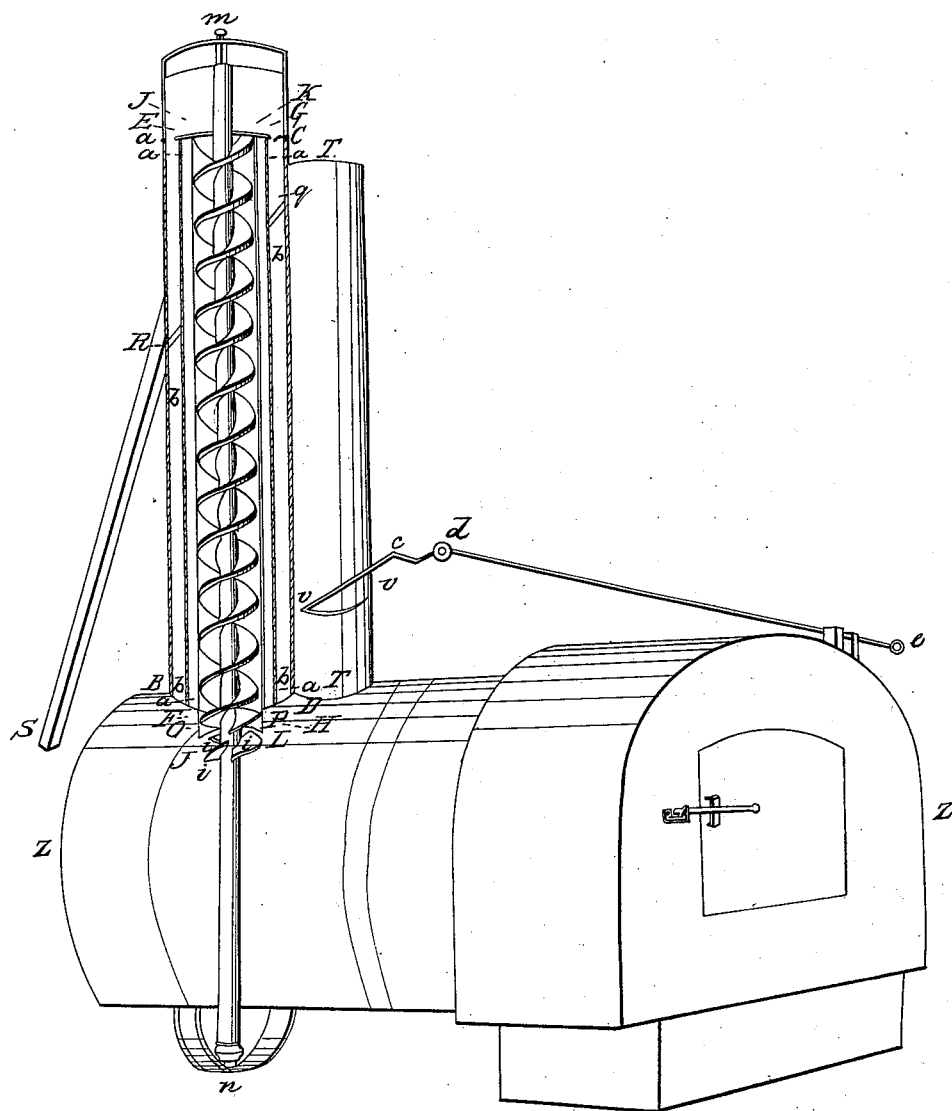


*S. Gibson,*  
*Spark Arrester,*  
*Nº 5,123, Patented May 22, 1847.*



*Witnesses:*  
*J. H. Swaby*  
*J. H. Martland*

*Inventor:*  
*Samuel Gibson*

# UNITED STATES PATENT OFFICE.

SAMUEL GIBSON, OF MANAYUNK, PENNSYLVANIA.

## SPARK-ARRESTER.

Specification of Letters Patent No. 5,123, dated May 22, 1847.

*To all whom it may concern:*

Be it known that I, SAMUEL GIBSON, of Manayunk, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Machine for Preventing Sparks from Issuing from the Flue or Smokepipe of Locomotive-Engines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making a part of this specification.

The flue consists of three cylindrical pipes one within the other marked in the drawing A, B, C, D, E, F, G, H, I, J, K, L, the purpose of which will appear below. The outer and second pipes are made (in the ordinary sized engines) about four inches apart, united at bottom by the upper surface or top of the boiler, on which they are fixed. The space or apartment between these two pipes *b, b, b, b*, has no communication with the interior of the boiler. The third or innermost pipe I, J, K, L, is movable so as to revolve freely within the second pipe, and passes into the boiler through an orifice F, H, in the top, or upper surface, thereof, exactly of the interior diameters of the second pipe, terminating about a foot below the upper surface of the boiler. It contains a shaft M, N, running from the crown at the top of the flue, down through the boiler passing out at the bottom through an orifice of a diameter just large enough to embrace the shaft but not so tightly as to prevent its revolving freely, terminating in a pivot resting on a step N, beneath the boiler. To prevent the rising of this shaft with its fixtures from the step on which it plays, a screw M, passing through the crown of the flue, described hereafter, presses vertically on the head of the shaft which is hollowed out to receive it. Surrounding this shaft are two spiral inclined planes or flanges I, O, K, P, forming a double threaded screw which terminates at the lower end of the inner pipe; the outer edges of these flanges are attached to the innermost pipe and their inner edges to the shaft which they surround. The innermost pipe I, J, K, L, is therefore fixed to, and revolves with the shaft M, N. The part of the boiler into which this pipe with its shaft enters as above described is that portion farthest from the furnace, and which in the ordinary locomotive engines is partitioned off

from the rest of the boiler, and into which the smoke and waste steam are discharged previous to issuing from the flue or smoke pipe. This construction of the boiler being that ordinarily in use and constituting no part of this invention is not therefore more particularly described. Immediately below the termination of the innermost pipe and its spiral planes and within the same part of the boiler, four inclined fans or flanges *i, i, i*, are fixed upon the shaft running in the same direction with the spiral planes making each about one fourth of a turn around the shaft and being of a sufficient size to catch the steam and by its action upon them give a revolving motion to the shaft M, N.

Below the top of the pipes at the distance of about one fifth of their length and between the outermost and second pipes there is a transverse plate or partition *q, R*, inclining downward toward the front of the engine at an angle of about forty five degrees; and on the front side of the outer pipe, immediately above the lower edge of the partition plate is an orifice or vent by which the sparks and cinders which fall on the partition *Q, R*, are discharged through a fourth pipe *R, S*, leading from the first pipe A, B, C, D, passing obliquely down and terminating just in front of the boiler.

The purpose of the triple pipe is as follows: The space between the outer and second pipe above the partition plate serves as a chamber into which the cinders and sparks are thrown after they have issued from the innermost pipe, previous to their being discharged upon the road below the engine. Were there but two pipes, viz. the innermost and the outer, the cinders would be apt, in falling upon the inclined partition plate, to get between that and the revolving pipe where it passes through the plate, and thus produce a friction which would stop its motion. Nor would a mere collar, surrounding the revolving pipe where it passed through the inclined plate, prevent this effectually. The additional pipe is therefore necessary at least from the inclined plate upward,—and by extending it downward as in this description so as to rest on the boiler like the outer pipe, the apparatus is made more firm and steady. There should also be a small space between the second and innermost pipes in order that any dust or other matter accidentally getting between

them, might not clog or prevent the free revolution of the innermost pipe. The screw might be made with a single thread but would not in that case revolve so steadily and freely. The space between the second and innermost pipes should be covered at top and bottom by transverse plates or collars E, I, K, G, F, H, so as to prevent any of the draft from passing between them. On the top of the outer pipe is a cap or crown A, M, C, which is terminated by an arch through which the screw M, passes that keeps the shaft in its place as already mentioned. This cap is cylindrical and the outer pipe is continued by it several inches above the two inner ones. The outer pipe may be made so much longer than the inner ones, as to render any other cap unnecessary except a mere cover.

20 The operation of the machine is as follows: When the engine is set in motion, the steam by acting on the fans *i, i, i*, at the bottom of the inner pipe, gives a rapid revolving motion to the shaft M, N, carrying the inner pipe I, J, K, L, and then passing with the smoke &c. into the spiral flue

formed by the inner pipe I, J, K, L, and spiral planes I, O, K, J, keeps up and increases that motion; issuing out of the top I, K, of the inner pipe, from whence the sparks and cinders are thrown with violence against the inside of the outer pipe, or its cap A, M, C, and then falling down on the partition plate Q, R are discharged by the oblique pipe R, S, downward upon the road.

When the apparatus is not in motion the smoke is discharged by a pipe of the ordinary construction T, T, made to open and close with a valve *v, v*, at the bottom of it, placed behind the triple pipe or spark catcher. The valve is managed by a crank *c, d*, and rod *d, e*, passing to the hand of the engineer.

What I claim as my invention is—

The combination of the triple pipe and the revolving screw, and in combination therewith the oblique partition plate and discharge pipe.

SAMUEL GIBSON.

Witnesses:

S. H. MARKLAND,  
GEORGE L. ASHMEAD.