May 4, 1937. M. A. ARNDT 2,079,272

MIXING MACHINE

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FIG. 1.

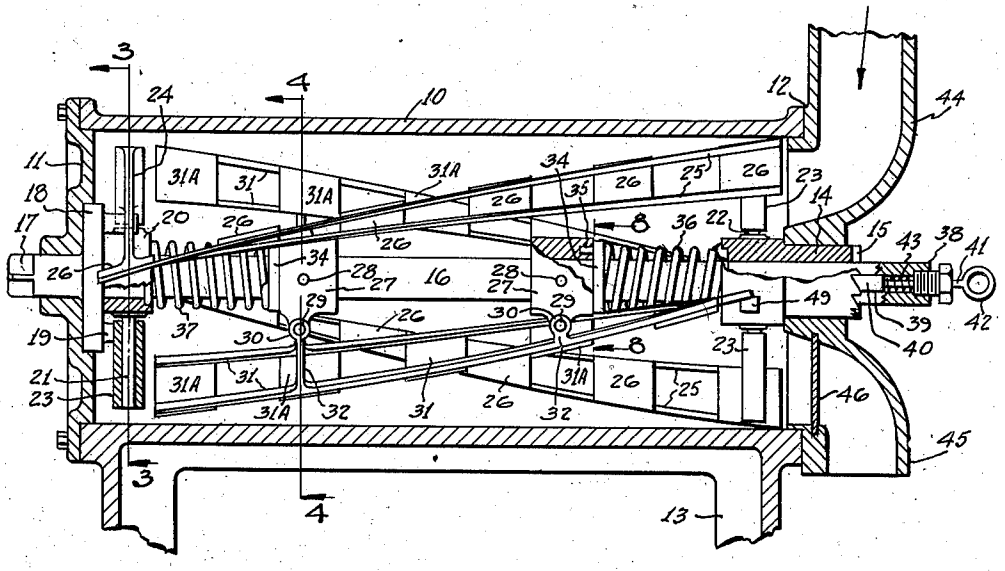
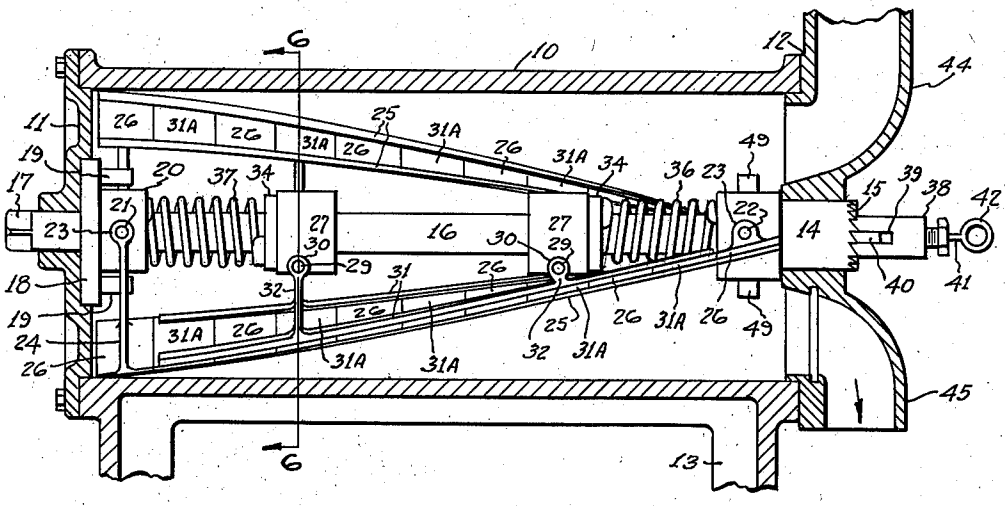


FIG. 2.



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FIG. 3.

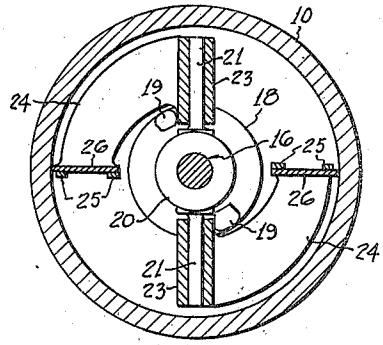


FIG. 4.

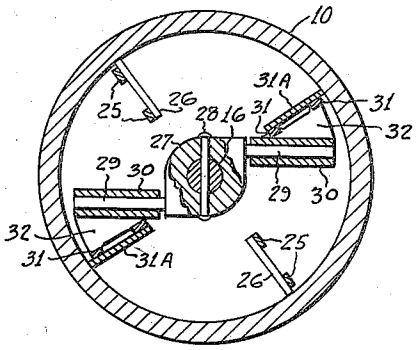


FIG. 6.

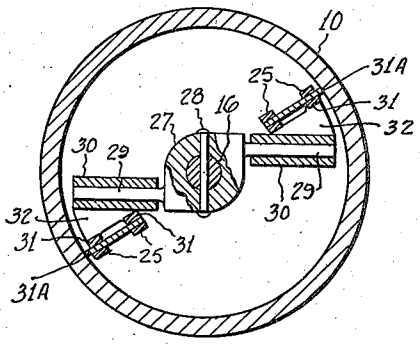


FIG. 5.

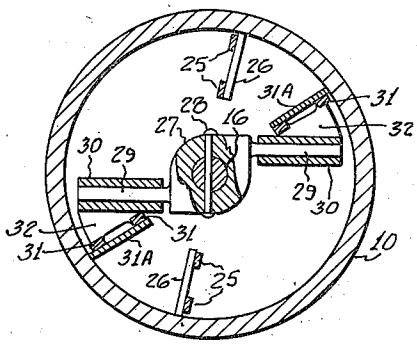


FIG. 7.

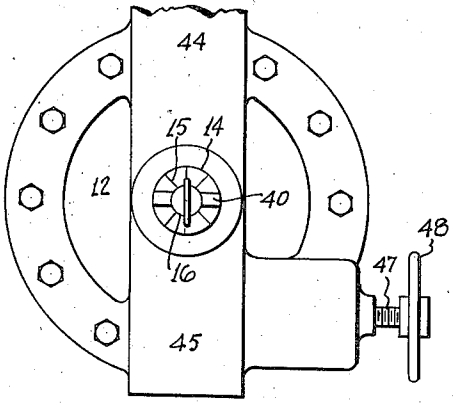
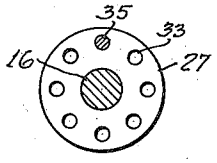


FIG. 8.



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UNITED STATES PATENT OFFICE

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MIXING MACHINE

Max A. Arndt, Portland, Oreg., assignor of one-half to Alexander M. McIntosh, Portland, Oreg.

Application June 8, 1936, Serial No. 84,123

7 Claims. (Cl. 259—25)

This invention relates generally to mixing machines and particularly to a machine for mixing ice cream during the freezing operation.

The main object of this invention is the provision of an exceedingly simple and efficient form of mixing element which will thoroughly blend the mixture and subject the entire contents of the container to the blending action.

The second object is to produce a mixture of the class described in which the material is subjected to alternating endwise movements during the mixing operation and to a longitudinal movement in one direction when the consistency of the ice cream has reached a predetermined consistency.

The third object is to so construct the device as to render same easily adjustable for the purpose of varying the point at which the mixing movement is replaced by a discharging movement.

These, and other objects, will become more apparent from the specification following as illustrated in the accompanying drawings, in which:

Fig. 1 is a vertical longitudinal section through the device showing the parts in a mixing position.

Fig. 2 is a view similar to Fig. 1 but showing the parts in a cream discharging position.

Fig. 3 is a section taken along the line 3—3 in Fig. 1.

Fig. 4 is a section taken along the line 4—4 in Fig. 1, representing a position of the parts during the time the mixture is still in liquid form.

Fig. 5 is a view similar to Fig. 4 showing the position of the parts as the mixture begins to thicken.

Fig. 6 is a section taken along the line 6—6 in Fig. 2 showing the position of the parts when the mixture has frozen or thickened to the desired degree.

Fig. 7 is an end elevation of the device.

Fig. 8 is a section taken along the line 8—8 in Fig. 1.

Similar numbers of reference refer to similar parts throughout the several views.

Referring in detail to the drawings, there is shown a horizontal cylinder 10, one end of which is provided with a head 11 and the other end of which has a head 12. The cylinder 10 is mounted on a suitable support 13. Journaling in the head 12 along the axis of the cylinder 10 is a sleeve 14, the outer end of which is provided with ratchet teeth 15. Rockably mounted within the sleeve 14 is a shaft 16 which journals in the head 11 and has its projecting end 17 squared or otherwise formed to receive a driving connection. Secured on the shaft 16 adjacent to the head 11 is a flange 18 which is provided with the stops 19. Rockably mounted on the shaft 16 and adjacent to the flange 18 is a collar 20 which has projecting from opposite sides thereof and in axial alignment with each other the guide rods 21. Similar rods 22 project from the sleeve 14. The rods 22 are in the same longitudinal plane as the rods 21. The rods 21 and 22 have mounted thereon the slides 23 from which extend the arcuate brackets 24, which support the spiral bars 25, the outer one of which is held close to the inner wall of the cylinder 10 by centrifugal force. Across the bars 25 are placed the blades 26 which are in spaced relationship to each other, the outermost edges of the blades 26 coinciding substantially with the outermost edge of the outer bar 25.

Secured on the shaft 16 are the hubs 27 by means of the pins 28. Each hub 27 has projecting therefrom in opposite directions and in parallel relationship the guide rods 29. Each guide rod 29 has slidably mounted thereon a slide 30. Spiral bars 31 are attached to the slides 30 by means of the connecting members 32. The outermost bars 31 are caused to revolve close to the inner wall of the cylinder 10 by centrifugal force. Each hub 27 is provided with a series of holes 33 which are concentric about the shaft 16.

Rotatable on the shaft 16 and against the perforated side of each hub 27 is a disc 34 provided with the pin 35 which may engage one of the holes 33. Around the shaft 16 is placed a torsion spring 36, one end of which is secured to the disc 34 and the other end of which is secured to the sleeve 14. A similar spring 37 is placed around the shaft 16 and has one end secured to the collar 20 and the other end to the adjacent hub 34.

The projecting end 38 of the shaft 16 is provided with a slot 39 in which is slidably placed a pawl 40 which is attached by means of a rod 41 to a ring 42 for manual manipulation. A spring 43 on the rod 41 urges the pawl 40 into engagement with the teeth 15.

The head 12 is provided with an inlet duct 44 and a discharge nozzle 45, the latter of which is provided with a suitable gate 46. The gate 46 may be actuated by means of a screw 47 which is operated by a hand wheel 48 or in any other convenient manner without departing from the spirit of this invention.

It is desirable to provide stops 49 on the sleeve 14 adapted to engage one bar 31. The blade

sections 31A extend across the bars 31 and register with the spaces between the blade sections 26.

The operation of the device is as follows:

Assuming that the gate 46 is closed and that a quantity of mix is inserted in the cylinder 10 through the inlet 44, rotation is now supplied to the shaft 16 from any convenient source of power not shown. The springs 36 and 37 have urged their attached members apart as far as possible, that is, against the stops 19 and 49. Owing to the fact that the blade sections 26 are spaced from each other and that the blade sections 31A register without exception between the blades 26 while the mix is in a relatively soft or fluid condition, it follows that the rotation of the shaft 16 will impart a thorough mixing action to the entire contents of the cylinder 10, the movement being longitudinal as well as circumferential. As the freezing action proceeds and the mix thickens, the blade sections 31A, which are positively driven from the shaft 16, naturally rotate in unison with the shaft, but the blades 26 which are actually driven through the springs 36 and 37, tend to lag behind the shaft 16 until they finally come into register with the sections 31A, resulting in the formation of two continuous spiral blades instead of four sectional or interrupted blades. When this point is reached, the main effort of the blades is to expel the mix which is permitted by the manual opening of the gate 46. It can be seen that the point at which the mixing action is changed to an expelling action depends upon the initial tension of the springs 36 and 37, this being adjustable by the mere movement of the pins 35 to the desired hole 33.

It will be noted that as the blades 26 begin to lag, the pawl 40 rises out of its notch in front of a tooth 15, and by the time the blades 26 and 31A are in full register, the pawl 40 drops in front of the next tooth 15 automatically latching the blades in a discharged position, from which they can be released only by a manual withdrawal of the pawl 40 by pulling the ring 42.

In some cases it may be found desirable to make the teeth 15 square on both sides in order that the transfer from the mixing to the discharging actions may not be automatic in order that the degree of freezing may be completed controlled manually.

It is a matter of common knowledge that mixing machines have been constructed employing continuous spiral blades which may be moved to and from a spiral form or a straight blade. A typical illustration is Patent No. 1,837,565 over which my device is an improvement. With my device, it is unnecessary to change the shape of the mixing element and the mixing blades are always permitted to move freely to the wall of the container for the purpose of scraping the freezing particles therefrom.

It will be noted that the springs 36 and 37 are wound in opposite directions in order that the desired driving action may be obtained therefrom and that the springs will tend to tighten on the shaft as the driving action increases.

I am aware that many forms of mixing machines have been constructed in the past. I therefore do not intend to cover such devices broadly, but I do intend to cover all such forms and modifications thereof as fall fairly within the appended claims.

I claim:

1. A mixing machine having in combination a container, a series of spaced blades mounted in a fixed spiral having means for positively revolving same within said container about the longitudinal axis of said spiral and a second set of blades adapted to occupy the spaces between the first set of blades and having a torsion spring for driving said second set of blades normally in advance of the first set of blades in a manner that the resistance offered to the movement of said spring driven blades will cause same to register with the first set of blades in a manner to form a continuous spiral for the purpose of ejecting the contents of the container from one end thereof.

2. An ice cream mixer having in combination a cylinder, a shaft revolvable along the axis of said cylinder, a spiral series of positively driven blades carried by said shaft and free to move radially in relation thereto, a second set of blades disposed in spaced spiral formation adapted to be moved into position between the blades of the first mentioned set, a torsion spring drive between the two sets of blades adapted to normally drive one set of blades in advance of the other for mixing purposes and means for latching both sets of blades into a single continuous spiral for discharge purposes.

3. In an ice cream mixing machine the combination of a cylindrical container having a shaft revolvably mounted along its axis and having a plurality of fixed spiral blades positively driven by said shaft, each of said blades being interrupted or formed of spaced sections, said shaft having revolvably mounted thereon spiral blades consisting of short sections adapted to occupy the spaces between the sections of the positively driven sets, torsion springs between the two sets of blades adapted to yieldably drive said second set of blades and means for adjusting the tension of said springs.

4. In an ice cream mixing machine the combination of a cylindrical container having a shaft revolvably mounted along its axis and having a plurality of fixed spiral blades positively driven by said shaft, each of said blades being interrupted or formed of spaced sections, said shaft having revolvably mounted thereon spiral blades consisting of short sections adapted to occupy the spaces between the sections of the positively driven sets, torsion springs between the two sets of blades adapted to yieldably drive said second set of blades, means for adjusting the tension of said springs and means for latching the two sets of blades into registering positions for the purpose of forming continuous spiral members therefrom.

5. The mixing machine described in claim 4 characterized by having each of the spiral members slidably mounted in a radial direction for the purpose of permitting said blades to move outwardly under centrifugal action.

6. The machine described in claim 4 characterized by having a manual means for releasing said latching means for the purpose of permitting said spirally arranged blade members to move out of register into a mixing position.

7. A mixing machine including a container in combination with a sectional blade mounted in said container, means for positively rotating said blade and a second sectional blade yieldably driven by said first mentioned blade, the sections in the two sets of blades alternating to form a continuous blade when the two sections are brought into register under load.

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