

(No Model.)

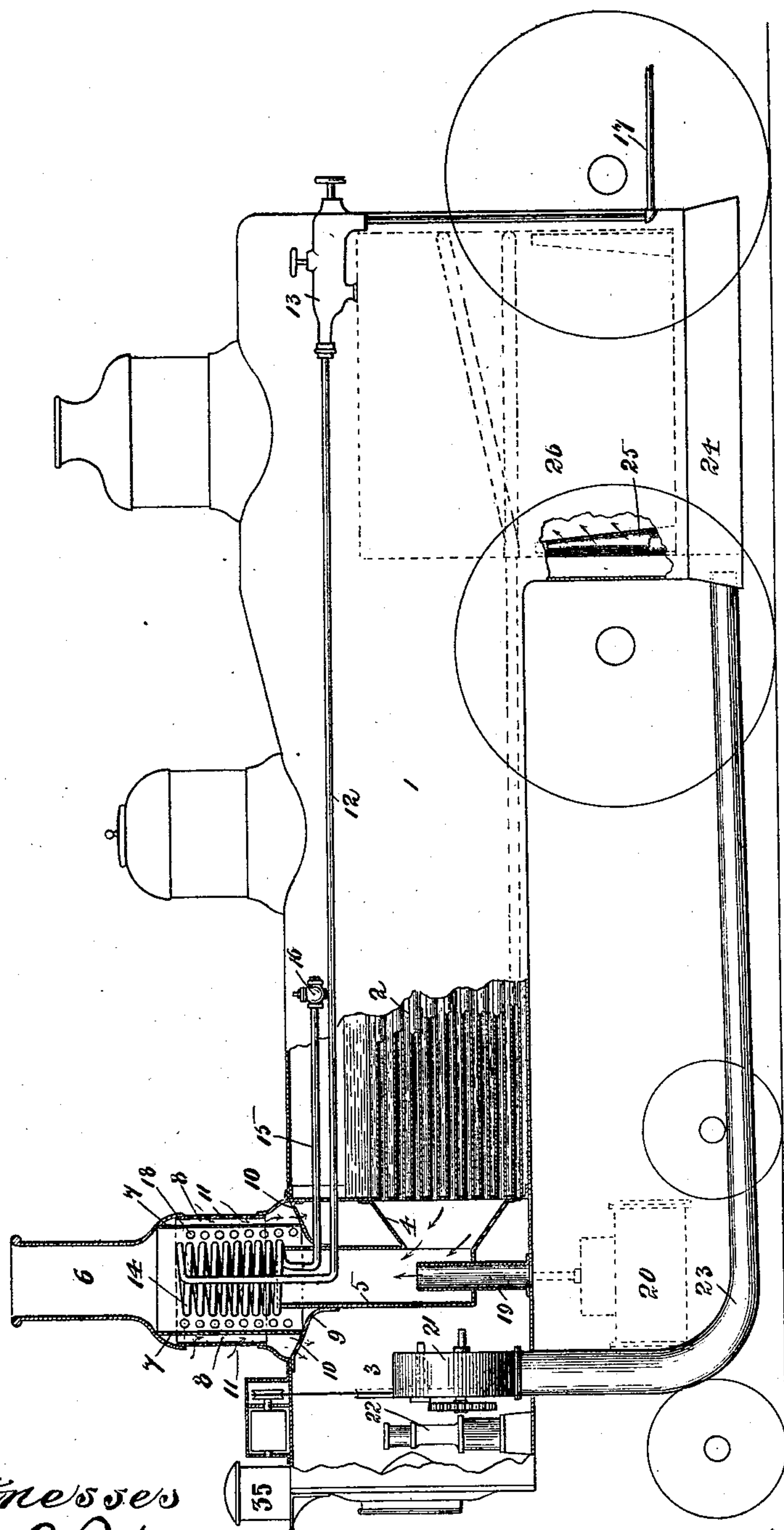
A. R. CAVNER, Dec'd.

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LOCOMOTIVE ENGINE.

No. 478,684.

Patented July 12, 1892.



Witnesses
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UNITED STATES PATENT OFFICE.

ALEXANDER R. CAVNER, OF CHICAGO, ILLINOIS; EDWARD E. HOLMAN, ADMINISTRATOR OF SAID ALEXANDER R. CAVNER, DECEASED, ASSIGNOR TO THE CAVNER LOCOMOTIVE IMPROVEMENT COMPANY, OF SAME PLACE.

LOCOMOTIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 478,684, dated July 12, 1892.

Application filed August 4, 1891. Serial No. 401,709. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER R. CAVNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Locomotive-Engines, of which the following is a specification, reference being had to the accompanying drawing, in which the figure is a side elevation of a locomotive, some parts being broken away to show my improvements.

My invention relates to locomotive-engines, and has for one of its objects to provide improved apparatus by means of which the draft of the furnace of the locomotive may be greatly improved, and thereby to economize the consumption of fuel.

Another object of my invention is to provide improved apparatus for heating the water which is supplied to the boiler before it is introduced into the boiler.

I accomplish these objects as hereinafter specified and as illustrated in the drawing.

That which I regard as new will be pointed out in the claims.

In the drawing, 1 indicates a locomotive-engine having a boiler 2 and a compartment 3 in front of the boiler.

4 indicates a hood, which connects the flues of the boiler with a pipe 5, which extends upward and terminates at the lower portion of the smoke-stack 6 of the engine. The lower portion of the smoke-stack 6 is enlarged, as shown, to form a chamber, in which the devices for heating the water and air are located.

7 indicates a partition, which is preferably composed of sheet metal and is placed in the lower portion of the smoke-stack 6 and extends around said smoke-stack at a short distance from its sides, forming a narrow compartment 8 around the central portion of the smoke-stack, as shown.

9 indicates a circular plate or hood, which is connected at its outer edges to the upper portion of the compartment 3 and at its inner end is secured around the pipe 5 to separate the interior of the smoke-stack 6 from the compartment 3. Apertures 10 are provided in the plate 9, which afford communi-

cation between the compartment 8 and the compartment 3.

11 indicates apertures formed in the lower portion of the smoke-stack 6, which apertures permit of the passage of air into the compartment 8. The apertures 11 are preferably small, and a great number of them is provided, so that a liberal supply of fresh air may enter the compartment 8.

12 indicates a water-supply pipe, which extends from an injector 13 into the lower portion of the smoke-stack 6, where it is arranged in the form of a coil 14, the lower end of the coil terminating in a pipe 15, which opens into the boiler through a check-valve 16. The injector 13 and check-valve 16 may be of the usual construction.

17 indicates a pipe for conducting water from the tender to the injector 13, which pipe may be arranged in the usual manner.

18 indicates a coil of pipe, which is placed in the lower portion of the smoke-stack, around the coil 14, and preferably close to the partition 7. The coil 18 may be secured in position in any suitable manner.

19 indicates a pipe for conducting exhaust-steam from the cylinders 20 of the locomotive into the pipe 5, which pipe 19 terminates in the lower portion of the pipe 5.

21 indicates an exhaust-fan, which is operated by an engine 22 and is adapted to exhaust the air from the compartment 3 and deliver it through a tube 23 into the ash-box 24 of the furnace, substantially as described in one of my former applications.

25 indicates tubes for delivering air from the ash-box 24 into the furnace of the locomotive. The tubes 25 open at their lower ends into the ash-box and extend upward through the furnace to the fire-box of the locomotive and terminate near the top of the fire-box. They are provided with apertures 26, through which air is delivered into the furnace. Any desired number of pipes 25 may be used, and they are preferably located at the front and rear portions of the fire-box, as shown.

The operation of my improved apparatus is as follows: When the exhaust-fan 21 is in operation, a supply of air will be drawn down-

ward through the apertures 11 into the compartment 8, and will thence pass into the compartment 3 through the apertures 10 in the plate 9. As the air passes through the compartment 8 it will come in contact with the partition 7 and will pass close to the coil 18 at the interior of the smoke-stack 6. The coil 18 is heated to a high temperature through the action of the hot gases, which pass from the furnace through the flues of the boiler and are delivered into the lower portion of the smoke-stack, as hereinbefore described. This will bring the air in the chamber 8 to a high temperature, and it will be carried by the exhaust-fan through the pipe 23 and be delivered into the ash-box 24 while still at a high temperature, and will thence be carried through the pipes 25 into the fire-box. The furnace will thereby be fed with a hot-air blast, which will render the combustion of the fuel much more complete, and a great saving of fuel will be effected. When the locomotive is in operation, the exhaust-steam from the cylinders will pass into the tube 19 and will be delivered into the lower portion of the pipe 5, where its expansion will cause a draft through the flues of the boiler, thus producing a draft through the furnace. The water which is supplied to the boiler will pass through the pipe 12 and around the coil 14, where it will be subjected to the heat from the hot gases from the furnace and the exhaust-steam from the cylinders and will be brought to a high temperature before it is introduced into the boiler. By this arrangement the fuel is further economized, as very little further heat will be required to raise the water to the desired temperature after it reaches the boiler.

That which I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a locomotive, of an air-heater arranged in the forward portion thereof, an air-heating compartment arranged in juxtaposition to the heater and wherein the air is heated by such heater, a compartment arranged at the forward portion of the locomotive and having communication with the air-heating compartment, a hood located in said compartment and connecting the boiler-flues with the smoke-stack, and mechanism which operates to draw external atmosphere into the air-heating compartment and force the same to the locomotive-furnace, substantially as described.

2. The combination, with a locomotive, of an air-heater at the forward portion thereof, an air-compartment separated from the air-heater by a perforated partition and in communication with the external atmosphere, a compartment having communication with the air-heating compartment through the said perforated partition, a hood located in said compartment and connecting the boiler-flues with the smoke-stack, and mechanism which operates to draw air into the air-compartment

and force the same to the locomotive-furnace, substantially as described.

3. The combination, with a locomotive, of an air-heater arranged in the forward portion thereof, an air-heating compartment arranged in juxtaposition to the heater and wherein the air is heated by such heater, a compartment arranged at the forward portion of the locomotive and having communication with the air-heating compartment, a hood arranged in said compartment and connecting the boiler-flues with the smoke-stack, and an exhaust-fan having a pipe connection with the locomotive-furnace and operating to draw external atmosphere into the air-heating compartment and force the same to the locomotive-furnace through said pipe, substantially as described.

4. The combination, with a locomotive, of a feed-water and air heater arranged in the forward portion thereof, an air-heating compartment arranged in juxtaposition to the water and air heater and wherein the air is heated by such water, a pipe for conducting water to the heater, a pipe for conducting water from the heater to the locomotive-boiler, a compartment arranged at the forward portion of the locomotive and having communication with the air-heating compartment, and mechanism which operates to draw external atmosphere into the air-heating compartment and force the same to the locomotive, substantially as described.

5. The combination, with a locomotive having a boiler 2 and forward compartment 3, having no communication with the boiler, of a smoke-stack 6, having partition 7, exterior compartment 8, said exterior compartment 8 having apertures 11, plate 9, separating the compartment 3 from the interior of the smoke-stack, apertures 10 in said plate 9, pipe 23, adapted to conduct air from the compartment 3 to the ash-box of the locomotive, and apparatus located in said compartment 3, adapted to exhaust the air from said compartment and deliver it into the pipe 23, substantially as described.

6. The combination, with a locomotive having a forward compartment, said compartment having no communication with the flues of the locomotive-boiler, and a smoke-stack having an interior compartment in communication with the flues of the boiler and an exterior compartment having apertures adapted to permit of the access of air into said compartment, said exterior compartment being in communication with the forward compartment of the locomotive, of a coil 18 in the interior of the smoke-stack and apparatus for causing a current of air to flow through the compartment 8 into the forward compartment of the locomotive, substantially as and for the purpose specified.

7. The combination, with a locomotive having a boiler 2 and a forward compartment 3, having no communication with the boiler, of

a smoke-stack 6, having an exterior compartment 8, the exterior compartment being in communication with the forward compartment of the locomotive and with the open air
5 and the interior of the smoke-stack being in communication with the flues of the boiler, a coil 14, located in said smoke-stack, pipes for conducting water into said coil and for delivering it into the boiler of the locomotive, coil
10 18 around said coil 14, tube 19 for delivering

exhaust-steam into the smoke-stack, exhaust-fan 21, tube 23 for conveying air from the compartment 3 to the ash-box of the locomotive, and pipes 25, adapted to deliver air from the ash-box into the fire-box of the locomotive, substantially as described. 15

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Witnesses:

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