(No Model.)

R. F. DOUGHERTY.

SPARK ARRESTER.

No. 524,525. Patented Aug. 14, 1894.

Fig. 1.

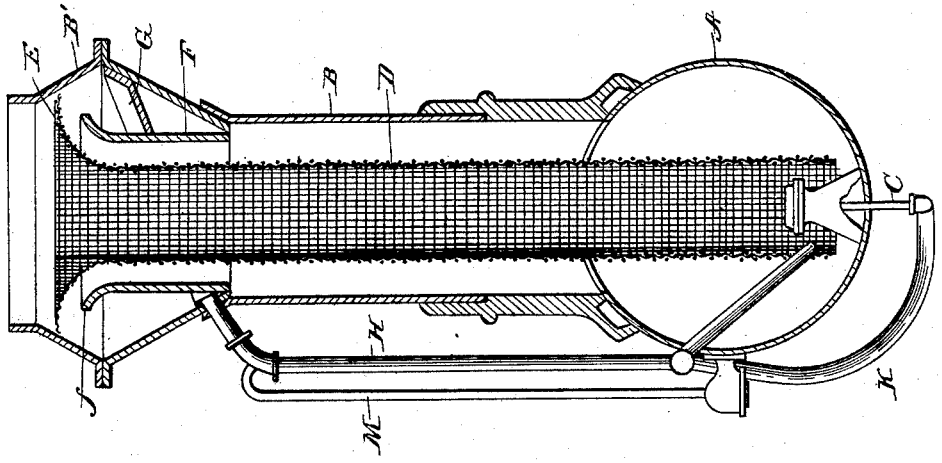

Fig. 2.

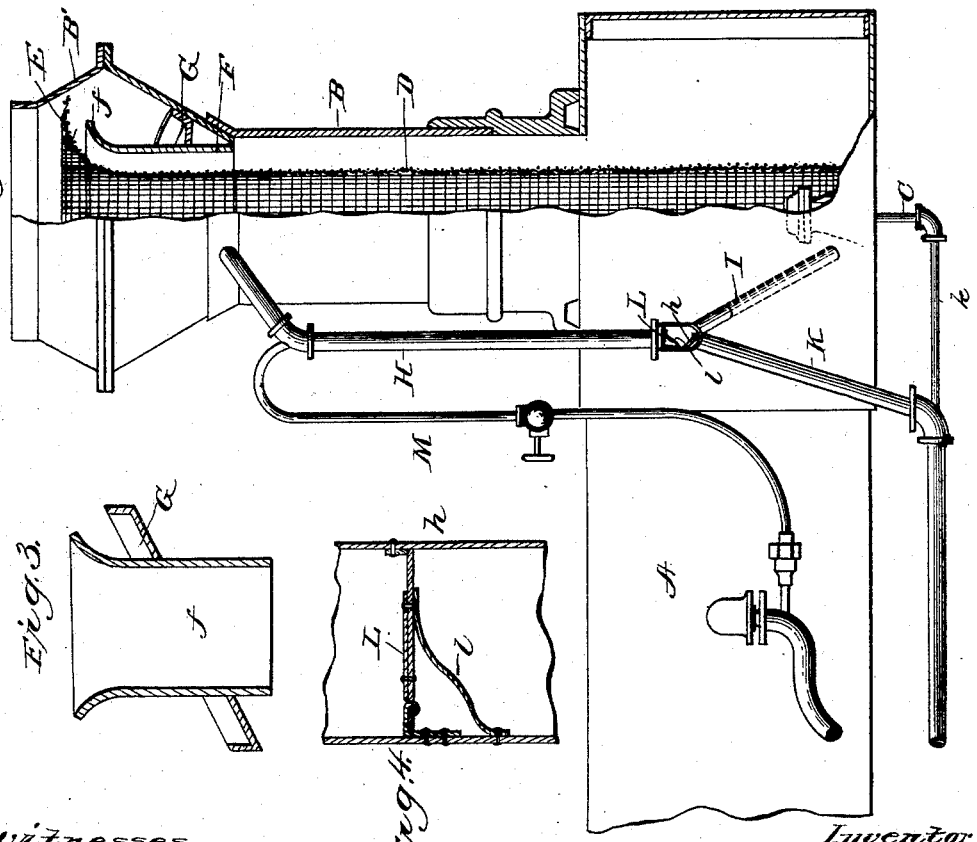

Fig. 3.

Fig. 4.

Witnesses
J. M. Fowler Jr.
A. M. Kelly

Inventor
Richard F. Dougherty
By Church & Church
his Attorneys.

UNITED STATES PATENT OFFICE.

RICHARD F. DOUGHERTY, OF SCRANTON, PENNSYLVANIA.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 524,525, dated August 14, 1894.

Application filed December 21, 1893. Serial No. 494,311. (No model.)

To all whom it may concern:

Be it known that I, RICHARD F. DOUGHERTY, of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Spark-Arresters; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention has for its object to provide an improved spark arrester, adapted more especially for use on locomotives, and in which the sparks will be collected, extinguished and then, if desired discharged automatically in the ordinary manner.

The invention consists in certain novel details of construction and combinations and arrangements of parts as will be now described and pointed out particularly in the claims.

Referring to the accompanying drawings: Figure 1 is a transverse section through a spark arrester embodying my present invention. Fig. 2 is a side elevation partly in section. Fig. 3 is a detail of the outer cone and diagonal flange forming the upper portion of the conductor for collecting the sparks. Fig. 4 is a detail of the automatic gate for holding the body of collected sparks previous to their discharge.

Like letters of reference in the several figures indicate the same parts.

The letter A indicates a locomotive boiler of any ordinary or preferred type and B, the smoke stack, or more properly, the inclosing cylinder of a smoke stack, which at the upper end terminates in the usual double frusto-conical enlargement B′.

Immediately below the smoke stack within the smoke box, is located a blast or exhaust pipe C, into which the exhaust from the cylinder discharges in the ordinary well known manner, and by means of which the draft up through the smoke stack is increased.

The cinders, sparks, &c., from the fire box passing through the boiler tubes, enter the smoke box and in the ordinary apparatus are mostly discharged up through the smoke stack by means of the exhaust pipe, but in the present case, while I propose to allow the cinders to be elevated by the exhaust, I also propose to prevent their escape and that without materially retarding the exhaust itself, gather them at the top of the stack, extinguish them, and finally discharge them if desired at such a point that they will be carried up by the exhaust and out of the stack. To accomplish this, I provide first, a wire netting conductor D, usually of cylindrical form, having its lower end surrounding the blast or exhaust pipe and extending down to the bottom of the smoke box or if desired, in proximity thereto, as illustrated, and at the upper end terminating in an outwardly flaring deflecting portion E, the edge of which contacts with or is secured to the stack at a point near its mouth. From this it will be seen a sufficient space is left between the cylinder D and stack casing B for the passage of sparks, cinders, &c., and it will be readily seen that sparks, cinders, &c., entering the smoke box will be elevated by the exhaust rushing up through the netting or foraminous conductor, and will be carried to the top of the stack, where they are deflected outward by the portion E and may be trapped by any of the ordinary means. For trapping them, I prefer to provide a cast cylinder F, adapted to be secured to the top of the cylindrical portion of the stack, and having an outwardly flared mouth *f* which approximately corresponds in curvature to the curvature of the portion E of the foraminous conductor. The space between the said conductor D and cylinder F forms a continuation of the space between the conductor and stack casing, and the space around the cylinder F forms a trap in which the sparks are caught. An inclined flange G may be provided on the cylinder F for conveying the sparks, cinders, &c., down to one side, from which point a pipe H will conduct them down to the base of the stack and if desired discharge them through a pipe I passing into a foraminous conductor D at a point in proximity to the blast or exhaust pipe, a gate *h* may be provided at the point where the pipes H and I unite, from which point a second pipe K may extend back to the ash pan for discharging the cinders into the said pan when so desired.

To effect the discharge of the cinders into the ash pan, a small pipe *k* extends from the blast or exhaust pipe and terminates in a noz-

zle within the pipe K, pointed in a direction to cause the rearward movement of the cinders. Sufficient pressure may thus be taken from the blast or exhaust pipe for causing the discharge of the cinders into the ash pan. In order now to effectually extinguish the sparks, the vertical pipe H is provided with a water inlet at a point near the top and preferably with a valve L, Fig. 4, supported by the spring *l*, the strength of the spring being preferably so proportioned that after the accumulation of three to four pounds of sparks, it will allow the valve to open and the sparks to pass out. This gives a sufficient time for the sparks to be thoroughly wetted and extinguished.

Obviously, the supply of water may come from any source, but I prefer to introduce it through a pipe M extending up from the boiler, or from the pump pipe, thereby avoiding the necessity of providing a special means for elevating the water to the top of the stack.

In operation, it will be seen that the sparks and cinders entering the smoke box are first carried up through the stack outside of the foraminous conductor, are caught at the top and carried down through the pipe H where they are effectually extinguished and then discharged into the ash pan, or preferably out through the foraminous conductor by means of the blast or exhaust mechanism, thereby effectually getting rid of the sparks after they have been extinguished, a result which is highly desirable, if not absolutely necessary to the successful operation of devices of this character.

In the preferred arrangement, the foraminous conductor D terminates just a little above the bottom of the smoke box thereby permitting dead sparks and cinders which accumulate in the bottom of the box to enter and be discharged into the air as before described.

Having thus described my invention, what I claim as new is—

1. In a spark extinguisher, the combination with the stack, the blast or exhaust mechanism, and the foraminous conductor passing through the stack and having a deflector at the upper end, of the trap for catching the sparks ascending outside of said foraminous conductor, and a pipe leading from said trap to the base of said foraminous conductor, whereby the sparks and cinders are first trapped and then discharged in position to be carried out through the foraminous conductor by the blast or exhaust mechanism; substantially as described.

2. In a spark extinguisher, the combination with the stack, the blast or exhaust mechanism, and the foraminous conductor surrounding the blast or exhaust mechanism passing up through the stack and having the deflector at the upper end, of the trap for catching the sparks and cinders carried up outside of the foraminous conductor, the pipe leading from said trap down into the base of the foraminous conductor and the moisture supply pipe; substantially as described.

3. In a spark extinguisher, the combination with the stack having the flared mouthed cylinder within the same at the upper end, the blast or exhaust mechanism below the stack and the foraminous conductor extending from said blast or exhaust mechanism up through the stack and having the deflector at the upper end for deflecting the sparks and cinders down between the flared mouthed cylinder and stack and a discharge pipe leading from said space with a moisture supply discharging into said pipe; substantially as described.

4. In a spark arrester, the combination with the stack, having the cinder trap at the upper end, the blast or exhaust mechanism below the stack and the foraminous conductor extending from said blast or exhaust mechanism up through the stack and terminating in the deflector for directing the cinders into the trap, of the pipe leading from said trap into the base of the foraminous conductor with a branch pipe leading therefrom into the ash pan and a gate for controlling the discharge of cinders; substantially as described.

5. In a spark extinguisher, the combination with the stack having the trap at the upper end, the blast or exhaust mechanism and the foraminous conductor extending from said blast or exhaust mechanism up through the stack with the deflector at the upper end, the pipe leading from the trap, the spring pressed valve located in said pipe for retaining the cinders therein and the moisture supply; substantially as described.

6. In a spark extinguisher, the combination with the stack having the trap at the upper end, the blast or exhaust mechanism and the foraminous conductor extending from said blast or exhaust mechanism up through the stack with the deflector at its upper end, of the pipe leading from the trap into the base of the foraminous conductor, the automatic valve in said pipe and the moisture supply; substantially as described.

RICHARD F. DOUGHERTY.

Witnesses:
C. P. O'MALLEY,
CATH. LANGAN.