

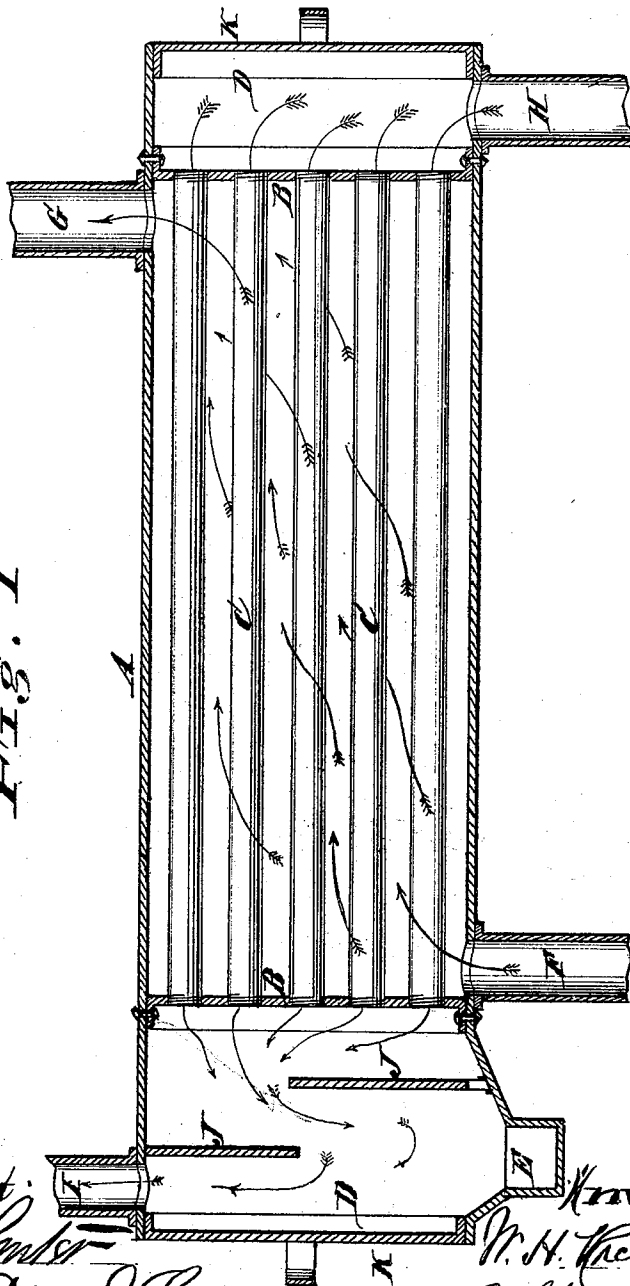
W. H. RICHARDSON.

SPARK-ARRESTER.

No. 171,865.

Patented Jan. 4, 1876.

Fig. 1



Attest.

Edgar J. Cross

Inventor.

W. H. Richardson
By F. Millward
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM H. RICHARDSON, OF CINCINNATI, OHIO.

IMPROVEMENT IN SPARK-ARRESTERS.

Specification forming part of Letters Patent No. **171,865**, dated January 4, 1876; application filed October 17, 1874.

To all whom it may concern:

Be it known that I, WILLIAM H. RICHARDSON, of Cincinnati, Hamilton county, State of Ohio, have invented certain new and useful Apparatus for Preventing the Escape of Smoke, &c., of which the following is a specification:

The object of my invention is to prevent the escape of heavy smoke, soot, cinders, &c., from fire-grates, furnaces, steam-boilers, &c.; and consists of an apparatus so constructed and operated that the heated gases which are made to pass through it are considerably and quickly cooled by surfaces exposed to a current of air, so as to cause the precipitation, catching, or lodging of the condensed carbon or other matter resulting from combustion in the interior of the apparatus, from whence it may be cleaned at any time.

The accompanying drawing is a vertical section of my apparatus.

A is a case or shell, having heads B, in which tubes C are fitted, chambers D being left at the ends for the reception and discharge of the products of combustion from the furnace or fire. E is a receptacle provided for the reception in bulk of the soot, &c., cleaned from the tubes or other parts of the apparatus, and such a receptacle may be placed at either or both ends of the apparatus, and doors or other devices may be applied to the ends of the receptacle for the removal of the matter collected.

In the operation of the apparatus cold air or other fluid is introduced at F, and by internal heating, by the presence of gases in the tubes, is made to rise, pass along the passages around the tubes, and to escape at the pipe G. The gases, &c., from the furnace or fire, to which the apparatus is attached, is introduced at H, and, after its passage through the tubes C, is permitted to escape at I.

It will be seen that the current of gases is in the reverse direction to the current of air, and for this reason the gases are considerably cooled in a short length of tube, the gases leaving the tubes at a point where the air is coolest; but it is obvious that a great portion of the advantages resulting from my apparatus may be attained when the air is introduced, so as to follow the same direction as the current of gases.

In the operation of the apparatus applied to a fire or furnace, the gases, as they enter at pipe H, contain vapors emitted from the coal, the partial condensation of which must result in the precipitation of unconsumed carbon and other matter, and it is for the purpose of effecting such condensation and collection of precipitated matter that my apparatus is designed, and by the current of air or other fluid, as described, this condensation is so effected that the matter to be collected is precipitated upon the interior of the tubes, from whence it may be removed as often as may be necessary.

In order to create eddies at one or both ends of the apparatus, which will cause a collection or catching of floating matter not liable to be precipitated by the condensation of vapors, I provide diaphragms J in reverse directions, and these act to produce the effect (the collection) desired.

Doors K are provided, by the removal of which the tubes C and other parts of the apparatus may be exposed for cleaning purposes.

The air enters at the bottom of the precipitator at one end, and escapes at the top from the other end, a natural flow of air through the precipitator being thus provided for.

In this respect it is broadly distinguishable from feed-water heaters constructed somewhat after the plan hereinbefore described, in which the water is introduced at the top and discharged from the bottom. It also differs from such feed-water heaters in having both the induction and eduction pipes communicating openly with the atmosphere.

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

The combination, substantially as specified, of the multi-flue smoke-conductor, the air-induction and air-eduction pipes, both communicating with the atmosphere, and arranged to admit of a natural circulation of air through the smoke-conductor, and deflecting-diaphragms at one or both ends of the latter.

In testimony of which invention I hereunto set my hand.

WILLIAM H. RICHARDSON.

Witnesses:

EDGAR J. GROSS,
J. L. WARTMANN.