2 Sheets—Sheet 1.

GWYNN & CLARK.

Refining Oils.

No. 81,496.

Patented Aug. 25, 1868.

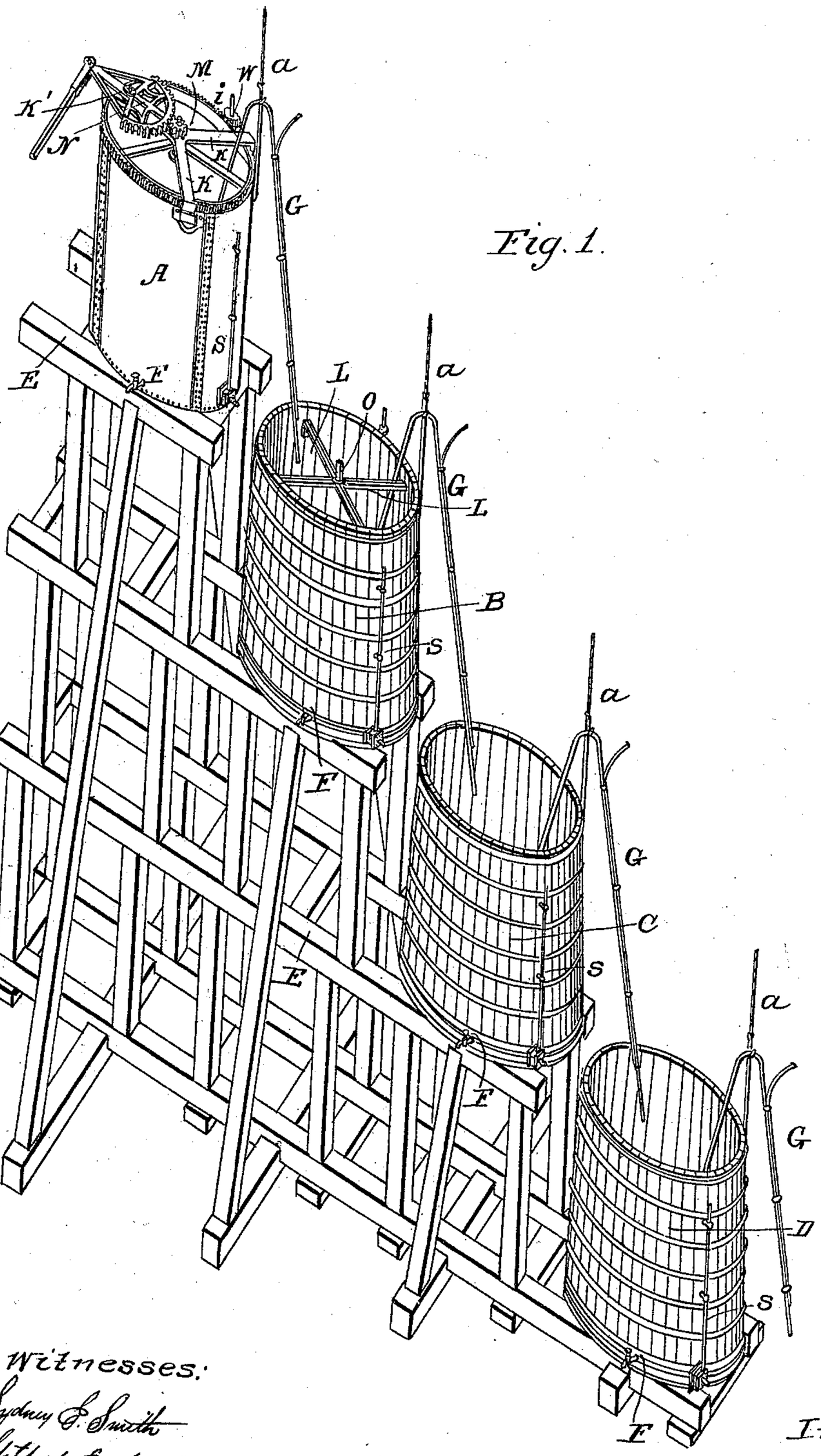

Fig. 1.

Witnesses:

Sydney F. Smith

Gilbert B. Fowler

Inventors:

Stuart Gwynn

Spencer M. Clark

By Dana A. Burr

Atty.

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Fig. 6.

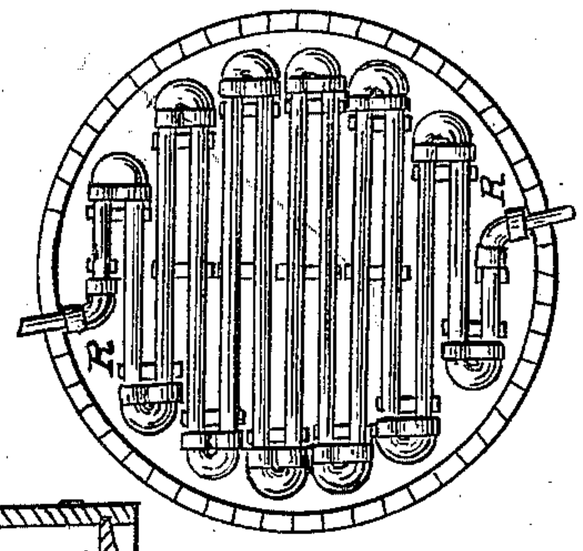


Fig. 4.

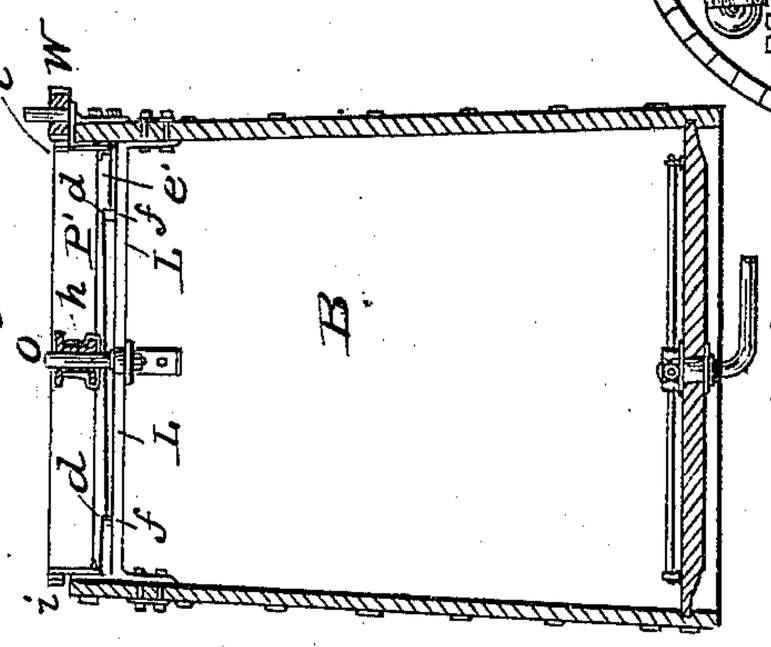


Fig. 8.

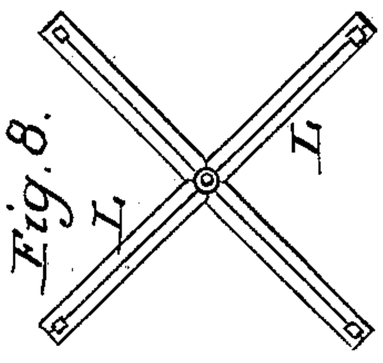


Fig. 7.

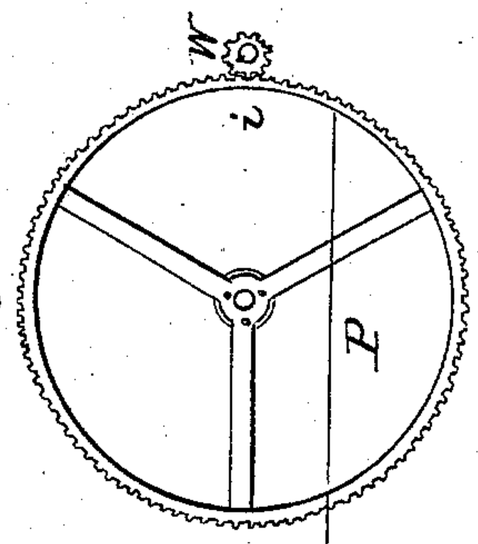


Fig. 5

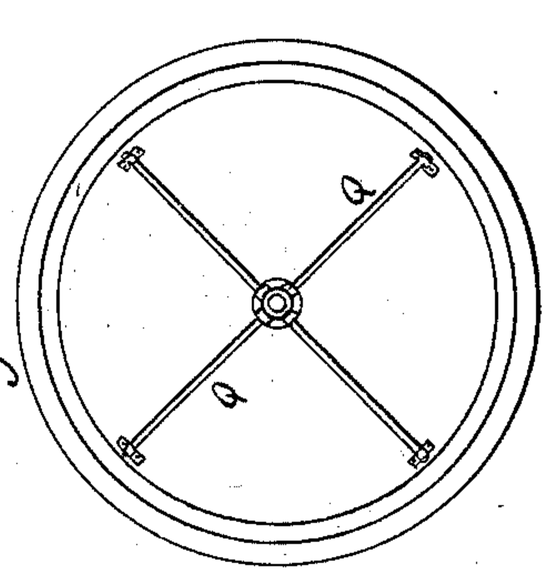


Fig. 2.

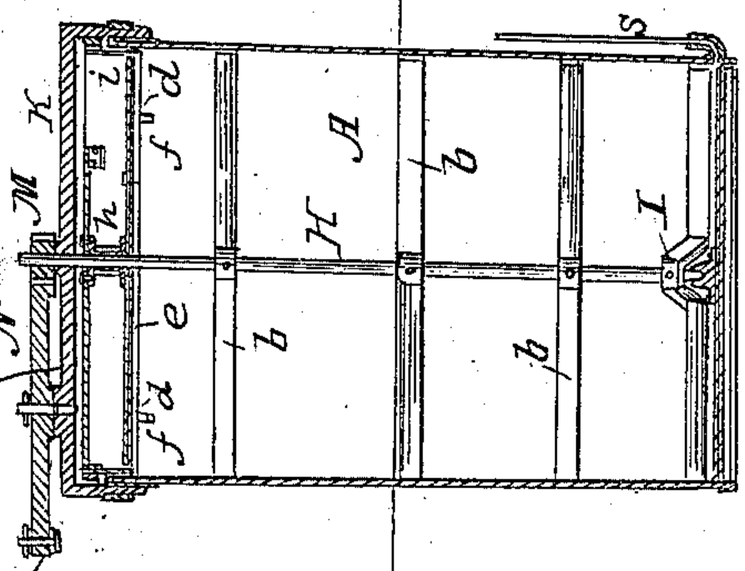
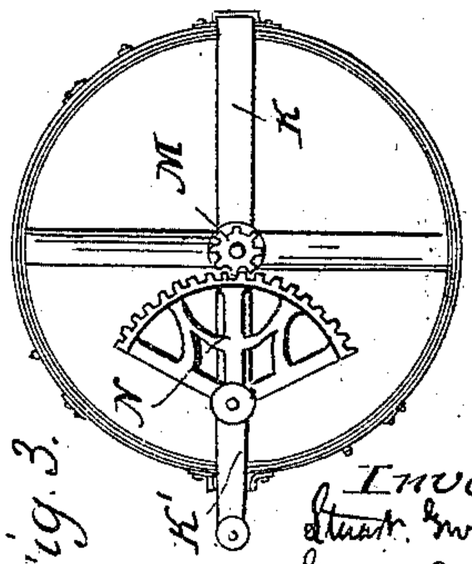


Fig. 3.



Witnesses:
Sydney E. Smith
Gilbert B. Towles

Inventor:
Stuart Gwynn
Spencer M. Clark
By David A Burr
atty

Fig. 9.

Fig. 10.

United States Patent Office.

STUART GWYNN, OF NEW YORK, N. Y., AND SPENCER M. CLARK, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNORS TO SPENCER M. CLARK, OF WASHINGTON, DISTRICT OF COLUMBIA.

Letters Patent No. 81,496, *dated August* 25, 1868.

IMPROVED APPARATUS FOR THE PURIFICATION OF OILS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, STUART GWYNN, of the city, county, and State of New York, and SPENCER M. CLARK, of the city of Washington, in the District of Columbia, have invented a new and improved Apparatus for the Purification of Oils; and we do hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is an isometric view of our apparatus.

Figure 2, a central vertical section through the upper tank thereof, and

Figure 3 a top view of said tank.

Figure 4, a similar section through the second tank.

Figure 5, a plan view of the steam-pipes in the bottom of the second tank.

Figure 6, a plan view of steam-pipes in bottom of the lower tank.

Figure 7, a detached view of the sifter, and

Figure 8 a view of the cross-bars and pins upon which the sifter rests.

Figure 9 a plan, and

Figure 10 an end view of the stirring-blades or paddles of the apparatus.

Similar letters indicate like parts in all of the figures.

The nature of our invention consists in the combination, in one apparatus, of tanks specially arranged and adapted for carrying out successively the operations of oxidizing, neutralizing, steaming, and heating for evaporation, oils to be purified under the process invented by STUART GWYNN, and for which an application for Letters Patent is herewith filed, and of special devices to be employed in connection with one or more of said tanks for the addition of oxidizing and neutralizing chemicals to the oils, for stirring and agitating the same, and for detecting the condition of the contents of each tank.

The process for the purification of oils, for which this apparatus is especially designed, will be found fully described in the specification for Letters Patent thereon, filed by STUART GWYNN at the same time with this. Said process involves the following operations:

First, oxidation: subsidence and decantation.

Second, **neutralization:** subsidence and decantation.

Third, steaming: subsidence and decantation.

Fourth, evaporation of volatile matters: subsidence and decantation; and

Fifth, bleaching.

In fig. 1, of the accompanying drawings, A represents a tank, in which the first operation in the treatment of the oil is conducted; B, that for the second; C, that for the third; and D for the fourth.

These tanks, made of any desirable dimensions, are so supported upon a framework, E E, or otherwise, as that the top of each successive tank in the order named shall be below the bottom of that preceding it. Each tank is provided with a discharge-cock, F, at the bottom thereof, for the purpose of cleansing the same, and with a siphon-tube, G, supported by a sliding rest, moving upon and secured to a vertical bar or rod, *a*, projecting from the upper edge of the tank, so that the inner end of the siphon may be adjusted to any desired height above the bottom of the tank into which it is inserted.

The tanks are lined with lead, or otherwise made proof against the action of acids or alkalies, and the tubes, cocks, and other appliances hereinafter described are similarly protected.

In the upper tank A is placed a central vertical shaft, H, (fig. 2,) provided with flat arms or blades *b b*, arranged to project radially therefrom. The face of each blade is inclined from a horizontal plane, as seen in the end view thereof, (fig. 10,) every alternate blade being inclined in an opposite direction.

The lower end of this stirring-shaft H is supported in a step, I, on the bottom of the tank. Its upper end passes through and is supported by a collar or bearing formed in one or more cross-pieces K K, whose ends

are secured to the edge of the tank in such manner as to admit of being readily detached therefrom, to permit the removal of the shaft H and stirring-paddles *b*. The upper end of the shaft H is fitted with a pinion-wheel, M, into which mesh the teeth of a toothed sector, N, pivoted horizontally upon one end of the cross-bar K supporting the shaft, and from the sector N extends an arm, *c*, to operate the same.

Within the upper portion of the tank, beneath the cross-bar K, and encircling the shaft H, is placed a very fine metallic sieve, P. The lower edge of its rim, which is made to fit closely within the tank, is cut away, to form, or is otherwise provided with, ratchet-notches *d*, figs. 2 and 4, with intermediate inclined surfaces *e e* resting upon a corresponding number of pins *f*, projecting inwardly from the side of the tank. The intervals between the pins and notches are all equal, so that when the notches drop upon the pins, the whole sieve falls to that extent, and a revolution of the sieve upon the pins will cause it to lift equally at all points of its circumference until the notches reach the next pins and allow the sieve to drop again. As the sieve thus falls, a shock is given thereto, which disengages from the bottom thereof any drops that may accumulate thereon in passing through the same, before they become full and large, thus insuring a distribution, in very small quantities, of the acid or other matter therefrom. The centre of the sieve is fitted with a collar, *h*, to encircle loosely the shaft H, so that the contents of the sieve cannot reach the same. Its upper edge is provided with an outwardly-toothed rim, *i*, (fig. 1,) meshing into a pinion-wheel, W, (figs. 1 and 4,) secured in suitable bearings on the side of the tank, and by means of which a revolution of the sieve about the shaft H is secured.

A similar revolving sieve, P′, is placed in the upper portion of the second tank B, but as in this tank the stirring-shaft H, used in the tank A, is omitted, cross-bars L L, fig. 8, are secured at a proper point within the tank, from which projects a central pivot, O, fig. 4, to serve as an axis for the sieve. In this case, the cam-pins *f* may be formed upon the cross-bars L, instead of being made to project from or secured to the side of the tank.

In the bottom of the tanks B and C we place steam-pipes, (see Q Q in fig. 5, and R R in fig. 6,) for the purpose of heating their contents, and the tank D is also so constructed as to admit of heating its contents to a temperature of from 215° to 400°, either by steam-pipes or otherwise.

Each tank is provided with a glass indicating-tube, S, arranged at the side thereof, and communicating, by means of a suitable tube and cock, *t*, with the interior of the tank at the bottom thereof. If the communicating-cock *t* be opened during the subsidence of the contents of the tank, the depth of sediment therein will appear in the tube, thus enabling the operator to decant the clear oil from the sediment without disturbing the latter.

The operations to be effected by our apparatus thus constructed are as follows:

The first tank, A, being filled with linseed or other oil, the vertical shaft H, with its paddles *b*, is made to revolve alternately in opposite directions with great rapidity, by a to-and-fro movement of the arm *c* of its sector N, so as to cause a violent agitation of the oil. So soon as this has commenced, sulphuric acid is placed in the sieve P, which is then made to revolve by means of the pinion-wheel W. In each of its revolutions the sieve is gradually lifted and suddenly dropped three or more times, according to the number of its notches and of the pins upon which it rests. This disengages from the under side of the sieve the drops of acid which may accumulate thereon whilst they are yet small, insuring a distribution of the acid in the minutest quantities possible.

After a proper proportion of acid (say about two and a half to five pounds to each one hundred pounds of oil) has thus been added to the oil, and properly mixed, the shaft H and sieve P are lifted out of the tank by means of suitable appliances, (the cross-bars K, forming the upper bearings of the shaft H, being made detachable from the tank for this purpose, as hereinbefore described,) and the oil allowed to stand and settle. Before subsidence commences, and immediately after removing the shaft and sieve, the cock *t*, communicating with the indicator-tube S, is opened, and the depth of the clear oil, after subsidence, can be at once determined by the depth of sediment in the tube. The siphon G is now inserted into the tank A, as near to the bottom of the clear portion of the oil as is desirable, and the clear oil decanted thereby into the second tank B.

The sediment is next removed from the tank A by means of the waste-cock F, the shaft H and sieve P replaced, and the tank A is ready for another measure of oil.

The clear oil in the tank B is heated therein by means of steam (or hot air) introduced in the pipes Q, in the bottom thereof, these pipes having first been covered with water before the oil was introduced. We prefer to make small perforations in the pipes Q when steam is used, to allow the steam to escape therefrom and pass up through the oil. Into the oil thus heated, milk of caustic lime is introduced by means of the sieve P′, which is made to revolve, and is shaken by the same method as has been described in reference to the sieve P on the tank A.

When the acidity of the oil has thus been properly neutralized, the cock of the indicator S, in this tank, is opened and the oil allowed to subside until separated from all sediment, and the clear oil is then decanted, by means of the siphon attached to the tank, into the third tank C, where it is submitted for a suitable time to the action of free steam forced into and passing up through the same from the steam-pipes R R, fig. 6, which are perforated with numerous fine apertures for this purpose.

After being allowed to subside in this tank C, the clear oil is again decanted into the fourth tank, D, (by means of the connecting siphon-tube,) in which it is heated by means of steam or hot-air pipes in the tank, or otherwise, to 215° and upwards, until all the aqueous particles and volatile matters foreign to the oil are evaporated, when it is finally carried into bleaching-vats, and exposed to the action of light, until it becomes as colorless as required.

Having thus fully described our improved apparatus, and the manner of using the same, we claim therein as new, and desire to secure by Letters Patent—

1. The within-described combination and arrangement, in successively lower planes, of an oxidizing-tank,

A, provided with a detachable stirring-shaft, H, and diffusing-sieve P; a neutralizing-tank, B, with sieve P′ at top, and steam or hot-air pipes Q within the same; a steaming-tank, C, containing suitable steam-jet pipes R, and an evaporating-tank or vessel, D, the whole being adapted and made to operate for the refinement of oils, as has been herein set forth.

2. In combination with the tanks A, B, C, and D of our apparatus, we claim outer vertical glass indicating-tubes S, communicating with the bottoms of said tanks, and operating as herein described.

3. We claim the within-described combination of inclined or cam-surfaces and suitable notches, formed upon a revolving sieve, P, with pins supporting the same, when arranged and operating to lift and drop the sieve in its revolutions, substantially as herein set forth.

As witness our hands hereto.

STUART GWYNN.
S. M. CLARK.

Witnesses as to STUART GWYNN:
W. G. MONROE,
L. BOUVIER.

Witnesses as to S. M. CLARK:
THOS. W. FOWLER,
A. A. BROOKE