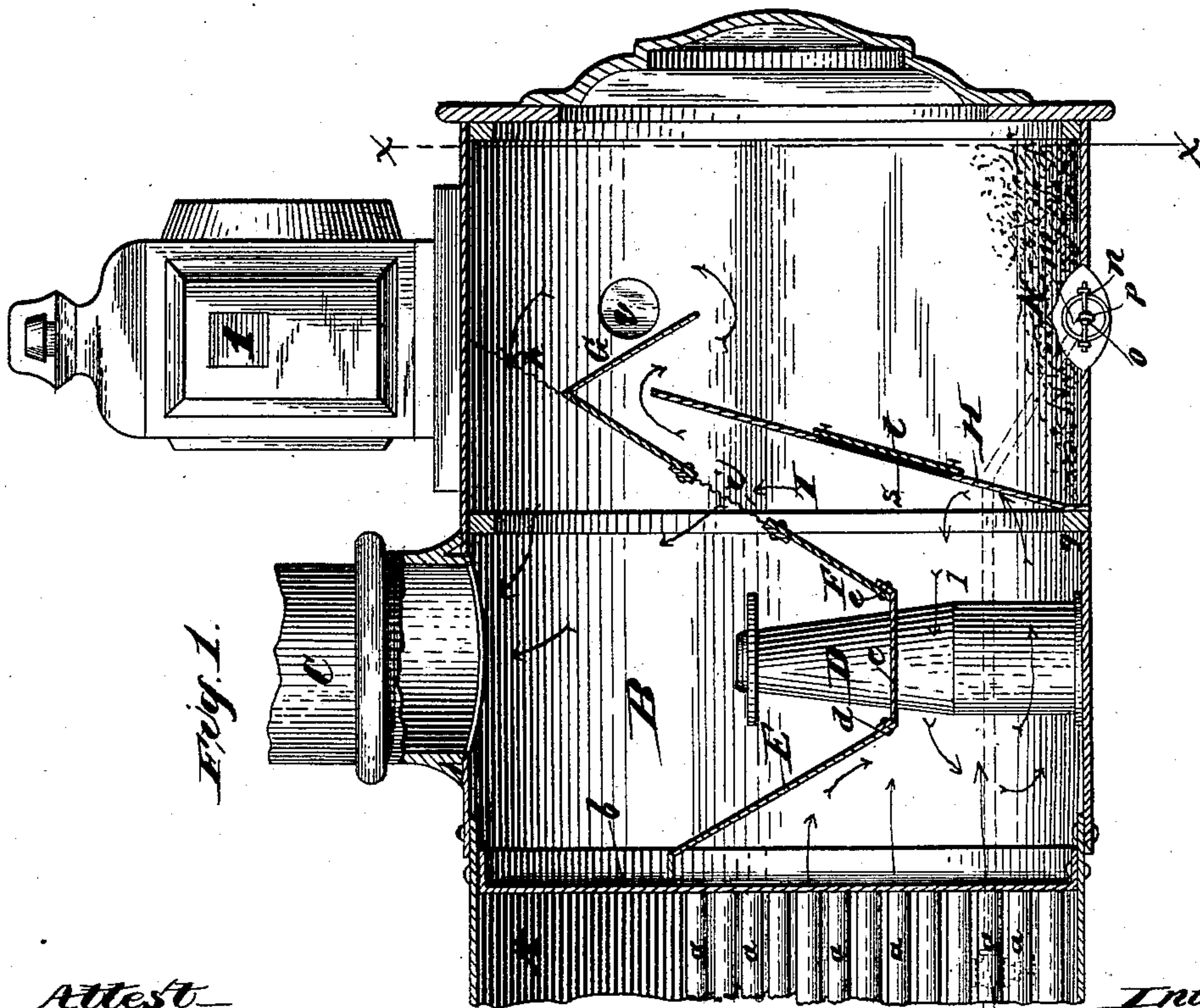
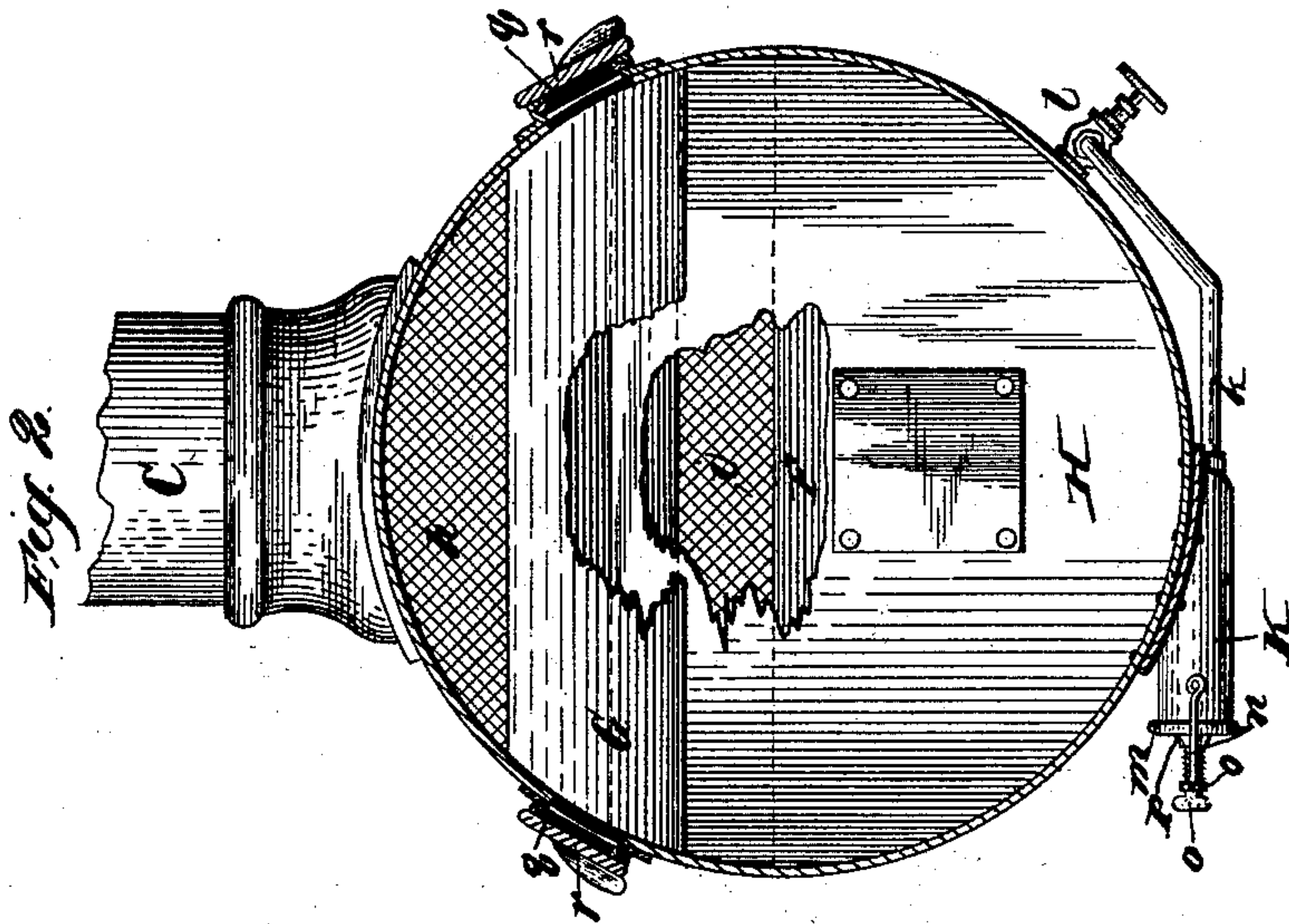


(No Model.)

R. H. COLEMAN.  
SPARK ARRESTER.

No. 387,624.

Patented Aug. 14, 1888.



Attest

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# UNITED STATES PATENT OFFICE.

ROBERT H. COLEMAN, OF CORNWALL, PENNSYLVANIA.

## SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 387,624, dated August 14, 1888.

Application filed May 10, 1888. Serial No. 273,385. (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 Coal-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 for coal-burning locomotives or other engines, and has for its object an improvement in the construction of such devices, whereby the passage for the main draft is extended, the burning gases backed up in the fire-box and flues by cushioning them upon eddies formed in the smoke-box, the cinders or refuse of combustion disintegrated, extinguished, and deposited in an extension of the smoke-box.

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 extension to the smoke-box removed.

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

B is the smoke-box, which is provided with a stack, C, and an exhaust-nozzle, D, into which both engines exhaust, or a separate nozzle for each engine may be provided. The exhaust-nozzle supports a horizontal nozzle-plate, *c*, having its ends secured to the walls of the smoke-box in the usual manner. The plate *c* is provided with flanges *d e*, to which the lower ends of the deflection-plate E and the channel-plate F are secured by suitable bolts or rivets. The deflection-plate E is secured to the tube-sheet *b* a suitable distance above the flues, and extends at an angle to the flange *d* of the plate *c*. The channel-plate F crosses the smoke-box and its extension at an angle and terminates in a baffle-plate, G.

H is a dead-plate secured to the ring *g*, and is also set at an angle to form an extension-passage, I, between it and the channel-plate

F, for the main draft of the gases from the furnace to the boiler.

The space between the upper end of the channel-plate and the wall of the extension of the smoke-box is closed by wire-gauze *h*, or by a sheet of perforated metal, for arresting any sparks that have not been extinguished. The channel-plate F may be provided with an opening covered by a section, *i*, of wire-gauze or perforated sheet metal, which admits of an escape of a portion of the incombustible gases from the furnace. The position and angle of the opening in the angle-plate are such that cinders emitted from the flues are driven past it and on into the cinder-pit. This opening may be increased or diminished in size, or its position changed to suit different constructions of ash-pits and to adapt it to other furnaces or boilers.

The baffle-plate G, it will be observed, projects out a considerable distance beyond the upper end of the dead-plate and directs the cinders down into the chamber formed by the extension of the smoke-box, which I have termed the "cinder-pit."

The cinders are removed from the pit by means of an ejector, K, which is supplied with water from the boiler A through pipe *k* and valve *l* at suitable intervals. The nozzle of the ejector is provided with a cover, *m*, swung upon a yoke, *n*, secured to the sides of the body of the ejector by suitable pivots, and the cover is held in place upon the nozzle of the ejector by a thumb-screw, *o*, which passes through the yoke *n* and engages with a boss, *p*, on the cover.

Variations may be made in the angles of the several plates shown without departing from the spirit of my invention, the principal object being to secure an extension of the passage for the main draft of the gases, and to produce eddies in the gases in the smoke-box, against which the gases issuing from the flues are cushioned, producing counter-currents in the outer ends of the flues, backing up the heat and gases in the fire-box and the flues until the combustible gases are consumed.

The smoke-box is provided with hand-holes *q* and covers *r*, and the dead-plate H is provided with an opening, *s*, and a removable cover, *t*, for obtaining access to the space between the tube-sheet and the dead-plate for



the removal of any foreign matter which may be deposited there.

The construction being substantially as described, the operation is as follows: The draft  
5 of the furnace induced by the smoke-stack and the exhaust of the engines causes the gases, with some particles of solid refuse matter, to be drawn through the fire-tubes, which, upon issuing from the ends of the tubes, strike  
10 against the deflection-plate E, are directed downward, and by their velocity strike against the dead-plate H and form eddies, as indicated by the arrows 1. These eddies form a cushion for the gases emitted from the tubes, produce  
15 counter-currents in the ends of the tubes, and back up the heat and the gases in the fire-box and the tubes until the combustible material in the gases is entirely consumed. After forming the eddies in front of the dead-plate the  
20 gases and comminuted particles of cinder form a circumflex current in passing through the passage I, between the channel-plate F and the dead-plate, and under the baffle-plate G. In their passage some of the incombustible gases  
25 pass off to the stack through the perforations in the wire-gauze *i*, while the cinders are raised by the current and deflected by the plate G into the cinder-pit. The remaining gases then pass off through the wire-gauze *h*, while any  
30 live sparks are arrested by the meshes of the wire.

The method involved in my invention forms subject-matter of another application for a patent, Serial No. 273,384, filed herewith.

Having thus fully described my invention, 35 what I claim is—

1. In a spark-arrester, the combination of a deflection-plate between the tube-sheet and the exhaust-nozzle, a channel-plate, and a dead-plate on the opposite side of the nozzle, substantially as described. 40

2. In a spark-arrester, the combination of a deflection-plate between the tube-sheet and the exhaust-nozzle, a channel-plate, a nozzle-plate between the deflection-plate and the channel-plate, a dead-plate, a baffle-plate, and an extended passage formed by the channel-plate and the dead-plate, substantially as described. 45

3. In a spark-arrester, the combination of a deflection-plate, a channel-plate, a dead-plate, 50 a baffle-plate, and a screen between the upper end of the channel-plate and the wall of the smoke-box, substantially as described.

4. In a spark-arrester, the combination of a deflection-plate, a channel-plate provided with 55 a perforated section or wire screen, a dead-plate, a contracted passage between the channel-plate and the dead-plate, a baffle-plate, and a screen between the upper end of the channel-plate and the wall of the smoke-box, substantially as described. 60

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

ROBT. H. COLEMAN.

Witnesses:

A. HESS,  
LEWIS REHR.