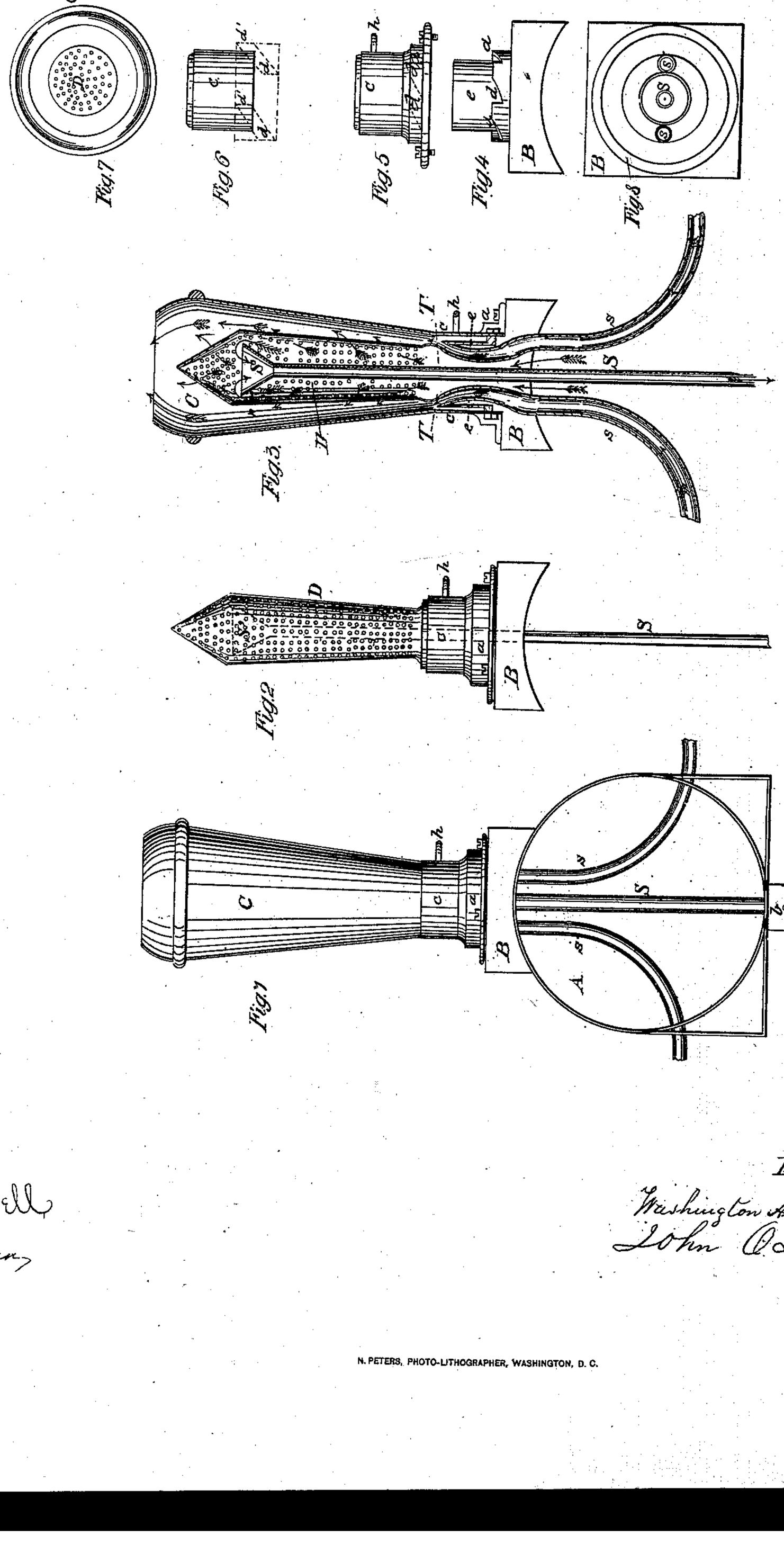
Peaslee & Lilly,

Spark Arrester.

No. 26,373. Patented Dec. 6, 1859.



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W. A. PEASLEE AND JOHN O. D. LILLY, OF INDIANAPOLIS, INDIANA.

SPARK-ARRESTER AND CHIMNEY FOR LOCOMOTIVE-ENGINES.

Specification of Letters Patent No. 26,373, dated December 6, 1859.

To all whom it may concern:

Be it known that we, WASHINGTON A. PEASLEE and JOHN O. D. LILLY, of Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Improvement in Chimneys and Spark-Arresters for Locomotives; and we hereby declare that the following is a full and exact description.

The nature of our invention consists in providing a perforated spark and smoke cone—within the chimney stack proper—and forcing, or drawing all the products of combustion through the perforations by a centrifugal action given to said products by means of a continuous current of exhaust steam passed up along the outside of this perforated cone, and between it and the inside of the chimney. In this way, a more perfect and uniform exhaust is kept up and maintained, than by any of the other known plans.

To enable others, skilled in the art, to manufacture and use our invention, we will now proceed to describe its construction and operation.

Figure 1, is an elevation of chimney and smoke arch, box, or reservoir, (viewed from the standpoint of the engineer in his cab) showing the manner in which the exhaust pipes enter the said chimney—also the waste pipe for redundant sparks, that are arrested in their outward passage. Fig. 2, is an elevated view of the perforated cone, through which all the products of combustion make their escape. Fig. 3, is an elevated sectional view of the chimney,—perforated cone,—waste spark tube,—saddle for chimney, and all else pertaining to the device. Fig. 4, is a view of the chimney saddle, and the lower inclined planes—by means of which the escape throat is enlarged, or diminished, at the will of the engineer. Fig. 5, is an elevated view of the collar which surrounds the escape throat, and which also supports the outer chimney case. Fig. 6 is an elevated view of the above collar proper—showing the pins and, by dotted lines the inclined slots in which these pins play, to elevate, or depress the chimney. Fig. 7, is a top view of the chimney and the perforated cone within. Fig. 8 is an underside view of the saddle showing the manner in which the exhaust pipes enter it; also the relative position of the tube, for waste sparks, to these exhaust steam pipes.

In the following description, the same letters always refer to like parts: to wit:

C, is the outer case of the smoke chimney (except a supplementary wooden jacket, which will be referred to hereafter.) In this stack, we gain a great advantage, by using a much smaller chimney than is now necessary, in the other plans.

c, is the collar (or upper part of the chimney saddle B.) Upon this the chimney C is coupled by a simple slip-joint.

h, is a handle, or lever, to which a rod is attached, running from the engine cab;—placing the draft under his control for elevation or depression—as occasion may require.

a, is an outer case to the collar *c*, and serves to connect it to the saddle B by means of small screws, or bolts.

B, is a cast iron saddle, made to fit on the top of the engine boiler above the smoke arch A.

s, *s*, are eduction pipes, for the escape of exhaust steam—from the boiler—up the chimney.

S, is a waste pipe, for the downward escape of large supernatant sparks—said sparks being collected in their evolutions in the top of the perforated cone D, by means of the spark tunnel S′, and, thence conducted downward into the bath box, *b*, where they are immediately extinguished in water—in said box, an escape orifice shown in the picture.

D the perforated cone within the chimney proper, and made about one half its size in diameter. The waste pipe, S, for sparks, is in the center of this cone, and is held in a central position by stays diverging from the tunnel S′. This perforated cone may be made of sheet iron, or, it may be made of wire gauze—or any equivalent material—the only essential condition required that its perforations be in excess of the amount of combustion products. The spark waste pipe, S, may be about two inches in its bore—the exhaust pipes, the same—more or less.

The supplementary exhaust collars *c*, and *e*, are so arranged as to allow the exhaust steam to pass up between them the exhaust steam being first admitted underneath them, in the saddle B, through the two pipes *s*, *s*, and from thence distributed around the entire circumference of the collar, *e*, between it and the collar, *c*,—thence passing upward

between the perforated cone D, and the external stack C, to the place of egress at the top of chimney.

d', and *d'*, are pins projecting from the collar, *c*, these pins sliding in the inclined-plane slots, indicated by the dotted lines in Fig. 6.

s, *s*, being the steam exhaust pipes—these passing up into the saddle B through the smoke arch, (from lateral points,) having their termination in an annular space surrounding the base of the perforated cone D—the direction the steam takes is indicated by the double barbed arrows—thus "⋙⟶⟶," in contradistinction to the direction of the products of combustion, as indicated by the single barbed arrows.

By reference to Fig. 3, it will be seen that there is an adjustable throat or annular outlet for the steam, in passing from the exhaust pipes, *s*, *s*,—which is marked by the letters T, T; this throat can be enlarged, or contracted by the rotation of the saddle collar *c*, through the intervention of lever *h;* passing it to the left, lifts the chimney, or smoke stack—and thus contracts the said throat; while passing to the right, lowers the stack, and so enlarges the said throat. By a close view of this part of our invention, it will be seen that there are two prominent points standing opposite each other—one on the immovable projection of saddle B, and the other on the inside of collar *c*. Now, when collar, *c*, is dropped below the other, the throat for the passage of steam is enlarged, but, when raised so as to bring these projections opposite, the said steam throat is contracted to its smallest dimensions.

The advantages we claim for this invention over all others, constitute to some extent its plea of novelty in an economical point of view;—its philosophical adaptation to the functions it has to perform, completes—as we verily believe—its claims to superior novelty and practical usefulness over any and all other locomotive chimneys.

These points are more fully explained in the following description of the "operation" of our invention: viz: The flame, and products of combustion, pass up into the perforated cone D, around the spark waste pipe, *s*, and escape from this cone into the steam chamber—centrifugally—and, thence up and out at the top of chimney, C. The exhaust steam passes up the pipes—*s*, *s*,—through the throat T, into the annular space, around the perforated cone, (and within the chimney C,) to the place of egress at the top of same.

Now we are aware that it is no new thing to form a draft of air for the more perfect riddance of smoke, sparks, &c., by means of a current of steam, as experiments in "Ewbank's *Hydraulics and Mechanics*" are delineated, where steam is used for the elevation of water &c., but, in all such experiments the steam is passed up through a central tube, or nozzle, the draft acting upon a substance or substances on the outside of said current of steam. This peculiar feature of all known plans, similar to this, is mentioned, in order that the real operation, or rationale, of our mode of producing a draft, may be more fully comprehended. We pass the steam up, on the outside of the smoke, sparks, &c., and by so doing we not only bring a larger proportion of steam to bear upon these products of combustion—than the reverse plan would do—but, by surrounding the escaping sparks &c. with steam we effectually drown out and extinguish all supernatant sparks, &c. The advantages of this are self-evident. In this arrangement of ours, the steam is forced up the chimney with such a velocity as to suck, or draw the air, smoke, &c. from the furnace, through the flues, and up the perforated cone, and thence out at the top of chimney through the perforations—as indicated by the course of the single barbed arrows.

When we desire to raise steam, in an engine boiler speedily, we simply rotate the collar, *c*, so as to contract the throat T, and, when a sufficient supply is produced we rotate it back and so enlarge this steam throat to suit the exigencies.

To prevent the condensation of steam in the chimney (and consequently to prevent a retardation of its velocity) we contemplate surrounding the chimney C, with a wooden jacket during cold weather. This is not shown in our model or drawings, and, of course is optional with the users, and, in equatorial localities is not needed at all.

Observe the tunnel S', at the top of spark tube S, and the direction of the curved arrows over it. These arrows indicate the direction of supernatant and large sparks—too large to escape through the perforations of the cone D. As they are drawn up the cone—seeking egress into the steam channel without—they strike the pyramidal apex of said cone, and so, with a rebound, are caused to drop back into the tunnel S', and thence by their own gravity (being away now from the drawing influences of the steam) drop down through the tube S, into the bath box *b*, where, a constant supply of water drowns them out.

We are aware that returning sparks simply from the top of the chimney, is not new, but, no one has hitherto returned them in such way as to utterly preclude the possibility of choking the tube which conducts them—our tube passing down perpendicularly, while others pass at an angle of forty-five degrees—and, at the same time, are necessarily much longer.

In applying our invention to any common locomotive, no cutting, or mutilation is required, more than simply the cutting of two holes for the egress of the steam pipes *s*, *s*, as seen in Fig. 8. These holes are covered and guarded by the cast-iron saddle B. The chimney is simple in construction, light in weight, cheap, and besides performing the functions of a most perfect draft for the fire and spark arrester, and extinguisher, (all of which it performs in a superior degree) is durable to an extent equaled only by its exact adaptation to the purposes for which it is designed.

Having now described our invention in full, what we claim as new, and desire to secure by Letters Patent is—

The construction of a chimney, or spark arrester, by the combination and arrangement of the various parts, substantially as they are described in the foregoing specification, and for the purposes mentioned.

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