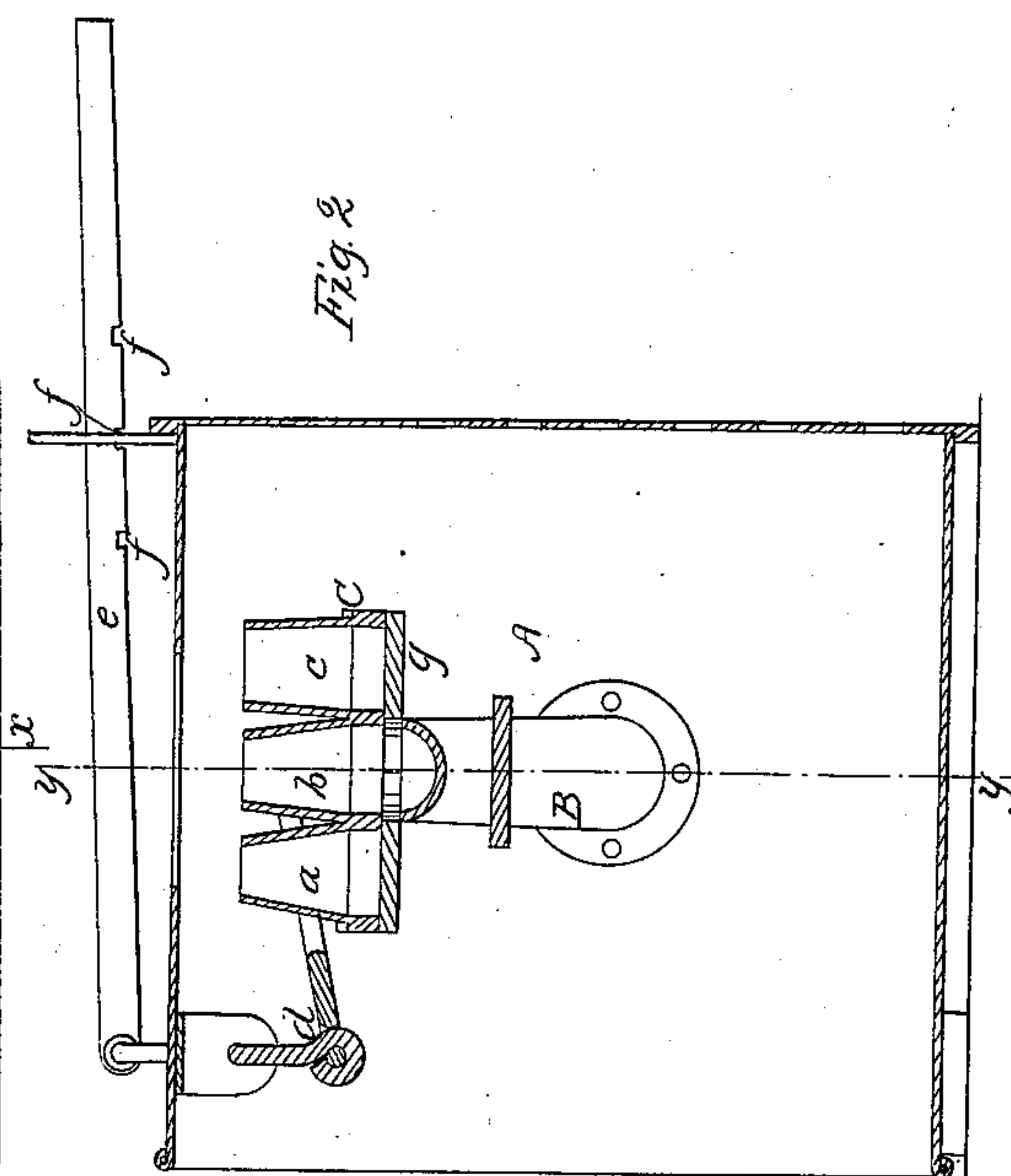
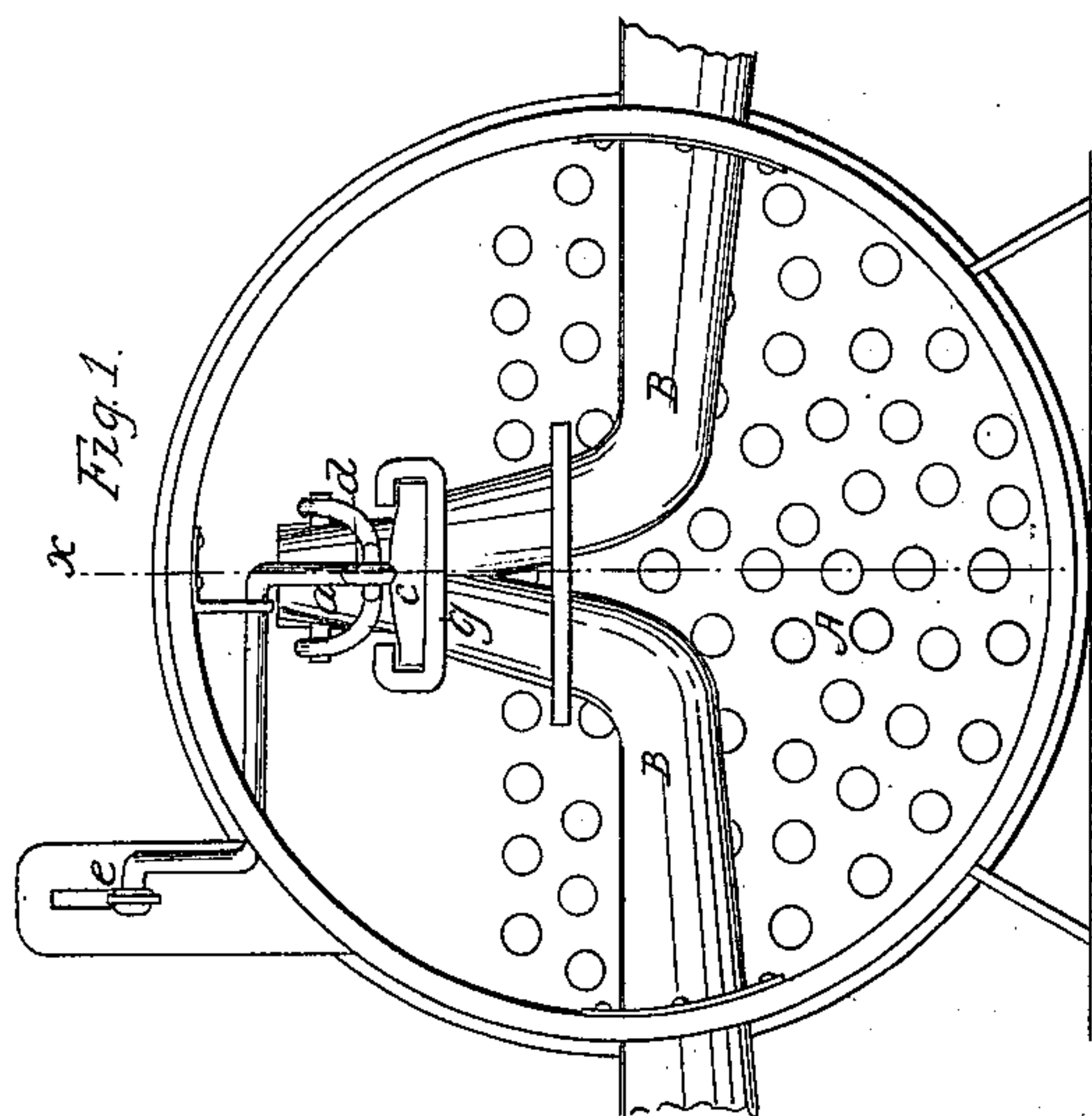
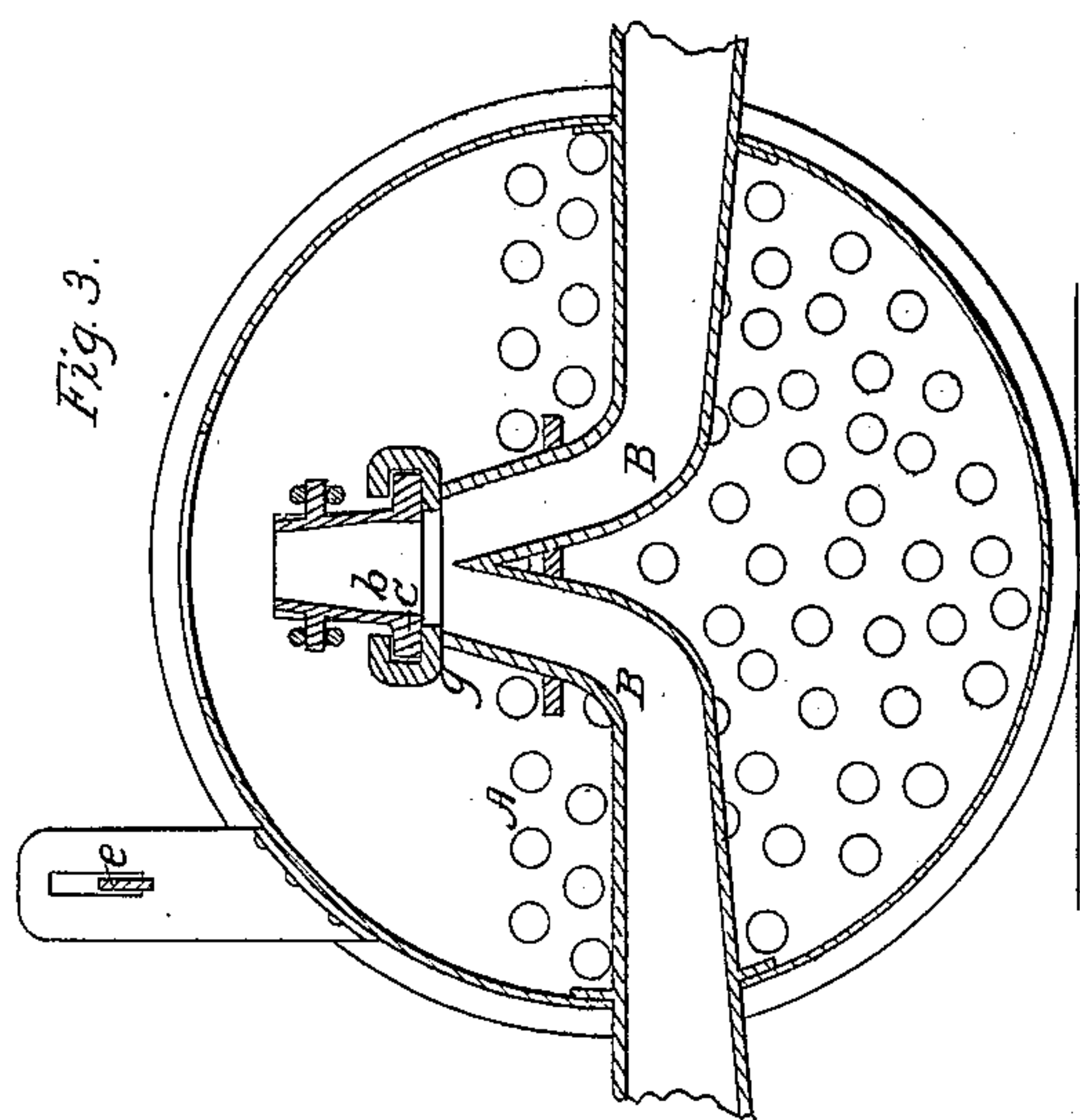


F. Espenshade,

Exhaust Mechanism for Locomotives.

N^o 10,634.

Patented Mar. 14, 1854.



UNITED STATES PATENT OFFICE.

FREDK. ESPENSCHADE, OF MIFFLINTOWN, PENNSYLVANIA.

MOVABLE TAPERING NOZZLE FOR THE EXHAUST-PIPES OF LOCOMOTIVES.

Specification of Letters Patent No. 10,634, dated March 14, 1854.

To all whom it may concern:

Be it known that I, FREDERICK ESPENSCHADE, of Mifflintown, in the county of Juniata and State of Pennsylvania, have invented a new and Improved Mode of Increasing and Diminishing the Discharge-Apertures of the Exhaust-Pipes of Locomotives for Varying the Draft of the Furnaces Thereof; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, Figure 1 being an elevation of such portions of a locomotive as are necessary to exhibit my improvement and the manner of its action; Fig. 2, a vertical section thereof in the line *x x* of Fig. 1, and Fig. 3 a vertical section of the same in the line *y y* of Fig. 2.

Like letters designate corresponding parts in all the figures.

In ordinary locomotives the orifice of the exhaust pipes of the cylinder is made of a certain size, so as to cause a draft in the furnace generally suited to the character and use of each particular locomotive, but is not variable. By the improvement patented by Mr. Ross Winans, the discharge orifice was made variable in size, at the pleasure of the engineer, in order to increase or diminish the draft of the furnace when desired; but the means heretofore employed for that purpose, being somewhat complicated or attended with other inconveniences, have failed to produce the full efficacy of the improvement.

The object of my improvement is to effect the above described purpose by the simplest and most efficacious means.

The nature of my invention consists in applying as many short movable pipes, or nozzles, contracted to different sizes as it is desirable to have variations of draft; which nozzles are severally brought over the discharge orifice of the exhaust pipes by any convenient means under the control of the engineer, whenever he may desire to vary the draft.

The exhaust pipes *B, B*, pass into the part of the locomotive *A*, which is situated under the smoke pipe, and terminates in a single orifice centrally beneath it. A horizontal plate *g*, is secured on a level with the termination of said orifice, upon which slides in grooves, (or confined and

guided in any other well known and convenient manner,) a plate *C*, which is provided with a series of short nozzles *a, b, c*; the lower ends of which correspond in size with the size of the discharge orifice, but their upper ends are contracted to different sizes, as shown most clearly in Fig. 2. Either of these nozzles is brought over the said orifice by means of levers *d, e*, &c., and their positions are fixed and retained by notches *f, f*, &c.; or any other equivalent device may be employed for operating these nozzles. Their action scarcely needs any explanation, since it is evident that, if the smallest nozzle, as *a*, is brought over the orifice, the velocity of the issuing steam will be much increased, and consequently the draft of the furnace proportionally increased; but, if the largest nozzle, as *c*, is brought over the orifice, the velocity of the issuing steam will be much diminished, and the draft in proportion. Any intermediate number of nozzles may be employed, in order to obtain as many intermediate variations of the draft as desired. Said nozzles may be arranged in a straight line, as represented in the drawings, or in the arc of a circle, or in any other possible and convenient manner, provided the principle remains the same.

I am aware that various contrivances have been combined with the usual immovable conical nozzle of the waste steam pipe of locomotives, for the purpose of enabling the engineer to vary the draft in the furnace; and therefore I wish it to be understood that I limit my claim for Letters Patent to the employment of movable tapering nozzles of various sized orifices, so arranged that either of the said nozzles may, at will, be brought over the mouth of the waste steam pipes to vary the draft in the furnace of the locomotive, substantially as herein set forth.

The above specification of my new and improved mode of increasing and diminishing the discharge apertures of the exhaust pipes of locomotives, for varying the draft of the furnaces thereof, signed by me this 10th day of December, 1853.

FREDERICK ESPENSCHADE.

Witnesses:

JOSEPH LONG,
JAMES H. BROWN.