

H. WHITTINGHAM.  
Sectional Steam-Boiler.

No. 161,582.

Patented March 30, 1875.

Fig. 1.

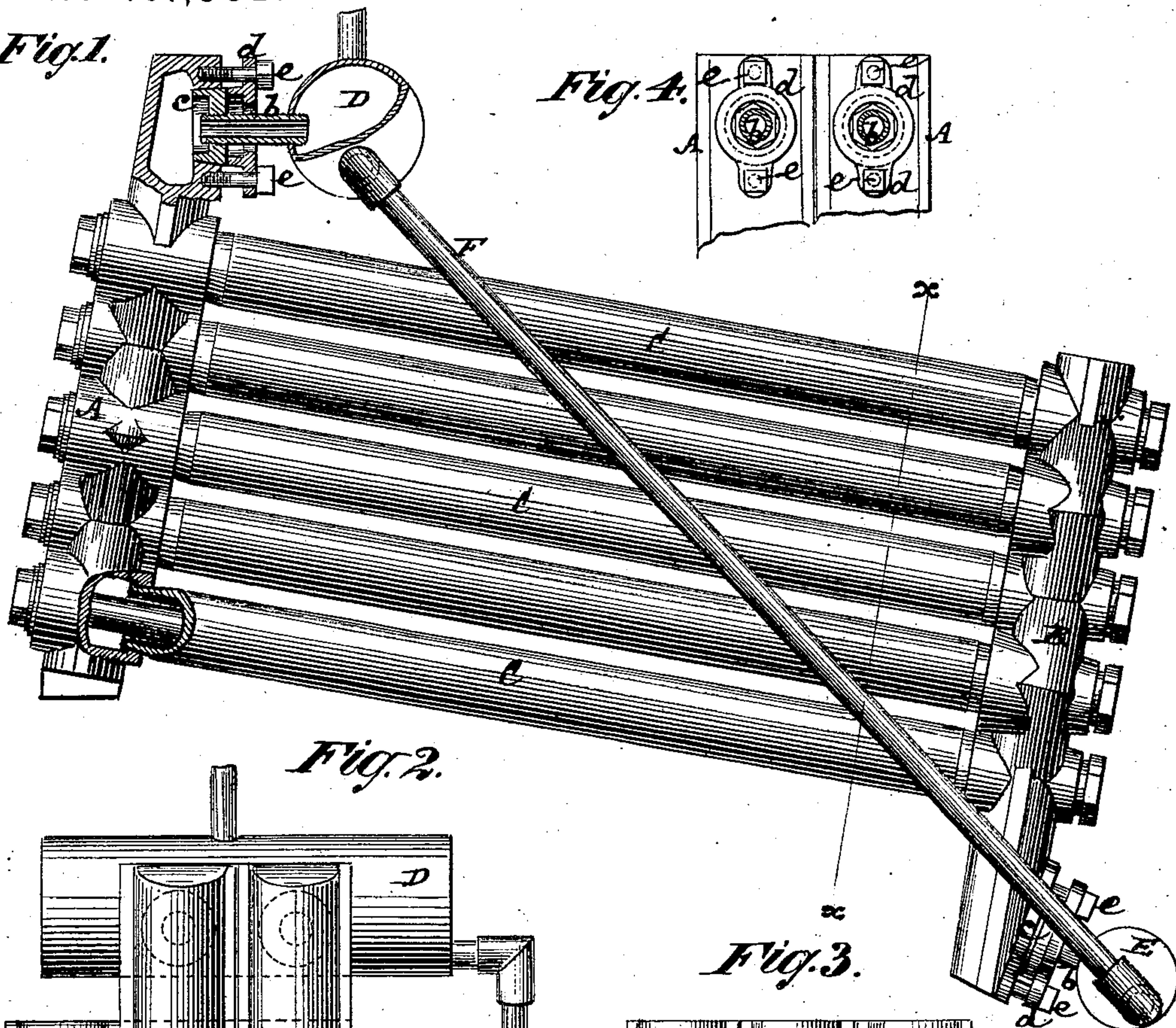


Fig. 4.

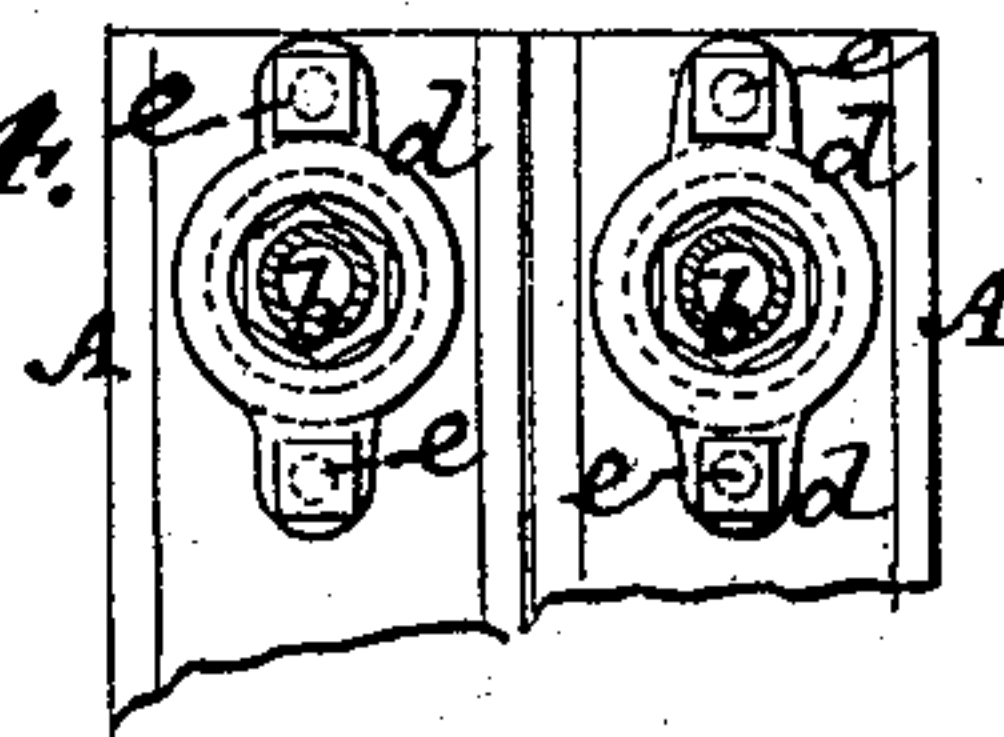


Fig. 2.

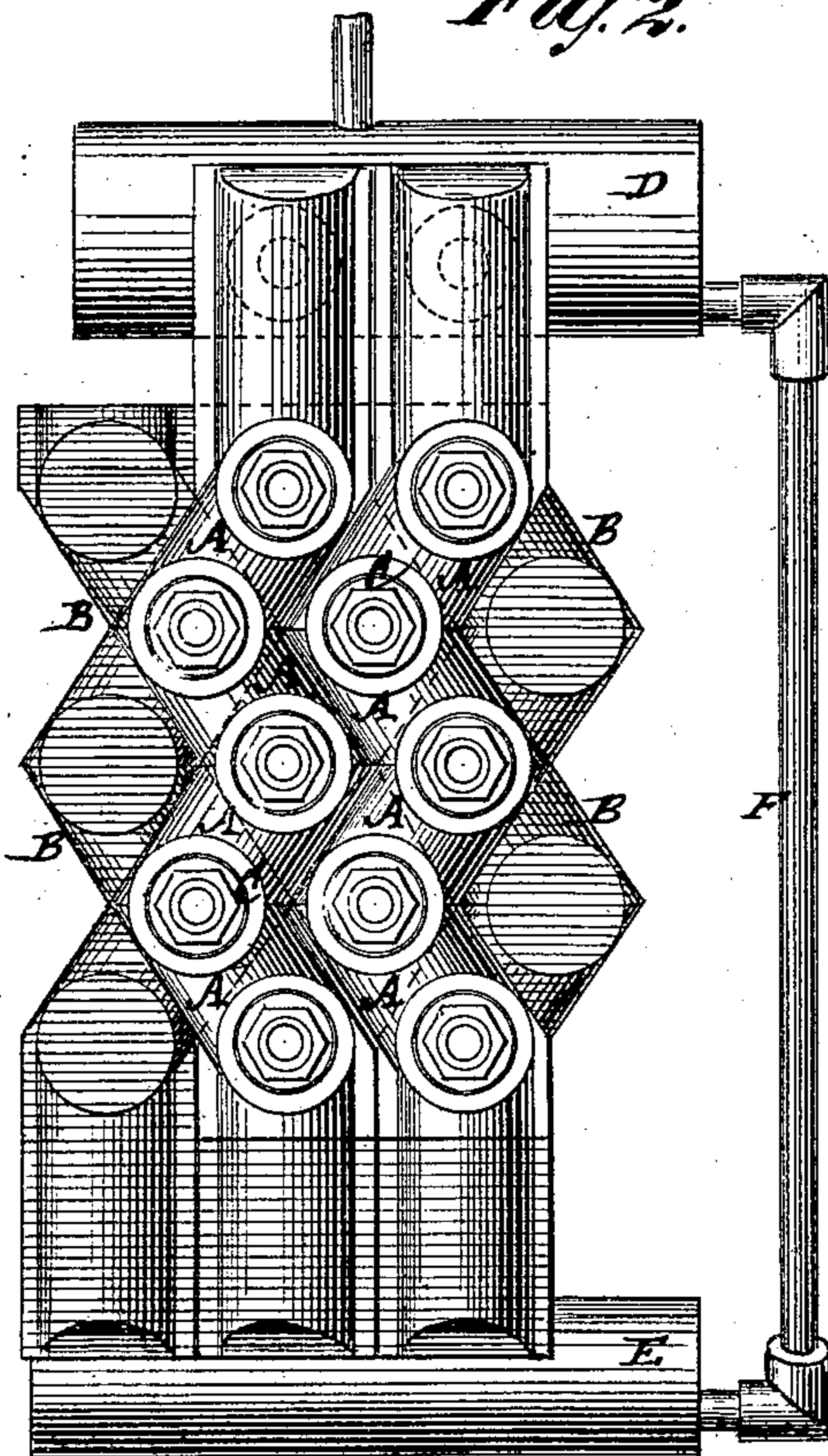
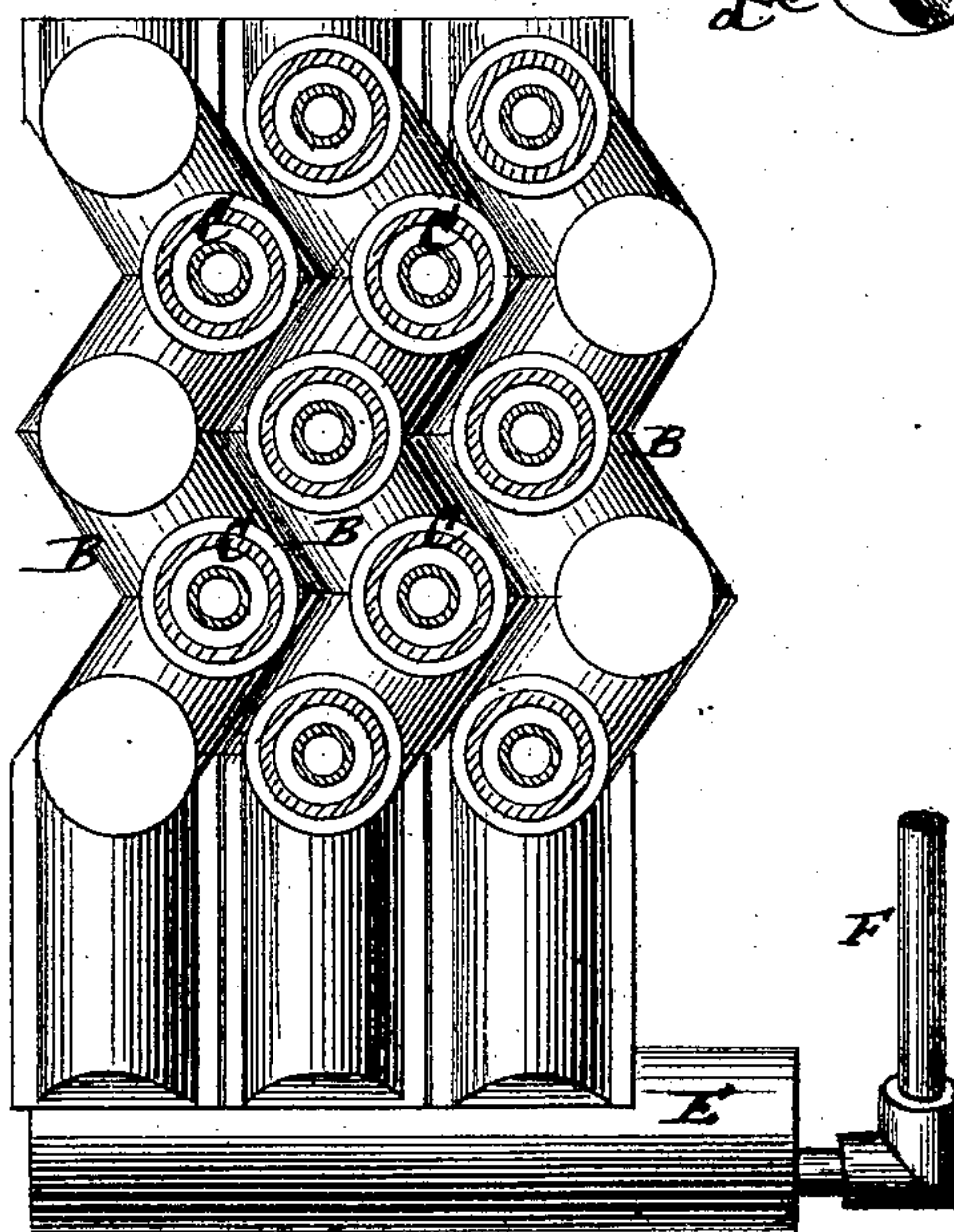


Fig. 3.



Witnesses  
John Becker  
Fred Haynes

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# UNITED STATES PATENT OFFICE.

HARRY WHITTINGHAM, OF NEW YORK, N. Y.

## IMPROVEMENT IN SECTIONAL STEAM-BOILERS.

Specification forming part of Letters Patent No. 161,582, dated March 30, 1875; application filed February 4, 1875.

*To all whom it may concern:*

Be it known that I, HARRY WHITTINGHAM, of the city, county, and State of New York, have invented certain new and useful Improvements in Sectional Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 is a partially sectional side elevation of a sectional steam-generator constructed in accordance with my invention; Fig. 2, a front view thereof; Fig. 3, a transverse vertical section on the line *x x*, looking backward; and Fig. 4, an outside face view of two of the joint-clamps or devices which unite the drums with the uprights.

This invention more particularly relates to that description of sectional steam boilers or generators in which the water and steam space of the boiler is mainly composed of front and rear uprights or end tubes of a zigzag construction and longitudinal connecting-tubes; and the invention consists in a combination of front and rear uprights of a reverse zigzag construction relatively with each other and a series of longitudinal tubes connecting said front and rear uprights at reverse points or angles, whereby each front zigzag upright is made to connect, by the longitudinal tubes, with two back uprights, and each back upright with two front ones, thereby giving increased elasticity to the structure on its foundation, and whereby a more perfect circulation laterally, as well as longitudinally and vertically, is kept up.

The invention also consists in a clamp and ring or plug joint of novel construction for uniting the drums with the uprights of the boiler, whereby increased facility is afforded for attachment and detachment of the drums, and a perfect or close joint is obtained, with every provision for expansion and contraction.

A A are a pair of front zigzag uprights, of which there may be any number, arranged in close proximity with each other, and having their zigzag or serpentine portions running, at any given level, in the same direction—that

is, all similarly jutting to the right or to the left throughout corresponding altitudes. B B are the back zigzag uprights, similarly arranged in relation with each other, but having their zigzag or serpentine portions jutting to the right or to the left in reverse order with the corresponding portions of the front uprights, and so that when the front uprights are connected by the longitudinal tubes C C with the rear uprights the connection is made by each longitudinal tube, respectively, between the right-hand side or crook of a front upright with the left-hand side or crook of a back upright, and vice versa—that is, the right-hand side or crook of a back upright with the left-hand side or crook of a front upright, and so that each front zigzag upright is connected by the longitudinal tubes with two back zigzag uprights. By this combination of the reversely-constructed zigzag front and rear uprights with their longitudinal connecting-tubes, increased elasticity is given to the structure on its foundation, and a most thorough lateral circulation in reverse directions at opposite ends of the boiler, and good or perfect longitudinal as well as vertical circulation is kept up.

The longitudinal tubes C C may, as in the case of a sectional steam-generator already patented to me, have smoke-flues arranged to pass not only through them, but through the end uprights as well, to obtain a most thorough exposure, both inside and out, of the heating-surfaces to the gaseous products of combustion.

D is the steam-drum of the boiler, and E its mud-drum, connected by a pipe, F. These drums, or either of them, are attached to their respective end uprights in front or in rear of the boiler—that is, to the end upright of each boiler portion—by means of tubes *b*, made to screw at their one end into the drums, and at their other end into tapering rings or plugs *c*, arranged to fit tapering holes in the end uprights of the boiler, and tightened up or held to their places by clamps *d*, which latter encircle the tubes *b*, and are connected with the end uprights by screws *e e*. This clamp and ring or plug joint not only admits of the drums being attached and detached with facility and

dispatch, but by it a most perfect or close joint is obtained, with every provision as regards expansion and contraction.

I claim—

1. The combination of the front and back uprights A B, of reverse zigzag construction or arrangement relatively with each other, and the longitudinal tubes C, made to connect each front zigzag upright with two back zigzag uprights, and each of said back uprights with two of said front uprights, substantially as and for the purposes herein set forth.

2. The combination, with the drums D E, or either of them, and end uprights, to which they are attached, of the tubes *b*, the taper rings or plugs *c*, and the clamps *d*, connected with the end uprights by screws *e e*, substantially as specified.

HARRY WHITTINGHAM.

Witnesses:

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