(No Model.)

A. BERNEY.

Spark Arrester.

No. 239,598. **Patented April 5, 1881.**

FIG. I.

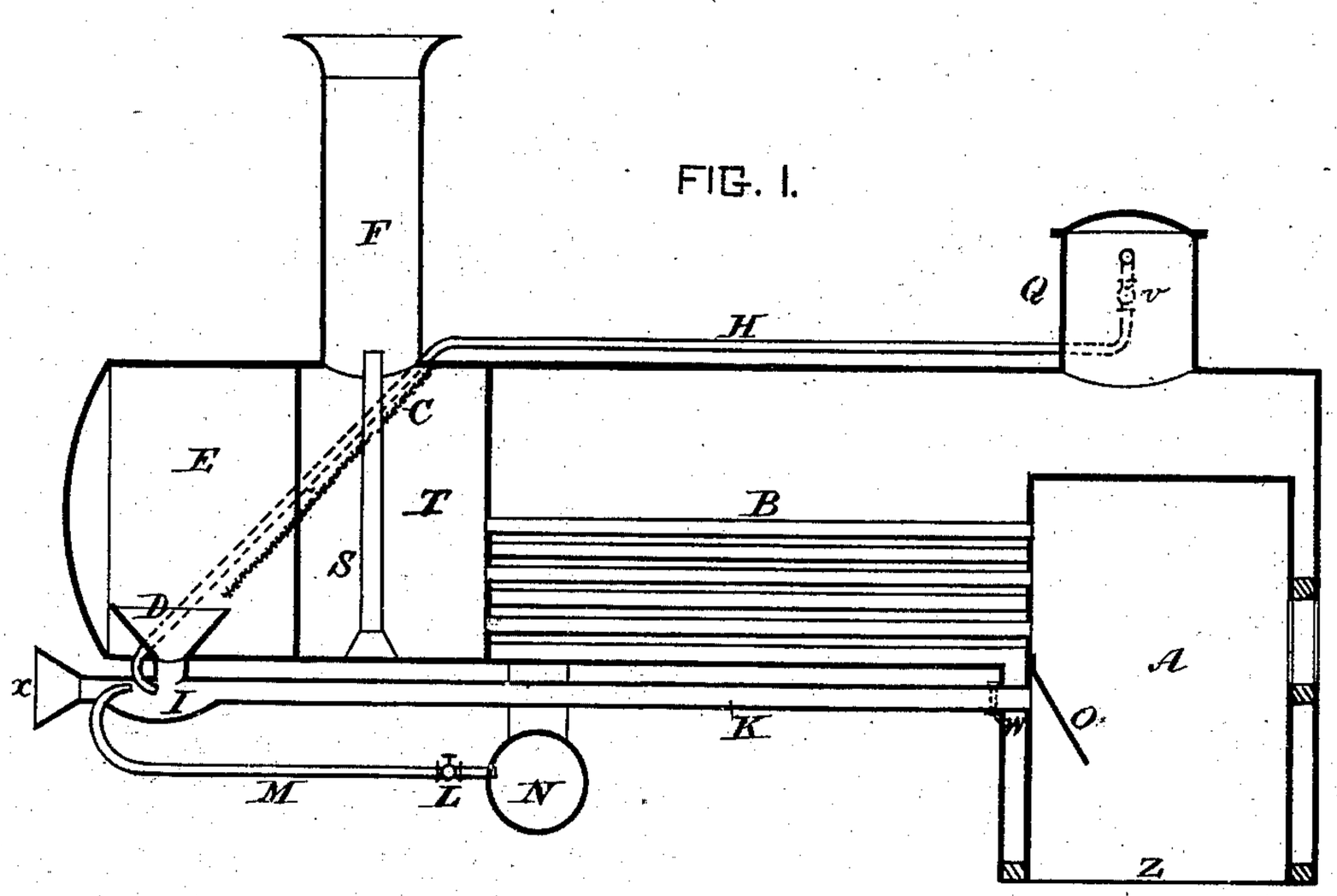
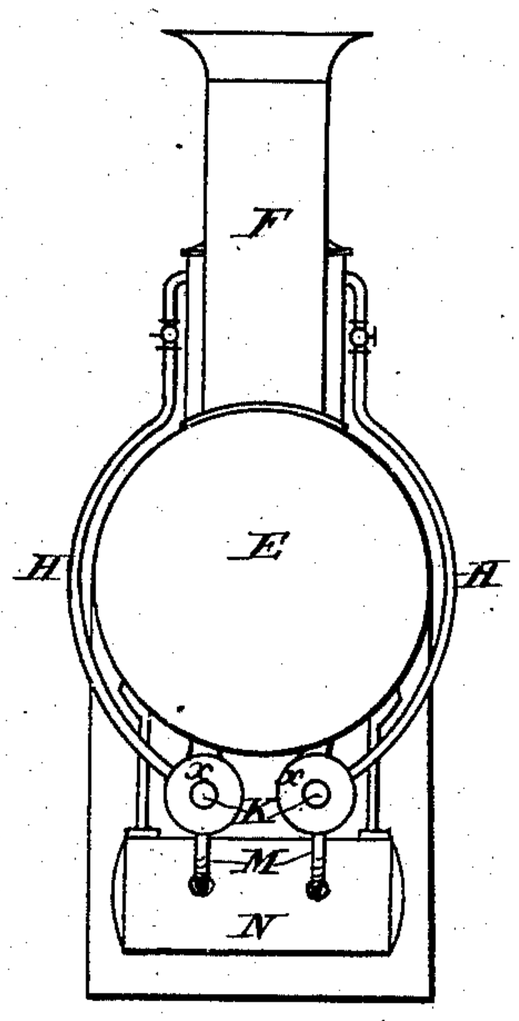


FIG. II.



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SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 239,598, dated April 5, 1881.

Application filed September 21, 1880. (No model.)

To all whom it may concern:

Be it known that I, ALFRED BERNEY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, 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 invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to spark-arresters, and is designed to arrest and convey sparks back to the fire-box from a spark-receiver by means of a jet of air or live or exhaust steam.

Nearly all locomotives are now fitted up with an air-pump and a reservoir, and these can be used to force back the sparks to the fire-box, in connection with a steam-jet or not, or each can be used separately.

On many locomotives there is now used what is called an "extended smoke-box" or arch to arrest sparks. This invention is designed to convey the sparks so collected back to the fire, to be consumed there. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure I is a vertical section of a locomotive-boiler with my invention attached. Fig. II is a front elevation of the same.

The fire-box A is connected with flues B, opening into the smoke-arch T, in which there is located a wire mesh or screen, C, and an exhaust-pipe, S.

In the extended smoke-arch E there is a hopper, D, so constructed that all the sparks drop from screen C into it, down into chamber I.

The pipe K is attached to the chamber, and passes thence through a thimble, W, into the fire-box, over which is placed a small cast-iron shield, O.

Under the boiler is placed an air-reservoir, N, to which is affixed a pipe, M, provided with a suitable stop-cock, I. Said pipe extends forward and enters into the return-pipe K or chamber I, forming a jet of compressed air.

One or two steam-pipes, H, provided with valves *v*, are connected to the steam-dome, and, curving downward, also enter the chamber I and assist in returning the sparks and air back into the furnace, and in burning them therein.

The smoke-stack F is of ordinary construction, as also the grate-bars Z.

The hopper D can be left out of the extension-front, if desired, as the shape of the arch will do almost as well; but I prefer to use the funnel-shaped hopper D, as it prevents any clogging of the sparks by any jar of the engine.

The operation is as follows: When a fire is burning on the grate and the locomotive in motion, the exhaust-blast from the pipe S causes a partial vacuum in the smoke-arch, and that draws air up through the grate-bars, and with the air a portion of the coal. These go through tubes B into smoke-arch T against wire screen C, the gases and steam passing through said screen, but the sparks falling down into the hopper D, thence into chamber I through the pipe K, down shield O into the fire, to increase the speedy return of the sparks through pipe K. A jet of steam or air through pipes M and H, which can be regulated by stop-cocks L and V, (one or both can be used, and the effect will be beneficial,) forces the sparks, &c., back into the furnace. The sizes of the pipes are regulated according to the sizes of the locomotives—viz., the spark-pipes may be three inches in diameter and the steam and air pipes half an inch, while chamber I is about six inches in diameter and ten inches long.

I do not confine myself to one spark-pipe, as two may be used, one on each side of the boiler, or the pipes may be inserted through the inside of the boiler.

If desired, the exhaust-pipe S can be tapped at the base and exhaust-steam be used instead of live steam.

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

1. The combination of an air-reservoir, N, air-pipe M, provided with stop-cock L, with spark-chamber I and return spark-pipe K, with or without air-opening X, for returning sparks to the fire, substantially as specified.

2. The combination of an air-reservoir and one or more returning pipes or tubes with a fire-