(No Model.)

# H. M. SMITH.

## SPARK ARRESTER.

No. 288,195. Patented Nov. 6, 1883.

*Fig. 1.*

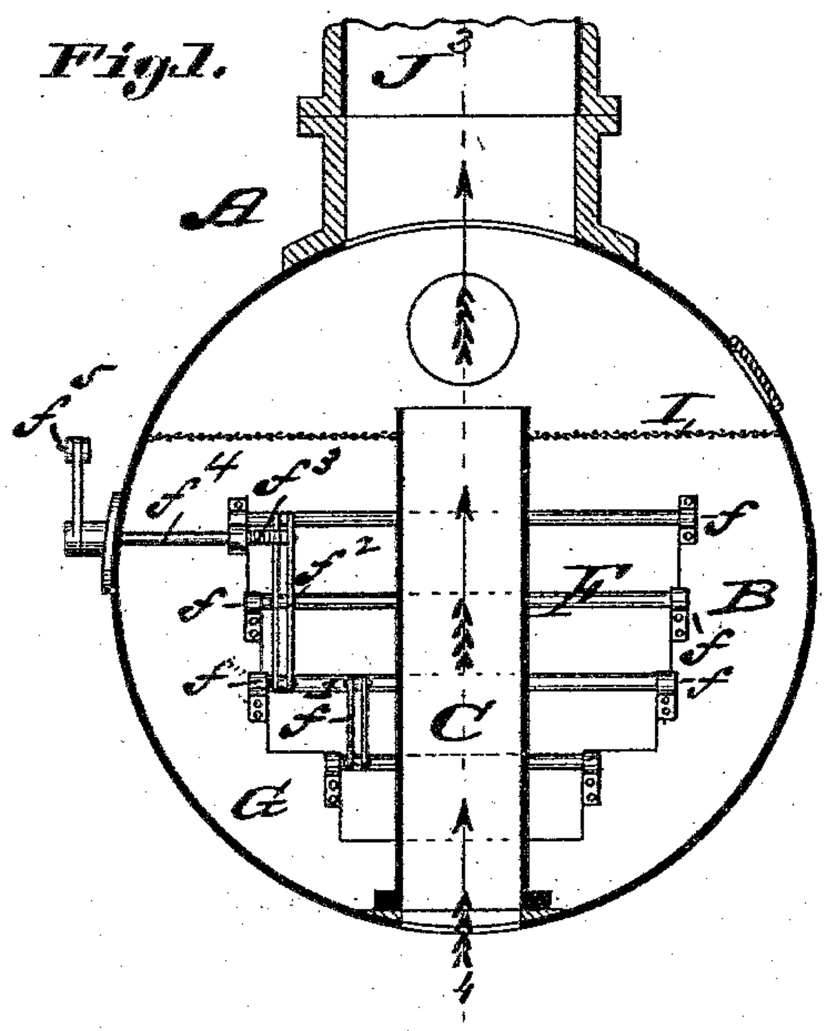



*Fig. 2.*

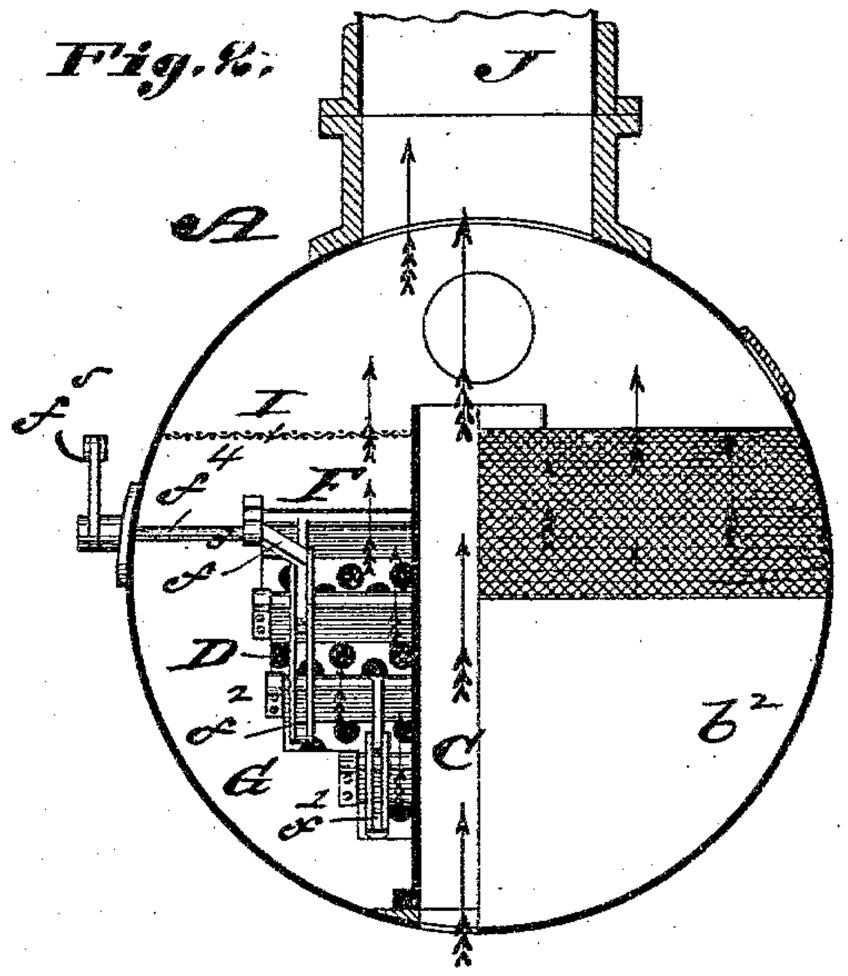



*Fig. 3.*

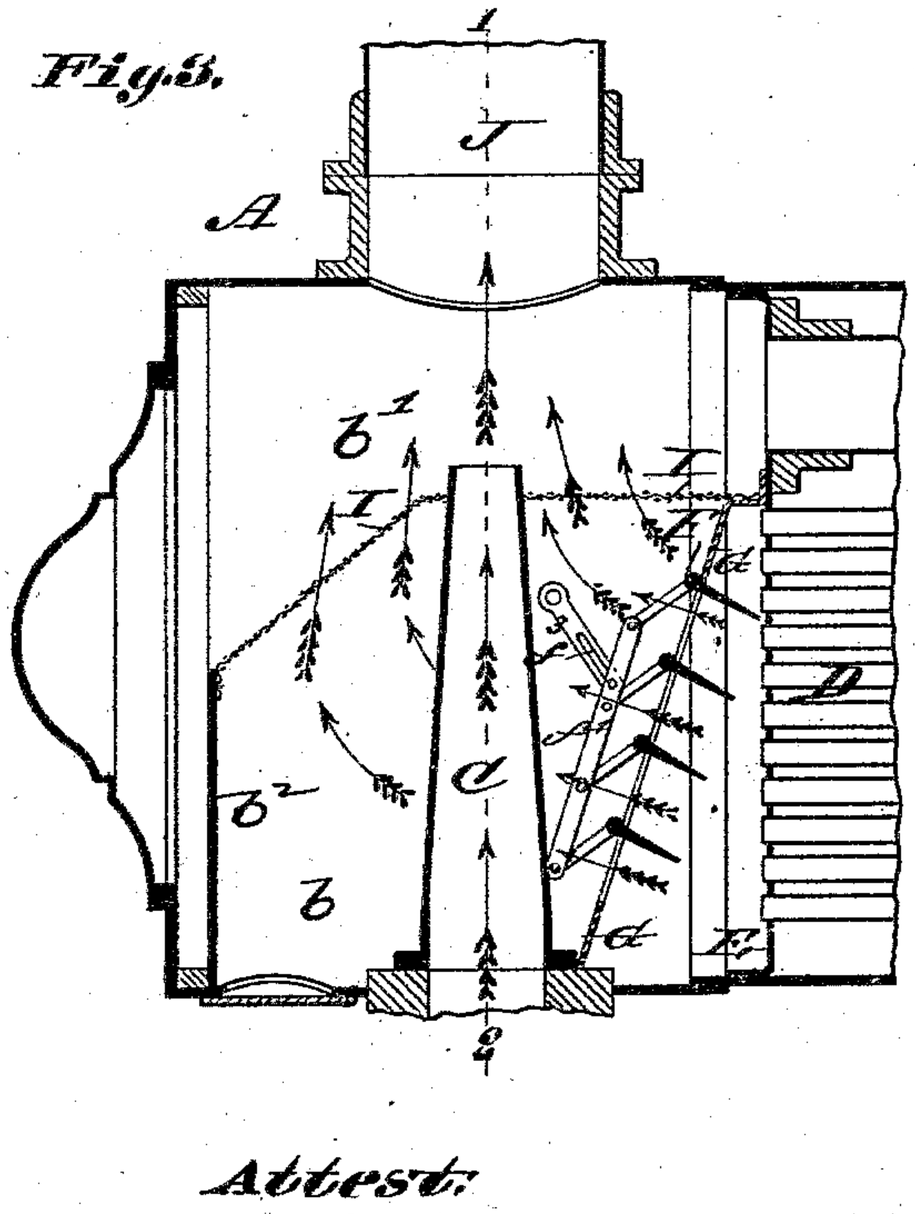
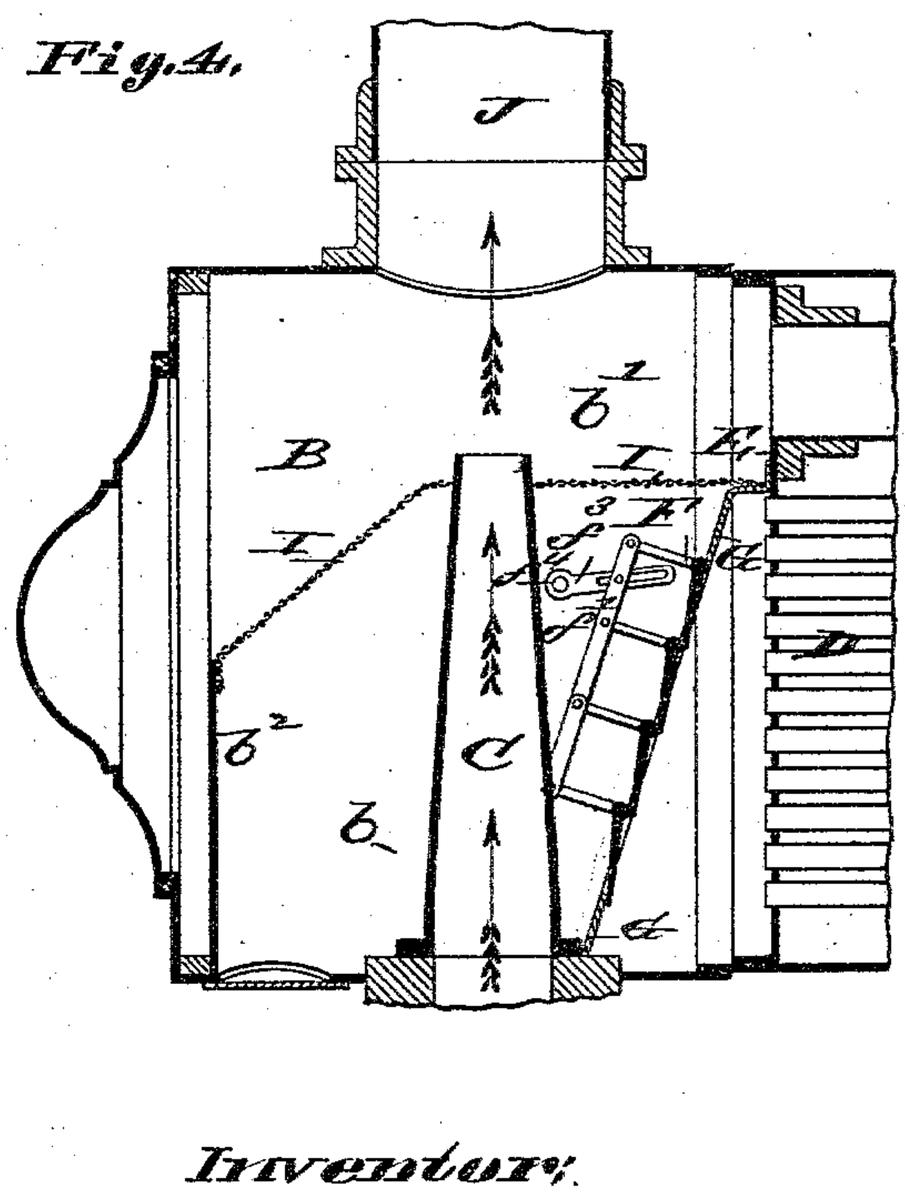



*Fig. 4.*

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# UNITED STATES PATENT OFFICE.

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## SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 288,195, dated November 6, 1883.

Application filed April 7, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, HOWARD M. SMITH, of St. Louis, Missouri, have made a new and useful Improvement in Locomotive Spark-Arresters, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a vertical cross-section, on the line 1 2 of Fig. 3, of the improved construction; Fig. 2, a section, one-half on the line 1 2 of Fig. 3, and the other half just within the front plate of the smoke-box; Fig. 3, a vertical longitudinal section, the vanes being opened; and Fig. 4, a similar section, the vanes being closed.

The same letters of reference denote the same parts.

The aim of this improvement is to provide means for wholly arresting the draft through the flues when the locomotive is at rest or when it is in motion, but not using steam; and to this end the improvement consists in a set of pivoted vanes adapted to be opened and closed in manner similar to that of blind-slats, and arranged across the smoke-box between the flue-head and exhaust-nozzle, and surrounded by an imperforate plate or frame, so that when the vanes are closed the draft from the boiler-flues through the smoke-box is entirely closed, but when the vanes are opened the smoke can escape between them.

A represents that portion of a locomotive with which the improvement is immediately associated.

B represents the smoke-box, C the exhaust-nozzle, D the boiler-flues, and E the flue-head, all of which are of the usual construction, except as modified by the present improvement.

F represents the set of vanes. They are pivoted at $f\,f$, are connected by the rods $f'\,f^2$, and are adapted to be opened and closed by means of a crank, $f^3$, upon the shaft $f^4$, which in turn is provided with an arm, $f^5$, which can be operated from the locomotive-cab.

G represents the plate or frame surrounding the set of vanes. It extends entirely across the smoke-box and in an upward and downward direction from the flue-head E, just above the flues D, downward and forward to the bottom of the smoke-box, just in the rear of the exhaust-nozzle. In Figs. 1, 4 the vanes are shown closed, and in Figs. 2, 3 they are opened, in which case the course of the products of combustion is through the vanes, thence into the space *b* in the smoke-box, which space is separated from the space *b'* by means of the screen I, which extends from the flue-head, just above the level where the plate G joins the flue-head, horizontally forward to the exhaust-nozzle, and from the exhaust-nozzle it inclines downward and forward to the forward end of the smoke-box, meeting and joining with the end plate, $b^2$, of the smoke-box at a level about half the height of the exhaust-nozzle. The draft from the space *b* is through the screen I into the space *b'*, and thence out the stack J.

By having one part of the screen I horizontal and the other part inclined, as shown and described, there will be created below the screen a whirlpool or eddy of the sparks, which will break their direct force against the screen and prevent them from being driven through its meshes. The inclined portion of the screen also operates to pulverize the flying cinders and prevent sparks from escaping.

I claim—

1. The combination, with a locomotive smoke-box, of the inclined frame provided with apertures, the pivoted vanes applied thereto, the exhaust-nozzle, and the screen I, inclosing said frame and vanes, all constructed and arranged inside of the smoke-box below the stack, substantially as described.

2. The combination, with a locomotive smoke-box, of a screen extending from the flue-sheet, and inclined downwardly and forwardly to the front of the smoke-box, a series of pivoted vanes, and an exhaust-nozzle extending through said screen, substantially as described.

3. A locomotive smoke-box having the screen extending horizontally from the flue-head to the exhaust-nozzle, and thence downward and forward to the front end of the smoke-box, substantially as described.

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Witnesses:
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