

W. D. FARRAND.
Spark-Arresters.

No. 141,869.

Patented August 19, 1873.

Fig. 1.

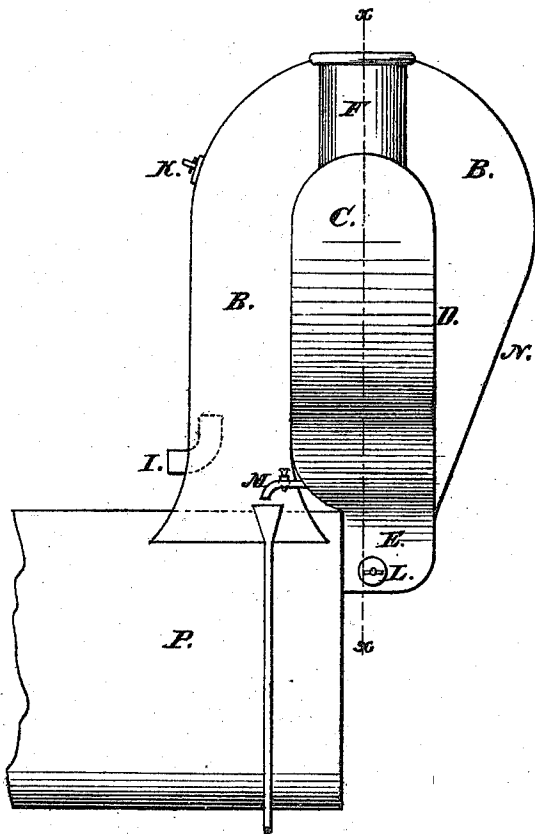
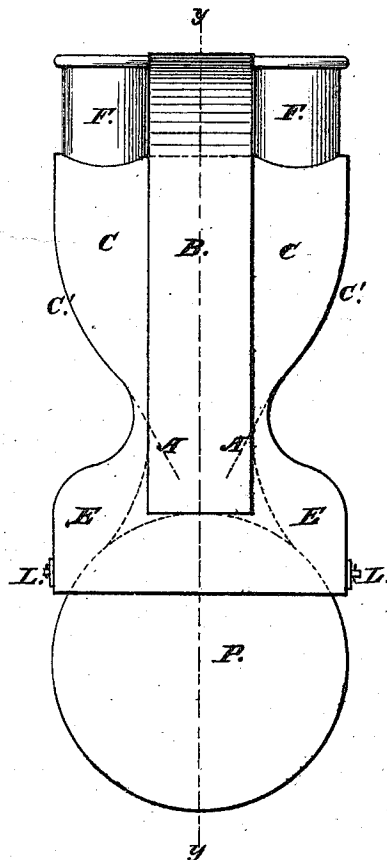


Fig. 2.



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Fig. 3.

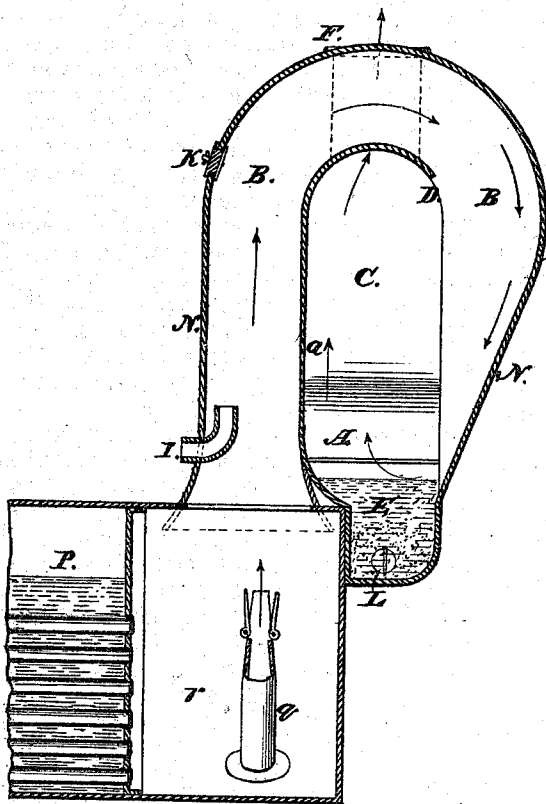
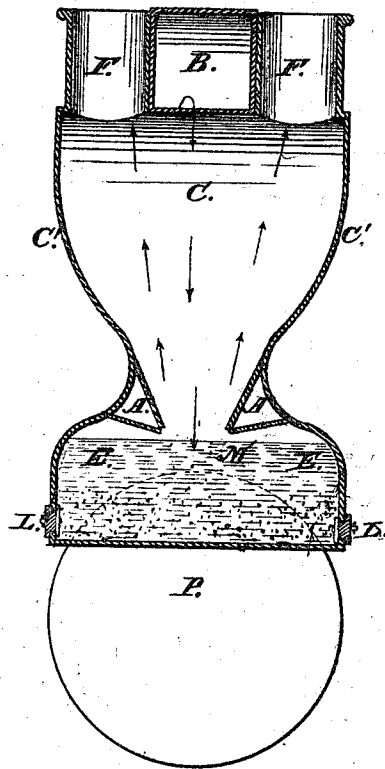


Fig. 4.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. 141,869, dated August 19, 1873; application filed July 2, 1873.

To all whom it may concern:

Be it known that I, WILLIAM D. FARRAND, of New York, in the State of New York, have invented a new and Improved Spark-Arrester for Engines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, which form a portion of this specification—

Figure 1 being a side view of said invention; Fig. 2, a front view of the same; Fig. 3, a section in the line *yy* of Fig. 2; and Fig. 4, a section in the line *xx* of Fig. 1.

Similar letters indicate the same parts in each of the drawings.

The accompanying drawings represent the manner of combining my improved spark-arresting smoke-pipe with the locomotive-engines in use on the railways in France. The form of American locomotive-engines is such that it probably will not be necessary for a portion of my improved spark-arresting smoke-pipe to project beyond the front end of the boiler thereof, as is shown in the accompanying drawings.

My improved spark-arresting smoke-pipe is composed of the curved exterior flue B, the laterally-enlarged central chamber C, the two guard-plates A A, the two discharging-tubes F F, and the water-tank E, arranged with each other in the manner represented in the accompanying drawings and hereinafter fully set forth. To the inner sides C' C' of the central chamber C the inwardly-inclined guard-plates A A are combined, which descend into the water-tank E, as shown in Fig. 4. The exterior plate N of the smoke-flue B rises vertically from the mouth thereof to about three-fourths the usual height of locomotive smoke-pipes, and then curves around and descends, in a slightly-inclined inward direction, to the front side of the water-tank E, as shown in Fig. 4. The interior plate *a* of the smoke-flue B occupies a parallel position to that of the exterior plate N of the same until it terminates at the point D, Fig. 3, the point where the inwardly-closed portion of said flue terminates and discharges the products of full and partial combustion into the remaining inwardly-open portion of said flue. The said products of combustion, being driven forward with great

force and velocity by the exhaust steam from the engines, will pass down the inner surface of the inclined front side of the external plate N, and, after being concentrated by their passage between the inclined guard-plates A A, will strike obliquely upon the surface of the water in the tank E, and, passing over the same, will ascend and strike obliquely against the surface of the flue-plate *a*, and thence pass upward into the laterally-enlarged central chamber C, and be discharged through the eduction-tubes F F. The products of combustion will be driven with such force against the surface of the water in the tank E that all the cinders, dust, and ashes contained therein will pass into the water and remain in the tank, leaving only the gaseous portion of said products of combustion to pass upward and be discharged from the smoke-pipe.

When the products of combustion and the steam combined therewith strike the surface of the water in the tank E they cause the water to rise into the spaces on the outer sides of the two guard-plates A A, as shown in Fig. 4; and experience has demonstrated that if these guard-plates were left out of the combination of parts composing my improved spark-arresting smoke-pipe it would be impossible to retain any water in the tank E. Usually the condensation of the steam within my improved spark-arresting smoke-pipe will furnish an ample supply of water in the tank E. To prevent an excessive accumulation of water in the tank E a stop-cock, M, communicates with and is secured to one side of said tank in the position shown in Fig. 1.

Suitable openings should be made in the sides of the water-tank E for the purpose of enabling the cinders and ashes to be removed therefrom, which openings should be closed by suitable water-tight coverings L L.

A suitable man-hole, K, may be made in the side of the smoke-flue B, to be used whenever repairs or an inspection of the interior of the apparatus may become necessary.

In the drawings, P, Fig. 3, indicates a section of the front portion of a locomotive-boiler; *r*, the smoke-chamber of the same, to the upper surface of which my improved spark-arresting smoke-pipe is attached; and *g*, the exhaust-pipe, which conducts the exhaust

steam from the cylinders of the engines into the smoke-flue B of my said improved spark-arresting smoke-pipe.

I claim as my invention—

1. The combination of the smoke-flue B with the laterally-enlarged central chamber C, substantially as and for the purpose herein set forth.

2. The combination, with each other, of the smoke-flue B, the laterally-enlarged central chamber C, the guard-plates A A, and the

water-tank E, substantially as and for the purpose herein set forth.

3. The combination of the smoke-flue B with the laterally-enlarged central chamber C and the discharging-tubes F F, substantially as and for the purpose herein set forth.

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