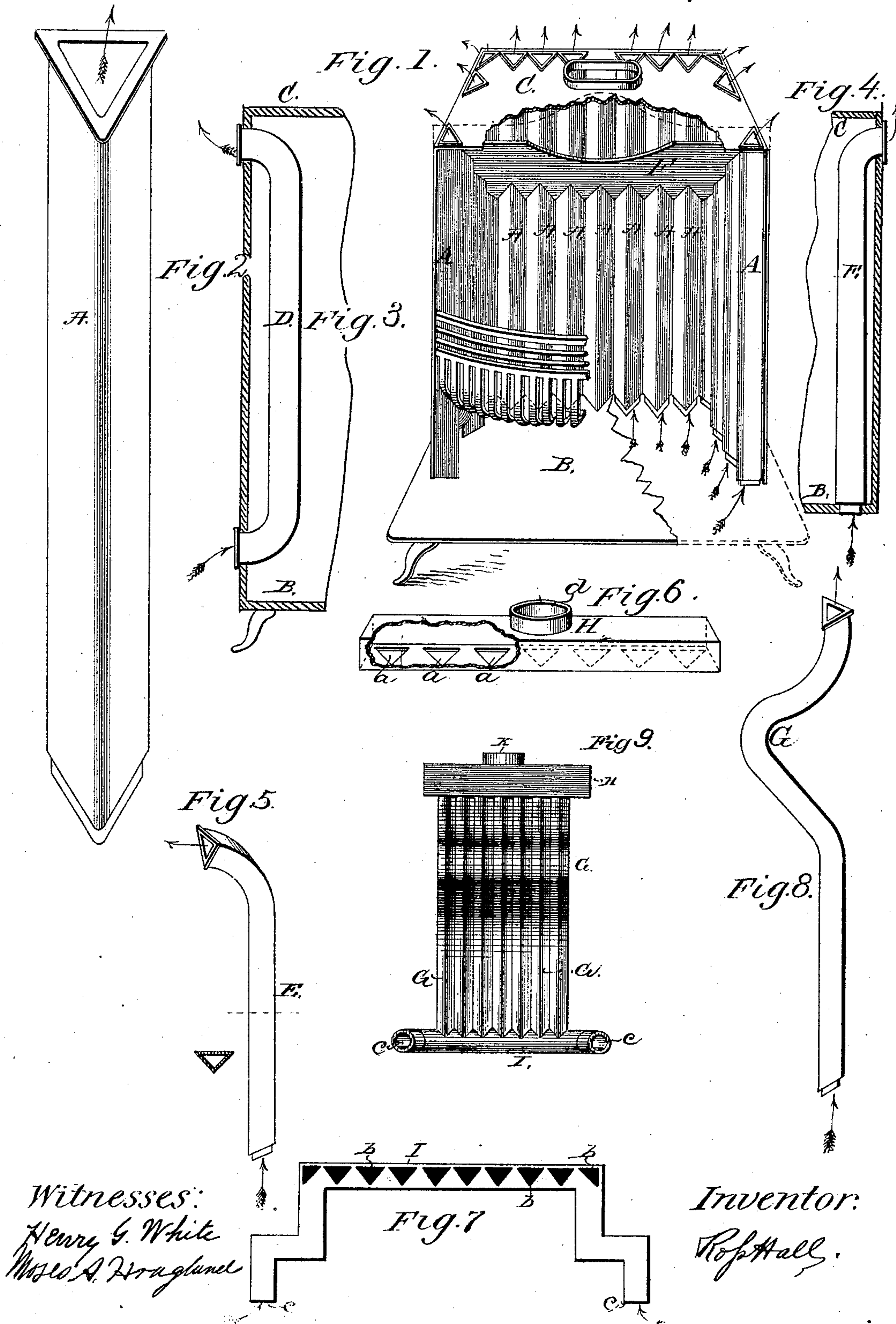


Heating Stove and Grate.

No. 232,263.

Patented Sept. 14, 1880.



UNITED STATES PATENT OFFICE.

ROSS HALL, OF MILLERSBURG, OHIO.

HEATING STOVE AND GRATE.

SPECIFICATION forming part of Letters Patent No. 232,263, dated September 14, 1880.

Application filed March 11, 1880. (Model.)

To all whom it may concern:

Be it known that I, ROSS HALL, of Millersburg, in the county of Holmes and State of Ohio, have invented a new and useful Improvement in Heating Stoves and Grates; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention is an improvement in the class of heating stoves and grates in which cylindrical pipes are employed to form the inner side walls of the same, the said pipes being open at the ends to allow air to enter and pass through them, and thereby become heated.

My invention consists, first, in forming the inner wall or walls of the fire chamber or space of a stove or grate of pipes, having in cross-section the form of a triangle, (preferably an equilateral triangle,) whereby I secure a greater heating-surface than is practicable with pipes of cylindrical or oval form.

It consists, secondly, in the construction and arrangement of horizontal and vertical tubes to form a skeleton-grate attachment, all as hereinafter described.

In accompanying drawings, Figure 1 is a perspective view of a stove constructed according to my invention, a portion of the top and bottom plates being broken out. Fig. 2 is a perspective view of one of the triangular air-heating pipes or tubes detached and shown enlarged. Fig. 3 is a side view of a pipe having both ends curved. Fig. 4 is a side view, and Fig. 5 a perspective view, of a pipe curved at its upper end only. Figs. 6, 7, 8 represent parts of a fire-grate constructed according to my improved plan. Fig. 9 is a front view of said parts of a grate arranged and connected as required for use.

Referring to Fig. 1, the vertical back and sides of the open-front stove are formed exclusively of the open-ended tubes A, all of which are straight and have the form of an equilateral triangle in cross-section, and are also arranged in close contact, side by side, with one of their three angles inward and the opposite flat side outward. Thus the tubes form a vertically-ribbed wall, and have each two flat sides exposed to the fire. The superficial area of such sides is greater in the aggregate than the like area of one side of a round or oval pipe which is of the same diam-

eter or width as one of said flat sides. In other words, the heating-surface of triangular tubes is much greater than that of an equal number of round or oval tubes.

It is obvious that a correspondingly greater degree of heat will be imparted in a given time to air passing through the triangular pipes; or, what is the same thing, a larger volume of air will pass through them and become heated in a given time than could be effected by use of round or oval pipes. Besides this, clinkers will adhere less firmly in the angles and to the flat sides of the triangular pipes than to round or oval pipes.

The straight tubes A are reduced or shouldered at the lower end and enlarged or provided with a lateral flange at the upper end. Their lower ends enter sockets in the bottom plate, B, of the stove, and their flanged heads rest on the top plate, C, as shown in Fig. 1.

I show in Fig. 3 a tube, D, having curved and flanged ends, which will, in practice, pass through suitable openings in the back and side plates of the stove.

In Figs. 4 and 5 I show a pipe, E, curved at the upper end only, and obviously in such case the lower end will pass through or be socketed in the bottom plate, B, while the upper end will pass through the back or side plate.

In Figs. 6, 7, 8, 9 I show a modified construction, constituting what may be termed a "skeleton-grate attachment."

The top portion, H, is a rectangular oblong tube having triangular openings *a* in its under side. The lower portion, I, is an angular pipe whose longer side has triangular openings *b*, corresponding in number to those in the tube H. The curved tubes G are triangular in cross-section, and its respective ends are fitted in the openings *a b* of the upper and lower tubes H I, as shown in Fig. 9. Thus arranged, the parts G H I form an air-heating attachment for a grate, the air entering the open ends *c* of tube I, passing up the tubes G, and escaping through opening *d* of tube H into a pipe, (not shown,) by which they are conveyed into an apartment required to be heated.

The ends of tube I may be extended through the walls of a room or house so as to take in fresh air.

The pipes G are bent forward to form a breast or inclined deflecting-surface, so that the plate F (shown in Fig. 1) may be dispensed with.

5 The construction and arrangement of parts shown in Fig. 1 is better adapted for open-front stoves, while that shown in Fig. 9 is designed as an attachment for a grate proper.

What I claim is—

10 1. A stove or grate having an inner wall of its fire-space formed of tubes which are triangular in cross-section, and arranged, as

shown, with one of their flat sides parallel to the back of the stove or grate, as and for the purpose specified.

2. The combination of the bent triangular tubes G, arranged as shown, with the top and bottom tubes, H I, having, respectively, openings *a b* for escape and admission of air, as specified.

15

ROSS HALL.

Witnesses:

H. G. WHITE,
MOSES A. HOAGLAND.