

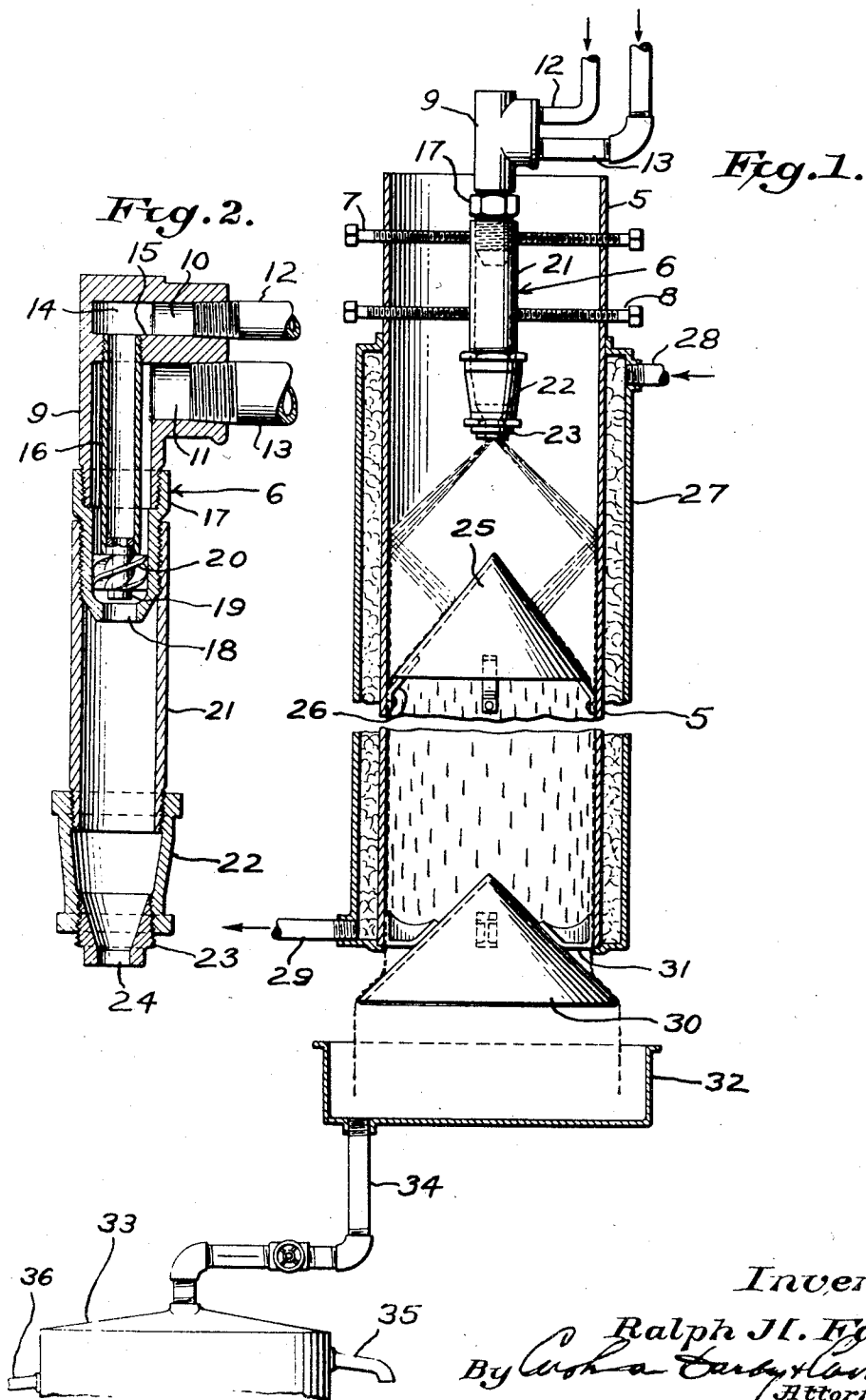
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REFINING APPARATUS

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REFINING APPARATUS

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432,719. Divided and this application Decem-
ber 28, 1943, Serial No. 515,951

5 Claims. (Cl. 259-4)

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In my copending application, Serial No. 432,719, filed February 27, 1942 now Patent No. 2,342,042, dated February 15, 1944, of which the present application is a division, I have disclosed a method of refining glyceride oils based on the mixing of the oil and a refining agent in a disintegrated condition, a mist condition being particularly emphasized. According to the present application, the oil and refining agent are mixed in a disintegrated condition, that is, in spray form, mixing continuing while the substances flow on a heated surface to have an emulsion breaking temperature imparted thereto. I use the term "spray" as including not only mists or aerosols but also a coarser state of subdivision involving, for example, drops or globules of substantial size, and films. While the results obtained in accordance with the present application by no means equal those obtainable by my preferred mist-mixing procedure, particularly as regards color removal, they are nevertheless superior to those obtainable by present liquid-mixing procedures as regards refining loss. The object of the invention is, then, to provide method and apparatus for refining glyceride oils whereby a lower refining loss is obtainable than in the use of present day liquid-mixing procedures. The invention will be described with reference to the accompanying drawings in which:

Figure 1 is a view partly in vertical section and partly in elevation of apparatus in accordance with the invention, and

Figure 2 is an axial section of a delivery nozzle which appears in Figure 1.

Referring to the drawing, reference numeral 5 designates a length of pipe disposed in vertical position, the pipe being, for example, four inches in diameter and eight feet in length. In the upper end of the pipe a nozzle 6 is supported on the axis of the pipe by means of a number of screws 7 and 8 threaded radially in openings in the pipe walls.

The nozzle 6 comprises a tubular nozzle body 9 having parallel inlet openings 10 and 11 into which are threaded pipes 12 and 13 which deliver, respectively, a solution of a refining agent, ordinarily a caustic alkali, and the oil to be refined. The supply is accurately controlled by flow meters in the manner described in the parent application.

The opening 10 connects with a chamber 14 having a bottom wall 15 with a threaded central opening in which is threaded a downwardly projecting coaxial tube 16. A tip 17 is threaded coaxially on the lower end of the body 9 and defines

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a discharge opening 18. A tip 19 is engaged internally with the lower end of tube 16 and is provided with spiral fins 20 which extend outwardly to the inner surfaces of tip 17.

Threaded on the tip 17 is a coaxial extension 21 on the lower end of which is threaded an adapter 22 carrying a hollow plug 23 defining a discharge opening 24. In the use of the thus constituted nozzle the caustic solution and oil are momentarily merged in liquid condition above the opening 24 and the mixture emerges from the latter as a hollow cone spray.

As shown in Figure 1, at least a portion of the spray is deflected by the walls of the pipe 5, and, in order to return this deflected portion to the surface of the pipe, I provide an upwardly pointed conical baffle 25 which is supported within the pipe by means of brackets 26 with its lower edge closely adjacent the pipe walls. Below baffle 25 the total mixture flows down the pipe walls as a film or thin layer wherein mixing continues and uniformity is achieved.

The pipe 5 is surrounded by a jacket 27 from its lower end up to a point above the zone of nozzle discharge and a heating fluid is circulated in the jacket from an inlet pipe 28 to an outlet pipe 29, the heating of the pipe being such that as the oil-caustic solution mixture flows down the pipe the emulsion which forms is broken by the time the lower end of the pipe is reached. As the broken emulsion leaves the pipe it strikes and flows from an upwardly pointed conical baffle 30, supported from the pipe by brackets 31, into a receiver 32 which drains into a centrifuge 33 through a pipe 34, the refined oil leaving the centrifuge at 35 and the soapstock at 36. The baffle is for the purpose of preventing such entrance of air at the bottom of the pipe as would cause undue fluctuations in the temperature of the mixture. The bottom of the baffle has a diameter substantially greater than that of the pipe and the baffle surface is quite close to the lower edge of the pipe.

The described procedure gives a low refining loss as compared with ordinary liquid mixing, batch or continuous, although the color of the refined oil will ordinarily be dark. Re-refining to obtain a light-colored product can be carried out by the mist-mixing procedure of the parent application. As specified in that application, the caustic alkali refining agent is used in an amount slightly greater than that theoretically required to neutralize the free fatty acids in the oil so that there will be unconsumed caustic present at the time of separation whereby a high pH, i. e., the pH of the caustic, is maintained up to separa-

tion. While the excess is variable, as described in the said parent application, as therein stated I can ordinarily use an excess of the order of 0.2%.

If the extension elements 21, 22 and 23 are omitted, a full cone spray will be delivered but the baffle 25 will still insure total delivery to the inner walls of the pipe. If a nozzle were used which delivered, for example, a more or less solid axial stream, baffle 25 would serve also as a disintegrator delivering to the pipe surface. These and other variations in procedure or apparatus are contemplated under the claims which follow.

I claim:

1. Apparatus for refining glyceride oils comprising an upright tubular member, means for delivering the oil and an alkaline refining agent in disintegrated condition against the interior surface of said member so that mixture of the oil and agent will occur as they flow down said surface, and means for heating said surface so that as the mixture flows down the same the emulsion which forms will be broken.

2. Apparatus for refining glyceride oils comprising an upright tubular member, nozzle means for delivering a hollow cone spray of the oil and of an alkaline refining agent against the interior surface of said member so that mixture of the oil and agent will occur as they flow down said surface, and means for heating said surface so that as the mixture flows down the same the emulsion which forms will be broken.

3. Apparatus according to claim 2 wherein a conical baffle is disposed below the nozzle means in position to re-direct to said surface such of the delivered spray as is deflected therefrom.

4. Apparatus according to claim 2 wherein a baffle is disposed at the lower end of said member and serves to prevent such entrance of air as would cause undue temperature fluctuations in said member.

5. Apparatus according to claim 2 wherein the nozzle means is constituted by a multi-fluid nozzle wherein the oil and agent are merged.

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