

(No Model.)

A. BERNEY.
Spark Arrester and Consumer.
No. 240,880. Patented May 3, 1881.

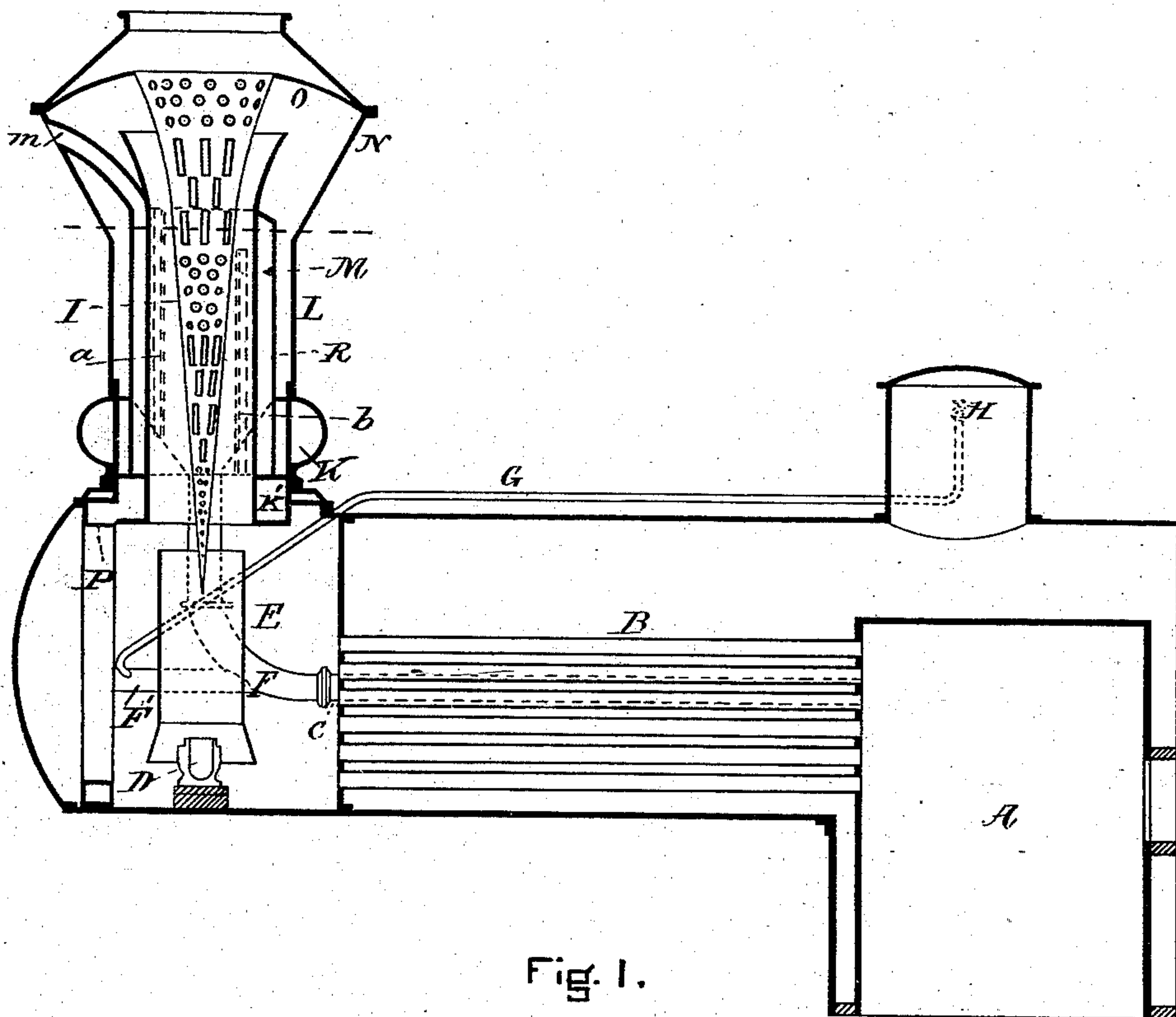


Fig. I.

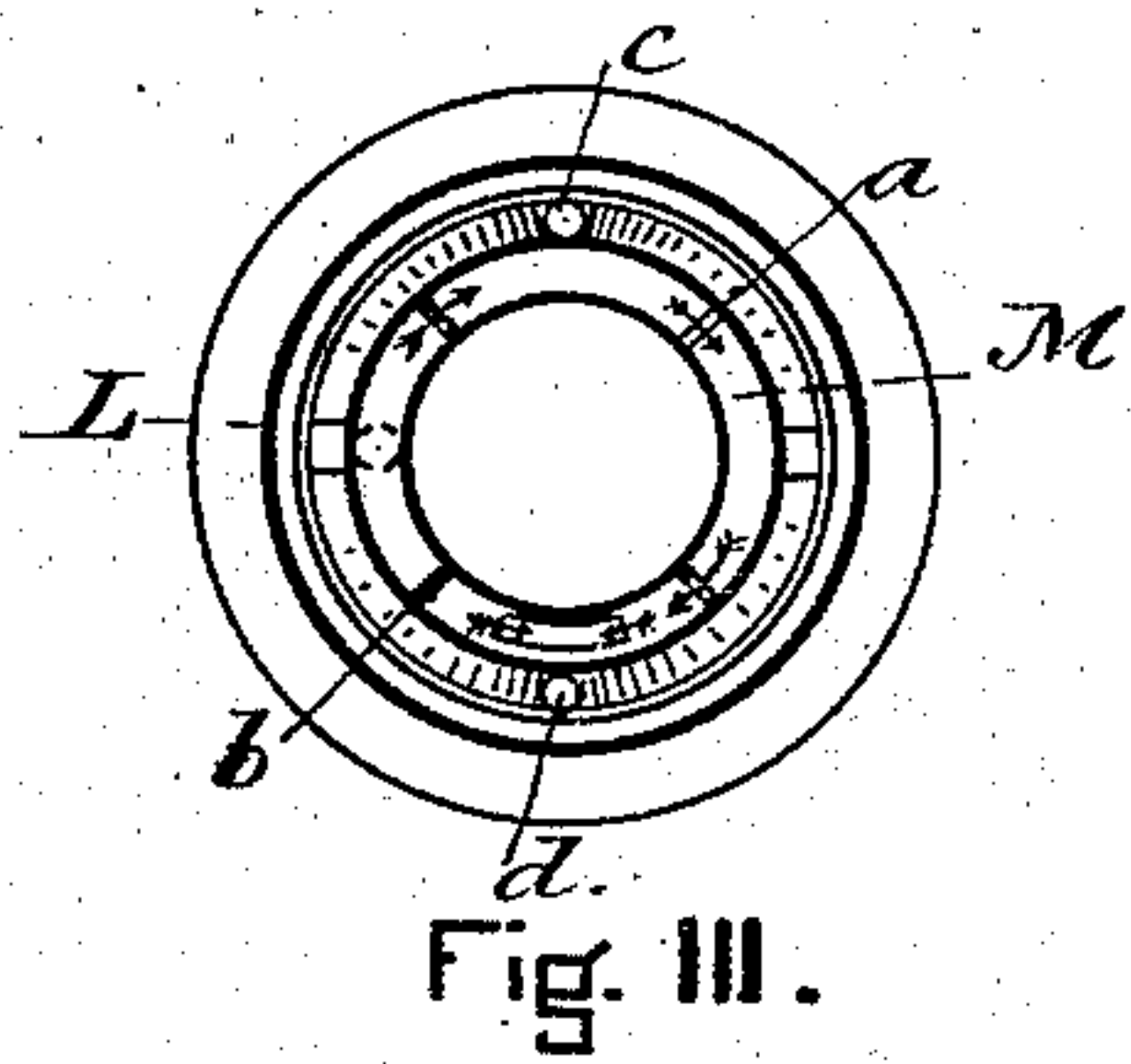


Fig. III.

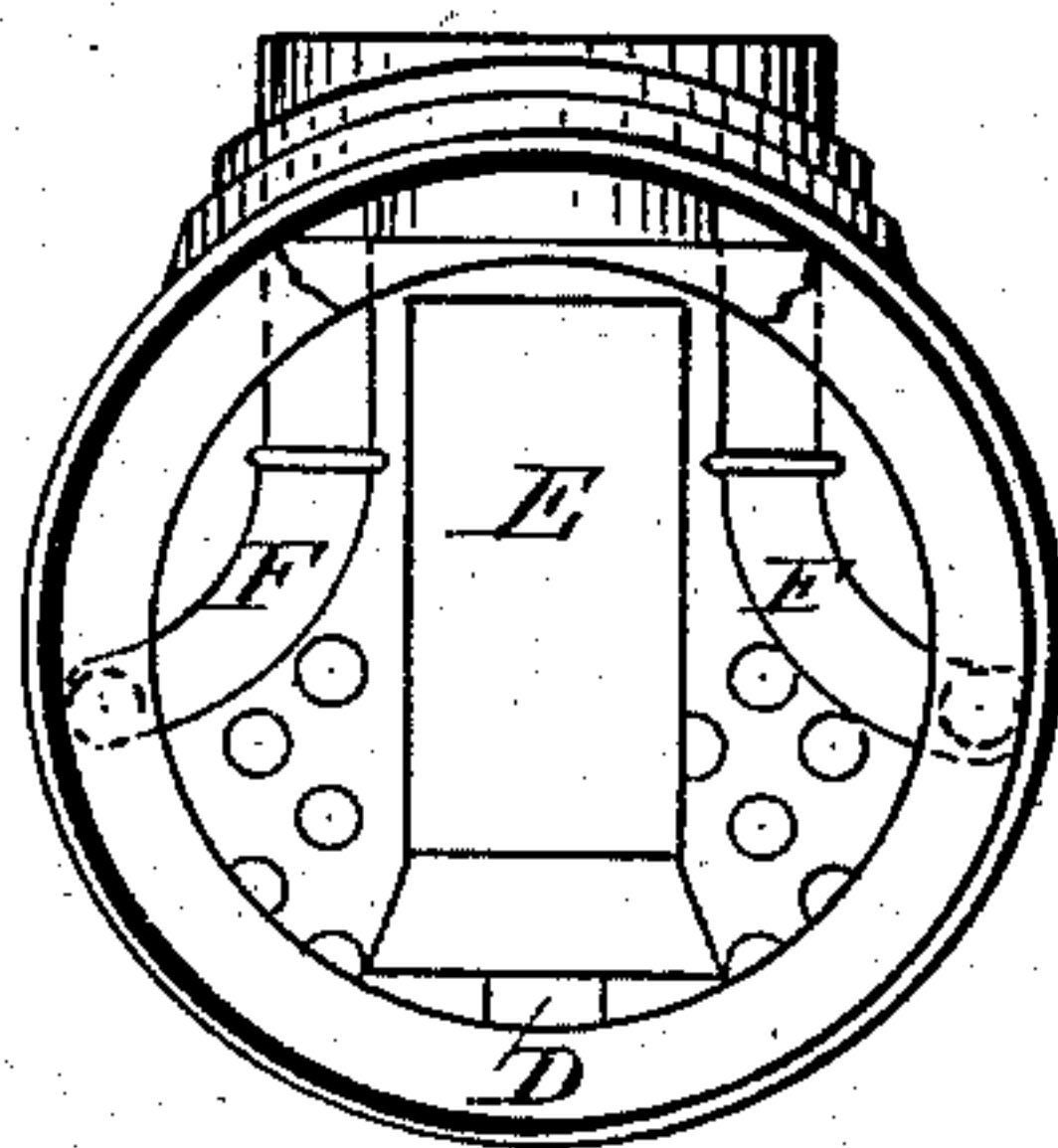


Fig. II.

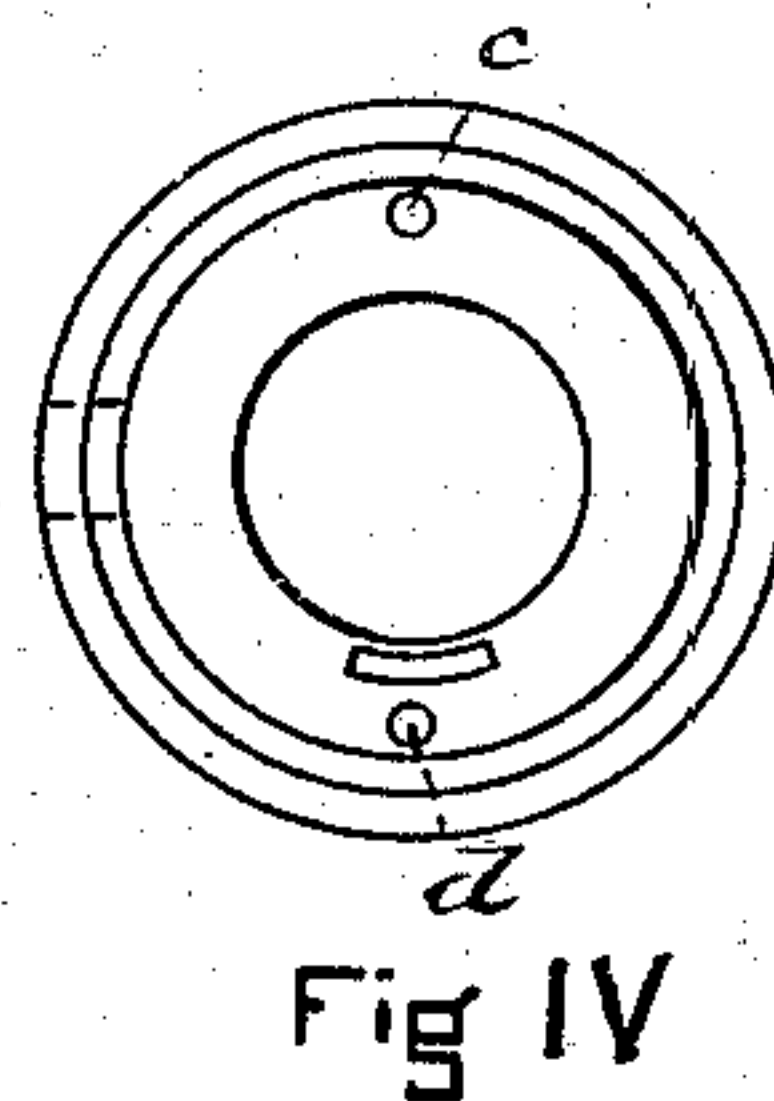


Fig. IV.

WITNESSES

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ALFRED BERNEY, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE GLOBE COMPANY, OF HARTFORD, CONNECTICUT.

SPARK ARRESTER AND CONSUMER.

SPECIFICATION forming part of Letters Patent No. 240,880, dated May 3, 1881.

Application filed March 14, 1881. (No model.)

To all whom it may concern:

Be it known that I, ALFRED BERNEY, a citizen of the United States, residing at the city of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Spark Arresters and Consumers; 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 that class of spark arresters and consumers in which the sparks, cinders, and unconsumed products of combustion, together with steam and hot air, are returned and forced into the furnace, to be there consumed and assist in the generation of steam; and the object is to accomplish this in a more efficient and perfect manner than has been done heretofore.

The invention consists in the construction and arrangement of parts, as will be more fully described hereinafter, reference being had to the accompanying drawings and the letters of reference marked thereon.

In the drawings, Figure I is a longitudinal vertical section of a locomotive-boiler embodying my invention. Fig. II is a vertical cross-section through the smoke-arch. Figs. III and IV are horizontal cross-sections of the stack.

In the drawings, A represents the furnace of a locomotive-boiler, connecting by tubes B with the smoke-arch of the boiler. In the smoke-arch are arranged the ordinary exhaust-tips, D, and lift or blast pipe E, and over the smoke-arch is secured a hollow saddle, K, having inclines, which guide the sparks into the connecting-pipes F, that connect with the return-flues C, through which the sparks, &c., are returned to the furnace, to be there consumed. A hot-air pipe, F', connects with pipes F, and extends into an annular hot-air chamber, P, in the smoke-arch, which connects with a double saddle, K, on the smoke-stack. Into said pipe a steam-jet, G, provided with a suitable cock, H, enters and forces the hot air from the chamber P into the furnace.

To the saddle K is secured the smoke-stack

L, having an inner and outer barrel, and also an inverted perforated cone, I, with flange O, (described more fully in another application filed herewith.)

Around the inner barrel, R, is formed an annular closed chamber, M, connected by a pipe with the outside of the stack, and having an open-mouthed end. This chamber is divided in a serpentine manner by a series of transverse or radial flanges, *a b*, forming a serpentine passage for air. Into the pipe *m* the air passes as the locomotive moves forward, and, entering into the annular chamber M, becomes highly heated therein. From this chamber two or more tubes, *c d*, descend, and connect with the saddle K, from which the now highly-heated air is drawn and forced into the lower saddle, K, then into the annular chamber P, and finally into the furnace by the steam-jet.

A perforated screen or a damper may be arranged over the mouth of the pipe *m*, so as to close it, if desired, against snow or rain, or, in case too much air is admitted, to regulate the amount of air necessary for the proper consumption of the fuel.

The operation is as follows: The sparks, cinders, &c., passing through the tubes B are arrested and deflected by the hollow cone I, and, passing through the annular space between the inner and outer barrels of the stack, are mixed in the saddles with the highly-heated air from the annular chamber M, and, together with hot air from the annular chamber P and steam from the steam-jet, are forced by it through the return-flues C into the furnace, where they are entirely consumed, and assist in the generation of steam in the boiler. By this means a large amount of fuel is saved, and accidents from burning sparks and cinders by fires cannot possibly occur. The perforated cone allows any unconsumed gases to escape.

Instead of a live steam-jet, a jet of exhaust-steam may be employed.

I am aware that inverted perforated cones, as also hot-air chambers, have been heretofore employed in spark-arresters, but not in connection with spark arresting and consuming devices, as herein shown and described, and I therefore do not claim such cones or air-chambers, broadly; but,

Having thus described my invention, what

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

1. In a spark arrester and consumer, the combination of a connecting-pipe, F, provided
5 with hot-air pipe F', opening into the annular chamber P, with a steam-jet pipe, one or more return-flues, C, and a furnace, substantially as shown, and for the purpose specified.

2. In a spark-arrester, the combination of an
10 annular hot-air chamber, M, having a pipe, m, leading to the atmosphere, with saddles K K', connecting-pipe F, steam-jet pipe G, and return-flues C, all arranged substantially as set forth.

15 3. The combination of an inverted perforated cone, I, provided with flange O, and annular hot-air chamber M, with saddles K K', connecting-pipes F, steam-jet pipe G, return-

flues C, and furnace A, all constructed and arranged for operation substantially as specified. 20

4. The combination of an inverted perforated cone, I, provided with flange O, annular hot-air chamber M, with saddles K K', annular chamber P, connecting-pipes F F', steam-jet pipe G, return-flues C, and furnace A, all
25 arranged substantially as set forth.

5. In a spark-arrester, the heating-chamber M, provided with radial partitions, forming a serpentine passage for the air, substantially
30 as shown and specified.

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

ALFRED BERNEY.

Witnesses:

S. N. BERNEY,
S. H. WALKER.