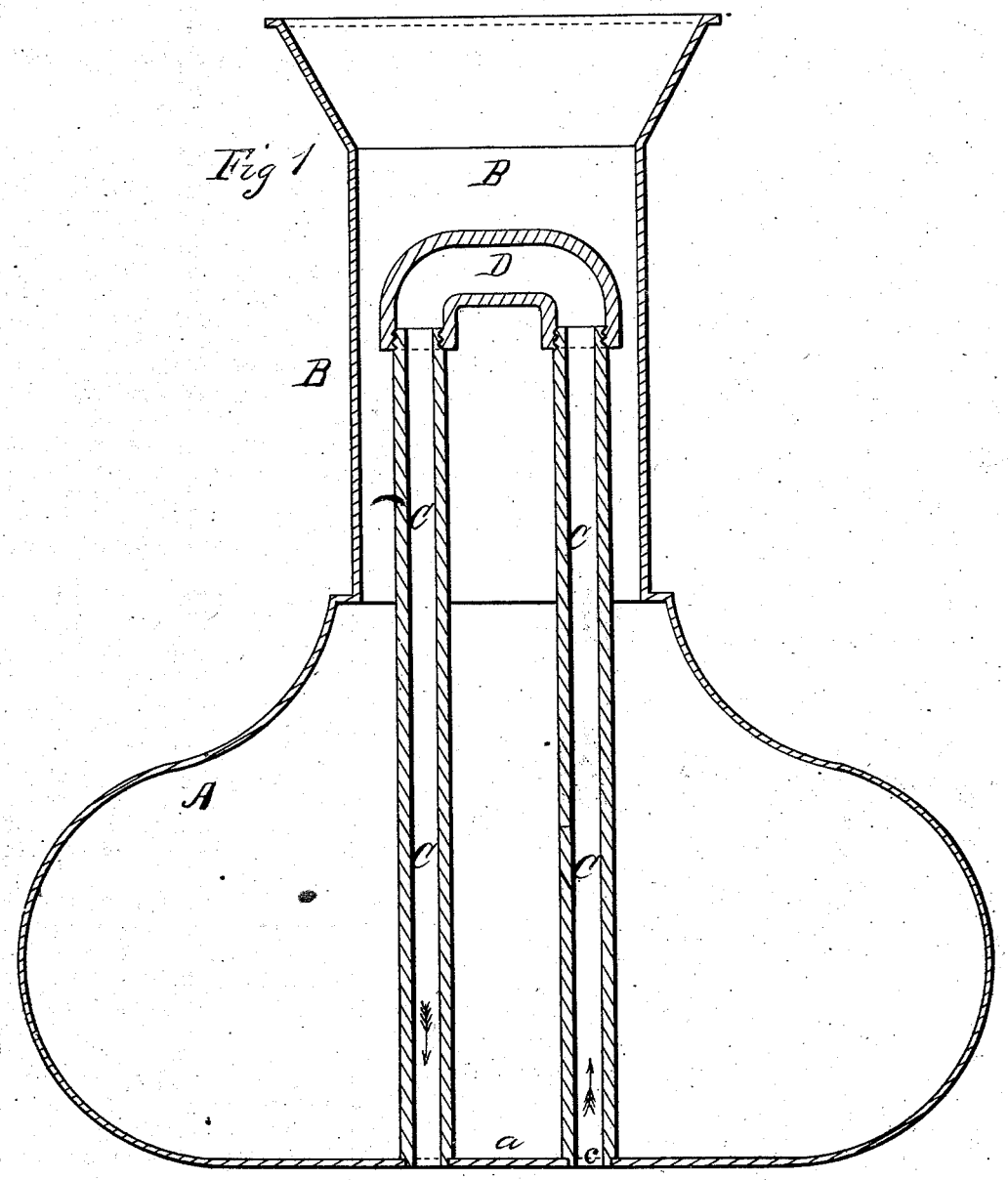
T. B. FIELD.

Smoke-Stack Heater-Pipe.

No. 161,108 Patented March 23, 1875.

Fig 1



WITNESSES

Mary S. Utley.

F. J. Masi

INVENTOR

Thomas B. Field

Chipman Hosmer & Co.

ATTORNEYS

THE GRAPHIC CO. PHOTO-LITH, 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

THOMAS B. FIELD, OF CORNING, NEW YORK.

IMPROVEMENT IN SMOKE-STACK HEATER-PIPES.

Specification forming part of Letters Patent No. **161,108**, dated March 23, 1875; application filed November 7, 1874.

To all whom it may concern:

Be it known that I, THOMAS B. FIELD, of Corning, in the county of Steuben and State of New York, have invented a new and valuable Improvement in Smoke-Stack Heater-Pipes; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

The drawing is a representation of a vertical central section of my heater.

This invention has relation to means for heating rooms, or the passenger-coaches of a railroad, by utilizing the heat and products of combustion after they have served their original purpose for heating air or water in a chamber situated within the smoke-box of a stationary or locomotive boiler; and the nature of the invention consists in pipes vertically arranged in the smoke-box of a boiler, and extending to the upper portion of the smoke-stack, the ends of the said pipes being connected by elbows, whereby air or water forced into the said heating-pipes will be exposed to the intense heat at the lower part of the smoke-box in ascending, and again in descending, the pipes thereby obtaining a very great degree of heating power for the contents thereof, as will be hereinafter more fully explained.

The chamber into which the products of combustion enter from the boiler-flues has a temperature much greater than that of the smoke-stack, and it is the object of my invention to obtain all the advantage of this increased heat, by arranging the heat-conducting pipes in connected pairs, to make their circuit in the smoke-stack directly within the flue-chamber, in order that both the induction and eduction branches of the heat-conducting pipes shall enter and leave the flue-chamber below its hottest portion, and receive thereby the double action of the currents of heat pouring from the boiler-flues, and by this means obtain a high degree of heat, which is so necessary in its subsequent passage through exposed pipes to the apartments to be warmed, especially railway-cars.

The state of the art shows that a pipe has been arranged in the flue-chamber entering at the bottom thereof, and passing up in spiral form round the interior of the smoke-stack of a locomotive, and passing out of the smoke-stack at its base and along the outside of the boiler to the heat-conducting pipes. But it is obvious that under such an arrangement no double action of the heat of the flue-chamber can be obtained, and that there is very considerable loss of heat in the exit of the conducting-pipe at the base of the smoke-stack; whereas, by the improvement claimed herein, the greatest possible heat is obtained by the smoke-pipe crossing the boiler-flue openings in passing into and out of the smoke-stack.

In the annexed drawings, A designates a smoke-box, and B the smoke-stack, of a stationary or locomotive boiler, in which only as many pipes C as are necessary to my invention are vertically arranged, as shown in Fig. 1, extending from the floor *a* of the smoke-box nearly to the top of the stack. These pipes pass through the floor of the smoke-box, and are extended into the apartment or cars which are designed to be heated, and their upper ends are connected by a tubular elbow, D.

The improved heating apparatus thus described is used in the following manner: Cold air is forced in a continuous current through the induction end *c* of these pipes by means of a blower in the apartment, and is subjected to intense heat at the lower part of the said pipes as it is forced upward. In its progress to the upper end of the pipe, it is also still further heated by hot air and products of combustion passing out of the smoke-stack to the open air, and, while also acted upon in its descent, is raised to a very high temperature by being again passed through the currents escaping from the furnace before issuing from the lower end of the said pipe into the apartment.

In this manner, air which has been withdrawn from the apartment in a cold condition is returned highly heated. When water is used for heating, a pump will be employed instead of a blower.

While using a single pair of coupled pipes, as shown in the drawings, I may in practice

employ a greater number when necessary, in which case each pair will be connected with the next by an elbow, alternately at top and bottom, forming a continuous connection, through which air and water will be forced, as above described, and with the same useful result. I shall also, when using water as the heating medium, use a check-valve, to prevent regurgitation thereof, and a safety-valve, to prevent explosions of the pipes.

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

In a heater in which the waste heat of the smoke box and stack of a steam-boiler is utilized for heating air or water, the pipes C, combined therewith and arranged in pairs, as described, to enter and leave the smoke-box below the impinging currents of heat from the furnace, whereby the fluid to be heated is caused to pass twice through that portion of the smoke-box at which the heat enters from the furnace, and obtain thereby the full benefit of the heat upon said entering and exit pipes, as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

THOMAS B. FIELD.

Witnesses:
J. S. ROBINSON,
D. F. BROWN.