V. FORNONZINI.

APPARATUS FOR RECOVERING KEROSENE OIL FROM WATER BATH.

APPLICATION FILED APR. 22, 1909.

929,204. **Patented July 27, 1909.**

Fig. 1.

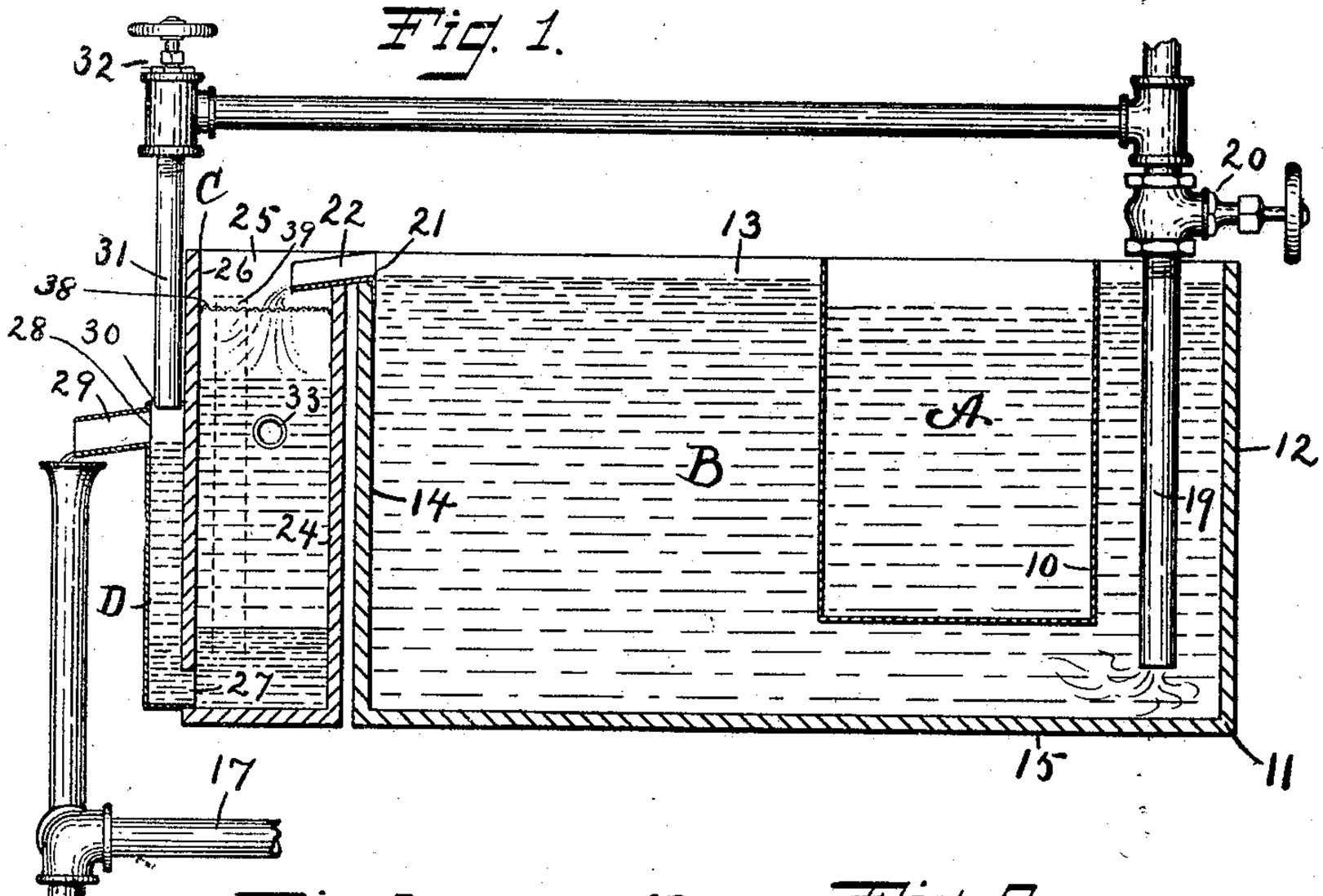


Fig. 3.

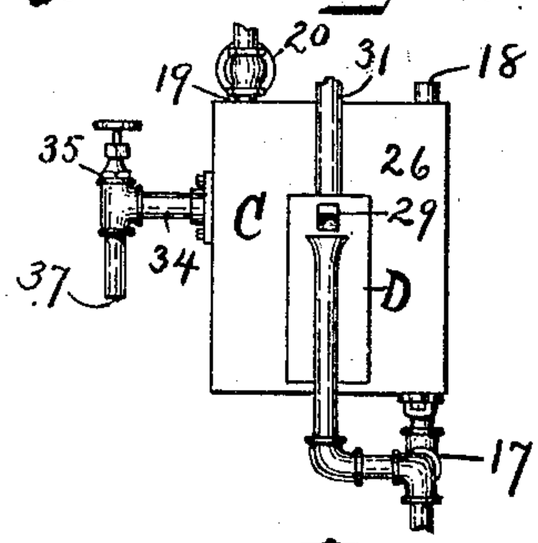


Fig. 2.

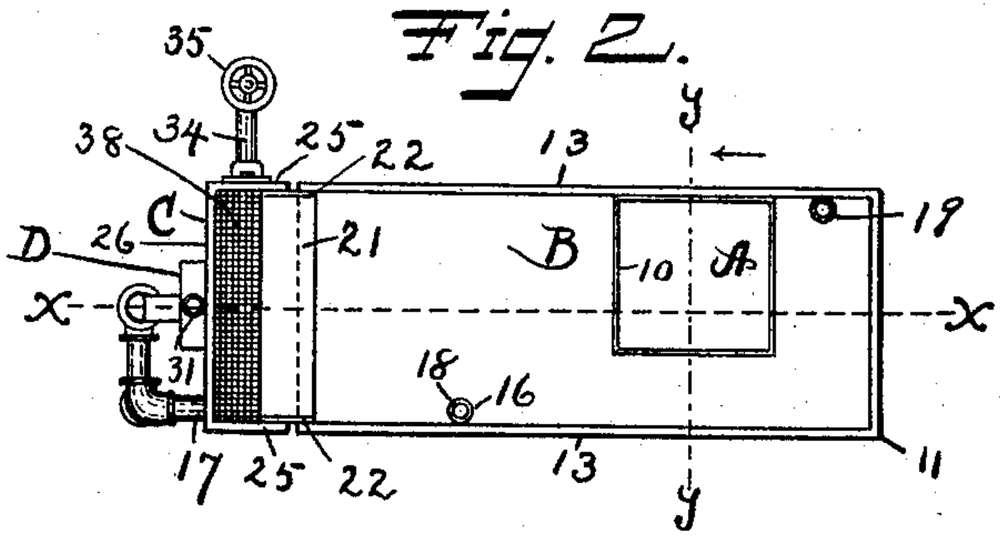


Fig. 4.

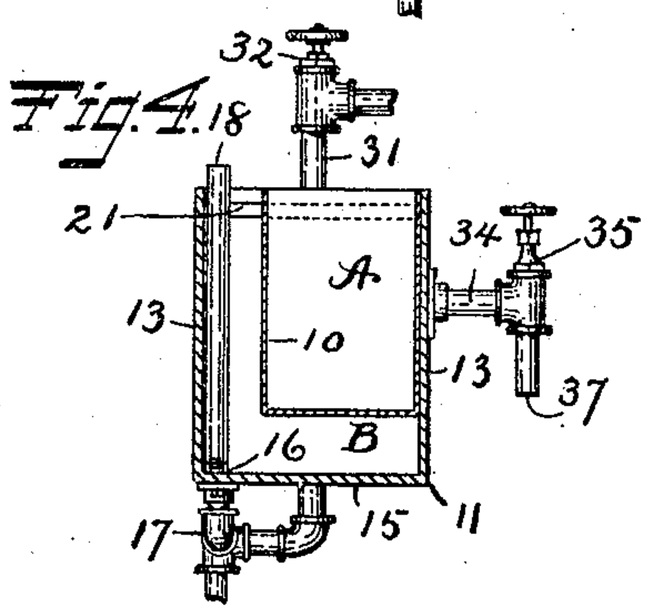
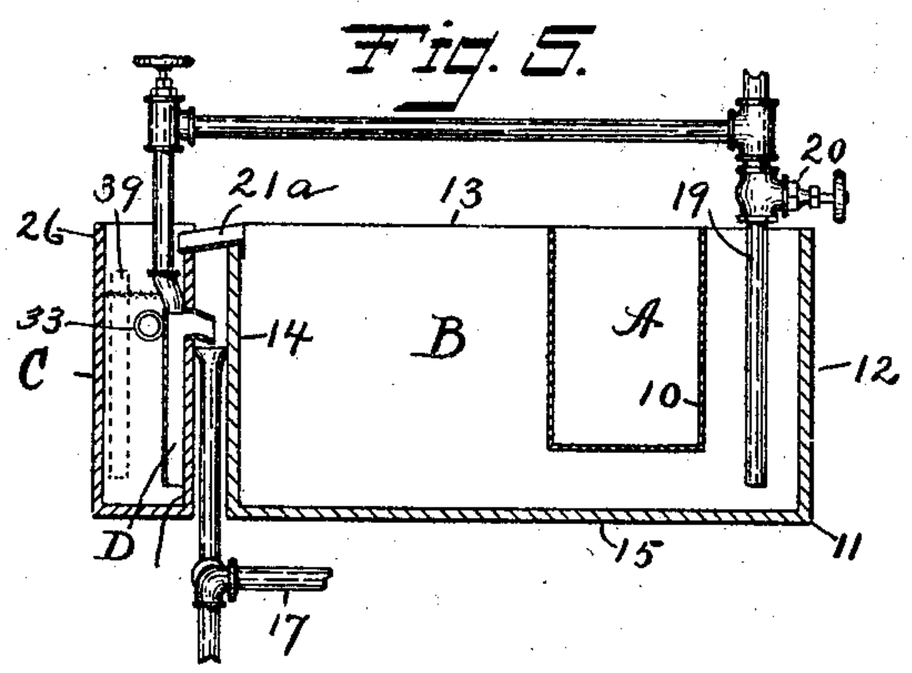


Fig. 5.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR RECOVERING KEROSENE-OIL FROM WATER-BATH.

No. 929,204. Specification of Letters Patent. Patented July 27, 1909.

Application filed April 22, 1909. Serial No. 491,626.

To all whom it may concern:

Be it known that I, VICTOR FORNONZINI, a citizen of Italy, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Apparatus for Recovering Kerosene-Oil from Water-Bath, of which the following is a specification.

My invention relates to improvements in the process of recovering kerosene oil from a water bath, especially in the process of tinning, and the apparatus for recovering the same, and the objects of my improvements are simplicity and economy in construction and convenience and efficiency in use.

In the accompanying drawing: Figure 1 is a longitudinal section of my apparatus on the line *x x* of Fig. 2. Fig. 2 is a plan view of my apparatus on a reduced scale. Fig. 3 is an end view of my apparatus. Fig. 4 is a sectional view on the line *y y* of Fig. 2. Fig. 5 is a longitudinal section of a modification.

In one of the processes of tinning the articles that are being tinned are dipped while hot first in a bath of kerosene oil and then in a bath of water. In the transfer from the bath of kerosene oil to the bath of water particles of kerosene oil are transferred from the oil bath to the water bath. By my process and apparatus the kerosene oil thus transferred to the water bath is recovered and may be used over again repeatedly. Furthermore, this recovery of the kerosene oil is effected without interfering with the ordinary methods of operation in the use of the said kerosene oil bath and water bath, that is, as applied to the continuity of operation and without particular attention, other than occasional drawing off of the recovered kerosene for future use, which recovery may be effected during the night or at any time out of the regular working hours if desired. This means that a flow of cooling water may be maintained freely as desired during operations without practical effect upon my process or the efficiency of the apparatus that I use for the said recovery of the kerosene from the water bath.

In carrying out my process I employ a kerosene bath A, retained in a vessel 10, preferably of thin sheet metal, and rectangular in shape, open at the top, the said vessel 10 nearly filled with kerosene and immersed for the greater part of its depth in the water bath B, retained in a relatively large tank or vat 11, which may be made of boiler plate or any suitable material and preferably rectangular, the said kerosene bath A being located somewhat near one end which end may be designated as the oil bath end 12, and also near one of the sides 13 which may be designated as the working side for convenience in working in using the apparatus for the dipping operations that have been mentioned. The sides 13 and the oil bath end 12 of the said vat 11 are of essentially the same height and have tops horizontal. That is, two sides and one end are of the same height. The end of the vat 11 remote from the said oil bath end 12 is dropped below the level of the tops of the said sides 13 and oil bath end 12, which low end may be designated as the dam end 14 and is dropped low to form an over flow for the fluid, that is the mixture of kerosene oil and water, from the said water bath B. The bottom 15 of the said vat 11 for the water bath B may be horizontal, and is provided with a cleaning out hole 16, connecting through suitable conduits 17 with the sewer, the said cleaning out hole 16 being normally closed in any convenient manner, as by inserting in the same a pipe 18 of such length as to protrude above the general level of the liquid in the said water bath B, the protruding portion of said pipe 18 serving conveniently as a handle for insertion and removal.

A cold water pipe 19, provided with a valve 20, connects with a cold water supply and leads to the water bath B, preferably near the said oil bath end 12 of the tank 11, opening out near the bottom 15, and supplies cold running water during normal operations for cooling purposes to offset the heating effect of the hot materials immersed successively in the oil bath A and the water bath B, the cooling effect of the water being readily transmitted to the kerosene of the oil bath A through the walls of the said vessel 10 which as has been stated are of thin sheet metal. The said dam end 14 of the vat 11 may be provided with any dam apron 21 extending full width of the said dam end 14 and which may be made of sheet metal, flanged upwardly at the sides to form the side flanges 22, which dam apron 21 may be set at a slight downward incline from the upper edge of the said dam end 14 of the vat 11, extending outwardly and downwardly therefrom and forming a trough for guiding the overflow of mixture

of water and oil from the said water bath B to a separating tank or vat C, to be hereinafter described. The said separating vat C is essentially rectangular, preferably of the same depth and width as the vat 11 for the water bath B and adjoins the dam end 14, the wall opposed to the same, which may be designated as the dam wall 24 being low enough to receive the said dam apron 21 at the slight incline as has been described, the tops of the two sides 25 and the outer end 26 being essentially on the same level as the tops of the sides 13 and oil bath end 12 of the vat 11.

The combined separating tank C and tank 11 for the water bath A comprise essentially an open elongated rectangular tank, divided by a dam across one end into two parts respectively, the main part constituting the water bath B, and the other part constituting the separating tank C, the said dam apron 21 forming a wide channel connecting the said two parts. In normal conditions of operation there is an overflow of mixed water and kerosene from the said water bath over the said dam apron 21 into the said separating tank C. Near the bottom the said separating tank C opens into a pipe or conduit which constitutes the water outlet conduit D the same leading upward and having an outlet at a definite height which is appreciably lower than the height of the dam as represented by the height of the highest level or overflow point of the said dam apron 21. In Fig. 1 and 2 the said water outlet is shown as a rectangular conduit comprising a sheet metal channel piece forming three walls mounted against the face of the said outer end 26 of the separating tank C so that the inclosed part of the said outer end 26 may form the fourth wall, the said conduit D closed in on the outside at the bottom and opening on the inside by means of a passage 27 with the body of the separating tank C, and provided with a discharge outlet 28 at the definite height described, and which may be provided with a spout 29. The said conduit is also open at the top above the said discharge outlet 28 as shown at 30, which opening 30 is adapted to receive the delivery of a fresh water supply pipe 31, the flow of water in which is controlled by a cock 32. The body of the said separating vat C is provided with an oil discharge opening 33 in one of the sides 25 at essentially the same level as the water discharge outlet 28 in the water discharge conduit D, and leading into an oil conduit 34 the flow in which is controlled by a shut off 35, the said oil conduit 34 leading outward and downward from the said side 25 and having a discharge outlet 37 convenient for discharging into a bucket or temporary receptacle which may be used as a means for delivering the recovered oil to the oil bath A or wherever the same may be wanted. Immediately below the discharge point of the said dam apron 21 in the separating vat C and receiving the discharge therefrom is a screen 38 which serves the purpose of breaking up the said discharge, facilitating thus the separation of the oil from the water, and incidentally as an ordinary screen for holding back any large particles of foreign substances. In one side 25 of the separating vat C is a window 39, the location being shown by the dotted lines in Fig. 1, for convenience in observing the division line of the kerosene oil and water in the separating vat C.

The modified form of my apparatus shown in Fig. 5, has the water discharge conduit D located between the water bath B and the separating vat C, necessitating an appreciable separation of the same and a corresponding increase in the length of the dam apron 21^a, and leaving the exterior walls at the sides and outer ends, of the said water bath B and separating vat C essentially unobstructed.

During the operation of my apparatus running water is admitted to the water bath B from the said cold water pipe 19 so that a liquid level is maintained in the said water bath B determined by the height of point of overflow of the said dam apron 21. As the dipping operations are continued, involving dipping heated metallic articles first in the kerosene oil bath A and next in the water bath B particles of kerosene oil cohere to the said metallic articles and as the said metallic articles are transferred to the water bath B the said particles of kerosene oil are washed off and on account of the specific gravity of the same being less than that of the water they rise and float on the top of the water. Consequently as the flow is maintained from the water supply there will be a continuous flow from the water bath B over the dam apron 21 to the separating vat C of a mixture of kerosene oil and water, and as the cold water supply pipe 19 is of small dimensions and the dam apron 21 is of relatively considerable extent, the said overflow will be in the form of a thin layer over the extent of the said dam apron 21, and on this account is favorable to carrying away essentially all of the kerosene oil as it accumulates on the surface at a relatively slow rate, being accordingly favorable to a separation of the oil from the water in case they happen to be more or less intimately mixed together. As the discharge falls on the said screen 38 in the separating vat C the flow is further retarded and the separation of the oil from the water is thereby further facilitated. Accordingly, as the flow of oil and water mixture is continued from the water bath B to the separating vat C there is an accumulation of kerosene oil in the upper part of the separating vat C, due to the difference in

specific gravity of the kerosene oil and water, and as the water drops below the level of the kerosene oil the same is forced by the pressure of the incoming flow through the passage 27 at the bottom of the said water outlet conduit D and upward through the same and out through the said discharge outlet 28 and the spout 29, the discharge of water being essentially free and uninterrupted and the said water being discharged practically free from kerosene. The kerosene oil may be safely permitted to accumulate in the separating vat C, as observed through the window 39, until the lower level approaches the level of the discharge outlet 27 leading to the water discharge conduit D, when it may be drawn off. This may be conveniently done by shutting off the cold water supply pipe 19 by means of the shut off 20 and admitting water to the top of the water discharge conduit D by means of the opening at the top 30 from the fresh water supply pipe 31, and then also opening the shut off 35 controlling the oil discharge through the oil discharge opening 33 and the conduit 34. As the water is admitted to the bottom of the separating tank the oil is displaced and forced up and out of the separating tank C through the said discharge pipe 34. As the displacing water approaches the level of the said discharge opening 33 the discharge may be interrupted by stopping the inflow of displacing water and resuming normal operations.

In practice it would be most convenient to draw off the accumulated oil sometime during the night, so as not to interfere with normal operations during the day time.

By the use of the apparatus described the kerosene oil may be recovered and used again repeatedly, practically the only loss of kerosene oil being that due to evaporation.

The specific construction employed in the operation of my process may be varied in detail from the description given so long as the principles of the process described are maintained.

I claim as my invention:

1. In combination an oil bath, a water bath and a separating vat, the said water bath receiving oil from the said oil bath and running water, and adapted to overflow into the said separating vat, and means for drawing off the water from the bottom of said separating vat and maintaining a definite depth of liquid in said separating vat.

2. In combination a water bath adapted to receive accumulations of kerosene oil, and supplied with running water, a separating vat, the said water bath adapted to overflow into said separating vat, the said overflow being relatively wide, means for permitting a continuous outflow of water from the bottom of said separating vat and means for intermittently drawing off accumulations of oil from the upper part of said separating vat.

3. In combination with a water bath, a separating vat comprising a separating chamber, a water outlet connecting with the bottom of said separating chamber and discharging at an elevation, and an oil discharge connecting with said separating chamber at essentially the same level as the said discharging level for the water.

4. In combination, a water bath adapted to receive oil and be supplied with running water, a separating vat having separate discharges for water and for oil, said water bath adapted to overflow into said separating chamber by a relatively wide and shallow flow, said discharge for water connecting with the bottom of said separating vat and discharging at a higher point, said oil discharge being at the level of said higher point, and means for admitting water to the bottom of said separating vat for displacing and recovering accumulations of oil in said separating vat.

5. In combination, an oil bath, the said oil bath adapted for dipping articles in the process of tinning, a water bath, said water bath adapted for dipping the said articles after they have been dipped in said oil bath, and thereby receive accumulations of oil transferred from said oil bath, provided with running cooling water and an overflow, and means of recovering the oil from said overflow, said means comprising a separating vat provided with an outlet connecting with the bottom for the discharge of water and means for storing oil above said outlet.

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Witnesses:

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