M. LEITCH & B. R. WRIGHT.

EMULSIFIER.

APPLICATION FILED MAR. 19, 1914.

1,145,600.

Patented July 6, 1915

Fig 1

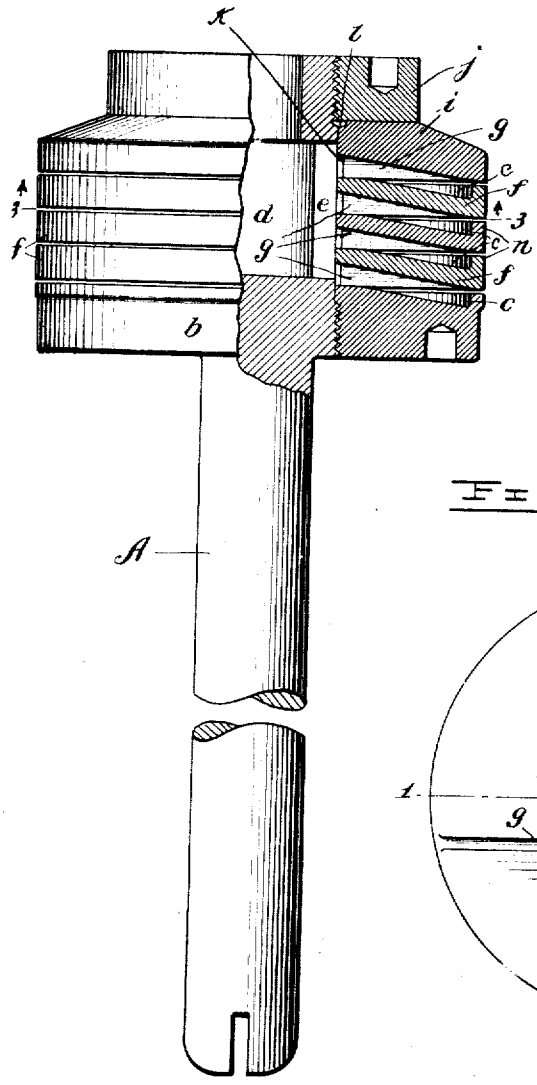


Fig 2

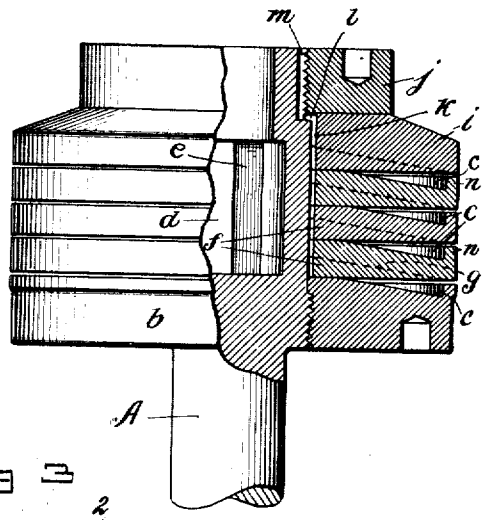
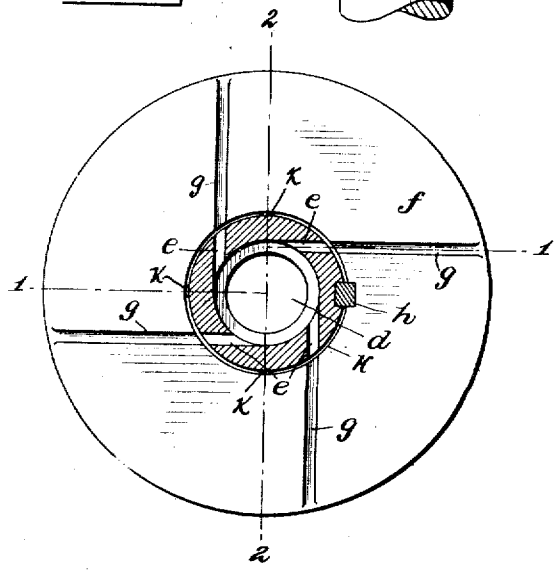


Fig 3



Witnesses
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UNITED STATES PATENT OFFICE.

MEREDITH LEITCH AND BERT R. WRIGHT, OF POUGHKEEPSIE, NEW YORK, ASSIGNORS TO THE DE LAVAL SEPARATOR COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

EMULSIFIER.

1,145,600. Specification of Letters Patent. Patented July 6, 1915.

Application filed March 19, 1914. Serial No. 825,778.

To all whom it may concern:

Be it known that we, MEREDITH LEITCH and BERT R. WRIGHT, both citizens of the United States, and residing at Poughkeepsie, county of Dutchess, State of New York, have invented certain new and useful Improvements in Emulsifiers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in the formation of a more or less permanent mixture, commonly called an emulsion, of two materials, one of which is of a fatty nature and the other of a watery nature.

More particularly, it relates to the formation of such an emulsion by discharging a rough mixture of the two materials, by centrifugal force, between revolving plates arranged in close proximity to each other and of relatively small diameter, thereby requiring a minimum amount of driving power to operate them effectively, although of large capacity appropriate to a wide variety of commercial uses.

In the accompanying drawings,—Figure 1 represents, partly in elevation and partly in section, an emulsifier constructed in accordance with our invention, the portion shown in section being taken upon a plane indicated by the line 1—1 of Fig. 3; Fig. 2 is a similar view, the part shown in section being along a plane indicated by the line 2—2 of Fig. 3; Fig. 3 represents a section, viewed from below, taken on a plane indicated by the line 3—3 of Fig. 1, and, consequently, shows the underside of one of the elements making up the emulsifier.

Similar letters of reference indicate similar parts throughout the several views.

Referring to the drawing, A indicates a shaft which may be supported and revolved in any approved manner. This shaft carries a bottom plate *b* having an annular depression or distributing chamber *c*. The upper portion of the shaft is bored out to form a central receiving chamber *d* for the materials to be emulsified; and, leading from this central receiving chamber are a number of passages *e*, tangent to the wall of the chamber, these passages serving to supply the material from the central chamber to the emulsifying elements of the device.

Surrounding the outer wall of the receiving chamber *d* are a plurality of plates *f*, each having upon its upper face an annular groove *c* corresponding to the annular groove *c* of the bottom plate *b*, and having in its lower side a number of slots or grooves *g* which form continuations of the tangential passages *e* in the wall of the central chamber.

The slots or grooves *g*, in the lower face of each of the plates *f* serve as feeding passages respectively to the annular depressions or distributing chambers *c* in the upper face of the several proximate elements. A key *h* engaging in corresponding keyways in the shaft and in the several elements to be assembled causes the slots *g* to register accurately with the tangential passages *e* in the wall of the central chamber.

The top plate *i* rests upon the uppermost plate *f* of the series of emulsifying elements and has in its under-face slots corresponding to those in the under-faces of the several plates *f*. A nut *j* engaging a thread on the upper end of the shaft, when screwed down against the plate *i*, holds the assembled elements together.

In each of the plates *f*, and in the top plate *i* are a number of vertical grooves *k*, spaced at suitable distances apart about the outer periphery of the wall of the central chamber. These vertical grooves *k* communicate with an annular groove around the shaft at *l* and serve as air vents from the several sections to the said annular groove *l* and thence from the annular groove *l* through corresponding vertical grooves *m* in the nut *j*.

In cross section, the slots or grooves *g* preferably deepen from without inwardly; and the annular depressions or distributing chambers *c* deepen from within outwardly. This arrangement is found to facilitate regularity and uniformity of feed and discharge of the materials to be emulsified.

The operation of the device is as follows: The material to be emulsified, which is preferably first roughly mixed, is fed into the central chamber *d* in any approved manner. It is immediately thrown out against the wall of the chamber and discharged through the passages *e*. The tangential arrangement of these passages facilitates the entrance of the liquid and its feed into the slots or grooves *g*. These slots or grooves *g* feed the material into the annular surface depressions or distributing chambers *c*, where, because of the high speed of rotation of the device a centrifugal force is set up. The outer wall *n* of the annular surface groove *c* in each element is slightly lower than the central portion of the element, thereby leaving a very narrow orifice between the top of the wall *n* and the bottom of the element above,—this intervening space, in many instances, being as small as one-thousandth of an inch in height. The pressure caused by the centrifugal force, acting upon the material in the depressions or distributing chambers *c*, forces the material through the very narrow discharge orifices, and mixes the particles so thoroughly as to form the desired emulsion. During the operation, any air that is entrained with the material and which would otherwise tend to interfere with the proper feed thereof is carried off by the venting grooves.

The large capacity of the emulsifier is due in part to the presence of the air vents referred to, the tangential feed of the material from the central receiving chamber, the conformation of the slots or grooves *g* forming a continuation of the tangential slots *e*, the outward slope of the annular surface depressions or distributing chambers *c*, and the employment of a series or plurality of the emulsifier elements superposed one upon the other; and, at the same time, while having the desired high capacity for efficient commercial uses, the emulsifier operates, with safety, at high speeds, and with a minimum expenditure of power, because of its relatively small diameter.

What we claim is:

1. An emulsifier, provided with a central receiving chamber and having discharge passages leading from said chamber and tangent to the inner wall thereof, and one or more outlying emulsifying elements supplied from said tangential passages.

2. An emulsifier, provided with a central receiving chamber and having discharge passages leading from said chamber and tangent to the inner wall thereof, and one or more outlying emulsifying elements supplied from said tangential passages through the intermediacy of grooves forming continuations of said passages.

3. An emulsifier, provided with a central receiving chamber and having discharge passages leading from said chamber and tangent to the inner wall thereof, and one or more outlying emulsifying elements supplied from said tangential passages through the intermediacy of grooves forming continuations of said passages, said grooves decreasing in height from within outwardly.

4. An emulsifier provided with a central receiving chamber and having discharge passages leading from said chamber and communicating with outlying emulsifying elements made up of superposed plates the lower plate having an annular face groove increasing in depth from within outwardly, and communicating with the discharge passages of the central chamber by grooves in the upper plate decreasing in height from within outwardly.

5. An emulsifier, provided with a central receiving chamber and having discharge passages leading therefrom, one or more outlying emulsifying elements supplied from said passages, and a vent from said passages for the escape of air entrained with the material fed.

6. An emulsifier, provided with a rotatory central receiving chamber, and a plurality of emulsifying elements communicating with said chamber and superposed one upon the other.

7. An emulsifier, provided with a central receiving chamber, and a plurality of emulsifying elements communicating with said chamber by tangential passages and superposed one upon the other, and air vents leading upwardly from the exterior of the central chamber.

8. An emulsifier, provided with a central receiving chamber having passages leading therefrom, and a plurality of emulsifying elements communicating by said passages with said chamber and superposed one upon the other, one member of each of said elements being provided with an annular surface depression and an outlying discharge lip and the other member of each of said elements being provided with feed grooves forming continuations of the passages from the central chamber.

9. An emulsifier with a rotatory central receiving chamber, having passages leading therefrom, and an outlying series of emulsifying elements superposed one upon the other, means for locating the elements in predetermined arrangement, and a securing nut for locking them removably in place.

10. An emulsifier, provided with a central receiving chamber having tangent discharge passages and a plurality of emulsifying elements communicating with said chamber and superposed one upon the other, one member of each of said elements being provided with an annular surface depression and an outlying discharge lip, and the other member of each of said elements being pro-

vided with feed grooves forming continuations of the tangent discharge passages from the central chamber.

11. An emulsifier, provided with a central receiving chamber having tangent discharge passages and a plurality of emulsifying elements communicating with said chamber and superposed one upon the other, one member of each of said elements being provided with an annular surface depression and an outlying discharge lip, the other member of each of said elements being provided with feed grooves forming continuations of the tangent discharge passages from the central chamber and air vents leading upwardly from the exterior of the central chamber.

12. An emulsifier, provided with a central receiving chamber and a plurality of emulsifying elements communicating with said chamber and superposed one upon the other, and air vents leading upwardly from the exterior of the central chamber.

13. An emulsifier, provided with a rotatory central receiving chamber and a plurality of emulsifying elements, each of said elements having a distributing chamber and having an annular discharge orifice, said distributing chamber communicating with the receiving chamber by feed passages.

14. An emulsifier, provided with a rotatory central receiving chamber, an outlying emulsifying element made up of plates having on their adjacent faces the one an annular depression, and the other feed grooves, said feed grooves communicating with and constituting continuations of discharge passages which lead from the receiving chamber.

15. An emulsifier, having a rotatory central receiving chamber, and a plurality of emulsifying elements each having an annular discharge orifice and a distributing chamber, and feed passages leading from the receiving chamber to the distributing chamber, said feed passages being provided with air vents.

In testimony whereof we affix our signatures, in presence of two witnesses.

MEREDITH LEITCH.
BERT R. WRIGHT.

Witnesses:
SELDEN H. HALL,
CHARLES L. POWELL.

Correction in Letters Patent No. 1,145,600.

It is hereby certified that in Letters Patent No. 1,145,600, granted July 6, 1915, upon the application of Meredith Leitch and Bert R. Wright, of Poughkeepsie, New York, for an improvement in "Emulsifiers," an error appears in the printed specification requiring correction as follows: Page 1, lines 60 and 61, strike out the word "groove" and insert the words *depressions or distributing chambers;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 31st day of August, A. D., 1915.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.