

J. BULLARD.

Oil Still.

No. 34.195.

Patented Jan. 21, 1862.

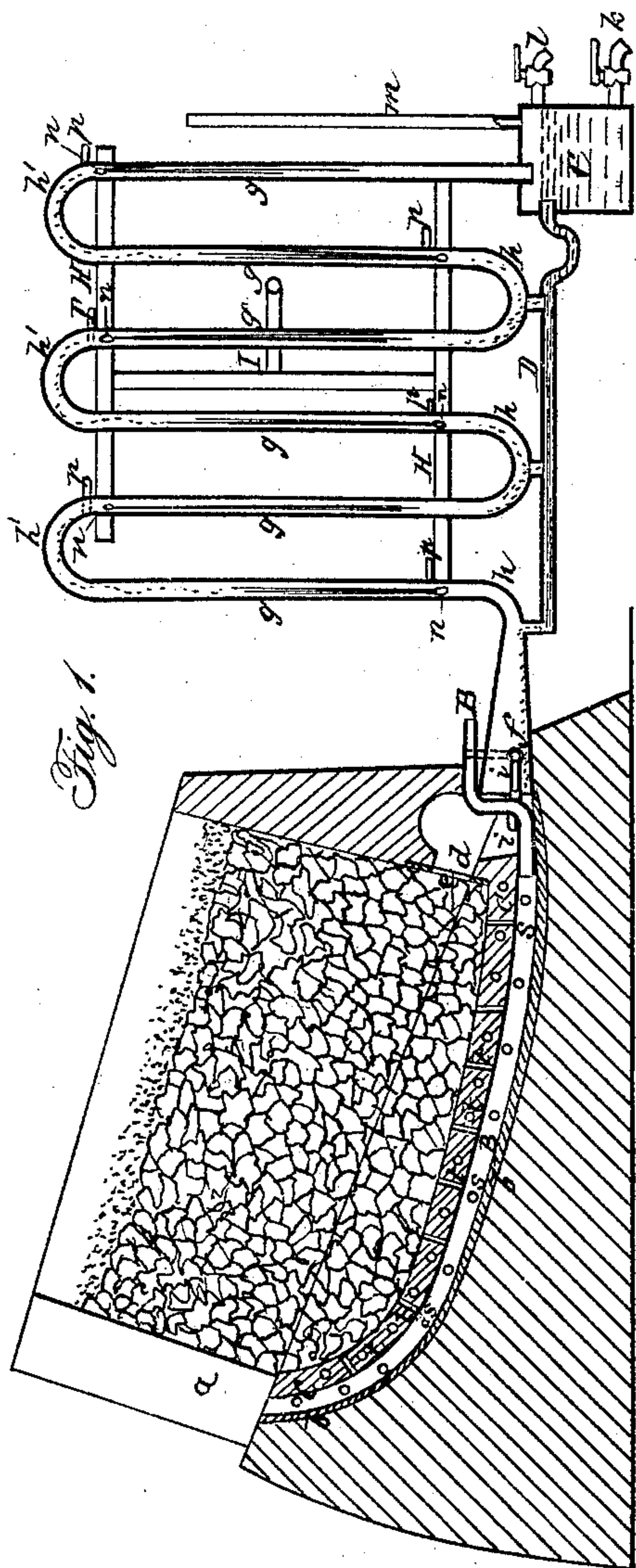


Fig. 1.

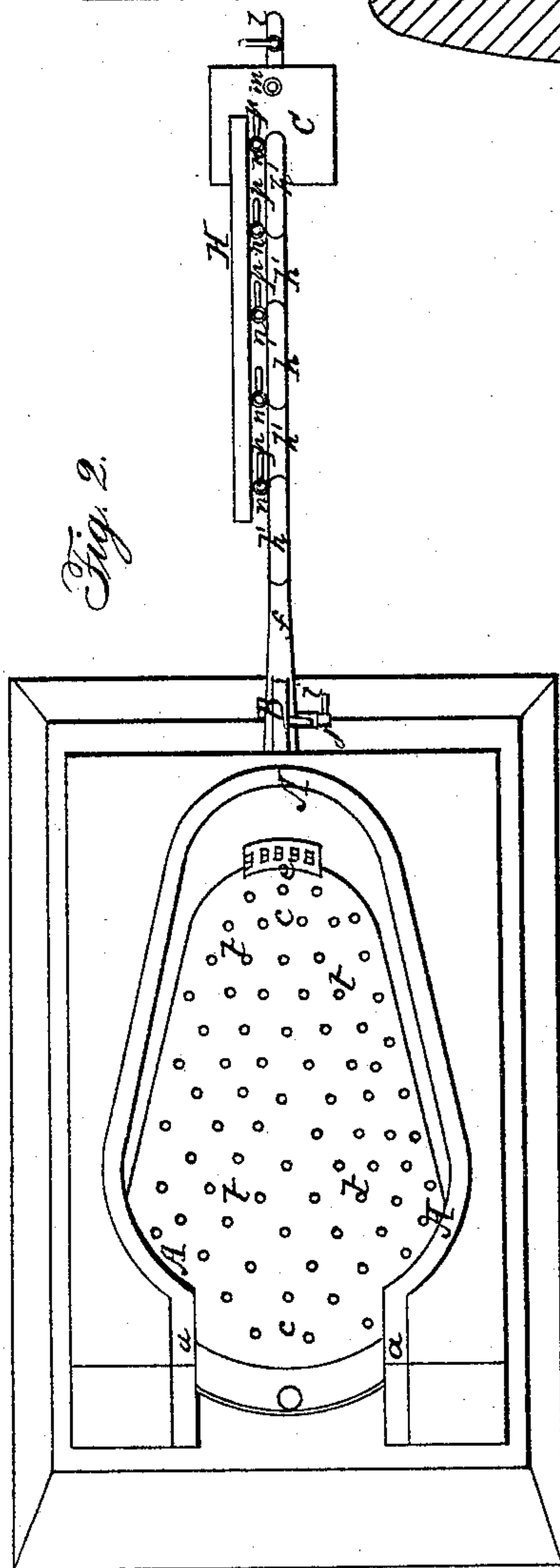


Fig. 2.

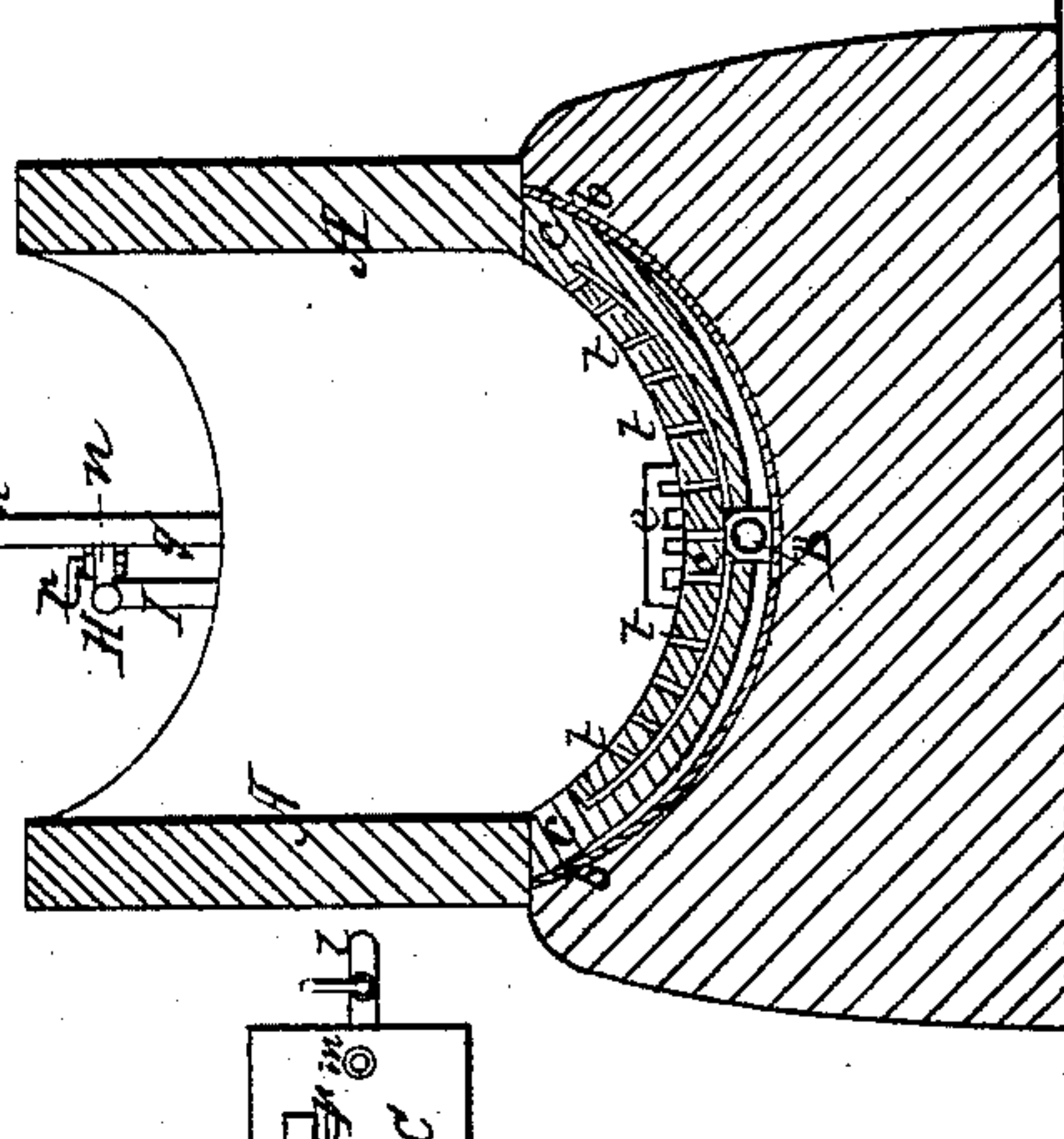


Fig. 3.

Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN BULLARD, OF STOCKBRIDGE, VERMONT.

IMPROVEMENT IN APPARATUS FOR DISTILLING COAL-OIL.

Specification forming part of Letters Patent No. **34,195**, dated January 21, 1862.

To all whom it may concern:

Be it known that I, JOHN BULLARD, of Stockbridge, in the county of Windsor and State of Vermont, have invented certain new and useful Improvements in Apparatus for Obtaining Oil from Coal and other Oil-Yielding Substances by Distillation; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, forming part of this specification, in which—

Figures 1 and 2 are vertical sections at right angles to each other of a distilling apparatus constructed according to my invention, and Fig. 3 is a plan of the same.

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

This invention relates more particularly to that class of retorts in which the heat to effect distillation is derived from the slow burning away of the charge toward the outlet.

It consists in the construction and arrangement of such retort in such manner and with its outlet in such a position as to obtain a draft along the bottom and obliquely downward to the lowest point in the retort throughout the whole of the charge, by which means I avoid both the difficulties encountered in the working of the so-called "meerschau" retort, in which the draft is directly downward through the charge, and those encountered in the working of horizontal or slightly-inclined retorts, in which the draft is toward an opening distant from the bottom.

It also consists in the introduction of steam into and through the bottom of the retort, to heat it before firing, and to prevent the vapors condensing in the kiln and being burned therein; and it further consists in certain novel means of obtaining a draft through the kiln, serving at the same time as a means of condensation for the vapors.

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

A is the retort, built of masonry or brickwork, with its bottom of a form approximating to that of half an egg divided longitudinally, and having its sides continued upward to any depth convenient for working. This retort is constructed or arranged in an inclined position, the larger end having an elevation of about

twenty degrees. Its upper side is completely open, and there is a large opening, *a a*, in the higher end. Its bottom is lined with sheet-iron *b b*, covered with fire-brick *c c*, and a steam-pipe, B, from a boiler conveniently situated is laid all along the center of the bottom in a cavity formed for it in the fire-brick *c*, which protects both the said pipe and the wrought-iron bottom, and the said pipe has numerous perforations, *s s*, to deliver the steam under the fire-brick *c*, which has also numerous perforations, *t t*, to convey the steam in small jets into the retort. The steam thus allowed to circulate through the bottom heats the whole of the bottom of the retort and prevents the vapors condensing thereon, and the said steam, afterward entering the retort, assists in the elimination of the oily vapors from the coal. The outlet *d* of the retort is close to the bottom of the lower end and protected by a grating, *e*, and is fitted with a taper-throated eduction-pipe, *f*, to which is attached a condensing-worm composed of a series of upright pipes, *g g*, united by bends *h h h' h'* at the top and bottom, as shown in Fig. 1, the last pipe, *g*, of the series opening downward into a cistern, C, through the top thereof. The said worm should diminish in size all the way from the retort to the cistern C. The steam-pipe B may enter the bottom of the kiln at any convenient point; but it is most convenient to have it enter over or by the side of the eduction-pipe. A small branch pipe, *i*, from the pipe B, fitted with a stop-cock, *j*, enters the eduction-pipe and opens into the outlet *d*, to prevent the condensing and chilling of the oil at that point.

The several lower bends *h h* of the worm are connected at their lowest points with a pipe, D, (see Fig. 1,) arranged below them, for the reception from the worm of the oil and the water used in its condensation, which will be presently described, said pipe entering and delivering the oil and water into the cistern C through one side thereof, as shown in Fig. 1. The cistern C is furnished with a cock, *k*, near the bottom, for drawing off the water, and with a cock, *l*, higher up, for drawing off the oil, and with an upright pipe, *m*, at the top, for the escape of the permanent gases that are unavoidably formed in the distilling process and delivered by the worm to the cistern.

Opposite to the point where the vapor enters each of the straight pipes *g* of the worm there enters the said pipes one of a series of small branch pipes, *n n*, from one of two water-pipes, *H H*, which are connected with a pipe, *I*, which supplies the cold water for condensation from a powerful force-pump or from an elevated reservoir, to deliver the water into the pipes *g g* at a high pressure. The ends of the branch pipes *n n* are severally turned upward or downward, according to the direction in which the circulation in their respective pipes is required, and so made to throw the water in a powerful jet in the proper direction for the circulation, by which means an artificial draft is created in the worm, besides the natural circulation due to the condensation of the vapors. The proper quantity of water is regulated by stop-cocks *p p* in the pipes *n n*. The draft in the worm may be regulated by raising or lowering the lower end of the last pipe, *g*, of the series, or by regulating the height of the liquids in the cistern by means of a cock, so as to leave more or less space between the mouth of the said pipe *g* and the surface of the liquid for the escape of the gases.

The retort is charged at the top or through the opening *aa*. The charge is covered at the top with closely-packed earth, ashes, or other material to exclude the air, and is lighted at the bottom of the higher end. The water is admitted to the worm *g g h h* before or at the same time as the charge is ignited. The charge burns slowly downward toward the outlet *d*,

and the heated products of combustion, passing through the whole of the charge between the ignited portion and the outlet, serves to effect the distillation. The inclined arrangement of the bottom and arrangement of the still are such as to prevent the coal from falling into and choking the outlet, and yet, the outlet being at the lowest point, the collection within the still and subsequent burning of any of the products that may condense therein are effectually prevented, and the draft being obliquely downward toward one end from all parts of the still, the charge is caused to burn uniformly, and no portion of it fails to be thoroughly distilled.

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

1. An egg-shaped retort, arranged substantially as described, with draft-opening at its lower end, so that the unburned contents of the retort will always be within the lines of the draft, all as set forth.

2. In a retort in which the distillation is effected by the gradual burning away of the charge toward the outlet, the introduction of steam into and through the bottom, substantially as and for the purpose herein specified.

3. The combination, with the outlet of the retort, of a still which has its interior pipes provided with a cold-water injection, as and for the purpose herein shown and described.

JOHN BULLARD.

Witnesses:

J. B. ROGERS,

E. J. MORGAN.