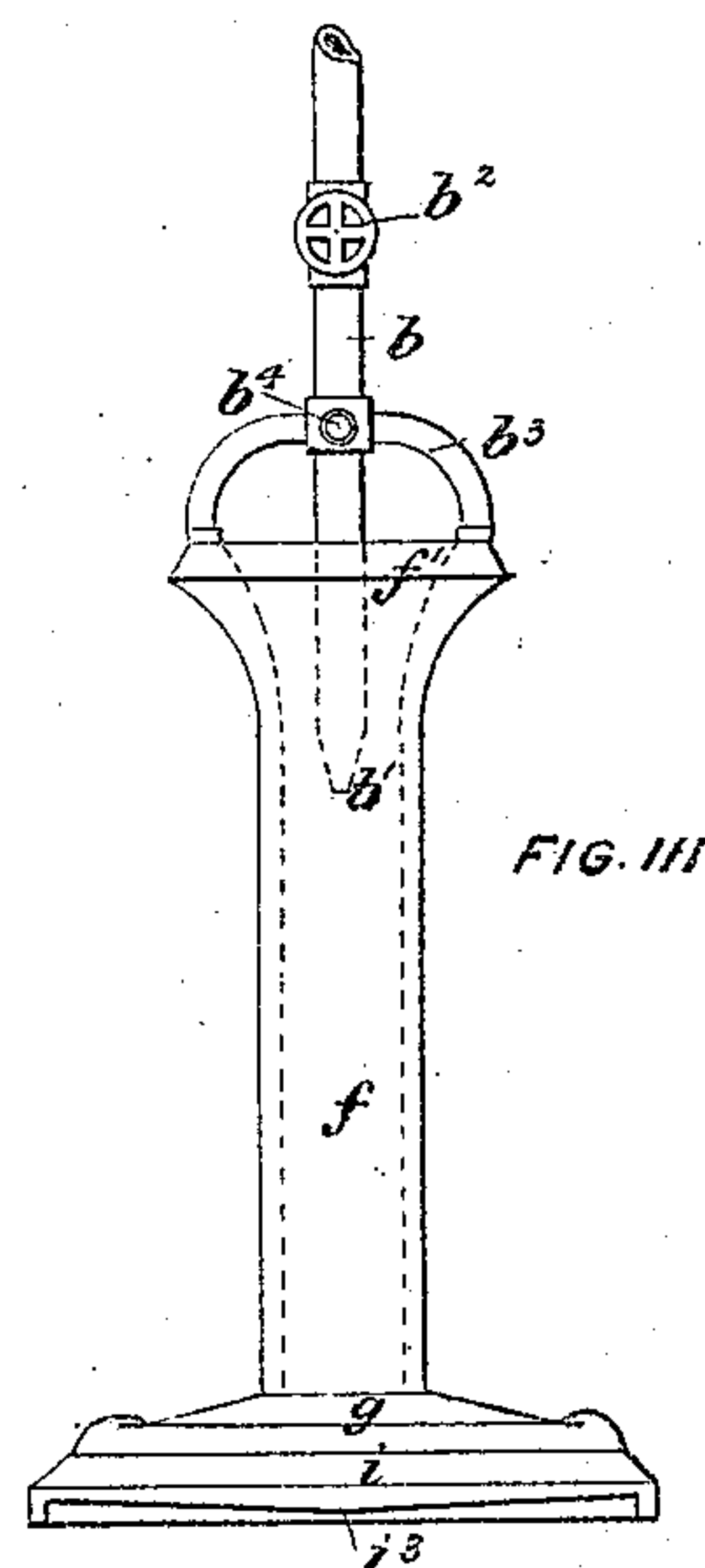
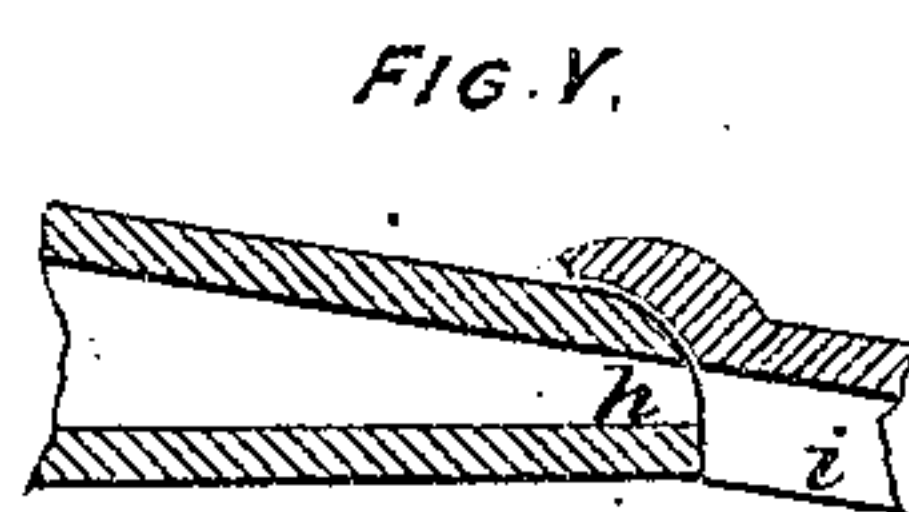
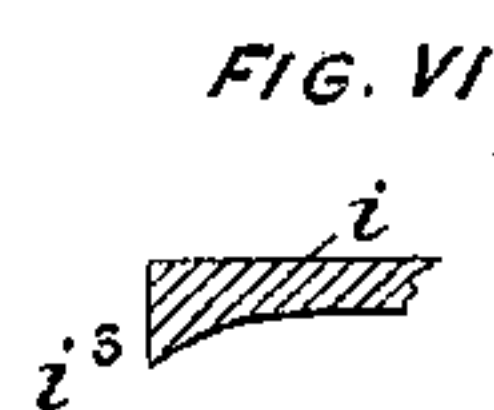
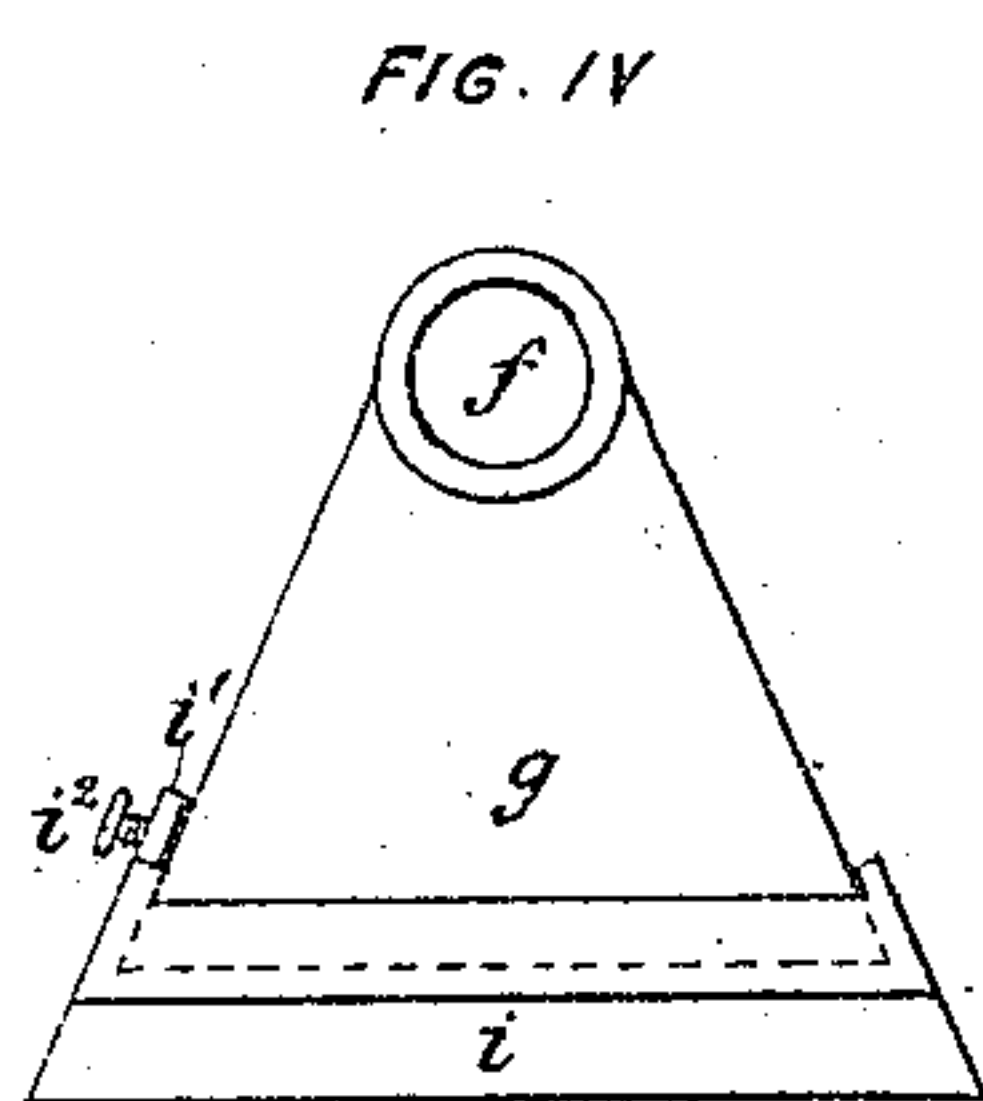
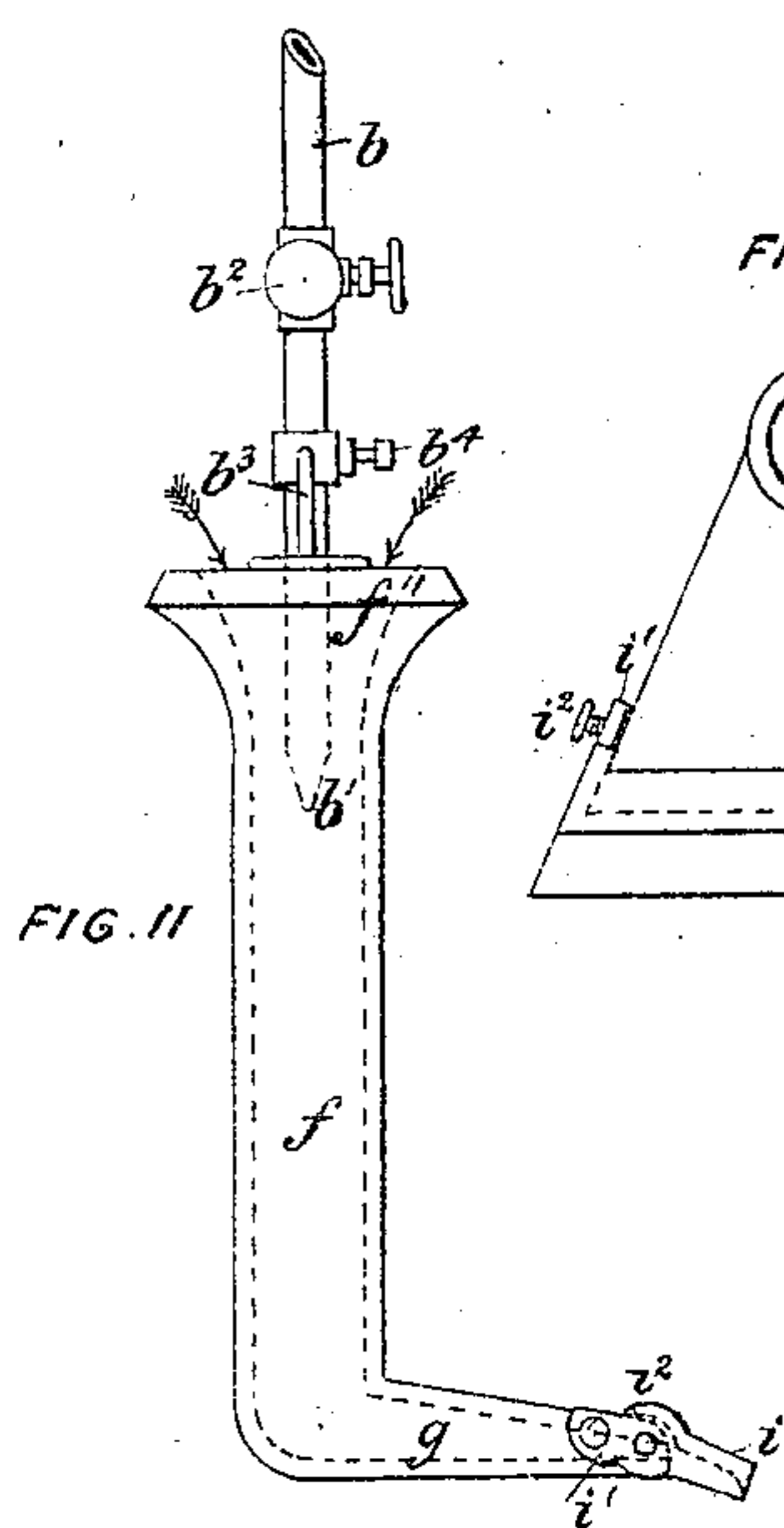
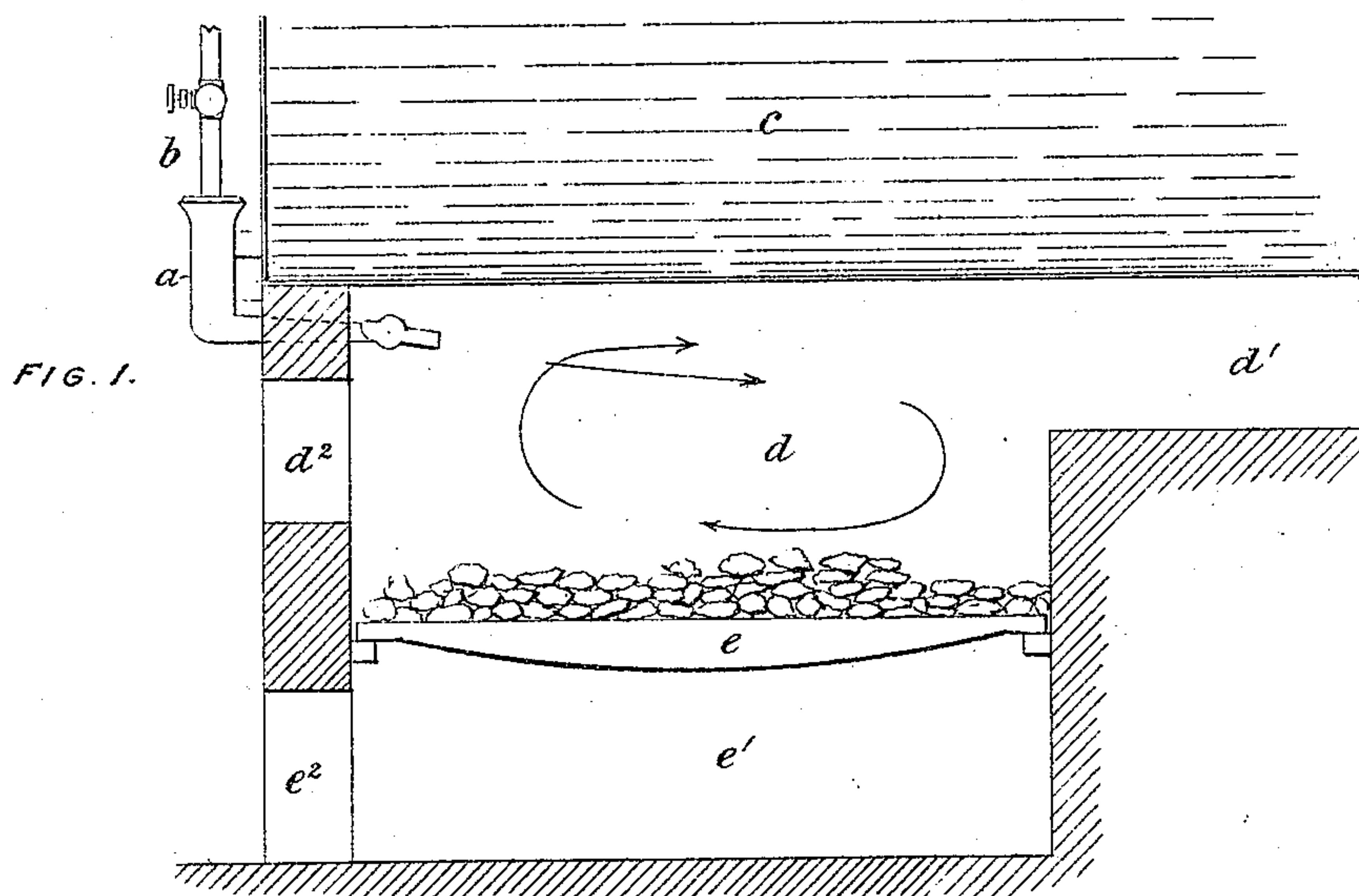


CHARLES PLUMB.

Improvement in Smoke Consumer.

No. 119,881.

Patented Oct. 10, 1871



Witnesses

Charles Legge
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Inventor

Charles Plumb.

UNITED STATES PATENT OFFICE.

CHARLES PLUMB, OF MONTREAL, CANADA, ASSIGNOR TO HIMSELF AND ROBERT MITCHELL, OF SAME PLACE.

IMPROVEMENT IN SMOKE-CONSUMERS.

Specification forming part of Letters Patent No. 119,881, dated October 10, 1871.

To all whom it may concern:

Be it known that I, CHARLES PLUMB, of the city of Montreal, in the district of Montreal, in the Province of Quebec, Canada, engineer, have invented new and useful Improvements on the Art of Consuming Smoke and on the apparatus used therefor; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, where—

Figure I represents a side elevation of the apparatus as applied to the furnace of a steam-boiler. Fig. II represents a side elevation of the apparatus. Fig. III represents a front elevation of the apparatus. Fig. IV represents a plan of nozzle of the apparatus. Fig. V represents a detail of nozzle of the apparatus. Fig. VI represents a detail of lip of the apparatus.

This invention relates to an improved apparatus for causing the smoke and gas arising from the combustion of fuel, which would otherwise pass to the chimney, to be consumed, in furnaces and other inclosed fire-places, and also materially assists the draught of the furnace, whereby more heat is obtained from the same amount of fuel and a proportionate amount of steam raised. The invention, however, can only be used where a jet of steam can be had to apply to the apparatus, or a blast of air from a fan or other blowing apparatus.

In the drawing, similar letters of reference indicate like parts.

In Fig. I, *a* is the apparatus for the consumption of smoke; *b*, a steam-pipe leading from the steam-space of any suitable boiler, *c*, and connected with the apparatus. *d* is the fire-chamber; *d*¹, the flue; and *d*², the fire-door; *e*, the fire-bars; *e*¹, the ash-pit; and *e*² the ash-pit door, respectively, of any furnace. In this figure the ordinary situation of the apparatus in connection with a furnace is delineated, but it may be varied to suit different cases. In Figs. II, III, IV, V, and VI the apparatus is shown in detail, and comprises the following parts: *f* is a pipe placed vertically, or as may be found most convenient, in the different furnaces to which the apparatus is applied, widening out at the end most distant from the furnace into a bell-mouth, as shown at *f'*, into which is set the steam or air-pipe *b*, which diminishes at its lower end in diameter, so that

the steam can only escape through a very small aperture, as shown at *b*¹. *b*² is a valve for regulating the supply of steam or air to the pipe *f*; and *b*³, a bracket for the support of the steam-pipe *b* furnished with a set-screw, *b*⁴, for the purpose of adjustment. To the bottom of the pipe *f* is fixed (in this case at right angles, but it may be varied to suit the circumstance of any furnace) the nozzle *g* changing in shape from a cylindrical to a rectangular form, flattening and widening as it is carried out, so as to produce a narrow elongated opening, *h*, of the size required. To the end of the nozzle *g* the lip *i* of the configuration shown in Figs. IV, V, and VI is secured in such a way as to allow it to be depressed to any angle, so as to be able to direct the draught in any particular direction. The lip *i* is secured at any required angle to the nozzle *g* by means of a projection, *i*¹, and set-screw *i*², and its top side is depressed in the center at the inner end, as shown at *i*³, Figs. III and VI, to divide and diffuse the current of air, or air and steam. This depression gradually returns to the thickness of the rest of the lip *i*, in the manner shown in Fig. VI.

Having thus described the construction of my invention, I will now proceed to show the manner in which it is put in operation.

The fire having been lighted in the fire-chamber *d*, and the boiler thoroughly heated steam is admitted by the steam-pipe *b* into the pipe *f* and rushes into it with great force through the small orifice at *b*¹, creating a partial vacuum into which the air pours, as indicated by the arrows, and, mixing with the steam, passes down the pipe *f*, along and out of the nozzle *g*, being depressed to any required amount, according to the angle at which the lip *i* is set, and divided and diffused by the depression *i*³ at the end of the lip. The immediate effects of this mingled blast of air and steam are to produce an eddy in the flame-chamber and cause the products of combustion to revolve or roll over the surface of the fire several times, as indicated by the arrows, Fig. I, before escaping to the flue, the process being repeated until the gas and smoke arising from the combustion of the fuel are wholly or nearly consumed. The mingled air and steam act also somewhat in the nature of a "blast," increasing the draught of the furnace and making the fire burn more fiercely. The pipe *b*, as before mentioned, may be arranged to

convey a blast of air from any suitable blowing apparatus instead of steam, as above described, for producing similar results.

Having thus described the construction and operation of my invention, what I claim as my invention, and wish secured by Letters Patent, is the new and useful improvements on the art of consuming smoke, and on the apparatus used therefor, as follows:

1. The process described of consuming smoke, consisting in causing the smoke to revolve over the furnace by means of an eddy, created substantially as described.

2. The pipe *f*, nozzle *g*, lip *i*, steam or air-pipe

b, or their equivalents, arranged for operating substantially as and for the purpose set forth.

3. The adjustable lip *i*, in its parts of projection *i*¹, set-screw *i*², depression *i*³, arranged and working substantially as set forth.

4. The nozzle *g*, with elongated opening *h*, arranged and operating with a blast, substantially as set forth.

Montreal, 28th day of July, A. D. 1871.

CHARLES PLUMB.

Witnesses:

CHARLES LEGGE,

WM. BRYMNER.