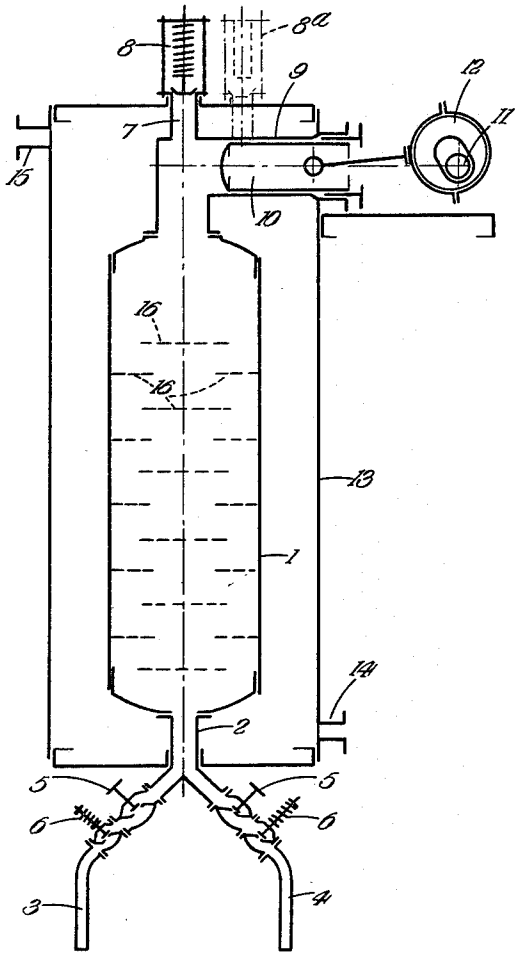
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EMULSIFYING AND ANALOGOUS APPARATUS

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EMULSIFYING AND ANALOGOUS APPARATUS

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This invention relates to an improved apparatus for making emulsions and mixtures, effecting changes in viscosities and surface tensions; and disintegration of molecular aggregates.

According to the invention, the materials employed are introduced in suitable quantities into a closed container and are subjected therein to a continuous series of oscillations of pressure, thereby effecting continuous changes in the volume of the materials depending on the compressibility thereof acting with or without the elasticity of the container. The container is provided with an outlet in the form of an orifice or orifices of small size which is or are controlled by suitable means such as a valve or valves and after subjection to the oscillations of pressure the contents are allowed to escape through the orifice or orifices and are found to be in the form of a stable emulsion or mixture of the liquids or materials treated, or otherwise to have undergone any of the physical changes described above.

Various forms of apparatus may be devised for carrying out the invention.

For example a piston pump working in a closed container for the purpose of producing a continuous series of oscillations of pressure therein may be so arranged that part of its outstroke is used to relieve the pressure in the container and the other part of its outstroke is used to draw in adjusted quantities of the liquids or materials to be treated from one or more inlets. Part of the instroke of the piston is then used to raise the pressure in the container and the other part of the instroke to force part of the liquids and materials through the outlet of the container in the form of an emulsion or stable mixture.

To enable the invention to be fully understood it will now be described with reference to the accompanying drawing which shows diagrammatically one suitable apparatus for carrying out the invention and adapted to operate upon two liquids or materials.

As shown the apparatus comprises a closed container 1 fitted at the lower end with an inlet pipe 2 having two branch pipes 3, 4 for the two liquids or materials to be treated, the pipes 3, 4 being fitted with stop valves 5 and check valves 6 if desired. The upper end of the container is connected to a T-piece, one branch 7 of which forms an outlet orifice and is fitted with a relief valve 8 while the other branch 9 forms a cylinder in which a piston 10 is adapted to be reciprocated by suitable driving means hereby indicated by the crank shaft 11 and eccentric 12. The whole may be surrounded by a jacket 13 which has an inlet 14 and an outlet 15 and may be used either for heating or cooling fluid if it is desired to heat or cool the container.

The interior of the container may be fitted with a series of baffles 16 which may be perforated if necessary to regulate the movement of the liquid or liquids.

The operation of the above described apparatus is as follows:—

The pipes 3, 4 are connected to the sources of supply of the two liquids to be treated and the piston 10 is reciprocated by suitable driving means such as an electric motor. The piston at first acts simply to draw in the two liquids through the valves 6 and the container gradually fills, the valve 8 being adjusted to allow the expulsion of the air in the container. When the container is filled the valve 8 is adjusted to allow the pressure in the container to be raised a suitable amount. Alternatively the sources of liquid supply may be at any required pressures. The action of the piston is then as follows:—

On the first part of its outstroke it relieves the pressure in the container and on the other part of its outstroke it draws in fresh supplies of the liquids through the valves 6. On the first part of its instroke it raises the pressure in the container, the valves 6 closing, while on the other part of its instroke it forces a portion of the liquids through the valve 8 which lifts slightly to allow the mixture to discharge through the small opening made between the body of the valve and the edge or face of the seating.

The displacement of the piston and the volume of the container may be so adjusted that the materials therein may be subjected to any suitable number of the required type

of oscillations in pressure prior to being ejected through the orifice or orifices.

It has been found that the above method produces a stable emulsion of various liquids and also changes the physical condition of various liquids and materials as before mentioned.

The quantities of liquids admitted may be adjusted by the valves 5, by alteration in the piston displacement or by other means.

The apparatus illustrated may be operated to admit one liquid only into the container on the suction stroke of the piston when it is required to alter the viscosity of a liquid or generally to change the physical condition of a single liquid.

Further, by changing the position of the valve 8, for instance to a position shewn in dotted lines at 8^a, the first part of the instroke of the piston will cause the pressure in the container to rise; further displacement will cause the liquid to be discharged through the valve and the remainder of the stroke will raise the pressure in the container to a higher pressure than the valve release pressure. This is advantageous when dealing with certain materials.

As examples of materials treated by the invention emulsions or mixtures of water with petrol, water with creosote (useful for a sheep dip) and water with castor or other oils may be mentioned. Other examples of the applications of the invention are:—

Producing alteration in the viscosity of glucose.

Lowering the surface tension of castor oil.

The disintegration of molecular aggregates of tans, or milk, and other similar applications.

It will be understood that the necessary pressure oscillations may be produced by means other than a reciprocating piston or pistons.

I claim:

1. Apparatus of the class described comprising a closed container having inlet means for admitting thereto material to be treated, a discharge valve for said container, and reciprocatory means for subjecting material in said container to a continuous series of oscillations of pressure and thereby effecting continuous changes in the volume of the material according to the compressibility thereof, the discharge valve being operative to discharge part of the material from said container under the increases in pressure to which the material is subjected and to close under the intervening decreases in such pressure.

2. Apparatus of the class described comprising a pressure-tight container, inlet valve means for admitting to the container material to be treated, an outlet valve operative by pressure of the material in the container to discharge the same therefrom, and a single reciprocatory piston operative on the material in the container to subject such material to a continuous series of oscillations of pressure, the increases of which pressure are sufficient to effect changes in the volume of the material and to expel a part thereof from the container through the outlet valve and the intervening decreases in which pressure relieve the material of pressure and cause closing of the outlet valve and introduction of further material for treatment into the container through the inlet valve means.

In testimony whereof I have signed my name to this specification.

VINCENT GREGORY WALSH.