

(No Model.)

2 Sheets—Sheet 1.

N. J. NOBLE.

VENTILATION MECHANISM FOR LOCOMOTIVE OR OTHER BOILER
FURNACES.

No. 552,196.

Patented Dec. 31, 1895.

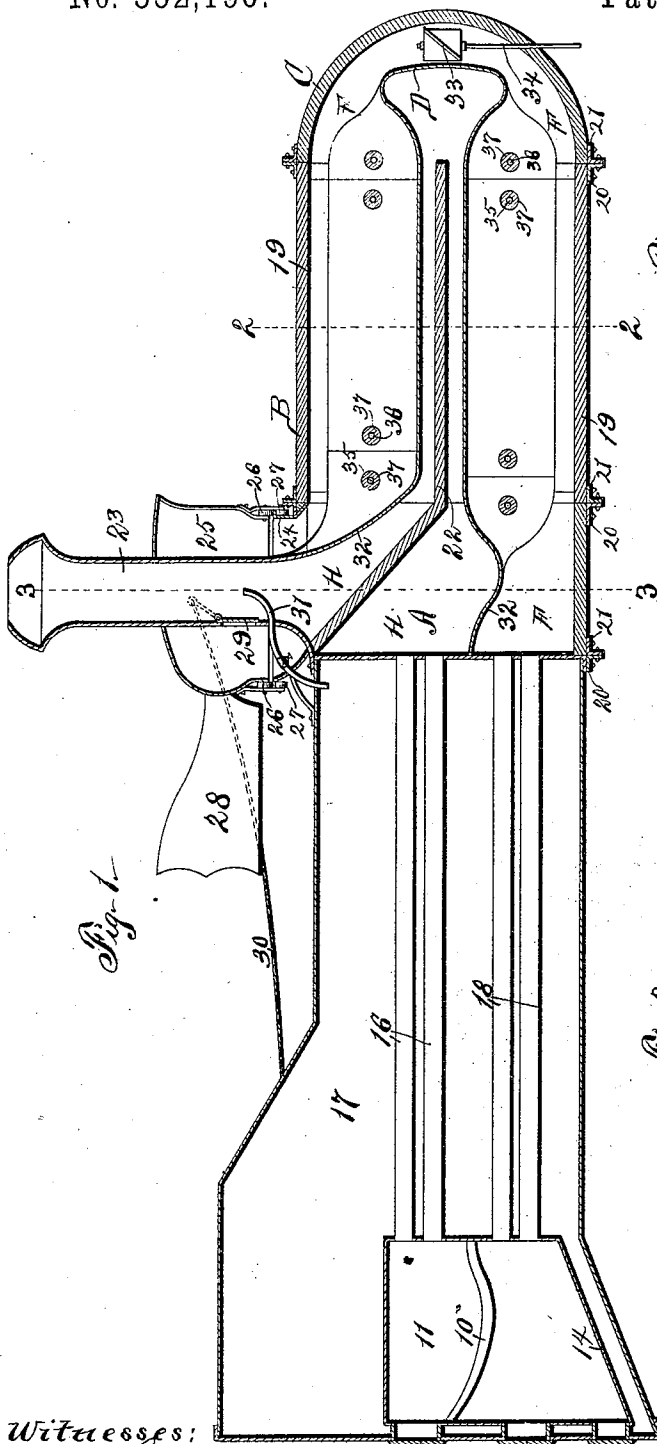


Fig. 1.

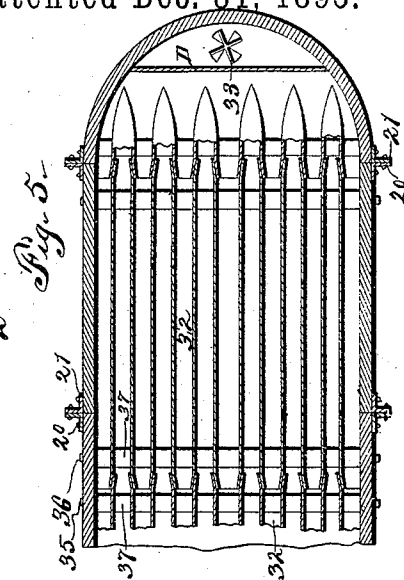


Fig. 5.

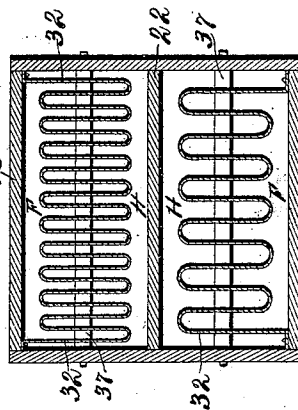


Fig. 2.

Witnesses:

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Inventor:

Neville J. Noble,

By Thomas G. Orwig, Attorney.

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Fig. 3.

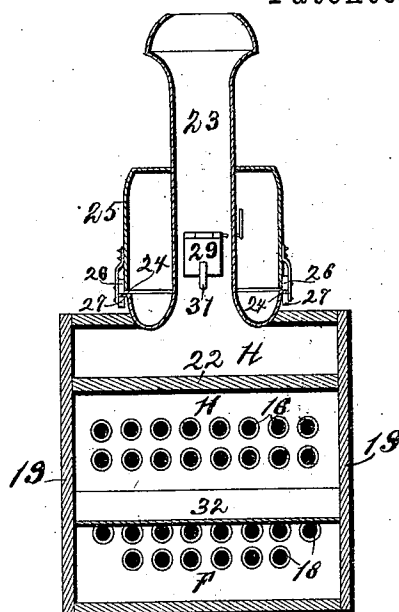
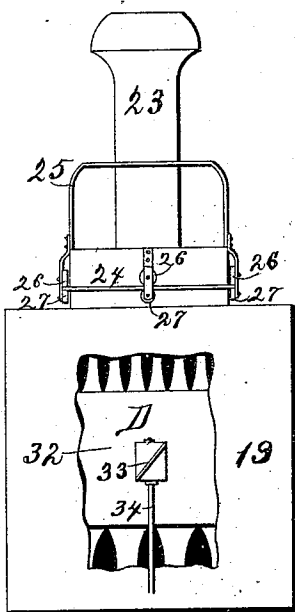


Fig. 4.



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UNITED STATES PATENT OFFICE.

NEWELL JAS. NOBLE, OF STATE CENTRE, IOWA, ASSIGNOR OF ONE-HALF TO
A. JUDSON SHOMBER, EDWARD H. SCHILLING, AND THEODORE ENGLE,
OF SAME PLACE.

VENTILATION MECHANISM FOR LOCOMOTIVE OR OTHER BOILER FURNACES.

SPECIFICATION forming part of Letters Patent No. 552,196, dated December 31, 1895.

Application filed December 7, 1894. Serial No. 531,163. (No model.)

To all whom it may concern:

Be it known that I, NEWELL JAS. NOBLE, a citizen of the United States of America, residing at State Centre, in the county of Marshall and State of Iowa, have invented a new and useful Ventilation Mechanism for Locomotive or other Boiler Furnaces, of which the following is a specification.

The object of this invention is to provide improved means for returning the heat contained in escaping gas or foul air to a room, building, forge, furnace, stove, or fire-box whence it emanates, and simultaneously therewith permitting the escape of the gas or foul air into the atmosphere with the temperature thereof greatly reduced.

This invention consists in the construction, arrangement and combination of elements, hereinafter set forth, pointed out in my claims and illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation showing my improvement applied to a locomotive-boiler. Fig. 2 is a transverse sectional elevation on the indicated line 2 2 of Fig. 1. Fig. 3 is a transverse sectional elevation on the indicated line 3 3 of Fig. 1. Fig. 4 is a front elevation of the apparatus, the casing being broken away. Fig. 5 is a detail view illustrating the formation of joints in the apparatus.

In the construction of the apparatus as shown, the numeral 10 designates curved grate-bars mounted in a fire-box 11 of a locomotive-boiler. A fuel-door 12 is provided in the front of the fire-box above the grate-bars 10. A door 13 is provided in the front of the fire-box immediately beneath the grate-bars 10. The fire-box is formed with a bottom 14 inclined downwardly and forwardly, and an ash-door 15 is provided in the front of the fire-box adjacent to said bottom, whereby the ashes may be withdrawn from the said fire-box. A series of smoke-tubes 16 are mounted in the upper portion of the boiler 17 and extend from the fire-box, above the grate-bars, 10, to the opposite end of the said boiler. Fresh-air or draft flues 18 are mounted in the lower portion of the boiler 17 and extend from the fire-box, below the grate-bars 10, to the op-

posite end of said boiler. A casing 19 is fixed to and projects horizontally forward from the front end of the boiler 17, the connection between said casing and boiler being formed with angle-plates 20 21, bolted to the same and to each other. A partition 22 is positioned in the casing 19 and extends horizontally from a point adjacent to the forward end of said casing to a point near the rear end of the casing and from thence extends on an inclined plane to a connection with boiler 17 near the smoke-stack 23.

The casing is formed in sections A B C, detachably connected by means of angle-plates 20 21, bolted thereto and to each other. An aperture is formed in the upper portion of the casing 19 adjacent to the boiler, and the smoke-stack 23 extends vertically through said aperture. A track 24 is supported on the casing 19 about the aperture and surrounding the smoke-stack, and a funnel 25 is mounted on said track, which funnel is open at one side thereof.

Antifriction-rollers 26 27 are fixed to the lower edge portion of the funnel 25 and engage above and below the track 24 to support and steady said funnel in the travel thereof. A tail-board or vane 28 is fixed to and extends outwardly from the funnel 25. A damper-valve 29 is positioned in the rear of the smoke-stack 23 and opens to the funnel, which valve is connected to an operating-rod 30. An exhaust or steam pipe 31 is mounted in and communicates with the boiler and smoke-stack. A partition 32 is mounted in the casing 19. One end of the partition 32 is fixed to the boiler between the flues 16 18, and the opposite end of said partition is fixed to the forward portion of the lower edge of the smoke-stack 23.

The body or central portion D of the partition 32 curves around the forward end of the partition 22 approximately midway between said end and the forward end of the casing. The portion of the partition 32 lying above the partition 22 is closely corrugated or folded to subdivide the space traversed thereby into a series of connected grooves above and below the partition 32. The space above the partition 32 communicates at one end with the

atmosphere through the aperture in the casing leading to the funnel, and the space below the upper portion of said partition opens at one end to the smoke-stack.

- 5 The portion of the partition 32 below the partition 22 is corrugated coarsely to subdivide the space traversed thereby into a series of connected grooves of greater transverse area than the grooves above the partition 22.
- 10 The space below the lower portion of the partition 32 opens at one end to the fresh-air flues 18 in the boiler, and communicates at the other end with the forward end of the space above the upper portion of said partition, thus forming a continuous fresh-air conduit F from the
- 15 funnel to the fire-box. The space above the lower portion of the partition 32 opens at one end to the smoke-tubes 16 and communicates at its forward end, around the end of the partition 22, with the forward end of the space below the upper portion of said partition 32, thus forming a continuous conduit H for the passage of smoke and gases from the fire-box to the smoke-stack.
- 20 A fan 33 is mounted for rotation in the section C of the casing 19 on a shaft 34 vertically positioned in said casing and driven by gearing to a prime mover. (Not shown.) The fan is so constructed and arranged as to cause a
- 25 current of air to pass through the conduit F into the fire-box beneath the grate-bars 10. The corrugated portions of the partition 32 are retained in fixed relations by bolts 35 36, positioned therein and in the casing 19, transversely thereof, and collars 37 mounted on
- 30 said bolts and engaging the vertical portions of the corrugations, Fig. 2.

The partition 32 may be formed in sections with overlapping or telescoping end portions, and pairs of bolts 35 36 with the accompanying collars are mounted in the end portions of the sections to steady and support the same, Fig. 5.

35 In practical use atmospheric air is drawn and driven through the funnel and conduit F into the fire-box beneath the grate-bars by way of the flues 18, and supplying draft to the fire drives the smoke and hot gases out of the fire-box through the tubes 16 and conduit H to and through the smoke-stack. The juxtaposition of the air-passages and smoke-passages provides for the equalization of the respective temperatures of the fresh air and smoke and insures a great saving of fuel by

40 utilizing the heat which otherwise might be carried away with the smoke and gases and discharged through the smoke-stack.

When it is desired to supply the fire-box with fuel the damper-valve 29 is opened and the draft through the smoke-stack increased thereby, the draft beneath the grate-bars 10 being thus correspondingly diminished.

When the engine is at rest the draft through the smoke-stack is increased by permitting a flow of steam from the boiler to said smoke-stack through the pipe 31.

The vane or tail-board 28 holds the funnel "in the wind" at all times, so as to insure the entrance of natural air-currents to the said funnel.

I claim as my invention—

1. In a locomotive boiler, the combination of a boiler having a set of upper tubes for smoke conveyance, a set of lower tubes for fresh air conveyance, a fire box communicating with all of said tubes at one end, grate bars located in said fire box between said sets of tubes, a fuel door in the fire box above the grate bars, a cleaning door in the fire box below the grate bars, an ash door in the lower portion of said fire box, a casing fixed to and extending horizontally forward from the front of said boiler and communicating with the forward ends of the tubes therein, a partition in said casing partially dividing the same into two sections which communicate at the front of the said casing, a partition 32, corrugated for portions of its length, mounted in said casing and subdividing the same to form fresh air and smoke conduits communicating with the fresh air and smoke tubes in the boiler, a funnel feeding air to the fresh air conduit, a smoke stack receiving and discharging smoke from the smoke conduit, a blast fan mounted in the fresh air conduit, and means for adjusting said funnel, as set forth.

2. In an apparatus of the class described, a casing having an aperture in the top of one end portion thereof, a partition longitudinally positioned in said casing and extending from one end nearly to the other end thereof, a partition 32 in said casing, corrugated portions in said partition 32, a series of bolts positioned in and transversely of said corrugated portions, and a series of collars mounted on said bolts between the corrugations, as set forth.

3. In an apparatus of the class described, a casing providing smoke and fresh air conduits, and provided with an aperture communicating with both of said conduits, a smoke stack mounted in said aperture and closing said smoke conduit, a funnel mounted about said aperture and open at one side, a track supported by said casing and supporting said funnel, antifriction rollers connecting the funnel and track, a wind vane on said funnel, a damper valve in the smoke stack, and a steam pipe leading into said smoke-stack, as and for the purposes set forth.

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