(No Model.)

2 Sheets—Sheet 1.

C. J. M. HAŸNA.

STEAM BOILER.

No. 369,448. Patented Sept. 6, 1887.

Fig. 2.

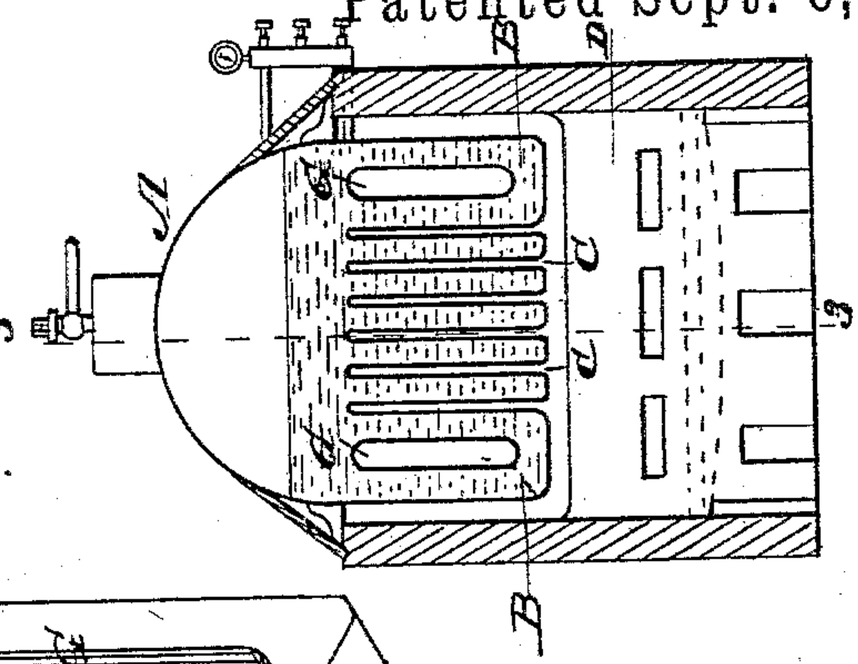
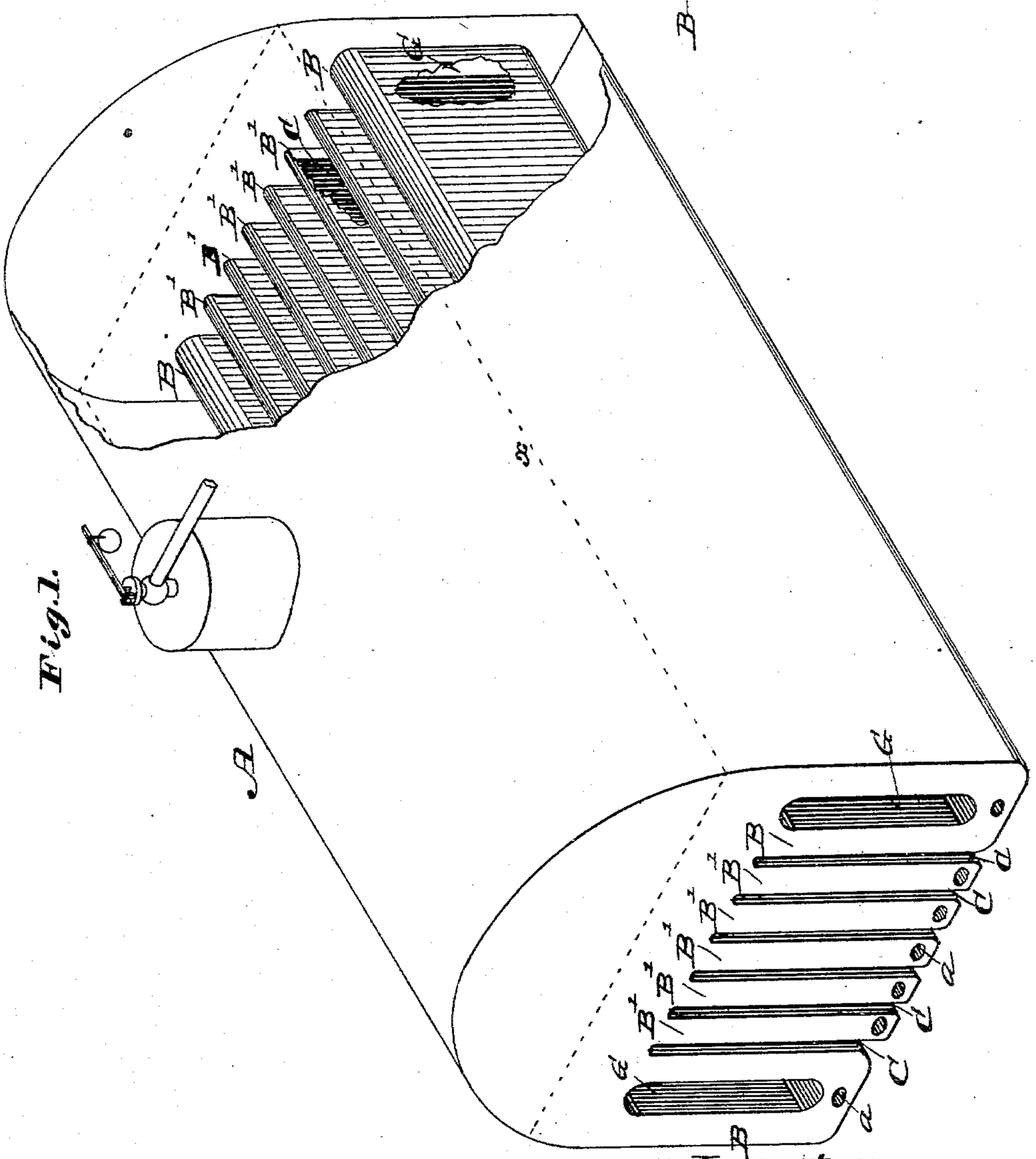


Fig. 1.



Witnesses:
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

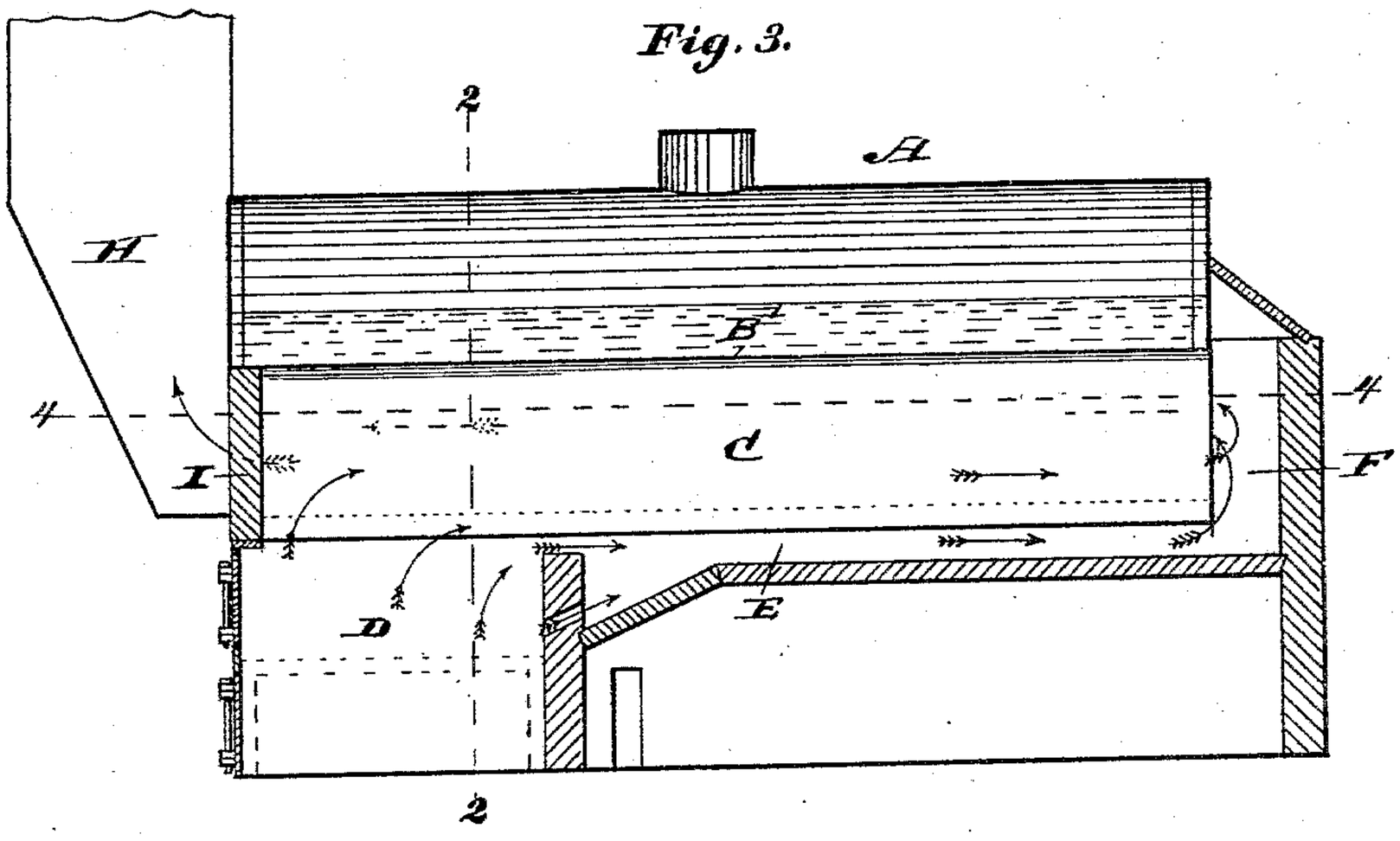
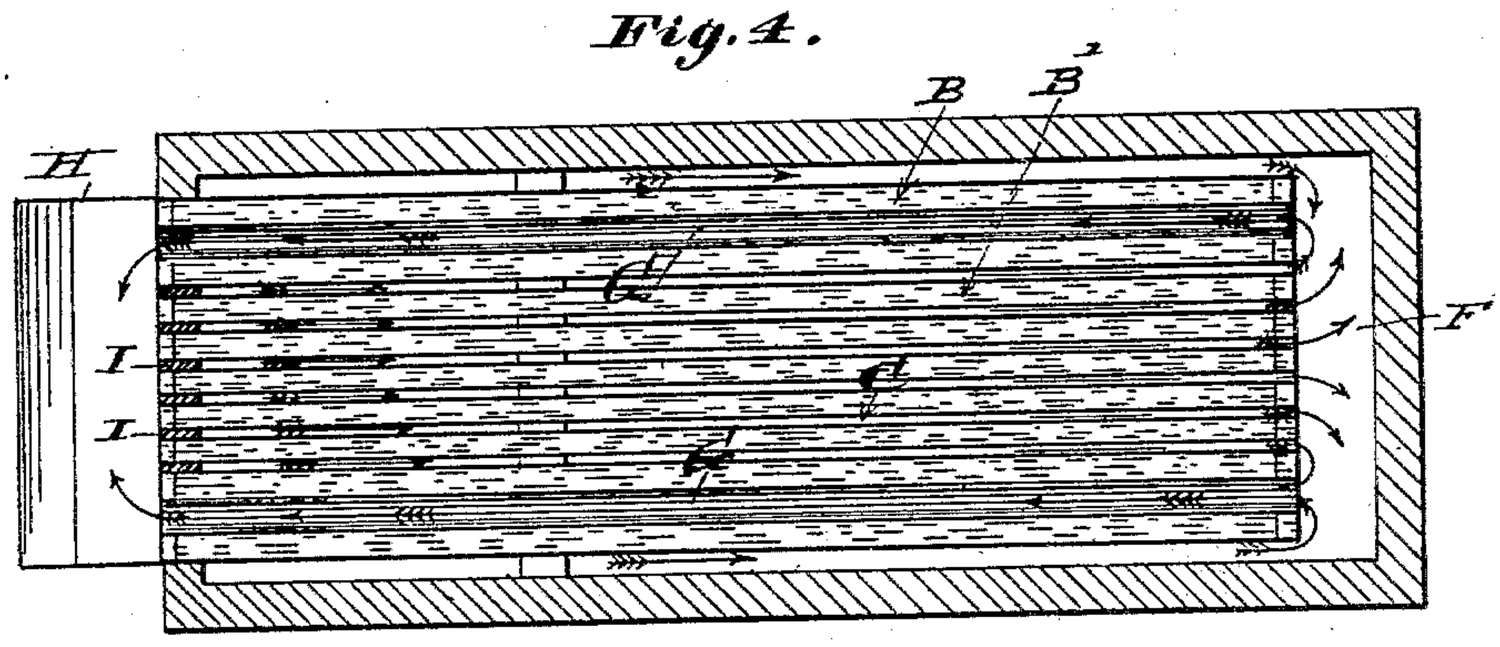


Fig. 4.



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UNITED STATES PATENT OFFICE.

CLEMENTINA J. M. HAŸNA, OF ST. LOUIS, MISSOURI.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 369,448, dated September 6, 1887.

Application filed October 7, 1886. Serial No. 215,565. (No model.)

To all whom it may concern:

Be it known that I, CLEMENTINA J. M. HAŸNA, of St. Louis, Missouri, have made a new and useful Improvement in Steam-Boilers, of which the following is a full, clear, and exact description.

The improvement relates to the construction of the lower portion of the boiler, by means whereof the heating-surface of the boiler is increased, its safety promoted, and the fuel consumed to better advantage.

It consists in shaping the shell of the boiler so as to form one or more flues extending in the bottom of the boiler from above the fire-place of the boiler to the farther end of the boiler, and being open at the bottom to admit the heat-current and the products of combustion from the fire-place, and also from the customary flue leading from the fire-place beneath the boiler, which current and products, after reaching the farther end of the boiler, are directed into return-flues in the boiler, and thence into the uptake, substantially as is represented in the annexed drawings, making part of this specification, in which—

Figure 1 is a view in perspective of the improved boiler, the shell being broken away to exhibit the interior. Fig. 2 is a vertical cross-section on the line 2 2 of Fig. 3. Fig. 3 is a vertical longitudinal section on the line 3 3 of Fig 2, and Fig. 4 is a horizontal section on the line 4 4 of Fig. 3.

The same letters of reference denote the same parts.

The boiler A, aside from its improved feature, may be constructed in the usual manner. Its lower portion, however, consists of what may be termed a "series of legs," B B B′, which extend throughout the length of the boiler, and which are spaced apart from each other to form flues C C, which extend longitudinally in the boiler and at the bottom open to the outer air, so that when the boiler is placed in position, as in Figs. 2, 3, 4, the heat and the products of combustion may pass from the fire-place D and the flue E upward into the flues C C, and, after traversing those flues, enter the flue-space F, which serves to direct the current into the return-flues G G, which are formed, respectively, at opposite sides of the series of flues C C in the outer legs, B B, respectively. The course of the products of combustion is then through the return-flues into the uptake H.

The flues C, by means of a suitable partition—say of fire-brick—I, Figs. 3, 4, are constructed to prevent a direct draft from the fire-place through the forward end of the flues C into the uptake H, and to cause the course to be, as stated, through the flues C and G, and as indicated by the arrows in Fig. 4.

Any number of flues C may be employed, and in height they may extend upward nearly to the water-line indicated by the broken line *x*, Fig. 1. It is manifest that the heating-surface of the boiler is largely increased by means of the flues C, and that these flues can be readily cleaned by reason of the flues being open at the bottom. The heat can also, for the same reason, pass upward into these flues throughout or substantially throughout the entire length of the flues. It is also apparent that the flues serve to render the lower portion of the boiler substantially sectional, and thereby to strengthen it. But an especial advantage derived from the flues C is the more perfect consumption of the fuel. The flues afford numerous spaces, into which the partially-consumed fuel, together with a suitable quantity of air, can pass and be more thoroughly burned than if the escape from the fire-place were solely through the flue E beneath the boiler. To this end the air may, in any desirable quantity, be admitted into the flues C, and at any point or points along the length of the flues.

The improvement is not confined to stationary boilers, as it can be applied to locomotive-boilers. Nor is any special form of fire-place essential to the operation of the improvement. The construction exhibited in the drawings is considered, however, a desirable one for attaining the improved results described. There may be hand-holes *a*, Fig. 1, for the purpose of reaching the interior of the legs B B′. The covers and fastenings for these hand-holes are not shown in the drawings.

So far as the flues C by themselves are concerned, they need not necessarily be extended in a longitudinal direction in the boiler, provided always they are open at the bottom to admit the heat.

I am aware of Patent No. 13,761, and do not claim what is shown therein, as the structure of my device differs essentially from what is found in that.

I claim—

1. In combination with the open-bottom flues C, the fire-brick I, which stops the forward ends of such flues, and the side return-flues in the legs B B, substantially as described.

2. In combination with the fire-place D and flue E, the open-bottom flues C, fire-brick I, the side flues, G, and the uptake H, substantially as and in the manner set forth.

CLEMENTINA J. M. HAŸNA.

Witnesses:
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B. F. RIX.