

No. 877,605.

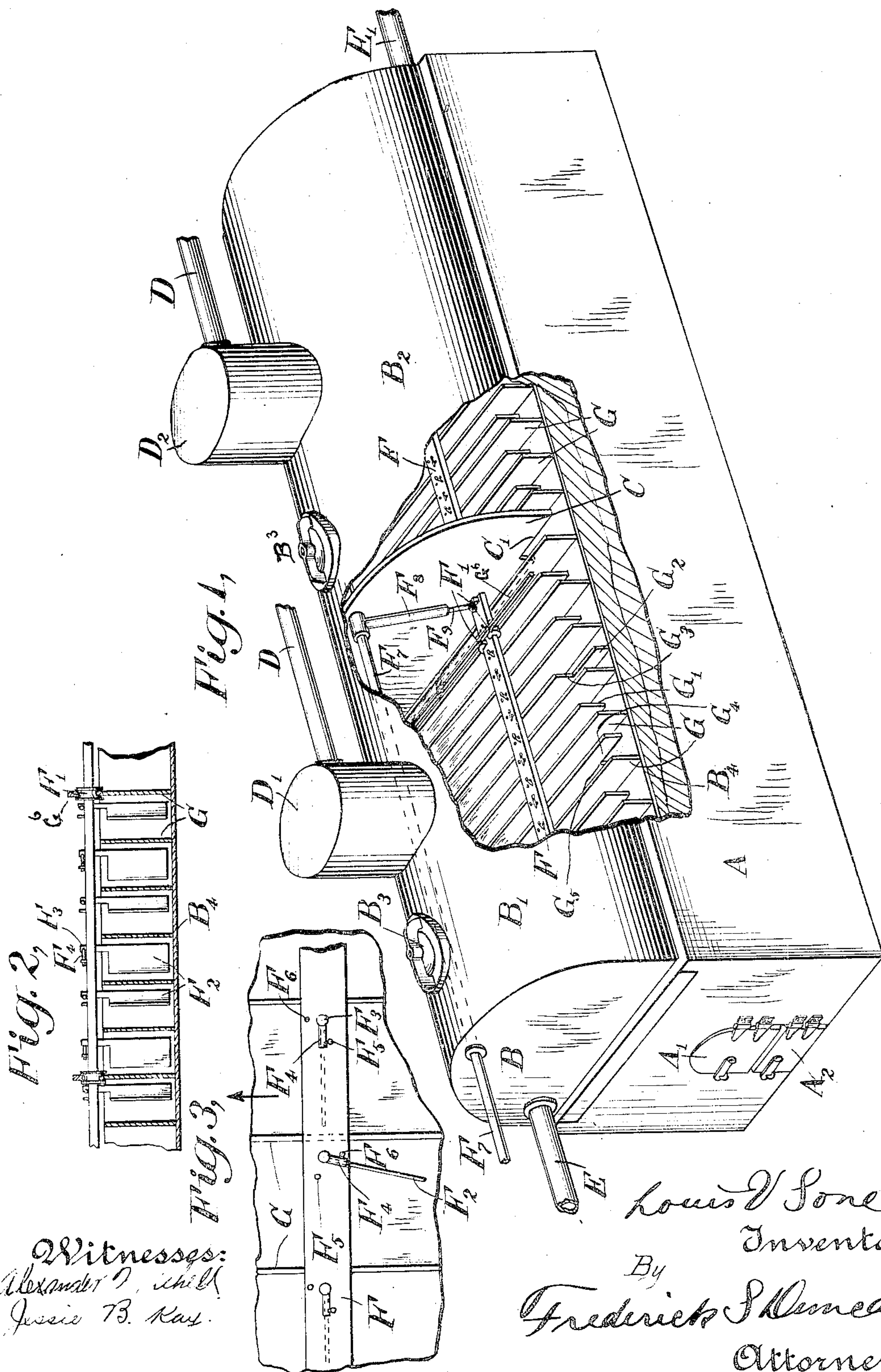
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STILL.

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# UNITED STATES PATENT OFFICE.

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STILL.

No. 877,605.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, LOUIS V. SONE, a citizen of the United States, and resident of White Plains, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Stills, of which the following is a specification, taken in connection with the accompanying drawings, forming part of the same.

10 This invention relates to stills which are particularly adapted for distilling the heavy mineral oils and in which the oil is passed through the still in an elongated conduit.

15 In the accompanying drawings in which the same reference character refers to similar parts in the several figures, Figure 1 is a perspective view of a form of still embodying this invention, parts being broken away to show the interior construction. Fig. 2 is a partial longitudinal section showing the current producer operating in the conduit. Fig. 3 is a plan view of the same.

25 The setting A upon which the still chamber is mounted is provided with a furnace of usual construction for heating the several compartments of the still chamber B. This furnace is provided with the ordinary firing doors A<sub>1</sub> A<sub>2</sub> although other firing openings may be provided and if desired the still may be heated by any other well known means. 30 The still chamber is formed as indicated of a substantially semi-cylindrical construction, the division plate C separating the still chamber into two compartments B<sub>1</sub> B<sub>2</sub>. The man- 35 holes B<sub>3</sub> are provided to permit access to the compartments of the still. The vapor from these compartments passes into the vapor drums D<sub>1</sub> and D<sub>2</sub> and then passes out by the vapor pipes D. A series of parti- 40 tions G are formed on the floor of the still chamber, these partitions extending nearly across the width of the still but allowing in every case a passage G<sub>1</sub> around the end of the partitions, the other ends of the partitions G 45 being formed in a similar manner, so that a staggered conduit for the oil is formed, by which the oil is conducted in a zigzag manner around the partitions from one end of each compartment to the other. A suitable 50 gate C<sub>1</sub> is formed in the division plate C below the normal level of the material in the still so as to allow this material to pass from the compartment B<sub>1</sub> to the compartment B<sub>2</sub>.

It will be noted that the partitions in the compartment B<sub>2</sub> are formed in a similar manner 55 to those in the compartment B<sub>1</sub> but that they are spaced more closely so that the height of material in the conduit at this point is substantially the same as in the compartment B<sub>1</sub>. In this way by spacing the partitions 60 more closely together the oil or other material is maintained constantly at substantially the same height in spite of the evaporation of the oil. In some cases, it may be desirable to space the partitions so as to vary the 65 width of the conduit in each of the compartments of the still instead of spacing all the partitions in the same compartment at the same distance apart. Instead of forming the still chamber with two compartments it 70 may be formed with any desired number of compartments by using the proper number of division plates.

75 The oil or other material is supplied to the compartment B<sub>1</sub> by the supply pipe E and the material flows through the staggered conduit in this compartment as has been indicated under the influence of gravity, if desired, since the still may be set at a considerable angle, the floor of the still slanting down- 80 ward from the supply pipe E to the discharge pipe E<sub>1</sub> where the liquid material is withdrawn from the compartment B<sub>2</sub>. In order to accelerate the movement of the material through the staggered conduit a current producer or feeder is provided. This device 85 may take the form indicated in the drawings where a reciprocating current producer F is shown as mounted to move transversely of the still. The current producer is accurately 90 guided during its reciprocation by the wheels F<sub>1</sub> which engage the tops of the partitions G and also the top guides G<sub>2</sub> indicated above these partitions. A series of paddles F<sub>2</sub> are preferably mounted on the current producer, 95 the stems F<sub>3</sub> of these paddles being freely movable in the member F. The paddle heads F<sub>4</sub> rigidly attached to the stems control the movements of the paddles, these heads engaging the operating pins F<sub>5</sub> when the paddles are acting upon the material in the conduit and when the paddles move into the in- 100 active or feathering position the heads bear against the stop pins F<sub>6</sub>. This action is clearly illustrated in Figs. 2 and 3. In Fig. 3 as the 105 current producer moves forward, as indicated



by the arrow, the paddle heads of the alternate paddles are brought into contact with the operating pins  $F_5$  and the corresponding paddles then extend transversely across the conduit in operative position and produce a flow of the material in the sections of the conduit in which these paddles lie. It will, of course, be understood that the paddles may be formed to engage the sides of the conduit as closely as desired in order to produce the desired flow of material therethrough. During this movement of the current producer, the other paddles move backward into inactive or feathering position, the heads engaging the stop pins  $F_6$ , so that these paddles do not have any substantial action upon the material in conduit at this time. When the current producer moves in the opposite direction the action of these two sets of paddles is reversed so that the current producer affects the movement of the material in all of the sections of the conduit. The current producer is reciprocated by the oscillating shaft  $F_7$ , which is rotatively mounted in the upper portion of the still chamber. The arms  $F_8$  are rigidly connected to this shaft and the lower telescoping sections  $F_9$  move within these arms and are pivotally connected with the current producer. In this way, as the shaft oscillates the current producer is reciprocated transversely of the still. Any other desired means may be used for operating the current producer and any other forms of current producer may be employed for moving the oil or other material along the conduit at the desired rate.

In order to thoroughly mix the oil or other material as it passes along the conduit, suitable weirs  $G_2$  are provided at various points along the conduit, these weirs being formed with the weir notches  $G_3$  through which the oil passes. This is to mix the oil and prevent the stratification of the same. These weirs also prevent to some extent the backward movement of the oil in the conduit. The gates  $G_4$  formed in the partitions as indicated in Fig. 1 also have the same function in preventing stratification. These gates are formed with the opening  $G_5$  as indicated. The gate  $C_1$  in the division plate  $C$  has the same structure and operation.

In operating this still to carry out the continuous process of distillation, it is desirable to pass the oil successively through a number of these stills. The various compartments being maintained at different temperatures so that the products which vaporize at the different temperatures are removed successively, the lighter portions being removed first and then the heavier portions of the material until finally the residue is removed from the last compartment in a liquid condition. Under some conditions, however, a single still chamber may be employed and this chamber may be divided into the desired

number of compartments so that the different products may be removed successively from the material in a similar manner.

It is, of course, understood that many modifications may be made in the form of still described without departing from the spirit of this invention. Furthermore parts of this invention may be used without employing all of the same. I do not, therefore, wish to be limited to the disclosure which I have made in this case, but

What I claim as new and what I desire to secure by Letters Patent is set forth in the appended claims.

1. In a still, a series of inclosed compartments provided with vapor drums and vapor pipes, means to heat said compartments, a series of partitions formed on the floor of said compartments extending nearly across the same to form a staggered conduit for material, said partitions being spaced apart at varying distances to form a conduit of varying width in the various parts of the same, said partitions being provided with weirs and gates to secure the uniform distribution of material in the conduit, a current producer mounted to reciprocate upon said partitions, means to reciprocate said current producer, a series of paddles pivotally mounted on said current producer, operating pins and stop pins to control the movement of said paddles to cause alternate paddles to operate upon the material in said conduit at each reciprocation of said current producer.

2. In a still, a series of inclosed compartments, partitions in said compartments to form a staggered conduit therethrough, a current producer mounted adjacent said conduit and provided with movable paddles to operate upon the material therein.

3. In a still, a closed still chamber provided with partitions to form a staggered conduit, a current producer movably mounted adjacent said conduit and provided with means to produce a current of material along said conduit.

4. In a still, a closed still chamber provided with partitions to form a staggered conduit and a reciprocating current producer to cause a current of material along said conduit.

5. In a still, a staggered conduit, and a reciprocating current producer having movable paddles mounted thereon, said paddles entering said conduit and producing a current of material therein.

6. In a still, a closed still chamber having partitions therein to form a staggered conduit and a current producer movably mounted adjacent said conduit to engage material therein and to produce a current of said material along said conduit.

7. In a still, a chamber having a staggered conduit formed therein and a reciprocating current producer to feed the material along



said conduit from end to end of the same, said current producer comprising pivoted paddles and operating pins and stop pins to regulate the position of said paddles in said conduit.

8. In a still, an inclosed compartment, heating means therefor, and partitions in said compartments formed with weirs and gates therein to produce a staggered conduit of varying cross-section.

9. In a still, an inclosed compartment, a vapor pipe connecting with the vapor space in said compartment, means to heat said compartment and partitions formed on the floor of said compartment spaced at different distances apart in the various parts of said compartment to form a staggered conduit of varying cross-section.

10. In a still, an inclosed compartment, means to heat said compartment and partitions formed on the floor of said compartment to produce a staggered conduit, said partitions being provided with weirs to secure the uniform distribution of material in said conduit.

11. In a still, an inclosed compartment, partitions formed on the floor of said compartment to produce a staggered conduit and gates formed in said partitions below the normal level of material in said conduit to secure the uniform distribution of material in said conduit.

12. In a still, an inclosed compartment, means to heat said compartment, a vapor drum and vapor pipe leading from said compartment, means to supply material to said compartment and to deliver it therefrom and partitions in said compartment to form a staggered passage therein.

13. In a still, a series of inclosed compartments provided with means to heat the same, a series of partitions formed on the floor of said compartments and extending nearly across the same to produce a staggered conduit for material, said partitions being spaced apart at varying distances to form a conduit of varying width in the various parts of the same, said partitions

being provided with weirs and with gates to secure the uniform distribution of material in the conduit and a movable current producer to progressively feed material from end to end of said conduit.

14. In a still, a closed still chamber provided with partitions on the floor of the same and extending nearly across said chamber to form a staggered conduit for material, said partitions being provided with weirs and gates to secure the uniform distribution of material passing along the conduit and a movable current producer to progressively feed material along said conduit.

15. In a still, an inclosed compartment, means to heat said compartment, partitions formed on the floor of said compartment to form a staggered conduit and an obstruction provided with a vertically contracted opening extending across said conduit to secure the uniform distribution of material in said conduit.

16. In a still having an inclosed compartment, means to heat said compartment, partitions formed on the floor of said compartment, alternate partitions extending from opposite sides of the compartment to form a conduit and means to cause the liquid passing through the said conduit to flow in a vertically zig-zag course as it passes through the still to thoroughly mix the oil or other material treated.

17. In a still, an inclosed compartment, a vapor pipe connecting with the vapor space in said compartment, means to heat said compartment, partitions formed on the floor of said compartment spaced at different distances apart in various parts of said compartment to form a staggered conduit of varying cross-section and obstructions provided with vertically contracted openings at different height extending across said conduit at various points to secure the uniform distribution of material in said conduit.

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