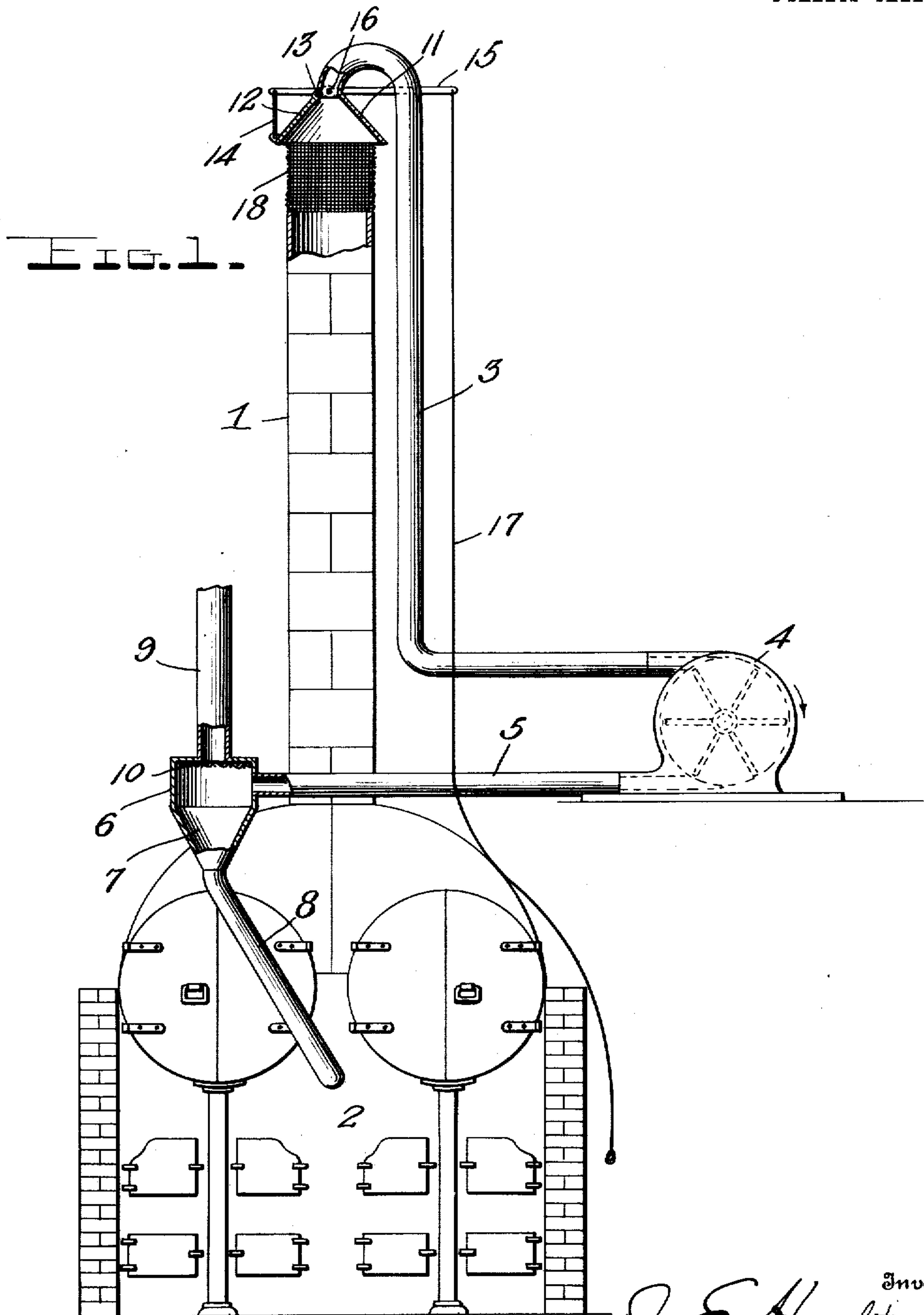


J. E. HAZELTON.
 SPARK ARRESTER AND SMOKE CONSUMER.
 APPLICATION FILED APR. 14, 1909.

952,737.

Patented Mar. 22, 1910.

2 SHEETS—SHEET 1.



Witnesses

Chas. L. Griebauer.
 & M. Rickette

334

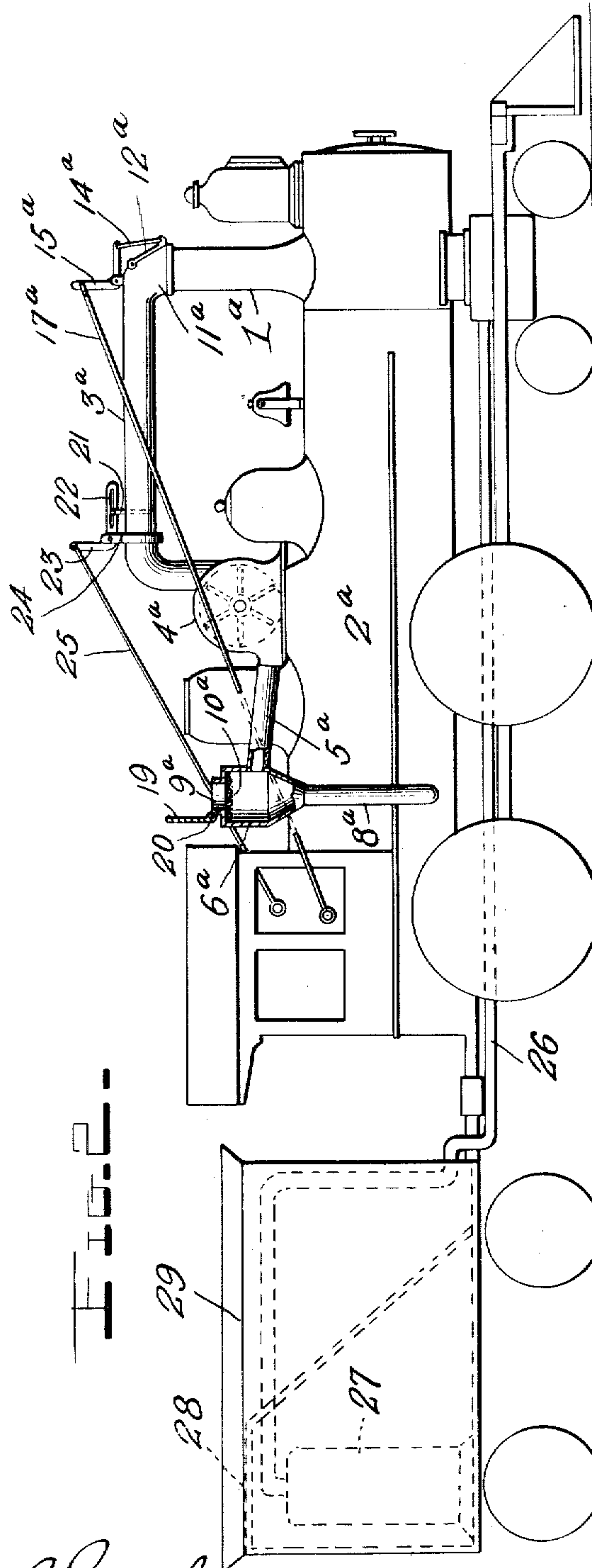
J. E. Hazelton
 Inventor
 Watson E. Coleman
 Attorney

J. E. HAZELTON.
SPARK ARRESTER AND SMOKE CONSUMER.
APPLICATION FILED APR. 14, 1909.

952,737.

Patented Mar. 22, 1910.

2 SHEETS—SHEET 2.



Witnesses

Chas. R. Griesbauer
E. M. Rickette

By

J. E. Hazelton
Inventor
Watson E. Coleman
Attorney

UNITED STATES PATENT OFFICE.

JOSEPH EDWARD HAZELTON, OF PESHTIGO, WISCONSIN.

SPARK-ARRESTER AND SMOKE-CONSUMER.

952,737.

Specification of Letters Patent. Patented Mar. 22, 1910.

Application filed April 14, 1909. Serial No. 489,863.

To all whom it may concern:

Be it known that I, JOSEPH E. HAZELTON, a citizen of the United States, residing at Peshtigo, in the county of Marinette and State of Wisconsin, have invented certain new and useful Improvements in Spark-Arresters and Smoke-Consumers, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in spark arresters and smoke consumers which may be used upon stationary steam boiler furnaces and also the boiler furnaces of locomotives, traction engines, steamboats and the like.

The object of the invention is to provide a simple and practical apparatus of this character which will not only effectively prevent fires due to sparks from a smoke stack but which will also consume the smoke, save fuel, increase the draft and render the operation of the furnace otherwise more effective and economical.

With the above and other objects in view, the invention consists of the novel features of construction and the combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatic front elevation with parts in section of a stationary steam boiler furnace showing the application of the invention thereto; and Fig. 2 is a diagrammatic side elevation of a locomotive and its tender showing a different embodiment of the invention, parts being also broken away and in section.

Referring more particularly to Fig. 1 of the drawings, 1 denotes a smoke stack of a stationary steam boiler furnace 2. Connected to the top of the stack or pipe 1 is a pipe 3 which leads to the inlet of a rotary fan casing 4 suitably mounted and driven by a motor of any description. Projecting from the outlet of the fan casing 4 is a pipe 5 which leads to a separator 6, the bottom of which is cone-shaped or funnel-shaped, as shown at 7, and has extending from its small lower extremity a cinder discharge pipe 8 leading into the fire box of the furnace 2. Rising from the top of the separator 6 is an outlet pipe 9, the lower end of which is covered by a screen 10 provided for the purpose of preventing the escape of cinders and soot through said pipe. The upper end of the pipe 3 is attached to

the small upper end of a cone-shaped cap 11 which is arranged upon the top of the stack 1 and which has in one side an opening closed by a door 12. The latter is pivoted at its upper end, as shown at 13, and its lower free end is connected by a link 14 to a lever 15 pivoted intermediate its ends, as shown at 16, and having depending from its other end an operating cable or element 17. The door 12 is adapted to be opened when getting up steam.

In operation, the door 12 is kept normally closed and the smoke, gases and products of combustion are drawn upwardly through the stack 1 by suction created by the fan 4. From the stack it passes through the cap 11, then down through the pipe 3, then through the fan casing 4, and from the latter through the pipe 5 into the separator 6. In this separator chamber or box the cinders and soot are separated from the gases and the latter escape through the pipe 9 while the cinders and soot drop through the pipe 8 and into the fire box of the furnace where they are again burned.

When the invention is applied to a small single furnace, the stack may be omitted entirely and the pipe 3 connected directly to the outlet for the smoke and products of combustion but on large furnaces and especially where a number are connected to form a battery, a portion of the top of the stack 1 beneath the cap 11 may be made of woven wire or other foraminous material 18, as shown in Fig. 1.

Referring more particularly to Fig. 2 of the drawings, 1^a denotes the smoke stack of the boiler furnace of a locomotive 2^a. 3^a denotes a pipe leading from the casing of a rotary exhaust fan 4^a to a cap 11^a arranged upon the top of the stack 1^a and having an opening closed by a hinged door 12^a. The latter is connected by a link 14^a to a lever or bell crank 15^a suitably fulcrumed upon the pipe 3^a and adapted to be operated by a rod or other element 17^a extending to the cab of the locomotive. The outlet of the fan casing 4^a is connected by a discharge pipe 5^a to a separator 6^a from the bottom of which a cinder discharge pipe 8^a leads to the fire box of the locomotive. At the top of the separator is an outlet pipe 9^a covered by a screen 10^a, which latter prevents the escape of cinders and soot but permits the gases to pass to the atmosphere. The outlet 9^a of the separator is normally open but when the

locomotive passes through a tunnel or when it is in a station it is adapted to be closed by a cover 19 preferably hinged at 20. I also preferably provide in the pipe 3^a a damper 21 for the purpose of regulating the draft. Said damper is in the form of a vertically sliding plate having a slot and pin connection 22 with a lever or bell crank 23 fulcrumed at its angle in a clamp or bracket 24 on the pipe. An operating rod 25 extends from the locomotive cab to the bell crank 23 for the purpose of operating the damper to regulate the draft.

When the invention is applied to a locomotive as shown in Fig. 2, the fan 4^a will create sufficient draft for the furnace, and the exhaust from the locomotive cylinders, instead of being discharged into the stack 1^a to create a draft in the usual manner, is conducted through a pipe 26 to a condenser 27 arranged in the water tank 28 on the locomotive tender 29. By thus utilizing the exhaust from the engine cylinders, the water in the tank 28 is heated and it is fed by a vacuum pump or other means to the boiler, thereby effecting a saving in fuel.

The operation of the embodiment of the invention shown in Fig. 2 is similar to that of the one first described and it is thought that it will be readily understood from the foregoing description taken in connection with the drawings.

The use of the invention will effectively prevent fires due to flying sparks, will save fuel and render the furnace more efficient, and will prevent the dirt caused by flying soot and cinders. The use of the invention will also prevent strong winds from affecting the operation of the furnace to which it is applied and factories will not be com-

pelled to shut down during windy weather to prevent danger of fire.

Having thus described the invention what is claimed is:

1. The combination with a steam boiler furnace having a smoke stack and a fire-box, of a cap upon the top of the stack and provided with an opening, a door to close said opening, means for operating said door, an exhaust fan, a pipe leading from said cap to the inlet of the fan-casing, a separator, a screen covered outlet of said separator, a pipe extending from the discharge of the fan-casing to said separator, and a pipe extending from said separator to the fire-box of the furnace.

2. The combination with a steam boiler furnace having a smoke stack and a fire-box, of a cap upon the top of the stack and provided with an opening, a door to close said opening, means for operating said door, an exhaust fan, a pipe leading from said cap to the inlet of the fan-casing, a separator having an open top and a funnel-shaped bottom, a screen at the open top of the separator, an imperforate closure for said open top of the separator, a pipe extending from the discharge of the fan-casing to said separator, a cinder discharge pipe leading from the bottom of the separator to the fire-box of the furnace, a damper arranged in the first mentioned pipe between the cap and the fan-casing, and means for operating said damper.

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

JOSEPH EDWARD HAZELTON.

Witnesses:

E. P. MCCARTHY,
FRANK H. LOHFF.