

(No Model.)

J. W. EVANS.
EXTRACTING NAPHTHA FROM OIL.

No. 291,175.

Patented Jan. 1, 1884.

Fig. 1.

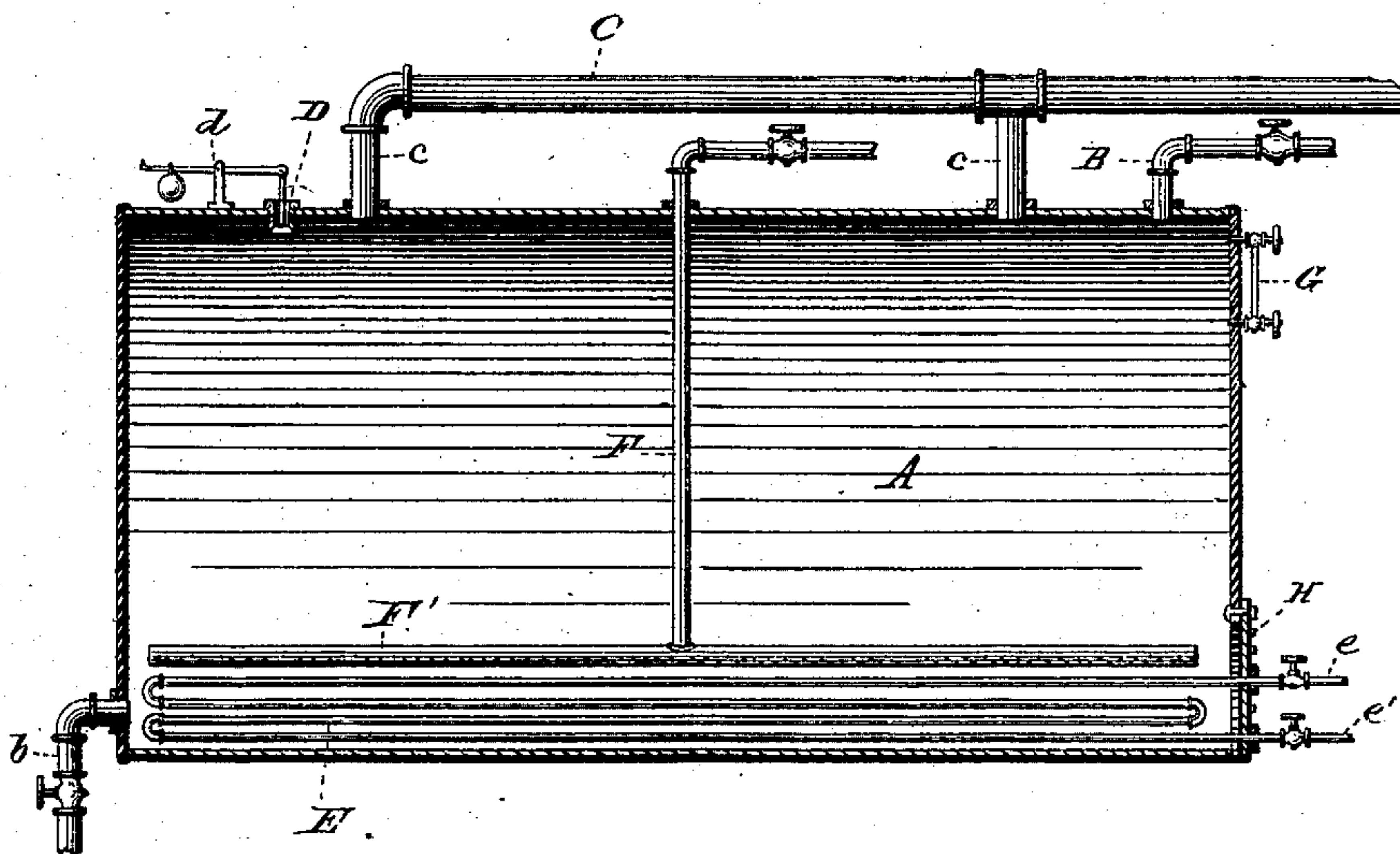
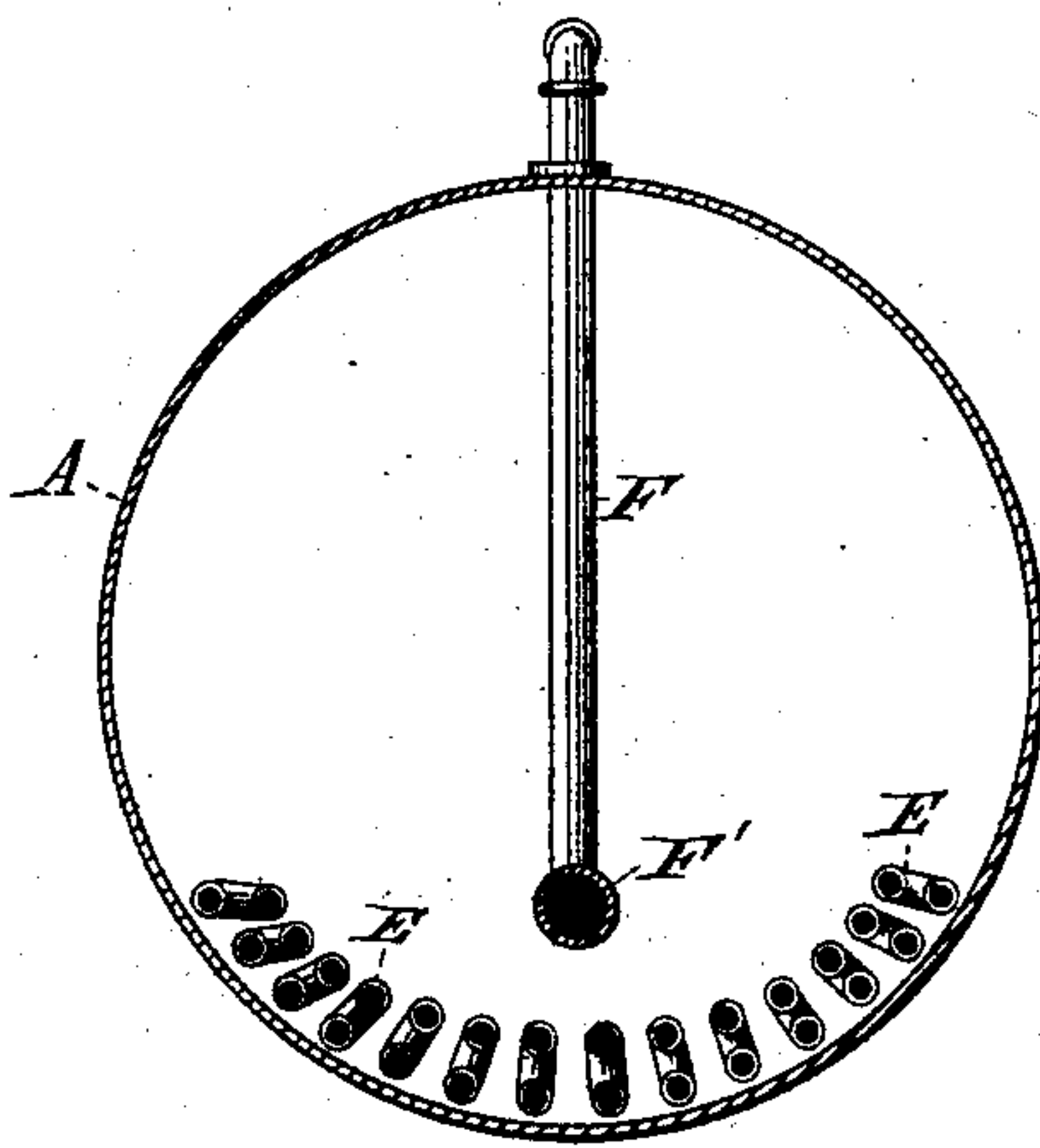


Fig. 2.



WITNESSES
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UNITED STATES PATENT OFFICE.

JOHN W. EVANS, OF CLEVELAND, OHIO.

EXTRACTING NAPHTHA FROM OIL.

SPECIFICATION forming part of Letters Patent No. 291,175, dated January 1, 1884.

Application filed June 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. EVANS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful
5 Improvements in Extracting Naphtha from Oil; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the
10 same.

My invention relates to improvements in a process for extracting naphtha from oils, as will be hereinafter described, and pointed out in the claim.

15 When vegetable oils have been extracted by the naphtha process, it is important that the naphtha be afterward entirely removed from the oil. A mere trace of it may be detected by the odor thereof, and when it is known to
20 be present in the oil the ordinary purchaser is suspicious that the oil may be largely adulterated with the naphtha, and this suspicion injures the commercial value of the oil. The bulk of the naphtha—say, from eighty to ninety
25 per cent.—can be evaporated and separated from the oil by heating the oil in various ways, preferably by steam-pipes immersed therein; but the process is slow, even in the first
30 stages and under the most favorable circumstances, while toward the close it becomes extremely slow and tedious; but after this treatment there will still remain from ten to twenty
35 per cent. of naphtha that cannot be thus extracted without employing so high a degree of heat as would be likely to scorch the oil. Much money, labor, and ingenuity have been expended for improvements in this direction, but hitherto without entire success. I have
40 therefore invented the following apparatus and process.

In the drawings, Figure 1 is a side elevation, partly in section, of an apparatus embodying my invention. Fig. 2 is a cross vertical section of the same.

45 A represents a container, preferably horizontal, and cylindrical in shape.

B is a supply-pipe, and *b* a discharge-pipe, by means of which oil is supplied to and discharged from the container.

50 C is a vapor-pipe for conducting vaporized naphtha from the container to a condenser,

and should have connections *c* of such number and size as will give the vapor free escape from the container.

D is a vacuum-valve opening inward. As 55 is shown, the fulcrum *d* is between the valve and weight, so that both the gravity of the weight and any pressure that may be inside the container operate to keep the valve closed. The weight itself is only of sufficient 60 power to just close the valve, and when a vacuum occurs inside the container the valve is instantly opened by the atmospheric pressure outside.

E is a coil of steam-pipe, located as near the 65 bottom of the container as is practicable, and preferably as shown in Fig. 2. The coil is provided with the inlet-pipe, *e*, and the outlet-pipe, *e'*.

F is also a steam-pipe leading into the pipe 70 *F'*, that is located just above the coil E, and should extend nearly the whole length of the container. This pipe *F'* should be punctured with small holes the entire length and on the top and sides, leaving preferably only about 75 one-third of the circumference on the bottom side without holes. The sum of the areas of all of these holes should be less than the area of the supply-pipe F, so that the pipe *F'* may be always full and the same pressure had the 80 entire length of the pipe.

G is a glass gage to show the depth of oil in the container.

H is a cap bolted to the outside of the end 85 of the container, as shown. The pipes *e* and *e'* pass through this cap or plate and are made fast thereto. By removing the cap, the attached pipes, and, in fact, the entire coil E, may be withdrawn from the container, as is 90 sometimes necessary for repairs or for cleaning.

The operation of the device is as follows: First, oil is admitted through the pipe B until the oil can be seen in the glass G, when located 95 as shown. There should be plenty of room for the vapor to have free access to the pipes *e*, which would be prevented if the container was too full. Next, steam is admitted to the coil E, and the oil heated thereby to about 240° Fahrenheit, more or less. This heat, if continued long enough, will, as aforesaid, ex- 100 pel from the oil from eighty to ninety per cent. of the naphtha. Next, I introduce steam by

means of the perforated pipe F' into the oil in the container and under considerable pressure — say, from seventy to eighty pounds. This, of course, produces violent agitation of the oil, thus bringing the steam in contact with every atom of the mass, by means of which the naphtha is quickly vaporized and carried off with the steam to the condenser, leaving the oil entirely free from every trace thereof. This latter part of the process is so much more expeditious than the former part that I now only use the said coil to heat the mass, as aforesaid, so that there will not be too much condensation in first introducing the steam into the oil. After the full head of steam has been admitted, as aforesaid, the naphtha is so soon expelled that the cost of this part of the process is merely nominal. When the steam and vaporized naphtha reach the condenser, the condensation is sometimes so rapid as to form a vacuum, more or less perfected, in the container. This causes a great strain on the container, which is usually of large size, and also makes the flow of naphtha irregular. To obviate this difficulty, I have introduced the said vacuum-valve, that instantly opens and releases any tendency to-

ward a vacuum. If naphtha, as it pours from the pipe leading from the cylinder, is caught in a test-glass, at first it will show only naphtha. Toward the end of the process, when the naphtha is nearly expelled from the oil, water will begin to show in the bottom of the said glass, and the amount of water will increase and the amount of naphtha decrease, as the tests are made from time to time, until, finally, there will no naphtha appear in the test-glass, showing that the naphtha has all been extracted from the oil in the container.

What I claim is—

The process herein described for extracting naphtha from oil, consisting in first heating the oil to the desired temperature, then admitting live steam in direct contact with the heated oil, and driving off the naphtha in the form of vapor, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 14th day of June, 1883.

JOHN W. EVANS.

Witnesses:

JNO. CROWELL,

CHAS. H. DORR.