Dec. 9, 1924. 1,518,684

L. BENGE

APPARATUS FOR RECLAIMING WASTE LUBRICATING OILS

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Fig. 2.

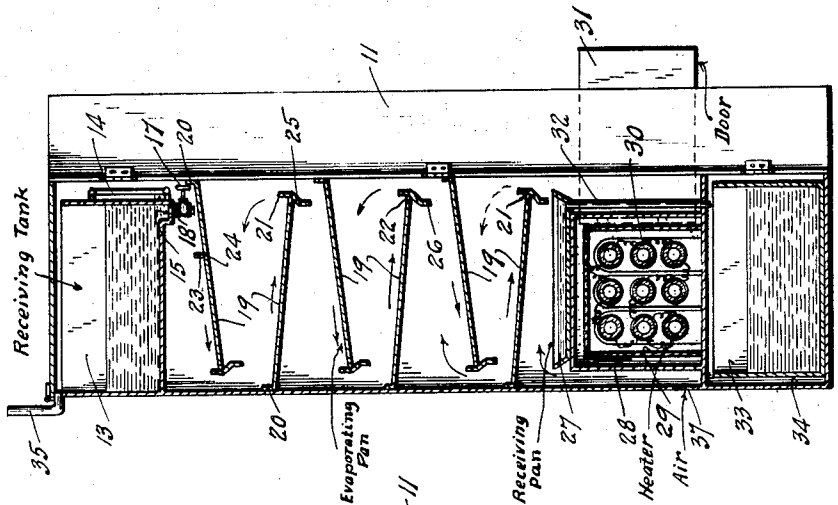
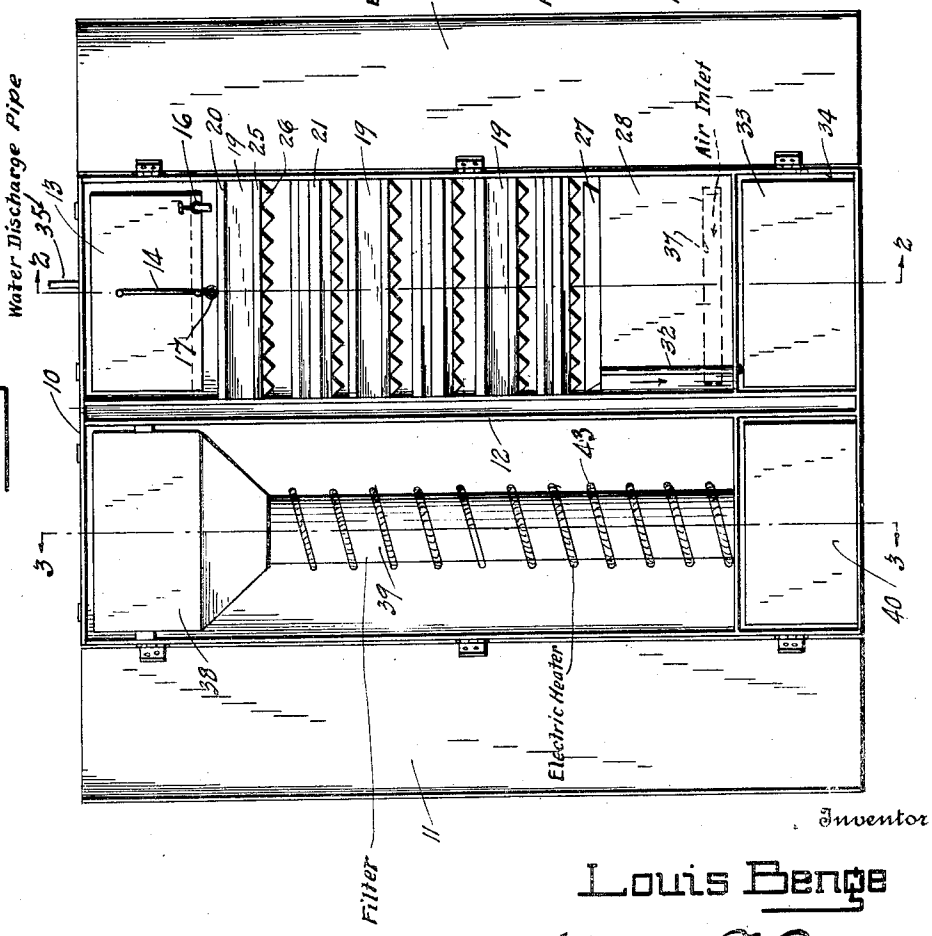


Fig. 1.



Inventor

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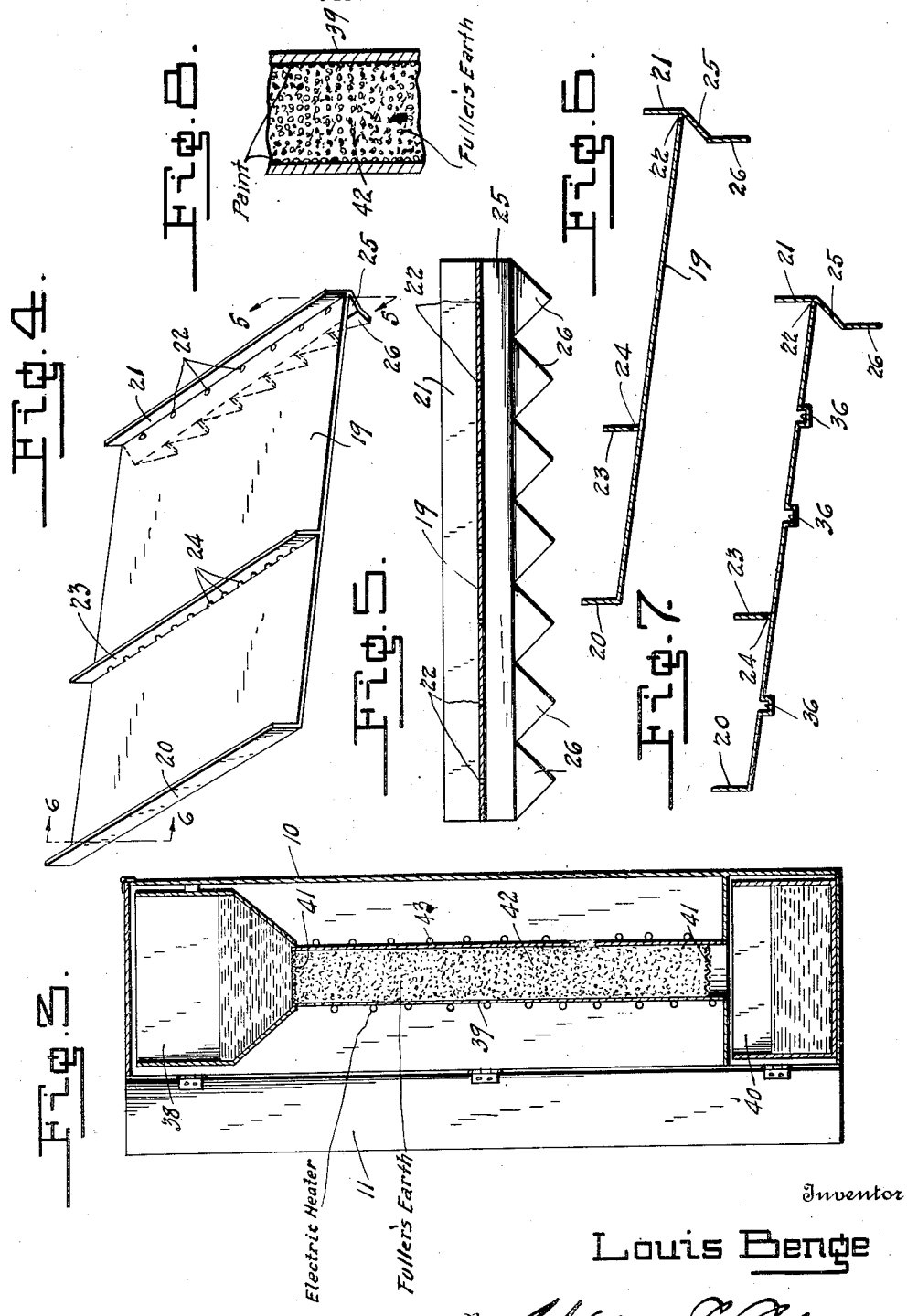
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Patented Dec. 9, 1924. 1,518,684

UNITED STATES PATENT OFFICE.

LOUIS BENGE, OF STERLING, COLORADO.

APPARATUS FOR RECLAIMING WASTE LUBRICATING OILS.

Application filed February 15, 1922. Serial No. 536,767.

To all whom it may concern:

Be it known that I, LOUIS BENGE, a citizen of the United States, residing at Sterling, in the county of Logan and State of Colorado, have invented certain new and useful Improvements in Apparatus for Reclaiming Waste Lubricating Oils, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to apparatus for treating lubricating oils, and particularly to means for treating lubricating oils to separate the oil from water, gasoline and other foreign substances which would be deleterious to the use of the oil for lubricating purposes.

In the running of motor car engines, there is a great waste of lubricating oil for the reason that the oil in the crank case and in other like situations becomes quite heavily charged with gasoline, water and other foreign matters and ordinarily this oil is thrown away.

The general object of this invention is to provide very simple means whereby the lubricating oil proper may be separated from gasoline and other relatively volatile hydrocarbons and whereby any water which may be within the oil and any other foreign substances may be readily separated from the lubricating oil, leaving the lubricating oil in such condition that it may be used over again.

A further object is to provide a construction of this character wherein the contaminated and supposedly refuse oil is allowed to flow by gravity over a series of evaporating plates through a chamber traversed by a current of heated air so that the gasoline or other volatile hydrocarbons will be vaporized and thereby separated from the lubricating oil, and in this connection to provide means whereby the air within this evaporating chamber may be heated, and provide means whereby the oil may be caused to flow in a thin and evenly distributed layer over the evaporating pans or plates.

A still further object is to provide means whereby any water which may be in the lubricating oil may be allowed to settle and separate from the oil and may be withdrawn prior to and during the passage of the oil over the evaporating pans or plates.

Another object is to provide an improved filter through which the oil is passed after the volatile hydrocarbons have been removed therefrom, this filter being so constructed as to remove the carbon and other foreign particles from the oil, leaving the oil free from contamination and capable of re-use.

Still another object in this connection is to so form the filter that the liquid passing therethrough cannot pass around the filter bed or between the filter bed and the enclosing pipe or casing within which the filter bed is disposed but must pass through the filter bed itself.

Other objects have to do with the details of construction and arrangement of parts as will appear more fully hereinafter.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a front elevation of an oil reclaiming apparatus constructed in accordance with my invention;

Figure 2 is a vertical section on the line 2—2 of Figure 1;

Figure 3 is a vertical section on the line 3—3 of Figure 1;

Figure 4 is a perspective view of one of the evaporating pans;

Figure 5 is a cross section on the line 5—5 of Figure 4;

Figure 6 is a longitudinal section on the line 6—6 of Figure 4;

Figure 7 is a longitudinal sectional view of a modified evaporating plate;

Figure 8 is a fragmentary vertical section on an enlarged scale of the filter tube 39.

Referring to these drawings, 10 designates a metallic cabinet or outer case, preferably made of sheet metal, though not necessarily so, this case being adapted to receive the evaporating mechanism and the filtering mechanism and having its front normally closed by the doors 11. The casing 10 is divided into two sections by partitions 12. One of the compartments so formed contains in its upper end a tank 13, into which the refuse oil is adapted to be disposed. This tank is smaller than the casing so as to provide an air passage surrounding the tank on three sides. This tank is provided with a gauge glass 14 of any ordinary or suitable description whereby the height of the liquid within the tank may be readily determined and the lower portion of the tank is provided with a sump or depressed portion 15 in which water, settling through the combined oil and water in the tank, will be received. From the bottom of the tank leads

a water outlet provided with a controlling valve 16. This sump has a downwardly discharging branch 18 controlled by the valve 17 whereby the descent of oil onto the evaporating plates may be controlled. Below this discharge 18 there are disposed a series of plates or evaporating pans 19, alternately inclined in opposite directions, each pan having a width equal to the width of the compartment, and having a length nearly equal to the length of the compartment. The first pan is inclined downwardly and rearwardly, the next pan downwardly and forwardly, the next downwardly and rearwardly, and so on. Each pan is constructed as illustrated in Figure 4, that is of a sheet of metal flanged, as at 20, at that end which is attached to the wall of the compartment and flanged, as at 21, at its free end. This plate or pan 19 at its junction with the flange 21 is formed with a plurality of perforations 22.

Disposed intermediate the length of the first pan of the series is a transverse dam 23 which at its junction with the plate 19 is formed with perforations 24, these perforations being equi-distant and greater in number than the perforations 22. This dam 23 with its perforations acts as a distributer for the first plate of the series, and oil flowing into the space above this dam is held back and passes out through the perforations 24 in the form of small streams so that over the remainder of the first plate 19 the oil will flow in a thin, evenly distributed film or layer. All the other plates or pans 19 of the series are the same as the first plate, except that they do not have thereon the distributer 23.

Below the free edge of each plate there is disposed a distributing flange 25 which, as illustrated in Figure 6, extends downward and inward entirely across the width of the pan 19 and then is formed with a plurality of downwardly extending, triangular portions 26. Thus the oil as it passes through the perforations 22 will be caused to flow down this plate 25 and drip off these points 26 and be more or less evenly distributed upon the plate or evaporating pan 19 below. It will be seen that with this construction the oil flows downward over this series of evaporating pans in a thin layer and that between these pans the oil drips downward so that the oil is fully subjected to the column of hot air which is passing upward between the pans.

In order to form water pockets along the evaporating pan, the pan may be constructed as illustrated in Figure 7, with pockets 36 in which water sinking through the film of oil will collect. The lowermost evaporating pan 19 discharges into a receptacle or receiving pan 27. This pan is disposed immediately over a chamber 28 and within this chamber 28 is a heating chamber 29. Within this heating chamber 29 is disposed a heater 30 which is illustrated as an electric heater, though other forms of heating devices may be used. The heating chamber 29 is normally closed by a door 31.

From the pan 27 leads a drain pipe 32 which extends downward past the heating chamber 28 and discharges into an oil tank 33. This oil tank is disposed within a compartment 34. A flue or pipe 35 communicates with the upper portion of the casing or evaporating compartment above the tank 13 so that all of the fumes of gasoline or other volatile matters will be carried off through this vent 35 and carried into a chimney or otherwise prevented from being noxious. The lower end of this compartment at a point below the heating chamber has an air inlet 37. Thus it will be seen that air passing into the air inlet 37 will be highly heated by passing around the chamber 28 and will pass up over the pan 27 and then back and forth around and past the several evaporating pans until it is eventually discharged into the vent 35 which may be carried to the outside of the building. In its passage this column of hot air will so heat the thin films of oil on the several evaporating plates so that the more volatile constituents of the contaminated oil will be volatilized and carried off, thus eliminating the gasoline, kerosene and other light hydrocarbon elements from the oil and leaving it relatively pure and only contaminated by particles of carbon and the like.

In order to remove the contaminating particles from the oil, I provide a filtering chamber or compartment within which is disposed at its upper end a tank 38 having a hopper-shaped lower end into which the cleansed oil from tank 32 is placed. Extending downward through the filter compartment and from the lower end of the tank 38 is a hollow casing 39 which may be made of iron pipe or other suitable material, this casing at its lower end discharging into a filtered oil tank 40. Disposed at the upper and lower ends of this casing are screens 41, and disposed between these screens is a filtering bed composed preferably of fuller's earth 42. In order to prevent any oil from passing between the filtering bed and the filter bed casing, the interior of the casing is painted, as for instance with oil paint, and then while the paint is still fresh the filtering material is placed within the casing so that the particles of the filtering material, namely fuller's earth, will adhere all around the pipe to the freshly painted surface thereof. Obviously after the oil has passed from tank 38 to the tank 40 through filter 42, all of the foreign particles within the oil will be separated from the oil and the oil will be in condition for re-use as

lubricant. By disposing the filter and the evaporating apparatus within an outer casing having doors, the complete construction is made compact, reasonably portable and self-contained and the objectionable fumes which would arise from the evaporating gasoline or other hydrocarbons will be largely prevented from entering the room in which the apparatus is disposed. This apparatus is sufficiently simple so that it may be readily installed in private garages and like places and its use will result in a considerable saving to the owner of an automobile.

It will be understood, of course, that the oil containing the foreign matter and intermingled with water and gasoline is disposed within the tank 13 and allowed to settle. Any water which may be intermingled with the oil will settle down to the bottom of the tank 13 and this water will be indicated on the gauge glass 14. If there is too great a proportion of water, the entire amount of oil within the tank 13 may be withdrawn or the water merely withdrawn until there is little or no water left in the tank but only the refuse oil. When this occurs the outlet valve is closed and the valves opened to permit the oil to discharge onto the plates 19. There may be a number of stop cocks permitting the descent of the oil onto the plates 19 if desired. The oil flows down these plates in a very thin stream or film and the angle of the plates is such that the oil flows but relatively slowly. The gasoline or other volatile matters will be evaporated from the oil and the relatively slight amount of water which is intermingled with the oil and which has not been heretofore separated will either evaporate or be collected in the transversely extending riffles 36 illustrated in Figure 7. This apparatus in actual practice has been found to entirely clean the oil and put it in condition for re-use.

Preferably an electric heater, as for instance a coil 43, will also be used for heating the filter, as illustrated diagrammatically in the drawings, so that the oil may be heated as it passes down through the filter, thus causing it to pass more quickly through the filter.

While I have illustrated details of construction which I believe to be of particular value, I do not wish to be limited thereto, as it is obvious that many changes might be made in these details and in the arrangement of parts without departing from the spirit of the invention.

I claim:—

1. An apparatus for reclaiming refuse oil comprising an outer casing having a vent at its upper end, an air inlet at its lower end, means for heating the air as it enters the lower end of the casing, and a series of evaporating pans disposed within the casing, each pan being inclined and the lower end of one pan discharging upon the higher end of the next lower pan, each pan at its lower end being perforated and formed with a downwardly and inwardly directed flange upon which said perforations discharge, the flange at its lower margin extending downwardly and formed to provide a series of drip points discharging onto the upper end of the pan below.

2. An apparatus for reclaiming refuse oils comprising an exterior casing, an oil receiving tank disposed in the upper portion of the casing and having a valved, downwardly discharging outlet, a series of downwardly inclined evaporating pans disposed below the tank and discharging one onto another, means for causing the oil discharged from one evaporating pan to drip in a plurality of streams upon the pan below, means upon the first pan of the series for distributing the oil discharged onto said pan from the tank, a receiving pan at the lower end of the casing, and heating means disposed at the lower end of the casing, and a tank disposed below the heating means into which the reveiving pan discharges, the lower end of the casing being provided with an air inlet adjacent the heater.

3. An apparatus for reclaiming refuse lubricating oils comprising a casing having a vent at its upper end, a tank disposed in the upper end of the casing and having means whereby water collected in the lower portion of the tank may be discharged, a series of evaporating pans disposed below the tank and within the casing and discharging one onto another, the pans being spaced from each other to permit the circulation of air between and around the pans, a valved outlet in the said tank discharging onto the first pan of the series, a receiving pan into which the last pan of the series discharges, a receiving tank into which the receiving pan discharges, and a heater casing disposed below the receiving pan, the casing having an air inlet disposed adjacent the heater casing.

In testimony whereof I hereunto affix my signature.

LOUIS BENGE.