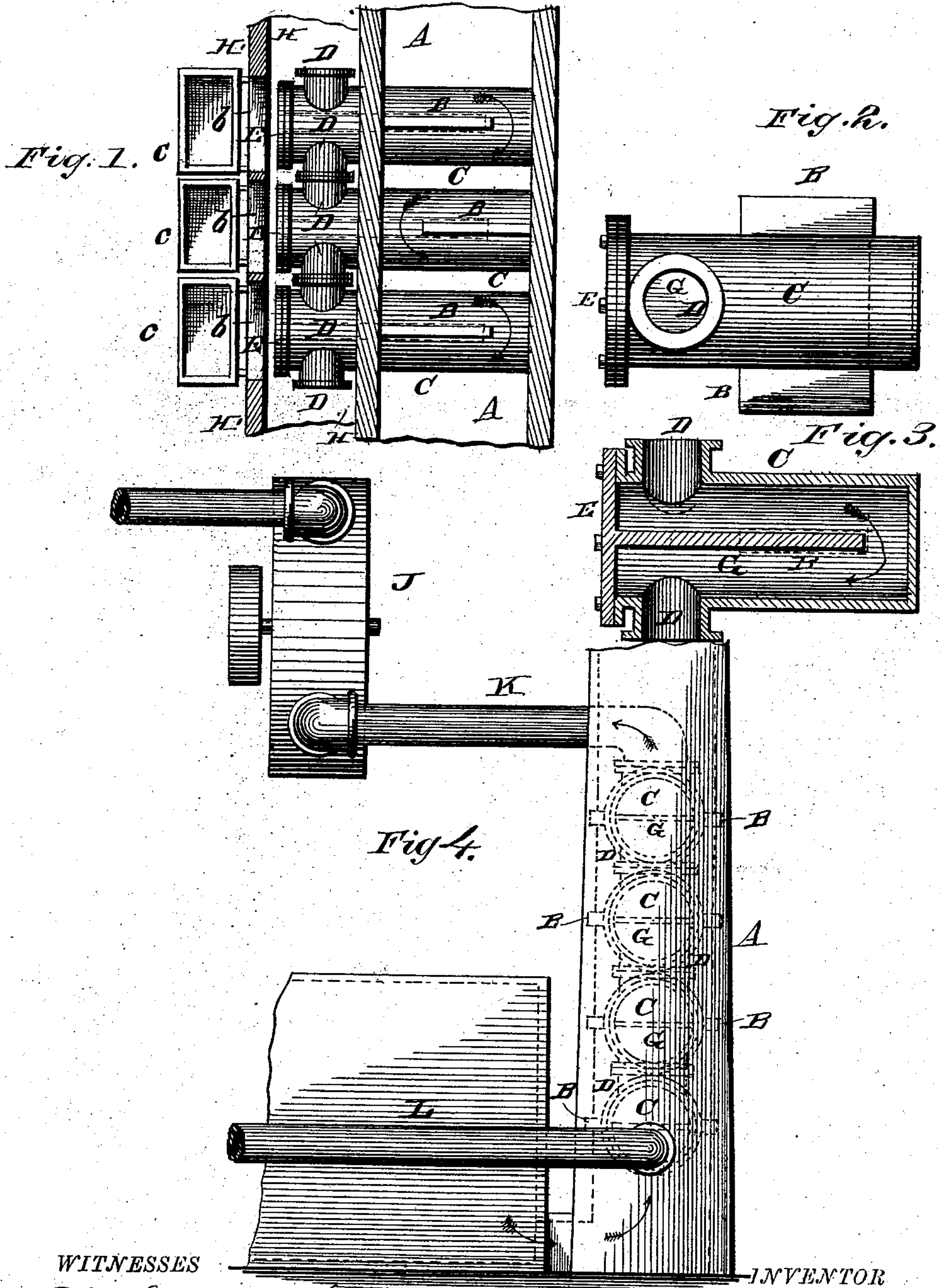


(No Model.)

V. W. BLANCHARD.
AIR HEATER FOR FURNACES.

No. 290,172.

Patented Dec. 11, 1883.



WITNESSES

Phil. J. Dietrich,
D. R. Cowl

INVENTOR

Virgil W. Blanchard,
By: Alexander
Attorney

UNITED STATES PATENT OFFICE.

VIRGIL W. BLANCHARD, OF NEW YORK, N. Y.

AIR-HEATER FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 290,172, dated December 11, 1883.

Application filed November 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, VIRGIL W. BLANCHARD, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Air-Heaters for Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification, in which—

Figure 1 is a central vertical section of a chimney having my improvement applied to it. Fig. 2 is a top view of one of the heaters. Fig. 3 is a vertical diametrical section through Fig. 2; and Fig. 4 is a side elevation of a chimney, an air-engine, and part of a furnace.

This invention relates to means for heating air to be supplied to furnaces for the purpose of increasing combustion therein; and it consists in a chimney which is provided with air-heaters which are constructed with exterior wings and removable diaphragms, and in a series of cylinders having exterior webs and interior diaphragms, whereby air can be forced downwardly in a zigzag course, while at the same time the heated products of combustion are compelled to take an upward zigzag (or serpentine) course about the heaters in the chimney.

Before describing my invention, I will state that I have partly described the same in an application for Letters Patent, which was allowed on the 5th day of October, 1883, and numbered 78,978.

The chimney A communicates at its base with furnace, up through which the heated products of combustion are allowed to pass, and these heated products are caused to take a serpentine course in their upward flight by reason of the flanges, wings, or ribs B, which are formed on the exterior sides of cylinders C. I have represented a number of cylinders inside of the uptake or chimney A, arranged horizontally, each cylinder being connected with its fellow by a pipe, D, and also provided with a cap, E, which is removable by loosening the nuts on the bolts *a*. Each cylinder is also provided with a diaphragm, G, attached to its respective head or cap E. I show an exterior dead-air space, H, outside of the chim-

ney proper, in which the ends or heads of the air-heaters are inclosed, and I also show in the annexed drawings a wall, H', through which are openings *b*, provided with doors *c*, for the purpose of affording convenient access to the heads of the air-heaters for the removal of the diaphragms when it is necessary to do so.

J designates an air-forcing engine, which may be the well-known rotary blower, or it may be constructed in any suitable manner. This air-forcing engine communicates with the topmost air-heater by means of a pipe, K, and the lowermost air-heater communicates with a furnace by means of a pipe, L.

Now, it will be observed from the above description that the ascending products of combustion take a zigzag course about the several heaters in the chimney A, while the descending air is caused to circulate through the several heaters in a similar course by reason of the diaphragms therein, which latter touch the alternate ends of the cylinders.

It will also be observed that the front ends of the air-heaters are in a dead-air chamber, and that the rear portions thereof are in the chimney subjected to the heat rising through this chimney, and also that the air-heaters are free to expand and contract, because they are sustained in position only at one end, the opposite end being free.

Having described my invention, I claim—

1. The combination, with a chimney or uptake, of air-heaters arranged therein having external flanges or wings for causing a serpentine deflection of course of the ascending currents of heat, and diaphragms in said air-heaters arranged to cause a serpentine course of the descending currents of air, substantially as described.

2. The combination of removable diaphragms with air-heaters, constructed substantially as shown, arranged in a chimney substantially as described.

3. The combination of diaphragms and flanged or ribbed air-heaters with a chimney or uptake, substantially as described.

4. The combination of an air-forcing engine with air-heaters provided with external flanges and internal diaphragms, a chimney, and an outlet at the lowest air-heater, substantially as described.

5. The combination of a chimney, having a dead-air space, with air-heaters and apertures for the removal of the heads of said heaters, substantially as described.

6. An air-heater consisting of a cylinder or bod externally flanged, and a head having a diaphragm applied to it, substantially as described

7. The combination of one or more air-heaters, flanged as described, a removable diaphragm, a chimney in which the air-heaters are arranged, a dead-air space outside of the chimney proper, and apertures through the outer wall of said dead-air space, provided with doors, substantially as described.

8. The combination of an air-heating vessel, having external flanges or ribs, with a head for this vessel, having a diaphragm applied to it, a chimney, and a dead-air space, and the intermediate wall for sustaining the said vessel, substantially as described.

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

VIRGIL W. BLANCHARD.

Witnesses:

W. R. KEYWORTH,

F. O. McCLEARY.