(No Model.)

Z. B. CHURCH.

BOILER FURNACE.

No. 308,652. Patented Dec. 2, 1884.

Fig. 1

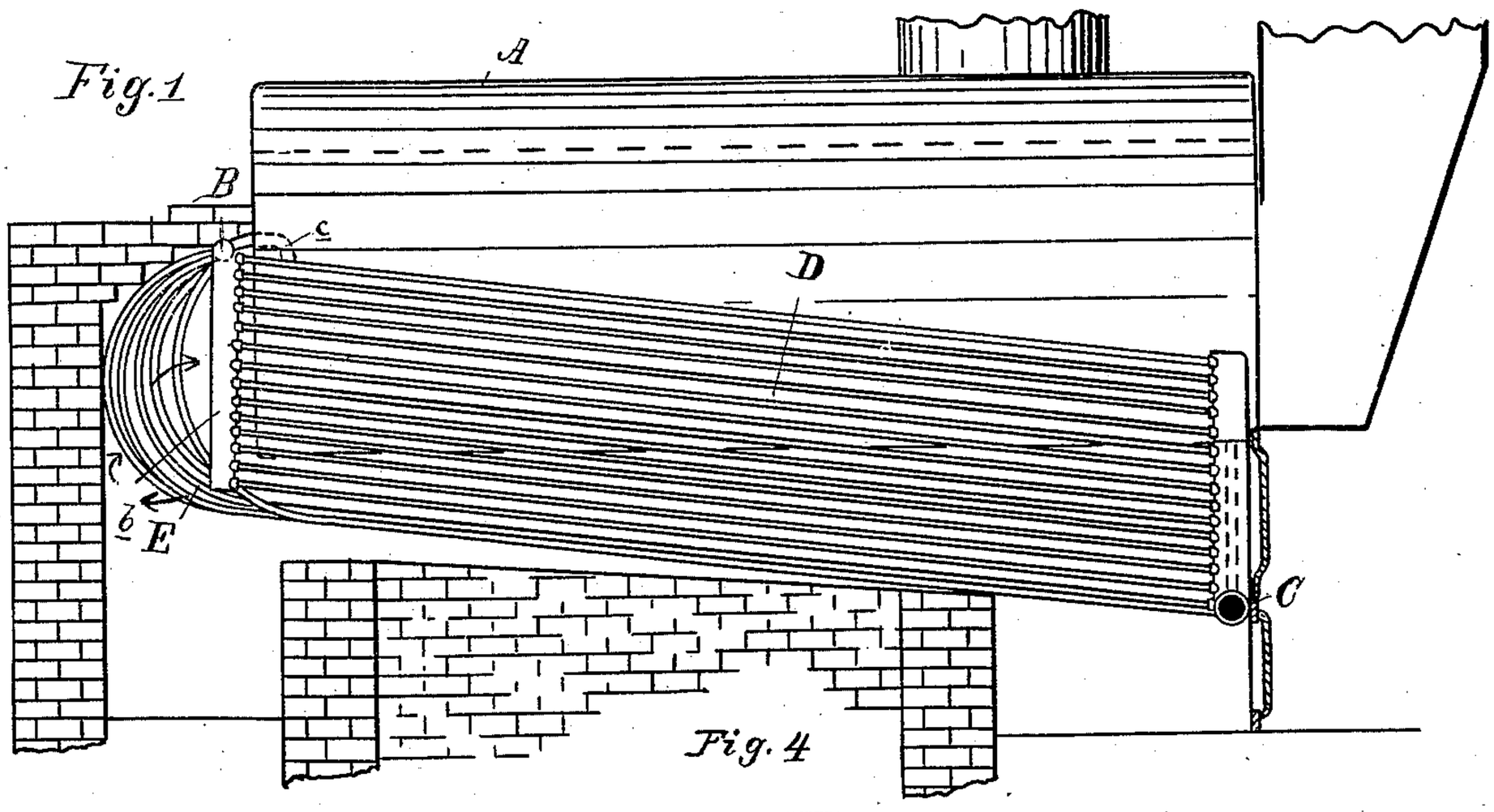


Fig. 4

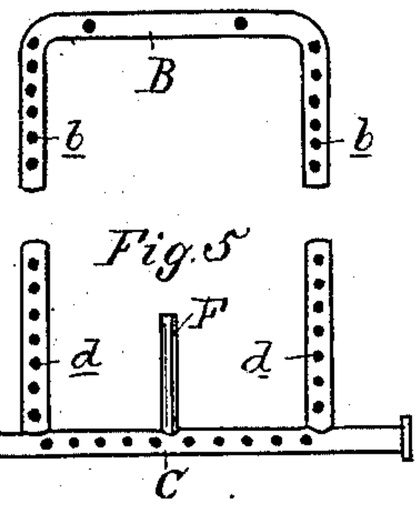


Fig. 5

Fig. 2

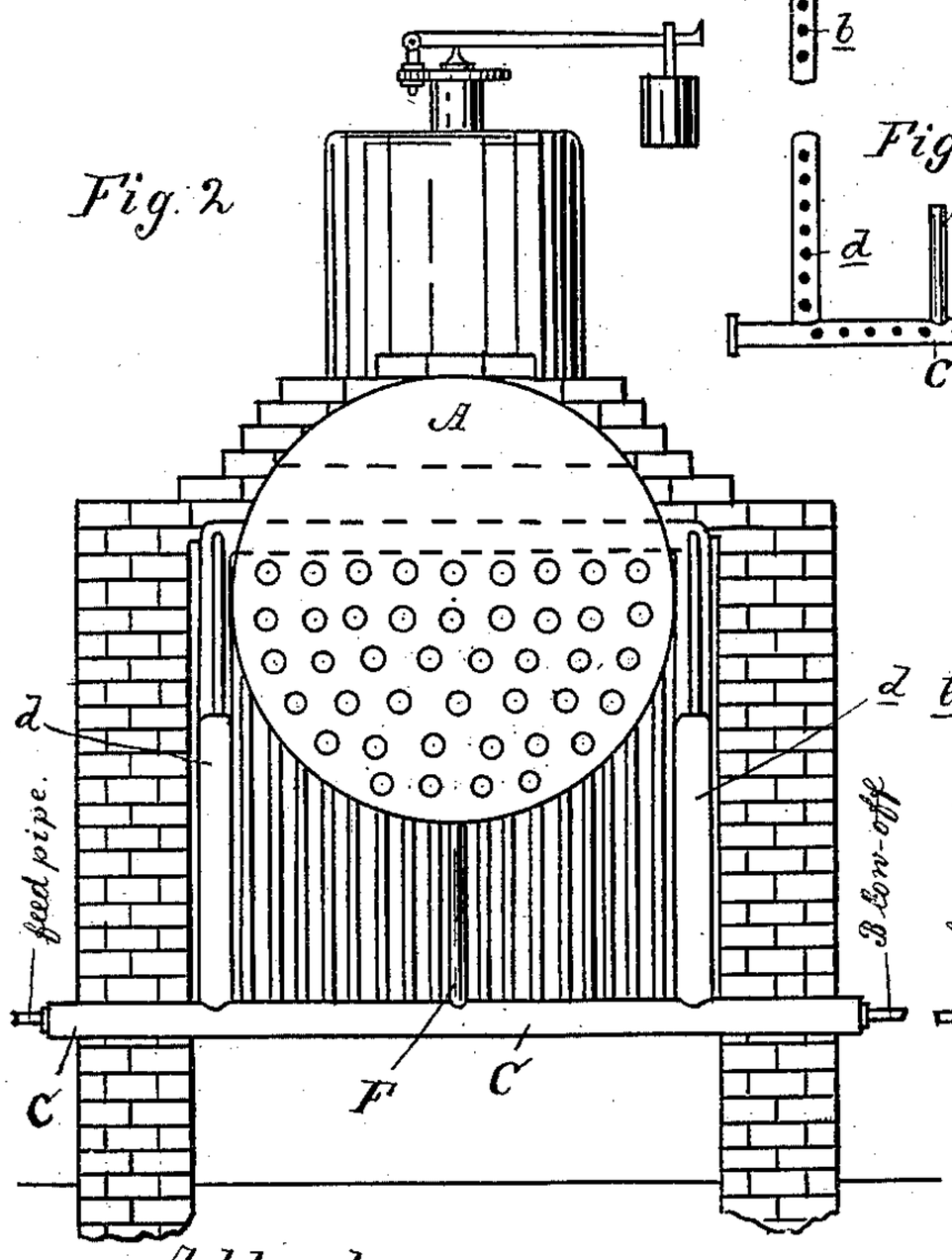
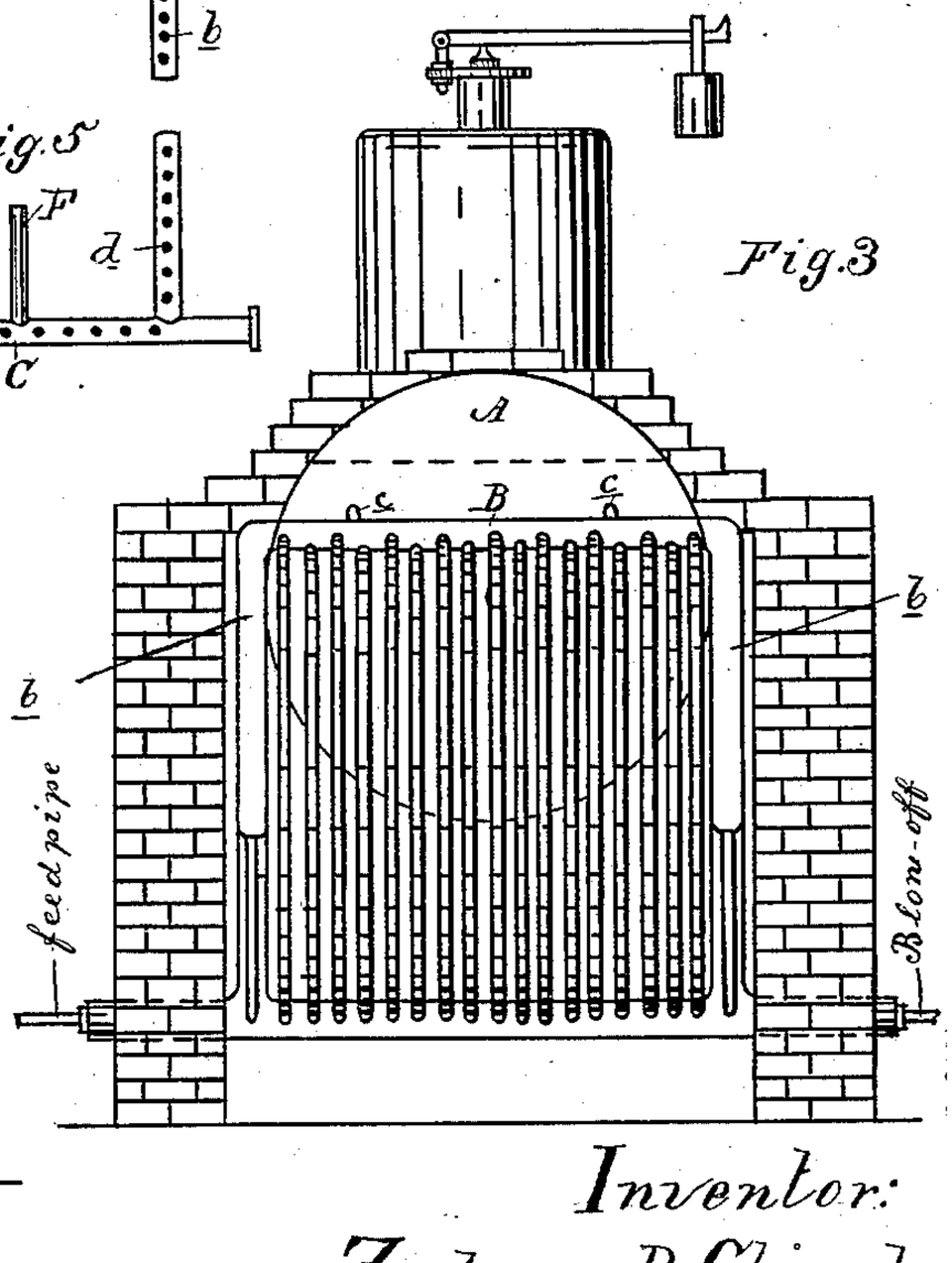


Fig. 3



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UNITED STATES PATENT OFFICE.

ZALMON B. CHURCH, OF MAY, MICHIGAN.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 308,652, dated December 2, 1884.

Application filed September 24, 1884. (No model.)

To all whom it may concern:

Be it known that I, ZALMON B. CHURCH, of May, in the county of Tuscola and State of Michigan, have invented new and useful Improvements in Boiler-Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to certain new and useful improvements in boiler-furnaces; and the invention consists in the peculiar construction, arrangement, and combination, with the boiler, of a series of pipes located within the combustion-chamber, and communicating with the boiler, a portion of such pipes forming the grates, while others form sides of the combustion-chamber, preventing destruction of the side walls in firing, all as more fully hereinafter set forth.

Figure 1 is a sectional side elevation of my improvement, showing it as applied to a steam-generator or horizontal boiler of ordinary construction. Fig. 2 is a front elevation. Fig. 3 is a rear elevation. Fig. 4 is a plan of the rear cross-pipe, and Fig. 5 is a similar view of the front horizontal cross-pipe.

In the accompanying drawings, which form a part of this specification, A represents a steam-generator, which is properly set in masonry.

B represents a rear cross-pipe provided with the downwardly-projecting legs *b*, the horizontal pipe B being connected to the water-space of the generator A by means of the pipes *c*.

C is a horizontal pipe provided with the upwardly-extending portions *d*. This pipe C is located at the front end of the generator, its ends being supported in the masonry, (shown in Fig. 2,) and to one end of such pipe C the feed-pipe is connected, while the opposite end may be used as a blow-off.

D represents a series of pipes, which are connected, as in a system of coils, to the vertical legs *b d* of the horizontal pipes B C, respectively, and E is another series of pipes, the forward ends of which are connected with the horizontal pipe C, while their rear ends are bent and connected with the horizontal cross-pipe B at the rear of the generator, such pipes being of different lengths, so that their bends will not come close together and shut off the draft communication with the flues of the boiler, as will be clearly seen upon referring to Fig. 1.

F is a pipe which affords communication between the boiler and the horizontal pipe C at the front of the generator. The series of pipes E are arranged sufficiently close together so as to perform the functions of grate-bars, and it will readily be seen that the products of combustion must pass back over the bridge-wall between the pipes E at the rear end of the boiler, and between them at that point in the return of the draft to the flues of the boiler, this result being due to the interposition of the curved portion of said pipes E between the rear end of the steam-generator A and the rear wall of the furnace Thus the products of combustion in passing from the fire-box to the rear wall of the furnace pass between the pipes E at their lower portion, as indicated by the arrows, and as said wall deflects the products of combustion upward and forward in their passage to the smoke-stack they again pass between the curved portions of the pipes. By this construction and arrangement I utilize all of the heat that can be produced in an ordinary construction, while I also utilize the heat of the products of combustion by compelling them to pass between the pipes in their passage to the flues, while at the same time the side walls of my furnace are protected against injury from breaking away, which is caused in firing.

What I claim as my invention is—

1. In combination with the boiler A and pipes D and E, the pipe C, located in front of the fire-box, and provided with the upwardly-extending branches *d d*, and the pipe B, provided with the downwardly-projecting branches *b b*, and located in the rear of the boiler, as and for the purposes specified.

2. The boiler A and pipes C and B, in communication therewith, the former located at a distance beneath the front portion of the boiler, and supported within the walls of the furnace, and the latter located in the rear of said boiler, in combination with the pipes E, forming the grate-bars, and attached to the pipe C, and extending beneath the boiler through the fire-chamber, and curving upward, connecting with the pipe B, as and for the purposes set forth.

ZALMON B. CHURCH.

Witnesses:
J. B. CROSBY,
A. B. MARKHAM.