2 Sheets--Sheet 1.

CALVIN G. BEITEL.

Improvement in Water Tube Steam Boilers.

No. 124,929. Patented March 26, 1872.

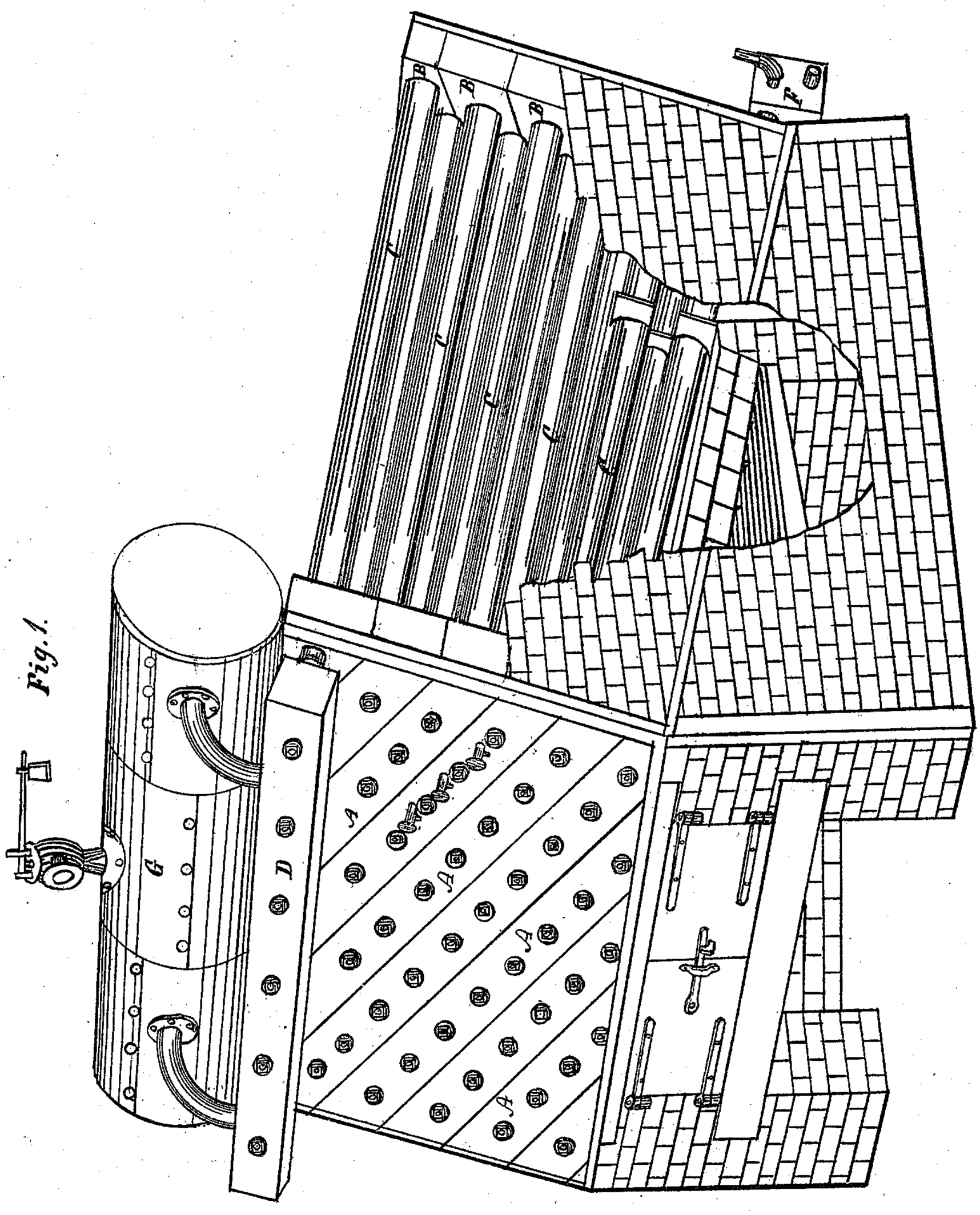

Fig. 1.

Witnesses,
D. J. Brown
E. F. Mc Gaw

Calvin G. Beitel,
By his attorney,
D. J. Brown.

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

2 Sheets--Sheet 2.

CALVIN G. BEITEL.

Improvement in Water Tube Steam Boilers.

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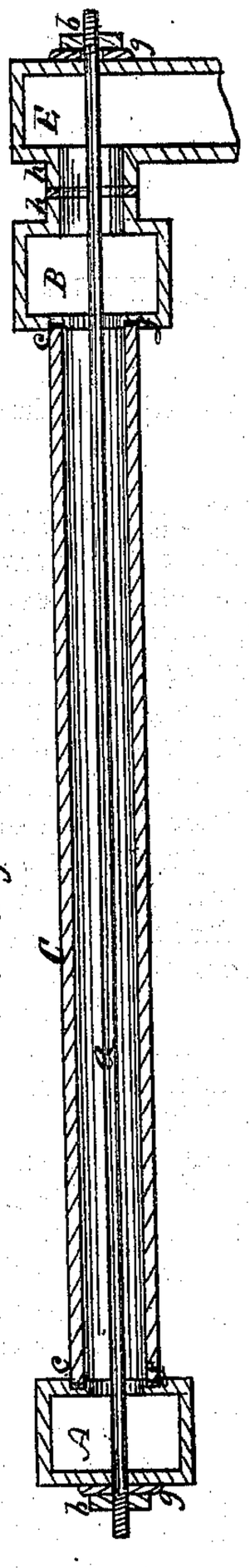

Fig. 4.

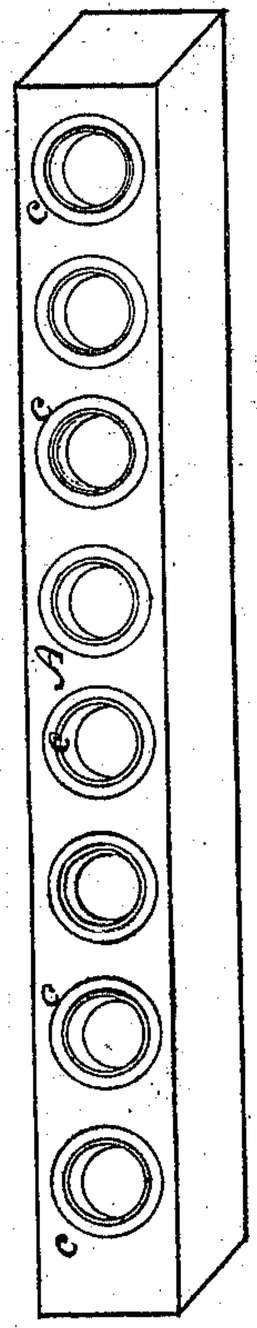

Fig. 3.

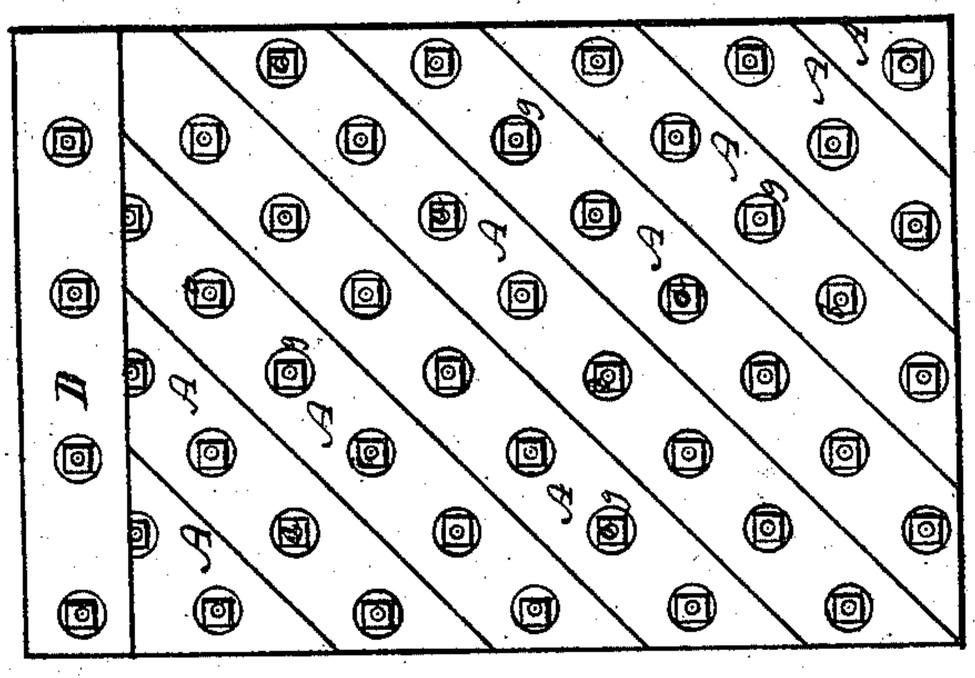

Fig. 2.

Witnesses,
D. J. Brown
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by his attorney,
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AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

124,929

UNITED STATES PATENT OFFICE.

CALVIN G. BEITEL, OF EASTON, ASSIGNOR TO WILLIAM H. CORNELL, OF TITUSVILLE, PENNSYLVANIA.

IMPROVEMENT IN WATER-TUBE STEAM-BOILERS.

Specification forming part of Letters Patent No. 124,929, dated March 26, 1872; antedated March 14, 1872.

To all whom it may concern:

Be it known that I, CALVIN G. BEITEL, of Easton, in the county of Northampton and State of Pennsylvania, have invented an Improved Steam-Boiler; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing making part of this specification—

Figure 1 being a view in perspective of the improved boiler as set in the brick-work, with fire-grate, &c., ready for use; Fig. 2, a front view of the boiler alone; Fig. 3, a view of one of the boxes at the end of the boiler; Fig. 4, a central section through one of the connecting-tubes, and through the boxes with which its end are connected.

Like letters designate corresponding parts in all of the figures.

My improvements are in "sectional boilers" composed of separate steam and water boxes at the ends connected by tubes. The principal feature of my invention consists in the arrangement of the boxes A A at one end of the boiler in inclined positions, and the boxes B B at the other end also in inclined positions, but in a direction opposite to that of the boxes A A, so that the lines of direction at the two ends, respectively, cross each other at right angles, or at angles approximating thereto, substantially as herein specified.

In the drawing, let A A represent the boxes at one end of the boiler; B B, the boxes at the other end thereof; and C C the connecting-tubes. The boxes A A are shown as inclined diagonally in one direction, and B B inclined diagonally in the other direction. The rows of connecting-tubes C C are also thereby arranged diagonally, so that alternately one tube lies vertically over the space between the tubes next below. The rear end of the boiler is, or is preferably, placed a little lower than the front end, so that the connecting-tubes are somewhat inclined. The method of connecting the tubes and boxes may be as represented—namely, by having the ends of the tubes fit in annular grooves *c c* in the sides of the boxes, concentrically around the communicating-holes therein; there being packing-rings *f f* in the bottoms of the grooves to tighten the joints, and having rods *a a* extend lengthwise centrally through the several tubes and through the adjoining boxes, so as to project beyond the same and to receive tightening-nuts *b b*, with packing-washers *g g* under the nuts to make all steam-tight; or the connections between the boxes and tubes may be made swaged or screw-joints. Another feature of my invention consists in the employment of horizontal boxes D E, one at each end of the boiler, in connection with the inclined boxes, the front box D extending across the width of the boiler near the top, and communicating with each of the inclined boxes A A, which extend to the top of the boiler, and the other box E extending across the width of the boiler at the rear end near the bottom, and communicating with each of the inclined boxes B B, which extend to the bottom of the boiler. The box D receives steam from all of the inclined boxes with which it is directly connected at once, and it transmits the steam to the steam-drum G. The box E, which receives the water to supply the boiler, also supplies water at once to all of the inclined boxes with which it is directly connected. The connections between these auxiliary boxes D E are made by a continuation of the rods *a a*, which connect the main boxes and tubes; there being short tubes or flanges *h h* which project from the sides of the said boxes D E and from the adjacent inclined boxes A A and B B, respectively, fitting one another, with packing-washers between.

The special advantages of the inclined boxes A A and B B are, first, by thus placing the rows of connecting-tubes C C diagonally the ascending flames and products of combustion rising from the furnace are caused to impinge successively against the tubes, and are prevented from passing directly upward between the tubes; second, the inclination of the boxes, and also of the connecting-tubes, causes all of the sediment to descend through the same and to finally settle in the box E, the lowest part of the boiler, from which it is easily blown off. The use of the auxiliary boxes D E is obvious.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The arrangement of the two series of separate boxes A A and B B, connected by the tubes C C in inclined positions, the inclinations being in opposite directions, substantially as and for the purposes herein specified.

2. In combination with the separate boxes A A B B, the auxiliary boxes D E, arranged substantially as and for the purposes herein specified.

C. G. BEITEL.

Witnesses:
JAMES I. SMITH,
J. A. TRANSUE.