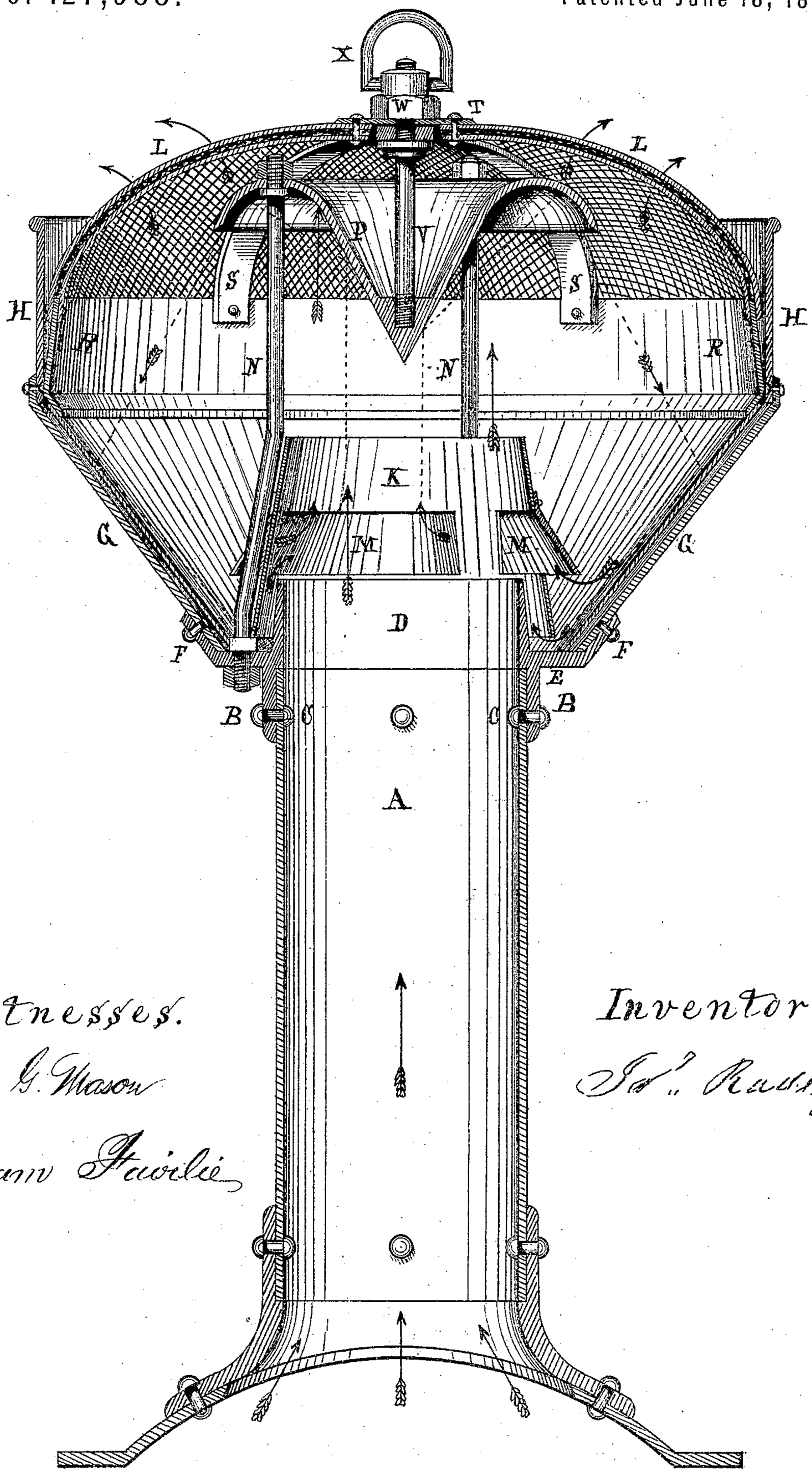
JAMES RADLEY.

Improvement in Locomotive Spark-Arrester.

No. 127,988. Patented June 18, 1872.



Witnesses.

Charles G. Mason

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UNITED STATES PATENT OFFICE.

JAMES RADLEY, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN LOCOMOTIVE SPARK-ARRESTERS.

Specification forming part of Letters Patent No. 127,988, dated June 18, 1872.

To all whom it may concern:

Be it known that I, JAMES RADLEY, of the city of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Locomotive Spark-Arresters; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing and to the letters marked thereon, by which the several parts are indicated.

Heretofore the spark-arresters of locomotive-engines have been so constructed that to make renewals or repairs of any of their parts required that the engine should be laid up or kept out of use till such renewals or repairs would be completed. Such spark-arresting apparatus was also, for the most part, so defective in principle that pieces of burning fuel were frequently ejected from the stack, to the great danger not only of the cars immediately attached to the engine, but to the property also adjacent to the railroad; and it is well known that fires involving great destruction of property have originated from this cause. Such arresters were usually so arranged and constructed as to collect and retain the sparks in a chamber provided for that purpose; but it is found in practice that upon such chamber becoming filled with the sparks the apparatus would cease to act efficiently, and the ignited sparks would then be driven out of the stack with great force.

The object of my invention is to obviate the above-referred-to difficulties, first, by such a construction of the apparatus as will permit of its being readily and quickly taken apart or put together, thus rendering it unnecessary to lay up the engine, or even to let down the steam for the purposes of renewal or repair; and, secondly, by such arrangement and construction of the parts of the apparatus and their conjoint operation as will effectually prevent the emission of such sparks as would be capable of carrying fire from the smoke-stack.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation.

I place at a proper height upon a smoke-pipe or chimney, A, of the ordinary cylindrical form the flanged casting B B, and secure it to the chimney by bolts or rivets passing through the casting and the sheet-iron of the chimney, as shown at C C. The central part D of the casting forms a continuation of the chimney A, and has the same internal diameter, and is made to sit or rest upon the top edge of the chimney A, so as to relieve the rivets or bolts of the incumbent weight of the apparatus. Around the central portion D of this casting, and about four inches below its upper edge, is a horizontal projection or floor, E, about three inches in width. On the outer edge of this floor there is a bevel-flange, F F, turned upward and outward to carry the top chamber G G, and to which it is secured by rivets or small bolts. The upper edge of the outer casing of the chamber G G is turned up into a vertical flange, to which the cylindrical belt H H or top part of the smoke-stack is secured, which embraces and protects the wire-gauze covering L L of the smoke-stack.

This completes the whole outer casing of the apparatus, and it may be attached permanently by rivets to the top of the chimney A, as it is not liable to injury or wear from use; but if screw-bolts be used instead of rivets to secure the flange casting B B to the chimney, the whole apparatus may be disengaged from the chimney by simply removing such screw-bolts.

The conical part G G of the top chamber is lined with sheet-iron to protect it from the abrading action of the sparks from the high velocity at which they are moved, and is secured in place by the bottom flange of the top covering of the stack resting upon it, as shown. Around the top piece D of the chimney I place the conical piece K of sheet-iron, and having three or four longitudinal openings cut through it, as shown at M M, about three inches wide, and having a piece of sheet-iron riveted to the upper edge of each, and flaring outward at bottom, so as to make an opening of about an inch and a half wide, like an inverted pocket. This conical piece has the same diameter at top as the chimney A, but is sufficiently large at bottom to make an opening or space an inch wide around the base of the cast-iron part D of the chimney, which it embraces; and the lower edge is one inch from the horizontal floor E of the casting

B B, so as to make an opening all around it. Around the conical piece K I place three or four standards, N N, of three-quarter inch round iron, and at equal distances apart, and so as to be between the pocket-shaped openings M M in the conical piece K. The lower ends of these rods or standards pass through the horizontal part E of the casting B B, and are secured to it by nuts above and below, as shown. The upper nuts serve also to support the conical piece K by taking under its lower edge. These standards are made to take or conform to the taper or slope of the conical piece K, and by that means secure it to its proper position centrally over the chimney A. On the upper ends of the standards N N is mounted the cast-iron deflecting-cone P, through which they pass, and it is secured in place by nuts above and below the casting, as shown. The whole upper portion of the top chamber G G is covered and inclosed by a bonnet, L L, having a sheet-iron rim, R R, about six inches wide, and made with a beveled edge at bottom to rest upon the sheet-iron lining of the chamber G G. To this rim are attached six ribs, S S, of flat bar-iron, secured at the center to a circular plate or disk of No. 10 iron, eight inches in diameter. Over these ribs is spread wire-gauze for the purpose of preventing the escape of the sparks till they are so reduced in size as to be too small to carry fire from the stack. This gauze is secured to the rim and to the central disk at top. The deflecting-cone P has secured to it, as shown, a central bolt, V, having a screw cut upon its upper end, and passing through the central plate or disk T of the bonnet, and having also a nut or collar for the support of the said center plate and bonnet, and a nut, W, on top of the center plate, by which the bonnet L L and lining of the top chamber G G are secured in their respective places. The nut W is furnished with a bail, X, jointed to its opposite sides, by means of which bail the whole apparatus or stack may be removed from or placed upon the engine; or, by removing the nuts from the bottom ends of the standards N N, the deflecting-cone P, conical piece K, and bonnet L L may be lifted clear off the chimney A, thus leaving the sheet-iron lining of the top chamber, so that it can be lifted out or renewed.

In this manner any of the parts of the apparatus may be removed or replaced with new pieces, when duplicates are in readiness, in a few minutes, without cutting a single rivet or stay-bolt, and without necessarily causing a delay in the use of the locomotive.

I shall now explain the operation of the apparatus as a spark-arrester.

The draught being established in the chimney by the action of the exhaust steam through the blast-pipes in the usual manner, as indicated by the arrows in the drawing at the smoke-arch and in the chimney, the sparks which are carried up by the draught are first impinged against the deflecting-cone P, and from its surface downward against the inclined sides of the top chamber G G, and then down to the bottom E of the said chamber, from which position they are drawn back into the conical piece K on top of the chimney, through the space around its bottom edge and the pocket-shaped openings M M in its sides, as indicated by the arrows. The sparks, being thus rotated in the apparatus, and so frequently impinged against the deflecting-surfaces, become so reduced, crushed, or pulverized that they finally pass off from the apparatus in the form of dust with the gaseous products of combustion and the exhaust steam through the meshes of the wire-gauze of the bonnet, and thus effectually prevent the accumulation of sparks in the upper chamber, or the carrying of fire from the stack.

In experimenting with an apparatus constructed as herein described, it was found to work well, and to present so little obstruction to the draught that the engine was enabled to make an abundant supply of steam with a greatly-enlarged area of the exhaust-orifices, and a consequent reduction in the back pressure on the pistons of the steam-cylinders.

Having now described my invention, and the manner of constructing and arranging the same so as to produce a useful effect, to which exact details of construction, however, I do not limit myself, as the same may be varied in some respects without thereby changing the principle or character of the device, what I claim therein as new, and desire to secure by Letters Patent of the United States, is—

1. The flanged casting B B, forming the vent or mouth of the chimney and support for the top chamber, constructed and arranged substantially as described.

2. I claim the combination of the deflecting-cone P with the top casting B B of the chimney, in the manner and for the purpose set forth.

3. I claim the middle openings M in the conical piece K of the chimney, constructed in the manner and for the purpose described.

4. I claim the sheet-iron lining of the top chamber, when constructed and secured in the manner and for the purpose substantially as described.

5. I claim the central nut of the bolt V and the bail or eye attached to it on top of the bonnet of the stack, by which the top portion of the apparatus is secured in place, and by which, also, the top portion of the apparatus or the whole stack may be removed or replaced, substantially as described.

6. I claim the method of confining and se-

curing the conical piece K of the chimney to its place by means of the standards N N, substantially as described.

7. I claim the combination and arrangement of the openings and deflecting-surfaces of the apparatus whereby the sparks are rotated and impinged against the deflecting-surfaces, as indicated by the arrows in the drawing, till they are so crushed and pulverized as to pass off readily with the gases and exhaust steam through the wire-gauze covering of the stack, substantially as described.

JAS. RADLEY.

Witnesses:

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