

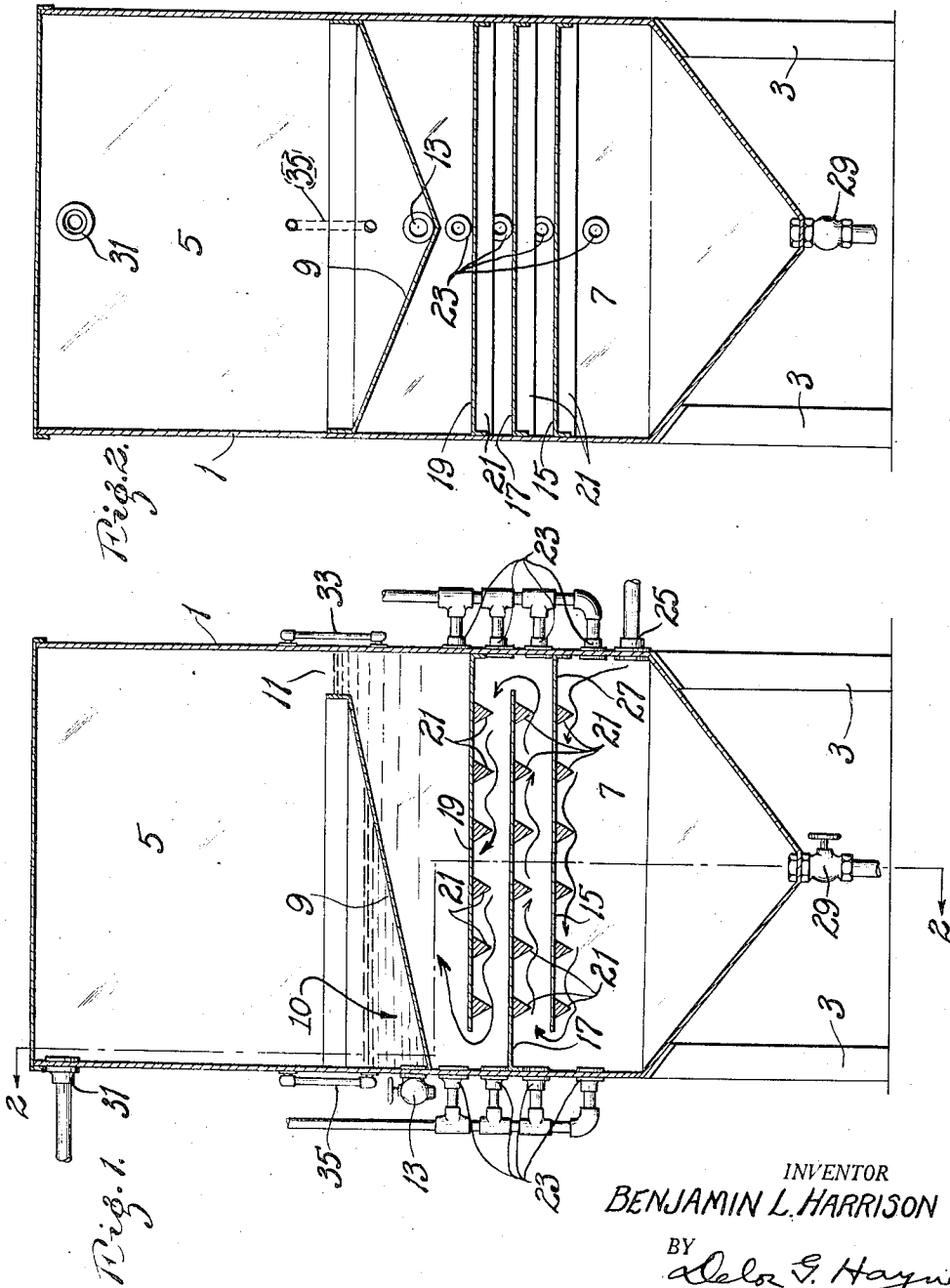
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CLARIFIER

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CLARIFIER.

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This invention relates to clarifiers and with regard to certain more specific features to a cleaning apparatus, and/or a cleaning method for naphtha, gasoline and similar liquids.

Among the several objects of the invention may be noted the provision of a simple and compact apparatus adapted to rid naphtha, gasoline and similar mineral liquids, of both soluble and insoluble impurities; an apparatus which is readily filled, emptied and cleaned; an apparatus which is adapted to be made economically; and one which involves the method to be described herein.

The invention accordingly comprises the features of construction, combinations of elements and arrangements of parts, which are exemplified in the description hereinafter in connection with the accompanying drawings, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a vertical longitudinal section taken from the right side of the device and,

Fig. 2 is a section taken on the line 2—2 of Fig. 1.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

Referring now more particularly to Fig. 1 there is illustrated at 1 a tank adapted to hold liquids. This tank 1 is mounted upon suitable legs 3 and comprises substantially two compartments, namely, an upper naphtha settling compartment 5, and a lower water compartment 7.

For purposes of description, only naphtha will be considered hereinafter, although any liquid which does not readily mix with water will be implied. The naphtha and water compartments 5 and 7 are separated by a shelf-like sump 9, at all points except a passage 11. The passage 11 is relatively narrow and the sump 9 slopes forwardly from said passage and is adapted to be drained by a large throated valve 13 located at the lowest point of said sump.

The lower water, or dissolving compartment 7 is equipped with staggered baffles 15, 17 and 19 longitudinally thereof. Laterally, and on the under sides of said baffles, are provided convoluting protrusions 21. These

convoluting protrusions extend completely across the baffles as shown in Fig. 2. The protrusions 21 cause a fluid passing upwardly and along the under sides of the baffles to take a tortuous and vertically zig-zag course.

The lower chamber 7 of the tank 1 is provided with combined water-and-steam inlets 23 which are arranged with respect to the baffles 15, 17 and 19, so that said inlets are adapted to blow steam and/or water over said baffles thus keeping them free of incrustations. The inlets 23 are also used to fill the lower chamber with water.

A naphtha inlet 25, for the tank as a whole is provided at a downward point in the lower water chamber 7. This inlet 25 is provided in such a position as to discharge naphtha at the closed end 27 of the lowermost baffle, thus causing the naphtha to travel over the total convoluted surface of this baffle before rising to the next one.

The lower water chamber 7 is provided with a drain valve 29 at its lowermost point for purposes of emptying the tank.

The upper chamber 5 is provided upwardly with an outlet 31 for drawing off purified naphtha.

The operation of the device is as follows:

Water is let into the lower chamber 7 by way of the inlets 23 and its level permitted to rise until said level reaches the confines of the relatively narrow passage 11. The water supply is then cut off. The drain valve 29 is kept closed. The water is charged, before entering the tank, with a solvent adapted to dissolve and/or saponify certain impurities found in naphtha, gasoline or like fluids after said fluids have been used in certain industrial processes. For example, commercial alkalis such as either caustic soda or trisodium phosphate have been used successfully in the proportion of about ten to twenty per cent by weight of alkali to water, depending upon the character of impurity to be removed. This solvent may vary with the type of impurities to be dissolved. A gage glass 33 is installed in such a manner as to span the passage 11 vertically. This glass 11 guides an operator in filling the tank with water.

Naphtha to be cleaned is circulated as follows:

It is pumped into the lower part of the water chamber by way of the naphtha inlet 25. In so far as a liquid such as naphtha has

a lower specific gravity than water, it tends to rise to the surface of the solvent-treated water in chamber 7. In so doing it passes along the under sides of the baffles 15, 17 and 19, and due to the protrusions 21, is made to take a zig-zag tortuous path. The main path of the naphtha is normal, in direction, to the length of the protrusions. Thus the naphtha is made to remain in contact with the water for a greater length of time for a given length of horizontal travel in the tank. Furthermore the naphtha receives a swirling motion which causes more surface contact between the water and said naphtha, thus facilitating the dissolving action on the impurities in the naphtha by the solvent in the water. This effect is enhanced by staggering the baffles. The baffles are otherwise known as scrubbers. The path of the naphtha is shown by arrows in Figure 1.

After the naphtha has passed between the baffles it finds its way up to the surface of the water at passage 11. In so doing it passes upwardly along the under side of the rearwardly rising sump 9 and so receives a rolling motion which further increases the effect of the solvent in cleaning the naphtha. The rolling motion is caused by the naphtha's tendency to form globules in the water, which tendency pertains to all liquids of this class. The globules roll up the under surface of the sump 9.

As the naphtha collects on the water surface in passage 11, it quickly builds up a head and spills into the sump 9. After the sump is full, the upper chamber 5 gradually fills and any undissolved insoluble impurities (these are the heaviest ones) gradually settle to the bottom of the sump. The settling out of the impurities takes place chiefly into the sump in so far as the reduced area of the constricted passage 11 is conducive to a relatively greater velocity and agitation of the liquid over this passage 11, than over the sump. Over the sump the naphtha is in a more or less quiet state and settling of the impurities takes place more or less quickly. The settled impurities are known as muck and do not gather on the surface of the water at passage 11 for reasons stated. Thus clogging is prevented. The muck may be drawn from the sump by means of the valve 13. A gage glass 35 communicating with the sump, permits an operator to observe the progress of settling. Numeral 10 of Fig. 1 indicates settled muck.

Purified naphtha is drawn off from the top of chamber 5 by means of pipe 31 located over the sump. At this point settling has been completed, and disturbances due to naphtha coming up the passage 11 are almost nil.

Cleaning of the device after a period of operation may be accomplished by first emptying it through drain valve 29.

Steam may then be turned into the lower chamber 7 by way of the inlet ports 23. Either or both sets of ports (forward or rearward) are operable at one time. After loosening incrustations with steam said incrustations may be washed out by opening valve 29 and turning water in through the ports 23.

From the above it will be seen that the several objects of the invention are attained and other advantageous results achieved.

As many modifications of the embodiments above illustrated might be made without departing from the spirit or scope of the present invention, it is intended that the above description and accompanying drawings and claims shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A liquid clarifier comprising a chamber for fluid solvent and a chamber for other lighter fluid thereabove, baffles in the solvent chamber and an inlet for the lighter fluid therebelow, a sump substantially separating said chambers, a passage connecting said chambers, and means for drawing off liquid from said upper chamber.

2. A liquid clarifier comprising a chamber for fluid solvent and a chamber for other lighter fluid thereabove, laterally formed baffles in the solvent chamber and an inlet for the lighter fluid therebelow, a sump substantially separating said chambers, a passage connecting said chambers, and means for drawing off liquid from said upper chamber.

3. A liquid clarifier comprising a chamber for fluid solvent and a chamber for other lighter fluid thereabove, convoluted baffles in the solvent chamber and an inlet for the lighter fluid therebelow, a sump substantially separating said chambers, a passage connecting said chambers, and means for drawing off liquid from said upper chamber.

4. A liquid clarifier comprising a chamber for fluid solvent and a chamber for other lighter fluid thereabove, laterally formed, convoluted baffles in the solvent chamber and an inlet for the lighter fluid therebelow, a sump substantially separating said chambers, a passage connecting said chambers, and means for drawing off liquid from said upper chamber.

5. A liquid clarifier comprising a chamber for fluid solvent and a chamber for other lighter fluid thereabove, baffles in the solvent chamber and an inlet for the lighter fluid therebelow, a sump substantially separating said chambers, a passage connecting said chambers, means for cleaning the baffles comprising inlet ports aligned therewith for ejecting cleaning fluid.

6. A liquid clarifier comprising a chamber for fluid solvent and a chamber for other

lighter fluid thereabove, baffles in the solvent chamber and an inlet for the lighter fluid therebelow, a sump substantially separating said chambers, a passage connecting said chambers, means for cleaning the baffles comprising inlet ports aligned with said baffles for ejecting cleaning fluid thereon, means for drawing off by means of a liquid flow liquid from the upper chamber, settled impurities from the sump, and loosened encrustations and impurities in the solvent chamber.

7. In a naphtha clarifier a tank comprising a lower compartment and an upper compartment, a sump substantially separating said compartments and a relatively small passage way joining them, treated water in said lower compartment and convoluted, staggered baffles therein, means for passing impure naphtha through said water, between

said baffles and upwardly out of said passage way whereby it is partially purified, and held in the upper compartment until its remaining impurities settle into said sump, and means for drawing off purified naphtha from the device.

8. A liquid clarifier comprising a chamber for fluid solvent and a chamber for other lighter fluid thereabove, baffles in the solvent chamber and an inlet for the lighter fluid therebelow, a sump substantially separating said chambers, a passage connecting said chambers, means for drawing liquid from said upper and lower chambers and settled impurities from the sump.

In testimony whereof, I have signed my name to this specification this 15th day of December, 1924.

BENJAMIN L. HARRISON.