W. RUSHTON.

SPARK-ARRESTER.

No. 182,713. Patented Sept. 26. 1876.

Fig. 1.

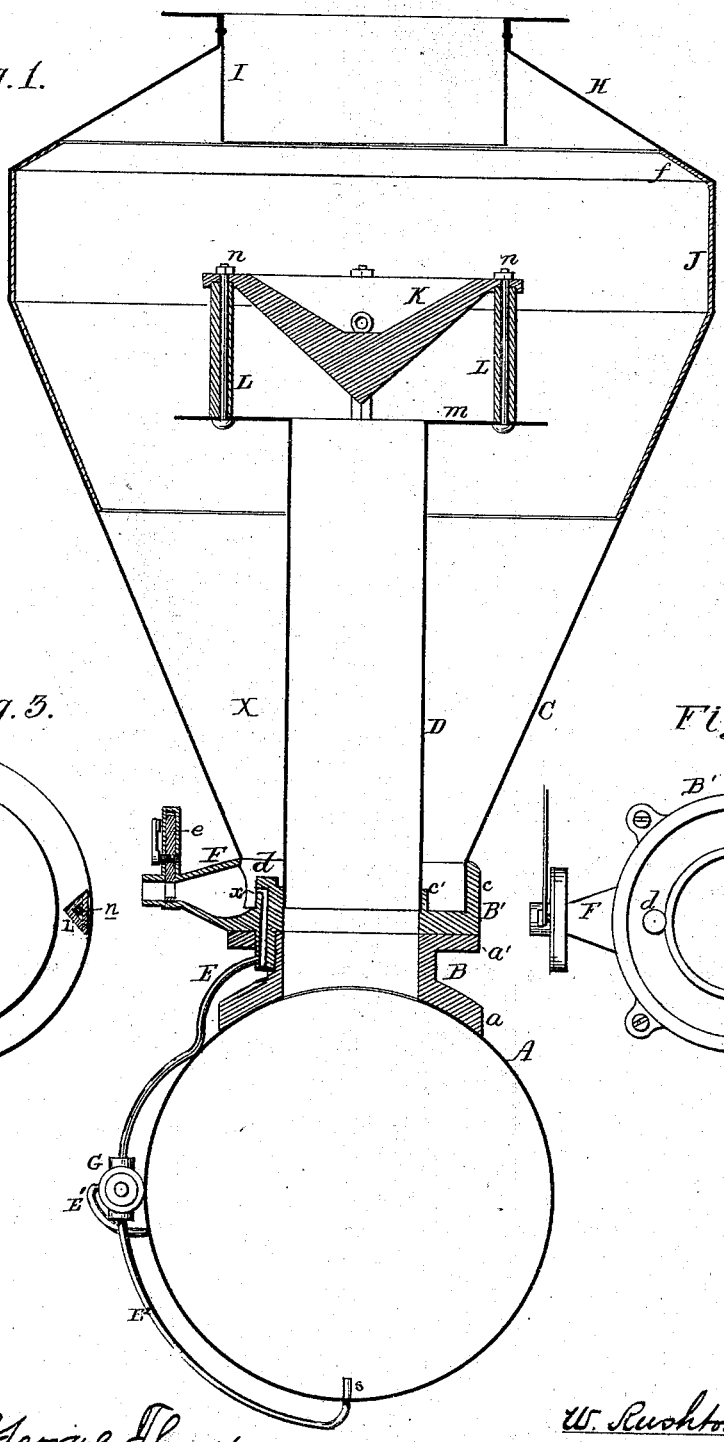


Fig. 3.

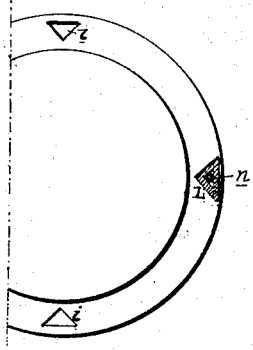
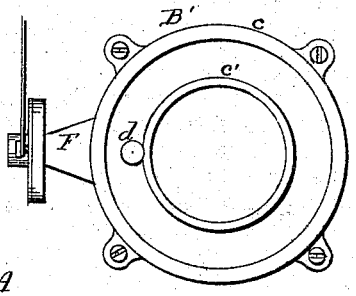


Fig. 2.



Attest:

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UNITED STATES PATENT OFFICE.

WILLIAM RUSHTON, OF ATLANTA, GEORGIA.

IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **182,713**, dated September 26, 1876; application filed June 1, 1876.

To all whom it may concern:

Be it known that I, WILLIAM RUSHTON, of the city of Atlanta, Fulton county, State of Georgia, have invented Improvements in Locomotive-Stacks, of which the following is the specification:

The objects of my invention are, to prevent the constant escape of sparks from the stacks of locomotives, but to collect and discharge them at intervals, to insure a free draft without discharging the sparks, to impart increased durability to the stack, and facilitate its connection to the boiler; and these objects I attain by the arrangement and construction illustrated in the accompanying drawing, in which—

Figure 1 is a sectional elevation of a locomotive boiler and stack showing my improvements; and Figs. 2 and 3, detached plan views.

To the boiler A is bolted a saddle, B, having a flange, *a*, adapted to the boiler, and an upper flange, *a'*, to ears of which is bolted a ring, B', having two concentric upright flanges, *c c'*, the outer flaring case C of the stack being bolted to the flange *c*, and the inner cylindrical pipe D being bolted to the flange *c'*. Upon the ring B' is cast a hollow enlargement, *d*, which projects through an opening in the saddle B, and with this enlargement communicates a pipe, E. In the side of the enlargement is an opening, *x*, directly opposite which, and cast with and projecting from the ring B', is a short pipe, F, level with the bottom of the stack, and serving to support the case of a sliding, rotating, or other valve or damper, *e*, operated by a rod leading to the cab of the engine. The tube E leads to a three-way cock, G, from which extends a pipe, E^1, communicating with the boiler at any desired point, and a pipe, E^2, communicating with the usual blow-pipe *s* in the combustion-chamber. At the edge of the opening in the usual inclined top H is a plain imperforate curtain or flange, I. Extending downward and within the stack is as independent lining, J, consisting of a cast-steel plate extending below the top of the pipe D, bent or otherwise formed to conform to the case A, and to form an inwardly-inclined flange, *f*, adapted to the inclined top H, as shown. Above the uptake is an inverted cone or funnel, K, made of chilled cast-iron, having a smooth lower face, and provided with recesses or sockets *i* to receive the upper ends of V-shaped, grooved, or hollow guards, L, consisting of chilled iron, resting on or in sockets in the flange or plate *m* at the upper edge of the pipe D, and covering the bolts *n*, which secure the funnel in its position.

The sparks carried upward by the exhaust, striking the smooth inclined surfaces of the funnel, are deflected outward without being materially broken, and thrown against the liner J, which prevents the wearing either of the outer case A or the top H. This is an important feature of my invention, as liability to wear away at the point of junction of the side and top of the case has heretofore been a serious objection to this form of stack.

When the sparks have accumulated in the receptacle X, the engineer opens the valve *e*, and, turning the cock G, discharges the jet of steam or water, or both, through the opening or nozzle *x* through the mass of sparks in front of the same, and through the pipe F, forcibly expelling the sparks, which continue to fall in front of the nozzle until all are discharged.

It will be apparent that by so arranging the nozzle and the pipe F that the sparks must fall between the two, their forcible expulsion is secured, while the valve *e* serves to retain them until a considerable quantity has accumulated, thereby avoiding the constant discharge, which is as objectionable from one part of the side of the stack as from the top.

By substituting a three-way cock, G, for the cock usually employed with the pipe E^2, the steam is admitted to the nozzle *x* without the use of any expensive appliances, and without any material additions to the devices ordinarily in use. By forming the cone K of chilled metal with a smooth surface, it is rendered much more durable than it would be if of malleable iron and roughened as usual, for I have found that the existence of any shoulder or projection for the sparks to strike against materially diminishes the durability of the parts. The guards L serve to support the funnel, and further protect the bolts *n*, which would otherwise be rapidly cut away, the sides of the

guards or standards being on an angle to each other, thus deflecting the sparks and reducing the abrading action.

It will be seen that the stack is secured to the ring B′, which is simply bolted to the saddle B, thus permitting the removal of the stack without disturbing the connection with the boiler, the pipe or hollow enlargement F cast with the ring supporting and facilitating the attachment of the valve appliances, and the hollow enlargement *d* affording a connection for the pipe E that is not interfered with by the removal of the stack.

As before stated, the pipe connecting the nozzle *x* and the boiler may communicate with the latter at any point, so as to discharge either dry steam, or steam and water, or water alone, thus serving as a surface-cock, and to conduct the water to a position to quench and expel the sparks.

Without confining myself to the precise arrangement of parts shown and described, and without claiming the liner J, which will form the subject of another application,

I claim—

1. The combination, in a locomotive-stack, of a nozzle, *x*, communicating with the boiler, and the hollow enlargement or opening F, arranged at the base of the stack opposite the nozzle, to leave an intervening receptacle for the sparks, substantially as set forth.

2. The saddle-ring cast with a hollow enlargement, F, carrying the valve-casing, and with a hollow projection, *d*, extending downward through an opening in the saddle, and serving to conduct the steam or water to the nozzle *x*, as set forth.

3. The combination of the nozzle *e*, pipes E E^1 E^2, and three-way cock G, as and for the purpose set forth.

4. The guards L, having inclined sides, for the purpose specified.

5. The combination of the guards or supports L, and funnel K, having sockets *i* to receive the upper ends of said supports, as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

W. RUSHTON.

Witnesses:

CHARLES E. FOSTER,

J. W. HAMILTON JOHNSON.