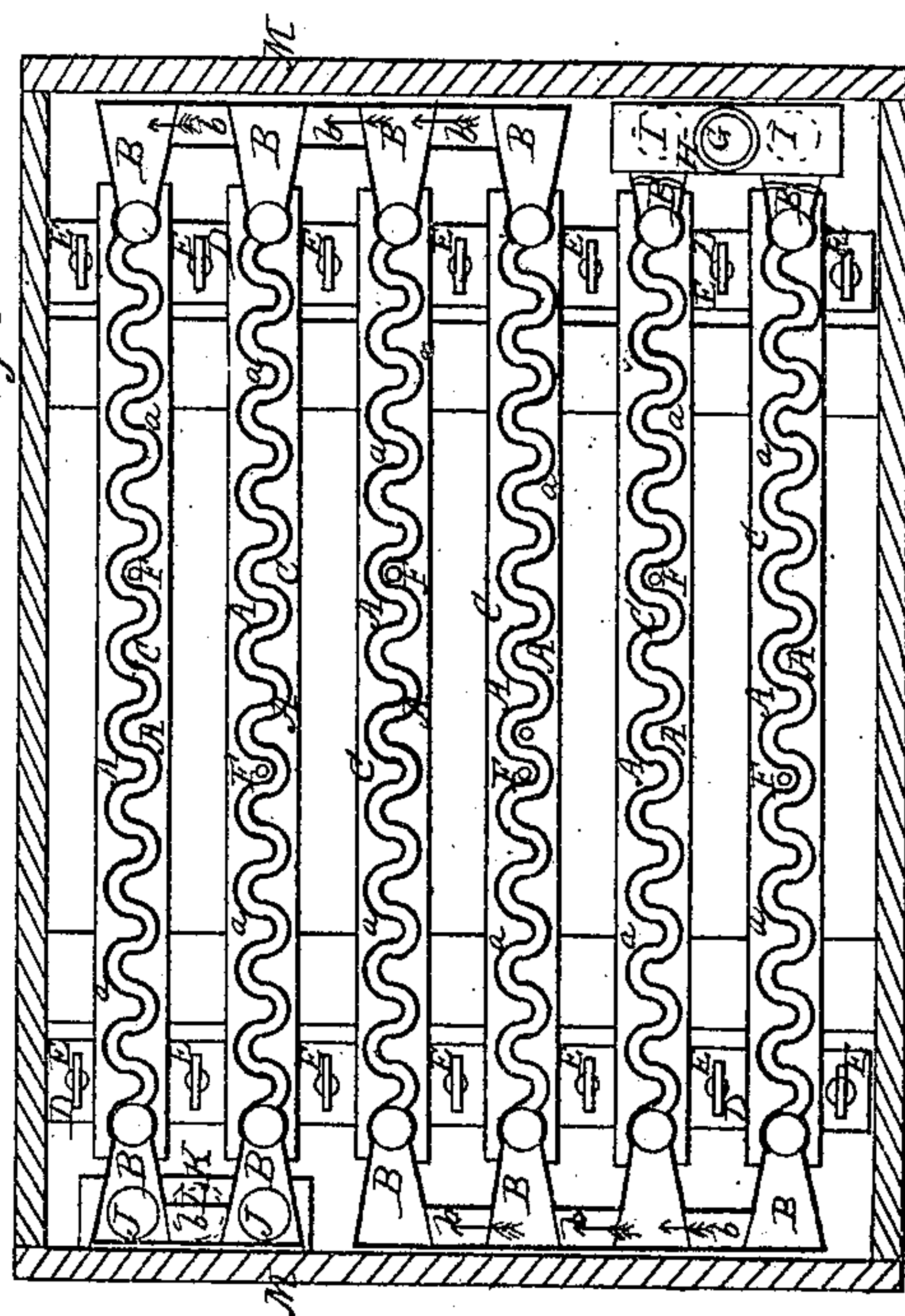
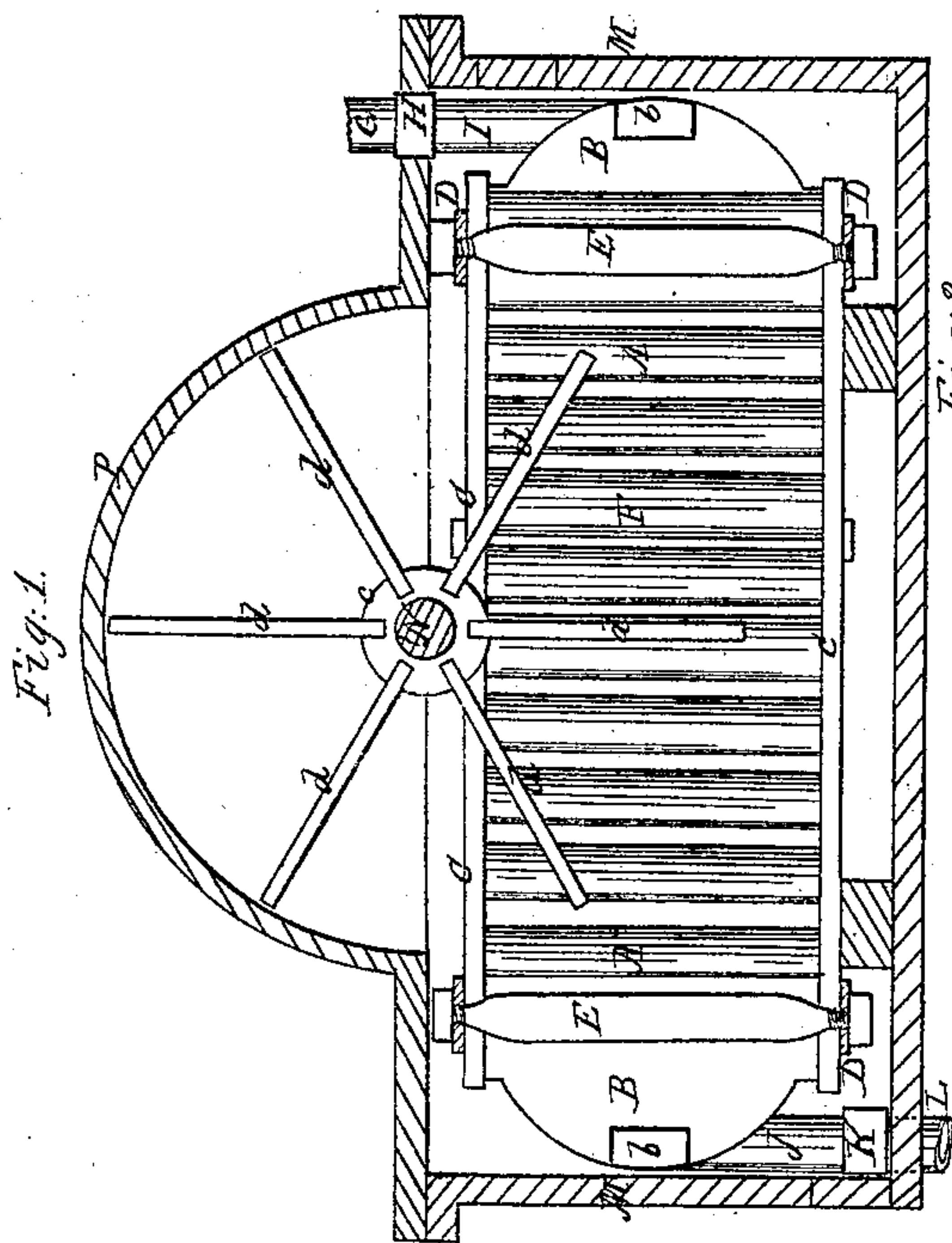
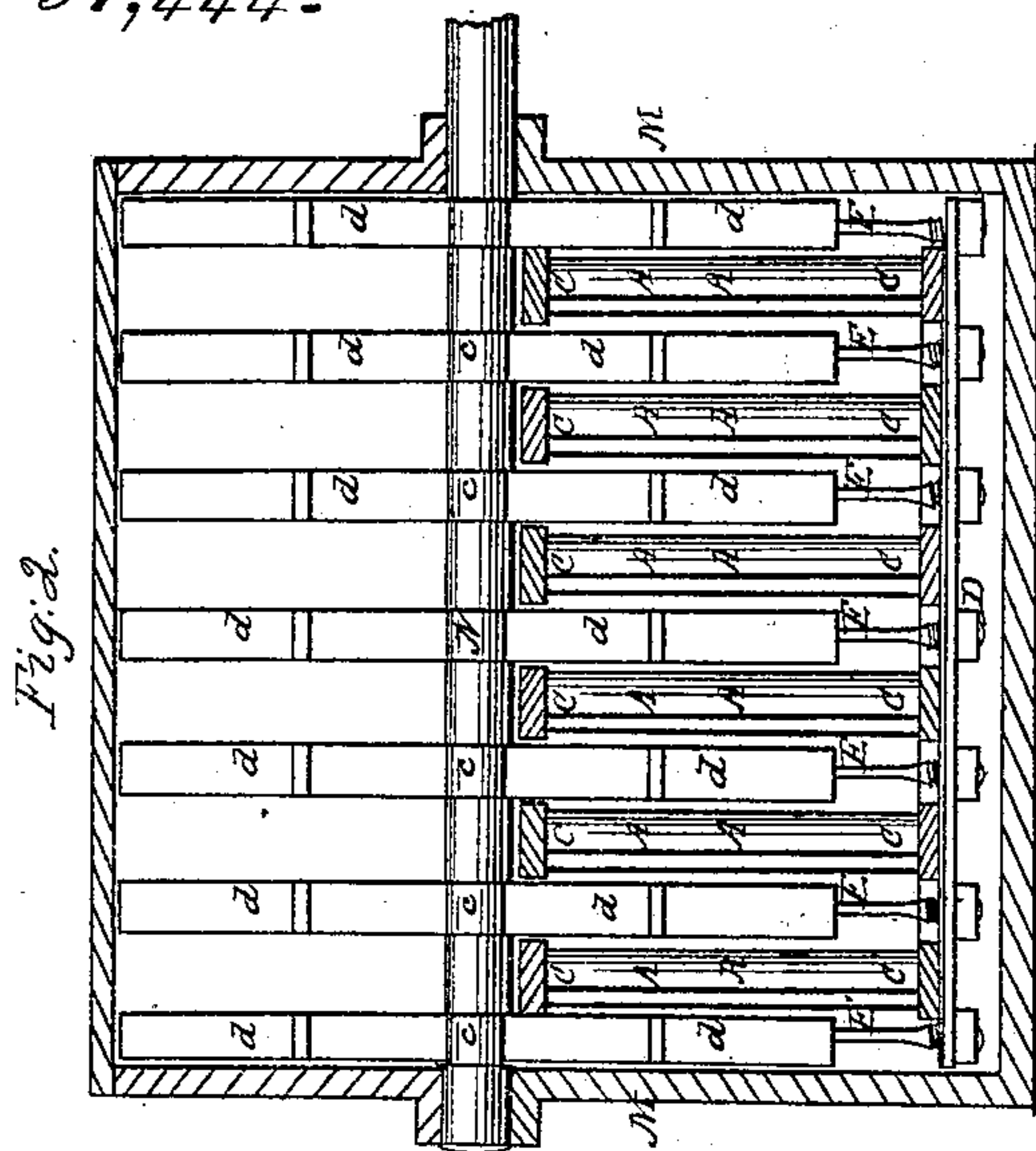


P. Hammond,
Steam-Boiler Condenser.

N^o 37,444.

Patented Jan. 20, 1868.



Witnesses.

W. H. Combs.
Geo. W. Reed

Inventor.

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UNITED STATES PATENT OFFICE.

PETER HAMMOND, OF CASTLETON, NEW YORK.

IMPROVEMENT IN SURFACE-CONDENSERS.

Specification forming part of Letters Patent No. 37,444, dated January 20, 1863.

To all whom it may concern:

Be it known that I, PETER HAMMOND, of Castleton, in the county of Richmond and State of New York, have invented a new and useful Improvement in Surface-Condensers and Water-Coolers for Steam-Engines and Other Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1 and 2 are vertical sections at right angles to each other of a condenser or cooler with my improvement. Fig. 3 is a horizontal section of the same.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in combining the plates, or their equivalents, which constitute the condensing or cooling surfaces of the condenser or cooler, by means of joints of novel construction, whereby I obtain at comparatively small cost a very effective condenser or cooler which is not liable to leakage.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction with reference to the drawings.

A A are the plates, which constitute the principal condensing or cooling surfaces, made of corrugated iron, and arranged side by side in pairs at short distances apart to form narrow spaces *a a* for the passage of the steam to be condensed or the water to be cooled. The plates of each pair have their ends, which are straight, united by hollow segment-shaped connections B B, and their top and bottom edges, which present the irregular or wavy form consequent upon the corrugation, are combined by means of the flat strips of wood C C, which are clamped so firmly against them as to cause the said edges to indent themselves into the wood, which is thus caused to form tight joints with both plates without packing. The said strips C C extend the whole length of the plates A A, and a pair of plates, A A, two segment-shaped connections, B B, and two strips, C C, form one section of the condenser or cooler, which may be composed of any number of such sections arranged side by side.

The clamping of the strips C C to the plates

A A may be effected by various applications of screw-bolts. In the drawings there are represented four flat clamping-bars, D D D D, two above and two below, extending right across the whole series of sections, and held by screw-bolts E E, applied between the several sections and outside of the outer sections, and at intervals between the clamping-bars of each section bolts F F are inserted through the strips themselves, as shown in Figs. 1 and 3.

Other material may be substituted for wood for the strips C C, but I prefer wood, as it is cheap and does not require packing to make tight joints.

The segment-shaped connections B B at each end of the apparatus are severally so connected with each other, as shown at *b b* in Fig. 3, that there may be a circulation back and forth from one to another and through the several sections of the condenser or cooler, as indicated by arrows in that figure.

The system of connections *b b* may be so arranged that the circulation may be alternately in opposite directions all through the series of sections, but the drawings represent the system so arranged that the circulation is through two sections in one direction, and then through two in the opposite direction throughout, as will be understood by reference to Fig. 3 and the arrows marked thereon.

The pipe G, by which the steam or hot water enters, is connected by a box, H, with two branch pipes, I I, connecting with the first two pieces B B, and the last two pieces B B are connected by pipes J J and a box, K, with the pipe L, by which the condensed or cooled water is carried off.

M is a wooden tank in which the condenser or cooler is placed, and in which the cooling-water circulates in contact with the exterior surfaces of the plates A A, suitable openings being provided in the said tank for the entrance or exit of such water.

N is a horizontal shaft arranged above and across the condenser or cooler in suitable bearings on the sides of the tank, and furnished with hubs *c c*, to each of which is attached a series of arms or floats, *d d*, to work in the spaces between the several sections and between the outer sections and the sides of the tank. By giving rotary motion to this shaft the arms or floats are caused to produce a cir-

culatation of the water from the inlet to the outlet, and at the same time produce such a degree of agitation of the water as to bring every portion of it in contact with the surfaces of the plates A.

P is a cover fitting to the top of the tank, and inclosing the shaft and arms or paddles.

Instead of this system of revolving arms or paddles there may be used for the same purpose a rotating screw, like a screw-propeller, fitted to the inlet-pipes, by which the cooling-water is supplied.

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

Combining the plates A A, or their equivalents, which constitute the cooling-surfaces of the condenser or cooler, by means of strips C C, applied and clamped in their places, substantially as herein set forth.

PETER HAMMOND.

Witnesses:

HENRY T. BROWN,
M. M. LIVINGSTON.