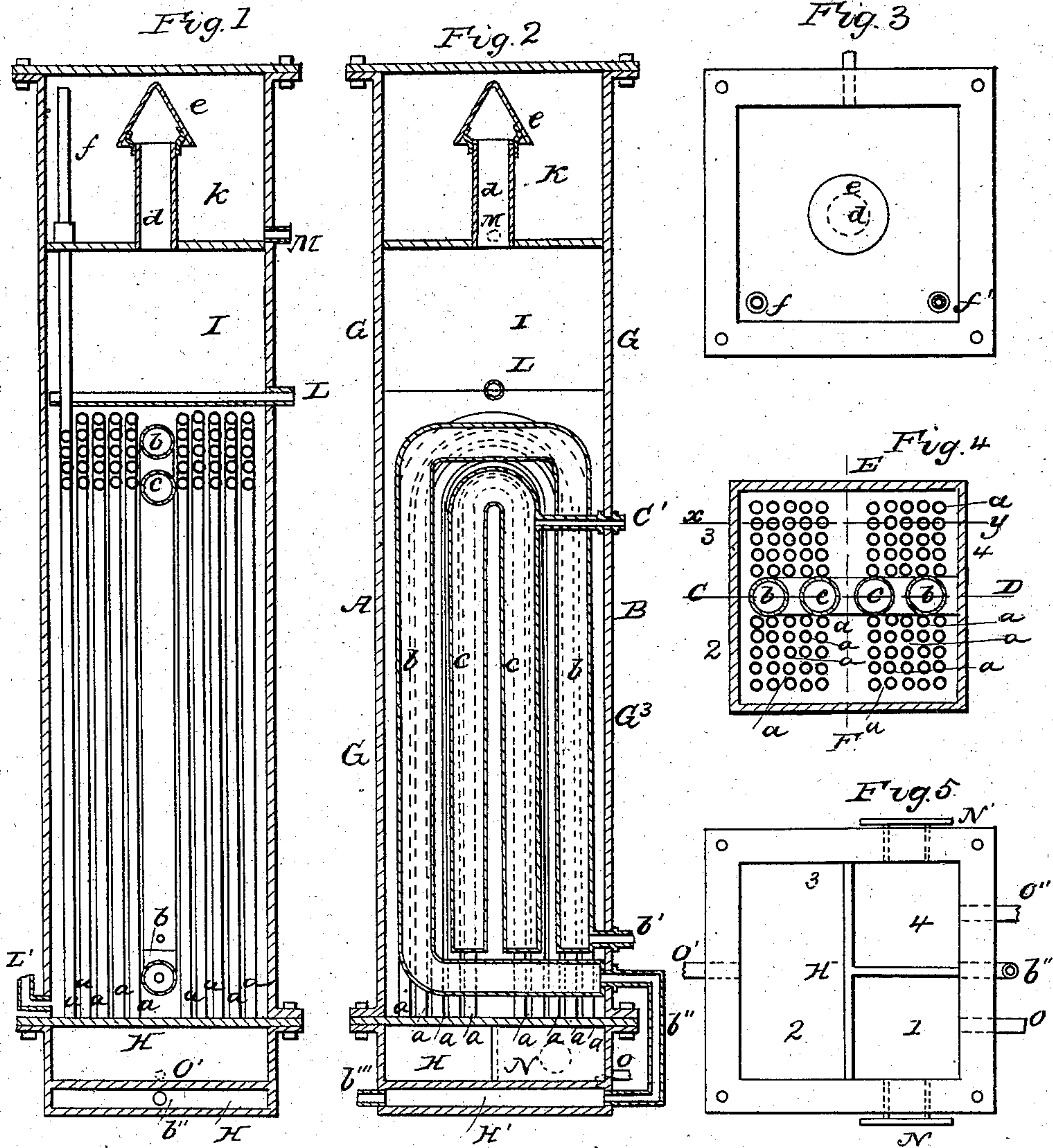


PRENTISS & ROBERTSON.

Apparatus for Distilling Petroleum.

No. 48,435.

Patented June 27, 1865.



Witnesses
John Lathrop
J. E. Chas.

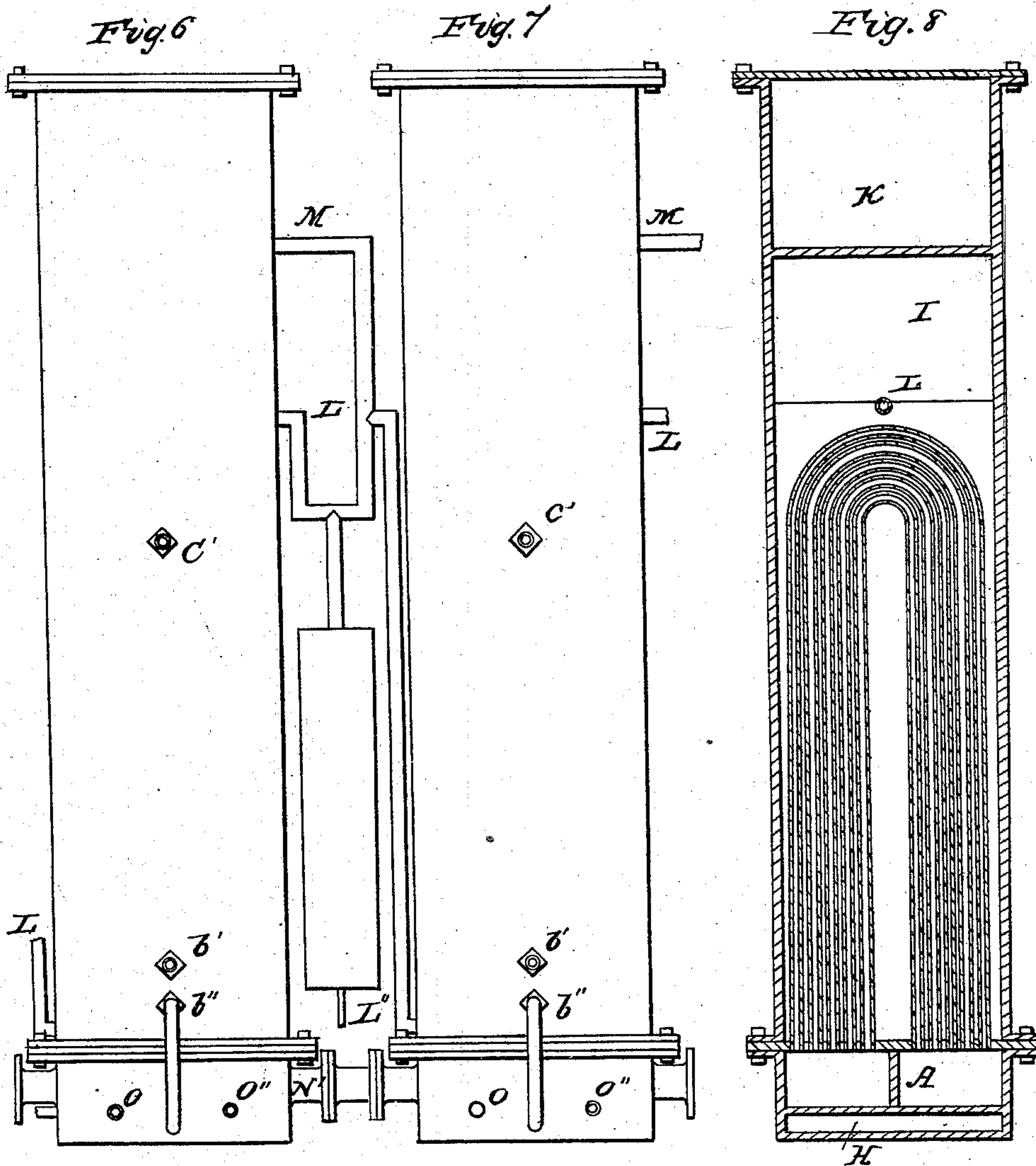
Inventors
Elijah Freeman Prentiss
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

ELIJAH FREEMAN PRENTISS AND ROBERT ADAM ROBERTSON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVED APPARATUS FOR DISTILLING PETROLEUM.

Specification forming part of Letters Patent No. 48,435, dated June 27, 1865.

To all whom it may concern:

Be it known that we, ELIJAH FREEMAN PRENTISS and ROBERT ADAM ROBERTSON, both of the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Distilling Rock-Oils and other Hydrocarbons; and we 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 drawings, forming a part hereof.

The improvements herein described relate to the condensers, which form a part of the apparatus for which Letters Patent of the United States were granted to us on the 8th day of March, 1864.

In the drawings, which are on a scale of one-eighth ($\frac{1}{8}$) of an inch to an inch in the working machine, Figure 1 is a vertical section of an improved column through the line E F in Fig. 4. Fig. 2 is a similar section of the same on the line C D, Fig. 4. Fig. 3 is a plan of the top of the column. Fig. 4 is a horizontal section of the column on the line A B in Fig. 2. Fig. 5 is a plan of the bottom of the column. Figs. 6 and 7 are front views of two columns or condensers, showing the pipes which connect the top chamber of the condenser with the water-leg, and showing also the pipes which connect one condenser with the other. Fig. 8 is a longitudinal vertical section on the line X Y of Fig. 4.

The advantages of our improvements consist, first, in doing away with danger of damage to the condenser from the expansion and contraction thereof; second, in giving a freer boiling-space above the surface of the oil in the condenser; third, in making the "auxiliary head" (so called in the specification of our said Letters Patent, and numbered in the drawings attached thereto V) a part of the column, thus dispensing with connecting-pipes, (marked in the drawings last referred to W W'') and thus lessening the surface liable to cause condensation, and making at the same time the condenser more compact; fourth, the improved condensers being square instead of round, the inlet and outlet pipes are on the same line, and the condensers can be more conveniently ranged on a straight line; fifth, feeding the

condensers with crude oil in such a manner that the oil is distributed equally over all of the tubes; sixth, getting a much enlarged air-chamber and a greatly-increased surface for steam-heating by a better disposition of the vapor-pipes without increasing the size of the columns.

To enable others skilled in the art to make and use our improvements, we will proceed to describe them in detail.

Similar letters refer to similar parts in all of the drawings.

G G' G² G³, Fig. 2, is the shell of the condenser, which we prefer to make of cast-iron, twenty inches square in the horizontal section and about eight feet high. The condenser consists, first, of a cast-iron base inclosing a chamber, H, which is divided by partitions into three compartments, 1 (2 3) 4, as shown in Fig. 5, which partitions are planed true and flush with the flanges by which the base is united to the body of the column; second, of the body I of the column; third, of the head K.

The body I of the column contains the vapor-tubes *a*, which may be of wrought-iron, copper, or any other metal, each of one inch diameter. The tubes in each row are bent, as shown in Fig. 8, the ends of the tubes forming four clusters, which we mark 1 2 3 4 in Fig. 4. Each tube in the innermost row of cluster No. 1 is carried up perpendicularly to a height of, say, four feet six inches, or the desired height, bent over and brought down, so as to form the innermost row of cluster No. 2. The tubes in the row next the said innermost row pass as last mentioned, are carried up so as to overarch the innermost row, preserving the same space between the pipes at the bend of the pipes that is left between them, where they are perpendicular and brought down, so as to form the row next to the innermost row of cluster No. 2, and so on with each of the other three rows, as shown in Fig. 8. There is the same arrangement of tubes forming clusters 3 and 4.

In Fig. 2, *b* is the improved steam-pipe, which is colored blue.

c is the improved air-pipe, colored red. It can be seen on comparison of the annexed drawings with the drawings attached to our

above-mentioned Letters Patent that the improved steam-pipe has a much greater surface and the improved air-pipe a much larger area than the pipes for similar purposes described in the specifications of our said Letters Patent.

b' is the steam-supply pipe.

b'' is the exit-steam pipe, which conveys the waste steam from the steam-pipe *b* to the chamber or underneath chamber *H'* in the base of the condenser.

b''' is the pipe for the exit of the steam from said chamber.

C' is the pipe to which the thermostat is attached.

L, Figs. 1 and 2, is the trough or slotted pipe through which the crude oil is admitted into the condenser, the oil overflowing from both sides of the trough and being thus equally distributed over all the pipes.

L', Figs. 1, 6, and 7, is the pipe for conveying the oil from one column to the next column.

K, Figs. 1, 2, and 8, is the head of the column or chamber for separating any oil that may be carried up from space *I* through the tube *d*, which tube has an umbrella-like cover, *e*, for forcing the oil down toward the floor of the chamber *K*. Two pipes, *f f'*, one of which is shown in Fig. 1, and the position of both of which is shown in Fig. 3, are for carrying the vapors which collect in the head *K* down to the chamber *H* of the base and mixing there with the current of vapors passing along from the still.

M, Figs. 1 and 6, is the pipe for carrying the oil that collects on the floor of chamber *K* down to the supply-trough *L* by an inverted siphon, and this siphon is connected with the water-leg as shown in Fig. 6 and as is described in the specification of our above-mentioned Letters Patent.

N, Fig. 5, is the pipe for the admission of the vapor into the base of the column, either from the still or from another column.

N', Fig. 5, is the pipe for the exit of the vapors from the column.

O O' O'', Figs. 1, 2, and 5, are pipes leading from the different compartments of the cham-

ber *H* in the base of the column and conducting the oil to the worm or worms, as described in the specifications of our above-mentioned Letters Patent. The shell of the column is cast with the diaphragm, which separates the head from the body of the column, and with flanges at top and bottom, the flanges being faced or planed true, so as to receive on top a plate or cover faced all around to the breadth of the flanges, and so as to receive on the bottom another faced plate, in which the ends of the vapor-pipes are fastened, the base of the column being also provided with flanges, by means of which the base and body of the column are bolted together, as shown in Figs. 1 and 2.

Having now fully described our improvement and how we believe the same may be best carried into practical effect, we wish it to be understood that we do not confine ourselves to the precise details, relative proportions, the materials, forms, and dimensions hereinbefore described, as it will be readily seen that the same may be considerably varied without departing from the principle of our invention; but

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

1. The employment of the bent vapor, steam, and air-pipes *a*, *b*, and *c*, arranged, constructed, and operating substantially as shown and described.

2. Constructing the column so as to have a space, *I*, unobstructed with pipes for the free boiling of the oil, substantially as shown and described.

3. Constructing the column so that the head *K'* shall form a part thereof, the same being arranged, constructed, and operating in the manner and for the purpose substantially as shown and described.

4. The slotted pipe or trough *L*, in combination with the column, whereby the cooler oil is fed in and distributed equally over the pipes arranged and constructed substantially as shown and described.

ELIJAH FREEMAN PRENTISS.

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Witnesses:

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