April 14, 1925. 1,533,843

E. M. FERNS

ADJUSTABLE CENTRIFUGAL MACHINE FOR EMULSIFYING

Filed Aug. 8, 1924

Fig. 1.

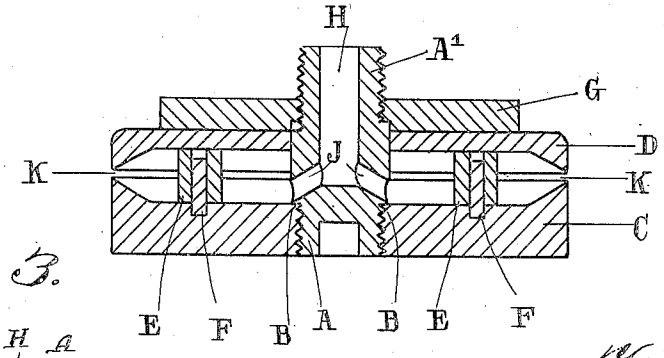


Fig. 3.

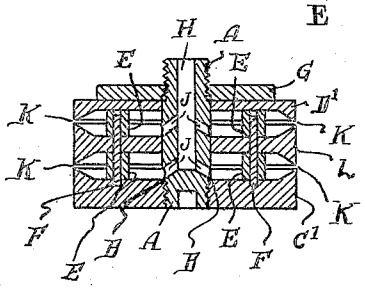


Fig. 4.

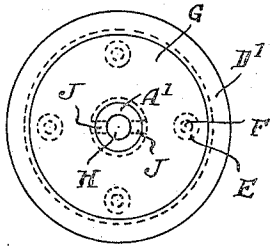
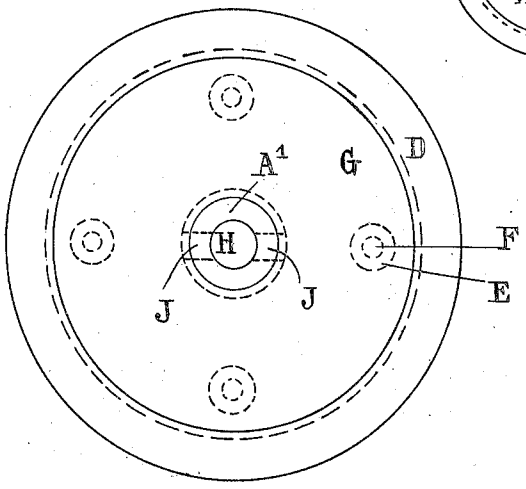


Fig. 2.



Inventor
Ethel Mary Ferns
By Wallace L. Pond
Attorney.

Patented Apr. 14, 1925. 1,533,843

UNITED STATES PATENT OFFICE.

ETHEL MARY FERNS, OF LONDON, ENGLAND, ASSIGNOR TO THE FERNS EMULSIFIERS LTD., OF LONDON, ENGLAND, A BRITISH COMPANY.

ADJUSTABLE CENTRIFUGAL MACHINE FOR EMULSIFYING.

Application filed August 8, 1924. Serial No. 730,952.

To all whom it may concern:

Be it known that I, ETHEL MARY FERNS, a subject of the King of Great Britain, residing at 13 Ladbroke Square, London, England, have invented new and useful Improvements in Adjustable Centrifugal Machines for Emulsifying, of which the following is a specification.

The forming of an emulsion of a fatty material with a watery fluid means that the fatty material is transformed from a coherent mass or liquid into small particles, termed "globules," which are distributed in the fluid and which, because of the size, keep apart and do not join each other again. The size into which the globules must be reduced to make sure that they will keep apart, depends upon different circumstances, for instance, the physical character of the fatty material, the temperature at which the ready made emulsion is kept, and the object of the emulsification (digestibility of the fat in emulsions of milk fat, codliver oil etc.). In practically every case, the size of the fat globules will differ. It is therefore of importance for manufacturers that an emulsifying apparatus or atomizer shall be adjustable to perform the different kinds of atomizing-work that may be required, and it is this problem the present invention deals with. The apparatus consists of two or more circular metal plates or discs, which are dished or scooped out on their juxtaposed sides in such a way that they are provided at their periphery with a sharp edged brim. These plates are supported one above the other, brim towards brim, in such a manner that a lenticular space is left between them. This space forms an outlet for any fluids that are introduced into it, and by using, for instance, screws, rods, sleeves or the like of a certain length as distance pieces, it is possible to make the opening between the brims of any desired dimension.

A mixture of the liquids is advantageously introduced into the space between the plates through an axial hole formed in the upper part of the supporting shaft and provided with lateral holes arranged to distribute the mixture as uniformly as possible throughout such space under the action of the centrifugal force due to the rotation of the chamber about its axis.

In the accompanying drawings, I have shown how my said invention may be conveniently and advantageously carried into practice, viz:

Figure 1 is a vertical central section and Figure 2 a plan showing one form of my improved emulsifying apparatus.

Figures 3 and 4 are similar views to Figures 1 and 2 respectively showing a modification.

Referring to Figures 1 and 2: A is a vertical shaft which is capable of being rotated at a high speed in any suitable known manner. This shaft is provided with a shoulder B against which rests one of the dished plates C, which has an axial screw threaded hole to receive the part of the shaft A of smaller diameter. The other dished plate D has an axial hole to fit over the part of the shaft A of larger diameter, the plate C, D being retained at the required distance apart by means of sleeves or tubes, E, E which glide over pins F, F secured at the lower end to the plate C. The plates are held together by means of a nut, G, fitting onto the upper screw threaded part A′ of the shaft A. This upper part of the shaft is provided with an axial hole H which is open at the top to permit the introduction of the mixture of liquids and is provided with an annular series of holes J, J at the bottom for the distribution of the liquids throughout the lenticular space between the dished plates. By using distance pieces E, E of different lengths the width of the annular space K between the brims of the dished plates, C, D can be varied as required to give the desired character of emulsion.

The operation of the improved machine is as follows:—After the distance K between the brims of the plates C, D has been adjusted by means of a set of distance pieces, E, E such that an opening suitable to the work to be done is obtained between the brims, the nut G is screwed on, and the machine is set in rotation. When the desired angular velocity and thereby the necessary centrifugal force is obtained, the mixture of ingredients to be emulsified is fed in through the aperture H, and is projected out of the apparatus through the opening K between the brims, emulsification taking place at that moment. The fluid after leaving the machine is liberated from the high pressure to which it was exposed while in the machine, and breaks up into a mist, the fineness of which is chiefly determined by the

relation existing between pressure and outlet opening. The mist is collected as an emulsion in a suitable receiver arranged around the rotary plates.

In the modification shown in Figures 3 and 4, the atomizer is made with three hollowed-out plates C′, D′, L which are arranged to form two lenticular chambers and are held with their brims at the required distances K, K apart by means of a nut "G" and distances pieces E, E arranged on pins F, F which extend through holes in the intermediate plate L.

I claim:

1. An emulsifying apparatus comprising in combination: a pair of rotatable circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, means for securing said discs together so as to leave an annular space of uniform width between the brims, and means for supplying a mixture of liquids to the space between said discs.

2. An emulsifying apparatus comprising in combination: a pair of rotatable circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, means for adjustably securing said discs together so as to leave an annular space of uniform but adjustable width between the brims, and means for supplying a mixture of liquids to the space between said discs.

3. An emulsifying apparatus comprising in combination: a pair of rotatable circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, pins arranged on the inner face of one disc, tubular distance pieces fitting on said pins, means for clamping said discs together, and means for supplying a mixture of liquids to the space between said discs.

4. An emulsifying apparatus comprising in combination: a pair of rotatable circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, interchangeable distance pieces arranged between said discs, means for clamping said discs together, and means for supplying a mixture of liquids to the space between said discs.

5. An emulsifying apparatus comprising in combination: a pair of circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, distance pieces arranged between said discs, a central rotatable shaft common to said discs, a nut threaded on said shaft for clamping said discs together, and means for supplying a mixture of liquids to the space between said discs.

6. An emulsifying apparatus comprising in combination: a pair of circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, means for securing said discs together so as to leave an annular space of uniform width between the brims, means for supplying a mixture of liquids to the space between said discs, and a rotatable shaft common to said discs and upon which said discs are fast.

7. An emulsifying apparatus comprising in combination: a pair of circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, means for adjustably securing said discs together so as to leave an annular space of uniform but adjustable width between the brims, means for supplying a mixture of liquids to the space between said discs, and a rotatable shaft common to said discs and upon which said discs are fast.

8. An emulsifying apparatus comprising in combination: a pair of circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, pins arranged on the inner face of one disc, tubular distance pieces fitting on said pins, means for clamping said discs together, means for supplying a mixture of liquids to the space between said discs, and a rotatable shaft common to said discs and upon which said discs are fast.

9. An emulsifying apparatus comprising in combination: a pair of circular discs having their juxtaposed faces dished or scooped out to form sharp edged brims, interchangeable distance pieces arranged between said discs, means for clamping said discs together, means for supplying a mixture of liquids to the space between said discs, and a rotatable shaft common to said discs and upon which said discs are fast.

10. An emulsifying apparatus comprising in combination: a pair of circular discs having their juxtaposed faces dished or scooped out to form sharp edged brims, distance pieces arranged between said discs, and a rotatable central shaft common to said discs, a nut threaded on said shaft for clamping said discs together, said shaft having a central conduit bored therein and radial holes connecting said conduit and the space between said discs.

11. An emulsifying apparatus comprising in combination: a pair of circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, means for securing said discs together so as to leave an annular space of uniform width between the brims, and a rotatable shaft common to said discs and upon which said discs are fast, said shaft having a central conduit bored therein and radial holes connecting said conduit and the space between said discs.

12. An emulsifying apparatus comprising in combination: a pair of circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, means for

adjustably securing said discs together, so as to leave an annular space of uniform but adjustable width between the brims, and a rotatable central shaft common to said discs and upon which said discs are fast, said shaft having a central conduit bored therein and radial holes connecting said conduit and the space between said discs.

13. An emulsifying apparatus comprising in combination: a pair of circular discs, having their juxtaposed faces dished or scooped out to form sharp edged brims, pins arranged on the inner face of one disc, tubular distance pieces fitting on said pins, means for clamping said discs together, and a rotatable central shaft common to said discs and upon which said discs are fast, said shaft having a longitudinal bore and radial holes connecting said bore and the space between said discs.

14. An emulsifying apparatus comprising in combination: a plurality of circular discs having their juxtaposed faces dished or scooped out to form sharp edged brims, interchangeable distance pieces arranged between said discs, means for clamping said discs together, and a rotatable central shaft common to said discs and upon which said discs are fast, said shaft having a longitudinal bore and radial holes connecting said bore and the spaces between the juxtaposed faces of said discs.

ETHEL MARY FERNS.