

EWING & EVEREST.

Oil Still.

No. 58,021.

Patented Sept. 11, 1866.

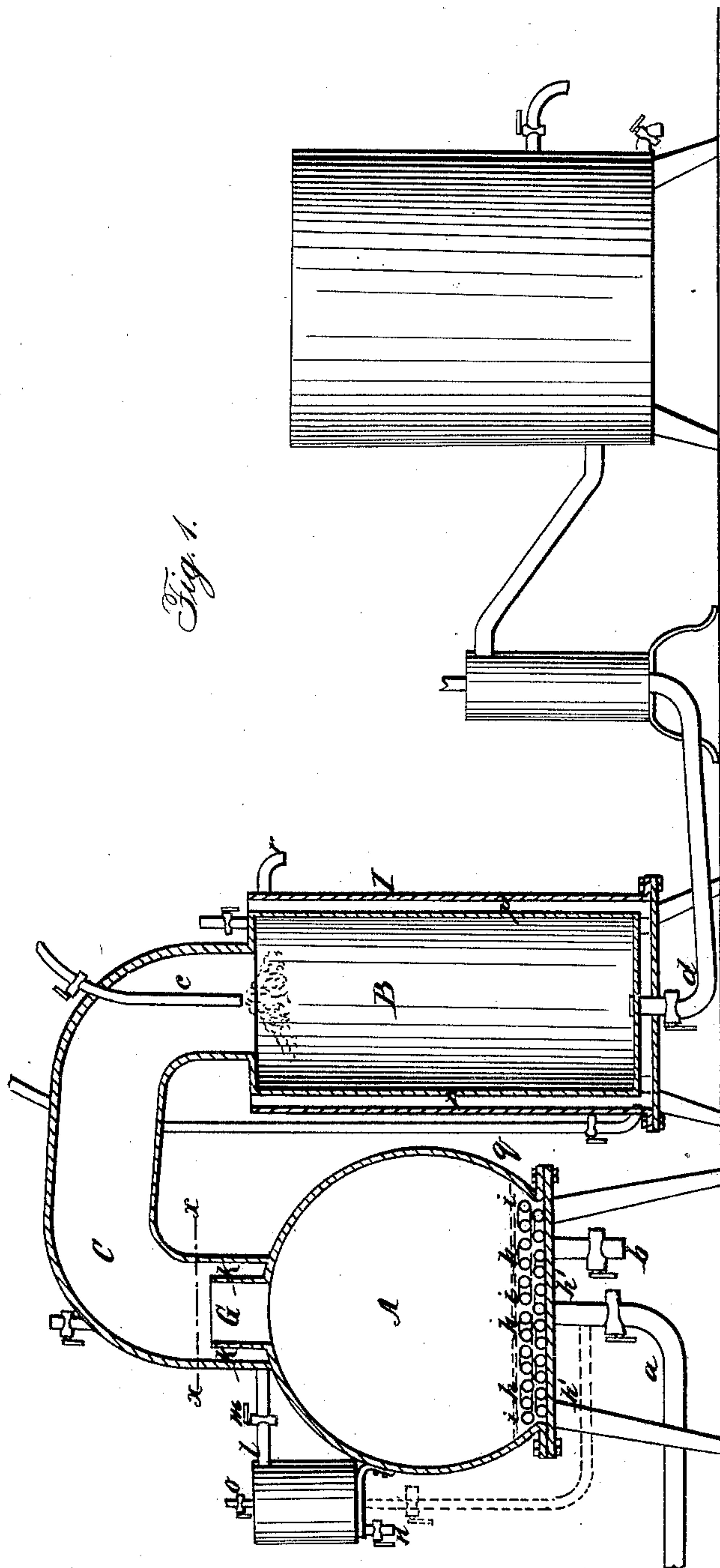


Fig. 3.

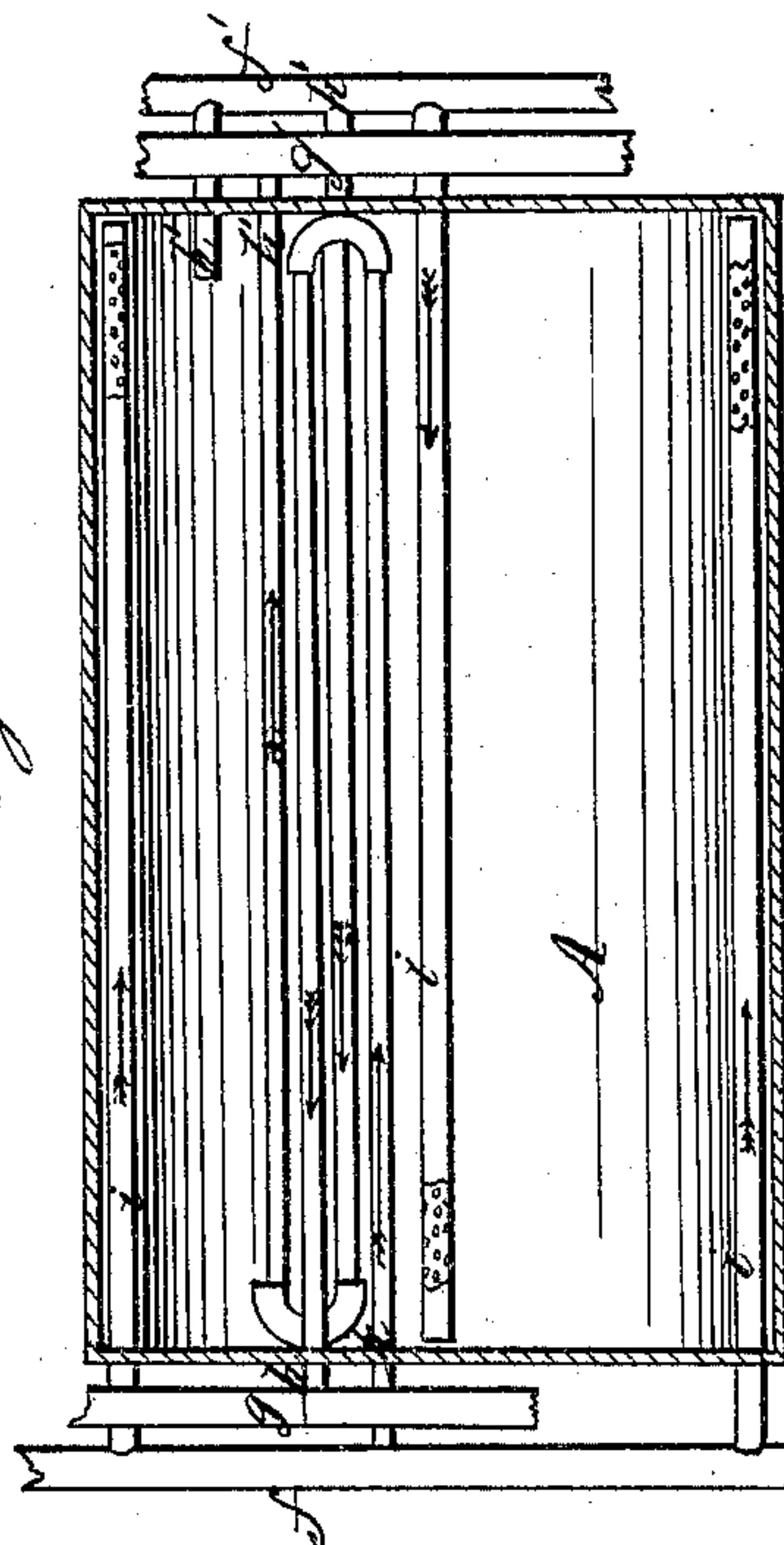


Fig. 2.

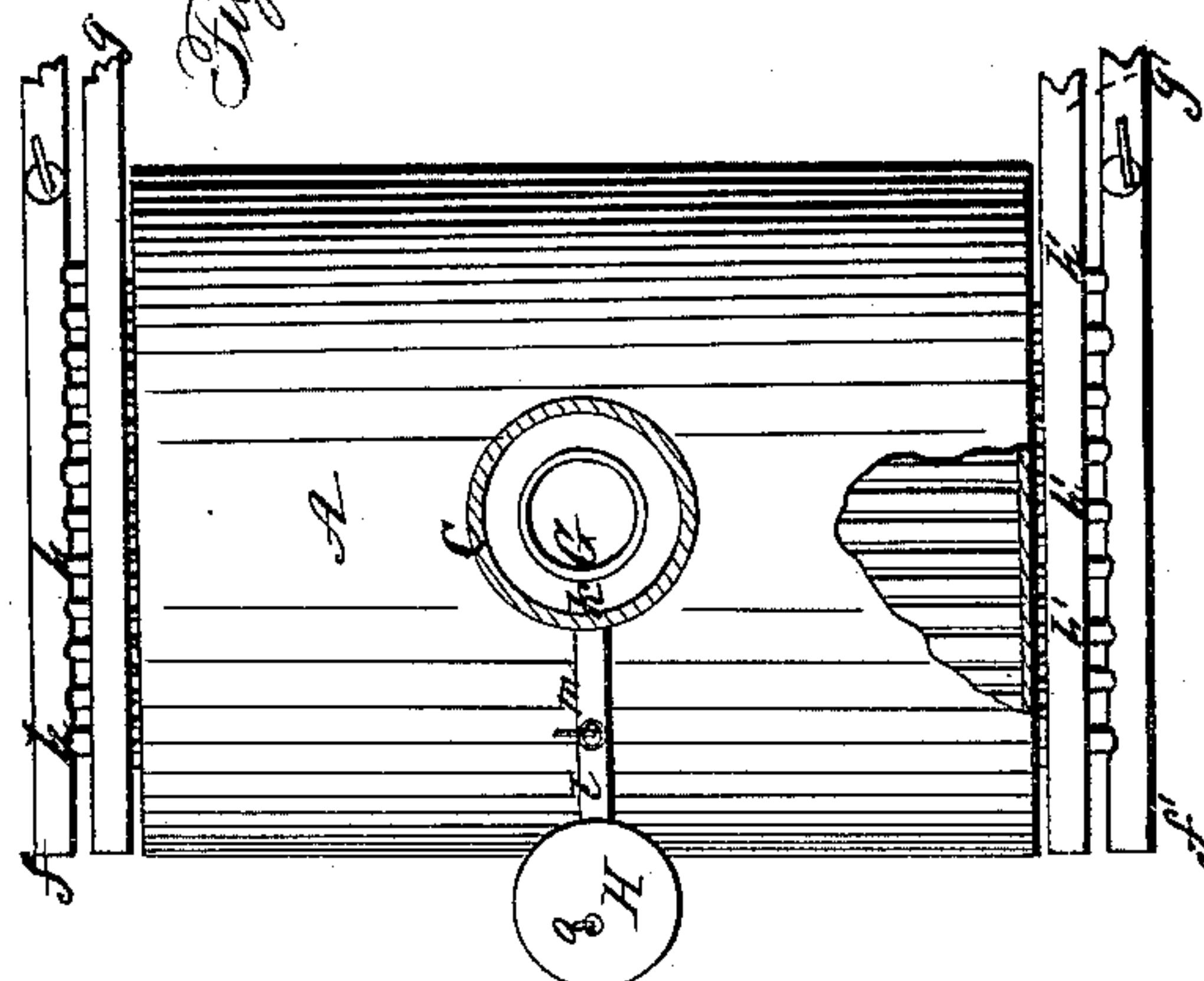
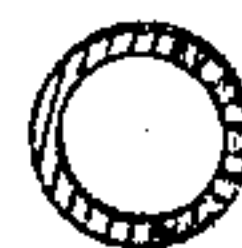


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

M. P. EWING AND H. B. EVEREST, OF ROCHESTER, NEW YORK, ASSIGNORS
TO H. B. EVEREST AND GEO. P. EWING.

IMPROVED APPARATUS FOR DISTILLING PETROLEUM, &c.

Specification forming part of Letters Patent No. 58,021, dated September 11, 1866.

To all whom it may concern:

Be it known that we, M. P. EWING and H. B. EVEREST, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Vacuum Apparatus for Distilling Petroleum; and we 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 is a central vertical section of our improved apparatus; Fig. 2, a horizontal section in plane of line *x x*, Fig. 1; Fig. 3, a diagram, showing the arrangement of the steam-pipes in the bottom of the retort; Fig. 4, a cross-section of one of the pipes for injecting steam into the body of oil in the retort.

Like letters of reference indicate corresponding parts in all the figures.

Our apparatus is similar in principle to that for which a patent has recently been allowed to M. P. Ewing, consisting in a vacuum-retort with a continuous feed for introducing the oil and a jet-condenser for condensing the produced vapor.

Our present invention consists essentially in certain improvements to prevent overflowing in vacuum-stills for petroleum by introducing jets of steam into and through the mass of oil in the still, and by the arrangement of the heating-pipes in close proximity, so as to lessen the amount of oil in the retort as compared with the heating surface, and the employment of an overflow-chamber, and conducting the overflowing material to a receptacle, thereby preventing its admixture with the distilled product; also, in the combination of a surface with a jet-condenser for the oil-vapor.

As represented in the drawings, A is the retort, B the condenser, and C the neck or tube that connects the two. The retort is supplied with a continuous feed-pipe, *a*, and outlet-pipe *b*, and the condenser is provided with a water-jet pipe, *c*, and a discharge-pipe, *d*, that connects with the pump, by which not only is the air exhausted from the apparatus to produce the vacuum, but the refined oil is forced into an outside tank ready to be separated from the water. The above parts do not differ essentially from corresponding ones in the aforesaid patent allowed to Ewing.

At the ends of the retort are respectively situated induction steam-pipes *f* and *f'*, and also eduction steam-pipes *g* and *g'*. From each of the induction-pipes *f f'* extend branch pipes *h* and *h'* inward through the head of the retort, and to the opposite end, where they are bent and return in the same direction and pass through the same head and connect with the eduction-pipes *g g'*. The several branch pipes *h h'* from opposite ends alternate in position or break joints within, as shown in Fig. 3, by which means they are made to lie close together.

We also employ several pipes, *i i*, passing inward from the induction-pipes and having minute perforations, opening preferably from their under sides, Fig. 4, to allow the escape of steam into the body of the oil. In the drawings three of these pipes are shown; two opening from one side, and one from the other. These pipes are provided with suitable cocks for letting on or cutting off the steam.

By the employment of the continuous feed through pipe *a* in connection with the vacuum-still, as described, the oil can be kept nearly at the same level at all times in the retort, by which means there can be no burning on the sides of the retort; and, since the pressure of the atmosphere is removed, the vapor from the oil is raised at a much less temperature than would otherwise be the case. In order to evaporate as rapidly as possible, the oil is kept standing only just above the top of the pipes *h h'*, as indicated in Fig. 1, and, as the pipes are fitted closely together, it will be seen that the body of oil acted on at once will be very small, and this body will be broken and pierced through and through by the pipes, which thus impart the maximum amount of heat. This body is rapidly vaporized; but since the feed is continuous and the residuum can be drawn out at any time, a fresh supply is always at hand. The oil being thus broken is prevented from accumulating in a large body, and is therefore not so readily drawn over by the action of the pump into the condenser. The pipes thus arranged not only occupy an exceedingly compact space, but, by admitting the steam from opposite sides and making each bend of pipe *h* separate and independent of its fellows, the steam retains its vitality and

does not become deadened, as it would do if it ran through all the coils before escaping. We design to employ superheated steam, as we have found it very effective in distilling oil.

The employment of the perforated pipes *i i* enables us to inject superheated steam into the body of oil, which forms a mechanical combination therewith for the time being, and alters its character in such a manner as to greatly lessen the danger of overflow of the oil into the condenser, which would otherwise occur. It also assists in conveying over the oil-vapor into the condenser. The amount of steam injected may be graduated by suitable stop-cocks. In addition to the above, by making the perforations in the bottom of the pipes the steam is thrown downward beneath the pipes *h h'* in such a manner as to thoroughly agitate the body of oil, and assists in throwing off the vapor.

In the end of the neck or tube C, at the top of the retort A, is situated a cylinder, G, or equivalent, of smaller size and of suitable height, forming, between it and the tube, a chamber, *k*, to catch such of the oil as may overflow the retort at any time. From the base of this chamber extends a pipe, *l*, having a stop-cock, *m*, and opening into a tight receptacle, H, from whence the material that enters may be drawn off through a discharge-spout, *n*. The receptacle is provided with an air-cock, *o*, and, if desired, with a pipe, (shown in dotted lines,) connecting it with the feed-pipe *a*, so that if at any time the overflow should be in considerable quantity of the crude oil it can be restored to the retort again without handling. But such of the more refined material as may collect gradually may be drawn off at *n* without passing through the retort a second time.

By this employment of the chamber *k* we are enabled to obviate the great difficulty occurring from overflow in vacuum-stills. Such of the oil as is carried up through the cylinder G, instead of passing over into the condenser, falls into the chamber and is drawn off. Thus constant watchfulness and care are avoided, and we are enabled to produce a superior quality of oil by excluding the impurities that would otherwise pass over with the refined material.

It will be seen that by shutting the cocks *n*

and *o* and opening the cock *m* the oil collected in the chamber *k* will be drawn into the receptacle; and then by closing *m* and opening *n o* the oil can be discharged from the receptacle, and this without impairing the vacuum at all. This is of much importance, and we are not aware that such an arrangement has ever before been used in connection with a vacuum-still.

We inclose the condenser B in a water-tank, I, in such a manner as to leave a space, *p*, all around. Into the lower portion of the tank opens a pipe, *q*, connecting with a suitable cold-water fountain, and with the top of the tank is connected a discharge-cock, *r*.

By this arrangement a circulation of cold water is kept up around the condenser, which cools the vapor brought in contact therewith, and, at the same time, the jet of cold water admitted through pipe *q*, being thrown into spray, condenses the vapor at once. By keeping the surface cool the condenser does not become heated, as it otherwise would, and the jet is rendered more effective in rapid distillation.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The pipes *h h'*, overlying each other, as specified, and forming a compact body, when employed in combination with a vacuum-still having a continuous feed, substantially as herein set forth.

2. The perforated pipes *i i* for injecting steam into the body of oil when combined with a vacuum-still having a continuous feed, substantially as specified.

3. The chamber *k*, in combination with the retort A and neck or tube C for catching the overflow, as herein set forth.

4. The pipe *l* and receptacle H, provided with the cocks *m n o*, or equivalent, when combined with the chamber *k*, for discharging the overflow without impairing the vacuum, as specified.

5. The combination of the inclosing water-tank I with the jet-condenser B, substantially as and for the purpose herein set forth.

M. P. EWING.
H. B. EVEREST.

Witnesses:

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