

H. W. MIELKE & G. M. SERGENT.
SPARK ARRESTER.

APPLICATION FILED MAR. 16, 1911.

1,014,018.

Patented Jan. 9, 1912.

Fig. 1.

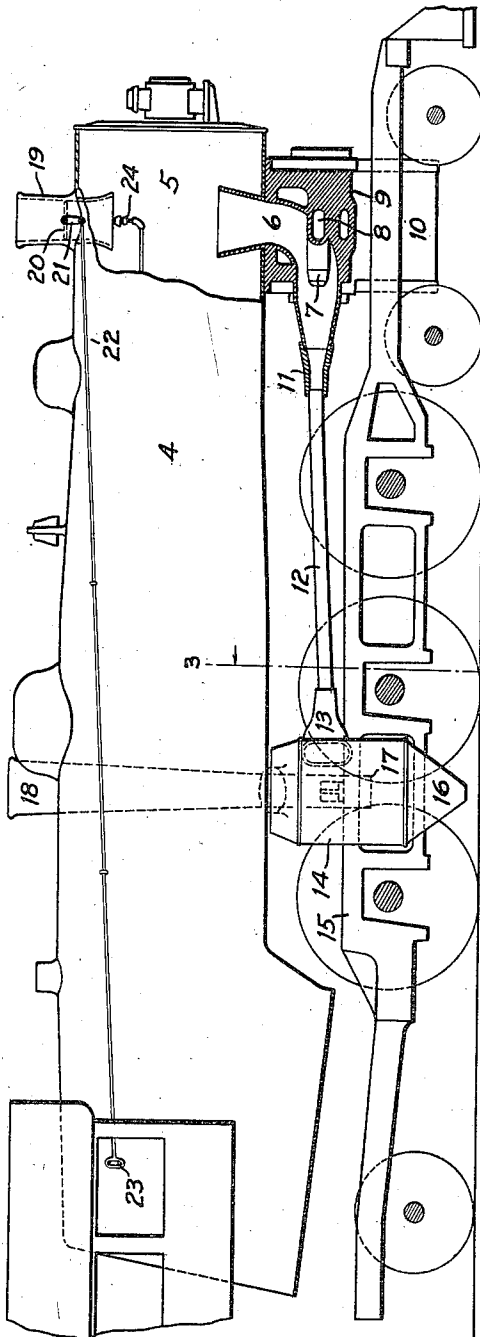


Fig. 2.

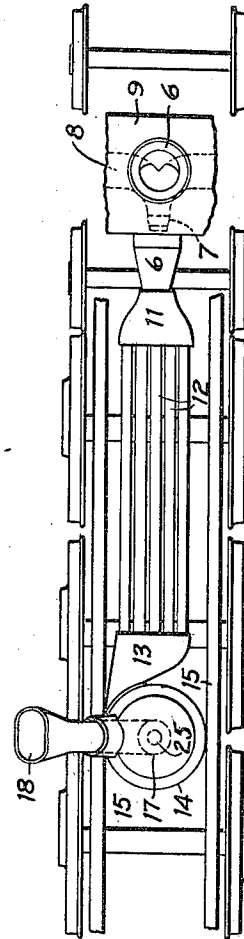
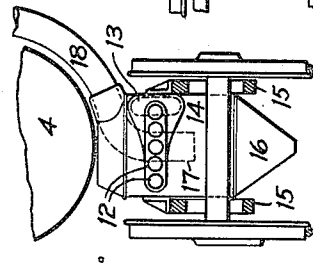


Fig. 3.



Witnesses:
Clarence W. Carroll
L. Thon

Inventors:
Henry W. Mielke
George H. Sargent
by their attorneys
Osgood, Davis & Dorsey

UNITED STATES PATENT OFFICE.

HENRY W. MIELKE AND GEORGE M. SERGENT, OF ROCHESTER, NEW YORK, ASSIGN-
ORS OF ONE-FOURTH TO GEORGE FORT SLOCUM AND ONE-FOURTH TO CHARLES F.
MIELKE, OF ROCHESTER, NEW YORK.

SPARK-ARRESTER.

1,014,018.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed March 16, 1911. Serial No. 614,972.

To all whom it may concern:

Be it known that we, HENRY W. MIELKE and GEORGE M. SERGENT, citizens of the United States, and residents of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Spark-Arresters, of which the following is a specification.

This invention relates to spark-arresters for locomotives, of the type in which a steam-jet is employed to withdraw the smoke from the smoke-box through an ejector, the mixture of steam and products of combustion being conducted rearwardly through a conduit to a settling-chamber or separator.

The object of the invention is to produce a spark-arrester in which the construction and arrangement of parts are such that it may be conveniently embodied in locomotives of ordinary design without great departure from the usual construction, and in which the exhaust-steam from the cylinders may be conveniently and efficiently employed both to operate the ejector and to moisten and assist in the separation of the solid particles in the products of combustion.

To the foregoing end the invention consists in an arrangement in which the cylinder-saddle of the locomotive is constructed to embody or contain the draft-tubes of the ejector, and is provided with exhaust-steam passages terminating in a nozzle coöperating with the draft-tubes, and in the further features of construction and arrangement hereinafter more particularly described, as defined in the succeeding claims.

In the accompanying drawings:—Figure 1 is a partial side elevation of a locomotive provided with a spark-arrester embodying the present invention, the forward portion of the device being shown in vertical median section; Fig. 2 is a plan-view of the spark-arrester and adjacent portions of the locomotive; and Fig. 3 is a vertical section, on the line 3—3 in Fig. 1, looking from right to left in the latter figure.

The invention is illustrated as embodied in a locomotive having a boiler 4 of ordinary form, provided with the usual smoke-box 5 at the forward end of the boiler. The spark-arrester comprises an ejector, which

is operated by the exhaust steam from the cylinders and which withdraws the products of combustion from the smoke-box, a surface-condenser into which the ejector discharges, a settling-chamber in the form of a centrifugal-separator, of which the inlet is connected with the condenser, and a stack connected with the settling-chamber and extending above the boiler so as finally to discharge the gaseous products of combustion.

The ejector is shown in section in Fig. 1. It comprises a curved funnel or passage leading from the bottom of the smoke-box and formed or embodied in the cylinder-saddle 9 of the locomotive. Through a nozzle 7 in the funnel 6 the exhaust steam from the cylinders is discharged. For this purpose the cylinder-saddle 9 is provided with curved exhaust-passages 8, which extend in the usual manner from the cylinders 10, but are arranged to discharge horizontally into the jet 7 instead of discharging upwardly into the smoke-box in the usual manner.

The rear end of the funnel 6 discharges into a hollow casting or manifold 11 which is connected with the forward ends of a number of tubes 12. These tubes extend rearwardly beneath the boiler, and, owing to the large surface which they expose to the air, they constitute an effective surface-condenser. The rear ends of the tubes 12 are united in a manifold 13, which discharges tangentially into the cylindrical casing 14 of the settling-chamber. This casing is supported upon the frames 15 of the locomotive, and it has a conical bottom of the form common in centrifugal-separators.

The outlet from the settling-chamber is through a tube 17 passing upward from the center of the casing, and terminating in a stack 18. This stack curves outwardly and upwardly at one side of the boiler so as to discharge the furnace-gases above the top of the locomotive.

When the locomotive is running the exhaust steam creates a powerful draft through the ejector, and the furnace-gases and solid particles withdrawn from the smoke-box are thoroughly mingled with the exhaust-steam. In the passage of the mixture through the condenser-tubes 12 it is

sufficiently chilled to partially or wholly condense the exhaust-steam, and the watery vapor so produced is absorbed by the sparks and other solid particles, whereby the temperature of these particles is reduced and their weight is increased. When the mixture is introduced into the settling-chamber it assumes a rotary motion therein owing to the tangential inlet, and the solid particles, particularly the larger and heavier ones, settle into the conical bottom of the chamber, whence they may be discharged by gravity through an opening 25 at the lower extremity. The gaseous products of combustion pass freely upward through the outlet 17 and the stack 18 and escape into the atmosphere.

The present invention has the important advantage that the free passage of the furnace-gases and the exhaust steam is not substantially arrested at any point, and that screen and other devices which tend to clog, and to be destroyed by corrosion, are entirely avoided. Owing to the action of the condenser the present construction guards against fire-risk due to sparks, without the necessity of the complete elimination of solid particles from the furnace-gases as they are finally discharged to atmosphere.

When the locomotive is standing still, so that no exhaust steam is discharged, the ejector does not operate, and to provide for the free escape of the furnace-gases at this time the smoke-box 5 is provided with the usual smoke-stack 19. To prevent indraft of air through this stack when the ejector is operating, a butterfly-valve 20 is pivotally mounted in the stack, this valve being provided with an arm 21, connected with a rod 22 running aft to the cab of the locomotive and terminating in a handle 23, by means of which a fireman may operate the valve when necessary. The usual steam-draft-nozzle 24 may be employed in connection with the

stack 19, to create an artificial draft when the engine is not running.

Our invention is not limited to the embodiment thereof hereinbefore described and illustrated in the accompanying drawing, but may be embodied in various forms, within the nature of the invention as it is defined in the following claims.

We claim:—

1. In a locomotive, the combination, with the boiler and the smoke-box, of a cylinder-saddle provided with an ejector-passage leading from the smoke-box downwardly and then rearwardly beneath the boiler, the cylinder-saddle being further provided with exhaust-steam passages terminating in a discharge-nozzle located in the ejector-passage and directed rearwardly, a plurality of tubes leading rearwardly beneath the boiler from the ejector-passage and constituting a surface-condenser, a settling-chamber beneath the boiler into which said tubes discharge at their rear ends, and a stack leading from the settling-chamber upwardly at one side of the boiler to a point above the boiler.

2. In a locomotive, the combination, with the boiler and the smoke-box, of a cylinder-saddle provided with an ejector-passage leading from the smoke-box and directed rearwardly beneath the boiler, the cylinder-saddle being further provided with exhaust-steam passages terminating in a discharge-nozzle located in the ejector-passage and directed rearwardly, a conduit leading rearwardly beneath the boiler from the ejector-passage, and a settling-chamber beneath the boiler into which said conduit discharges at its rear end, the settling-chamber having an outlet to atmosphere.

HENRY W. MIELKE.
GEORGE M. SERGENT.

Witnesses:

D. GURNEE,
L. THON.