

A. LAKE.
SPARK ARRESTER.

APPLICATION FILED MAR. 18, 1916.

Patented Feb. 6, 1917.

2 SHEETS—SHEET 1.

1,215,288.

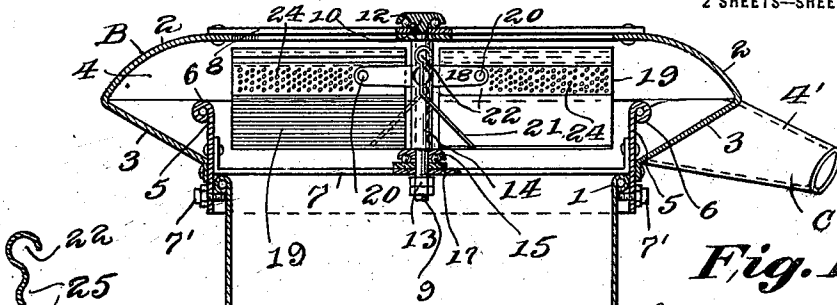


Fig. 1.

Fig. 3.

Fig. 5.

Fig. 4.

Fig. 2.

Witnesses
2/2. Lybrand
Charles D. Smith.

Inventor
Archibald Lake
By Victor J. Evans
Attorney

A. LAKE.
SPARK ARRESTER.
APPLICATION FILED MAR. 18, 1916.

1,215,288.

Patented Feb. 6, 1917.
2 SHEETS—SHEET 2.

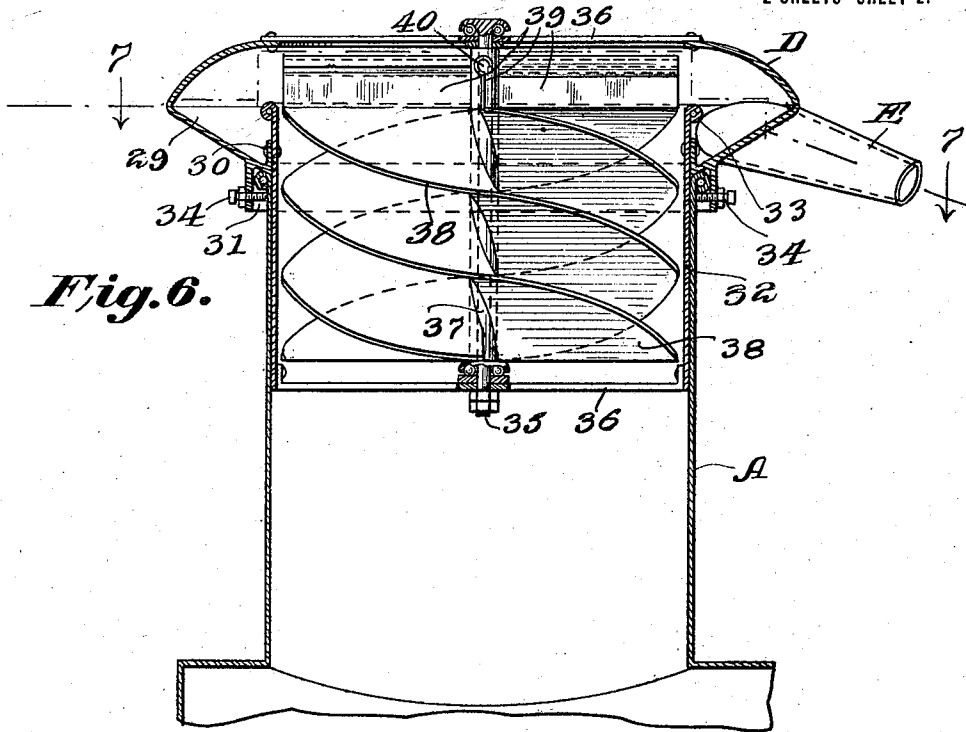


Fig. 6.

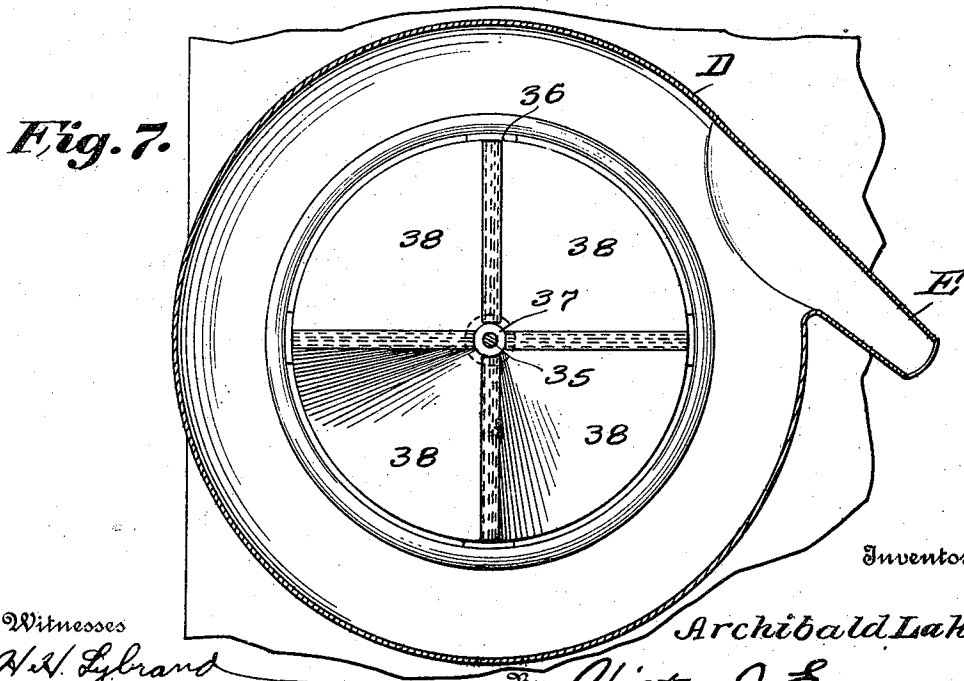


Fig. 7.

Witnesses
H. H. Lybrand
Edward D. Pratt.

Inventor
Archibald Lake
By Victor J. Evans
Attorney

UNITED STATES PATENT OFFICE.

ARCHIBALD LAKE, OF PARKLAND, ALBERTA, CANADA.

SPARK-ARRESTER.

1,215,288.

Specification of Letters Patent.

Patented Feb. 6, 1917.

Application filed March 18, 1916. Serial No. 85,219.

To all whom it may concern:

Be it known that I, ARCHIBALD LAKE, a subject of the King of Great Britain, residing at Parkland, in the Province of Alberta and Dominion of Canada, have invented new and useful Improvements in Spark-Arresters, of which the following is a specification.

This invention relates to spark arresters and has for its chief characteristic to provide a device of this character which is so constructed and arranged upon a stack as to utilize the draft created in the stack to impart a rotary motion to a number of blades, the blades being adapted to catch the cinders and sparks and to deposit them by the centrifugal force created by the rotation of the blades into a receptacle arranged adjacent the blades.

Another important object of this invention resides in the provision of a device of this character the blades of which are so constructed and arranged as to deflect the cinders from one blade to the cinder catching means formed on the adjacent blade.

Another important object of this invention is to provide a device of the character described in which the blades are perforated to allow the percolation of the smoke and steam therethrough and at the same time catching the cinders and preventing them from being ejected from the smoke stack.

Another important object of the invention is to provide a device of this character which may be quickly applied to or detached from a stack of any common construction.

Other objects of the invention will appear as the specification is read in connection with the accompanying drawings.

Figure 1 is a vertical section of my device showing the same applied to a stack and showing the blades in elevation.

Fig. 2 is a top plan view of the arrester.

Fig. 3 is a section of one of the modified forms of the blades.

Fig. 4 is a fragmentary perspective of a further modified form of a blade.

Fig. 5 is an end elevation of a still further modified form of blade.

Fig. 6 is a modified form of my invention applied to a stack, the stack and cinder receptacle being shown in section, while the blades are shown in elevation.

Fig. 7 is a horizontal section on the line 7-7 of Fig. 6.

Referring to the drawings in detail 1

designates the stack A of a locomotive, I having shown my device applied thereto for the sake of illustration, as I wish it to be understood that my spark arrester may be used in connection with a furnace of any description without departing from the scope of my invention. The stack A has its upper edge outturned to provide an annular bead 1. Mounted upon the stack A is my improved form of spark arrester which comprises a cinder receptacle B which is of annular formation and comprises diverging walls 2 and 3, the outer edges of the walls being secured together in any suitable manner to provide an annular pocket 4. The lower diverging wall 3 is provided with a tangentially arranged outlet pipe 4' to allow the exit of the cinders as will be hereinafter described. Riveted to the inner face of lower diverging wall 3 adjacent its lower edge is an annular ring 5 which extends above and below the free edge of the diverging wall 3 and has its upper edge beaded as at 6, the upper edge being disposed within the pocket 4 as is clearly shown in the drawings. Riveted to the inner face of the ring 5 and spanning the space therebetween are a pair of cross bars 7 which intersect each other at a point concentrically of the ring. As shown in Fig. 1 the opposite extremities of the cross bars 7 lie upon the beaded edge 1 of the stack A and support the receptacle thereupon as will be clearly understood. To rigidly hold the receptacle upon the stack I have provided the annular ring 5 with bolts 7' adjacent its lower edge, the bolts extending transversely through the ring and having their inner extremities engaging the under side of the bead 1. Secured to the top diverging wall 2 of the receptacle and spanning the space therebetween is a second pair of cross bars 8 which intersect each other in a manner similar to the cross bars 7 so that the intersection of both of the cross bars 7 and 8 lie in vertical alinement with each other. Connecting the cross bars 7 and 8 and extending through the same at their points of intersection is a shaft 9 the upper end of which is provided with a head 10. The inner face of the head 10 is provided with an annular groove which is adapted to cooperate with the upper cross bar 8 to form a raceway for the balls 12. The lower end of the shaft 9 is threaded to receive a nut 13 whereby the shaft will be held in assembled position upon

the cross bars. Mounted upon the shaft is a sleeve 14 which has its lower edge enlarged and provided with an annular groove 15, the same cooperating with the upper cross bar 7 and forming a raceway for the balls 17. The sleeve 14 is formed adjacent its upper end with a plurality of radially extending arms 18, the arms being slotted vertically for a portion of their length to receive the vertical portion of the blades 19, the blades being rigidly mounted within the arms by means of the rivets 20.

The rigidly extending blades 19 are of such a length as to have their outer ends terminate at a point on a line with the inner edge of the upper converging wall 2, and are of such a width as to permit the free rotation of the same within opening formed in the annular receptacle. The blades as shown in Fig. 1 have a major portion of their width inclined at an angle as at 21, while the upper edge of the blade is bent longitudinally to form a groove 22, the groove being substantially semi-circular in cross section and having its mouth disposed downwardly. The vertical portion 23 of each of the blades is perforated as at 24 to permit the percolation of the smoke and steam as will be hereinafter described.

In practice when the exhaust of the locomotive which comprises a certain amount of steam and smoke and cinders passes up through the stack A, it strikes the inclined portion 21 of the blades 19 whereby the blades will be caused to rotate as will be understood. Now assuming that the exhaust has impinged upon the angular portions of the blades, the exhaust will be deflected to the succeeding blade, whereby the exhaust will percolate through the perforations in the succeeding blade and pass out through the opening in the receptacle B. As the exhaust passes through the perforations, the longitudinal extending grooves 22 formed on the upper edge of the blades will collect the cinders contained in the exhaust and by the centrifugal action created by the rotating of the blades the cinders will move radially within the grooves and will be deposited in the receptacle B, the annular ring 5 preventing the cinders from returning within the stack. As the blades 19 are rotating with great impetus, a draft will be created within the pocket 4 whereby the cinders within the pocket will be ejected through the outlet pipe C. A flexible pipe of any suitable construction may be connected to the outlet pipe C whereby the cinders will be conveyed to the ground.

In Fig. 3 is shown a slightly modified form of the blade, the vertical portion of the blade being corrugated as at 25, the corrugations serving to form a greater obstruction for the exhaust and to direct the cinders upwardly within the groove 22. In

Fig. 4 the corrugated portion of the blade is perforated as at 26 to allow the percolation of the exhaust therethrough. In Fig. 5 is shown a further modified form of blade, the same being curved transversely in the form of an arc as at 27 and provided at its upper longitudinal edge with a longitudinally extending groove 28. It will be seen from this construction that the body of the blade is so curved as to direct the cinders which impinge thereupon into the groove 28 as will be understood.

Referring more particularly to Fig. 6, I have shown a new form of blade and a slightly different means to mount the cinder receptacle and blades upon a stack. In this embodiment of my invention the cinder receptacle D is similar to that shown in Fig. 1, but has the inner edge of the diverging wall 29 flanged upwardly as at 30, while the outer face of the wall is provided with a depending flange 31 at a point adjacent the inner edge. Riveted to the upturned flange 30 is an annular sleeve 32 which has a major portion of its width disposed below the receptacle, the remaining portion extending into the receptacle and having its upper edge provided with an annular bead as at 33. As shown in the drawing, the annular sleeve 32 extends into the stack for a considerable distance, the lower edge of the lower diverging wall 29 limiting the outward movement thereof, while the bolts 34 carried by the depending flange 30 engage the bead formed on the upper edge of the stack A and prevents the accidental displacement of the arrester. 35 designates the shaft which has its opposite ends journaled in the cross bars 36 in a manner similar to that shown in Fig. 1, the lower pair of cross bars being secured to the inner face of the annular sleeve 32. The shaft 35 is mounted in ball bearings as in Fig. 1 and therefore it is thought unnecessary to describe the mounting in detail. Mounted upon the shaft 35 is an annular sleeve 37 upon which is formed a plurality of spiral blades 38, the upper portion of each of the blades being arranged vertically as at 39 and are provided with a longitudinally extending groove 40.

It will be seen from this construction that the operation of the arrester is similar to that described in my preferred form with the exception that the spiral blades divide the exhaust from the locomotive into a series of columns, the blades being so shaped as to cause these columns to impinge upon the vertical portion 39 of the blades whereby the cinders contained in the exhaust will collect within the groove 40 and will move radially within the grooves and will ultimately be disposed in the cinder receptacle D. From the receptacle D the cinders will be forced by the draft created from the re-

tation of the blades, into and out of the outlet pipe E.

It is thought that the foregoing taken in connection with the accompanying drawings 5 that the construction and operation of my device will be apparent to those skilled in the art without further description, and that minor changes in size, shape, proportion and minor details of construction may be made 10 without departing from the spirit and scope of the hereunto appended claims.

What I claim is:—

1. In combination with a stack, a shaft 15 mounted concentrically in the stack, blades rotatably mounted on the shaft, the said blades each having a portion thereof inclined, a groove formed on the blade, and a vertical portion connecting the groove to the inclined portion.

2. In combination with a stack, a shaft 20 mounted concentrically in the stack, blades rotatably mounted on the shaft, said blades each having a portion thereof inclined, a groove formed on the blade, and a vertical 25 corrugated portion connecting the groove and the inclined portion.

3. In combination with a stack, a shaft 30 mounted concentrically in the stack, blades rotatably mounted on the shaft, said blades each having a portion thereof inclined, a groove formed on the blade, and a vertical perforated corrugated portion connecting the groove and the inclined portion.

4. In combination with a stack, a shaft 35 mounted concentrically in the stack, blades rotatably mounted on the shaft, a receptacle surrounding said blades, each of said blades having a portion thereof inclined, a groove 40 formed on the blades and a vertical perforated portion connecting the groove and the inclined portion.

5. In combination with a stack, a spark 45 arrester comprising an annular receptacle having diverging top and bottom walls, an annulus secured to the inner edge of the bottom wall and coöperating with said bottom wall to form a cinder receiving chamber, cross bars spanning said receptacle and arranged upon the opposite sides thereof, the bars upon the lower side of the receptacle 50 adapted to engage the stack to limit the downward movement of the receptacle, securing members carried by said annulus, a shaft mounted in said cross bars and connecting the same, and blades rotatably 55 mounted on said shaft, said blades each having a portion thereof inclined and a groove formed on the blade, and a vertical portion connecting the groove to the inclined portion. 60

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

ARCHIBALD LAKE.

Witnesses:

WILLIAM HUME LINTON,
ALFRED L. REEVE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."