United States Patent [19]

Carpigiani

[11] **3,764,117**

[45] **Oct. 9, 1973**

[54] **AUTOMATIC ICE-CREAM MACHINE**

[76] Inventor: **Poerio C. Carpigiani,** Anzola Emilia, Bologna, Italy

[22] Filed: **Jan. 24, 1972**

[21] Appl. No.: **220,135**

[30] **Foreign Application Priority Data**

Feb. 5, 1971 Italy 12477 A/71

[52] **U.S. Cl.** **259/107,** 259/43, 259/DIG. 34

[51] **Int. Cl.** **F25c 7/06**

[58] **Field of Search** 62/292, 342, 343; 259/DIG. 34, 43, 44, 107, 108

[56] **References Cited**

UNITED STATES PATENTS

3,465,540 9/1969 Carpigiani 62/343

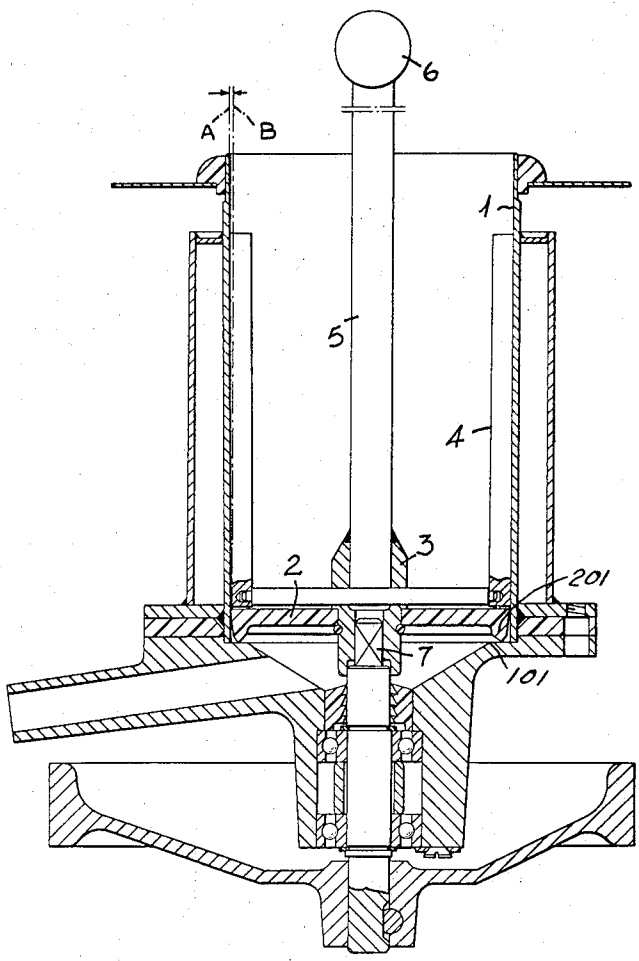
2,020,946 11/1935 Jordan ..... 62/342 X

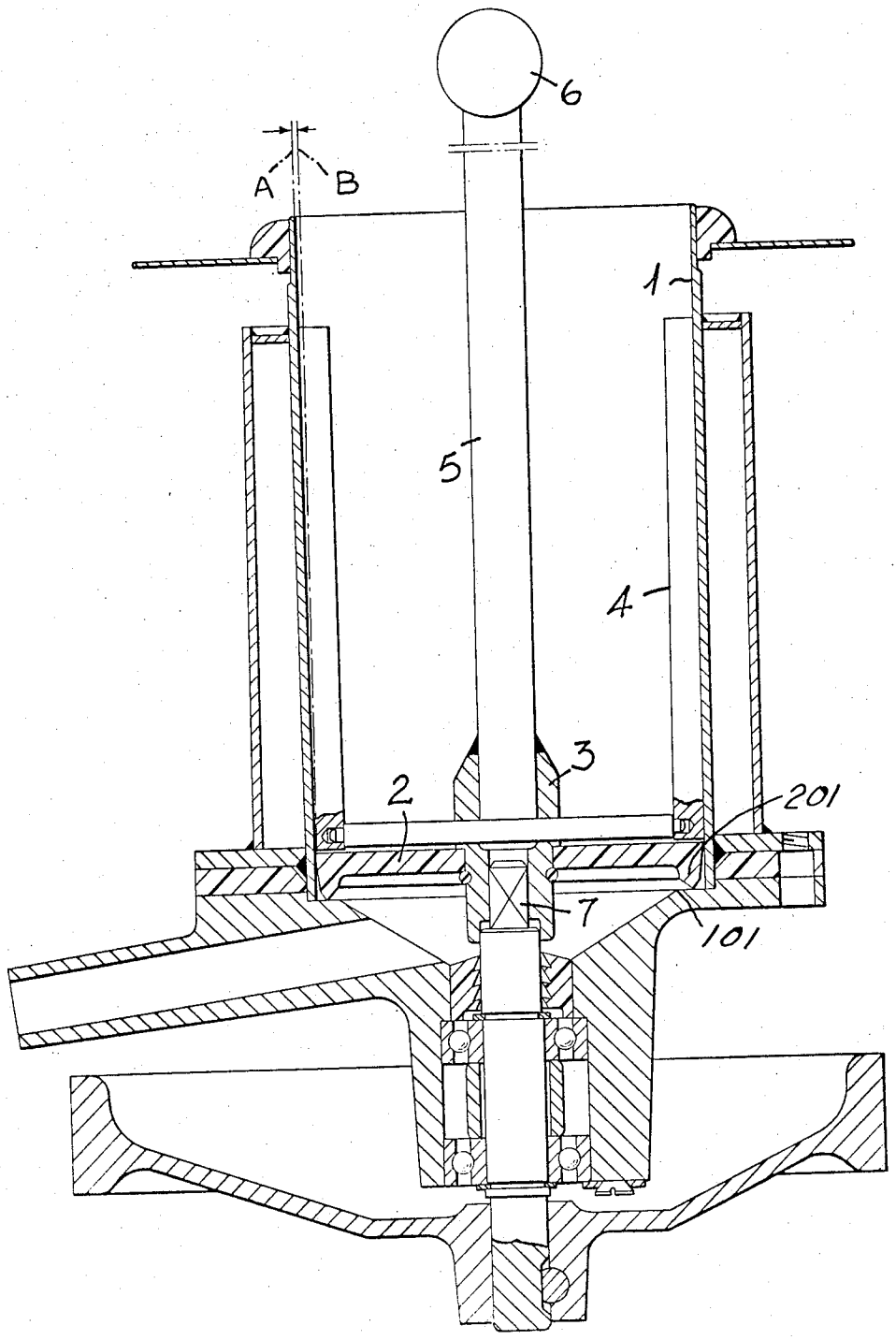
Primary Examiner—John Petrakes
Assistant Examiner—Philip R. Coe
Attorney—Edwin E. Greigg

[57] **ABSTRACT**

The refrigerating can of an automatic ice-cream machine is formed from the bottom towards the top thereof with a slight outward conicity which permits the bottom plate and dasher member of the machine to be readily and easily removed from the can together with a batch of ice-cream produced in the can.

3 Claims, 1 Drawing Figure




6
A
B
1
5
4
3
2
201
7
101

AUTOMATIC ICE-CREAM MACHINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to automatic ice-cream machines having small capacity, and in particular to ice-cream machines of the kind which comprise a refrigerated cylindrical can the bottom of which is closed by an axially movable bottom plate having a central bore in which is located a hub for rotating an agitator or dasher member. The bottom plate and dasher member form a unit removable from the can together with a batch of ice-cream produced in the can. An automatic ice-cream machine of this kind is described in U.S. Pat. No. 3,465,540.

The removal of the unit and ice-cream batch is performed by pulling a centrally arranged stem which is secured to the dasher member and bottom plate unit.

However, because the ice-cream strongly adheres to the can walls, removal thereof from the can is not always easy and usually requires a considerable effort by the operator.

2. Description of the Prior Art

In U.S. Pat. No. 3,630,493 it has been proposed, in order to overcome this disadvantage, to provide an ice-cream machine of the said kind with means driven by the motor which rotates the dasher member for automatically raising and lowering the bottom plate in the can.

This solution, however, not only increases the overall dimensions of the machine but also involve considerable expense, so that it cannot be economically adopted in small capacity ice-cream machines.

SUMMARY

According to the invention the above-mentioned disadvantages are overcome by forming the refrigerating can from the bottom towards the top thereof with a slight outward conicity. With a can so constructed it is found that a relatively moderate force is sufficient to remove the dasher member and plate unit carrying an ice-cream batch from the can.

It has been found that the desired result can be obtained by the use of a very slight conicity, in the order of 2 to 4 mm per thousand millimetres height of the can.

It has been also found that the said conicity can be advantageously utilised for the solution of an additional problem connected with the ice-cream machines of the kind referred to above. It happens that the can, after a certain time of operation, becomes worn by the action of scraping blades against the inside of the can and this makes regrinding necessary. After regrinding it is usually necessary to replace the dasher and plate unit, because the variation in diameter of the can, resulting from the grinding operation, renders the original dasher member no longer adapted correctly to perform its work of scraping the can wall, while the bottom plate no longer closes the bottom of the can with the required close fit.

With a can having a slight conicity according to the invention, compensation for wear may be obtained by lowering the bottom plate relative to the can.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawing illustrates, in longitudinal section, an ice-cream machine according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing, the conical mantle **1** of the ice-cream machine has the bottom thereof closed by a bottom plate **2** that has a depending annular rim, said plate being provided with an axial bore through which passes the lower end of a hub **3** which drives an agitator dasher member **4**. The hub **3** is fitted to a coupling member **7** rotatably driven by a motor (not shown). The hub **3** is also secured to a stem **5** provided with a handgrip knob **6**, which permits the bottom plate **2** that is provided with a rim **201** and the dasher member **4** to be removed as a unit from the can **1**. It will be observed that the rim **201** is supported within the machine by a bearing surface **101**, as shown.

As shown by dash-and-dot lines at the left-hand side of the FIGURE, A is a generatrix of the wall of can **1**, while B is a generatrix of a cylinder, whose diameter corresponds to the diameter of the bottom end of the can **1**.

As shown in the drawing, the can or conical mantle **1** is formed from the bottom towards the top thereof with a slight outward conicity of the order of 1 to 15 mm per thousand millimetres height of the can, thus providing a difference between the minor and major diameters of the can of about 1 mm. The conicity may be between 2 and 4 mm per thousand millimetres height of the mantle and for a can whose height is about 180 mm the conicity is of the order of about 3 mm per thousand. This extent of conicity as above described ensures that the dasher member and bottom plate unit, together with an ice-cream batch, can be readily and easily removed from the can without too great an effort.

Because of the conicity of the mantle it is possible to compensate for wear of the mantle wall by scraping blades, and to restore the parts into close contact with one another, by adjusting the position of the bottom plate **2** by lowering the bearing position thereof.

I claim:

1. A small capacity automatic ice-cream machine comprising a refrigerated conical mantle open at both ends and having an outward conicity from its bottom end toward its top end; bearing support means for the bottom end of said mantle, centrally apertured bottom plate means adapted to close the bottom end of said mantle, drive coupling means including a hub extending through said apertured plate means, means associated with said hub means arranged to support dasher means and means in axial alignment with said coupling means for lifting the dasher means and bottom plate means from the open end of said mantle.

2. A structure as claimed in claim **1**, wherein the bottom plate means includes a depending annular rim arranged to cooperate with the bearing support means.

3. A structure as claimed in claim **1**, wherein the mantle has a conicity in the order of 1 to 15 mm per thousand millimeters height of said mantle.

* * * * *