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(54) Title: AN APPLIANCE THAT MAKES FUFU FROM COOKED FOOD AND EJECTS IT CONTINUOUSLY.

(57) Abstract:

An appliance powered by electricity or other source of power has attached in front of its housing studs for mounting removable plastic, stainless steel parts or a combination. A masher enclosed within a shield and a nozzle independently rotates on a shaft. A hopper mounted over the nozzle serves to introduce food through a metal guard to the masher when a pusher pushes on the food. The action of pushing causes the food to be transported and compressed into a compression, concentration and compaction chamber. Pressure in this chamber, forces the food to move past the mashing end impellers where it undergoes further mashing as it is extruded out of the spout. The food coming out is flowable, thoroughly mashed and compacted. It can be recycled once more, or until the desired consistency and texture is obtained. Water is sprinkled on periodically whilst recycling. It is especially useful for starchy foods which is found to undergo considerable reduction in volume, though it can also process non-starchy compressible foods.

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A FOOD PROCESSOR FOR POUNDING COOKED STARCHY FOODS INTO A PASTE

Background-Field of Invention

This invention relates to the pounding of notably starchy cooked food, into a special paste such as that eaten in West Africa and in some South American countries.

Cross Reference to Related Applications

A patent application for this invention has been filed with ARIPO (African Regional Industrial Properties Organization with headquarters in Harare, Zimbabwe), March 1991.

Background -Description of Prior Art

Heretofore pounding of starchy tropical foods into a paste has been done manually in a mortar using a pestle. There is no record of the processing of this kind of food by modern technology. Moreover none of the available commercial food processors is suitable to process such food. The technology provided by food processors consist of mincing, kneading, beating, grinding and blending none of which can achieve the desired result of consistency, texture and softness. As a result I conceived this invention from an angle of trying to simulate the way in which it is prepared manually. The manual way consists of repetitive compressive blows with controlled intermittent addition of water. So in my invention a rotating masher conveys the food into a compressive chamber, mashes it and ejects it through a spout instantaneously and continuously. The conveying section of the masher uses the screw principle just like in the meat grinder. This is the only similarity with an existing prior art, which in this case is the meat grinder.

The idea of combining the conveying, compressing, concentrating and compacting, and mashing and extruding all in one rotating shaft makes my invention unique. More than that it accomplishes the same desired result as that obtained by pounding manually.

Accordingly the objects and advantages of my invention are:

- . It is simple, safe, and easy to use.
- . It is hygienic.
- . It saves time
- . It fits into a modern kitchen and environment.
- . It is noiseless
- . It is easy to clean and store away.
- . It accomplishes the same result of texture and consistency.
- . It is portable
- . It is commercially viable
- . It is continuous, not in batches.

Description of drawings

Fig. 1, Fig. 2, and Fig. 3, show the overall basic processor in isometric exploded view.

Fig. 1 shows the motor and housing with the hopper 20 and the shield 30 mounted on it.

Fig. 2 shows the masher 40

Fig. 3 shows the nozzle 50 with the metal guard 59 inserted.

Fig. 4 shows the front view of the hopper 20 in position over the shield 30.

Fig. 5 shows a cross section of the shield indicated on Fig. 4 by the mark **S-5**

Fig. 6 and Fig. 7 show the hopper 20 and shield 30 in side view and how the hopper 20 slides into position over the shield 30.

Fig. 8, Fig. 9, and Fig. 10 show the masher 40 in side view, left end view and right end view respectively.

Fig 11, Fig. 12, and Fig. 13 show the nozzle 50 in half top view, side view and mounting end view respectively.

Description of Invention

The basic embodiment of my invention is shown in Fig. 1, Fig. 2 and Fig. 3 in isometric view.

It comprises four main parts, namely a motor and housing 60, a hopper 20, a shield 30, a masher 40 and a nozzle 50. It has an accessory, a pusher 70.

The face of the motor and housing 60 provides two mounting studs 62, a rotating shaft 61, and a control or switch 63. The sloping upper face 64 of the motor and housing 60 makes it possible to have a symmetrically positioned hopper.

Fig. 1 shows the hopper 20 and the shield 30 in a mounting position over the motor housing. The hopper 20 and shield 30 are separable as shown in Fig. 6 and Fig. 7.

Fig. 4 shows a cylindrical sleeve 32 of the shield 30 that extends into the annular recess 45 Fig. 9 of the masher 40.

Also the arcuate groove 31 of the shield 30 is a recess for the protrusion 53 of the nozzle 50 of Fig. 13

The shield 30 has two holes 33 of Fig. 4 for mounting over the studs 62 of the motor and housing.

Fig. 2 shows the masher 40 in isometric view. The mounting end has a shaft bed 46 of Fig. 8, and Fig. 9. The annular recess 45 Fig. 9 of the masher 40 contains the sleeve 32 Fig. 1 of the shield 30 when assembled. The outer surface of the masher 40 has



three sections. The first section provides spiral threads 41. The second section provides a conical surface 47 and the third section provides the impellers 42 of which there are two and are spiral in design.

Fig 3 shows the nozzle 50 in isometric view. The mounting end has two holes 51, a protrusion 53 that recesses into the arcuate groove 31 of the shield 30. The nozzle has three chambers.

The first chamber 54 Fig. 12 houses the spiral threads 41 Fig. 2 of the masher 40.

The top of this first chamber is open and has a bordering raised wall 57 made to fit the base 21 of the hopper 20 of Fig. 1. The inside face of the raised wall has two matching grooves 58 that seat the metal guard 59.

The second chamber houses the conical section 47 Fig. 8 of the masher 40.

The third chamber 56 Fig. 12 houses the impellers 42 of the masher of Fig. 2. The outlet end of the nozzle is the spout 52.

The metal guard 59 of the nozzle 50 Fig 3 is in the shape of an arcuate dish made up of stainless steel wire of alternating U and inverted U form.

The wing nuts shown in Fig 3 are for threading the studs 62 of the motor housing when all parts are assembled.

Operation

Before operating the invention, it is assembled as shown in fig. 1., Fig. 2, and Fig. 3. To assemble first fit the hopper 20 into the shield 30 and install over the motor housing letting the threaded mounting studs 62 pass through the holes 33 Fig. 4. Next install the stainless steel washer 39. Then install the masher 40 over the motor shaft 61. Next install the nozzle 50 with the metal guard 59 in place, letting the studs 61 pass through the holes 51. The protrusion 53 of the nozzle 50 will fit into the arcuate recess 31 of the shield 30. Then thread on the wing nuts 59 and tighten.

Provide a plate under the spout 52 of the nozzle 50. Also place water in a bowl close by for use. Plug in the power and start the machine from the control or switch 63. Introduce some lumps of food into the hopper. Use the pusher 70 to push on gently through the metal guard 59. Within some seconds a continuous thoroughly mashed, compressed and compacted flowable paste extrudes from the spout. Introduce more food and continue pushing gently on the food.

After the first cycle the paste can be made softer as desired by sprinkling water over and running it through again, dipping the pusher in water periodically.

What happens to the food as it passes through? A look at Fig. 12 will help to visualize. The rotating masher 40 of Fig. 2 picks up the food as it comes through the metal guard 59 Fig. 3 already shredded into smaller bits. The spiral threads transport and



compress it into the chamber 55 Fig. 12. The continued concentration of material in this chamber as the threads 41 of the masher 40 continue to compress more material into it causes a build up of pressure that does two things:

- 1) It compacts the material merging all lumps into a more uniform mass and,
- 2) It forces the material to flow past the impellers.

Still under pressure in the extrusion chamber 56 the food gets mashed as it extrudes out of the spout in a compressed and compacted flowable state.

In my embodiment it has been practical to use motor speed of 1725 rpm at 1/4 hp., though speed as low as 1050 rpm has been used without appreciable difference.

The kinds of food material used, tropical yam, cassava, and plantain have been noted to undergo reduction in volume of up to 40 per cent, the first cycle through the processor.

Thus it can be seen that compaction by compression as the food is being mashed is a unique feature of my invention.

It becomes also evident why other ways of processing this food without compression and compaction, do not achieve the same desired end result as that obtained by pounding in a mortar.

Thus it can be seen that this invention is a simple, convenient instantaneous way of preparing "fufu" or "pounded yam" (Ghanaian and Nigerian names respectively of the finished paste) in a modern kitchen. It is hygienic, it saves time, it is noiseless, easy to clean. It is portable, easy to store. Importantly it accomplishes the same consistency, texture and softness of the finished food as the traditional way of pounding in a mortar.

Conclusion, Ramifications and scope.

The reader can see that this invention is unique in this respect:

- 1) It accomplishes a special effect that is achieved by mashing food under pressure to compact it considerably into a flowable paste.

Though the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as exemplification of one preferred embodiment thereof. Many variations are possible, the shield can be combined with the hopper as one unit or the nozzle with the hopper as one unit. Additionally non-starchy compressible foods can be processed, such as boiled potato, cooked rice and uncooked yellow plantain. Accordingly, the scope of the invention shall be determined not by the embodiments illustrated but by the appended claims and their equivalents.

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A FOOD PROCESSOR FOR POUNDING COOKED STARCHY FOOD INTO A PASTE.

Abstract

An appliance powered by electricity or other source of power has attached in front of its housing studs for mounting removable plastic, stainless steel parts or a combination. A masher enclosed within a shield and a nozzle independently rotates on a shaft. A hopper mounted over the nozzle serves to introduce food through a metal guard to the masher when a pusher pushes on the food. The action of pushing causes the food to be transported and compressed into a compression, concentration and compaction chamber. Pressure in this chamber, forces the food to move past the mashing end impellers where it undergoes further mashing as it is extruded out of the spout. The food coming out is flowable, thoroughly mashed and compacted. It can be recycled once more, or until the desired consistency and texture is obtained. Water is sprinkled on periodically whilst recycling. It is especially useful for starchy foods which is found to undergo considerable reduction in volume, though it can also process non-starchy compressible foods.

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CLAIMS I claim:

1. A food processor comprising,
 - a) a shaft,
 - b) drive means for rotating such shaft
 - c) food mashing means detachably connectable to said shaft, said mashing means including a conveying section, a compression, concentration and compaction section, and an extruding section,
 - d) nozzle means open at its mounting end, for accommodating said food mashing means and including a first chamber for housing said conveying section, a second chamber housing said compression, concentration and compaction section and a third chamber housing said extruding section, said nozzle means having an outlet openly communicating with said third chamber, and,
 - e) food inlet means communicating with said food mashing means for dispensing food into said conveying section.
2. The food processor of claim 1 wherein said conveying section includes spiral threads
3. The food processor of claim 2 wherein said spiral threads end at said compression, concentration and compaction section.
4. The food processor of claim 1 wherein said compression, concentration and compaction section is uniform or tapered in shape.
5. The food processor of claim 4 wherein said compression, concentration and compaction section is conical in shape.
6. The food processor of claim 1 wherein said extruding section includes at least one impeller.
7. The food processor of claim 6 wherein said impeller is spaced from said conveying section.
8. A method of processing food comprising,
 - a) automatically dicing food to convert such food from relatively large to smaller pieces,
 - b) conveying of the small pieces of food to a compressor, concentrator and compactor.
 - c) automatically compressing, concentrating and compacting the food to convert such food into a flowable state and,
 - d) dispensing the food in its flowable state by extruding such food through an opening of predetermined size and shape.
9. Food inlet means of claim 1 having a rectangular pyramid shape.
10. Food inlet means of claim 1 having a detachable base, such detachable base serving as a means of closing the said nozzle means at its said mounting end.
11. Detachable base of claim 10 having a means of attaching to housing for said shaft and said means for rotating shaft of



claim 1.

12. Means for attaching of claim 11 wherein multiple holes are provided through which threaded studs pass for connecting with wing nuts.
13. Detachable base of claim 10 having a cylindrical sleeve open at both ends.
14. Detachable base of claim 10 having an arcuate recess.
15. Nozzle means of claim 1 wherein means of communicating with said food inlet means has bordering walls.
16. Nozzle means of claim 1 having attaching means to housing for said shaft and said means for rotating shaft.
17. Attaching means of claim 16 wherein multiple holes are provided through which pass threaded studs for connecting with wing nuts.
18. Nozzle means of claim 1 having a protrusion of arcuate shape at its said mounting end.
19. Nozzle means of claim 15 wherein inside of said bordering walls have two matching grooves on opposite sides.
20. Matching grooves of claim 15 wherein houses a metal guard of arcuate dish made up of stainless steel wire of alternating U and inverted U form.