

(No Model.)

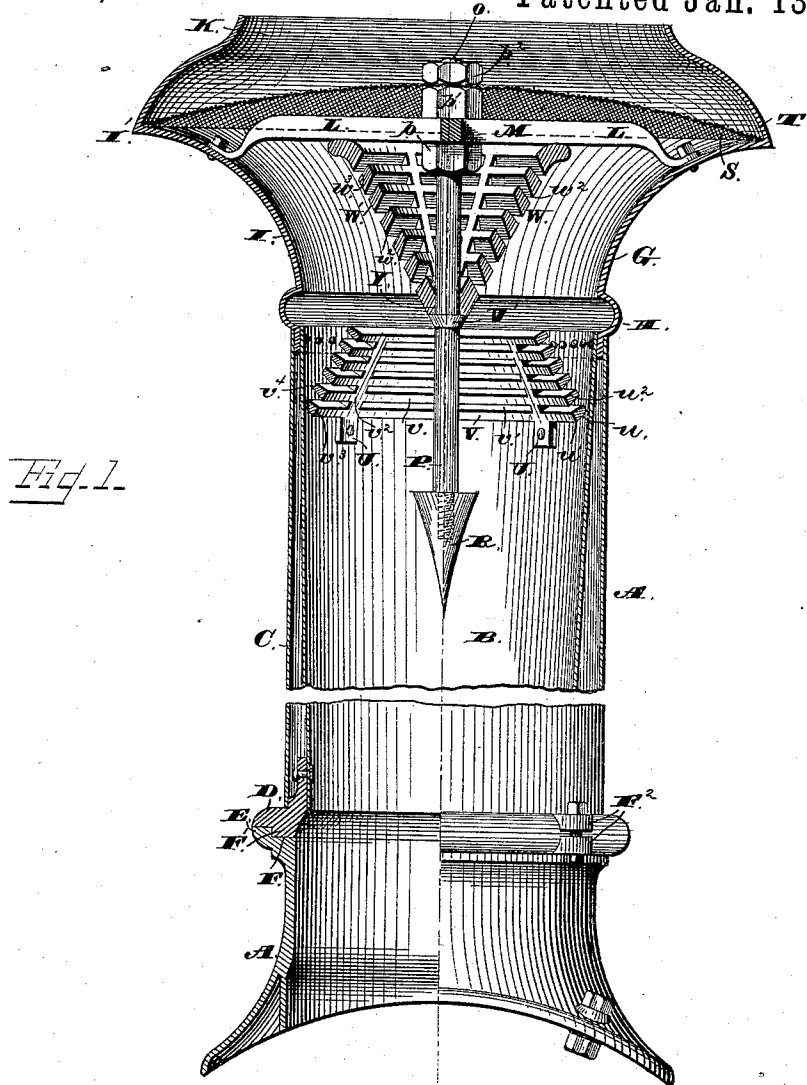
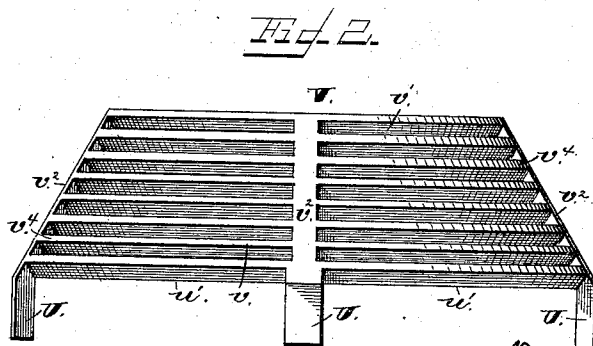
2 Sheets—Sheet 1.

T. H. HABERKORN.

SPARK AND CINDER ARRESTER.

No. 310,819.

Patented Jan. 13, 1885.



Witnesses

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Fig. 3.

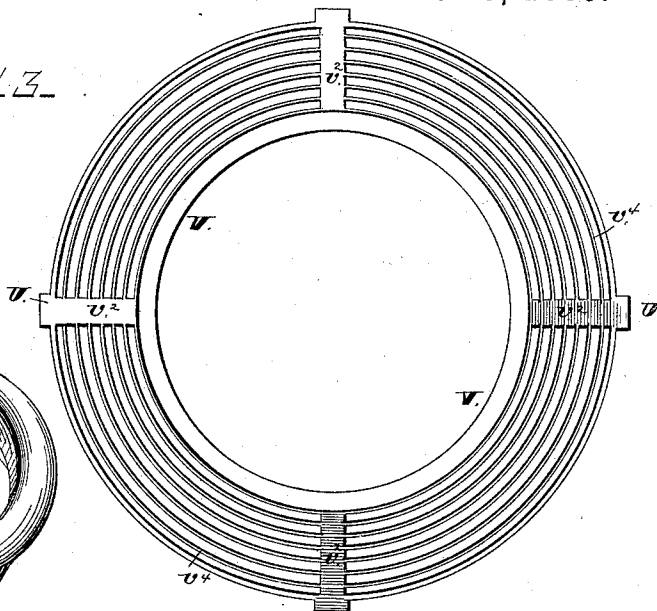


Fig. 4.

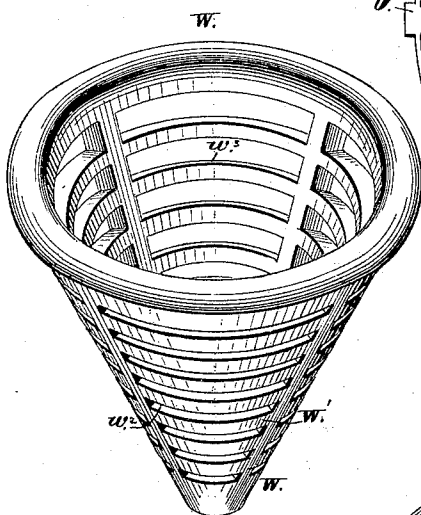
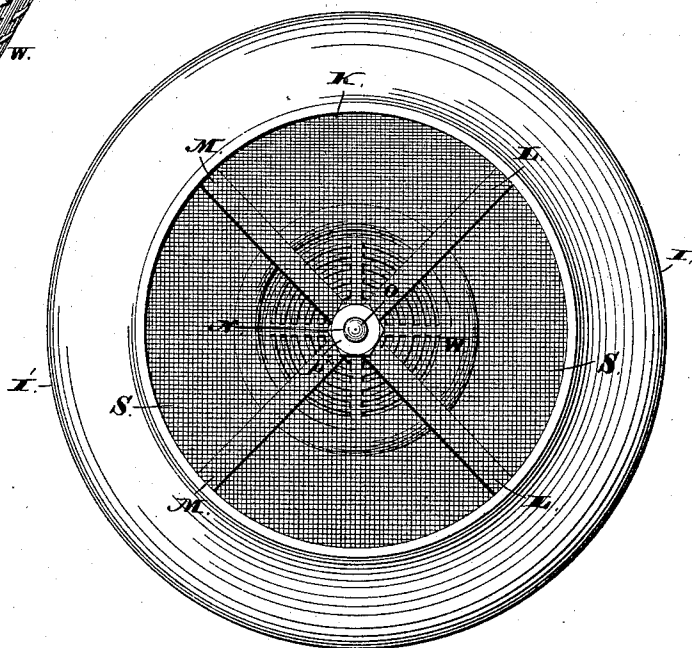


Fig. 5.



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UNITED STATES PATENT OFFICE.

THEODORE H. HABERKORN, OF FORT WAYNE, INDIANA.

SPARK AND CINDER ARRESTER.

SPECIFICATION forming part of Letters Patent No. 310,819, dated January 13, 1885.

Application filed June 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, THEODORE H. HABERKORN, of Fort Wayne, in the county of Allen, and in the State of Indiana, have invented certain new and useful Improvements in Spark and Cinder Arresters for Locomotives; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 shows a vertical central section of a smoke-stack provided with my improved spark and cinder arrester, the lower end or base of the stack being shown partly in section; Fig. 2, a detail view in elevation of the lower cinder-breaking cone; Fig. 3, a detail plan view of the same; Fig. 4, a detail perspective view of the upper cone; Fig. 5, a plan view of the upper end of the stack.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to provide an improved spark and cinder arrester for locomotives; and to this end it consists in the construction, arrangement, and combination of parts, as hereinafter described, and more specifically pointed out in the claims.

In the drawings, A designates the stack, which consists of the inner and outer concentric shells, B C. These at their lower ends are bolted to the ring D, which is bolted, as shown, to the top of the flange E, which extends upward from the smoke-box. This flange is preferably formed with the annular recess or rabbet F around its inner edge, and the ring D is formed with the annular rib F', which fits said recess or rabbet. The bolts which fasten the ring and flange together pass through ears F² projecting out from said ring and flange. The outer shell, C, of the stack is cylindrical, as shown, and at its lower end fits over and can be attached or fastened to the outer side of the ring D, while the inner shell, B, flares outward and upward, being larger at its top than at its bottom. At its lower end it is riveted or bolted to the inside of ring D. At its upper end it is riveted to the inside of the lower end of the stack-head G. The outer shell, C, fits over the outside of such lower end of the stack-head, as it does over the ring

D at its bottom, and can be riveted to the head or not, as desired. Riveting of the outer shell to the head or ring is not necessary, as the inner shell can be made stiff and strong enough to support and hold the head with its inclosed spark and cinder arresting devices. As shown in section, the head just above the ends of the shells B C is curved outward and inward, to form the annular enlargement H. Above this the sides of the head are curved so as to flare outward, the upper and outer edge of this flaring portion I being in or nearly in a horizontal plane or tangent thereto. From this edge I' the sides of the head curve inward, and then upward, to the edge of the discharge-opening K, so that the diameter of such opening is considerably smaller than that of the stack at the top of the flaring portion I.

Bolted at the ends of its arms L L, to the interior of the stack near the upper end of the flaring part I, is the spider M, whose arms L L extend at right angles to each other. This spider is of such size as to be capable of being introduced into place in the stack-head through the opening K. This is not done by dropping it directly into place, for it is too large for that, but by introducing it with one side extending diagonally down and out into the enlarged portion of the stack, so that the other end can be swung down within the opening and into place, resting on the outwardly-curved inner face of the portion I.

Through the central portion of the spider M is the opening N, up through which extends the screw-threaded upper end, O, of the cylindrical rod or bar P, which extends down within the stack, and has screwed upon its lower end the deflecting-cone R.

Upon the upper end of the deflector-bar P is a nut, p, bearing against the lower face of the spider, and a nut, p', screwed down against the top of the spider to hold the bar P rigidly and firmly in place in the axial center of the stack. A screen of steel wire, S, which is hemispherical in shape before being fastened in place, is introduced into the top of the stack-head. When this screen is flattened out, as shown in the drawings, its edges will rest on the upper and outer part of the flared portion I of the head. A nut, p², on the upper end of the

screw-threaded portion of the bar P, clamps the screen at its central point between it and the nut p' , and holds the screen in its flattened condition, with its edge resting in the angle 5 between the outer edge of flaring portion I and the inturned upper portion, T, of the head. With this construction the screen can be easily and quickly removed and replaced, which is not the case with those heretofore 10 made and used.

Attached by lugs or ears U U to the inner side of the inner shell, C, is the cast-iron frame V. This is in the form of a frustum of a cone, and is made up of the series of parallel horizontal rings v v , decreasing in size toward the 15 top of the frame. The rings are, as shown, placed a short distance apart to leave the spaces v' , and are connected together and held rigidly in place by the ribs or bars v^2 , with 20 which the rings are cast in one piece. These ribs or bars, of which there are four, but may be any number, are extended downward, as shown, below the lower ring, to form the attaching ears or lugs U U. The inner faces, 25 v^3 , of the rings are inclined inward and upward, so that they all coincide with the peripheral surface of a single frustum of a cone. The outer faces, v^4 , of the rings are preferably made parallel to such inner faces. The 30 lower faces, u u , are inclined upward and outward from horizontal planes, to form at their intersections with the inner faces the edges u' u' . The upper faces, w^2 w^2 , of the rings are at right angles to the inner faces, v^3 v^3 , so that 35 the openings between the rings flare outward, as shown in the drawings.

Surrounding the bar P above the frame V, and held firmly between the collar v' and the spider M, is the inverted conical frame W, 40 formed, as was the frame V, of a series of rings, W' W' , with the connecting ribs or bars W^2 W^2 . The bar P passes through and fits closely the opening Y in the apex of the cone, while the upturned base of the cone 45 rests against the lower face of the spider. The lower faces or sides, w , of the rings incline upward in planes at acute angles to the outer faces, which coincide with and form the surface of the cone. At the intersection of faces 50 w' and w will then be formed the edges w^2 . The upper sides or faces, w^3 w^3 , stand at or about at right angles to the outer faces, w' w' , of the cone-rings. With this construction the 55 spaces between the rings flare inward toward the axis of the cone.

In both the conical frames V and W each of the rings is a conical one with its inner and outer faces parallel.

Both frames are preferably of cast-iron.

60 The operation of my spark and cinder arrester is as follows, viz: The sparks and cinders carried up from below strike the deflecting-cone R, and are directed outward on all sides against the inner face of cone V, where they 65 are shattered against the faces of the rings and sheared against the lower edges thereof.

The dust formed of the broken, cut, and powdered cinders flies out toward the sides of the stack through the spaces between the rings, and is thus evenly distributed against the 70 wire screen which extends across the stack-head. The remainder of the cinders, which are unbroken and unpulverized by contact with the inner surfaces of the rings and their edges, pass up through the top of truncated cone V, and are thus directed against 75 the outer face of the rings forming conical frame W, where the hitherto unbroken cinders are thoroughly broken, crushed, and sheared or shaved into dust against the ring- 80 surfaces and the edges w^2 w^2 . The dust from them sifts between the rings W' W' into the space within the cone, and then passes up along the inside of the cone, out through its flaring upper end and is spread out against 85 the screen above.

Having thus fully set forth the nature and merits of my invention, what I claim is—

1. In combination with a smoke-stack provided with a central deflecting-cone, the frame 90 situated in the stack above the cone, consisting of a series of rings decreasing in size toward the top, supported at distances from each other, and having their inner faces inclined upward and inward, substantially as 95 and for the purpose described.

2. In combination with a smoke-stack provided with a deflecting-cone, the frame within the stack above the deflector in the shape of the frustum of a cone formed of a series of 100 rings supported at distances from each other, having their inner faces inclined inward and upward to form a conical surface within the frame, and their lower faces inclined upward and outward to form acute angles at their in- 105 tersections with the inner faces, substantially as and for the purpose described.

3. In combination with the stack, the spider fastened within it at or near its flaring portion, the screw-threaded rod extending up 110 through the center of the spider and provided with a nut resting against the under side of the spider, the inverted dish-shaped screen resting at its edge on the inner surface of the flaring portion of the stack, and the nut on 115 the upper end of the rod bearing down upon the center of the screen, substantially as and for the purpose set forth.

4. In combination with the stack, the spider fastened within it, the inverted dish-shaped 120 screen resting at its edge upon the inner face of the flaring portion of the stack, the rod passing up through the center of the spider and the screen, the nut thereon bearing against the under side of the spider, and the two nuts 125 at or near the upper end of the rod, one above and the other below the screen, and adapted to clamp and hold the central portion of the screen between them, substantially as and for the purpose set forth. 130

5. In a spark and cinder arrester and consumer for smoke-stacks, the inverted conical

frame situated centrally within the stack, and composed of a series of rings supported at distances from each other, and having their outer faces coincident with the surface of the cone, substantially as shown and described.

6. In combination with the spider within the stack and the deflector-bar extending downward from the spider and carrying on its lower end a deflecting-cone, the inverted conical frame composed of a series of rings surrounding the bar and held between a collar on said bar and the spider bearing against its upturned base, substantially as shown and described.

7. In a spark and cinder arrester for smoke-stacks, the inverted conical frame composed of a series of rings supported at distances from each other, having their outer faces in the plane of the surface of the cone and their lower faces inclined upward at acute angles thereto to form edges, against which the sparks and cinders will be sheared, substantially as and for the purpose described.

8. The spark and cinder arrester for smoke-stacks, consisting of a deflecting-cone, a frusto-conical frame above the cone, composed of a series of suitably-supported rings, having their inner faces inclined inward and coinci-

dent with the same conical surface, and sharp corners or edges at the intersections of their inner and lower faces, an inverted conical frame above the open end of the other frame, consisting of a series of suitably-supported rings, having their outer faces coincident with the same inverted conical surface, and sharp corners or edges at the intersections of the outer and lower faces, and a screen in the stack above the upper frame, substantially as shown and described.

9. A spark and cinder arrester for locomotives, consisting of a deflecting-cone within the stack, a frusto-conical frame above, against the inner face of which the sparks and cinders are directed by the deflector, and an inverted conical frame above such frame, against the outer surface of which the sparks and cinders are directed by the inner surface of the frame below it, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 20th day of May, A. D. 1884.

THEODORE H. HABERKORN.

Witnesses:

ROBERT S. ROBERTSON,
THOMAS A. NOFTZGER.