(No Model.)

C. G. LUTHMAN.

SPARK ARRESTER.

No. 477,058. Patented June 14, 1892.

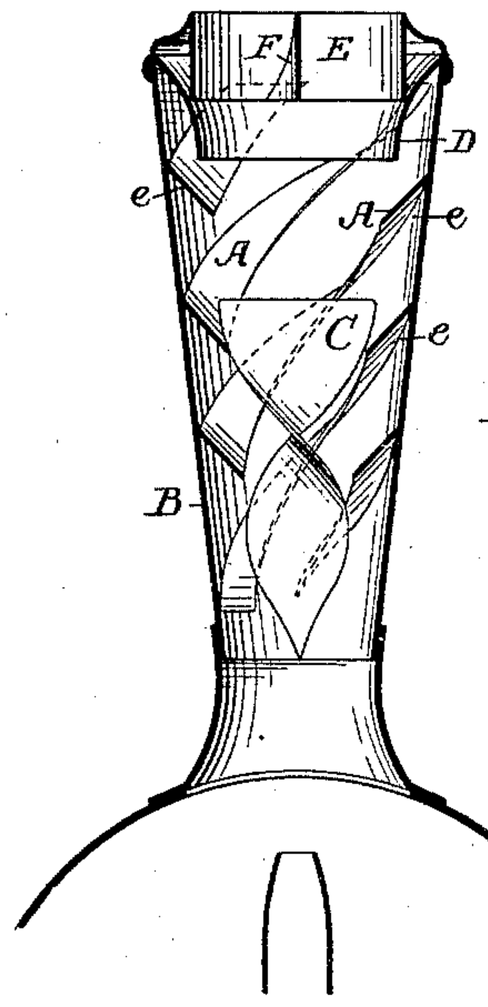


FIG. 1.

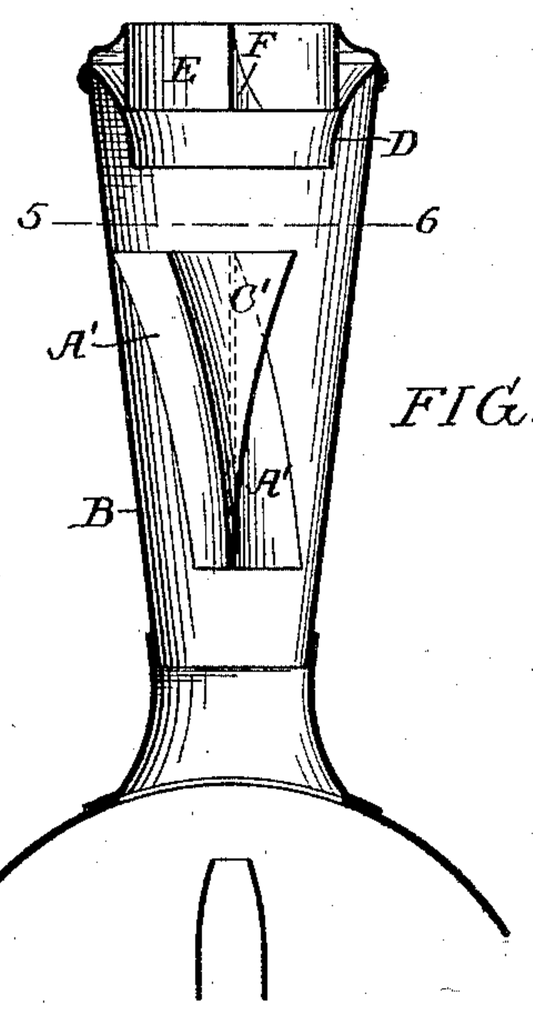
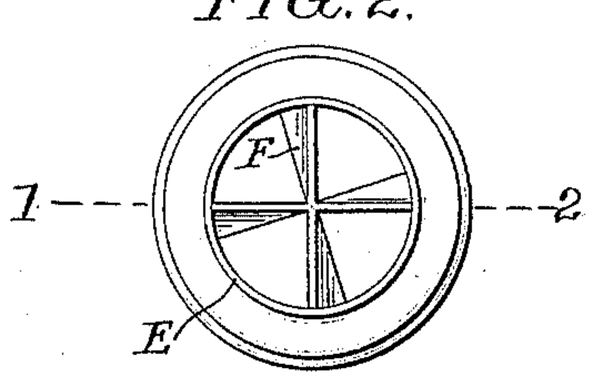


FIG. 3.

FIG. 2.

FIG. 4.



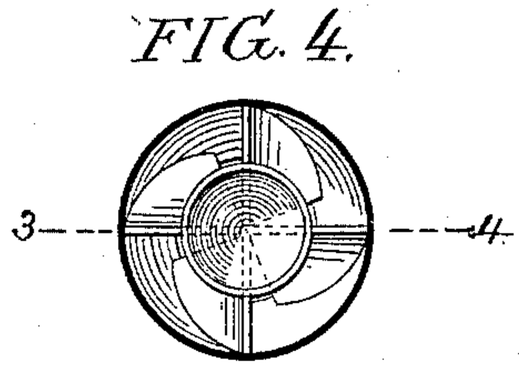


FIG. 5.

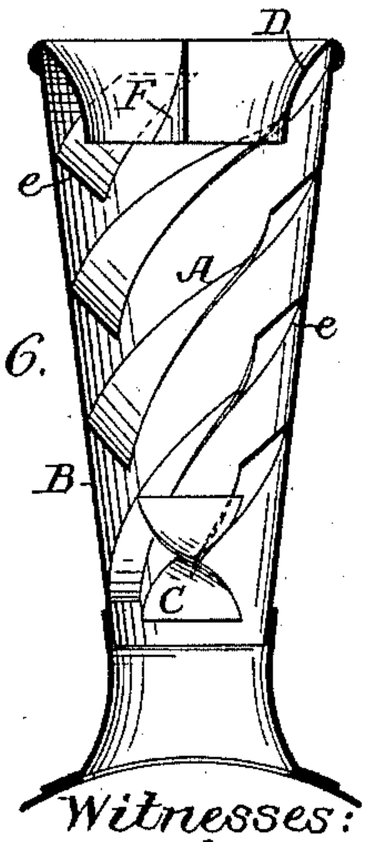
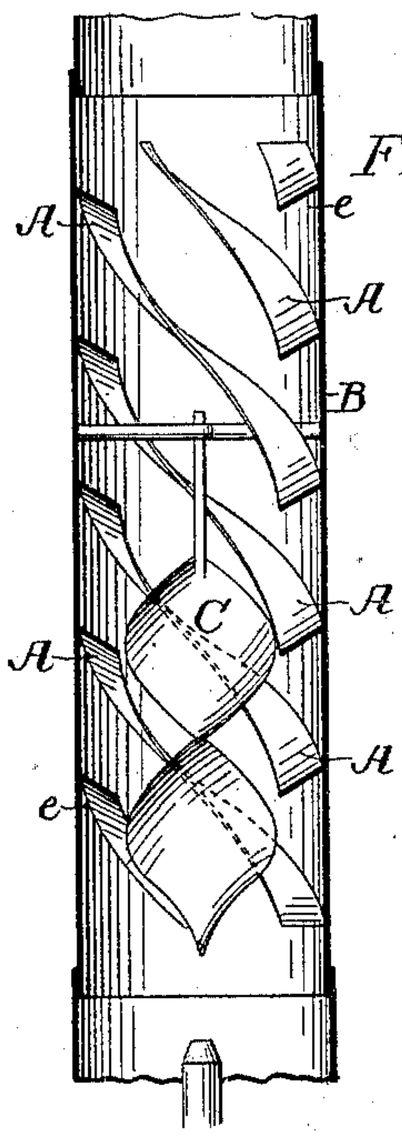


FIG. 6.



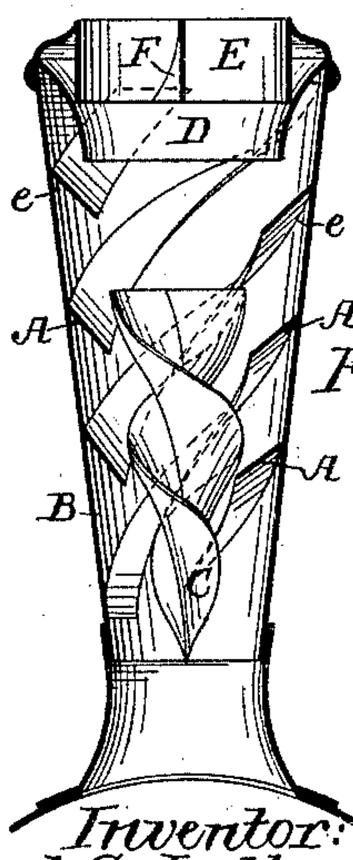


FIG. 7.

Witnesses:
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UNITED STATES PATENT OFFICE.

CARL G. LUTHMAN, OF ALTOONA, PENNSYLVANIA.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 477,058, dated June 14, 1892.

Application filed February 23, 1892. Serial No. 422,538. (No model.) Patented in Sweden March 26, 1889, No. 2,089, and in Finland October 7, 1890, No. 367.

To all whom it may concern:

Be it known that I, CARL G. LUTHMAN, a subject of the King of Sweden, and a resident of Altoona, Blair county, Pennsylvania, have invented certain Improvements in Spark-Arresters, (for which I have obtained Letters Patent as follows: in Sweden March 26, 1889, No, 2,089, and in Finland October 7, 1890, No. 367,) of which the following is a specification.

The object of my invention is to provide a spark-arrester for stacks, with a view of preventing the escape of sparks or cinders and permitting the passage of the gases and smoke. This object I attain in the manner more fully set forth hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional view on the line 1 2, Fig. 2, of a locomotive-stack provided with a spark-arrester constructed in accordance with my invention. Fig. 2 is a plan view of the same. Fig. 3 is a sectional view of a modified construction on the line 3 4, Fig. 4. Fig. 4 is a sectional plan view on the line 5 6, Fig. 3; and Figs. 5, 6, and 7 are vertical sections of further modifications.

Referring to Fig. 1, A represents a number of metallic strips curved in helical form and adapted to the interior of the stack B, the strips being placed at an acute angle to the sides of the stack, so that pockets *e* are formed, as illustrated in Fig. 1, and the lower ends of the strips are placed in a nearly vertical position, in order that the gases may meet with comparatively small resistance when entering the stack; but the length of pitch decreases toward the upper end of the stack, so that the gases are revolved with increased force as they ascend; but, if desired, the pitch of the strips may be equal throughout the length of the stack.

Secured within the stack in any suitable manner is a plate C, which may be made in several different forms. For instance, Fig. 1 illustrates a plate tapering in width and twisted in helical form in the same direction as the direction of twist of the strips A. In Fig. 6 the shape of the plate is practically the same, except that it is much shorter in length, and in Fig. 7 is shown a plate twisted in a such manner as to form a helical cone, which will offer but little resistance to the escape of the gas, but will force the gas and the sparks out toward the sides of the stack and act not only as deflecting-plates, but giving to the gases a rotary motion, as will be readily understood.

At the top of the stack is an inwardly-projecting flange D, curved or inclined in cross-section, and its inner diameter being about equal to the inner diameter of the clear passage between the upper portion of the strips A, and surmounting this flange there is a ring E of cylindrical form, and within this ring are a number of radial blades F, which are curved to correspond with the direction of the set of helices A and C, their upper ends, however, merging into a vertical line, so that the gases, which have been given a rotary motion within the stack, will be discharged in a vertical line and the soot and crushed particles will not be discharged by centrifugal force immediately around the stack; or, if desired, the ring E may be dispensed with and the blades F be carried by the flange D, as illustrated in Fig. 6.

In action the gases entering at the lower end of the stack are forced by the spirals to adopt a rotary motion, whereby the sparks and cinders are thrown outward by centrifugal force against the wall of the stack and are there crushed and grounded by being held in the pockets *e* between the strips A and the wall of the stack during their ascension. The sparks which have not been extinguished or ground before reaching the top of the stack are forced under the flange D and are there crushed, thus losing their energy, and in falling the crushed particles are carried away by the ascending gases.

In Figs. 3 and 4 I have illustrated a modification of my invention, in which a cone C′ takes the place of the helical plate C in Fig. 1, and between this cone and the wall of the stack are a number of curved plates A′ which act in the same manner as the strips A to give the gases and sparks a rotatory motion, and thus by centrifugal force throw the heaviest parts outward under the flange D, as before described, the cone preventing the escape of any sparks in a vertical direction and at the same time offering but little resistance to the ascending gases.

The devices shown in Figs. 1 to 4 and Figs.

6 and 7 are particularly applicable to short stacks—such, for instance, as those used on locomotives; but where a long stack is to be supplied with devices of this class it will be sufficient to make the strips A of sufficient length to crush the sparks in their upward passage in the angle between the strips A and the wall of the stack, thus making the flange D unnecessary, and the length of stack between the upper end of the strips and the discharge end will give the gases time to assume a vertical motion and pass out in a vertical direction, thus dispensing with the deflecting-plates F, as shown in Fig. 5.

I am aware that helically-arranged deflecting-strips have heretofore been employed in stacks, and am also aware that a central plate has been used to deflect the escaping products of combustion. Hence I do not claim either of these broadly, but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination, in a spark-arrester, of the stack, a series of deflecting strips or plates A, secured at an angle to the walls of the stack and forming a helix, and a helical deflecting-plate centrally mounted within the stack and curved in the same direction as the helical deflecting-strips A, substantially as specified.

2. The combination, in a spark-arrester, of the stack, a series of strips or plates secured thereto and forming a helix, the lower ends of said strips being in a line substantially parallel with the length of the stack, and a central deflecting-plate centrally mounted within the stack, substantially as specified.

3. The combination of the stack, a series of helical deflecting-strips, a flange at the top of said stack projecting inwardly and forming with the walls of the stack a pocket, into which the sparks or cinders are directed, and a series of deflecting-blades at or at about the top of the stack, whereby the escaping gases are deflected into a vertical path, substantially as specified.

4. The combination, in a spark-arrester, of the stack, a series of deflecting strips or plates A, secured at an angle to the walls of the stack and forming a helix, a helical deflecting-plate mounted centrally within the stack and curved in the same direction as the helical deflecting strips, and a flange at the top of the stack, said flange projecting inwardly and forming with the walls of the stack a pocket, into which the sparks or cinders are directed, substantially as specified.

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

CARL G. LUTHMAN.

Witnesses:
JACOB SNYDER,
GUSTAV. BERG.