

William M. Thornton's Spark Arrester

No. 119,544.

Patented Oct. 3, 1871.

Fig. 2

Fig. 1

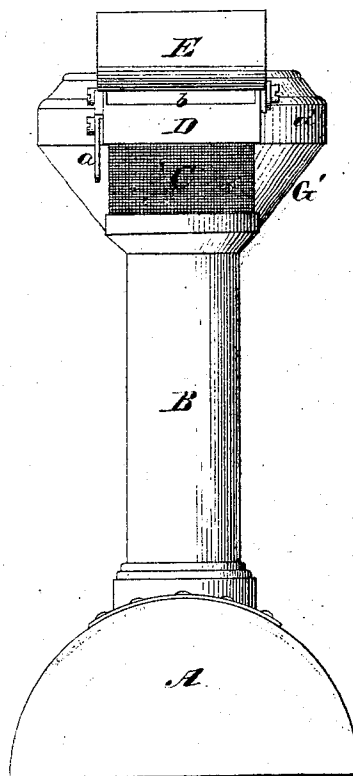
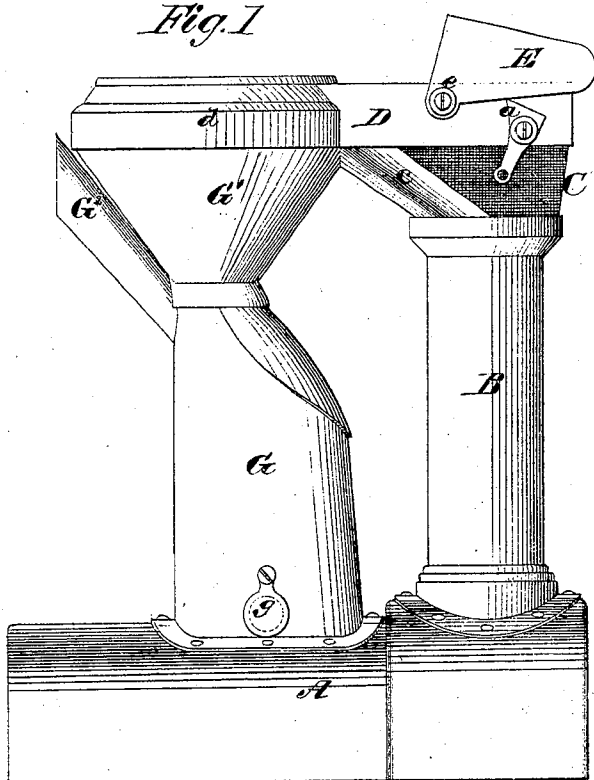
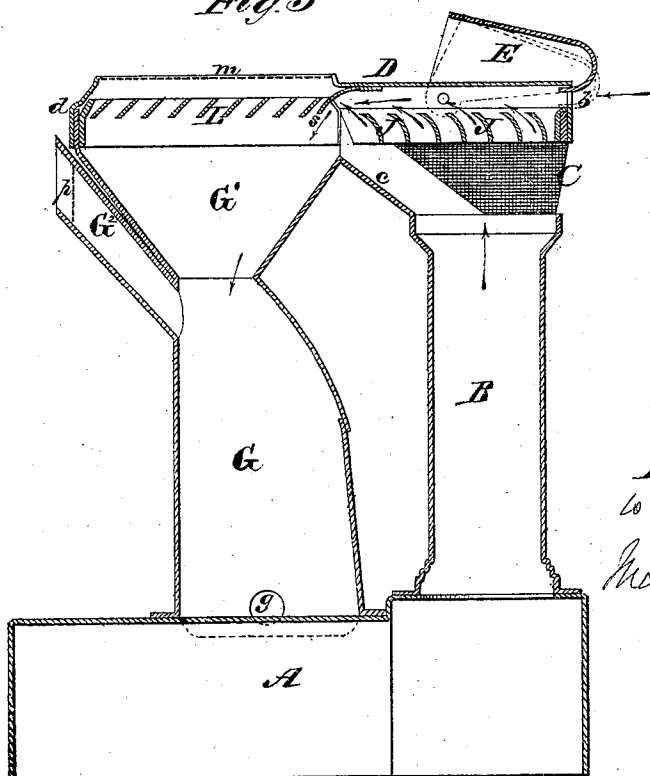


Fig. 3



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IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. 119,544, dated October 3, 1871.

To all whom it may concern:

Be it known that I, WILLIAM M. K. THORNTON, of St. Louis and State of Missouri, have invented a new and Improved Spark-Arrester; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a side elevation, showing my invention applied to a locomotive. Fig. 2 is a front elevation of the same. Fig. 3 is a vertical section taken longitudinally and centrally through the same.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this invention is to combine a spark-trap or receptacle, an adjustable hood, and a series of spark-deflectors with the smoke-stack of a locomotive in such manner that while a draught is secured, whether the locomotive be moved forward or backward, the sparks and flying cinders will be directed downward into said trap, from which they can be removed at the pleasure of the engineer, as will be hereinafter explained.

The following description of my invention will enable others skilled in the art to understand it.

In the accompanying drawing, A represents a portion of the boiler of a locomotive, and B the smoke-stack thereof. On the upper end of the stack is constructed a box, C, the front part of which is wire-gauze and the rear inclined part *c* imperforated sheet metal. The top of this box C is horizontal and strengthened by a band in any suitable manner. The back part of the box C opens into an inverted conical head, G¹, which communicates below with the spark-trap G, as shown in Fig. 3. The top of the flaring head G¹ is horizontal and level with the top of the box C, and upon these a cap or cover, D, is applied so as to fit snugly, and so that it can be removed when desired. At the front vertical side of the cap D an opening, *b*, is made for the admission of air freely over the top of the stack in addition to the currents of air which are admitted through the sides and front of the gauze box C. This opening *b* is provided with a hood, E, which is pivoted, at *e*, to the sides of the cap D, so that its front rounded end can be adjusted up or down by means of a lever, *a*, to which a rope will be attached and carried back to the pilot-house.

The hood E flares backward, and is open in the rear, so that currents of air may be collected and directed through the draught-opening *b* when the locomotive moves backward. When the locomotive moves forward the front end of the hood E is raised more or less so as to expose the opening *b*, as shown in full lines, Fig. 3. When the locomotive moves backward the front end of the hood E is depressed so as to direct currents of air backward through the opening *b*. It will be seen that the engineer can readily regulate the draught by adjusting the front rounded end of hood E up or down, and thus augmenting or diminishing the size of the draught-opening *b*. Within the box C, and arranged below the level of the draught-opening *b*, is a series of deflecting-plates, J, which are inclined backward and arranged transversely across the box C in a removable frame. These deflecting-plates may be curved, as shown in Fig. 1, or, if desirable, they may be flat. They are designed for breaking the force of the flying sparks and directing them backward into the flaring head of the spark-trap. This object is furthermore attained by means of a curved deflecting-lip, *s*, which is secured to the top of the cap D and arranged so as to overhang the front part of the flaring head G¹, as shown in Fig. 3. In order to secure an outlet for the air which enters the box C at *b* that portion of the cap D which covers the flaring head G¹ is made of wire-gauze, *m*, through which air can escape freely. To prevent any sparks escaping through the gauze *m* a series of deflecting-plates, L, is arranged below it and inclined forward or in an opposite direction to the inclination of the deflectors J, as shown in Fig. 3. These plates L are arranged transversely across the head G¹ and may be applied to a removable frame. They form obstructions to the ascent of sparks, but allow currents of air to pass freely between them. The drawing, Fig. 3, represents a space between the wire-gauze cover *m* and the upper edges of the deflectors L; but I prefer to have the deflectors extend up close to the wire-gauze cover *m*. Just below the contracted neck, at the junction of the trap G and its flaring head G¹, and at the rear side of this trap, is an opening leading into a tube, G², which is inclined backward and provided with a gauze partition, *p*. The object of this tube or opening is to create a downward current of air into the trap G and induce the

sparks to fall into the trap rather than ascend against the deflectors L. When the locomotive is moving rapidly forward it is obvious that there will be a constant tendency to a vacuum in the trap G, owing to the arrangement of pipe G² at the rear of the trap, and it is this tendency to a vacuum which greatly facilitates the falling of the sparks into the trap. The trap is bolted down fast upon the boiler-shell or casing, and at its lower end one or more openings, *g*, are made through it for removing the cinders from time to time. If desirable, pipes may be connected to these discharge-openings and carried beneath the boiler, which pipes or the openings should be provided with valves or covers.

It will be seen from the above description—First, that I arrange in the rear of the stack of a locomotive a spark-trap or receptacle, which communicates with the upper end of the stack by means of a gauze box, C, and an upwardly-flaring head, C'. In the box C deflectors are applied beneath a draught-inlet so as to direct the sparks backward and downward; and in the head G¹ deflectors are applied which will break the force of any sparks that might be carried up with the outwardly-flowing air-currents. Second, that I employ an adjustable hood, E, which will produce a draught when the locomotive moves backward, and which will also enable the engineer at all times to regulate the draught by reducing or in-

creasing the size of the inlet *b*. Third, that I employ a vacuum-tube, G², in connection with the spark-trap, which will induce the descent of the sparks into said trap by creating a partial vacuum therein when the locomotive moves forward.

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

1. The arrangement, on the stack B, of a gauze box, C, which is provided with deflectors J and combined with a spark-trap, G, substantially as described.

2. The adjustable hood E, in combination with the draught-opening *b* through the front of the gauze box C, substantially as described.

3. The upwardly-flaring head G¹ to the trap G, communicating in front with the gauze box C, and provided with deflectors L and a gauze cover, *m*, substantially as described.

4. The deflector *s*, arranged between the deflectors J and L and over the front part of the head G¹, substantially as described.

5. The inclined vacuum-tube G², in combination with a spark-trap, G, which communicates with the stack B, substantially as described.

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