

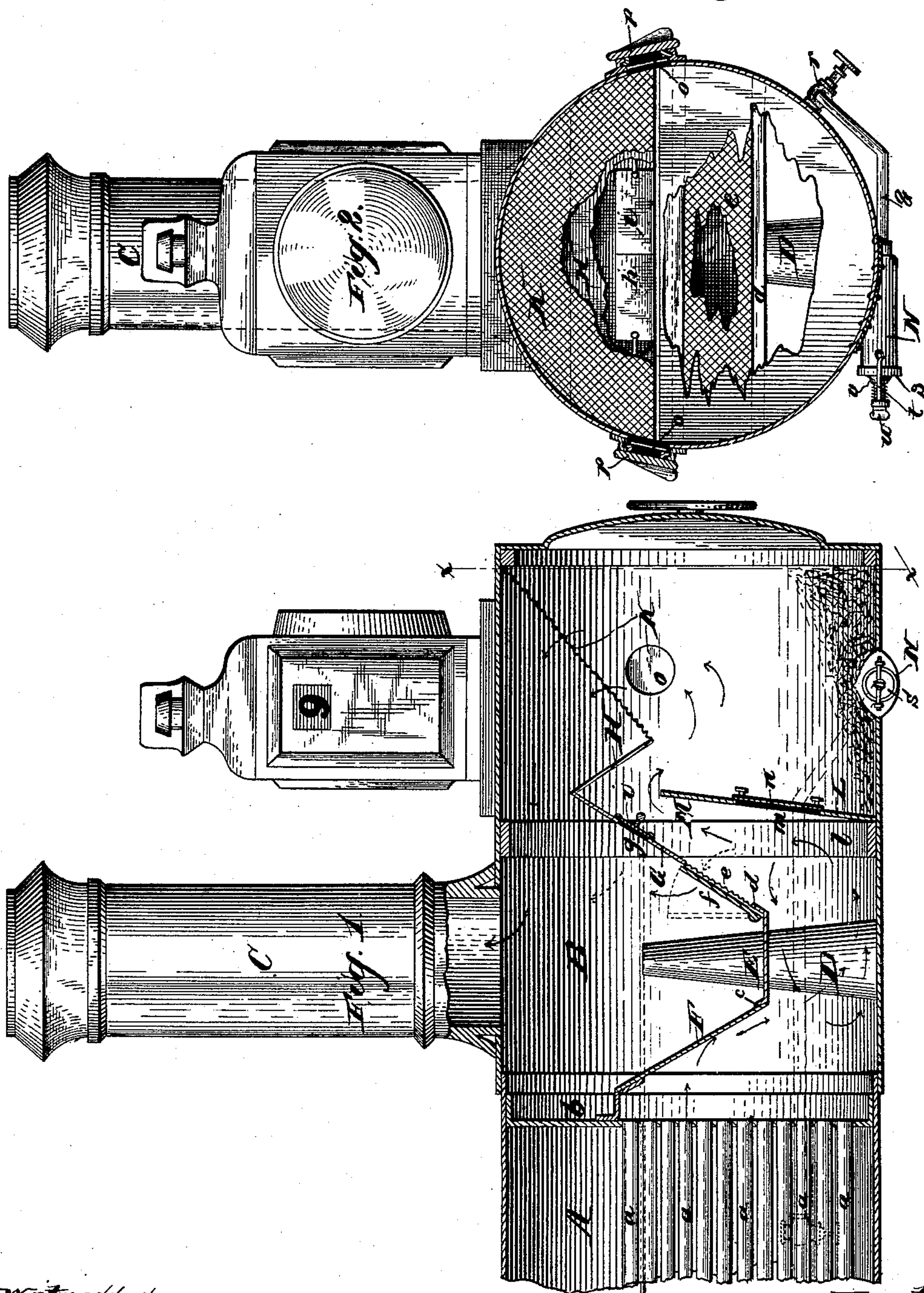
(No Model.)

R. H. COLEMAN.

SPARK ARRESTER.

No. 387,625.

Patented Aug. 14, 1888.



Witnesses—

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UNITED STATES PATENT OFFICE.

ROBERT H. COLEMAN, OF CORNWALL, PENNSYLVANIA.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 387,625, dated August 14, 1888.

Application filed May 10, 1888. Serial No. 273,386. (No model.)

To all whom it may concern:

Be it known that I, ROBERT H. COLEMAN, a citizen of the United States, residing at Cornwall, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in Spark-Arresters for Wood-Burning Locomotives; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to spark-arresters, and has for its object an improvement in that class of devices used for wood-burning locomotives. The invention will be hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a vertical longitudinal section, and Fig. 2 is an end view with the head of the smoke-box removed.

Reference being had to the drawings and the letters marked thereon, A represents the boiler, which is provided with a series of fire tubes or flues, *a*, secured in the tube-sheet *b* in the usual manner.

B represents the smoke-box, C the smoke-stack, and D the exhaust nozzle or nozzles.

E is a horizontal nozzle-plate with an aperture in it through which the exhaust-nozzle projects and is secured at its ends to the wall of the smoke-box. The nozzle-plate E is provided with angular flanges *c d*, to which the deflection-plate F and the channel-plate G are secured, respectively. The deflection-plate F is secured to the tube-sheet *b* just above the upper tier of flues, crosses the smoke-box, and extends forward at an angle until it reaches the flange *c* of the plate E, to which it is secured in the usual manner.

Upon the opposite side, or in front of the exhaust-nozzle, is the channel-plate G, which is secured at its lower end to the flange *d* of the plate E, projects forward and upward at an angle, and extends across the smoke-box, to the walls of which it is also secured. The channel-plate is provided with a perforated section, *e*, which may be composed of wire-gauze or perforated sheet metal, and forms a passage for smoke and gases when the engine is under way.

Over the section *e* is a hinged valve or damper, *f*, for controlling said passage, as will hereinafter more fully appear. Between the perforated section *e* and the apex of the channel-plate is an elongated opening or passage, *g*, controlled by laterally-sliding dampers *h i*, operated by rods *k k*, extending rearward to the cab of the engine. These dampers may be made to operate in any approved manner.

The channel-plate G is provided with an angular baffle-plate, H, which projects forward and downward from the apex of the channel-plate, and to its lower end, extending across the smoke-box and upward to the crown of the smoke-box, is a section, K, of wire-gauze or perforated sheet metal.

L is a dead-plate secured to the ring *l*, and projects forward at an angle to the bottom of the smoke-box. The channel-plate and the dead-plate form an extended passage, M, for the smoke, gases, and the main draft of the furnace. The dead-plate is provided with an opening, *m*, and a cover, *n*, for gaining access to the smoke-box within the space formed by the tube-sheet *b*, and said plate and the smoke-box are provided with hand-holes *o* and covers *p*, for a similar purpose.

N is an ejector attached to the under side of the smoke-box, and is provided with a pipe, *q*, which communicates with the boiler A, through the medium of a valve, *r*, for supplying water for removing refuse matter from the smoke-box periodically. The ejector is provided with a cover, *s*, which fits over its nozzle, is swung upon a yoke, *t*, attached to the sides of the ejector, and secured in position over the nozzle by a thumb-screw, *w*, which engages with the yoke and a boss, *v*, upon the cover.

The construction being substantially as described, the operation is as follows: When fire is kindled in the furnace or fire-box, the valves or dampers *f*, *h*, and *i* are opened, affording a ready and free draft, and after the wood has become thoroughly ignited the valves *h i* are closed. The draft of the furnace, induced by the stack and the exhaust of the engines, causes the smoke, gases, and fine particles of burning wood to be drawn forward through the flues into the smoke-box, where, issuing from the ends of the flues, they impinge against

the deflection-plate F, are directed downward, and in striking against the dead-plate the particles of burning wood are comminuted or broken into small granules, while the smoke and the gases with these granules form eddies within the smoke-box, upon which the smoke, gases, &c., issuing from the flues are cushioned and form counter-currents in the ends of the flues, which retard the gases in the fire-box and flues until the combustible matter has been consumed, thus greatly augmenting the units of heat developed by the fuel. After forming eddies, the smoke and gases pass on up between the channel-plate G and the dead-plate under the baffle-plate H into the outer end of the smoke-box in a circumflex current, carrying the finely-comminuted granules with them and depositing them in the cinder-pit in front of the dead plate. The smoke and refuse gases then pass out through screen K into the smoke-stack, while any live sparks are arrested by the screen. The sparks which pass through the screen K are so small that they are rarely ever projected five feet above the top of the smoke-stack in a state of ignition.

Preparatory to throwing wood into the furnace or fire box while under way, the fireman closes the valve *f*, thus causing all the escaping products from the furnace to pass through the extended draft-passage M, which results in the burning particles being extinguished before they make their exit from the smoke-stack.

35 In the present construction the screen K is attached to the lower end of the baffle plate, which brings it lower down than in coal-burners, and provides a larger spark-arresting surface and passage for the smoke and refuse
40 gases.

In another application filed herewith, Serial No. 273,385, I have claimed so much of the construction shown as is applied to a coal-burner, and in application, Serial No. 273,384, filed herewith, I have claimed the method in- 45 volved.

Having thus fully described my invention, what I claim is—

1. In a spark-arrester, the combination of a deflection-plate between the flue-sheet and the 50 nozzle, a channel-plate provided with a screen, and a valve or damper for covering said screen, a dead-plate in front of the exhaust-nozzle, and a baffle-plate projecting forward of the dead-plate, substantially as described. 55

2. In a spark-arrester, the combination of a deflection-plate between the flue-sheet and the exhaust-nozzle, a channel-plate provided with a draft-opening and a valve for controlling it, a dead-plate, an extended passage for the draft, 60 a baffle-plate, and a screen between the baffle-plate and the wall of the smoke-box, substantially as described.

3. In a spark-arrester, the combination of a deflection-plate, a channel-plate provided with 65 a section of wire-gauze and a draft-opening, valves for controlling said section and opening, and a baffle-plate projecting from its upper end, a dead-plate, and a wire-gauze section between the baffle-plate and the crown of the 70 smoke-box, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBT. H. COLEMAN.

Witnesses:

A. HESS,
LEWIS REHR.