J. A. DE CEW.

METHOD AND APPARATUS FOR EMULSIFYING OIL SOLUTIONS AND THE LIKE.

APPLICATION FILED MAY 17, 1918.

1,330,174. Patented Feb. 10, 1920.

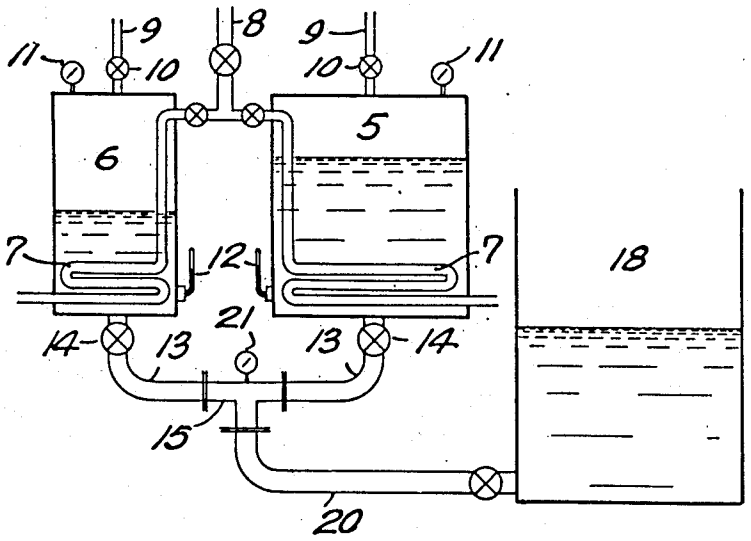


FIG. 1

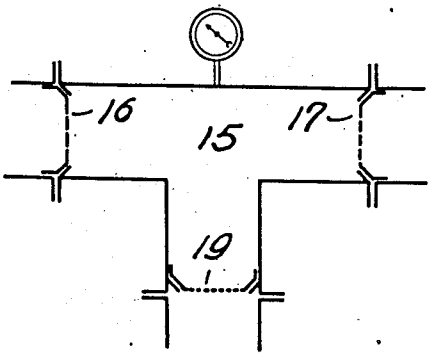


FIG. 2

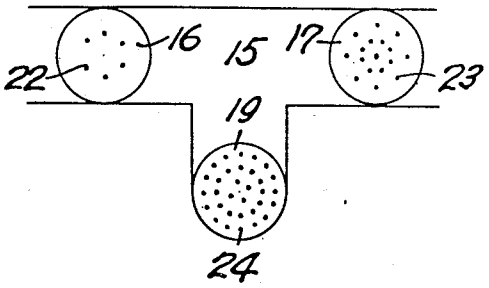


FIG. 3

Inventor
Judson A. DeCew
By Lothrop & Baughman Co
Attys.

UNITED STATES PATENT OFFICE.

JUDSON A. DE CEW, OF MONTREAL, QUEBEC, CANADA.

METHOD AND APPARATUS FOR EMULSIFYING OIL SOLUTIONS AND THE LIKE.

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To all whom it may concern:

Be it known that I, JUDSON A. DE CEW, a subject of the King of Great Britain, and resident of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Methods and Apparatus for Emulsifying Oil Solutions and the like, of which the following is a full, clear, and exact description.

This invention relates to an apparatus for emulsifying oils, sizing compounds, waxy or resinous materials and the like, and as an example may be used advantageously in the emulsification of such compounds as have been described in my application, Serial No. 219,133, or application, Ser. No. 195,607, or application, Ser. No. 172,035, or in fact in the emulsification of any compounds diluted in aqueous solutions.

The main object of my invention is to produce an apparatus which will be simple and inexpensive to manufacture and operate, which can be permanently adjusted or set to give a maximum efficiency under working conditions, and which will bring the materials to be emulsified into such intimate contact in fine streams under pressure with the aqueous solution, also in fine streams under pressure, that the atomizing and emulsifying effects will be made as nearly perfect as possible.

In carrying out my invention, I provide a suitable tank or reservoir adapted to contain a proper quantity of hot water under pressure and a second tank or reservoir adapted to contain the oily, waxy, resinous or other materials to be emulsified, these tanks being supplied with suitable pressure gages, heating apparatus and outlet pipes. From the outlet pipe, the material to be emulsified is adapted to be forced through a perforated screen or equivalent device against fine streams of the hot aqueous solution, which is also forced through a similar perforated screen in the pipe leading from the hot water tank. The material to be emulsified on the one hand and the hot solution on the other hand are thus forced from opposite directions in fine streams through the perforated screens to meet preferably at an angle of 180°. The violent agitation caused from this contact, coupled with the breaking up of the materials in fine streams through the perforated apertures produces excellent atomizing and emulsifying results. The diluted material may now be forced directly into water at a lower temperature or, in the case of certain materials, a secondary process may be employed, in which by proper regulation of pressure the material may be forced through a third screen or equivalent device into cold water, thereby causing a further breaking up of the particles with consequently more complete atomization and emulsification.

In the drawings which illustrate my invention;—

Figure 1 is a diagrammatic elevation showing the arrangement of the various units of the apparatus.

Fig. 2 shows an elevation of the screens or apertured plates.

Fig. 3 is a developed plan view of the apertured plates.

Referring more particularly to the drawings, 5 designates a tank or reservoir adapted to contain a warm aqueous solution, which may be either hot water or a hot alkaline solution, while 6 designates a tank adapted to contain the oily, waxy, resinous or other material to be emulsified. These tanks 5 and 6 are fitted with any suitable heating apparatus which may be in the form of the coils 7 supplied with heat from the steam pipe 8. The tanks are also provided with means for applying pressure thereto, which may be either in the form of compressed air or other nonsteam pressure from the pipes 9. The pipes 9 are provided with suitable valves 10 to control the pressure and the tanks are further provided with pressure gages 11, and preferably with thermometers 12.

The tanks 5 and 6 are further provided with outlet pipes 13 having control valves 14. These pipes are preferably designed to meet from opposite sides to form an emulsifying chamber 15 and, adjacent the chamber 15, I insert a perforated screen 16 for the material to be emulsified and a similar perforated screen 17 for the hot aqueous solution. These screens 16 and 17, being positioned at opposite sides of the emulsifying chamber 15, permit the oily or other material to be emulsified on the one hand and the hot aqueous solution on the other hand to come together under pressure in very fine streams, where atomization and emulsification take place simultaneously.

In emulsifying many materials, it may be only necessary to force the solution from the chamber 15 into cold water in the tank 18, but for certain oily and waxy materials, I find it preferable to put the solutions through a further atomizing process which is accomplished as follows:—A third apertured screen 19 is placed in the outlet pipe 20 from the chamber 15 and the pressure in the chamber 15, which can be measured by a suitable gage 21, then forces the solution through the reduced apertures in the screen 19, where it is further atomized and emulsified and then forced into the cold water tank 18. It will be obvious that when the materials are put through in batches the amount of material in the tank 6 must be proportioned to the amount of the aqueous solution in the tank 5. If the pressure is equal in both tanks, then the number of apertures 22 in the plate 16 should be determined by the area of the apertures 23 in the plate 17. Also, if it is desired to use the third apertured plate 19 and a certain pressure is required in the chamber 15 to give the best results, then the number of apertures 24 in the plate 19 can be determined, as the back pressure in the chamber 15 will be regulated by the rate of flow through the screen 19.

It will be obvious that a number of changes may be made in the positioning or arrangement of the elements entering into my invention without departing from the spirit thereof. It may for instance be possible to effect very good results by forcing the streams against each other at angles of less than 180°, but this would only involve a slightly different positioning of the pipes with respect to the emulsifying chamber. The main feature of my invention provides for an apparatus in which the materials to be emulsified will be brought into contact in very fine streams under pressure with the hot solutions, also in fine streams under pressure, to thereby effect simultaneous atomization, saponification and emulsification within an emulsifying chamber, and where necessary, to provide a further atomizing and emulsifying step in the process before forcing the solutions into cold water.

Having thus described my invention, what I claim is;—

1. Emulsifying apparatus comprising a reservoir for the material to be emulsified, a reservoir for the aqueous solution, means for applying heat and pressure to said reservoirs, conduits leading from said reservoirs into a common chamber, unequally apertured plates adjacent opposite sides of said chamber, a third apertured plate forming the outlet of said chamber having as many apertures as both of said apertured plates, and means for creating pressure within said chamber whereby the contents of the chamber are forced in fine streams through the outlet plate.

2. A process of emulsifying oil solutions and the like and water to form a stable emulsion, which consists in heating the oil and water separately, forcing the hot oil and water to impact against each other through atomizing orifices by means of pressure greater than one atmosphere, to make a fine emulsion; and then discharging the emulsion into cold water.

3. A process of emulsifying oil solutions and the like and water to form a stable emulsion, which consists in heating the oil and water separately, forcing the hot oil and water to impact against each other through atomizing orifices by means of pressure greater than one atmosphere, to make a fine emulsion; forcing this emulsion through further atomizing orifices to further subdivide and commingle the oil and water by non steam pressure, and then discharging the emulsion in cold water.

In witness whereof I have hereunto set my hand.

JUDSON A. DE CEW.