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E. H. CLARK

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FEEDER FOR SENSITIZING INGREDIENTS

Filed July 29, 1941

2 Sheets-Sheet 1

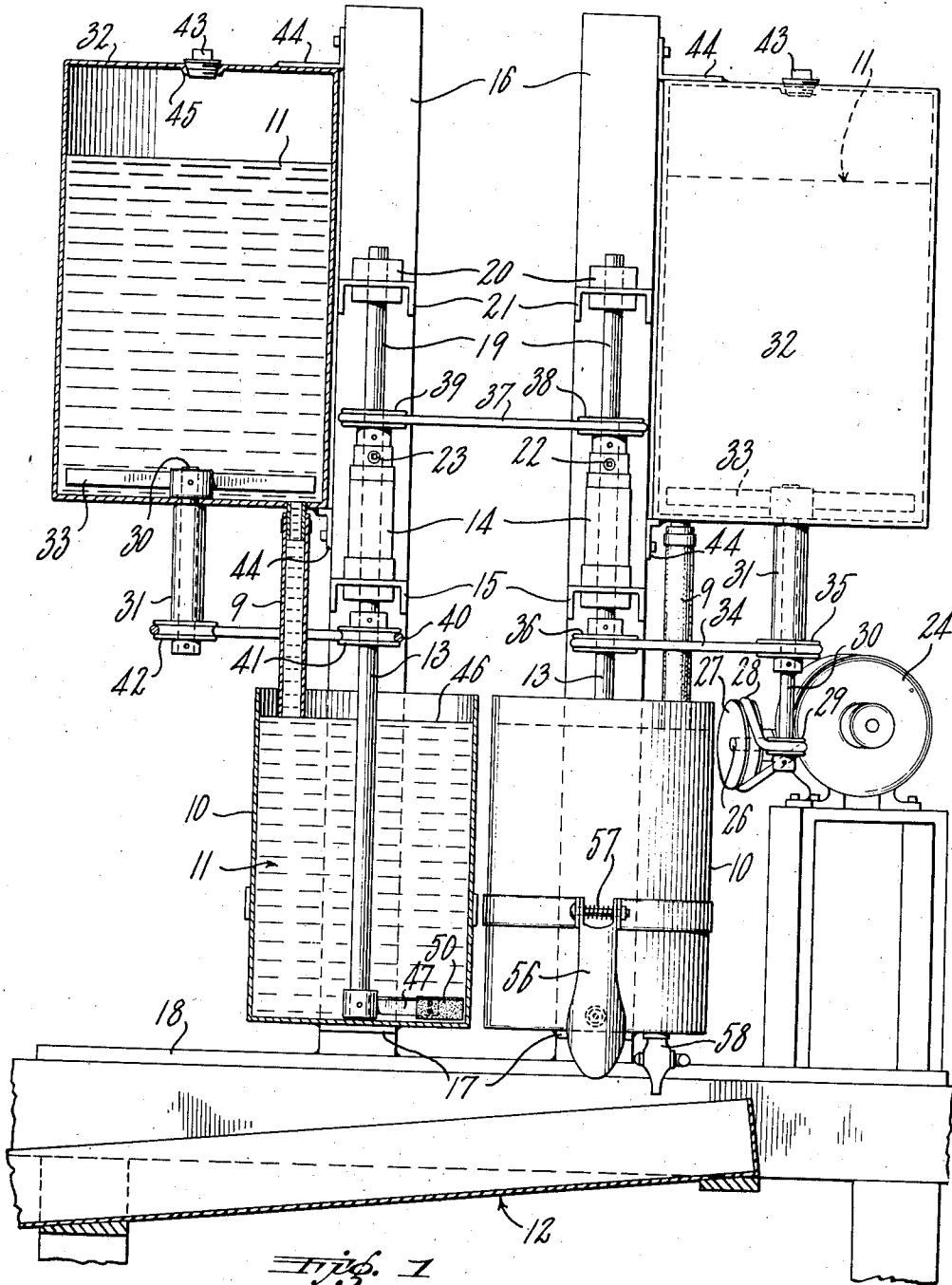


Fig. 1

BY

INVENTOR.
EDWARD H. CLARK
Edw. H. Clark

ATTORNEY

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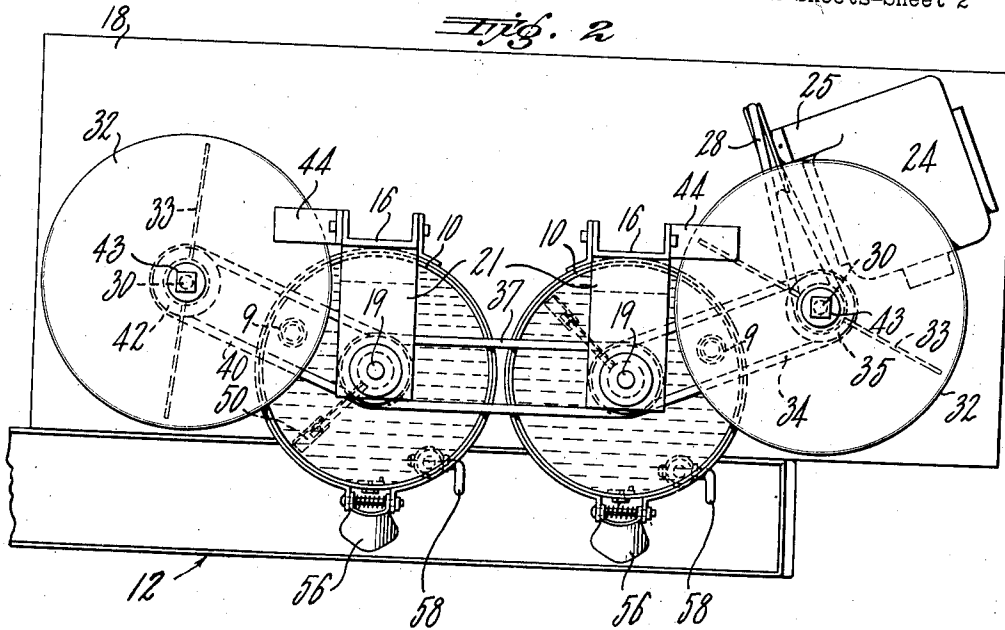


Fig. 3

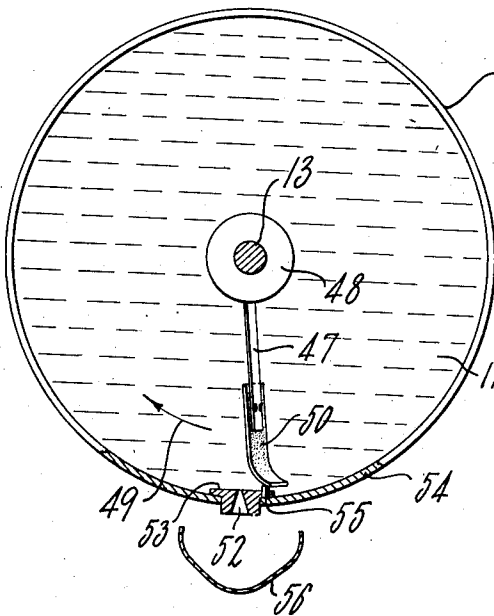
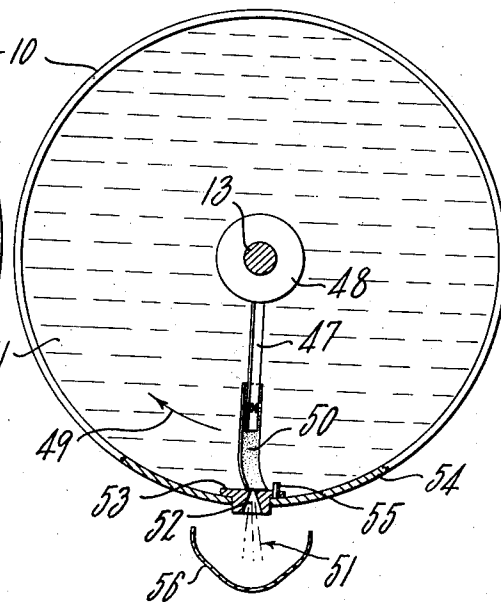


Fig. 4



INVENTOR.
EDWARD H. CLARK
BY *Lester G. Biedling*
ATTORNEY

UNITED STATES PATENT OFFICE

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FEEDER FOR SENSITIZING INGREDIENTS

Edward H. Clark, Mishawaka, Ind., assignor to
United States Rubber Company, New York,
N. Y., a corporation of New Jersey

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4 Claims. (Cl. 259—8)

This invention relates to apparatus for introducing minute quantities of ingredients into a mixer, and is of particular utility when utilized in an appliance for introducing a sensitizing medium such as a liquid containing in suspension fine solid particles of a sensitizing agent, such as sodium silico fluoride, to a foaming apparatus designed to produce a latex foam in a substantially continuous operation. The invention is, however, applicable for use in any analogous field where my improvements may be utilized advantageously by virtue of their nature.

In conventional apparatus for the delivery of a liquid charged with suspended fine solid particles of sodium silico fluoride, certain disadvantages and inconveniences of operation have been encountered, which have rendered the commercial use of such apparatus unsatisfactory for various reasons. In the first place, the fine particles in such a liquid are apt to clog up a small delivery aperture (e. g. of the order of $\frac{1}{16}$ of an inch, which is a desirable size), by the settling of the solid matter; and, in the second place, if the motor is stopped, or the flow otherwise arrested, the delivery aperture will clog up immediately.

Accordingly, the primary object of the present invention is to provide a device for supplying regulated minute quantities of sensitizing ingredients for use in a sensitizing mixer of the above mentioned type, which shall be free from the disadvantages and inconveniences heretofore encountered, as above exemplified, and which will embody novel improvements designed to achieve greater regularity and accuracy in operation, with economies in time, material and cost of production.

Viewed in its generic aspect, the invention consists in agitating the material constantly within a mixing chamber in a zone adjacent to the delivery orifice thereof, to facilitate the discharge therethrough in desirably minute quantities of a liquid containing the suspended fine solid particles, without interruption of said discharge by undesired agglomeration of the particles and consequent clogging of the delivery orifice.

The invention consists also in the provision of a mixing chamber with a rotatable shaft having a stirring blade moving in a path adjacent to a discharge orifice formed in a lateral wall of the chamber, the blade having means to expel a dose of the magma through the orifice with a

positive rapid action of the expelling means at the instant the expelling means moves past the orifice in contact therewith.

The invention consists further in the provision of a battery of mixing chambers of the aforesaid construction with means for actuating their stirring blades and expelling devices concurrently in timed relation, thereby to provide for increased capacity in the apparatus and also to permit the concurrent dispensing of more than one ingredient to a mix, provision being made of means to disconnect one of the dispensing units at will, and to operate the other unit singly.

The invention consists also in the provision of reserve tanks constructed and arranged to maintain automatically in each of the mixing chambers, a constant supply of the liquid to be dispensed.

Other features and objects of the invention will appear as the description of the selected embodiment herein illustrated progresses.

In the drawings:

Fig. 1 is a view in front elevation, partly in vertical section, of dispensing apparatus in the construction of which the present invention has been embodied;

Fig. 2 is a plan view thereof;

Fig. 3 is a fragmentary detail view in horizontal section, showing upon an enlarged scale the feed mechanism in its position preliminary to a feeding movement; and

Fig. 4 is a similar view; taken at the instant of feeding.

Referring to the drawings, the part designated by the reference character 10 is a supply tank which forms or includes a mixing chamber for the suspension to be dispensed, comprising, in the instance illustrated, a body of liquid 11 containing in suspension fine, solid particles of sodium silico fluoride, which it is desired to supply in very small quantities to a foamable latex dispersion in a foaming cell (not shown) through a suitable conduit 12.

For the sake of convenience in operation two such supply tanks 10 are shown, and as they are identical in construction, they will be described indiscriminately, unless one or the other be designated suitably for the sake of clearness.

In each tank is provided an upright shaft 13, rotatably supported in sturdy overhead thrust bearings 14 mounted on brackets 15 suitably secured, as by welding, to frame uprights 16 which are provided with steps 17 for the tanks 10 and which rise from a base 18, to which they may desirably be welded or bolted.

To afford smoothness of rotation, upward extensions 19, of the shafts may be provided, fitted in anti-friction bearings 20, carried by brackets 21 extending from the uprights 16. Each shaft may desirably be provided with a coupling device as 22-23, so that if the coupling 23 be disconnected, the right-hand shaft 13 may be rotated singly.

For actuation of either or both of the shafts, at will, an electric motor 24 is provided, with reduction gearing in a box 25 (see Fig. 2), having an output shaft 26 fitted with a driving pulley 27 from which a belt 28 runs to a driven pulley 29 on an upright countershaft 30 mounted in a sleeve 31 depending from the bottom of a reserve tank 32.

Within each of the reserve tanks 32, preferably near the bottom thereof, an agitator 33 is provided, fixed to one of the shafts 30, and a system of belts and pulleys 34, 35, 36, 37, 38, 39, 40, 41 and 42 serves to transmit motion from the right-hand shaft 30 to the shafts 13 and to the left-hand agitator 33, in timed relation.

The reserve tanks 32 are secured to the uprights 16 by brackets 44 welded and/or bolted thereto, and are filled through the openings 45 in their upper ends, closed by screw plugs 43, so that a suitable vacuum is made effective in the space above the level of liquid 11 in each of the reserve tanks, and thereby the level 46 of liquid 11 in each of the supply tanks 10 is maintained constant, in well-known fashion, as the supply is dispensed, the liquid flowing down through pipes 9.

In pursuance of the invention, the operation of dispensing the liquid 11, with its suspended fine, solid particles of sensitizing medium, is performed by means of a flap-like device 50 made of a somewhat resilient sheet material, such as rubber, leather, or the like, which is mounted on the end of a radial stirring blade 47 extending from a hub 48 fixed to each shaft 13 near the bottom of the tank, so that as each shaft 13 is rotated, in the manner already described, its blade 47 and flap 50 are swung around in the direction indicated by the arrows 49, and when the flap reaches the position shown in Fig. 4 it forces by wiping engagement a moiety 51 of the liquid 11 with its charge of suspended fine solid particles of sensitizing medium out through one or more discharge orifices, as for example that shown at 52.

Each orifice 52 may desirably be formed in a nozzle 53 set into the side wall 54 of the tank in registry with the path swept by the blade 47 and flap 50, and it will be noted that the latter perform recurrently the operation of agitating the magma 11, so that deposited solids are not allowed to accumulate in the vicinity of the orifice 52. Forming the orifice in the vertical wall of the container of itself tends to prevent clogging of the orifice since solid particles tending to settle out of the suspension, tend to be carried past the orifice rather than into it. In addition, the periodic wiping of the orifice by the flap 50 keeps it clear of suspended matter.

In further pursuance of the invention, the positive dispensing of each dose of the magma 11 is further assured by suitable means acting to give the flap 50 a flip at the instant of its dispensing action, whereby the flap moves outwardly against the wall of the container. The radial or outward component of its movement as it moves in alignment with the orifice positively

expresses a small dose of the suspension through the discharge orifice one convenient means for accomplishing this purpose, is a pin 55 set in the nozzle at a suitable distance from the orifice 52 to bend the flap back away from the orifice, as shown in Fig. 3, and then release it suddenly toward the orifice.

In order to confine the dose 51 against undesired dissipation, provision is made of hinged shields 56, as illustrated, by which the spray is directed downwardly into the trough 12, and it will be understood that the doses are there mingled into a substantially continuous stream, the volume of which may be varied at will by regulating the speed of the motor 24, and consequently changing the frequency of dosage.

Each shield 56 may be swung upwardly to reveal the orifice 52, and will be held in the elevated position by frictional action of the compression spring 57. Petcocks are shown at 58 to permit the liquid 11 to be drawn off for the cleaning operations, etc.

Each of the tanks 10 is shown with a single orifice 52, but this showing is not intended to exclude the provision of more than one orifice, inasmuch as it is possible to double the output of a tank 10, in any given period by the simple expedient of providing another nozzle 53 with its orifice 52 and pin 55, at a suitably spaced part of the lateral wall of the tank without otherwise altering the working parts. It will, of course, be understood that the conduit will be arranged suitably to receive the output of the nozzles so added.

From the foregoing disclosure, it is evident that provision has been made of a dispensing apparatus adapted to dispense regulated doses of liquid with the desired regularity and uniformity, avoiding clogging of the discharge orifice and making it possible to utilize one or more of the dispensing units at will, either to vary the capacity of the apparatus, or to use it for dispensing more than one ingredient concurrently in properly timed relation.

The invention may be embodied in modified forms which will occur to those skilled in the art and such modifications are considered to be within the scope of the appended claims, unless otherwise limited.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. Apparatus for delivery of regulated quantities of a liquid in which fine particles of solid material are suspended, said apparatus comprising a mixing chamber for a supply of said liquid, the chamber having a wall, the wall having a delivery orifice, and a dispensing mechanism including a shaft provided with a substantially radial stirring blade mounted to rotate in said chamber in a path adjacent to said orifice, the blade including dose-expelling means comprising a flap of resilient material at the free end of said blade moving in wiping engagement with the wall of said container, and means to impart to said flap a quick flip including a movement away from the orifice and a quick movement toward the orifice as the flap passes the same.

2. An appliance for the delivery, in regulated quantities, of a liquid in which fine particles of solid material are suspended, said appliance comprising a mixing chamber having a lateral wall, the wall having a discharge orifice, means to stir the mixture and expel successive doses thereof through said orifice, a conduit to receive said doses, and a shield to direct the doses toward

said conduit, said shield being hingedly connected to the exterior of said wall and movable from its normal shielding position to a position retracted to expose said orifice, and means to hold the shield yieldingly in said retracted position.

3. Means for dispensing regulated quantities of a suspension of fine solid particles in a liquid comprising in combination a container for the suspension, the container having a wall including a discharge orifice, stirring means including a rigid member adapted to move in a definite path over the orifice and spaced therefrom, said stirring means also including a flexible member longer than the distance from the rigid member to the orifice whereby the flexible member is urged resiliently against the wall of the container adjacent the orifice and an obstruction in the path of the flexible member adjacent the orifice to cause the flexible member to move away 20

from the orifice and to resiliently rebound against the wall adjacent the orifice as the flexible member passes over the orifice.

5 4. Means for dispensing regulated quantities of a suspension of fine solid particles in a liquid comprising in combination a container for the suspension, the container having a wall including a discharge orifice, stirring means including a rotatable support and also including a 10 flexible member carried by the support and longer than the distance from the support to the orifice whereby the flexible member is urged resiliently against the wall of the container adjacent the orifice and an obstruction in the path 15 of the flexible member adjacent the orifice to cause the flexible member to move away from the orifice and to resiliently rebound against the wall adjacent the orifice as the flexible member passes over the orifice.

EDWARD H. CLARK.