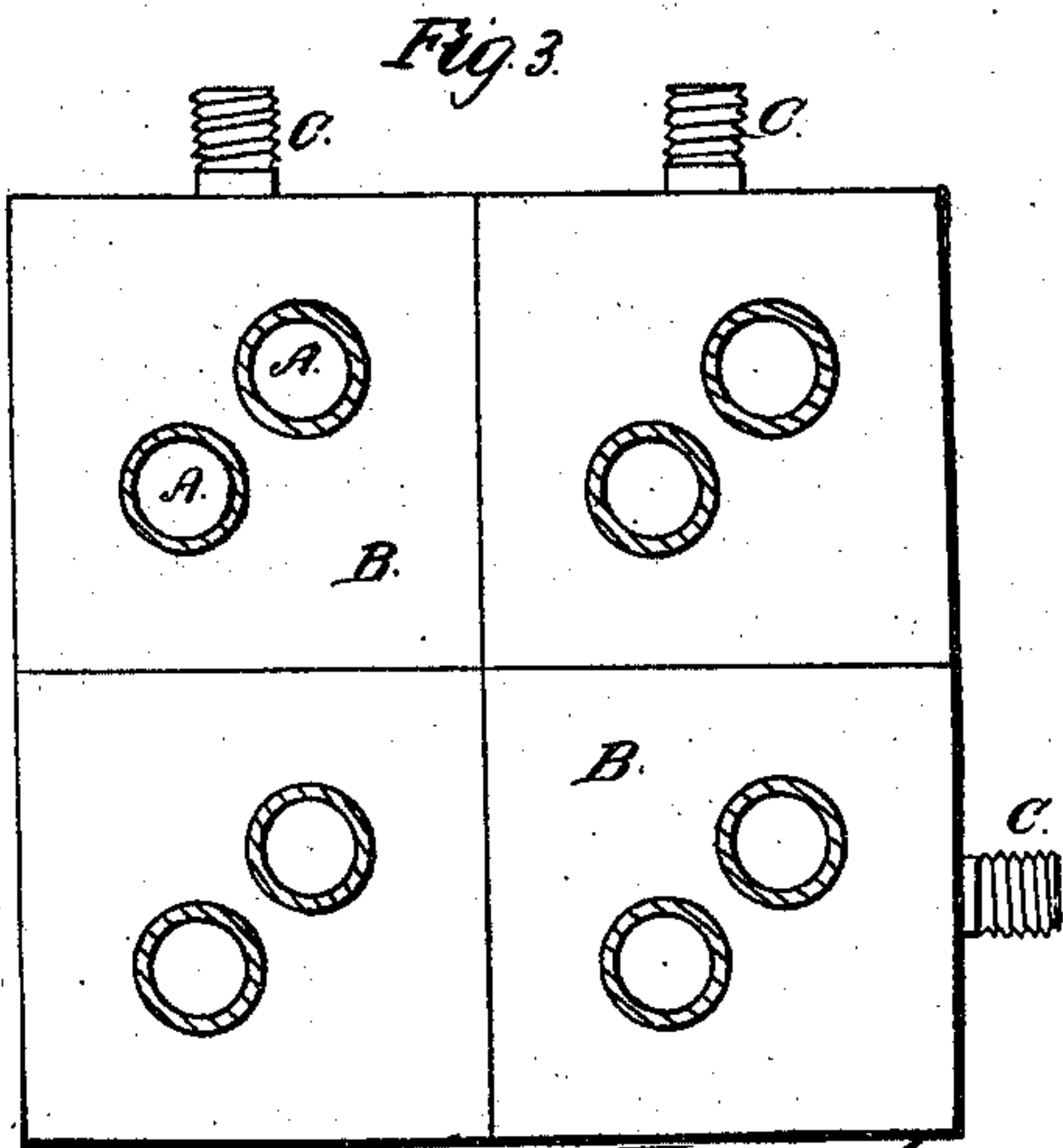
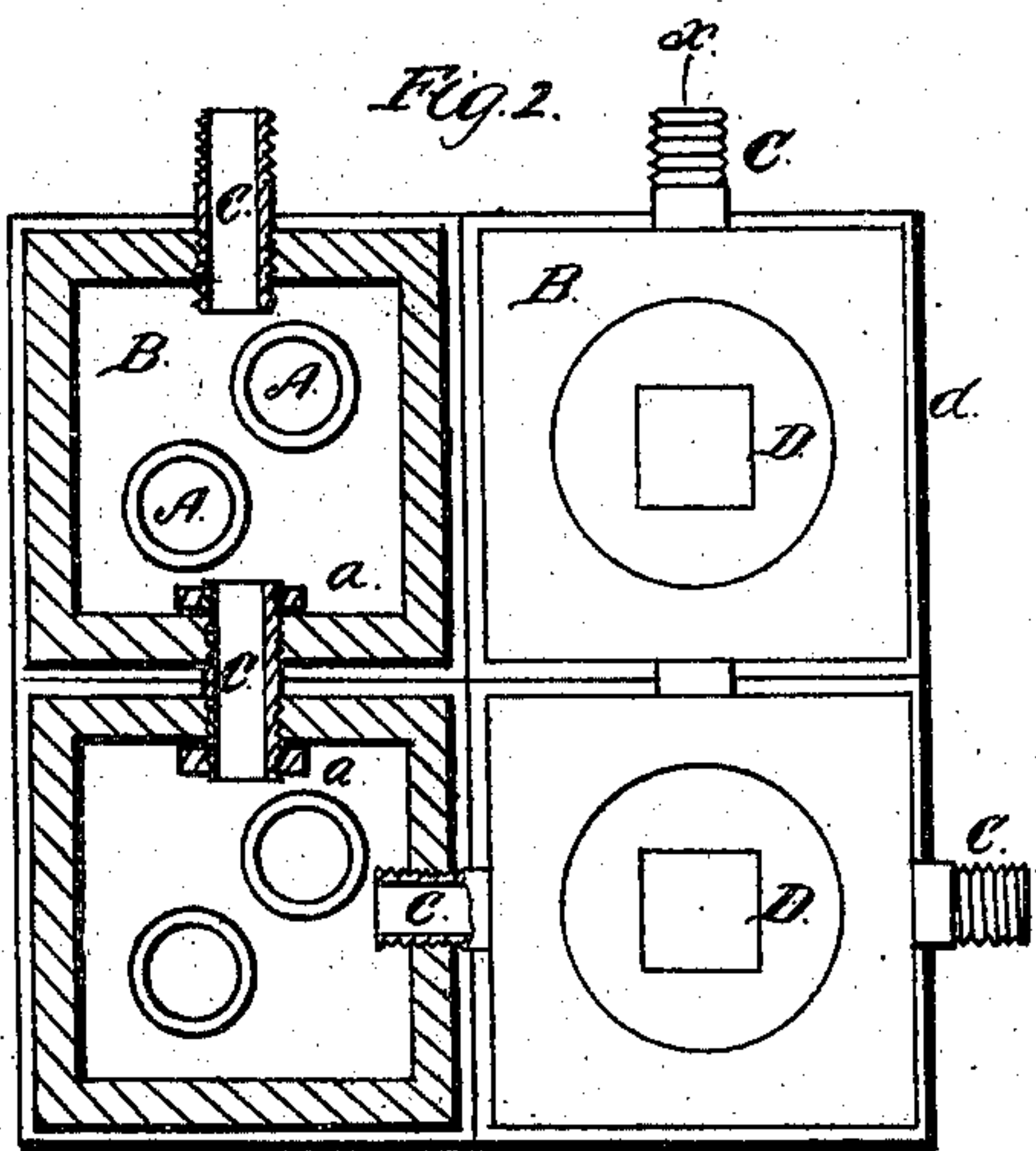
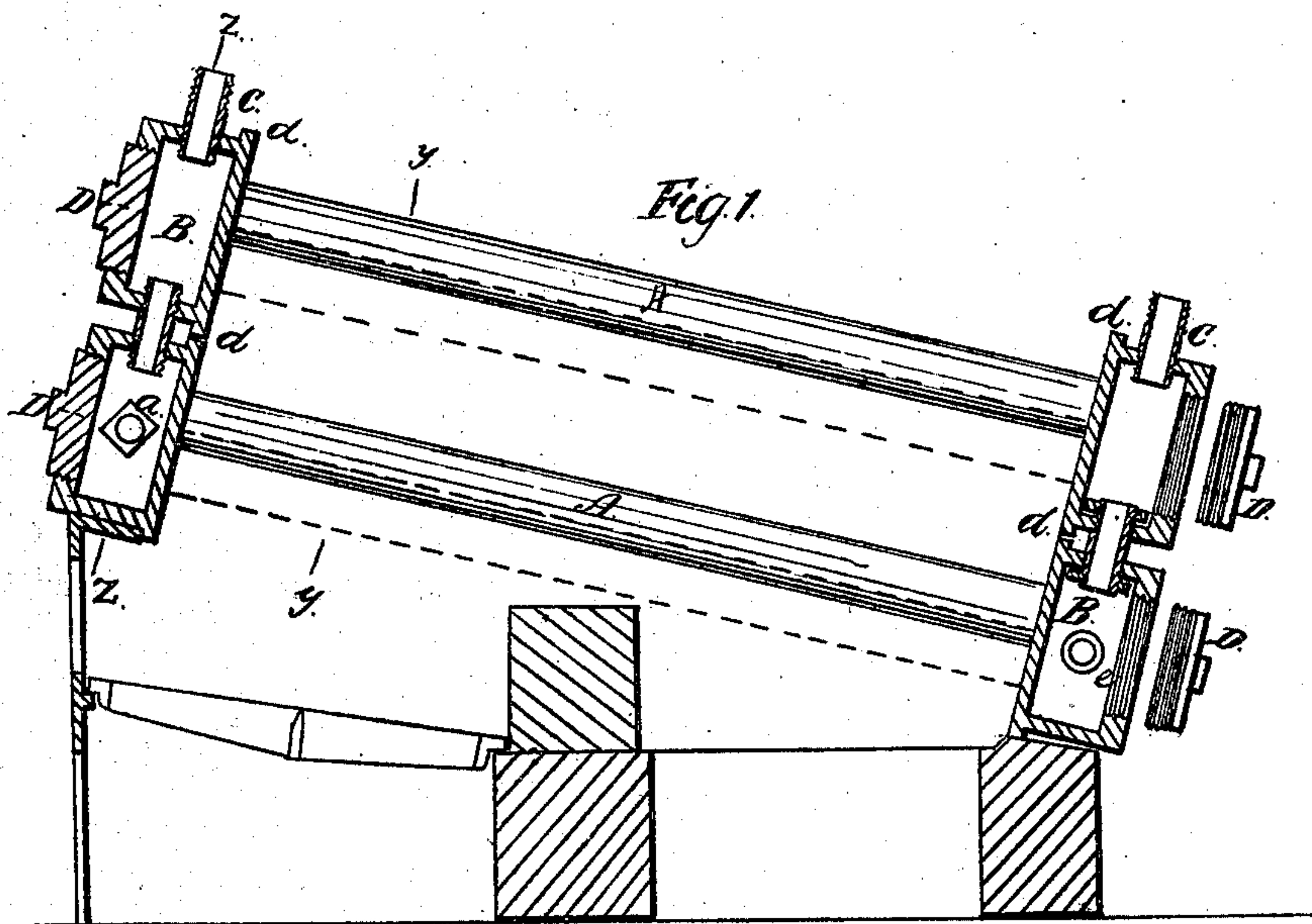


J. M. Clark.

Steam Generator.

N^o 89,916.

Patented May 11, 1869.



Witnesses
Sydney E. Smith
W. Morris Smith

Inventor
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United States Patent Office.

JONATHAN M. CLARK, OF NEW YORK, N. Y.

Letters Patent No. 89,916, dated May 11, 1869.

IMPROVEMENT IN STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, JONATHAN M. CLARK, of the city, county, and State of New York, have invented certain new and useful Improvements in the "Construction of Steam-Generators;" and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, through letters of reference marked thereon, making part of this specification, and in which—

Figure 1 represents a vertical longitudinal section, taken on the line *xx* of fig. 2, the tubes in front of the section-line being shown in red-ink lines.

Figure 2 is an end view and partial section, taken on the line *zz* of fig. 1.

Figure 3 is a section, taken on the line *yy* of fig. 1, showing the interior of one end-wall of a generator constructed according to my invention.

In the several figures, the same letters indicate corresponding parts.

This invention may be regarded as an improvement upon that for which Letters Patent were granted to me, bearing date September 8, 1868, and numbered 81,983; and

It consists in an improved mode of connecting the hollow, block-like heads of the tubes which form the end-walls of the boiler, in such manner that all bolts are dispensed with, and the parts which form the passages for water and steam-communication between the several tubes of the series, and through which a circulation is kept up, are made to serve, also, the purpose of binding the series together, to constitute the complete boiler or generator, thus materially simplifying its construction, and reducing its cost.

To enable others to make and use my invention, I will describe its construction and operation, by referring to the drawings, in which—

A A represent the tubes, of which there may be one, two, or more, connected with and opening into the cavity of the hollow, block-like heads B at each end, which they may be screwed or riveted into; or the heads may be cast on to the tubes, as preferred.

These heads are of rectangular or parallelogrammic form, so that they may be arranged in contact, to form a wall, and thus enclose the front and rear ends of the fire and flue-space.

The lower ranges are connected, each with the adjacent one, by a lateral pipe or nipple, C, which may be

formed with a right-hand screw-thread on one end, and a left-hand one on the other, with corresponding female-screw threads in the apertures in the sides of the heads, any number of which may be thus connected, side by side, and upwardly, one above another, the bottom and top rows, only, being connected laterally, to admit of a free circulation of water and steam.

The tubular couplings may be variously applied. Instead of as before described, they may be passed snugly through apertures in the heads, and secured by a nut, *a*, on each end; or they may be riveted; but the screw, in either form, is preferable to the rivet, as, in case it is desirable to remove a single range or section, with the head at each end, it can thereby be more readily accomplished.

When the right and left-hand screw is used, it is necessary to form a flange, *d*, around the inner edges of the heads, so as to leave a space between their sides, to admit of the application of a pair of tongs, to turn the nipple C with, by which, in case of leakage at any of the screw-couplings, they may be tightened up, when steam is on, without stopping the machinery; but, when the nipple C is fastened by nuts *a* inside the heads, this flange is unnecessary.

In the outer side or face of the heads B is formed a circular opening, *e*, of sufficient size to expose the open ends of the tube or tubes, A, connected with them, and to admit of the introduction of a suitable instrument to remove scale or sediment that may have formed therein.

These openings are provided with screw-stoppers, D, which may be readily inserted or removed.

By this construction, all perishable packing is dispensed with. The screw-couplings, being of a tapering character, are self-tightening, as are also the stoppers D, so that the boiler may be much more cheaply manufactured, and be less liable to leakage than similar boilers heretofore made.

Having thus described my invention,

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

The combination of the hollow, angular head B, tubular connecting-plug C, and flange *d*, substantially as described.

J. M. CLARK.

Witnesses:

F. B. DUNN,
W. MORRIS SMITH.