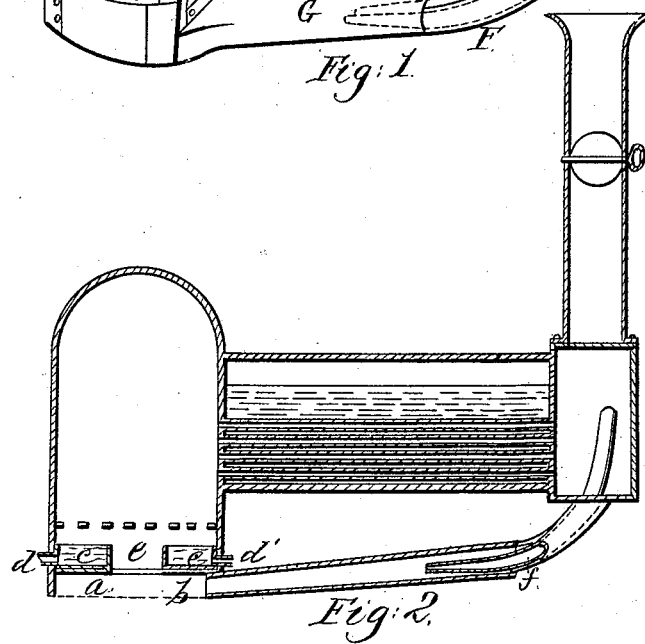
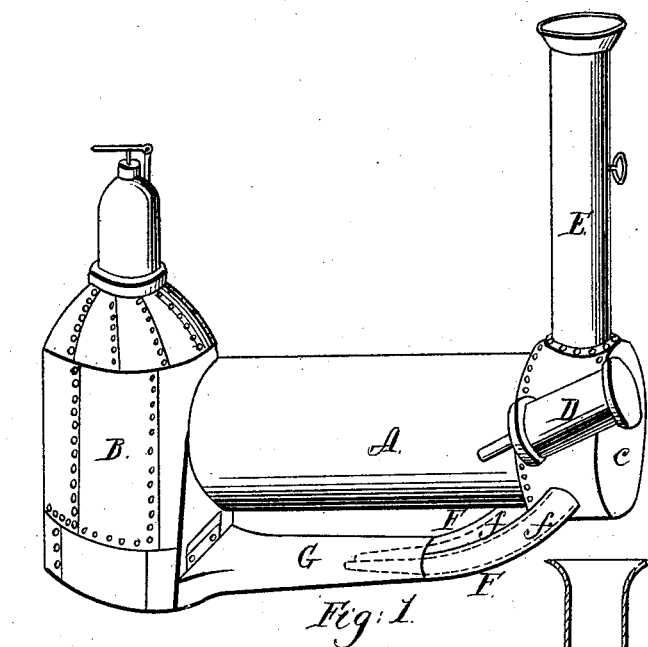


Longmire & Brooke,
Spark Arrester,
No 1.681, Patented July 10, 1840.



UNITED STATES PATENT OFFICE.

F. B. LONGMIRE AND H. JONES BROOKE, OF PHILADELPHIA, PA.

IMPROVEMENT IN LOCOMOTIVES FOR CONSUMING SPARKS.

Specification forming part of Letters Patent No. 1,681, dated July 10, 1840.

To all whom it may concern:

Be it known that we, FRANCIS P. LONGMIRE and H. JONES BROOKE, of the county of Philadelphia, in the State of Pennsylvania, have invented a new and useful apparatus for preventing the annoyance to passengers on railroads from the escape of sparks from locomotive steam-engines; and we do hereby declare that the following is a full and exact description thereof.

In the apparatus which we have invented for preventing annoyance from sparks we make use, as is usual, of the escape steam for the purpose of creating a draft through the fire; but instead of extending the waste-steam pipes upward into a vertical flue, in the ordinary way, we carry said pipes downward so as to pass within a flue under the boiler. Said flue may extend along into or below the ash-pit under the fire-box, so as to cause the sparks, with the waste steam and the gaseous products of combustion, to be discharged into a compartment prepared therefor, or into the ash-pit, allowing their final exit to be downward onto or toward the ground.

In the accompanying drawings, Figure 1 represents so much of a locomotive steam-engine as is necessary for the explanation of our invention. A is the body of the boiler; B, the fire-box; C, the smoke-box, and D one of the steam-cylinders. E is a flue situated in the ordinary manner for allowing the draft from the fire to pass through it when the locomotive is at rest, but furnished with a throttle or other valve to close it perfectly when the engine is in action. F F are two flues lead from the smoke-box and uniting in a flue, G, under the boiler. Through the two flues F F the escape-steam pipes *ff* (shown in dotted lines in Fig. 1) pass from the respective cylinders and extend into the flue G, which now takes the place and performs the office of the ordinary flue E. The flue G, as represented in the drawings, opens into a space at the lower end of the fire-box B, the bottom of which is composed of wire-gauze, the meshes of which need not be fine, as the smaller sparks which may escape through it will be projected downward and produce no injury.

The escape steam pipes must extend into the flue G to a point beyond all the curvatures leading thereto. For the purpose of economizing heat we in general construct a metallic water-box or chamber, made flat, inclosed on all sides, and of such size as to occupy the area of the fire-box, and this, by means of suitable tubes, we connect with the water-tank, so as to allow water to flow into it; and we also connect with it the tubes of the supply-pumps, so that the water flowing in from the tank on one side, and heated to a considerable extent by the heat from the ash-pit and from the escape steam on its passage to the opposite side, may go to supply the boiler.

Fig. 2 is a vertical and longitudinal section through the apparatus, like parts being lettered as in Fig. 1. *a* is the space into which the draft through G is represented as passing. *b* is the bottom of wire-gauze; *c c*, the water-box, into which water may flow from a tank through an opening or openings, as at *d*, and from which it may be drawn by the supply-pump through openings, as at *d'*. We make an opening through the middle of the water-box *cc*—say from six inches to a foot (more or less) in diameter, as at *e*—through which a portion of the heated air may pass up into the ash-pit and aid in urging the fire. Instead of carrying the pipe G into the space under the water-box, as represented, we intend sometimes to allow it to open into the ash pit, so that the sparks and heated air may be projected into that compartment, a portion of which, such as it may be found useful so to employ, may be allowed to pass upward through the fire and the remainder downward through the opening *e* in the water-box, a result which may be governed by the size of the latter, to be determined by experience. When we blow into the ash-pit in this way, the pipe or flue G is not to fill the capacity of its mouth, but a space is to be left around it for the admission of the necessary supply of atmospheric air.

Having thus fully set forth the nature of our invention, and shown the manner in which the same is to operate, what we claim therein, and desire to secure by Letters Patent, is—

1. The extending of the exhaust-steam pipes downward and into a flue passing horizontally along under the boiler into a compartment in the lower end of the fire-box, which compartment may consist of the ash-pit, or of one specially prepared for the purpose, substantially in the manner set forth.

2. The manner set forth of locating and using

a water-box, constructed in the way and employed for the purpose herein described.

FRANCIS P. LONGMIRE.

H. JONES BROOKE.

Witnesses:

JAMES SANDERS,

JAMES MAGINNIS.