April 13, 1937. E. CHRISTIANSEN 2,076,979

MEANS FOR AERATING FLUIDS

Filed March 10, 1936 2 Sheets-Sheet 1

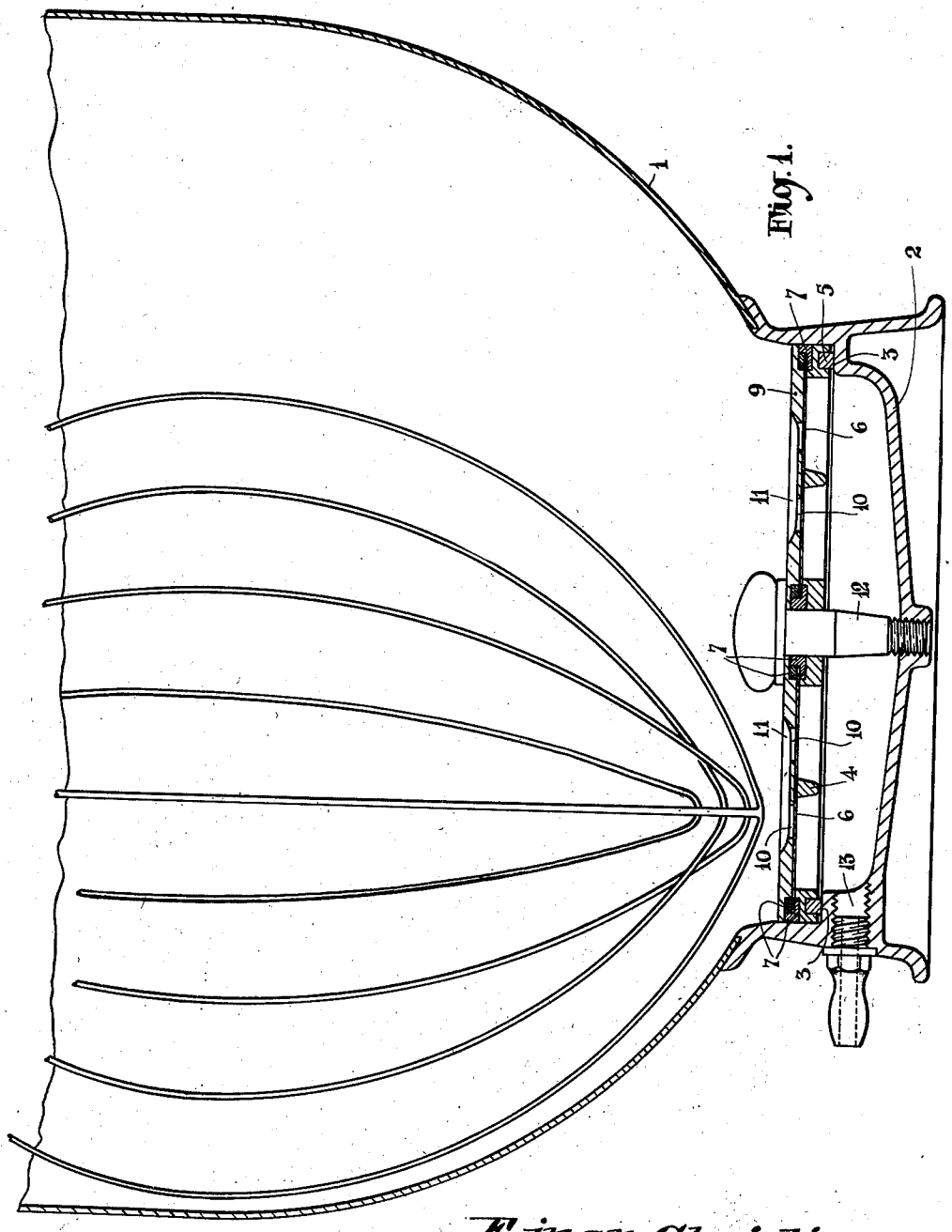


Fig. 1.

Ejnar Christiansen
Inventor

By C. A. Snow & Co.
Attorneys.

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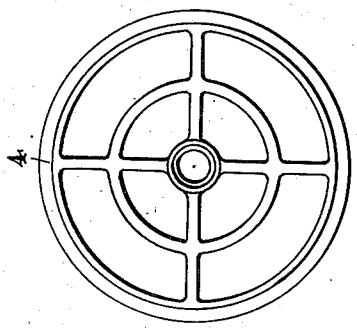


Fig. 4.

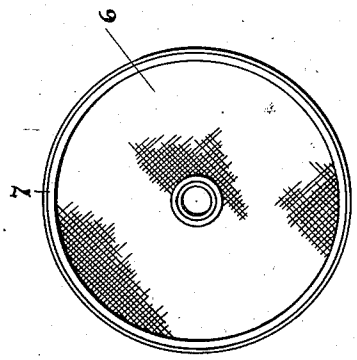


Fig. 5.

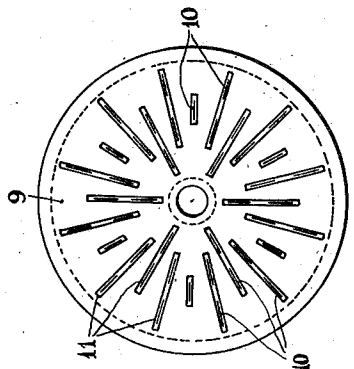


Fig. 2.

Ejnar Christiansen
Inventor

By C. A. Snow & Co.
Attorneys.

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UNITED STATES PATENT OFFICE

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MEANS FOR AERATING FLUIDS

Ejnar Christiansen, Birmingham, England

Application March 10, 1936, Serial No. 68,146
In Great Britain July 23, 1935

5 Claims. (Cl. 261—121)

This invention comprises certain improvements in or relating to means for aerating fluids particularly cream, mixtures for making sponge cake and the like, of the type wherein air or other gas is forced through a perforated member so that it enters the fluid in finely divided streams or bubbles.

According to the present invention, the means for aerating fluids comprises a member having narrow slits therein to form nozzles through which air is injected into the fluid to be aerated, and means for substantially sealing the bottom or outer side of the slit to prevent the said fluid from escaping through the slits, whilst permitting the air or gas to pass therethrough. The air or gas may be injected into the fluid to be aerated through air passages closed by a gauze or perforated member which allows air under pressure to stream therethrough but prevents the escape of the aerated fluid through the passages. The gauze member may comprise a plurality of gauze sheets of fine mesh and the gauze member may be supported on the underside.

Referring to the drawings:—

Figure 1 is a sectional elevation of a machine constructed according to this invention.

Figure 2 is a plan view of the air discharge plate, hereinafter referred to.

Figure 3 is a plan view of a gauze member, and

Figure 4 is a plan view of a support plate.

According to one convenient embodiment of this invention, a metal bowl 1, having a circular wall and rounded at the bottom has a hole in such bottom and under such hole a compressed air receiving chamber 2 is fitted. An annular recessed shoulder 3 is provided in the chamber 2 for receiving a false bottom. This false bottom comprises a metal ring or grate 4 which beds on the shoulder, such ring having a groove on the underface for receiving a rubber or other packing ring 5. This ring or grate 4 supports a perforated member which comprises one or a plurality of very fine gauze discs 6. A suitable combination of gauze discs can be obtained to prevent leakage of any particular fluid and for cream or sponge mixture it may comprise two outer discs of 100 mesh and two discs of 60 mesh. The gauze disc or discs are conveniently clamped between the rim parts 7 to form a single unit. This rim fits in a recess in the ring or grate so that the gauze can be supported on the ribs of the grate. Above the gauze member, an aluminium, steel, or other plate 9 is placed and such plate has a number of extremely fine slits cut therein. Any number of these slits may be provided in the plate and arranged in any desired manner. Conveniently the slits 10 are radially arranged and at equal intervals over the full area of the plate. The slits are formed by first milling on the upper side of the plate recesses 11. The slits 10 are then milled in from the face of the plate in register with recesses 11 and these slits 10 are of as small a width as can be obtained with a milling cutter. The edge of the plate 9 is recessed to receive the rim 7 and to enable the plate to rest on the gauze sheets supported by the grate 4. The false bottom is clamped in position by means of a stud 12 which passes through the false bottom and engages a tapped hole in the bottom of the air receiving chamber. An air conduit 13 passes through the wall of the air receiving chamber and is connected to a pump located in any suitable position.

The air is delivered by the pump into the air receiving chamber and passes through the layer or layers of wire gauze and through the slits 10 into the fluid. The gauze under the slits 10, prevents, for all practical purposes, the flow of fluid through the slits. The compressed air can, however, flow through the gauze and the slits 10 into the fluid. The gauze member forms small interstices which, on account of the surface tension of the fluid, or its adhesion to the walls of the interstices, resists flow of the fluid but does not for the same cause resist the flow of air under pressure. Any other member having similar properties may be substituted for the gauze. The false bottom can be readily removed for cleaning purposes. The air passes through the discharge plate in a finely divided condition at intervals throughout the area of the plate and in order to provide for a more complete aeration of the fluid, such fluid is stirred so that all the fluid is evenly and completely aerated as the position of the fluid in relation to the slits is constantly being changed, whilst the air is further broken up in the fluid.

The air discharge openings in the discharge plate are such that the air or gas flows therethrough in fine streams so that it can intermix with the fluid. The openings will also be of such a size that the surface tension of the cream or like fluid or its adhesion to the walls of the passages, prevents the ready flow of the fluid therethrough. The perforated member which seals the openings in the discharge plate may also be of any desired construction having small interstices which substantially prevent the flow of fluid therethrough whilst allowing compressed air to pass.

I claim:

1. Means for aerating fluids, comprising a container, for the fluid to be aerated, a removable plate at the bottom of the container, which plate has narrow slits therein through which air is injected, a wire or like gauze member sealing the bottom of the slits to prevent escape of fluid through the said narrow slits, and a supporting grate or member on the underside of the gauze member.

2. Means for aerating cream, mixtures for making sponge cake and the like, comprising a member having narrow slits therein to form nozzles through which air is injected into the fluid to be aerated the slits being of a size to resist the flow of cream, sponge mixture or the like therethrough, whilst air is being forced therethrough, and means for substantially sealing the bottom or outer side of the slits or openings to prevent the said fluid from escaping should any fluid run down the slits, whilst also permitting the air or gas to pass therethrough.

3. Means for aerating cream, mixtures for making sponge cake and the like, comprising a container for the fluid to be aerated, a member forming the bottom of the container having narrow slits therein of a size to resist the flow of cream, sponge mixture or the like therethrough, whilst air is being forced therethrough, a wire gauze member sealing the slits to prevent escape of fluid through the said narrow slits, and means for clamping the gauze member flat on the member having the slits therein.

4. Means for aerating cream, mixtures for making sponge cake and the like, comprising a member having narrow slits therein to form nozzles through which air is injected into the fluid to be aerated the slits being of a size to resist the flow of cream, sponge mixture or the like therethrough, whilst air is being forced therethrough, and a plurality of gauze sheets for substantially sealing the bottom or outer side of the slits or openings to prevent the said fluid from escaping should any fluid run down the slits, whilst also permitting the air or gas to pass therethrough.

5. Means for aerating cream, mixtures for making sponge cake and the like, comprising a container for the fluid to be aerated, a member forming the bottom of the container having narrow slits in recesses therein of a width as narrow as can be milled with a milling cutter and of a size to resist the flow of cream, sponge mixture or the like therethrough, whilst air is being forced therethrough, a wire gauze member sealing the slits to prevent escape of fluid through the said narrow slits, and means for clamping the gauze member flat on the member having the slits therein.

E. CHRISTIANSEN.