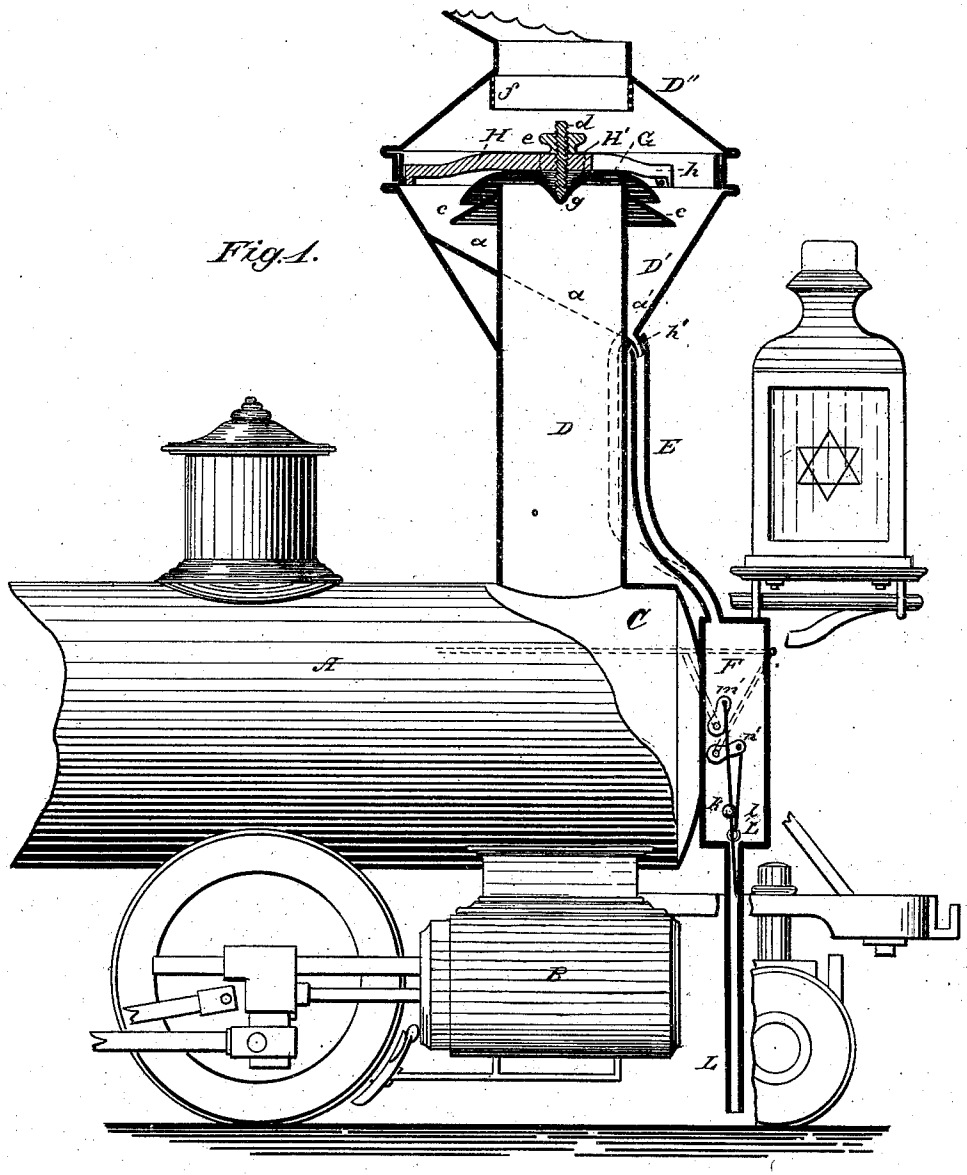
2 Sheets—Sheet 1.

J. A. PAE.

SPARK-ARRESTERS AND CONVEYERS.

No. 193,990. Patented Aug. 7, 1877.

Fig. 1.



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2 Sheets—Sheet 2.

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Fig. 2.

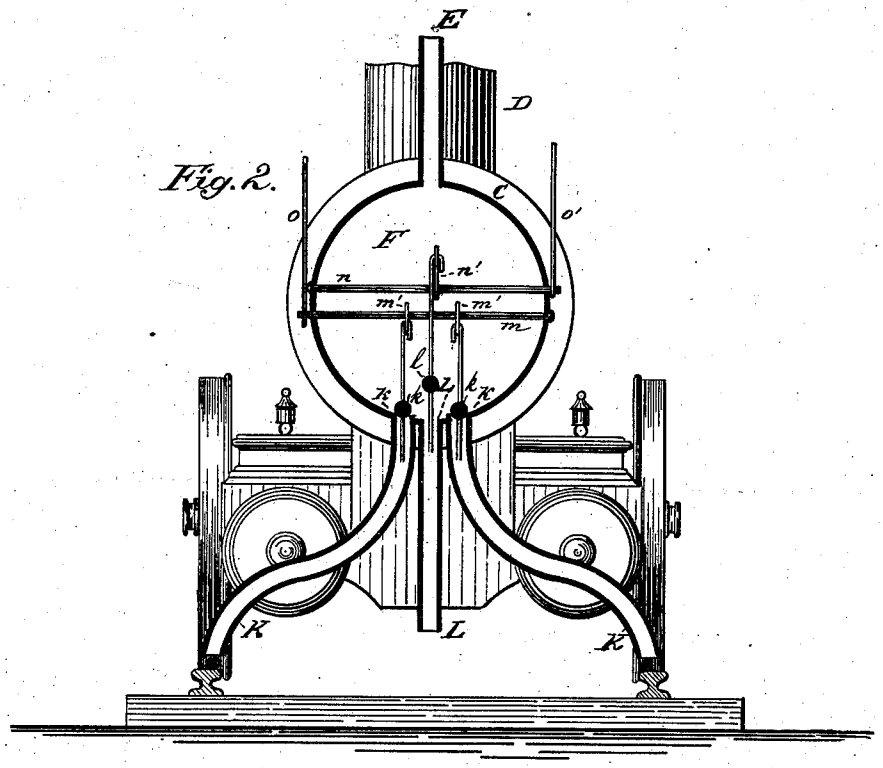
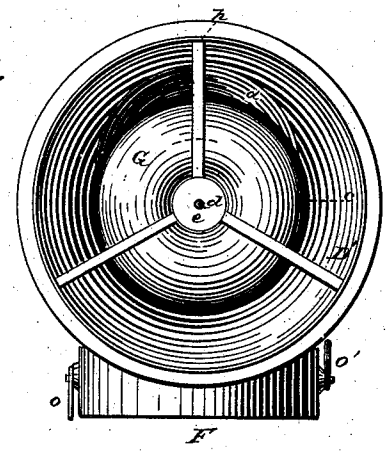


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES A. PAE, OF MONTGOMERY, ALABAMA.

IMPROVEMENT IN SPARK ARRESTER AND CONVEYER.

Specification forming part of Letters Patent No. **193,990**, dated August 7, 1877; application filed June 19, 1877.

To all whom it may concern:

Be it known that I, JAMES A. PAE, of Montgomery, in the county of Montgomery and State of Alabama, have invented certain new and useful Improvements in Spark Arrester and Conveyer; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a longitudinal vertical section. Fig. 2 is a front view, the cover of the spark-box being removed; and Fig. 3 is a top plan, the cap or cone having been removed.

Similar letters of reference indicate corresponding parts in all the figures.

My invention relates to a device for arresting or preventing the escape of sparks from the smoke-stacks of coal or wood burning locomotives, steamboats, and stationary engines; and it consists in the construction and combination of parts, as hereinafter more fully shown and described.

In the drawing I have represented my invention as applied to a coal-burning locomotive.

A is the boiler; B B, the cylinders; C the smoke-box, and D the smoke-stack. *a* is a crescent-shaped metallic slide, placed within the funnel D′, and slanting down toward the point *a′* at the convergence of the stack D and funnel D′. At this point is a discharge-nozzle, *h′*, which fits into, or outside of, a pipe or conductor, E, reaching down to the spark-box F, in front of the smoke-box C.

Instead of carrying the conductor E on the outside of the stack, it may be on the inside, as represented in dotted lines in Fig. 1.

c is a deflector, secured removably on the top of the inner stack D. Arranged immediately over the top of the stack is the adjustable cap or arrester G, of a cup-shape, depressed in the middle, and secured upon the tripod H by the vertical rod *d* and key or nut *e*, the rod *d* passing through a central boss, H′, on the tripod H above, and against which nut *e* works. The arms *h* of tripod H taper down to a sharp edge, so as not to obstruct the draft, and are secured to the inside of the upper rim of funnel D′ by screws, bolts, or in any other suitable manner.

Projecting downward from the cap or cone D″ is a perforated cylindrical guard or shield, *f*, to prevent the escape of any sparks which should not be arrested and thrown down into the funnel against the incline *a* by cap G and deflector *c*.

K L K are three pipes, opening out from spark-box F, and closed by valves *k l k*, operated, respectively, by rods *m n* and cranks *m′ n′*. The rods *m n* are pivoted in the sides of box F, and, extending outside of this one on each side, may be operated by an arm, *o o′*, and connecting-rods, which pass forward to the engineer's cab, one on each side of the locomotive. By pulling one of these rods the inlets to pipes K K are opened, while by pulling the rod on the opposite side of the engine the middle pipe L is opened.

The operation of this apparatus is as follows: The sparks passing up through the stack D will strike against the cup-shaped cap G, thrown down on the deflector *c*, and out against the sides of funnel D′. They then fall down on the incline *a*, which carries them to the discharge-nozzle *h*, by which they are conducted through the conveyer E down into the box or receptacle F, where they accumulate. By opening pipes or conveyers K K they are discharged upon the rails, while by opening the central conveyer they are discharged in the middle of the track.

It is obvious, however, that box F may be dispensed with, if desired, or that pipes K K, with their valves and operating mechanism, may be left out, so that the sparks will be discharged only through the central pipe.

In the case of steamboats and stationary engines it is desirable to conduct the end of pipe E into a tank containing water for effectually extinguishing the sparks, and thus prevent accident by fire; but when used on locomotives the construction of box F with the side pipes K K has the advantage, as already stated, that the dead sparks may be discharged upon the rails immediately in front of the engine, thereby increasing the friction, and dispensing with the use of sand on slippery rails.

By the use of this device the escape of live

sparks is absolutely prevented, except through the conveyer E, and the danger and annoyances which result therefrom entirely obviated.

Its construction is such that it will answer equally well for wood-burning and coal-burning engines; and it may readily, and without great expense, be applied upon any ordinary smoke-stack.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In combination with the smoke-stack D and spark-conveyer E, the chamber F, located in front of the engine, and having one central discharge-pipe, L, and two side discharges, K K, provided with suitable valves and operating-rods, so that the sparks contained in chamber F may be discharged either in the middle of the track or on the rails in front of the wheels, at the option of the engineer, substantially as and for the purpose herein shown and specified.

2. In combination with the smoke-stack D, the following co-operative elements—viz., the incline *a*, deflector *c*, adjustable cap G, tripod H, and annular screen *f*, all constructed and combined to operate substantially as and for the purpose hereinbefore set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JAMES A. PAE.

Witnesses:
W. E. PEINCE,
J. E. GRIFFITH.