No. 786,511. PATENTED APR. 4, 1905.

J. W. NORTON.

COMBINED SAFETY ATTACHMENT AND FLUE CLEANER FOR STEAM BOILERS.

APPLICATION FILED MAY 4, 1904.

2 SHEETS—SHEET 1.

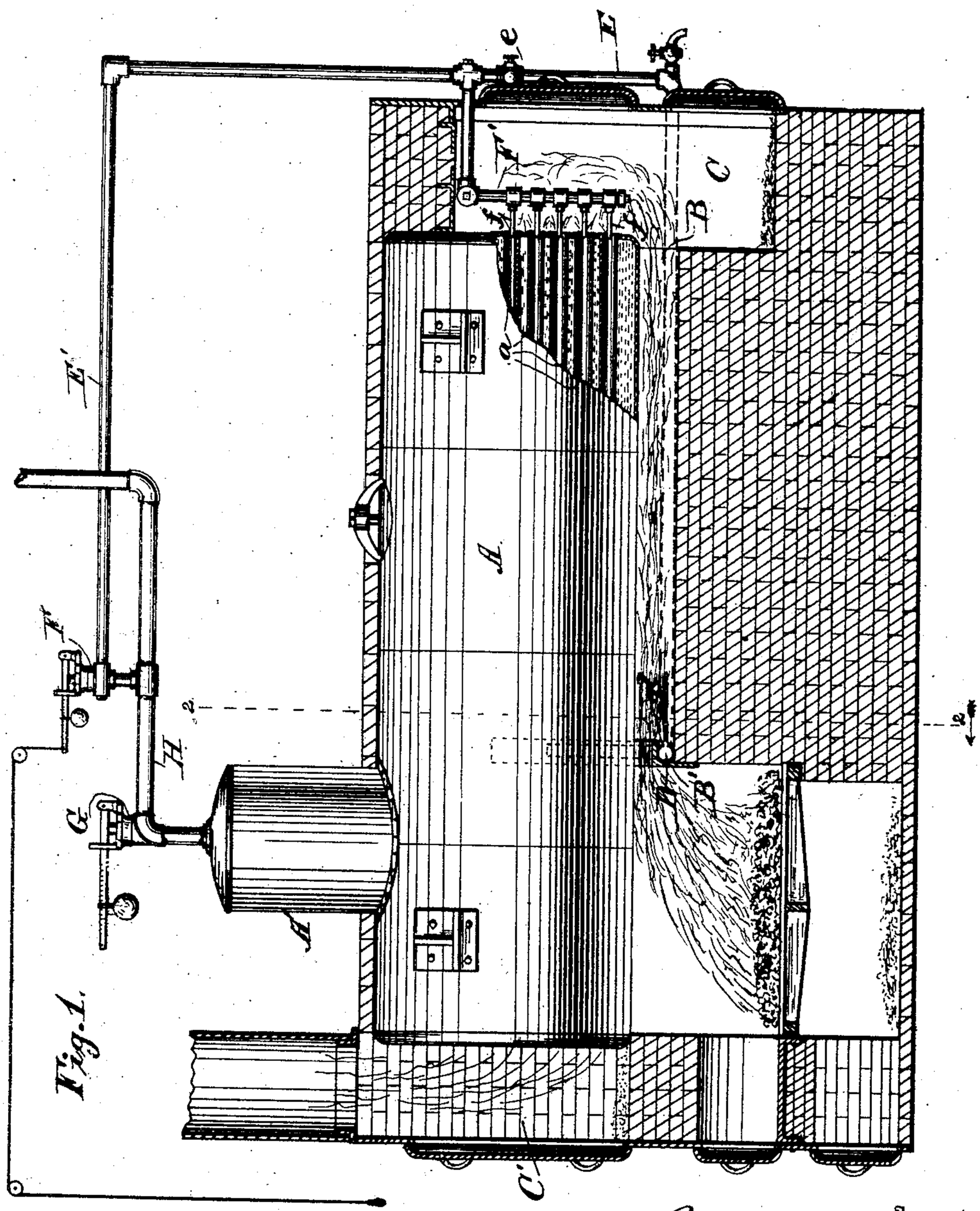

Fig. 1.

Witnesses
Theodore C. Johnson.
C. E. Hebb.

Inventor
James W. Norton,
By Eugene W. Johnson,
Attorney.

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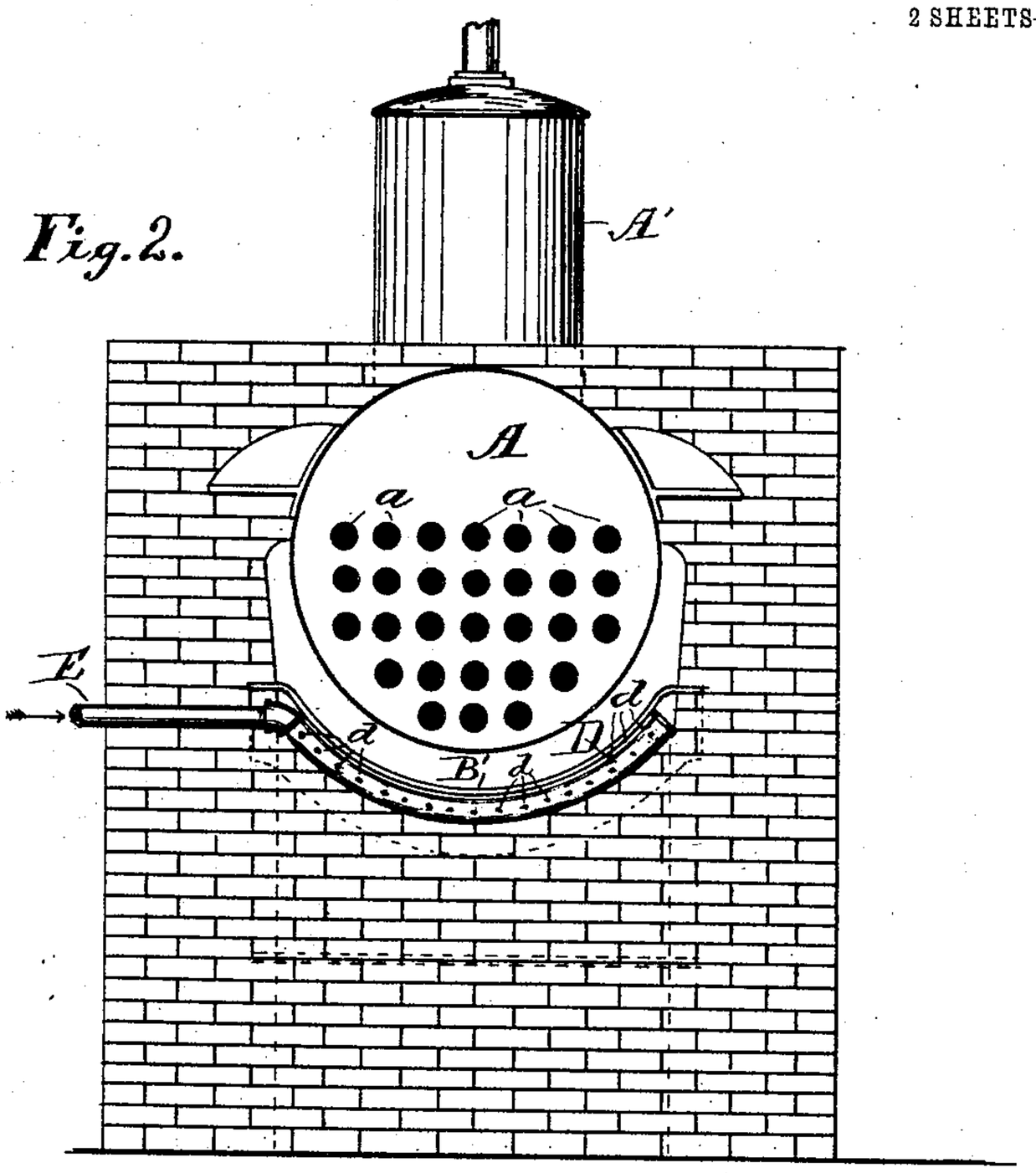
Fig. 2.



Witnesses
Theodore C. Johnson.
C. E. Hoff.

Inventor
James W. Norton.
By Eugene W. Johnson
Attorney.

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UNITED STATES PATENT OFFICE.

JAMES W. NORTON, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF ONE-HALF TO WILLIAM A. HEILPRIN, OF WASHINGTON, DISTRICT OF COLUMBIA.

COMBINED SAFETY ATTACHMENT AND FLUE-CLEANER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 786,511, dated April 4, 1905.

Application filed May 4, 1904. Serial No. 206,341.

To all whom it may concern:

Be it known that I, JAMES W. NORTON, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in a Combined Safety Attachment and Flue-Cleaner for Steam-Boilers, of which the following is a specification.

This invention relates to certain new and useful improvements in steam-boilers, the object being to provide a boiler with a flue-cleaner which will be automatic in operation when the pressure in the boiler reaches a predetermined point; and the construction includes an auxiliary safety-valve and pipes connected therewith which lead to distributing-pipes having jet-nozzles through which steam is projected under pressure through the flue of the boiler in the direction of the draft, so that the draft and steam-jets will coact in cleansing the flue.

My invention consists in contracting the direct or main flue, which is adjacent to the fire-box, and in providing the same with a curved or segmental pipe having a plurality of perforations whereby the under side of the boiler-shell and the flue is cleansed, the draft being accelerated and steam supplied to the products of combustion, live steam being supplied to and projected from a perforated pipe at the front end of the flue when the steam in the boiler exceeds a predetermined pressure, by which arrangement and construction the flue is cleaned only when the steam in the boiler blows off, such steam entering the flue when the pressure in the boiler exceeds what is required for use, as in driving engines, &c.

I am aware that it has been proposed to cleanse the fire-tubes of steam-boilers by means of steam admitted or projected from jet-nozzles attached to pipes connected to the boiler in such a manner that when a cock is opened steam will be forced through the flues to eject soot, ashes, and other foreign substances therefrom, and such features I do not claim as my invention.

With my improvement the draft is accelerated and the pressure in the boiler does not fall materially during the cleansing of the flues, and consequently the flue and tubes may be cleansed while the boiler is in use and automatically when the steam-pressure rises above a predetermined point.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, showing the application of my invention to a steam-boiler of ordinary construction; and Fig. 2 is a section on line 2 2 of Fig. 1.

The boiler A is of ordinary construction, having fire-tubes *a a* and steam-dome A′, the boiler being set to provide a direct flue B, at the rear end thereof a space C, and at the front of the boiler a space C′, which communicates with the smoke-stack. The brick-work which forms the under side of the flue B supports at its front end a flanged and curved casting B′, the purpose thereof being to provide protection for a pipe D, having a number of perforations or nozzles *d d*. Instead of a flanged casting, as shown, the covering for the pipe D may consist of brickwork laid in front and over the pipe, as it is desirable to protect the pipe from direct contact with the flames, which are intense at the outlet for the fire-box.

The construction shown provides a direct flue which extends from the fire-chamber to the rear end of the boiler, and the size of this flue is such as to cause the products of combustion to be utilized in heating the boiler to a greater extent than when merely a bridge-wall is present.

The pipe D is connected to a steam-supply pipe E in any suitable manner, which pipe may lead through the side of the brickwork and communicates with a pipe E′, having a safety-valve F and being on the other side of the safety-valve connected to the steam-boiler. The pipe E′ in practice may be connected to the boiler-tube cleaners, which are arranged in the upper part of the chamber C and consist of a series of pipes F′, having a series of jet-nozzles *f* maintained so that the

nozzles will enter the fire-tubes, as is usual in flue-cleaners of this character.

The steam-boiler has the usual safety-valve G and a pipe H for supplying steam to engines, and to this pipe H or to the boiler there is attached a pipe having connected therewith a safety-valve F, said safety-valve being set in practice to open at a lower pressure than the main safety-valve G. The safety-valve F is provided with means for manually opening the same to admit steam to the flue-cleaners when the pressure in the boiler has not reached a point which will open the main safety-valve G.

By means of the construction shown when steam is admitted to the pipe E′ either by the automatic or the manual operation of the valve F steam is discharged from the pipes D and F′ in the same direction as the draft to cleanse the flue and tubes, the soot and deposits being blown from the flue and tubes into the chambers at the rear and front of the boiler.

Having thus set forth my invention, what I claim as new, and desire to secure by Letters Patent, is—

In combination with a steam-boiler, a steam-supply pipe having a safety-valve, a branch pipe in communication with the supply-pipe and provided with a safety or automatic valve which is set to admit steam under pressure to the branch pipe before the pressure in the boiler reaches the blow-off point of the main safety-valve, steam-ejectors connected to the branch pipe to direct steam in the direction of the draft and in line with the travel of the products of combustion, for the purpose of coöperating with the draft and cleansing the flues, substantially as shown.

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

JAMES W. NORTON.

Witnesses:

MARIE E. WETZEL,

BERTHA W. WETZEL.