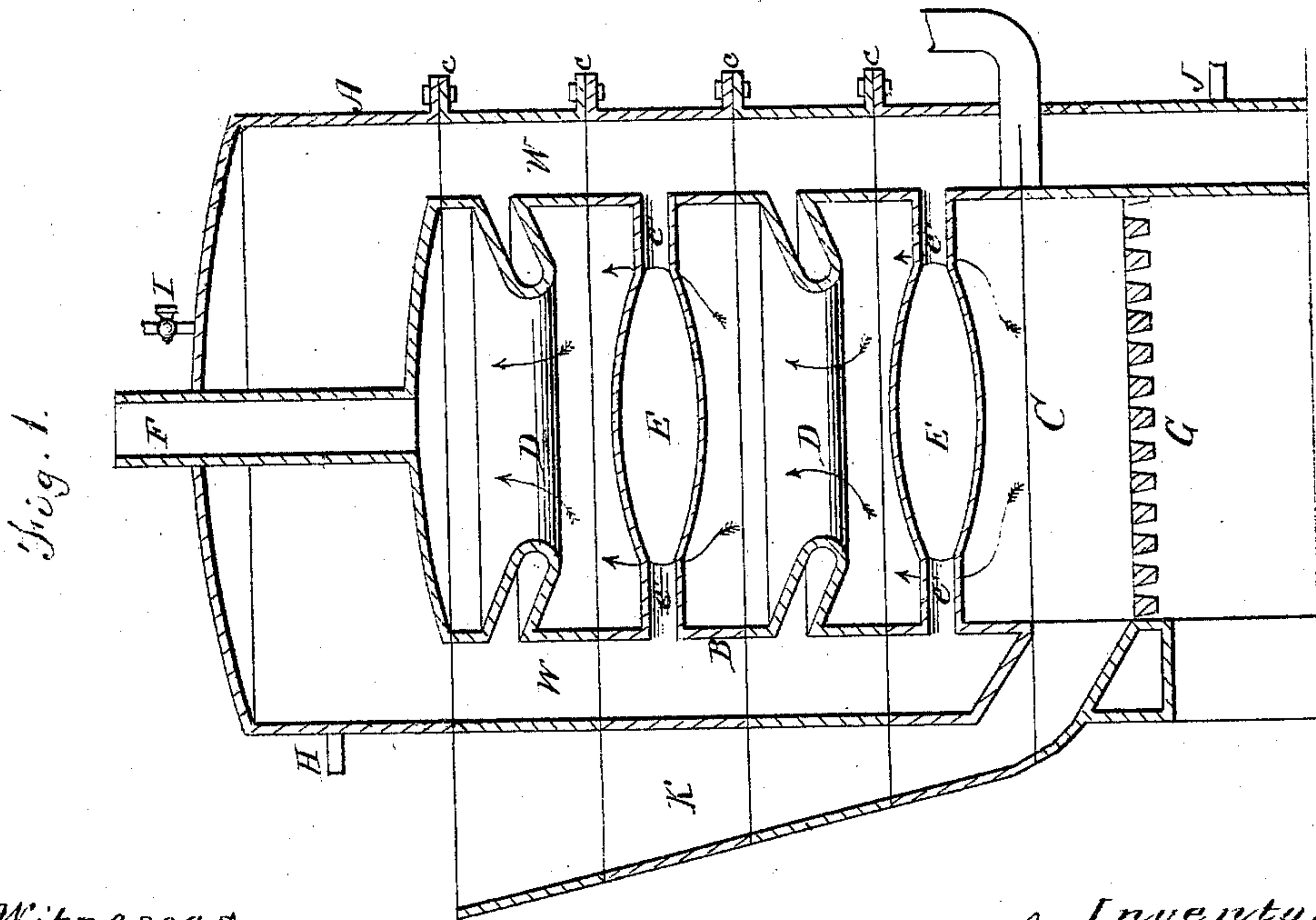
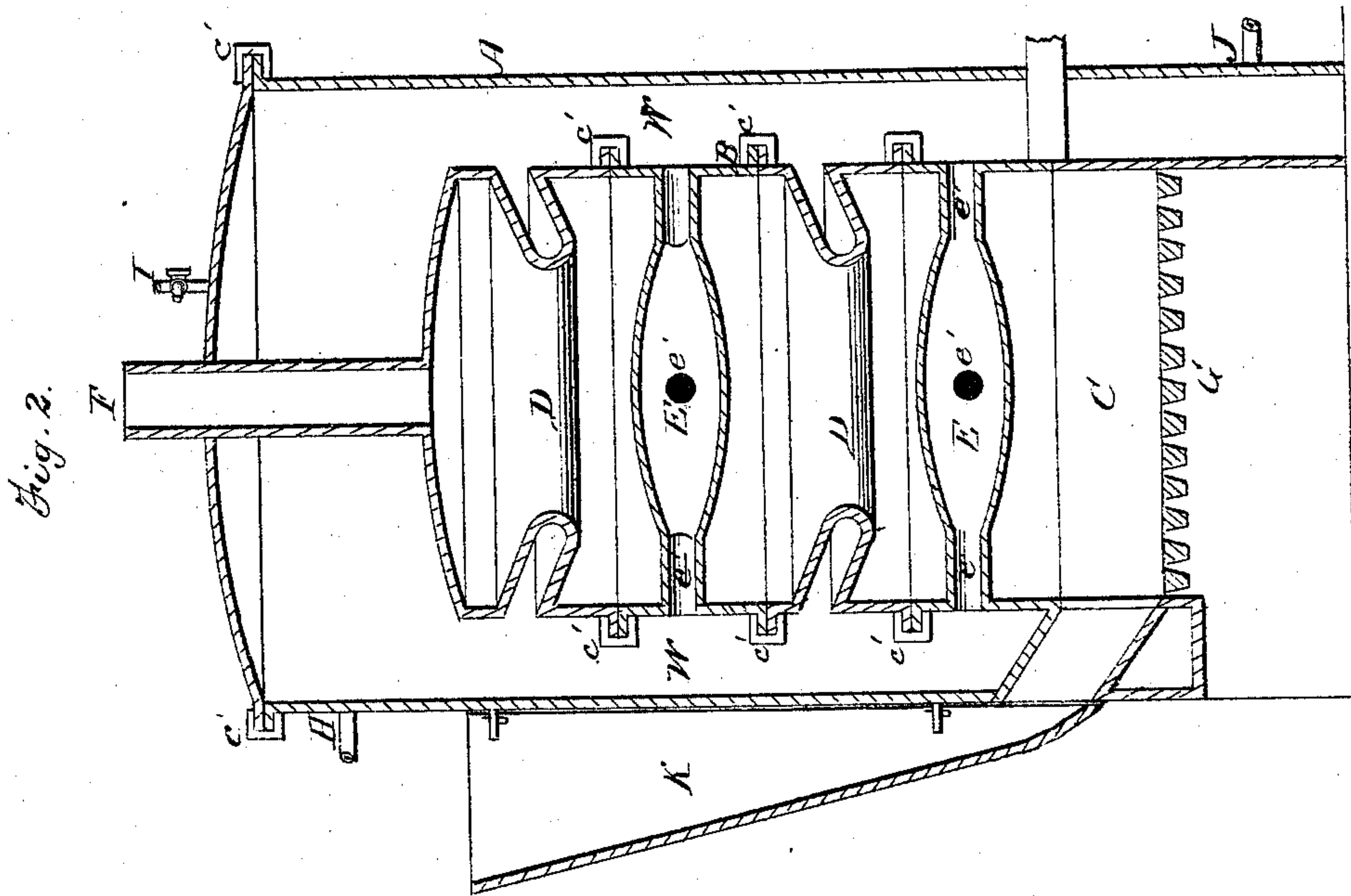


G. W. T. SHAFFNER.

Improvement in Sectional Steam-Generators.

No. 128,916.

Patented July 9, 1872.



Witnesses
 Wm. Ellsworth
 Melville Church

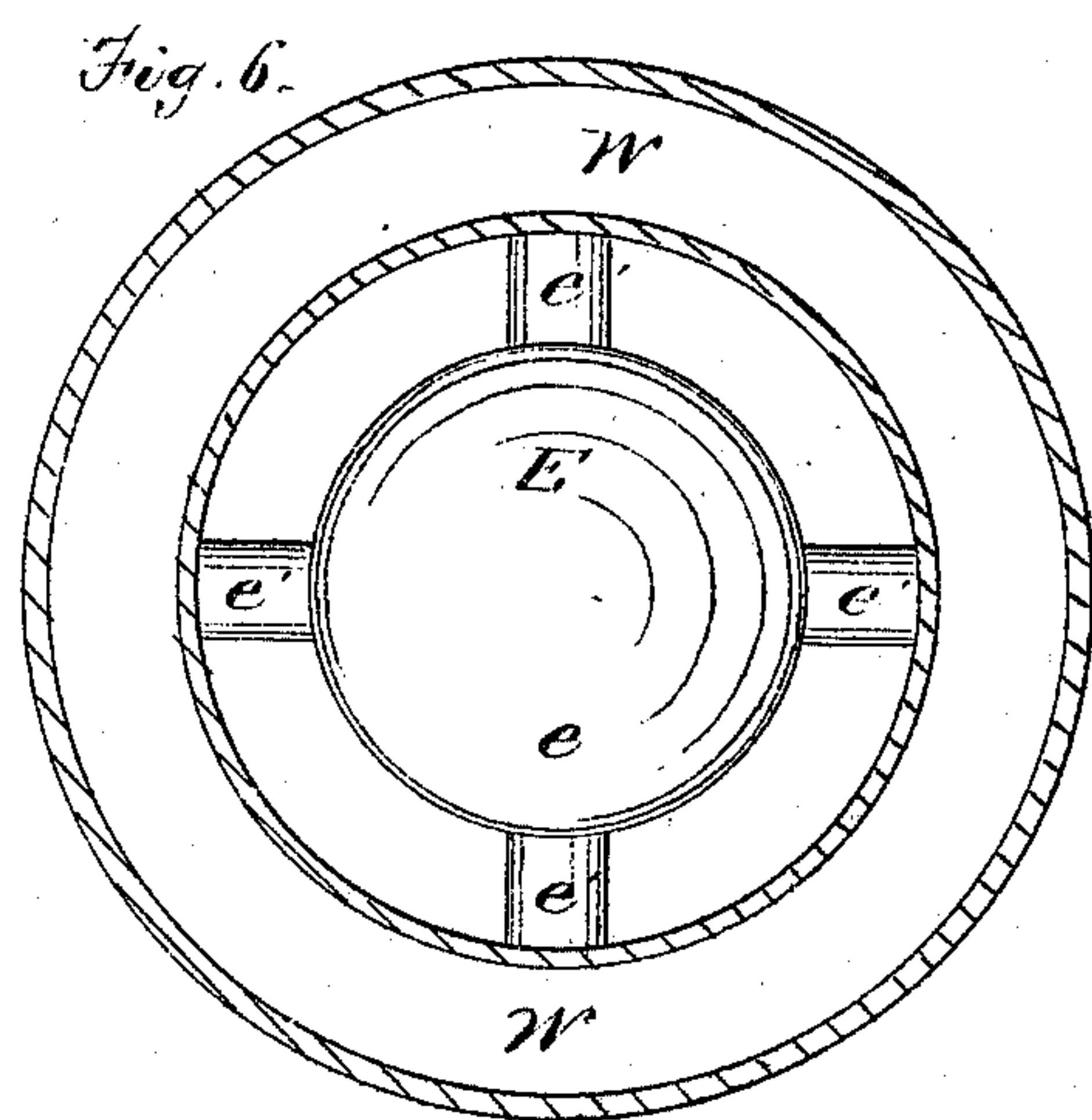
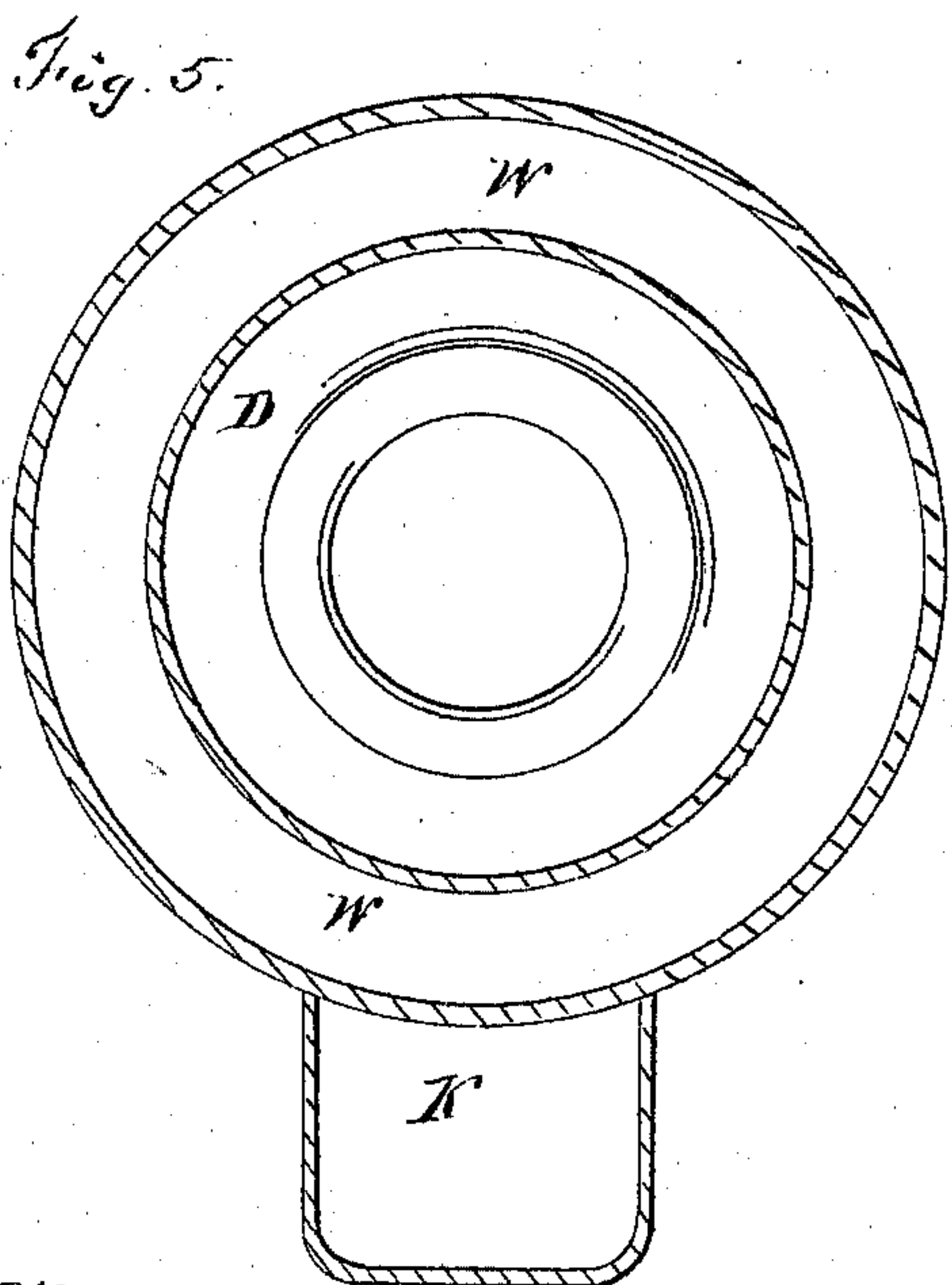
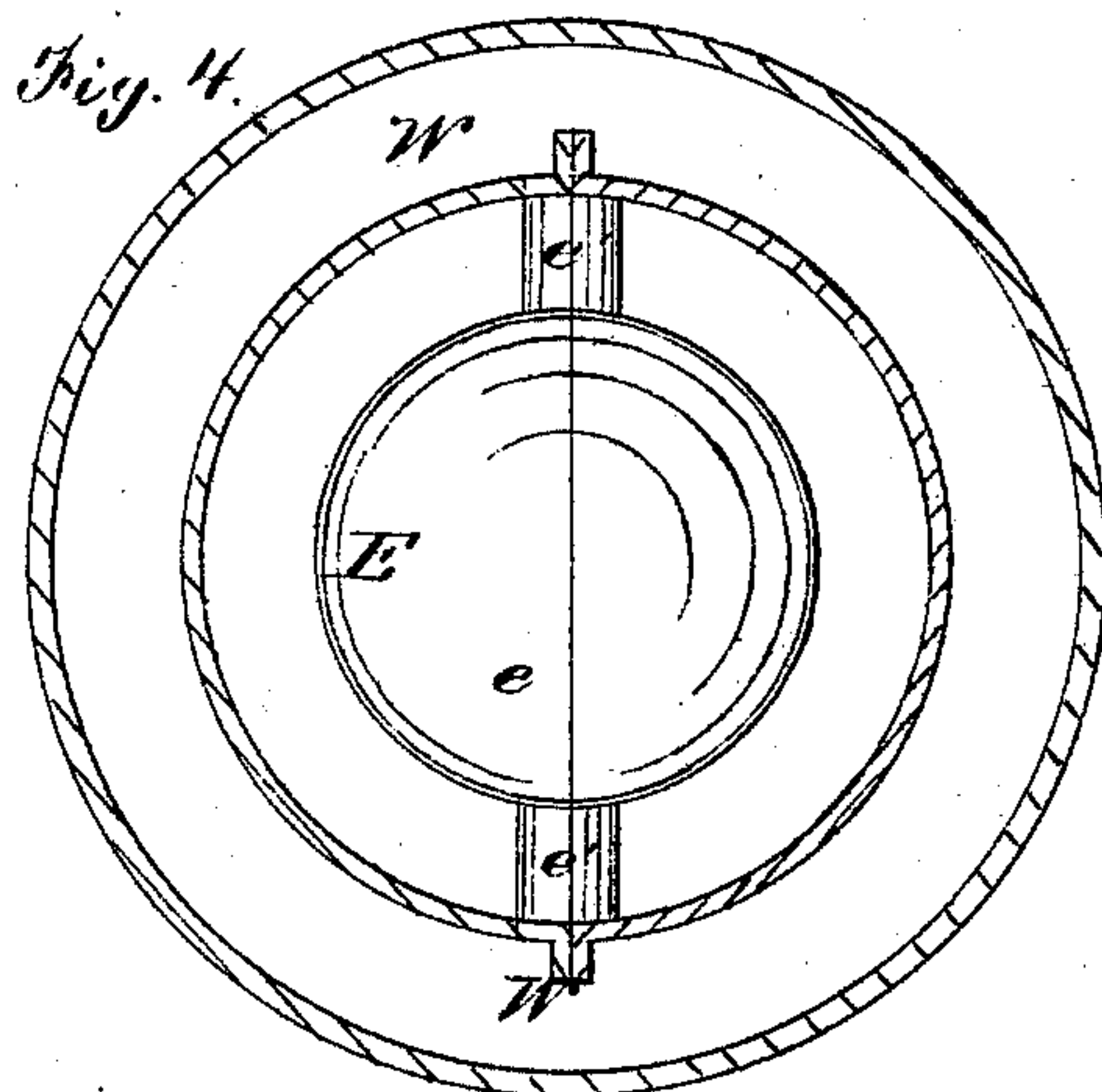
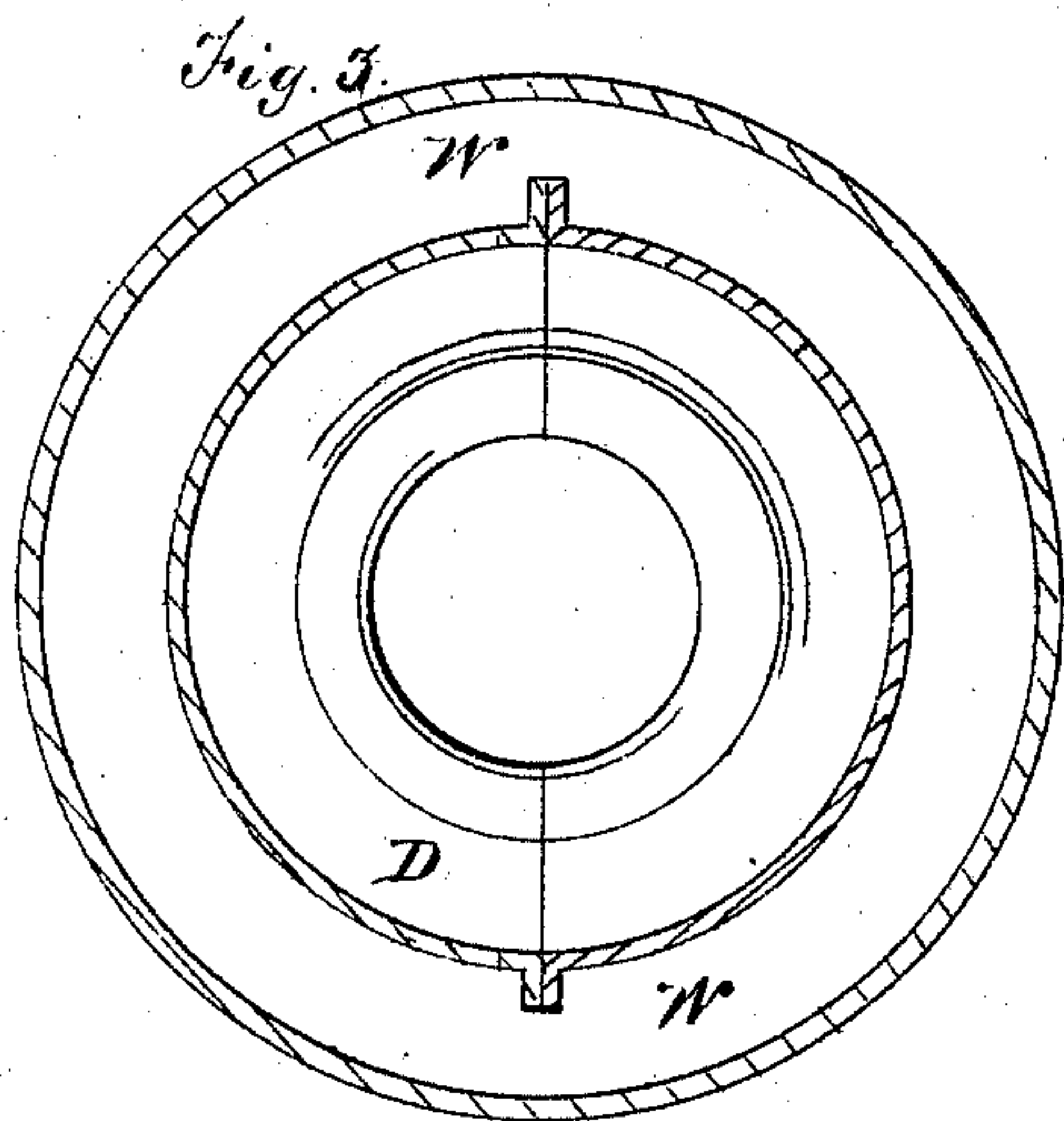
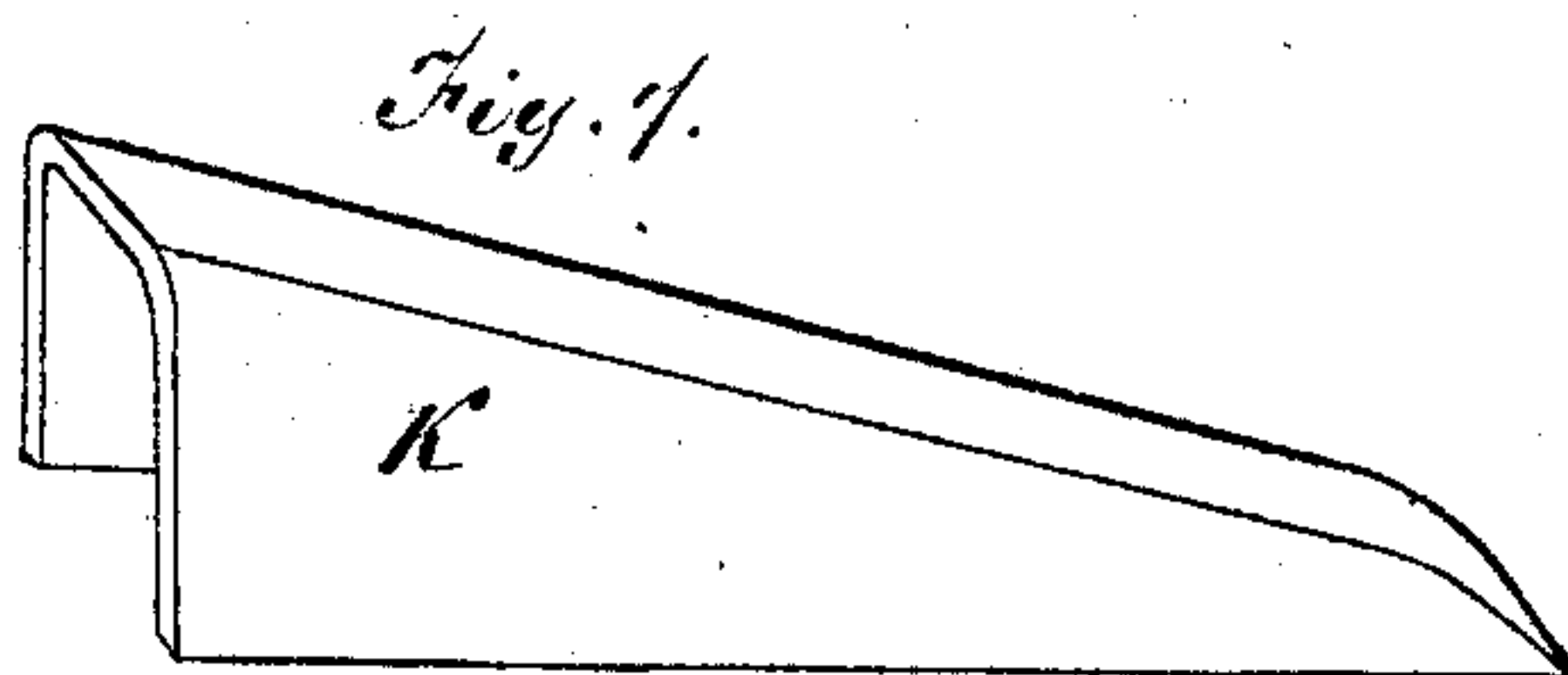
Inventor.
 G. W. T. Shaffner
 By his Attys.
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UNITED STATES PATENT OFFICE.

GEORGE W. T. SHAFFNER, OF FREDERICK, MARYLAND.

IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

Specification forming part of Letters Patent No. 128,916, dated July 9, 1872.

To all whom it may concern:

Be it known that I, GEORGE W. T. SHAFFNER, of the city and county of Frederick and State of Maryland, have invented a new and useful Steam-Generator; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figures 1 and 2 are vertical sections, showing different methods of construction. Figs. 3, 4, 5, and 6 are horizontal sections, showing different methods of construction; and Fig. 7 is a detached perspective view of the fuel-reservoir.

Similar letters of reference in the accompanying drawing indicate the same parts.

The object of this invention is to improve the construction of steam-generators in such a manner that without increasing their cost they will be adapted to the more rapid and effectual conversion of the water into steam than heretofore; and to this end, my invention consists in a series of steam-generating chambers arranged so as to deflect the currents of hot air, &c., in a zigzag course, said chambers receiving and discharging the water laterally, as hereinafter described.

In the drawing, A is the outer shell of the boiler; B, the inner wall; C, the fire-chamber; K, the fuel-reservoir; F, the smoke-flue; G, the grate; H, the supply-cock; I, the outlet-pipe for the steam; and J, the return-pipe for the steam. The whole apparatus, as in Fig. 1, or any portion of it, as at B, Fig. 2, may be cast or otherwise constructed in sections, the sections being connected by suitable flanges, as represented at *c c*, Fig. 1, and said flanges, when arranged inside of the boiler, being protected and rendered water-tight by means of annular caps *c' c'* of welded iron or any other suitable material, as shown in Fig. 2. The fuel-reservoir may be cast in sections with the rest of the apparatus, or it may be made independent of the rest and be attached by means of pintles and eyes, as shown in Fig. 2, so that it can be removed whenever desirable. The shape of all the parts above referred to may be as represented in the drawing, or it may be varied in whole or in part, according to the fancy of the manufacturer or the situation

where the generator is to be employed. Within the shell B steam-generating chambers D E are arranged as represented; those designated as D being of an annular form, opening into the water-space W around their outer edge, and provided with a large central opening; while those designated as E are in the form of a large lenticular vessel, *e*, connected to the water-space by horizontal tubular arms *e' e'*. The chambers D and E are arranged to alternate with each other, so that the heated currents of air, flame, smoke, &c., rising from the fire-chamber, will first strike one—as for example, the lower chamber E, Fig. 1—and be deflected outward against the annular ring constituting the chamber D, next above, which in turn will deflect them inward against the second chamber E, around which they will pass to the next chamber, D, and so on till they escape at the flue F. By this means the heated currents are thrown directly against the generating-chambers and caused to circulate around immediately in contact with them, so as to give up the greatest possible amount of caloric to the water circulating through said chambers, and thereby cause the steam to be generated with the least expenditure of fuel and the greatest economy of time. The chambers act in combination with each other in deflecting the heated currents of air, &c., but independently of each other in receiving and discharging the water, and the result is that quantities of heated water and steam are forced out into the space W at different points around the fire-chamber and at different elevations, imparting their heat simultaneously to the water in every part of the boiler, and thus greatly facilitating the rapid generation of the steam. The inner wall B and the generating-chambers D E, instead of being constructed in horizontal sections, as shown in Figs. 1, 2, may be made of wrought-iron, in which case the better way will be to make them in sections, as shown in Figs. 3, 4, the two sides being fitted closely together, so that, when united and cemented in any suitable manner, they will be perfectly water and steam tight. Instead of annular chambers, D, constructed like grooves sunk deep in the outer walls of the shell B, as shown, a system of pipes coiled around to occupy the

position of the chamber D might be employed. A system of such pipes might even be employed in lieu of the parts E, they being so arranged as to deflect the ascending currents outward from the center, while the pipes occupying the place of the chambers D would deflect toward the center, thus operating exactly like the generators D E. Such construction, if employed, I should regard as the equivalent of my invention, so far as the arrangement of the deflectors is concerned. When the sections are cast they are annealed to about three-fourths of the temper of wrought-iron, so as neither to scale nor crack by the great heat to which they will be subjected.

Having thus described my invention, what I claim is—

In a steam-generator the arrangement of chambers D E to deflect heated currents back and forth, when such chambers receive and discharge the water laterally from and into the space W, substantially as and for the purposes described.

GEO. W. T. SHAFFNER.

Witnesses:

N. K. ELLSWORTH,
MELVILLE CHURCH.