

No. 688,379.

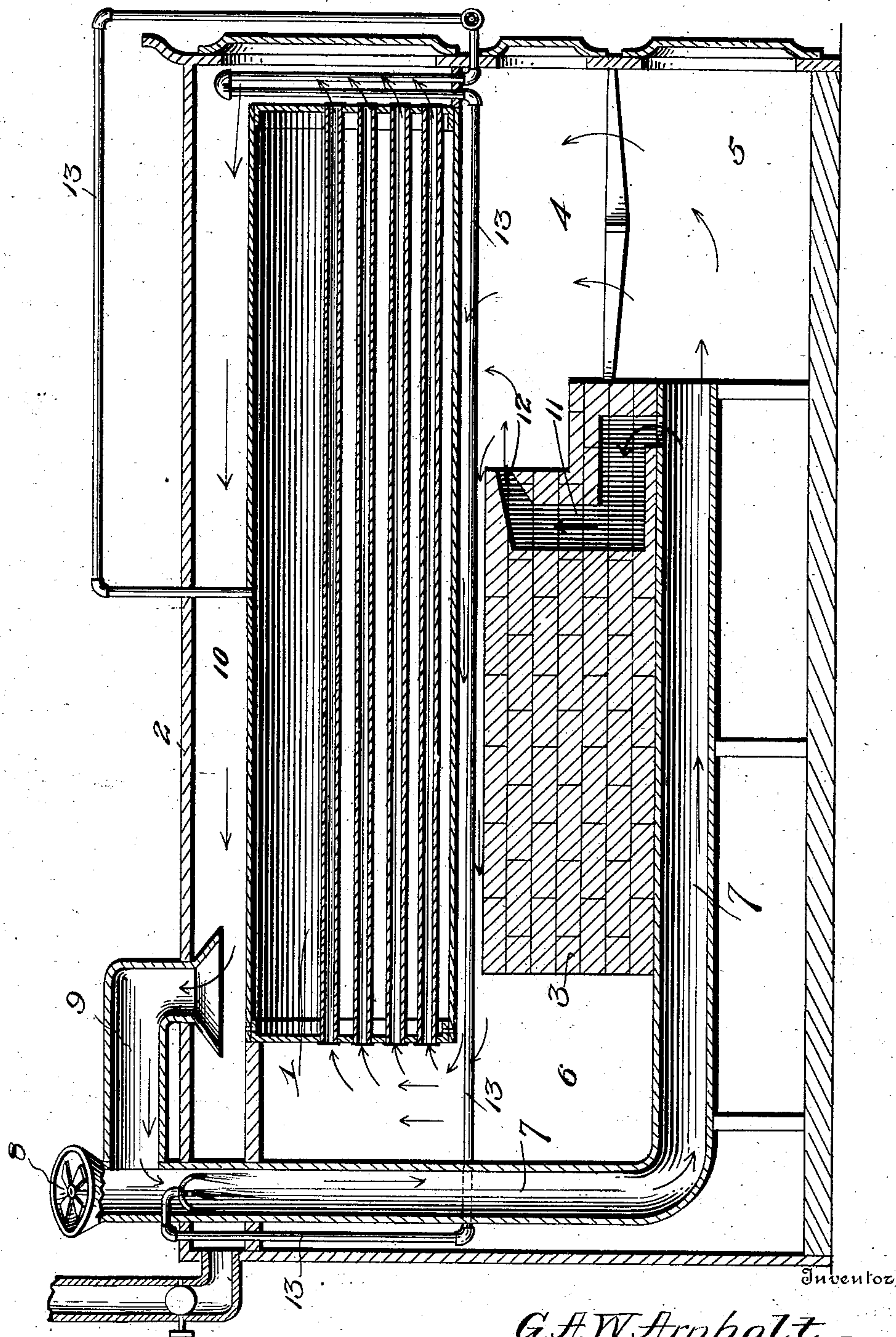
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G. A. W. ARNHOLT.

SMOKE CONSUMER.

(Application filed July 2, 1901.)

(No Model.)



G. A. W. Arnholt.

Witnesses

Co Agent
J. H. Wilson

Dy

H. Rivison & Co

Attorneys

UNITED STATES PATENT OFFICE.

GEORGE A. W. ARNHOLT, OF PHILADELPHIA, PENNSYLVANIA.

SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 688,379, dated December 10, 1901.

Application filed July 2, 1901. Serial No. 66,835. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. W. ARNHOLT, a citizen of the United States, residing at Philadelphia, (post-office same,) in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Smoke-Consumers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to smoke-consumers.

The object of the invention is to provide a more complete and effective arrangement of apparatus than has heretofore been employed for this purpose, whereby substantially all the smoke and other combustible gases generated in a furnace will be consumed, thereby largely reducing the quantity of fuel employed, and thereby doing away with the smokestacks and uptakes heretofore used for carrying off the products of combustion and preserving the atmosphere from contamination by the discharge therein of unconsumed smoke and gases.

With this and other objects in view the invention consists of certain novel features of construction, combination, and arrangement of parts, which will be hereinafter more fully described, and particularly pointed out in the appended claim.

In the accompanying drawing I have illustrated my invention in longitudinal vertical section, the upper end of the return-flue being distorted to show it in perspective.

Referring to the drawing, 1 denotes a horizontal tubular boiler, 2 the furnace-casing, 3 the bridge-wall, 4 the fire-box, 5 the ash-pit, and 6 the smoke-box.

7 denotes a return-flue which leads from the ash-pit 5 under the bridge-wall up through the top of the furnace-casing and is provided with a cold-air-inlet opening 8 and with a branch 9, which projects into and communicates with the smoke-space 10 of the furnace. The bridge-wall is provided with a passage 11, which communicates with the flue 7 at a point contiguous to that at which said flue communicates with the ash-pit 5 and communicates with the fire-box at a point 12.

13 denotes a steam-pipe leading from the steam-space in the boiler through the fur-

nace-casing, thence into the furnace-casing at its forward end and immediately in advance of the forward end of the boiler, thence back again under the boiler, and thence upwardly and provided at its rear end with injector-nozzles which are located in the vertical portion of the flue 7 immediately below the cold-air inlet 8 and branch 9 of said flue.

In operation the unconsumed products of combustion and gases escaping from the fire-box will pass under the boiler, over the bridge-wall, thence through the boiler-tubes and through the forward end of the boiler, thence upwardly into the smoke-space 10, thence from said smoke-space through the branch 9 into the vertical portion of the flue 7, where they are forced by the steam-jets downwardly into the horizontal portion of the flue 7 and are combined with fresh air drawn in through the opening 8 in said return-flue. In being discharged through the forward end of the return-flue 7 part of the gases and products of combustion, combined with the superheated steam and fresh air, will be discharged into the ash-pit under the grate, while a part will escape through the passage 11 in the bridge-wall and be discharged over the grate and at a point to check or retard the escape of the fresh unconsumed gases and products of combustion and hold them, as it were, in suspension and cause them to be more thoroughly consumed by the flame in the fire-box, which flame is augmented or intensified by the steam-laden fresh air and unconsumed gases and products of combustion escaping from the forward end of the return-flue into the ash-pit under the grate.

From the foregoing description, taken in connection with the accompanying drawings, the construction, mode of operation, and advantages of my invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion, and details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The combination with a furnace-casing and

its ash-pit, its fire-box, and a bridge-wall, of
a tubular boiler supported above said bridge-
wall to form a smoke-passage therebetween,
a return-flue extending from the ash-pit to
5 the rear of the casing and thence communi-
cating with the smoke-space in the casing
above the boiler, and with the atmosphere,
said flue at a point adjacent to that end com-
municating with the ash-pit being provided
10 with an opening, and said bridge-wall being
provided with a passage which communicates
at one end with said opening and at the other
end with the fire-box at a point contiguous to
the escape of the products of combustion from

said fire-box into the smoke-space beneath 15
the boiler, and an injector for forcing the
smoke and products of combustion from the
smoke-space above the boiler and fresh air
through said flue under the grate and into
the fire-box, substantially as set forth. 20

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit-
nesses.

GEORGE A. W. ARNHOLT.

Witnesses:

CHARLES P. ARNHOLT,
ANDREW SCHIMMEL, Jr.