

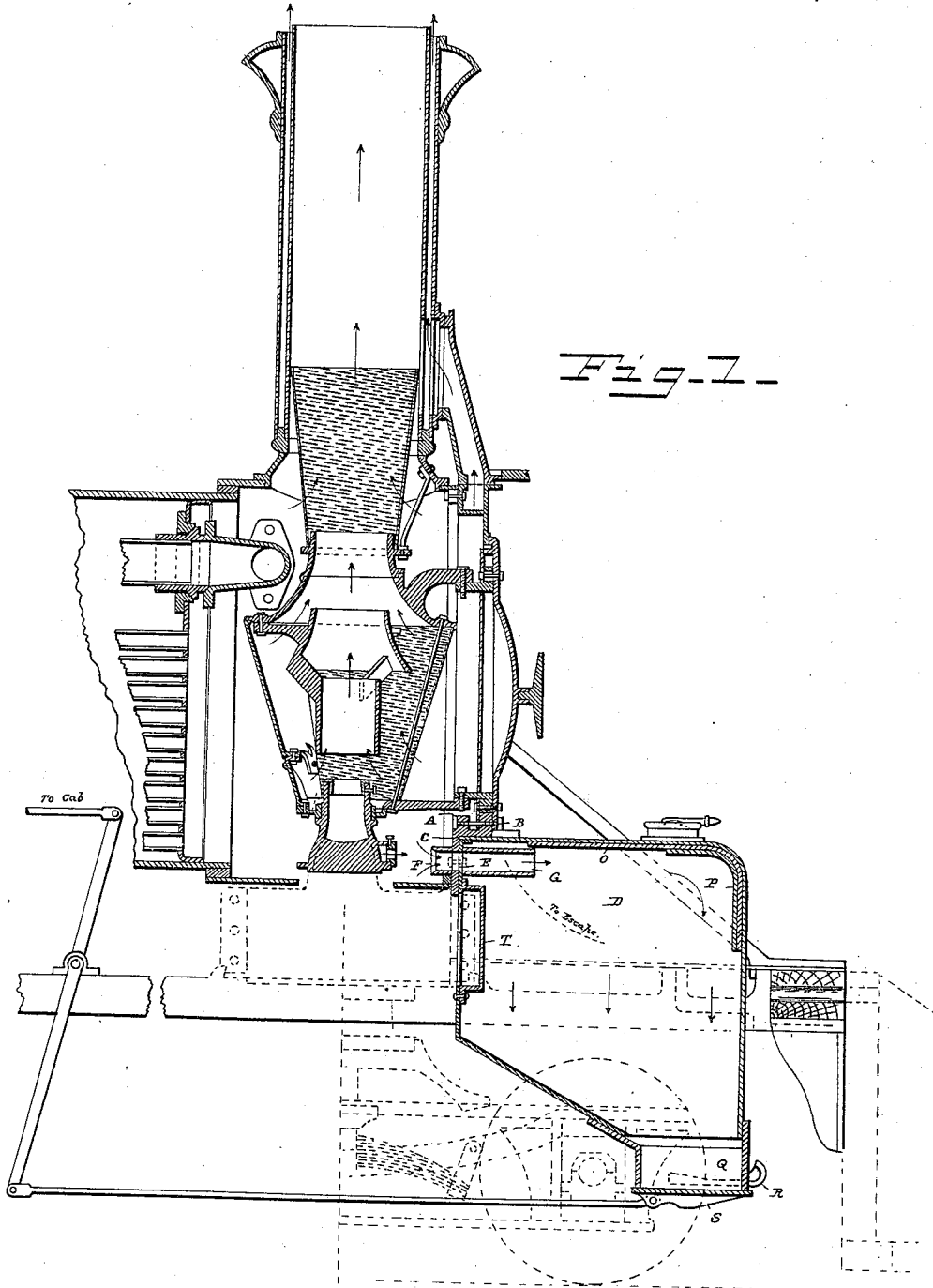
(No Model.)

3 Sheets—Sheet 1.

G. D. HUNTER.
SPARK EXTINGUISHER.

No. 320,875.

Patented June 23, 1885.



WITNESSES

Edwin L. Jewell
Edwin L. Bradford

INVENTOR

George D. Hunter.
By *Taunton & Sonnes*,
his Attorneys.

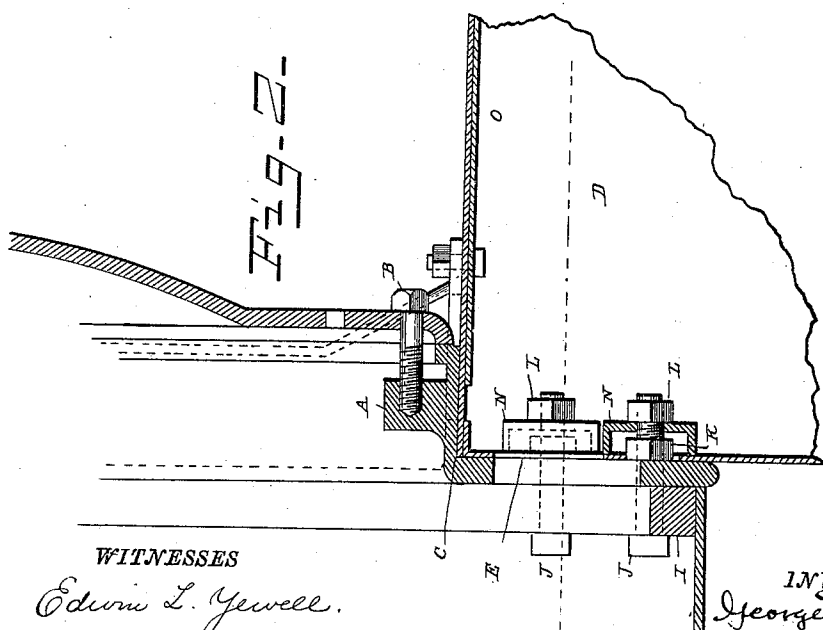
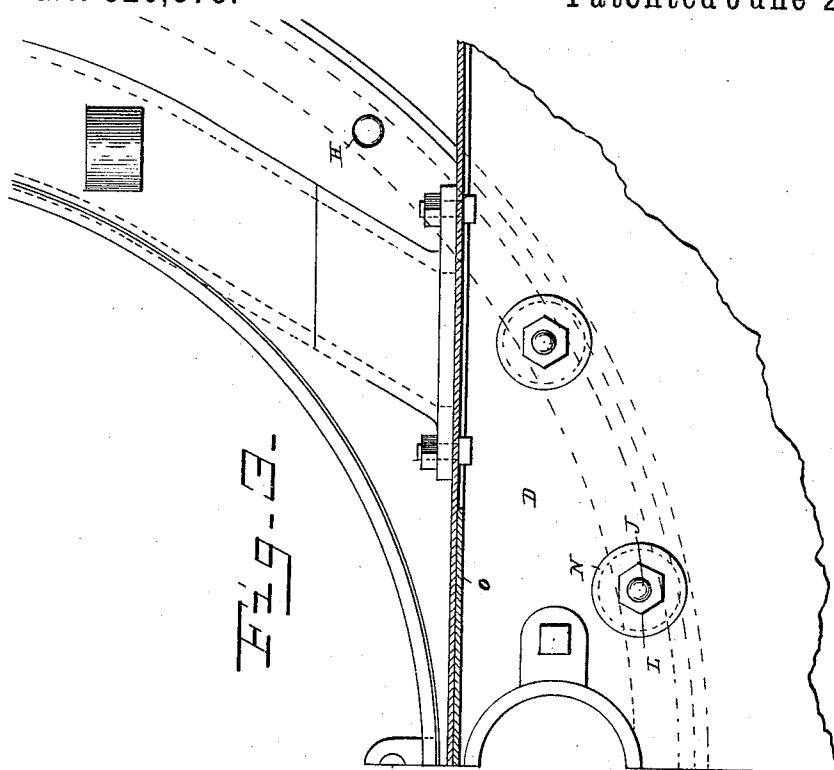
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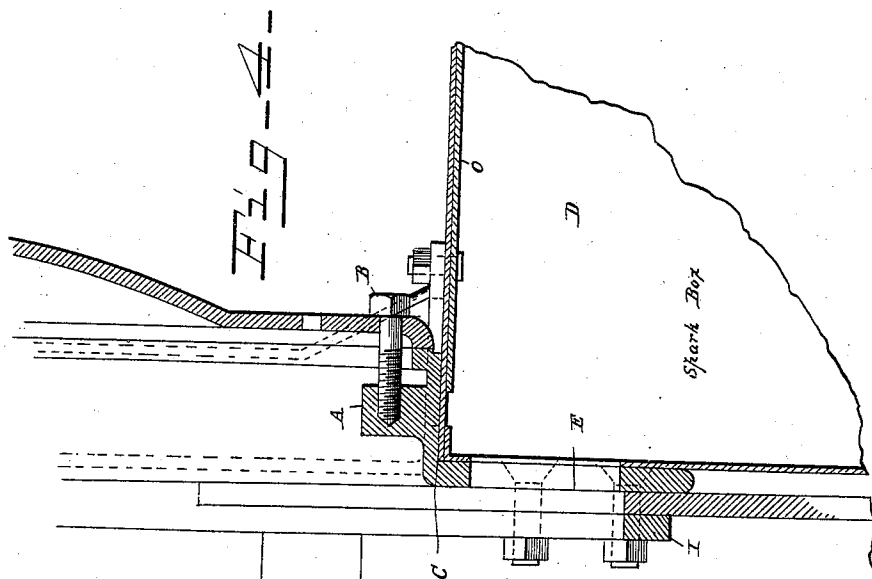
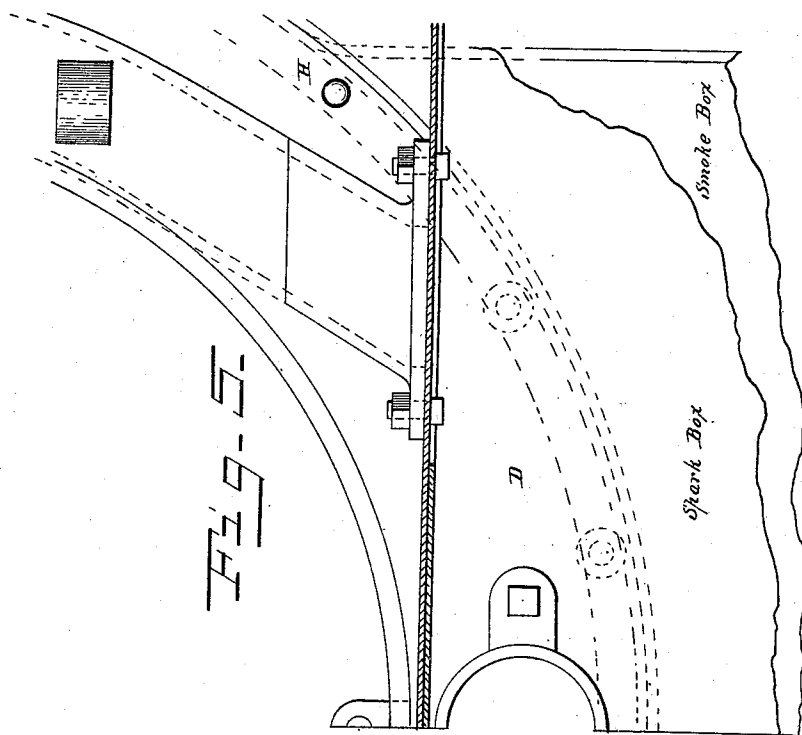
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SPARK EXTINGUISHER.

No. 320,875.

Patented June 23, 1885.



WITNESSES

Edwin L. Jewell,
Edwin L. Bradford

INVENTOR

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By *Smoke Box* Paulino & Semmes,
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UNITED STATES PATENT OFFICE.

GEORGE D. HUNTER, OF TERRE HAUTE, IND., ASSIGNOR OF FOUR-SIXTHS TO
THOMAS C. VAN NÜYS AND MORTON C. HUNTER, BOTH OF SAME PLACE.

SPARK-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 320,875, dated June 23, 1885.

Application filed February 27, 1885. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. HUNTER, a citizen of the United States, residing at Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Spark - Extinguishers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in spark-extinguishers or receptacles, having special reference to that class used in connection with railroad-locomotives, and being intended to improve certain points of detail construction in the spark-extinguisher for which Letters Patent were issued to me October 2, 1883.

15 The present invention has for its objects, first, to combine with and attach to the smoke-box a spark-receptacle in such manner as to bring the receptacle as high up across the front of the smoke-box as the door of the latter will admit of, so as to afford direct communication between the forward part of such box and the adjacent part of said receptacle, and to provide openings for the escape of such exhaust-steam and of the heat and gases that may be driven into said receptacle, leaving the cinders and sparks thoroughly extinguished, the heat being carried away by the exhaust-steam issuing out through the openings and conduits; second, to provide the spark-receptacle with wearing-plates constructed of material which shall withstand the violent pelting and abrasive action of the sparks and cinders coming in contact therewith, and to locate the same in such manner as to protect those portions of the receptacle most exposed to this action; and, third, to so construct the devices for connecting the spark-receptacle with the smoke-box that they will occupy but little space within the said box.

20 In the accompanying drawings, forming a part of this specification, and on which similar letters of reference indicate the same or corresponding features, Figure 1 represents a vertical longitudinal sectional view of the forward part of a locomotive-boiler, the smoke-box, the smoke-stack, and my spark-receptacle, showing the arrangement of the several fea-

tures of my spark arrester and extinguisher entire, also in section; Fig. 2, a detached enlarged diametrical sectional view of a portion of the smoke-box, its cap, and door, and the spark-receptacle, showing my improved means of connecting the latter thereto; Fig. 3, a view looking at a portion of the face of the smoke-box cap and the escape-conduit, showing the spark-receptacle in transverse section; Fig. 4, a similar view to Fig. 2, showing another means of connecting the smoke-box and spark-receptacle, and Fig. 5 a like view to Fig. 3, showing the connecting means represented in Fig. 4.

25 I have represented in Fig. 1 my improved spark-arresting and spark-extinguishing devices, consisting, essentially, of the partially-perforated drum located within the smoke-box and preferably secured to the smoke-box door, and having attached to it and located within it the exhaust-confining tube. The upper end of this drum is provided with an imperforated crown-sheet which is also connected to the door above alluded to, while fitting closely to the upper end of said crown-sheet is the upper section of the exhaust-confining tube, the same being supported by several braces made fast to the smoke-stack saddle. To this section of the said tube is connected the lower end of the screen, which extends a slight distance within the smoke-stack, these several devices being more fully set forth in Letters Patent granted to me February 19, 1884.

30 The smoke-box cap is in this instance constructed as in the patents already referred to, (save with respect to a lug, to be presently mentioned,) two conduits being cast integrally therewith and united in one at their upper ends, where, by a short section of tubing, they are connected with the annular space between the smoke-stack proper and the outer sheathing.

35 The smoke-box cap is provided with a lug, A, having a screw-threaded aperture. This aperture receives the threaded end of the bolt B, the latter passing through a hole in the lower portion of the smoke-box door, whereby the door is firmly held to the cap, making a tight joint at the bottom of the door. This form of fastener may be placed at intervals

around the door, or suitable clamps may be used at such points to bind the door to the cap.

The smoke-box cap, just below the door and at the lower end of the conduits, is constructed with an angular juncture, C, which serves as a recess for the top corner of the spark-receptacle D, and the cap and receptacle are provided with coincident openings E, whereby direct communication between the smoke-box and the receptacle is established, to permit a direct discharge of the auxiliary exhaust from the exhaust-nozzle in the smoke box.

It will be observed that by reason of extending the spark-receptacle up across the face of the smoke-box and providing the coincident opening E the necessity of a pipe running from the smoke-box to the receptacle, to conduct the solid particles of combustion from the former into the latter, is avoided. Such a pipe, by reason of the difference in the altitude of the smoke-box and the receptacle, is usually crooked or provided with an elbow. Among the advantages arising from doing away with the use of such pipe, besides that of reducing the cost of construction, is that it is found in practice to be liable to clog up, making it necessary at times to clean it out by hand. Another advantage of extending the spark-receptacle across the face of the smoke-box is that it admits of a much larger receptacle, thereby rendering the necessity of dumping less frequent, thus saving labor.

The exhaust-nozzle has a lateral discharge-neck, termed the "auxiliary exhaust," and is constructed in conformity with that described in the patents before alluded to, and the opening E, next to the smoke-box, is provided with a wearing tubing or thimble, F, preferably cast-iron, so as to receive the exhaust and sparks and withstand the violent action of the sparks and cinders passing through the same into the receptacle.

In some instances I contemplate providing the side of the opening E next to the spark-receptacle with an extension, G, of that ring, the function of which is to act as a pipe to assist to produce a better vacuum and to better draw the sparks to the lower front end of the smoke-box, so as to be forced into the receptacle. This extension, however, may be omitted, if found desirable.

The cap-piece is provided with a series of apertures, H, corresponding with a like series of apertures in the smoke-box ring I, which receive bolts J, whereby connection is made between the two. These bolts J, which come within the range of the spark-receptacle, are longer than the others, and are provided with two nuts, K and L. The receptacle is also provided with apertures large enough to allow the nuts K to clear within them, whereby said nuts are brought directly against the cap-piece, so as to bind it to the ring I and make a tight joint.

A cup-shaped washer, N, is placed over the nuts K within the spark-receptacle, and there-

by form a shoulder of resistance for the nuts L, so that the same bolts which connect the cap-piece and ring together also connect the spark-receptacle and the cap-piece.

There are several advantages attending this construction, and among them may be mentioned that of holding the cap-piece and ring firmly together without the interposition between the nut K and the cap-piece of the thin sheet metal constituting the adjacent part of the spark-receptacle. Another advantage is that the receptacle may be removed without loosening the connection between the cap-piece and the ring.

The foot N of the respective escape-conduits is provided with apertures corresponding with apertures in the top of the receptacle, so that connection with the cap-piece is also made at this point, these conduits being part of the cap-piece. The sides of the spark-receptacle are connected with the side pieces of the engine-frame by angle irons and bolts, as seen in Fig. 1, or in any convenient manner.

A supplemental lining or sheathing, O, is placed within the spark-receptacle, preferably at the upper and forward portions, and extending as far in either direction as may be desirable. In addition to this lining a wearing-plate, P, is also placed within the spark-receptacle and against said sheathing. This wearing-plate may be located at the upper forward corner and extend a suitable distance in either direction, as seen in Fig. 1, or may be placed at any other proper point of the receptacle, and this whether the lining intervenes between it and the receptacle proper or not. This wearing-plate and lining may be constructed of either sheet or cast metal, and may be case-hardened, their function being to withstand the violent abrasive action of the sparks and cinders which are discharged into the receptacle with considerable force by the exhaust-steam, thus preserving the integrity of the receptacle proper. The necessity for providing the spark-receptacle with a wearing plate or lining is brought about by reason of the direct discharge of the solid particles of combustion from the smoke-box into the receptacle.

It will be understood, as fully described in the patents before alluded to, that the escape-conduits are in communication with the interior of the receptacle by means of apertures cut in the wall of the latter.

To the lower extremity of the spark-receptacle D is riveted a cast-iron collar or chute, Q, the same lapping the receptacle sufficiently to afford space for the connecting-rivets. The exterior of this chute is provided with inclined ways R, in accordance with Letters Patent issued to me August 12, 1884, whereby the sliding door S is connected therewith. It is found desirable to construct this termination of the receptacle of cast-iron, so as to obtain the integral ways R, thus avoiding the necessity of riveting or otherwise attaching them to the

sheet metal of the receptacle, the riveting of the chute being compensated by its greater durability over the sheet-iron in withstanding hard usage, which this part of the receptacle undergoes.

In Figs. 4 and 5 I have represented a modified means of connecting the spark-receptacle with the cap-piece of the smoke-box, consisting in counter-sinking the apertures in the receptacle and cap-piece so as to receive the bolt-heads without protruding into the receptacle, the nuts in this instance being within the smoke-box. This construction can be resorted to when the smoke-box ring is wide or deep enough, as seen in Fig. 4, as there is room in such instance between the nuts and the casing of the smoke-box to allow the nuts to be manipulated with a wrench.

Adjacent to the cylinder-saddle (on some engines) an aperture is cut in the rear portion of the spark-receptacle, so as to give room for the flanges of the cylinder-saddle, a cap, T, being employed in such instance and riveted or bolted at its edges to the body of the receptacle, thus permitting the box to be made straight and brought up against the smoke-box cap, as shown.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a spark-extinguisher, the combination, with the exhaust-nozzle having a lateral discharge, of a spark-receptacle having an opening opposite to the said discharge, and provided with a wearing-plate by which the incoming solid particles of combustion may be resisted.

2. In a spark-extinguisher, the combination, with an exhaust-nozzle having a lateral discharge, of a spark-receptacle secured to and communicating with the smoke-box opposite said discharge, provided with a sheathing and wearing plate by which the incoming solid particles of combustion are resisted.

3. In a spark-extinguisher, the combination, with the smoke-box, the ring, and the cap-piece thereof, of the spark-receptacle lap-

ped across the same to within close proximity of the door and connected to the cap-piece.

4. In a spark-extinguisher, the combination, with the smoke-box, the ring, and the cap-piece having an aperture, of the spark-receptacle having a corresponding aperture lapped across the said cap-piece to within close proximity of the door, the bolts, the double sets of nuts, and the washers, whereby the several parts are connected together.

5. In a spark-extinguisher, the combination, with the smoke-box, the ring, and the cap-piece, of the spark-receptacle communicating with the smoke-box and lapped across the cap-piece to within close proximity of the door, the bolts and the nuts fitting within the apertures in the receptacle, the cup-shaped washers, and the nuts fitting against the same.

6. In a spark-extinguisher, the combination, with the smoke-box, of the spark-receptacle connected thereto and communicating therewith, lapped across the same to within close proximity of the door and provided with a wearing surface or plate.

7. In a spark-extinguisher, a spark-receptacle provided with an interior sheathing or lining and a cast-iron wearing-plate embracing one or more sides.

8. In a spark-extinguisher, the combination, with the smoke-box, of the spark-receptacle provided with an aperture within which the flanges on the cylinder-saddle extend, and with a cap to cover the same.

9. In a spark-extinguisher, the combination, with the exhaust-nozzle having an auxiliary discharge, of a spark-receptacle having an opening opposite to said discharge and provided with an escape opening or openings independent of the smoke-box, and a wearing-plate by which the incoming solid particles of combustion may be resisted.

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

GEO. D. HUNTER.

Witnesses:

JOHN CORY HUNTER,
HENRY L. BATES.