T. B. FIELD.

Smoke-Stack Heating-Apparatus.

No. 169,093. Patented Oct. 26, 1875.

FIG I

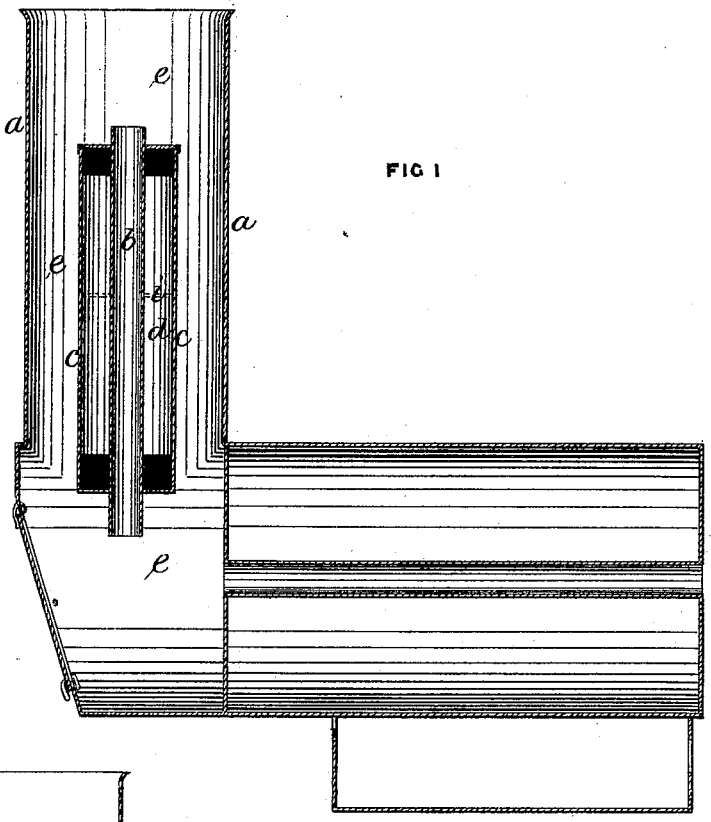


FIG IV

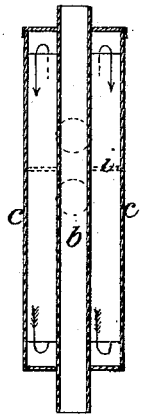


FIG III

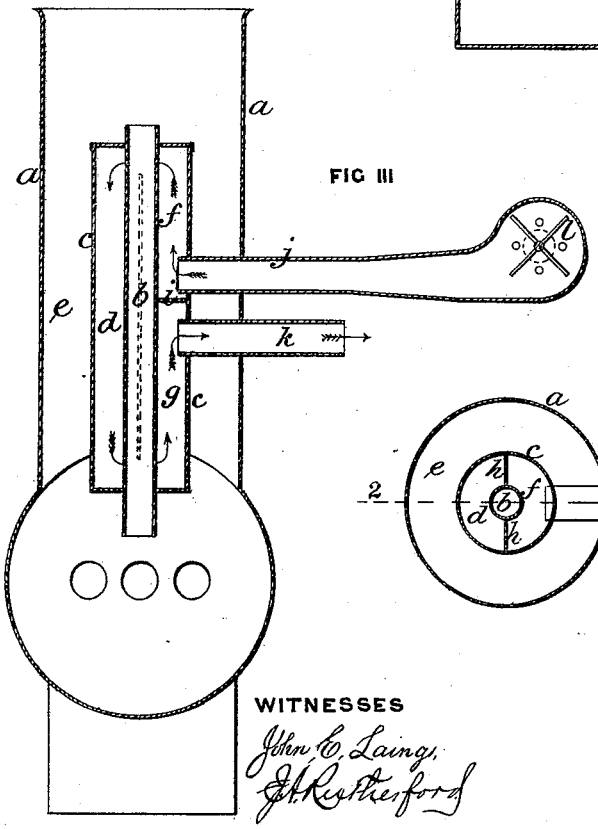
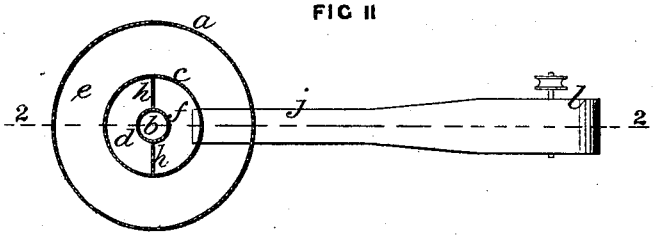


FIG II



WITNESSES

John C. Laing.
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UNITED STATES PATENT OFFICE.

THOMAS B. FIELD, OF CORNING, NEW YORK, ASSIGNOR TO MARY E. C. FIELD, OF SAME PLACE.

IMPROVEMENT IN SMOKE-STACK HEATING APPARATUS.

Specification forming part of Letters Patent No. **169,093**, dated October 26, 1875; application filed April 5, 1875.

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 certain new and useful Improvements in Smoke-Stack Heating Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates, primarily, to heating air for factory purposes and dry kilns, but is applicable also to heating water and superheating or drying steam.

The general objects of the invention are to utilize the heat of the escaping products of combustion in the smoke-stacks and smoke-boxes of stationary furnaces for the purpose above named, and to insure the circulation of a forced current or blast of air or other fluid, in such manner as to cause it to absorb the greatest amount of heat possible in passing through apparatus of given dimensions.

The invention consists in the combination, with a heating-drum of small diameter, arranged within the stack or smoke-box of a stationary furnace, of one or more longitudinal pipes, open at both ends, and one or more longitudinal flues and longitudinal and transverse partitions, to form three or more compartments between the inner and outer heating-walls of the drum, and communicating with induction and eduction pipes, whereby a circulation of the air-currents of the chamber is produced both upward and downward in contact with both inner and outer highly-heated walls directly within the flue through which the products of combustion pass.

In the accompanying drawings, Figure 1 represents a vertical longitudinal section of a steam-boiler furnace, illustrating the application of my smoke-stack heating-drum; Fig. 2, a horizontal section of the smoke-stack and drum, and Fig. 3 a vertical transverse section on the line 2 2 of Fig. 2.

A hot-air drum, *c*, is arranged within the flue *e* of the smoke-stack *a*, and is of such diameter as to give ample room between the walls of the flue *e* and the hot-air drum, to obtain the full benefit of the escaping heat upon its outer shell-surface. With this interior drum I combine one or more interior longitudinal pipes, *b*, so as to obtain the full benefit of an interior heated surface or surfaces for the hot air drum, by causing the products of combustion to pass through the drum while enveloping the shell-surface. In connection with the longitudinal pipes I also construct the drum with longitudinal flues *d f g*, and longitudinal and transverse partitions *h i*, in a manner to form three or more compartments within the drum, two of which, *f g*, being on one side of the central partition *h*, and formed by the half-circle partition *i*, and communicating at top and bottom with the flue *d*, which extends the whole length of the drum.

The induction and eduction pipes *j k* enter the flues *f g* on opposite sides of the transverse partition *i*, and the air or water is caused by said partition to rise in the flue or compartment *f*, and, descending the flue *d*, rises in the compartment *g*, which communicates with the eduction-pipe *k*, and is conveyed to the point where needed. A blower, *l*, is combined with the induction-pipe *j*, to force the air at high speed through the same.

Water can be forced into and heated in the drum-chamber by using a pump, check-valve, steam-gage, and safety-valve.

The induction and eduction pipes may be placed at a higher or lower point in the stack or chimney at pleasure, but the transverse partition must be located between them.

The heating-drum can be arranged in the smoke-box, or partly in the smoke-box and the smoke-stack or chimney, or in smoke-stack or chimney.

The air can be entered at the top and pass out at the bottom of the stack, or it may be received from the bottom and pass out from the top.

The device is equally applicable to stove-pipes for heating rooms.

I claim—

The smoke-stack or chimney-heating drum *c*,

provided with one or more longitudinal pipes, *b*, and constructed with longitudinal flues *d f g*, and longitudinal and transverse partitions *h i*, to form three or more compartments between the inner and outer heating-walls of the drum, and communicating with induction and eduction pipes, as and for purpose set forth.

In testimony that I claim the foregoing as my own I have affixed my signature in presence of two witnesses.

THOMAS B. FIELD.

Witnesses:

CYRUS S. HOOD,

ED. HOOD.