W. McK. THORNTON. 2 Sheets--Sheet 1.

Spark-Arrester for Locomotives.

No. 166,040. Patented July 27, 1875.

Fig. 1

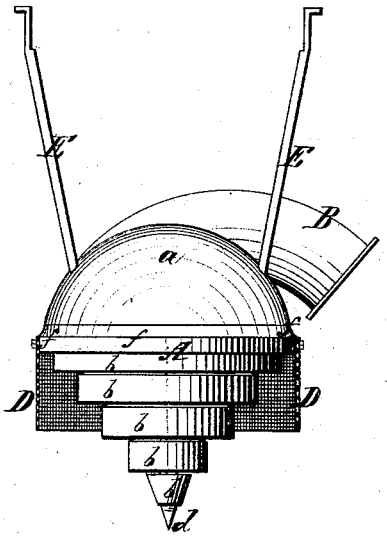
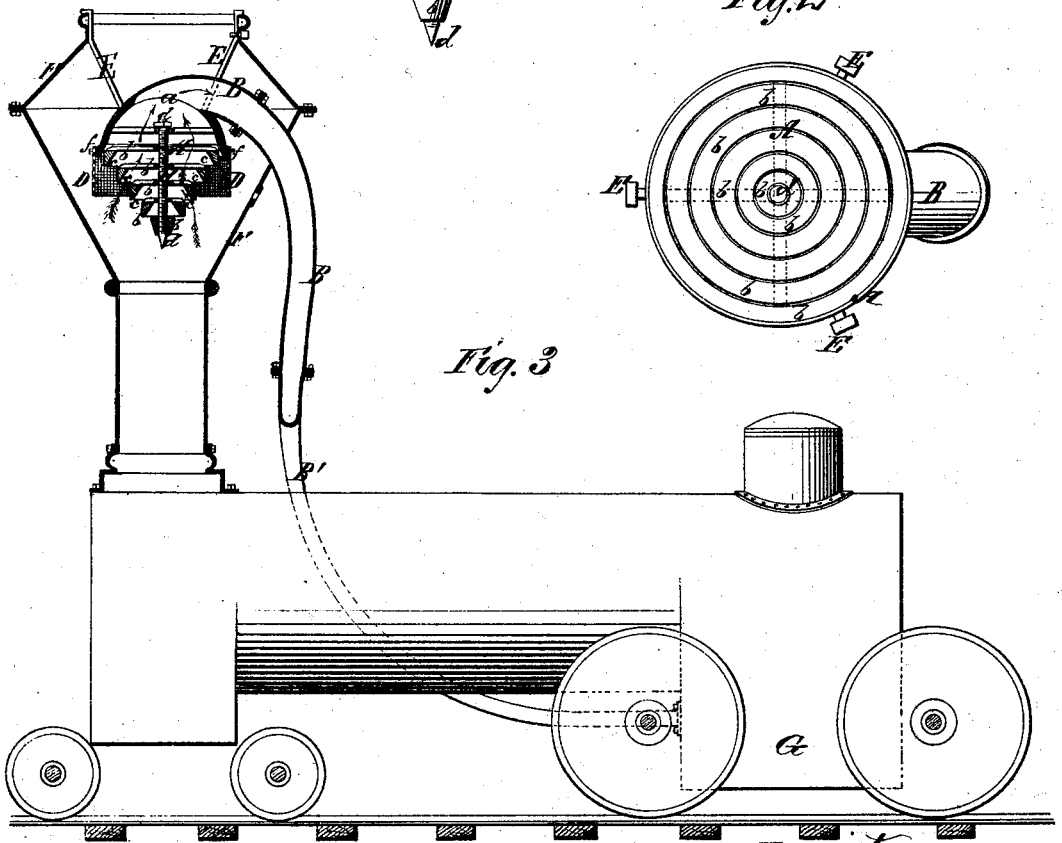


Fig. 2

Fig. 3



Witnesses.
James Martin Jr.
R. F. Campbell

Inventor.
William McK. Thornton - by
Mason, Fenwick & Lawrence,

2 Sheets--Sheet 2.

W. McK. THORNTON.

Spark-Arrester for Locomotives.

No. 166,040. Patented July 27, 1875.

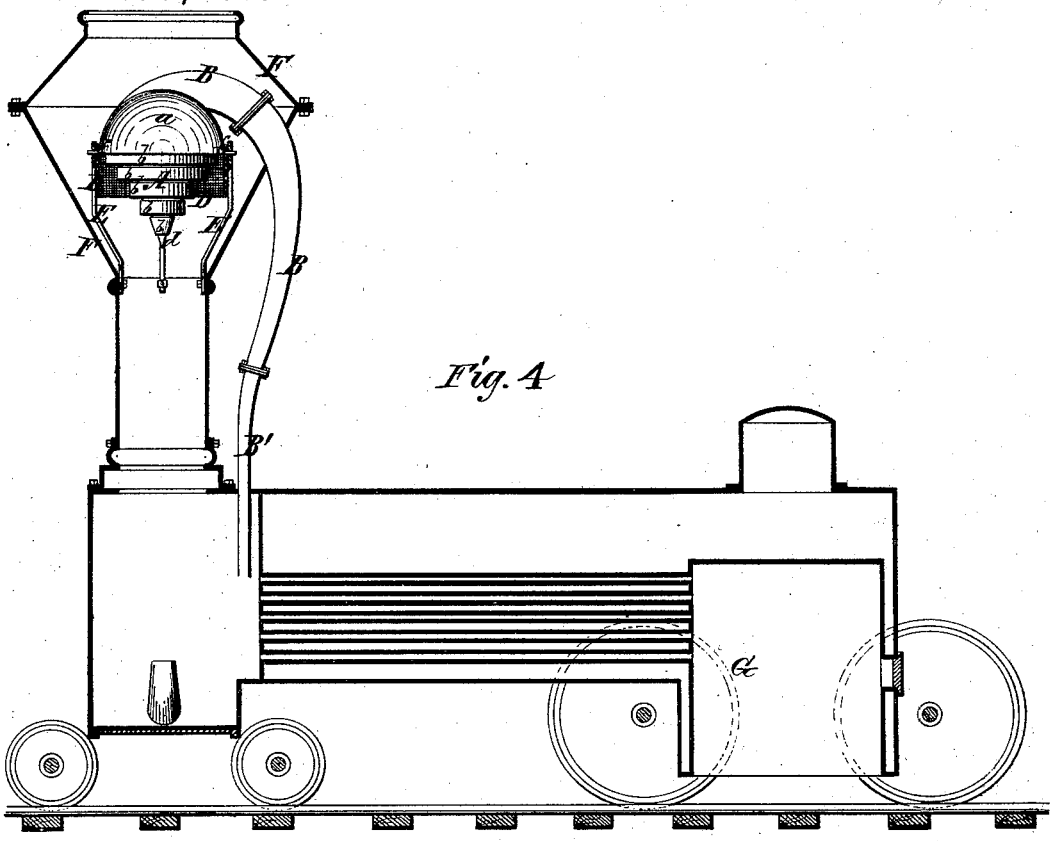
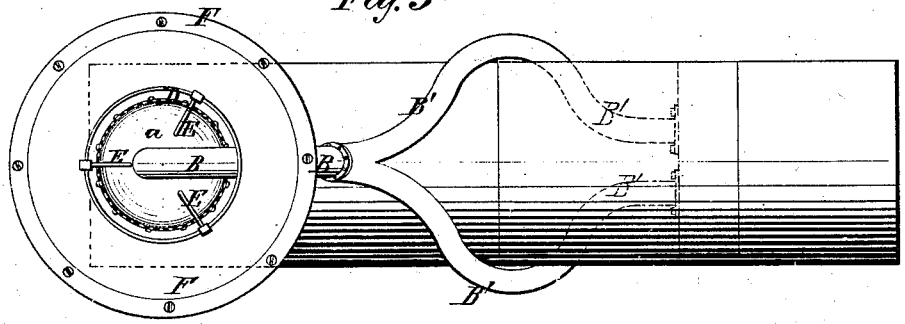


Fig. 4

Fig. 5



Witnesses.
James Martin Jr.
E. N. Campbell.

Inventor.
William McK. Thornton
by
Munn, Fenwick & Semmes

UNITED STATES PATENT OFFICE.

WILLIAM McK. THORNTON, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN SPARK-ARRESTERS FOR LOCOMOTIVES.

Specification forming part of Letters Patent No. **166,040**, dated July 27, 1875; application filed December 30, 1874.

To all whom it may concern:

Be it known that I, WILLIAM McK. THORNTON, of the city and county of St. Louis and State of Missouri, have invented a new and useful Improvement in Spark and Cinder Conducting Cones for Locomotive-Stacks; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation of the cone and its suspending bars or rods detached from the stack. Fig. 2 is an inverted view of the same. Fig. 3 is a vertical central section of the same applied to a stack, and as connected by a pipe or pipes to the fire-box of a locomotive from the outside. Fig. 4 is an elevation of the cone, and a longitudinal section of the stack and smoke-box and boiler of a locomotive, showing the spark and cinder conducting pipes leading to the smoke or fire box; also, showing a netting around the cone. Fig. 5 is a top view of the stack, spark and cinder conducting pipe, and locomotive-boiler.

The nature of my invention consists in the inverted cone made of annular sections, and having a hood and a pipe, the whole connected together by a pendent rod. It also consists in certain details of construction, and combinations of parts, as hereinafter described and specifically claimed.

A is an inverted cone formed with a semi-spherical hood, *a*, having an aperture across its top, and a short section of curved pipe, B, which incloses said aperture, attached to it. It is also formed, below the hood, of tapering rings *b*, of gradually-decreasing diameters, said rings being arranged on a vertical rod, *d*, one within another on different horizontal planes, and fastened by means of a screw-thread on the rod. The inner surface of the rings should be beveled so as to deflect sparks and cinders toward the center of the hood, and the outer periphery should be vertical or parallel with the neck of the smoke-stack, so as to not deflect the sparks against the sides of the head of the stack. The rings are of such diameters relatively that open spaces *c* for the sparks and cinders to rise through between them are formed, as shown. The extreme lower end of the cone is solid and tapering downward, and it is formed on, or attached to, the lower end of the rod. The rod is central and pendent from the semi-spherical hood. The rings of the cone are moved apart, so as to increase the size of the spaces *c c* by turning them around on the rod. A reverse movement decreases the size of the spaces *c*. The changes in the size of the spaces will be found necessary according to the amount of draft and the character of fuel used, or the amount of exhaust steam which is found necessary to force the sparks and cinders into the receiver, or back to the fire-box. By using annular sections a free passage of the sparks and cinders and exhaust steam through the cone is obtained, there being no corners or angles for the sparks and other matters to lodge upon. The cone A is suspended or supported in the head of the stack by means of several small rods, E, which are of sufficient strength, and yet do not obstruct the draft. The hood may have a vertical flange at *f*, and to this flange a short vertical cylinder of netting, D, may be attached, as shown, so as to aid in guiding the sparks through the spaces *c* of the cone, and protect the stack from wear. This is not absolutely necessary. For conducting the sparks into a closed receiver or back into the fire-box of the locomotive a curved pipe, B, with two lateral branches, B′ B′, is passed through the stack F, and carried into the receiver or forward into the fire-box G, as shown in the drawings, and there be consumed; or the pipe B may be carried down into the smoke-box, and then conducted to any convenient point in any proper manner.

By the employment of my invention the use of a netting on top of the stack is dispensed with, and thus by the peculiar construction of the cone, and its arrangement, a stack free from the obstructions to the draft is obtained, and, besides this, a stack which will not be worn out by friction of sparks and cinders against its sides. The rings by being adjustable can be set to admit just so much of the exhaust as may be necessary to carry or force the sparks and cinders through the cone and into the fire-box.

What I claim is—

1. The inverted conical spark-catcher, con-

sisting of the hood *a*, pipe B, and a downwardly-tapering portion formed of annular sections *b b*, which are of varying diameters, and are fastened upon a pendent rod, substantially as and for the purpose described.

2. The annular sections *b*, of varying diameters, and tapered on their inner circumference, and fitted (by means of a screw-thread formed on each of them, and a screw-thread formed on the pendent rod) to be adjusted nearer together or farther apart, in combination with the hood *a* and pipe B, substantially as and for the purpose described.

3. The inverted conical spark-catcher, consisting of the hood *a*, pipe B, and annular sections *b b* of varying diameters, and fastened upon a pendent rod, *d*, in combination with the netting D open at its lower end, and suspended from the spark-catcher and conductor, substantially as described.

4. The inverted cone portion of the spark-catcher and conductor, formed of annular rings of varying diameters, which are tapered on their inner circumference and cylindrical on their outer surface, substantially as described.

WILLIAM McKELVY THORNTON.

Witnesses:
C. P. ELLERBE,
FRANK HICKS.