube *e* of the deflector when the valve is down. And from the lower surface of the top plate *g* and surrounding the valve projects downward another ring *p*, in the form of a hollow frustum of a cone; and then outside of and at some distance from the ring *p*, are arranged segments made of wire gauze, such as is usually employed in making spark arresters. The inner face *q* of these segments is parallel with the ring *p*, and the outer face *r* cylindrical, the two faces uniting at the lower edge. They are placed just over the space *c* and attached to segment flanches *s* fitted to apertures in the top plate, and there secured in any desirable manner. These segments thus formed present inside each four faces of wire gauze, the conical, the cylindrical and two end faces, the top being open. Instead of wire gauze these surfaces may be made of perforated sheet metal.

When the furnace is in action with a draft due simply to the rarefaction of the column, the valve will be in the position represented in the drawings, and the current will then pass up the chimney, be deflected outward by the deflector, thence pass around the edge thereof, up between the edge of the valve and the ring *p*. But when the exhaust steam is introduced, the force of the current through the central tube *e* of the deflector will act with sufficient force against the

under face of the valve to keep it closed; and then the current striking the deflector will be reverberated, the sparks and other solid parts thrown down while the gaseous products of combustion escape through the meshes of the wire gauze, but that part of the current which passes up through the central tube *e* will be deflected, and passing down will receive from the ring *p*, a direction downward to throw down the sparks and other solid particles and thus prevent them from impinging on the wire gauze.

Having thus described the principle or character of my invention and the method of constructing and using the same, what I claim as my invention and desire to secure by Letters Patent is—

1. Combining, in manner substantially as described, with the chimney the surrounding jacket and the cap, a valve for governing an aperture in the top plate of the cap, so balanced or weighted that it shall open by gravity, when the furnace is working under a draft due to the rarefaction of the column, and be closed by the force of the current when increased by the exhaust steam in the chimney, for the purpose and in the manner substantially as described.

2. And I also claim in combination with the valve and the wire gauze, or the equivalents thereof, and the deflector over the chimney, all arranged substantially as herein specified, the central tube of the deflector and the conical ring within the wire gauze, substantially as herein specified and for the purposes set forth.

SAMUEL SWETT.

Witnesses:

CAIN BROWNE,
BIRDSEY C. LAKE.