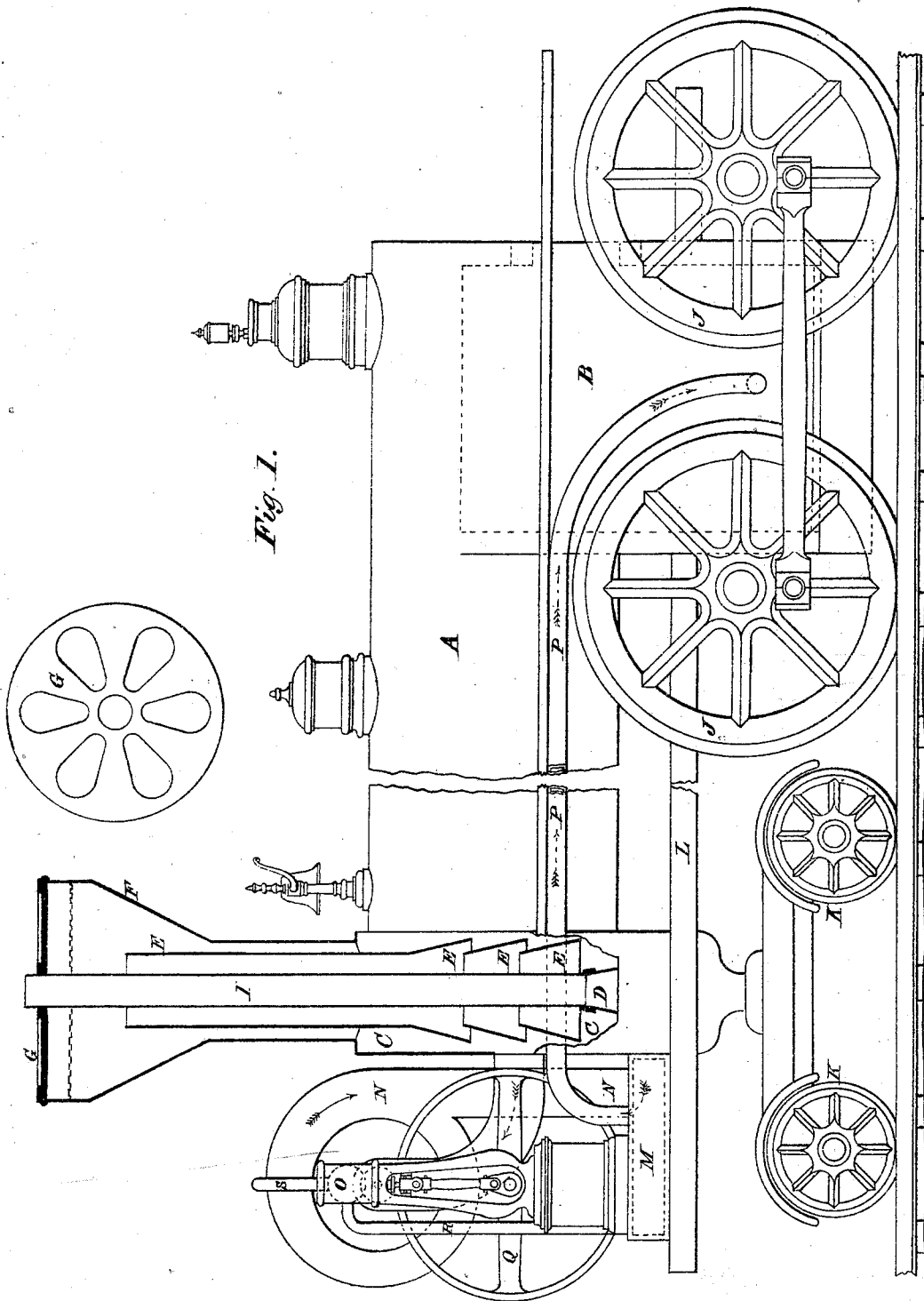


CHARLES F. PIKE.

Spark Arrester and Consumer.

No. 120,666.

Patented Nov. 7, 1871.



Witnesses
A. Moore
A. Kenigles

Inventor:
Charles F. Pike

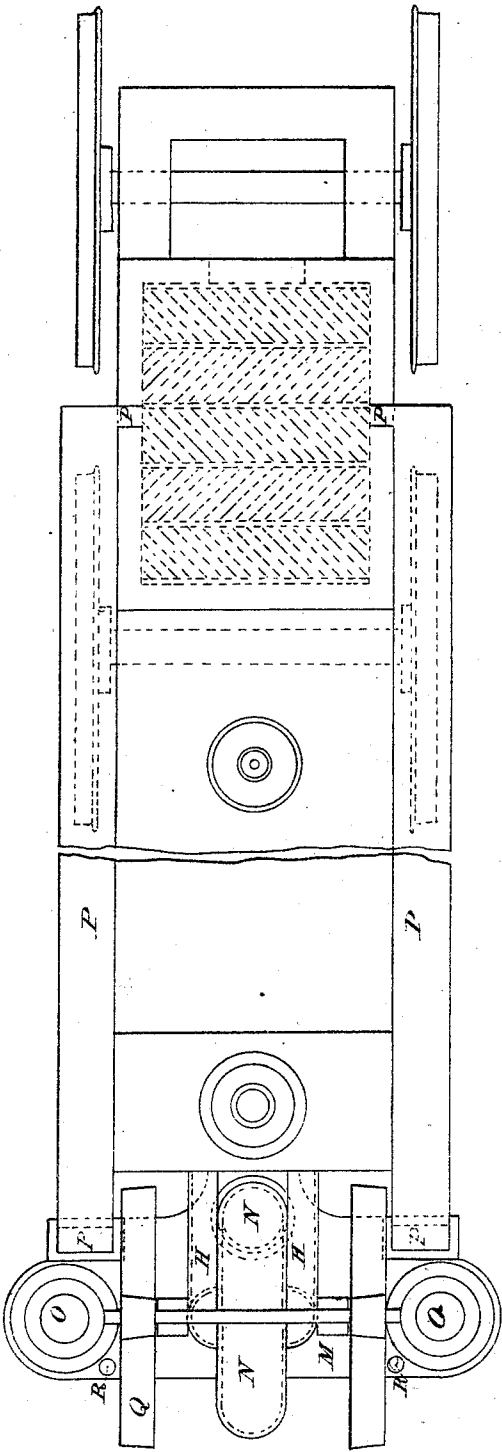
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Fig. 2.



Witnesses:
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Fig. 4.

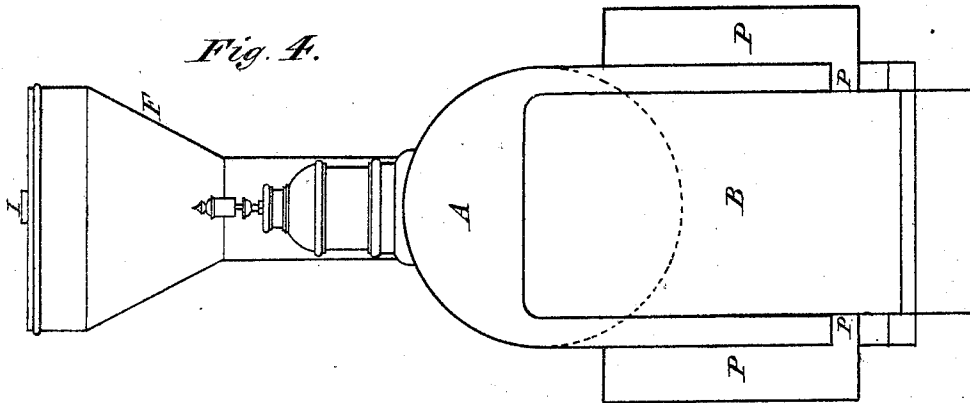
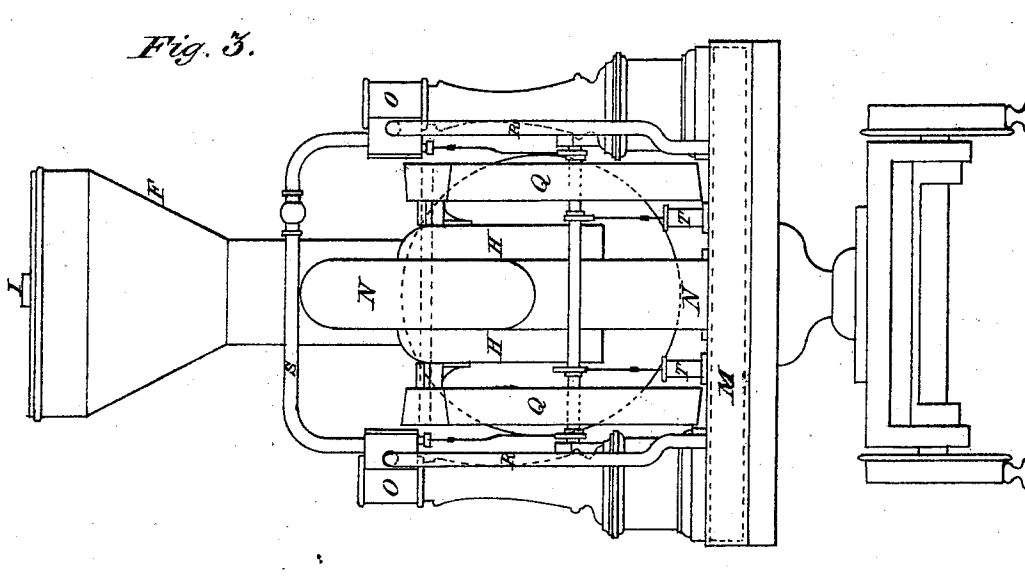


Fig. 3.



Witnesses:

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A. Hughes

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Fig. 5.

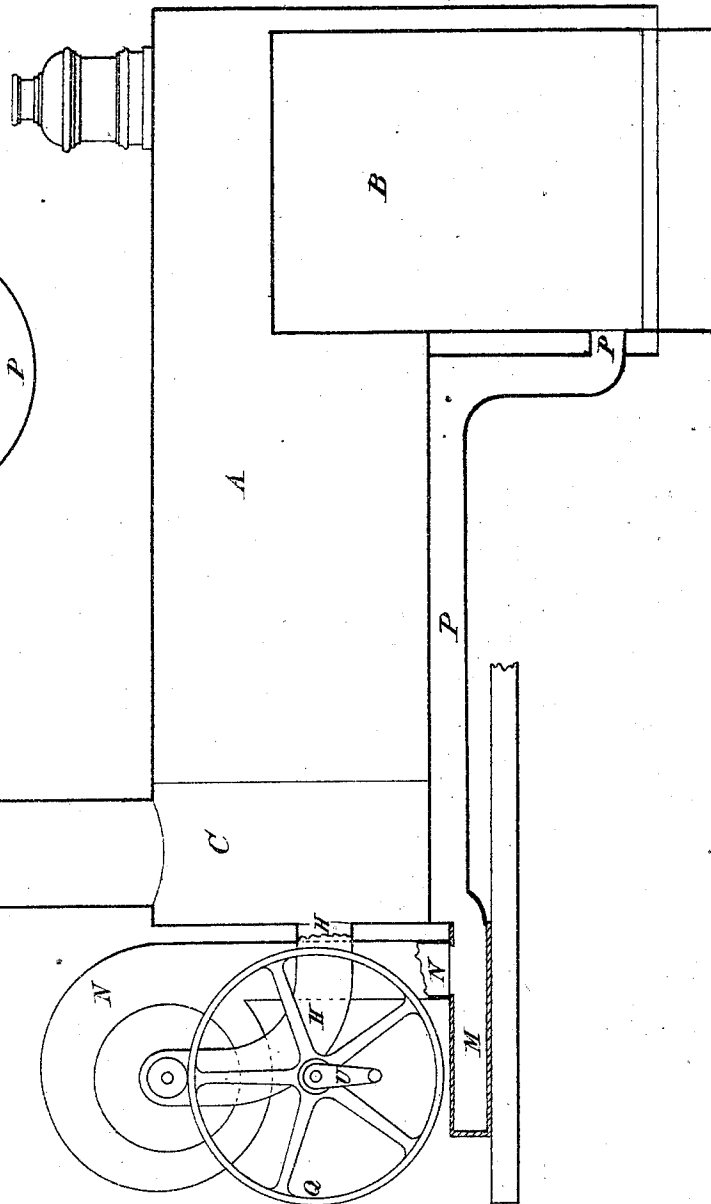
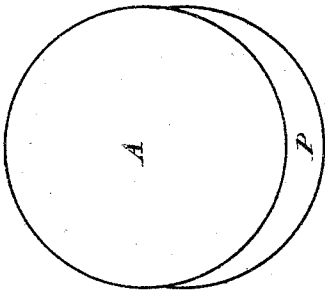


Fig. 6.



Witnesses:

A. Moore
A. Hughes

Inventor:

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Fig. 7.

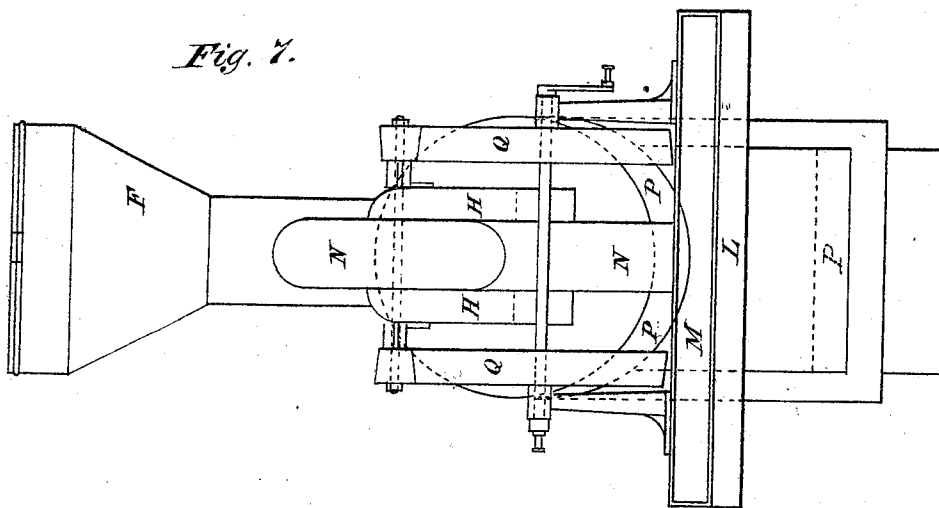


Fig. 8.

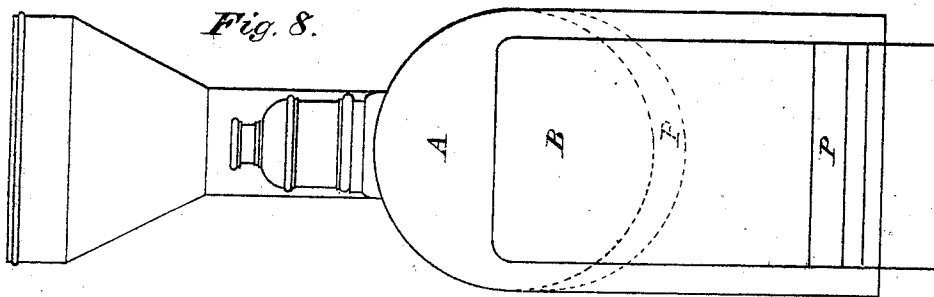
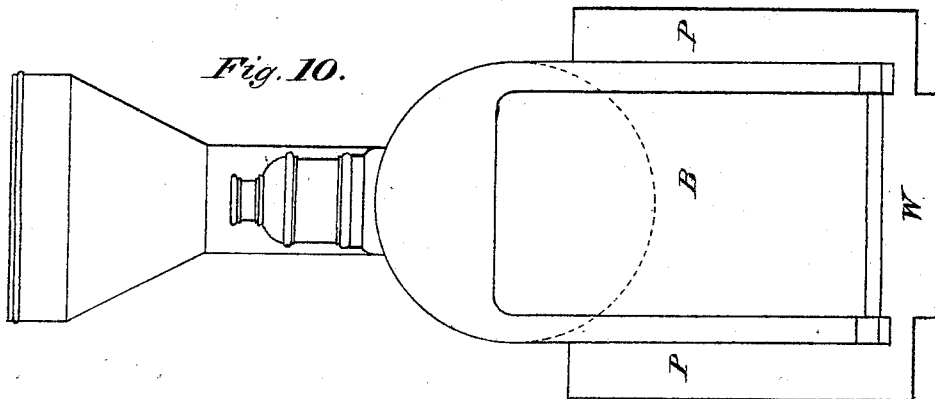


Fig. 10.



Witnesses:

A. Moore
B. Hughes

Inventor:

Charles F. Pike

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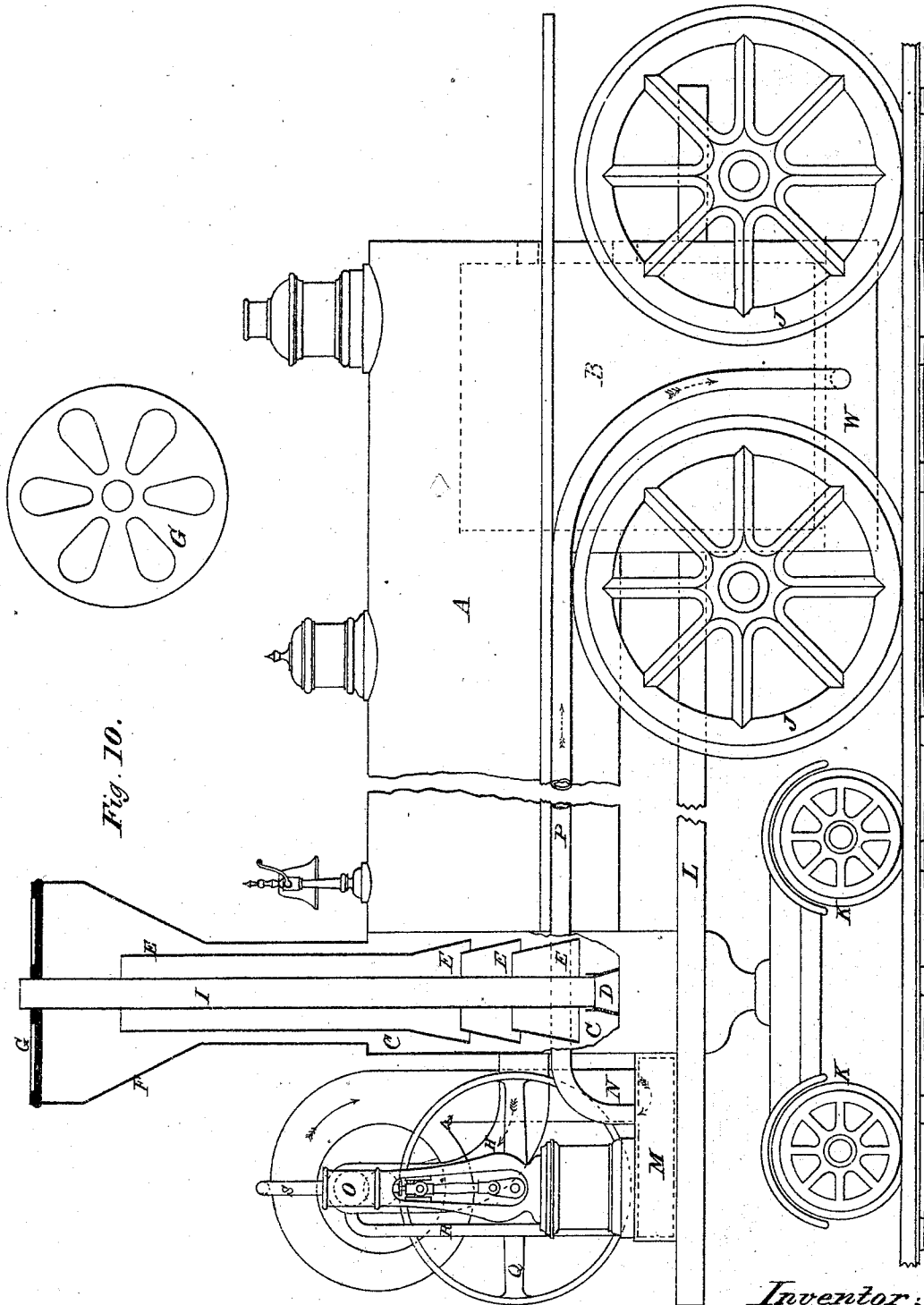


Fig. 10.

Inventor:

Charles F. Pike.

Witnesses:

A. Moore

A. Hughes

UNITED STATES PATENT OFFICE.

CHARLES F. PIKE, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN SMOKE AND SPARK ARRESTERS AND CONSUMERS.

Specification forming part of Letters Patent No. 120,666, dated November 7, 1871.

To all whom it may concern:

Be it known that I, CHARLES F. PIKE, of the city and county of Providence, in the State of Rhode Island, have invented a new and useful Improvement in Apparatus for Conveying the Sparks, Cinders, and Gases from the Smoke-Arch, Stack, or Flues to the Combustion-Chamber, where they originated.

This invention is particularly applicable to locomotive-engines and boilers. It is also very valuable when applied to marine and stationary engines and boilers, on account of the large amount of fuel saved when compared with all the well-known old devices heretofore employed.

I hereby declare that the following specification, taken in connection with the drawing forming a part of the same, is a full, clear, and exact description thereof.

In the accompanying drawing, Figure 1 represents a side elevation of a locomotive with my apparatus in position, partly in section. Fig. 2 is a plan view of the same. Fig. 3 is a front end view, and Fig. 4 a back end view. Figs. 5, 6, 7, and 8 are modifications of the same. Fig. 9 is a side elevation, similar to Fig. 1, but with the pipes P connected to the ash-pan. Fig. 10 is a back end view.

In the drawing, like letters refer to like parts.

The object of my invention is to arrest and convey back to the furnace or combustion-chamber the sparks, cinders, and gases which are now emitted from the smoke-stack of locomotive engine-boilers or marine and stationary boilers.

This invention will not only relieve the passengers of a great inconvenience and annoyance, but will prevent cars, buildings, and woods along the roads from being set on fire, by arresting the flying sparks and cinders. It will also reduce the running expenses of all railroad companies that adopt the same by a very large percentage of fuel and fire-damages.

I will now proceed to more particularly describe the same.

In the drawing, A is the boiler; B, the fire-box or combustion-chamber; C, the smoke-arch, which contains the tip or exhaust-pipe D, the petticoat-pipes E, inside smoke-pipe F, and outside pipe G, this being provided with a register-valve, G, so that it can be adjusted to admit the proper amount of fresh air, according to the work to be performed, or to graduate the open-

ings upon the top. In the register G there is a hole in the center for the exhaust-pipe I to pass through. The lower end of the exhaust-pipe I is screwed upon the tip D in the smoke-arch C, as shown in Fig. 1. J J are the driving-wheels, and K K the truck-wheels. L represents the frame of the engine, upon the front end of which is secured the hollow bed-plate M, extending across the front end. To this bed-plate the artificial draught or blower N and auxiliary engines O O are firmly secured. The cylinders of these are four-inch diameter and six inches stroke, and their cranks are set at an angle of ninety degrees, being the best position for starting. H are the pipes that connect the artificial draught or blower with the smoke-arch C; and P P are the pipes leading from the reservoir M to the furnace or combustion-chamber B, running along under the foot-board. Q Q are two balance-wheels upon the shaft of the auxiliary engines O O, being beveled on their face to match the small pulleys on the shaft of the blower, being made adjustable so as to give more or less friction, as desired, without belt or gears. This friction may be created by any other suitable means. R R are the exhaust-pipes of the auxiliary engines leading to the reservoir M. In Fig. 3 is shown the steam-pipe S, connecting the two small engines, and provided with a stop-valve to regulate the steam. This valve may be operated from the back end of the boiler in the well-known manner. T T are two small force-pumps to force water into the boiler when the engine is at rest—being a long-desired device. They are operated by eccentrics upon the shaft of the auxiliary engines O O. The entrance of the pipes P P is shown in Fig. 4, and in this view the register-valve G is also shown open. The connection of the pipes or flues P is best shown in Fig. 5, with the blower N, reservoir M, and furnace B. In this view the auxiliary engine O is removed, showing a small crank, U, which may be operated by a connecting-rod attached to the main cross-head of the locomotive, or at any other suitable place. It is more simple in form and less expensive than the extra engines for driving the blowers. The flue P is here represented partly encircling the boiler, and answers the purpose of a jacket, and it may be extended all around the boiler, if desired, and the whole length thereof. Fig. 7 shows the

small cranks at right angles to each other. Fig. 8 shows the flue P entering the furnace, and this is the most preferable form for locomotives, as well as marine and stationary engine-boilers. The pulleys upon the blower-shaft are attached thereto by a slot and spline or feather, with a thread cut upon the shaft, and a nut for adjusting them. The pulleys may be covered with leather or any other suitable material, if desired. Fig. 9 is a side elevation of a locomotive-engine with the pipes P P leading to the ash-pan W, and connected with it, for the purpose of blowing under the grate-bars into the furnace or combustion-chamber B, if preferred. Fig. 10 is a back end elevation of a locomotive boiler, showing how the pipes P P, leading to the ash-pan W, are connected and enter the ash-pan W.

The operation is as follows: Having coal in furnace or combustion-chamber B and water in the boiler A, the register-valve G open, the fires are made, and when sufficient steam is made the auxiliary engines O O are started, when the steam will increase very rapidly. If the register-valve G is closed and the exhaust-steam from the auxiliary engines is blown into the air the fires in the furnace will turn black and go out; but as long as the register-valve is kept open and the exhaust steam from the small engines into the reservoir, the furnace is properly supplied to keep up the combustion. If more hydrogen is needed, it may be taken from the main exhaust-pipe I or the steam-boiler. The blowers may be regulated according to the amount of work desired from them.

In the winter time this exhaust steam may be used, and is intended to be used, to keep the cars warm. It is a great relief to a locomotive-engine to exhaust through a five-inch pipe to what it is to exhaust through a three-inch pipe. Should, by accident, the apparatus or devices become broken, or be rendered useless for the time being, the exhaust-pipe I may be unscrewed from the tip D and the register-valve removed, and the engine be run as now in common operation, by attaching to the tip D a plate to reduce the exhaust-pipe.

Having thus described my invention, I disclaim being the inventor of a boiler, furnace, smoke-arch, blower, or artificial draught, these being old and well-known devices; but what I do claim as new is, arranging these old and well-known devices together with new ones so as to arrest the sparks, cinders, smoke, and gases and

return them to the combustion-chamber, whereby a large saving of the fuel that is now blown out of the top of the smoke-stack of locomotive-engines, and marine and stationary stacks or chimneys, and will be put into the combustion-chamber and produces a valuable result, not only to the stockholders of the railroad companies, owners of steamships, and those employed in mechanical business using steam, but to the great public at large, in the reduction of the consumption of fuel. This apparatus is as applicable to boilers or locomotives using wood as it is to coal.

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

1. The combination of the chimney provided with the smoke-arch C, artificial draught or blower N, engines O O, pipes or flues P P and H H, furnace or combustion-chamber B, boiler A of a locomotive, all constructed, arranged, and operating substantially as and for the purpose set forth.

2. The combination and arrangement of the chimney provided with smoke-arch C, register G, artificial draught or blower N, engines O O, pipes or flues P P and H H, furnace or combustion-chamber B, and boiler A, constructed and operating substantially as and for the purpose set forth.

3. The combination of the ash-pan W with the pipes or flues P P and H H, artificial draught or blower N, engines O O, smoke-arch C, register-valve G, chimney and the boiler A, when all are constructed, arranged, and operating as shown, and for the purpose set forth.

4. The arrangement of the chimney provided with the smoke-arch C, register G, with the artificial draught or blower N, reservoir M, pipes or flues P P and H H, furnace or combustion-chamber B, boiler A, auxiliary engines O O, exhaust-pipes R and I in a locomotive, when all are constructed and operated as shown, and for the purpose specified.

5. The combination of the chimney having a smoke-box or arch, C, the artificial draught device or blower N, the pipes or flues P and H, the furnace or combustion-chamber B, and the boiler A, all constructed and arranged for operation, substantially as shown and described.

CHARLES F. PIKE.

Witnesses:

A. MOORE,
JAMES S. GRINNELL.

(94)