

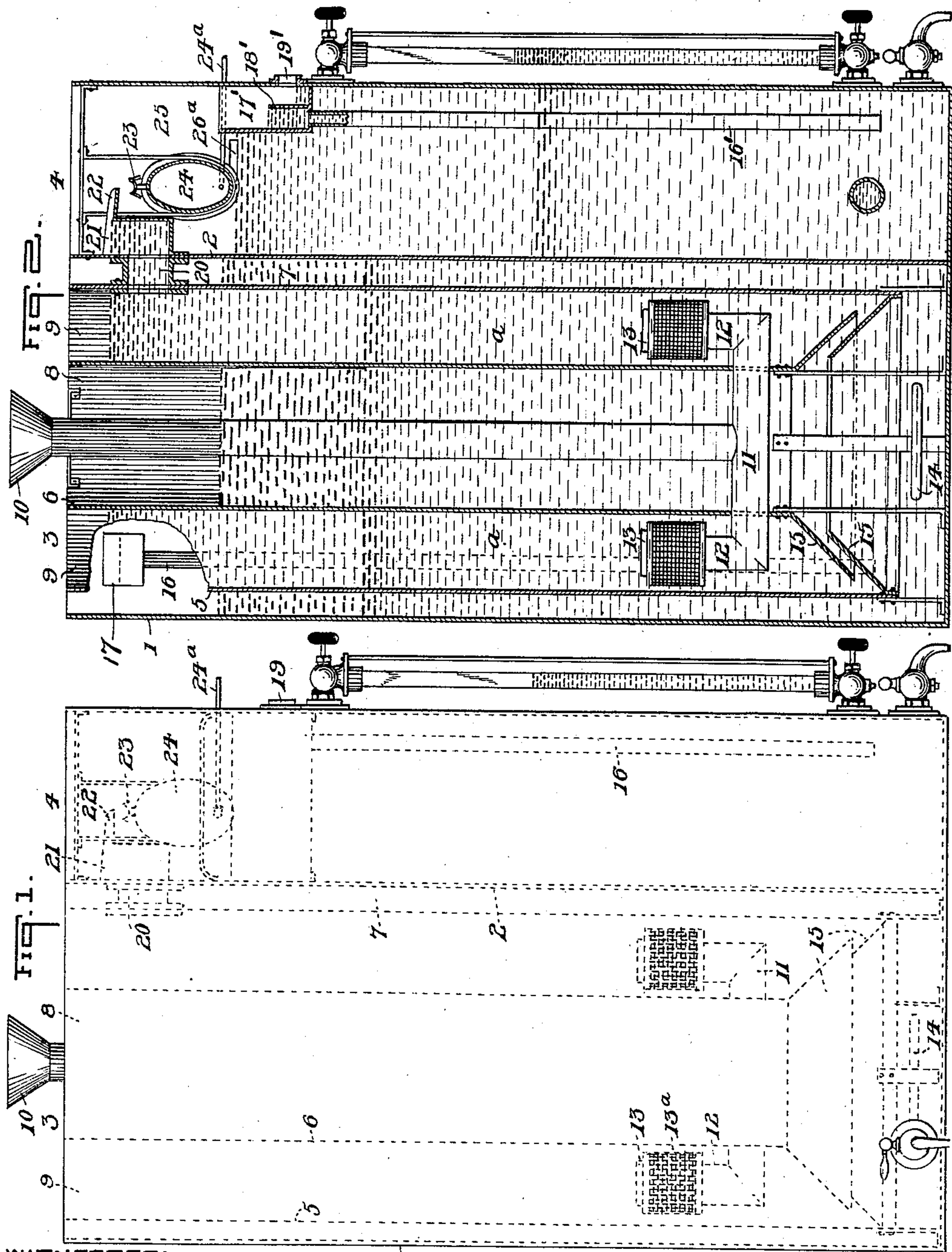
No. 886,718.

PATENTED MAY 5, 1908.

P. E. MOOCK.
APPARATUS FOR TREATING WASTE OIL.

APPLICATION FILED APR. 7, 1906.

2 SHEETS—SHEET 1.



WITNESSES:

J. P. Appleman,
Margaret Hughes

INVENTOR

Philip E. Moock
by W. G. Doolittle

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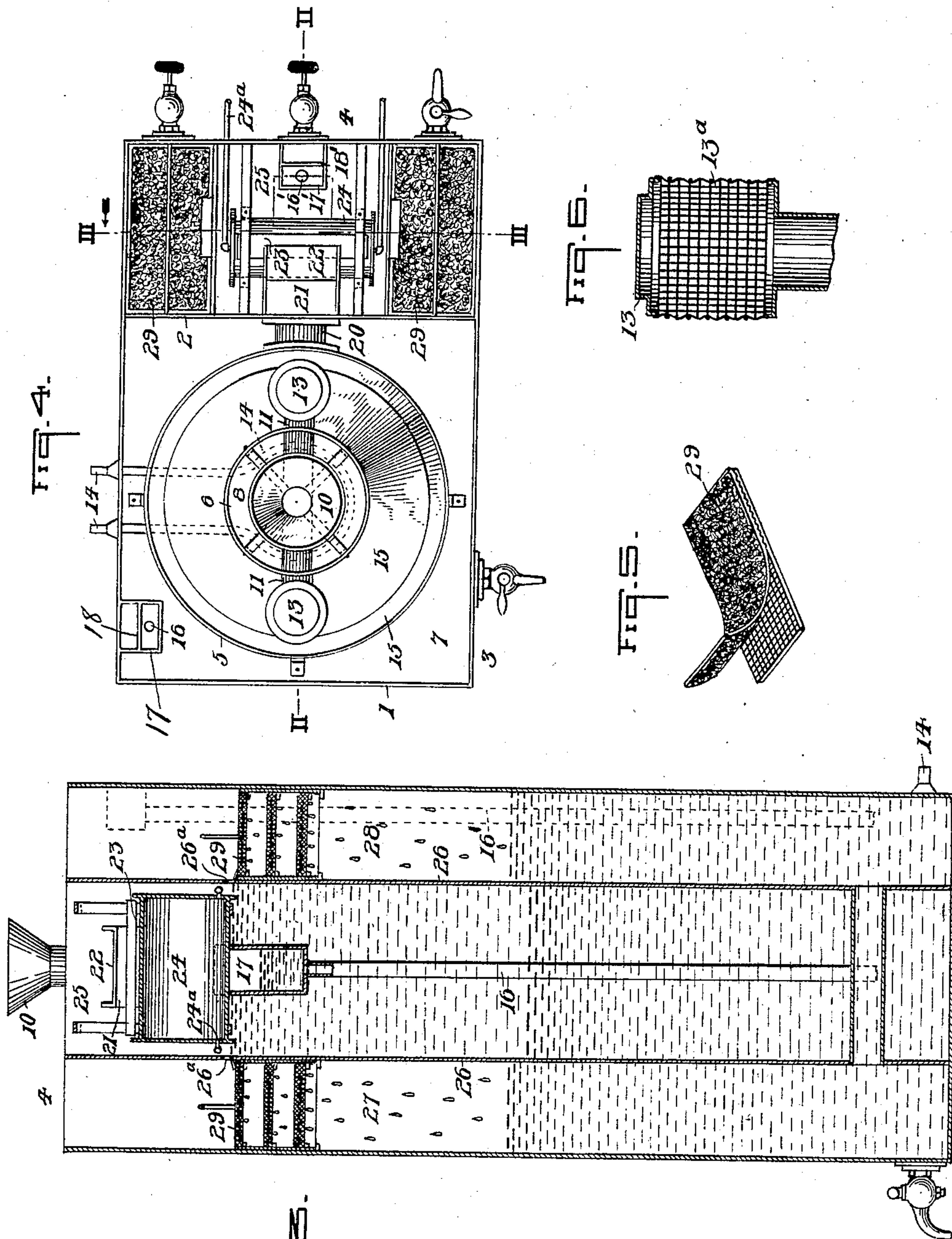
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WITNESSES:
J. C. Appleman,
Maryann Hughes

FIG. 5.

INVENTOR
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UNITED STATES PATENT OFFICE.

PHILIP E. MOOCK, OF SHERIDAN, PENNSYLVANIA, ASSIGNOR TO PITTSBURGH GAGE & SUPPLY COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS FOR TREATING WASTE OIL.

No. 886,718.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed April 7, 1906. Serial No. 310,429.

To all whom it may concern:

Be it known that I, PHILIP E. MOOCK, a citizen of the United States, residing at Sheridan, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Apparatus for Treating Waste Oil, of which the following is a specification.

This invention relates to a new and improved apparatus for treating waste-oils. The primary object of the invention being to treat oil, after it has been used in lubricating machinery, in such a manner as to produce a pure oil possessing good lubricating qualities. This I accomplish by extracting all foreign moisture and other impurities.

A further object of the present invention is to purify oil that has been used for other purposes than lubricating machinery, for example, such oil that has been used in connection with electrical apparatus and known commercially as transformer oil.

In the accompanying drawings which illustrate an application of my invention, Figure 1 is an elevational view of an apparatus constructed in accordance with my invention; Fig. 2, a central vertical sectional view of the same; Fig. 3, a vertical sectional view taken on line III—III of Fig. 4; Fig. 4, a top plan; and Figs. 5 and 6, detail views.

The apparatus as illustrated and as preferred, comprises a rectangular casing 1, having its interior divided up into a number of compartments and chambers. As shown, the interior of the casing is divided by a partition-wall or plate 2, into two main compartments 3 and 4. Compartment 3 contains two vertically extending cylindrical walls 5 and 6 dividing said compartment 3, into, an outer chamber 7, an inner chamber 8, and an intermediate chamber 9. Extending from the top of the inner chamber 8 and projecting downwardly into said chamber, I employ a receiving funnel 10. The lower end of the funnel is closed by a cross-pipe 11, which pipe extends through the wall of the inner chamber and into the annular intermediate chamber 9 and terminates in two upright members 12, each carrying a discharge separator 13, through which the waste-oil and water is passed into the intermediate chamber. These discharge-separators, as particularly shown by the detail view Fig. 5, are closed at the top and com-

prise a screen 13^a for aiding in separating the oil and water. Located in the lower portion of compartment 3 are means for heating the contents thereof, as shown. I employ a steam coil 14 connected with a steam supply. 15 designate deflectors for directing the vapors generated in this compartment to the inner chamber 8, and as said chamber, at its top, is in open communication with the atmosphere and separated from the intermediate chamber 9, containing the waste-oil, the vapors are passed to the atmosphere without coming in contact with the oil being treated.

The waste-oil to be treated is introduced to compartment 3 through receiving funnel 10 and passes down through said funnel into the intermediate chamber 9 by way of cross-pipe 11 and the discharge-separators 13. The waste-oil as shown by Fig. 2, passes upwardly through the water, indicated by *a*, contained in intermediate chamber and being somewhat diluted by being warmed, will be separated from the entrained water and some of its other impurities and rise to the surface of the water.

By means of an automatic overflow, I am enabled to maintain the oil and water at constant levels, the proportions preferably being, two-thirds water and one-third oil. The automatic overflow comprises a pipe 16, a compartment 17 having a partition wall 18 extending across the compartment, and 19 is the outlet.

Passing the waste-oil through the body of heated water as above described frees the oil of entrained water and some other impurities, the waste-oil, however, still contains much moisture and other impurities, which, in order to produce good lubricating oil, must be extracted. Consequently, after the step above described, this preliminarily treated oil must be subjected to a further heat, and in order to produce the best results the oil should be heated while being passed in a comparatively thin film or sheet over a heating surface. The importance of this step in my invention will be readily appreciated by those skilled in this art, for it is known that where heat is applied to a thick body of emulsified oil for the purpose of separating the foreign moisture contained in the oil by evaporation, the heat would necessarily have to be applied such a length of time as to over-

heat the oil and thereby greatly reduce the lubricating qualities of the oil. Another objection to this mode of separating the water and oil, that is, while the emulsified oil is in a collected body, the heat causes small globules of steam or vapor to be generated from the water or moisture in the oil and rise to the surface of the oil where they explode and scatter the oil in all directions. By applying the heat to the oil while the oil is in a thin film or sheet it is unnecessary to heat the oil to such a temperature as to cause evaporation, but only sufficiently to effect a change in the specific gravity of the emulsified oil, thereby instantly causing a complete separation of the moisture and some other impurities and the oil. As illustrated, this second step in the practice of my invention is performed in compartment 4, which compartment is connected with the compartment 3 by a passage 20. Passage 20 discharges the oil into a chamber 21, from whence the oil flows over a spreader 22 onto an adjustable trough 23. From trough 23 the emulsified oil drops onto the outer heating surface of a heating chamber 24, whereby the oil is instantly separated from the water or moisture and some other impurities having a specific gravity greater than the oil. The separated water, together with the free oil, then passes down into an oil and water chamber 25, the water and heavier impurities descending to the lower portion and the oil remaining on top. Chamber 25 is provided with an automatic overflow similar to the overflow described in reference to compartment 3, comprising pipe 16', compartment 17', partition-wall 18', and outlet 19'. In order to further treat the oil for the purpose of extracting any foreign impurities still remaining, as impurities having a specific gravity so near that of the oil that they have not been separated therefrom during the previous steps, I provide in the pure oil chambers 27 and 28, filtering devices 29 comprising a series of baffle plates or trays constructed with a wire mesh and covered with cloth, hair-felt or other suitable substances. Oil enters chambers 27 and 28 from chamber 25 through openings 26^a formed in the partition walls 26 dividing said compartment 4 into the two pure oil chambers 27 and 28 and the oil and water chamber 25.

In treating some waste-oils and particularly oil used in connection with electrical apparatus for other purposes than lubricating the apparatus, it is not necessary or desirable to first pass this waste oil through a body of water before subjecting the oil to the heat of the heating chamber 24, and in purifying this oil it is passed by suitable means into chamber 21 over spreader 22 to the outer heating surface of chamber 24, after which it is treated in the manner above described. Chamber 24 may be heated in any

suitable manner, as illustrated I employ steam for heating this chamber introduced thereto by means of the steam-coil 24^a.

What I claim is:

1. An apparatus for treating waste-oil comprising a compartment partially filled with water through which the waste-oil is passed, means for spreading the partially treated oil into a film, and means for heating the oil after its passage through the water comprising a heating-member upon which the oil is caused to fall. 70
2. An apparatus for treating waste-oil comprising a compartment partially filled with water through which the waste-oil is passed, means for heating the water, means for spreading the oil into a film or sheet and means for heating the oil after its passage through the water comprising a heating member upon which the film or sheet of oil falls. 75
3. An apparatus for treating waste-oil comprising a receiving compartment partially filled with water through which the waste-oil is passed, a storage compartment, means connecting the compartments, means for spreading the oil into a film or sheet, and means in the storage compartment for heating the film or sheet of oil after its passage through the water of the receiving compartment. 80
4. An apparatus for treating waste-oil comprising a compartment partially filled with a body of water through which the waste-oil is passed, means for spreading the oil into a sheet or film after its passage through the water, and means for heating the sheet or film of oil comprising a heating-member located below the spreading means onto which the sheet or film of oil flows. 85
5. An apparatus for treating waste-oil comprising means for spreading the oil to be treated into a sheet or film, and means for heating the sheet or film of oil comprising a heating-member located below the means for spreading the oil and onto which the sheet or film of oil flows. 90
6. An apparatus for treating waste-oil comprising a receiving compartment partially filled with a body of water, a second compartment partially filled with a body of water, a connection between the two compartments for the passage of oil from one compartment to the other, and an automatic overflow in each compartment for maintaining a constant level of oil and water in each compartment comprising a pipe, a compartment having a partition-wall, and an outlet opening. 95
7. An apparatus for treating waste-oil comprising a compartment divided into an outer chamber, an inner-chamber, and an intermediate-chamber, said chambers partially filled with water, means for heating the water, and a receiving funnel located in the in- 100

ner-chamber and provided with means for discharging the waste-oil into the intermediate-chamber.

8. An apparatus for treating waste-oil 5 comprising a compartment divided into an outer-chamber, an inner-chamber open to the atmosphere, and an intermediate-chamber, said chambers partially filled with water, means for heating the water, means for conveying the waste-oil down through the inner-chamber and discharging it into the intermediate-chamber, and means for directing the generated steam into the inner-chamber.

9. An apparatus for treating waste-oil 15 comprising a casing divided into a main receiving compartment and a second main compartment, said receiving compartment divided into an outer-chamber, an inner chamber, and an intermediate-chamber, said 20 chambers partially filled with water, means for heating the water, means for conveying the waste-oil down through the inner-chamber and discharging it into the intermediate-chamber, means for conveying the partially 25 treated waste-oil from the intermediate-chamber into the second main compartment, and means in the latter compartment for heating the oil.

10. An apparatus for treating waste-oil 30 comprising a receiving compartment partially filled with water, means for heating the water, means for introducing the waste-oil to the water below the surface of the water, a second compartment, a passage connecting 35 the compartments through which the partially treated oil is passed from the receiving compartment to the second compartment, means for spreading the oil into a thin sheet or film, and means for heating the thin sheet 40 or film of oil comprising a heating-member located below the spreading means onto which the film of oil flows.

11. In an apparatus for treating waste-oil, means for spreading the oil into a film or sheet, an adjustable trough, and a heating- 45 member onto which the film or sheet of oil is passed.

12. An apparatus for treating waste-oil, comprising a compartment partially filled with water through which the waste-oil is 50 passed, a second compartment, a passage connecting the compartments, means for spreading the oil after its passage through the first compartment into a film or sheet comprising a plate and a trough, and a heat- 55 ing member located below the trough upon which the film or sheet of oil is passed.

13. An apparatus for treating waste-oil, comprising a receiving compartment partially filled with water through which the oil is 60 passed, a second compartment comprising a central chamber and side chambers, a passage connecting the two compartments, means for spreading the oil into a film or sheet after its passage through the receiving 65 compartment, means for heating the film or sheet of oil, and a series of filtering plates located in the side chambers.

14. An apparatus for treating waste-oil, comprising a receiving compartment par- 70 tially filled with water through which the oil is passed, a second compartment, means connecting the compartments comprising a passage and an overflow oil-chamber, means located in the second compartment for spread- 75 ing the oil into a film or sheet, and a heating member upon which the film or sheet of oil is passed.

In testimony whereof I affix my signature, in presence of two subscribing witnesses.

PHILIP E. MOOCK.

Witnesses:

J. LEE RODGERS,
W. G. DOOLITTLE.