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APPARATUS FOR EMULSIFICATION OF IMMISCIBLE INGREDIENTS

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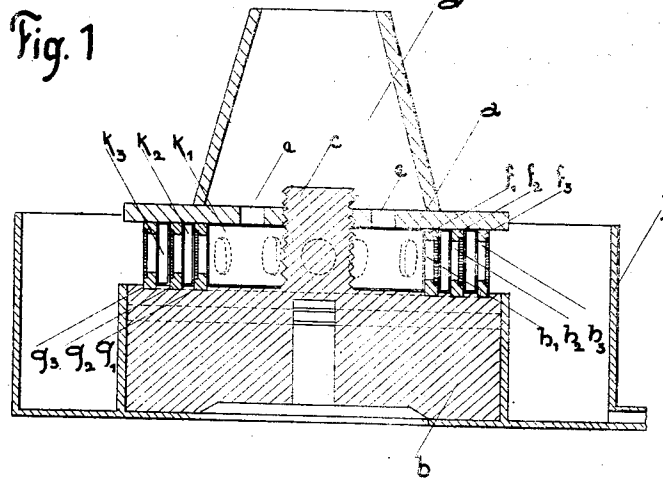


Fig. 2

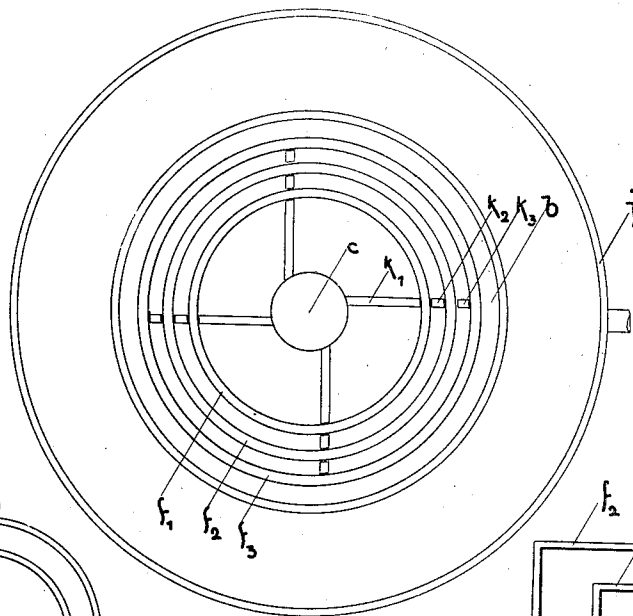


Fig. 3

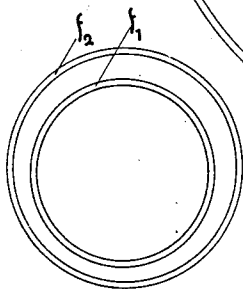


Fig. 4

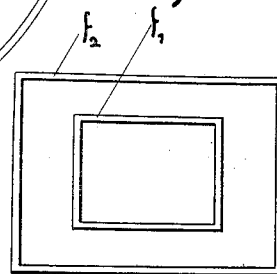


Fig. 6

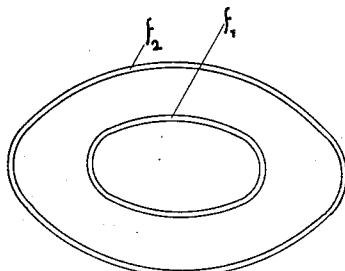


Fig. 5

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APPARATUS FOR EMULSIFICATION OF IMMISCIBLE INGREDIENTS

Application filed April 16, 1931, Serial No. 530,687, and in England November 24, 1930.

This invention relates to an apparatus for emulsification of immiscible ingredients.

In the known emulsors a pressure is created on the liquids in a closed container by centrifugal force and by releasing this pressure through spray-nozzles, knife-edges, etc., an atomizing effect is obtained by what is described as an "explosion" occurring the moment when the liquids are slung or pressed out of the container. This type of emulsors has the drawback, that the container must be made very strong to guard against bursting, and even the greatest precautions will often not suffice in case of stoppage of the fine outlet aperture.

The present invention is based on a principle different from the pressure-emulsors. The new apparatus employs no closed container but consists of two horizontally rotating metal discs which are detachably connected, for instance screwed together, in such a way that they hold in position between them a series of perforated metal jackets or rings of different diameters, the said perforations being covered by metal. Means are provided for feeding the liquids to be emulsified inside the smallest ring or jacket. By the centrifugal force the liquids are slung out through the smallest ring and atomized. The mist is then caught by the second ring and in this state it is possible to carry the atomizing very far, and this minimizing of the atomized particles can be carried further and further by adjusting the number of jackets or rings according to the fineness desired.

In a preferred embodiment of the invention the jackets are in the form of circular rings placed concentric to each other and to the center of rotation. Carriers, as for instance baffles or vanes, may be provided for moving the mixture through the perforations. The same results may be obtained by giving the rings certain shapes, as square, rectangular, and making their sides corrugated, serrated, etc. The jackets or rings may also be placed excentric to each other.

In the drawing forming part of this specification some preferred embodiments of the invention are illustrated.

Fig. 1 is a sectional elevation showing an apparatus with a plurality of rings interposed between the two discs;

Fig. 2 is a top view thereof, the upper disc of the apparatus being removed;

The Figs. 3-6 show different shapes and arrangements of the rings or jackets held in position between the said discs.

Referring first to Figs. 1 and 2, *a* and *b* are two cylindrical metal discs which can be screwed together by means of a screw-threaded metal part *c* or otherwise. They are meant to revolve at great velocity, for instance 10,000 revolutions per minute, around their centres. The upper disc is provided with a feeding funnel *d*, meant to receive during the revolution the mixture to be emulsified. By means of holes *e* the funnel communicates with the space between the two discs. Between these discs and outside the holes *e* perforated metal rings *f*¹, *f*², *f*³, are placed concentric to each other and to the center of rotation in annular grooves *g*¹, *g*², *g*³, provided in the upper face of the disc *b*. The perforations *h*¹, *h*², *h*³ are covered with metal gauzes *i*¹, *i*², *i*³. The rings are held in position when the discs *a* and *b* are screwed together, and in such a way, that no part of the mixture can pass between the rings and the discs and the only outlet will be through the perforations.

The working of the machine is as follows:

The discs are revolved, and when the desired velocity is obtained, the mixture of the immiscible ingredients is fed into the funnel in liquid form. They will then by passing through the first ring *f*¹ be transformed into a "mist". If the atomizing obtained is sufficiently fine for the purpose, the process is at an end, and the mist is collected in a container *j*, within which the apparatus rotates. But if the atomizing is insufficient, one or more rings *f*², *f*³ are added, and the mist slung out through the first ring will be slung out through the perforations and metal gauzes of the battery of two, three, four or more rings, each time passing through a ring of greater peripheral velocity than the previous, and therefore the atomizing effect is gradually and proportionally increased as the

diameters of the rings increase. It is in this way possible to obtain an atomizing of any desired fineness without using any noteworthy pressure inside the apparatus and thus avoid any danger from bursting. There will be no danger of bursting of the apparatus, because the outlet from the rings can be made many times greater than the feeding-opening, as no special proportion between the two is necessary for obtaining emulsions.

In some cases, especially when the liquids to be emulsified are of low specific gravity, and therefore will not be so responsive to the centrifugal force created in the apparatus as heavier liquids, it is preferable to apply some kind of carriers, as for instance baffles or vanes k^1, k^2, k^3 , before the first ring and even between the following rings. These baffles may be either independent of the rings or form part of them. They will give to the fluids that centrifugal force which in certain cases will be necessary for a vigorous passing of the fluids through the perforations of the rings.

In the modification illustrated in Fig. 3 the rings are placed excentric to each other and this last position will then in cases make the baffles unnecessary, because the so arranged rings act as carriers of the fluids in the same way as vanes, and the necessary centrifugal force will be applied to the fluids.

The same force can be obtained without placing the rings or jackets in excentric position to each other, namely by giving the rings or jackets certain shapes as square, rectangular (Fig. 4) oval (Fig. 5) etc., and (or) making their sides corrugated (Fig. 6) serrated, etc., and they can also in this case be placed excentric to each other.

What I claim is:

1. An apparatus for emulsification of immiscible ingredients, comprising two metal discs adapted to rotate horizontally, a series of perforated metal jackets of different diameters placed between the said discs, metal gauzes covering the said perforated jackets, means for detachably connecting the discs adapted to hold the jackets in position between the discs, and means for feeding the liquids to be emulsified inside the smallest jacket.

2. An apparatus for emulsification of immiscible ingredients, comprising two metal discs adapted to rotate horizontally, a series of perforated circular rings placed between the said discs concentric to each other and to the center of rotation, metal gauzes covering the perforations of said rings, means for detachably connecting the discs adapted to hold the rings in position between the discs, and means for feeding the liquids to be emulsified inside the smallest ring.

3. An apparatus for emulsification of immiscible ingredients comprising two metal discs adapted to rotate horizontally, a series

of perforated circular rings placed between the said discs concentric to each other and to the center of rotation, metal gauzes covering the perforations of said rings, means for detachably connecting the discs adapted to hold the rings in position between the discs, means for feeding the liquids to be emulsified inside the smallest ring, and carriers arranged before the first ring and between the following rings adapted to move the mixture to be emulsified through the said perforations.

4. An apparatus for emulsification of immiscible ingredients, comprising two metal discs adapted to rotate horizontally, a series of perforated circular rings placed between the said discs excentric to each other, metal gauzes covering the perforations of said rings, means for detachably connecting the discs adapted to hold the rings in position between the discs, and means for feeding the liquids to be emulsified inside the smallest ring.

5. An apparatus for emulsification of immiscible ingredients, comprising two metal discs adapted to rotate horizontally, a plurality of perforated metal rings placed between the said discs provided with a corrugated surface, metal gauzes covering the perforations of said rings, means for detachably connecting the discs adapted to hold the jackets in position between the discs, and means for feeding the liquids to be emulsified inside the smallest ring.

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

NIELS BENDIXEN.