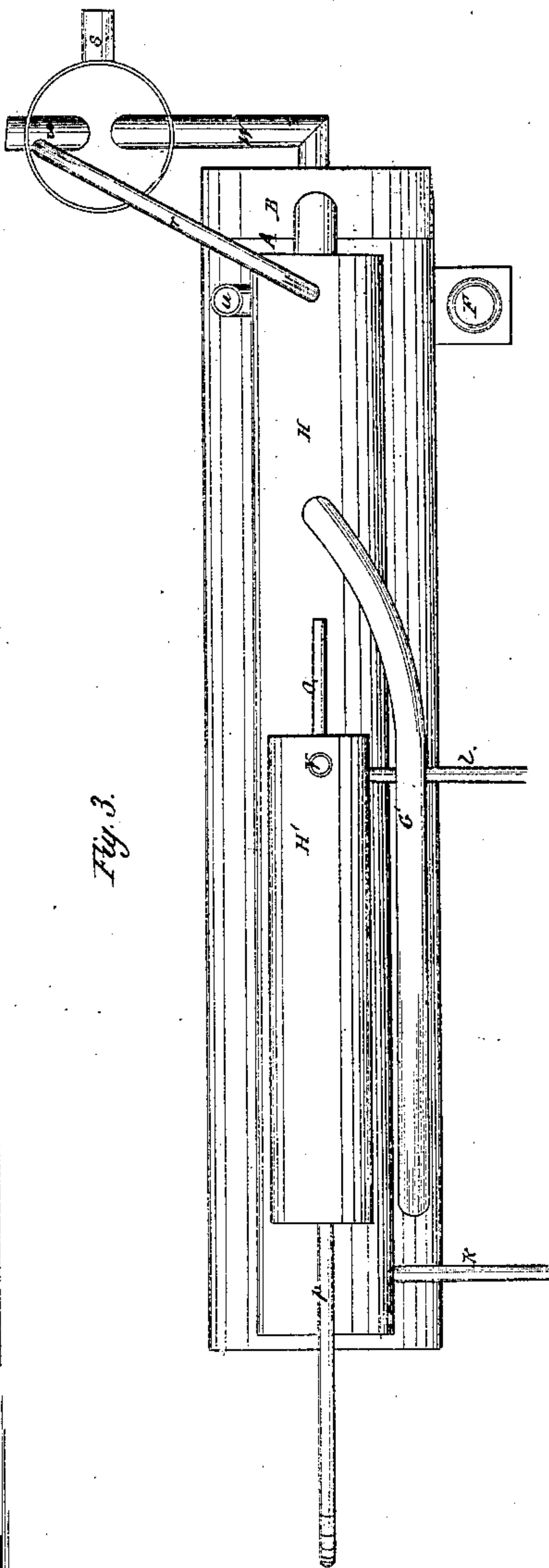
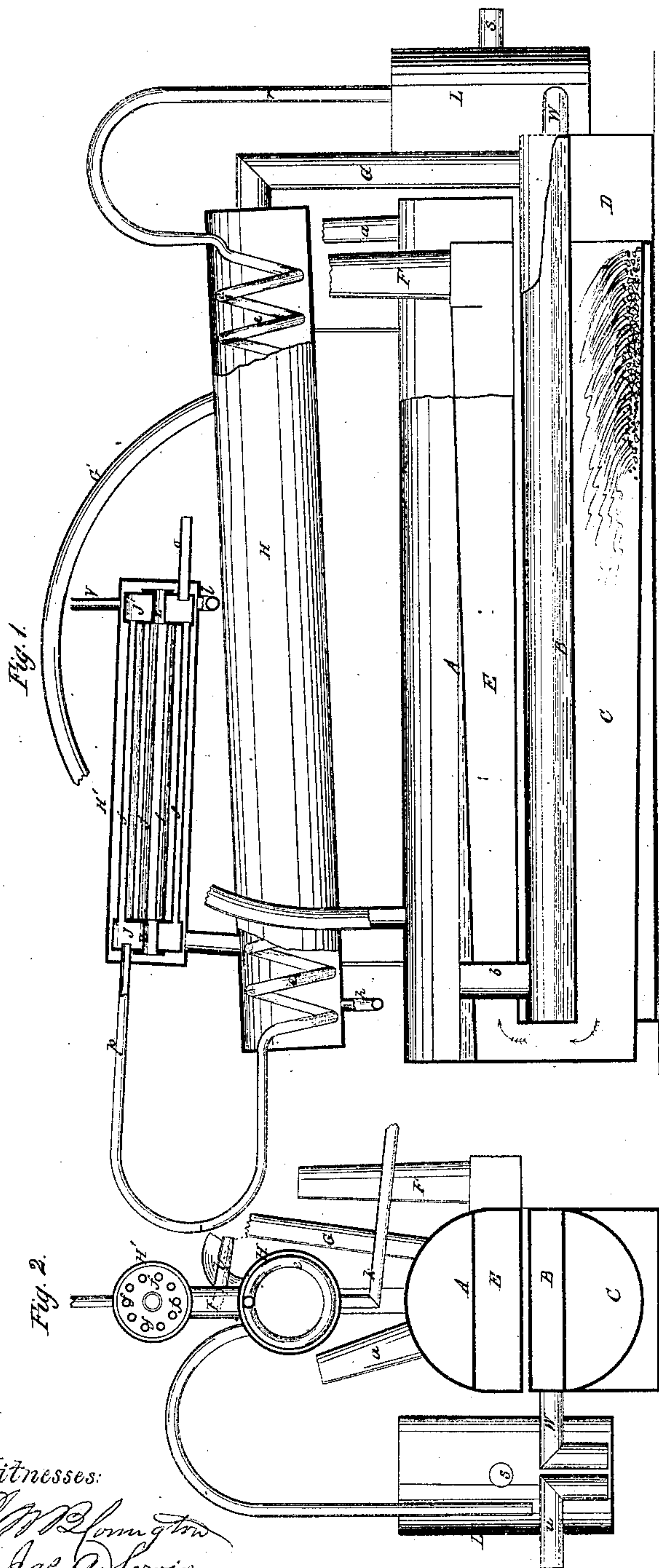


*Hall & Ellis,*

*Oil Still,*

*N<sup>o</sup> 58,813.*

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# UNITED STATES PATENT OFFICE.

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## IMPROVED DISTILLING APPARATUS.

Specification forming part of Letters Patent No. 58,813, dated October 16, 1866.

*To all whom it may concern:*

Be it known that we, C. H. HALL and JOHN ELLIS, of the city, county, and State of New York, have invented a new and Improved Distilling Apparatus; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal vertical section of this invention. Fig. 2 is a transverse vertical section of the same. Fig. 3 is a plan or top view of the same.

Similar letters of reference indicate like parts.

This apparatus is designed particularly for distilling or refining petroleum-oil, but may be employed in the distillation of turpentine and volatile oils of any other description.

It consists chiefly of two retorts or stills, A and B, one placed over the other, and then upon arch C and furnace D, with flue E between and connecting arch C with chimney E. It is provided with a supply-pipe, *a*, connecting-pipe *b*, discharge-pipe *c*, and vapor-passages G and G'. It is also provided with two condensing-chambers, H and H'. The condensing-chamber H is connected with retorts A and B by the vapor-passages G and G', and it contains a coiled tube, *e*, which extends through its entire length. The condensing-chamber H' is placed above the chamber H, and is connected with the same by passage I.

The chamber H' contains a series of tubes, *f*, which extend longitudinally through the same and pass into water-chamber J', as is clearly shown in Fig. 1.

Our apparatus is also provided with a residuum-receiver, L, which consists of an open cylindrical tank, into which enters the residuum-pipe W and the water-pipe *g*, and from which issues the waste-water pipe *m* and oil-pipe *n*.

The operation is as follows: Into the retort A the crude oil or other liquid to be distilled is first allowed to enter, so as to cover the bottom of the same in a thin stratum. The oil which is not distilled in the retort A flows into retort B through connecting-pipe *b*, and covers the bottom of said retort also in a thin stratum.

The oil or other liquid enters retort A in a continuous stream through the tube *a*, and when the bottom of said retort becomes covered with a stratum of oil of the desired depth it overflows into retort B through connecting-pipe *b*, which extends up through the bottom of retort A near the opposite end at which the oil enters, for the purpose above mentioned, and enters the top of retort B near its back end. The residuum of the oil or other liquid being distilled, after passing over the heated bottom of retorts A and B, is discharged through the pipe C.

C is the arch upon which retort B is placed, at the front end of which furnace D is located, in which a fire is made to produce the distillation of the oil or other liquid within retorts A and B. E is a flue which returns the heat under retort A and commences distillation within the same. F is the chimney through which the products of combustion finally escape.

H is a condensing-chamber, into one end of which the vapor of the oil or other liquid being distilled passes and becomes partially condensed into liquid again.

G is the pipe which passes the vapors from retort B into said chamber, and G' is the pipe which passes them from retort A into condensing-chamber H, near the same end.

Condensing-chamber H contains a coiled tube, *e*, which extends its entire length, through which water is allowed to run, in order to effect the partial condensation of the vapor within said chamber.

H' is another condensing-chamber, placed above chamber H, and connected with the same by passage I, through which the light vapors which do not condense in chamber H pass, to become finally condensed in chamber H'.

Through chamber H' extend tubes *f*, which connect at each end with water-chamber J and J', respectively, through which cold water enters at pipe *o*, and, passing through said tubes and chambers, completes the condensation of the vapors which pass into said chamber.

*p* is the pipe through which the water passes from water-chamber J into coiled tube *e*, through which it passes, and is finally discharged through pipe I into residuum-tank L. W is the pipe through which the residuum is finally discharged from retort B into receiver



L, said pipe being bent down so as to discharge the residuum into said receiver near its bottom, where it comes in contact with the water, with which it is partially filled from water-pipe I, when it becomes cooled and rises to the top of the water, and runs off through pipe S at an altitude corresponding to the depth of the stratum of oil within retort B, while the water is discharged from receiver L through bent pipe *u*, arranged so that it receives the water to be discharged near the bottom of receiver L, and discharges the same from the receiver at an altitude slightly lower than the point at which the residuum is discharged, thus completing the separation of the water from the oily products effectually, and at the same time keeping the surface of the oil within the receiver L, and consequently within retort B, of a uniform height; without exposing the same to the chances of spontaneous combustion in consequence of its exposure to the atmosphere while unduly heated, it being sufficiently cooled during its passage through the stratum of water which always exists in the lower part of receiver L.

*k* is the pipe through which the products of condensation from the chamber H are drawn off. *l* is the pipe through which the light oils are drawn from chamber H'. V is the pipe through which the non-condensable gases escape from chamber H'.

Z and Z' are tubes which pass through water-chambers J and J' longitudinally, and serve to give an additional passage for the vapors to enter and escape from chamber H'.

By these means a continuous distillation is effected and the products of distillation are separated according to their specific gravity

without being compelled to interrupt the operation and without danger of a spontaneous combustion.

We claim as new and desire to secure by Letters Patent—

1. The arrangement of two or more retorts, A B, through which the liquid to be distilled passes in a thin stratum, substantially as and for the purpose described.

2. The flues C E, in combination with the retorts A B and fire-place D, constructed and operating substantially as and for the purpose set forth.

3. The pipes G G', leading from the retorts A B to one and the same condensing-chamber, H, substantially as and for the purpose described.

4. The inclined condensing-chamber H', in combination with the inclined condensing-chamber H and retorts A B, constructed and operating substantially as and for the purpose set forth.

5. The residuum-tank L with pipes W *u* s, in combination with one or more retorts, constructed and operating substantially as and for the purpose described.

6. Passing the vapors through a closed vessel containing a pipe or pipes through which cold water passes, said vessel being provided with one or more discharge-pipes to draw out the condensed liquid of any desired gravity, substantially as set forth.

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