S. W. MORGAN.

HEATING-FURNACE.

No. 191,069. Patented May 22, 1877.

Fig. 1

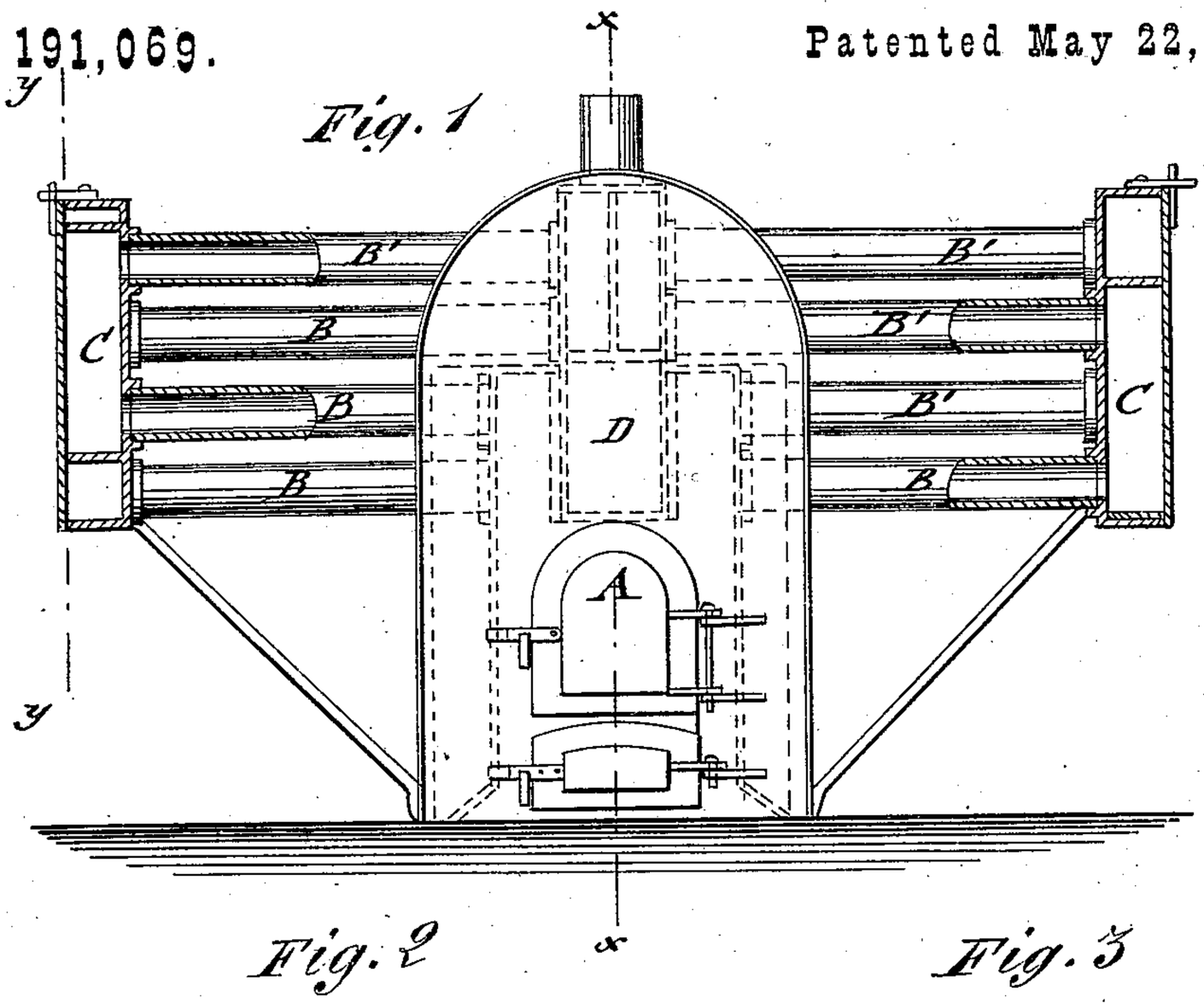


Fig. 2

Fig. 3

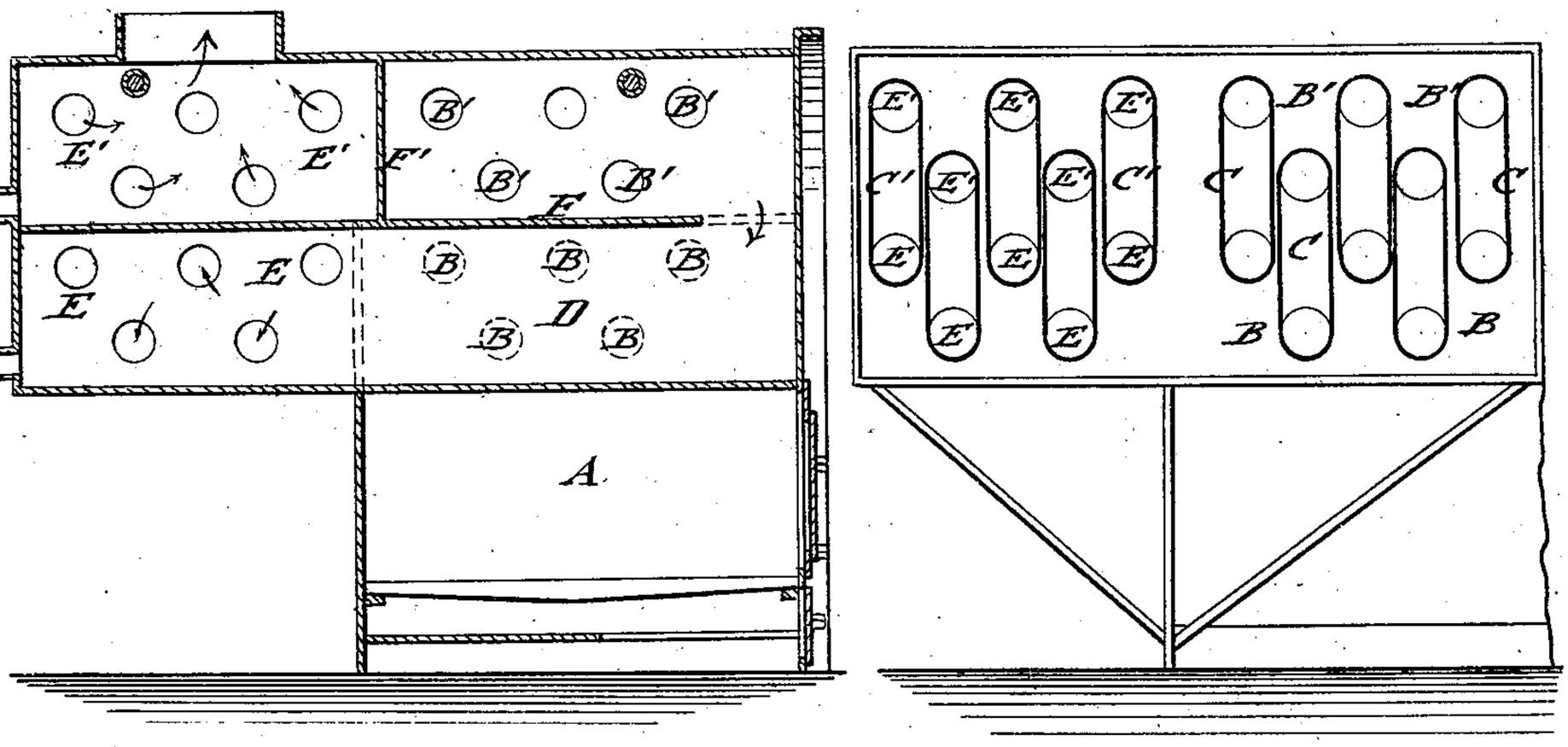
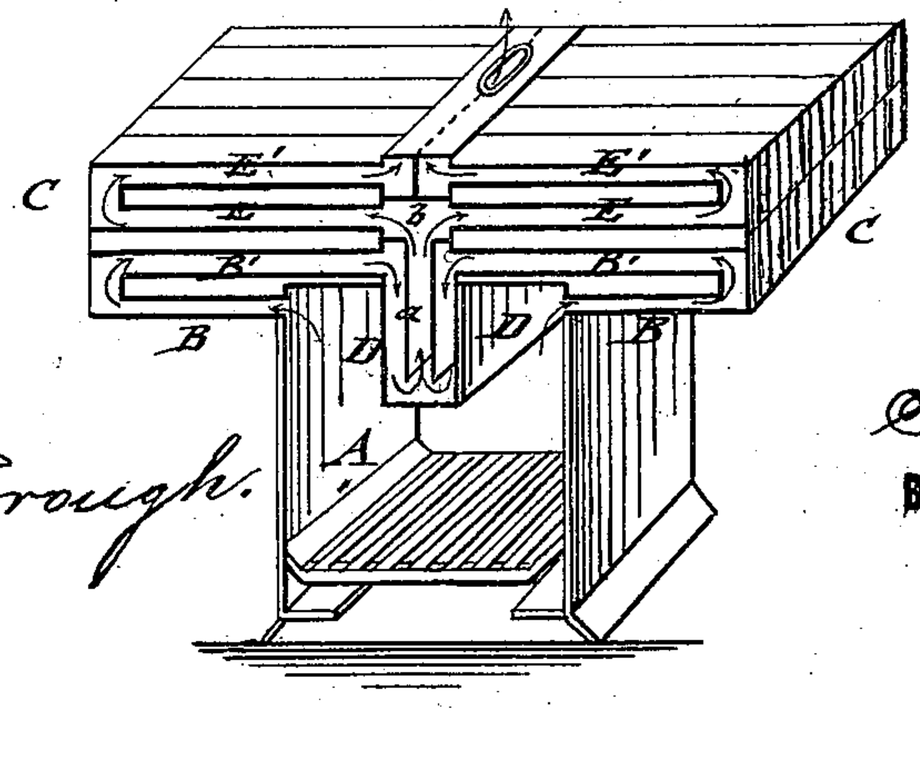


Fig. 4



WITNESSES:

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UNITED STATES PATENT OFFICE.

STEPHEN W. MORGAN, OF WINONA, MINNESOTA.

IMPROVEMENT IN HEATING-FURNACES.

Specification forming part of Letters Patent No. **191,069**, dated May 22, 1877; application filed April 16, 1877.

To all whom it may concern:

Be it known that I, STEPHEN W. MORGAN, of Winona, in the county of Winona and State of Minnesota, have invented a new and Improved Heating-Furnace, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a front elevation, partly in section, of my improved heating-furnace. Figs. 2 and 3 are vertical longitudinal sections of the same, respectively on line *x x* and *y y*, Fig. 1; and Fig. 4 is a perspective view of a modified form of my heating-furnace.

Similar letters of reference indicate corresponding parts.

The invention relates to improvements in heating-furnaces, by which the radiating-surface is increased, while it is made more compact in size and lower in height, so as to be put up in any place. The furnace saves fuel by means of reheating the smoke and passing the same again through a series of radiating-pipes or drum. The pipes are so arranged as to be cleaned with great facility, and furnish an effective and economical heater.

The invention consists, mainly, of a fire-box with a system of horizontal pipes extending therefrom, and returning to a reheating-box placed centrally in the fire, the gases of combustion being there reheated and conducted through a second system of heating-pipes, and finally out to the chimney.

In the drawing, A represents the fire-box, from which extend at both sides, in symmetrical manner, a number of horizontal pipes, B, that are connected by communicating heads C with a corresponding number of pipes, B′, that communicate with a reheating-box, D, of any suitable shape, placed centrally in the fire-box A.

The smoke and gases of combustion radiate the heat in their passages through the exit and return-pipes, and are then exposed again in the central reheating-box D to a high temperature, so as to be reheated and passed from the central box to a second series of heat-radiating pipes, E E′, which may be either arranged back of the primary system of heating-pipes, as shown in Figs. 1, 2, and 3, or, preferably, above the same, as shown in Fig. 4, so as to give the entire heating-surface a more compact shape, without, however, increasing its height to such an extent as not to be put up in any basement or other place of small height.

When the supplementary system of heating-pipes is placed back of the primary system, the gases of combustion pass from the return-pipes B′, along a horizontal partition, F, to the open front part of the same, and then down through the same into the central box D, and then backward along the lower part thereof to the heating-pipes E, which extend in similar manner as the primary front pipes at both sides of the central box D, and return the smoke, through double elbows C′ and upper tubes E′, to the upper part of the box D, which is separated by a lateral partition-wall, F, from the upper front part.

When the supplementary heating-pipes are arranged on the top of the primary system, the gases of combustion pass first through the lower pipes B B′, and then downward along vertical deflecting-plates *a* to the lower part of the box, being reheated in their downward passage, and then conducted in the space between the vertical plates in upward direction to enter the supplementary pipes E, which are connected by a horizontal partition, *b*, the reheated smoke passing then through the return-pipes E′ to a central space above, and out through the chimney. The reheating of the smoke in the central box increases the draft, and utilizes a greater percentage of the heat of the fuel than when they are conducted directly through radiating-pipes to the chimney.

The pipes or double elbows C C′ of the pipes B B′ and E E′ are so arranged that the closing-plates can be taken off for removing the soot, the central reheating-box being also so arranged that the same may be taken out when burned out and replaced by a new box.

The gases of combustion are reheated without requiring any more fuel, serving thus to heat up a double radiating-surface in an economical manner, and furnishing a compact and efficacious heating-furnace.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a fire-box having

a number of primary radiating-pipes extending at both sides therefrom, of a smoke-reheating box at the interior of the fire-box, and of a supplementary series of heating-pipes back of or above the primary pipes, substantially in the manner and for the purpose set forth.

2. The combination of fire-box A, primary pipes B B′, connected by pipes C′, central reheating-box D, having conducting or deflecting partitions, and supplementary exit-pipes E E′, substantially in the manner and for the purpose set forth.

STEPHEN W. MORGAN.

Witnesses:
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