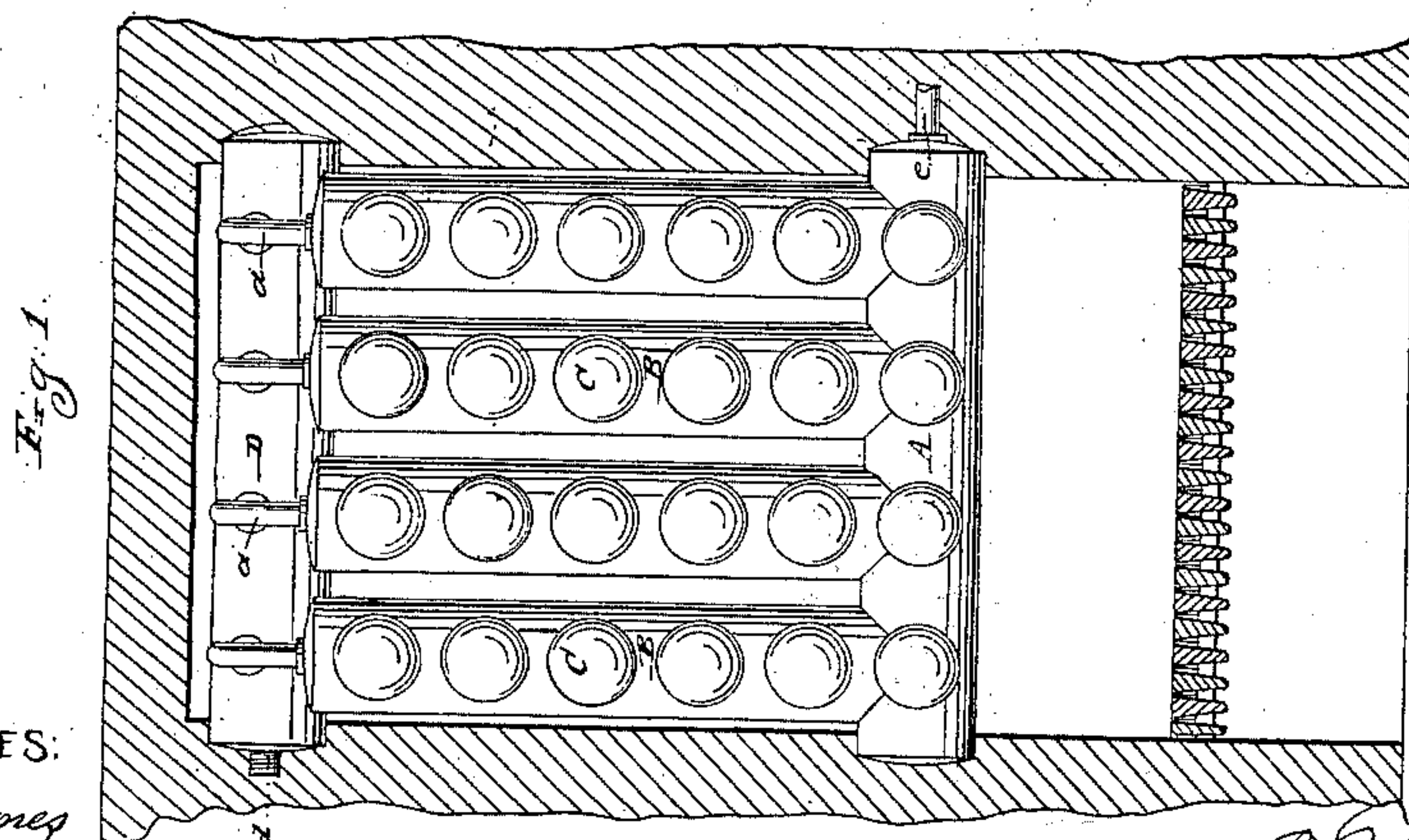
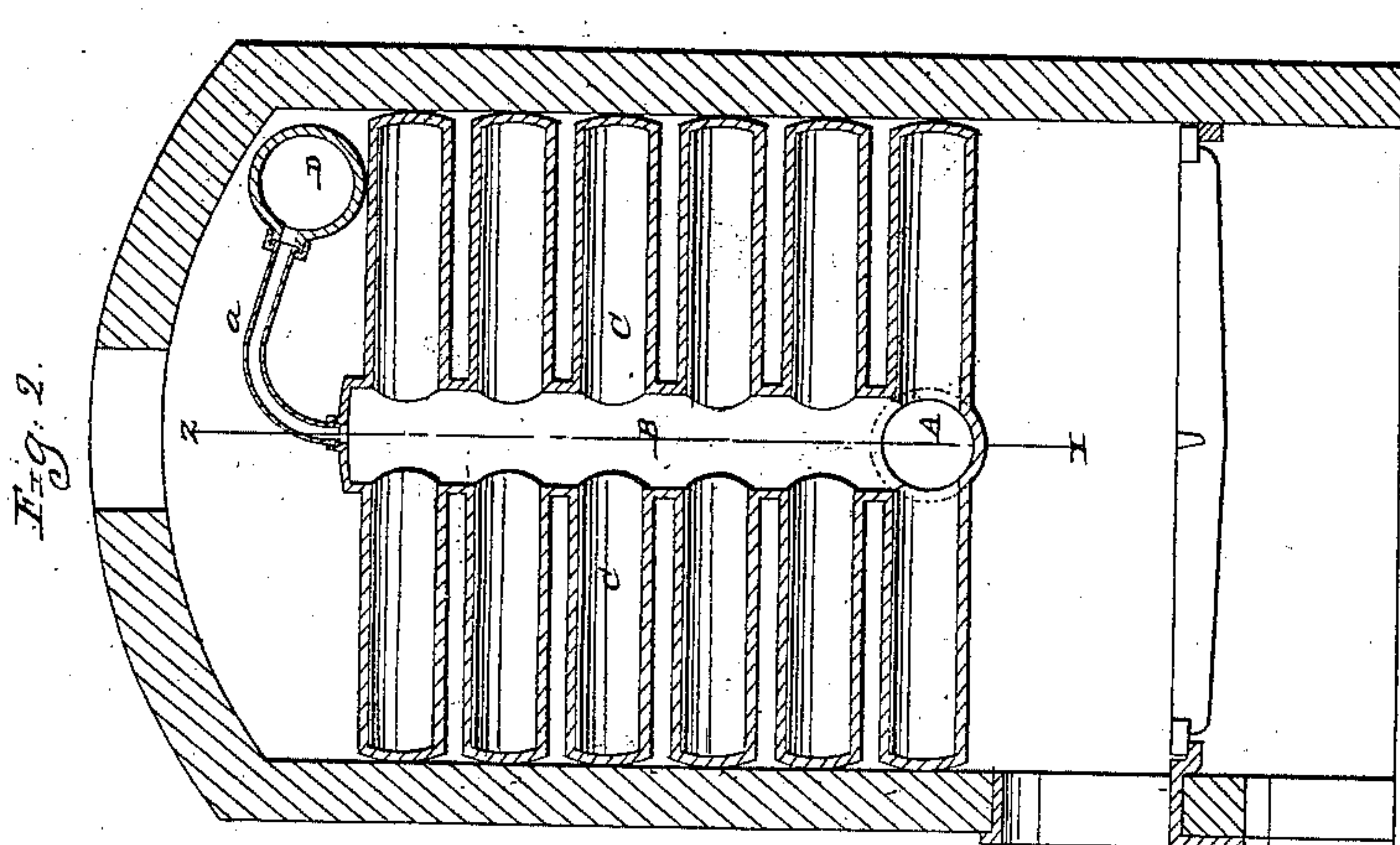
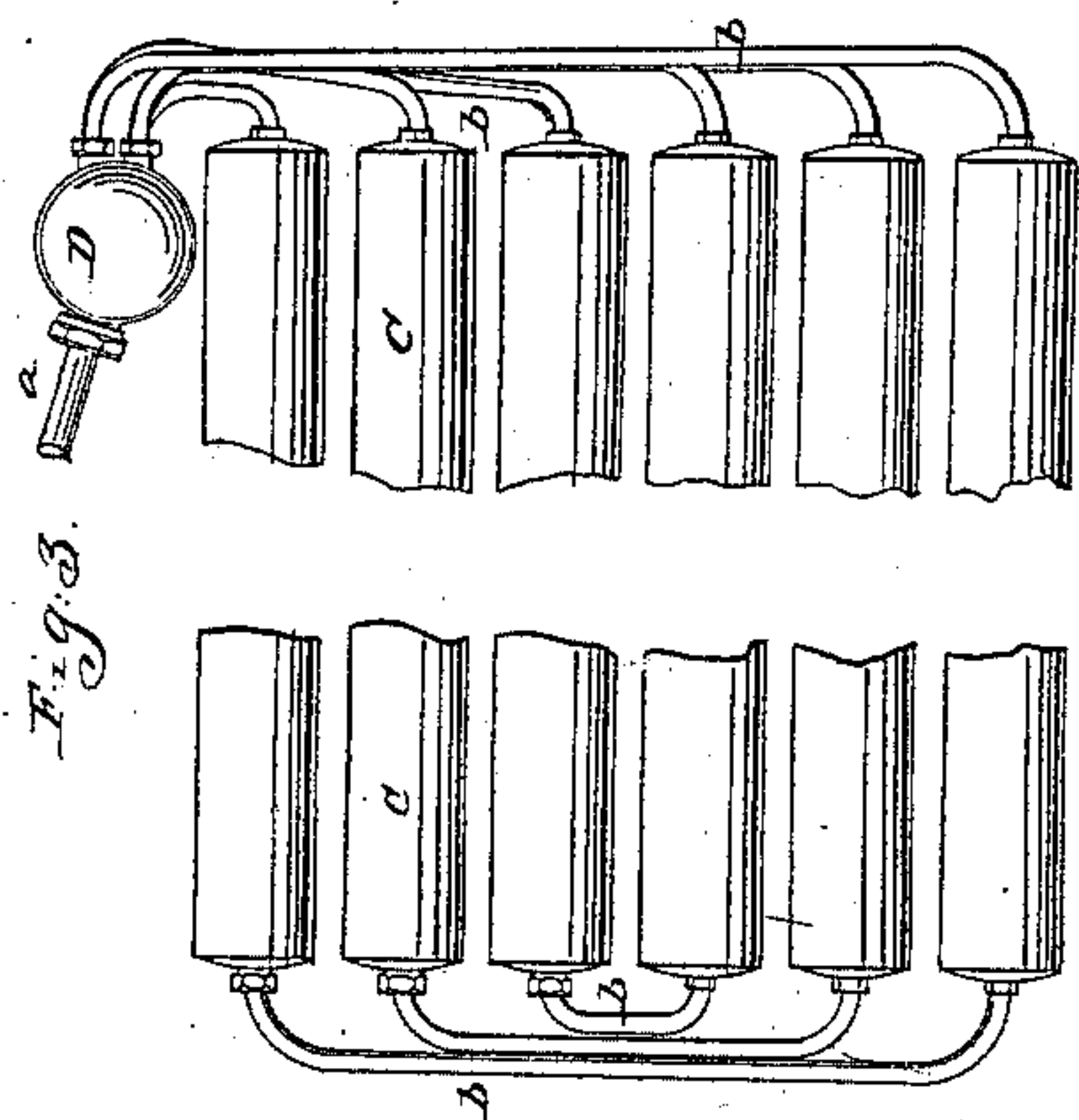


B. T. BABBITT.  
STEAM GENERATOR.

No. 92,000.

Patented June 29, 1869.



WITNESSES:

*Wm. Haynes*  
*Geo. Corbin*

INVENTOR

*B. T. Babbitt*



# United States Patent Office.

BENJAMIN T. BABBITT, OF NEW YORK, N. Y.

Letters Patent No. 92,000, dated June 29, 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, BENJAMIN T. BABBITT, of the city, county, and State of New York, have invented a new and useful Improvement in "Steam-Boilers, applicable also to Condensers," of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, and in which—

Figure 1 represents a side elevation of a steam-boiler, constructed in accordance with the invention, and

Figure 2, a sectional elevation of the same, taken transversely, or at right angles to fig. 1.

Figure 3 shows a broken view, in elevation, of portions of such boiler, with certain attachments for promoting circulation and for providing for the escape or passage, from the lower to the upper portion of the boiler, of the steam, as generated.

Similar letters of reference indicate corresponding parts.

My invention consists in a structure made up of main and branch pipes arranged to occupy right-angled or cross-positions, and forming tiers and rows of pipes or tubes connected so as to form but a single structure, and allowing of free circulation between or around them in various directions, the same combining cheapness and simplicity of construction together with an extended working-surface.

Referring, in the first instance, to figs. 1 and 2 of the drawing, which represents a steam-boiler set in its supporting or surrounding brick-work, to occupy a vertical position, but which may, if desired, be made to assume a different one, the entire body or steam-generating capacity of the boiler is supposed to be made of cast-iron, and may either be formed in sections suitably secured together, or of a single casting, as, for instance, by making it in flasks or moulds arranged to form halves, or opposite portions meeting, as indicated by the blue line *xx* in fig. 2.

Such body consists of an intermediate lower horizontal pipe, *A*, and any suitable number of connecting parallel vertical main pipes, *B B*, with horizontal branch tubes, *C C*, projecting in a radial manner from the vertical pipes, all of said pipes, *A*, *B B*, and *C C*, presenting free closed outer ends, and being so set, or dividedly arranged relatively to each other, as to form tiers and rows of pipes, with free circulation or passage for the flame and heated gases between them, both in vertical and horizontal directions, as also around them.

This peculiar pipe-like construction of the body constitutes at once both a cheap, simple, and effective boiler, the same combining, with a large or extended heating-surface, the most perfect freedom for independent expansion and contraction of the pipes or tubes, in direction of their length, by reason of the unrestrained exposure of them at their outer ends.

A steam-drum, *D*, from which the supply is de-

signed to be drawn, as at *d*, may, if desired, be connected with said body, without interfering with the hereinbefore-specified provision for expansion of the parts, as, for instance, by means of bent copper, or other comparatively flexible pipes, *a a*, disposed to connect said drum with the several vertical pipes *B B*.

A similar construction is shown in fig. 3, for the branch tubes *C C*, from or at their ends *C C*, with each other, and with the drum, by means of small and comparatively flexible bent pipes, *b b*, which, while they serve to increase or improve the circulation within the boiler, and to pass the steam as generated from the lower to the upper portion or portions of the boiler, offer no practical obstruction to the independent expansion and contraction, in direction of their length, of the branch tubes.

The water is supplied to the boiler through the lower horizontal main pipe *A*, as at *e*.

In some cases, it may be preferred to construct portions of the boiler of cast, and others of wrought-iron. Thus, the branch tubes *C C* may be of wrought-iron, and be screwed into the vertical pipes *B B*, and, if desired, turns or elbows may be fitted on to the outer ends of either two adjacent branch tubes, whether the latter be of wrought or cast-metal, thus making each branch tube of a double, or U-form, as it were, without destroying the independence of the same, as regards expansion and contraction, in direction of their length, irrespectively of the main pipes, as also without affecting or interfering with the independent expansion and contraction of the said main pipes.

The same pipe-like structure, as shown in the drawing, and as has here been described, may, by reversing its position, or turning it upside down, be used to advantage either as a surface or air-condenser, allowing, for instance, in such case, the steam to enter by the aperture or branch *e*, and the water of condensation to pass off by the opening or branch *d*, said branches being reversed, as regards their upper and lower positions, with the changed or reversed position of the whole structure.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The arrangement, with the main pipes or body of the structure, of the drum *D*, and connected with the same by means of bent pipes *a a*, whereby to secure an independent flexibility to such connections, and thereby to provide for the expansion and contraction of the main pipes, as herein set forth.

2. The combination, with the main pipes *B B* and branch pipes *C C*, of the tubular connections *b b*, of flexible character, as described, and arranged to connect the branch pipes with each other, and with the drum, substantially as specified.

B. T. BABBITT.

Witnesses:

FRED. HAYNES,  
J. W. COOMBS.