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(54) Title: A ROLLED COOKIE MACHINE

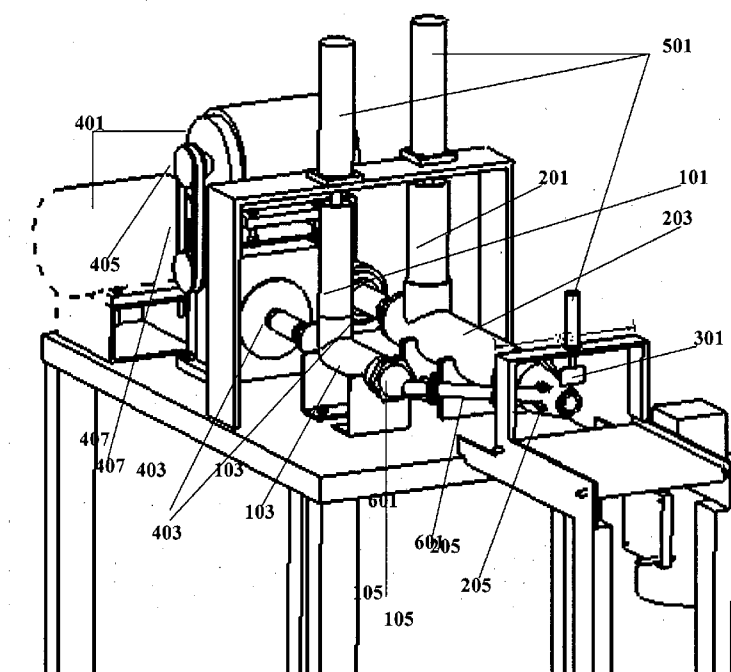


FIG.1

(57) Abstract: The present invention generally relates to a machine for preparing a rolled jam tart. The present invention comprises of mechanisms for compressing the dough and the jam, and filling the jam inside the rolled compressed dough. The mechanism involved is co-extrusion mechanism. The present invention also aided with a sensor for cutting the tart automatically and uniformly.



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- *as to the identity of the inventor (Rule 4.17(i))*
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Description

Title of Invention: A ROLLED COOKIE MACHINE

Technical Field

- [1] The present invention relates generally to a machine for preparing rolled cookies for example rolled jam tart.

Background Art

- [2] During festival seasons, the jam tart is one of the popular sweet pastries in Malaysia. Jam tarts are categorized into three main groups, which are filled with, rolled with or topped with pineapple jam. Nowadays, majority jam tarts are produced manually and very less amounts are produced by machine. The productivity of tarts cannot fulfill the market demand and the tarts produced by handmade are not uniform in shape and size.
- [3] Currently, the majority of jam tarts are produced manually and only an insignificant amount is machine-produced. The jam tart has great international commercial potential and can be machine-produced. But, the productivity of jam tart is very low and unable to meet market demand because it is manually produced. The current manual method of making pineapple rolled tart in Malaysia is troublesome. The most critical parts in making the pineapple rolled tart are the rolling and wrapping processes. The products are not consistent in term of shape and size, the method is labour intensive, inefficient and time consuming.

Disclosure of Invention

Summary of The Invention

- [4] According to the aspect of the present invention, the present invention is provided rolled tart machine comprising: a jam hopper **101** configured to receive tart jam; a dough hopper **201** configured to receive dough; first barrel **103** connected to the jam hopper **101** configured to house the jam for compressing before conveying; second barrel **203** connected to the dough hopper **201** to configured to house the dough for compressing and conveying; first nozzle horn **105** attached at the first barrel **103** configured for extrusion and compression; second nozzle horn **205** attached at the second barrel **203** configured for extrusion and compression; a cutter **301** located next to the second nozzle horn **205**; motor unit **400**; first extrusion screw **107** located inside the first barrel **103** connected to the motor unit **400**, wherein the first extrusion screw **107** configured to push, convey and compress the jam; second extrusion screw **207** located inside the second barrel **203** connected to the motor unit **400**, wherein the second extrusion screw **207** configured to push, convey and compress the dough; and a tube **601** extended at the mouth of the first nozzle horn **105** connecting to the concentric point of the second nozzle horn **205**, wherein the dough and jam are

extruded concurrently at the second nozzle horns **205**. This provision is advantageous as the production of the jam tart is fully mechanized; results in higher production rate than the manual.

Brief Description of Drawings

- [5] **FIG.1** : illustrates a diagram of one embodiment of the present invention.
- [6] **FIG.2** : illustrates hoppers of one embodiment of the present invention.
- [7] **FIG.3** : illustrates extrusion screws of one embodiment of the present invention.
- [8] **FIG.4** : illustrates barrels of one embodiment of the present invention.
- [9] **FIG.5** : illustrates nozzle horns of one embodiment of the present invention.

[10]

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

- [11] Referring to **FIG.1**, the present invention comprising a jam hopper **101** configured to receive tart jam; a dough hopper **201** configured to receive dough; first barrel **103** connected to the jam hopper **101** configured to house the jam for compressing before conveying; second barrel **203** connected to the dough hopper **201** to configured to house the dough for compressing and conveying; first nozzle horn **105** attached at the first barrel **103** configured for extrusion and compression; second nozzle horn **205** attached at the second barrel **203** configured for extrusion and compression; a cutter **301** located next to the second nozzle horn **205**; motor unit **400**; first extrusion screw **107** located inside the first barrel **103** connected to the motor unit **400**, wherein the first extrusion screw **107** configured to push, convey and compress the jam; second extrusion screw **207** located inside the second barrel **203** connected to the motor unit **400**, wherein the second extrusion screw **207** configured to push, convey and compress the dough; and a tube **601** at the mouth of the first nozzle horn **105** connecting to the concentric point of the second nozzle horn **205**.

- [13] The method for making pineapple rolled tart is by using co-extrusion method. The dough and jam are extruded concurrently at the second nozzle horns **205**. The design concept of this invention is by screw conveying, compressing, and extruding the dough and jam. The first nozzle horn **105** is extended into the concentric point of the second nozzle horn **205** by a connector tube **601**. The feeding unit is comprised of two pneumatic cylinders **501** and two hoppers **101**, **201**. These two pneumatic cylinders **501** are used to push jam and dough from hoppers **101**, **201** into the first and second barrel **103**, **203** respectively. These two hoppers **101**, **201** are used to hold and occupy while waiting to go down the extruding section in the barrels **103**, **203**. The dimension of the dough hopper **201**, the second barrel **203**, and the second nozzle horn **205** are two times bigger than their jam counter partner, because the volume ratio of dough to jam in the pineapple rolled tart is 2:1 as shown in **FIG.2**. The dimension of the two

barrels **103**, **203** also having similar dimension as the hoppers **101**, **201** accordingly as illustrated in **FIG.4**.

- [14] The length and diameter of nozzle horn **105**, **205** for jam and dough are the most critical dimension in this machine. If the too long of the nozzle horn length, the force for extruding is insufficient and it causes the blockage of dough, while if the length is too short, the dough is never have enough time for compression. If the dough have not been completely compressed, the dough is easy to break and separate into pieces. The diameter of nozzle horn cannot be too small to avoid the die pressure generated inside the nozzle horn. If the die pressure is high inside the nozzle horn, the force for extruding is required to be higher to overcome the die pressure. These two nozzle horns are depicted in **FIG.5**.
- [15] The cutting section is comprised of pneumatic cylinder **501**, a cutter **301**, infrared sensor and reflector. The sensor radiates the infrared. The circuit for cutter pneumatic is opened loop. When the tart extruded out from the second nozzle horn **205**, the infrared is blocked. Then the sensor cannot receive the infrared and the circuit for cutter pneumatic in the PLC would be connected and the command signal is sent to pneumatic cylinder **501** for pushing the cutter **301**. The moving direction of cutter **301** during cutting process of rolled tart dough is from up to down.
- [16] For motor unit **400**, the motor unit further comprising two thrust bearings to prevent the first and second extrusion screws **107**, **207** from moving forward and backward; two motors **401** configured to supply power for the extrusion screws **107**, **207**; two gear boxes **403** configured to regulate the motor speed; a linear bearing to hold the second extrusion screw shaft; a direct coupling to assemble the motor **401** and gearbox **403**; and two pulleys **405** and a belt system **407** to transmit power from the motors **401** to the gearboxes **403**. For clearer illustrations of these two screws **107**, **207**, it is shown in **FIG.3**.
- [17] Although the invention has been described with reference to particular embodiment, it is to be understood that the embodiment is merely illustrative of the principles and applications of the present invention. It is therefore to be understood that numerous modifications may be made to the illustrative embodiment that other arrangements may be devised without departing from the scope of the present invention as defined by the appended claims.

Claims

[Claim 1]

1. A rolled cookie machine comprising:
a jam hopper **101** configured to receive tart jam;
a dough hopper **201** configured to dough;
first barrel **103** connected to the jam hopper **101** configured to house the jam for compressing before conveying;
second barrel **203** connected to the dough hopper **201** to configured to house the dough for compressing and conveying;
first nozzle horn **105** attached at the first barrel **103** configured for extrusion and compression;
second nozzle horn **205** attached at the second barrel **203** configured for extrusion and compression;
a cutter **301** located next to the second nozzle horn **205**;
motor unit **400**;
first extrusion screw **107** located inside the first barrel **103** connected to the motor unit **400**, wherein the first extrusion screw **107** configured to push, convey and compress the jam;
second extrusion screw **207** located inside the second barrel **203** connected to the motor unit **400**, wherein the second extrusion screw **207** configured to push, convey and compress the dough; and
a tube **601** extended at the mouth of the first nozzle horn **105** connecting to the concentric point of the second nozzle horn **205**, wherein the dough and jam are extruded concurrently at the second nozzle horns **205**.

[Claim 2]

2. A rolled cookie machine as claimed in Claim 1, wherein the motor unit **400** further comprising:
two thrust bearings to prevent the first and second extrusion screws **107**, **207** from moving forward and backward;
two motors **401** configured to supply power for the extrusion screws **107**, **207**;
two gear boxes **403** configured to regulate the motor speed;
a linear bearing to hold the second extrusion screw shaft;
a direct coupling to assemble the motor **401** and gearbox **403**; and
two pulleys **405** and a belt **407** system to transmit power from the motors **401** to the gearboxes **403**.

[Claim 3]

3. A rolled cookie machine as claimed in Claim 1, wherein the jam hopper **101** is complemented with a pneumatic cylinder **501**.

- [Claim 4] 4. A rolled cookie machine as claimed in Claim 1, wherein the dough hopper **201** is complemented with a pneumatic cylinder **501**.
- [Claim 5] 5. A rolled cookie machine as claimed in Claim 1, wherein the cutter **301** is complemented with a pneumatic cylinder **501**.
- [Claim 6] 6. A rolled cookie machine as claimed in Claim 1, wherein the cutter **301** is aided with a sensor unit for making the cutting process automatically and uniformly.
- [Claim 7] 7. A rolled cookie machine as claimed in Claim 1, wherein the dimension of the dough hopper **201** is two times greater than the jam hopper **101**.
- [Claim 8] 8. A rolled cookie machine as claimed in Claim 1, wherein the dough hopper **201** is in conical shape.
- [Claim 9] 9. A rolled cookie machine as claimed in Claim 1, wherein the jam hopper **101** is in conical shape.
- [Claim 10] 10. A rolled cookie machine as claimed in Claim 1, wherein the dimension of the second barrel **203** is two times greater than the first barrel **103**.
- [Claim 11] 11. A rolled cookie machine as claimed in Claim 1, wherein the dimension of the second nozzle horn **205** is two times greater than the first nozzle horn **105**.

1/3

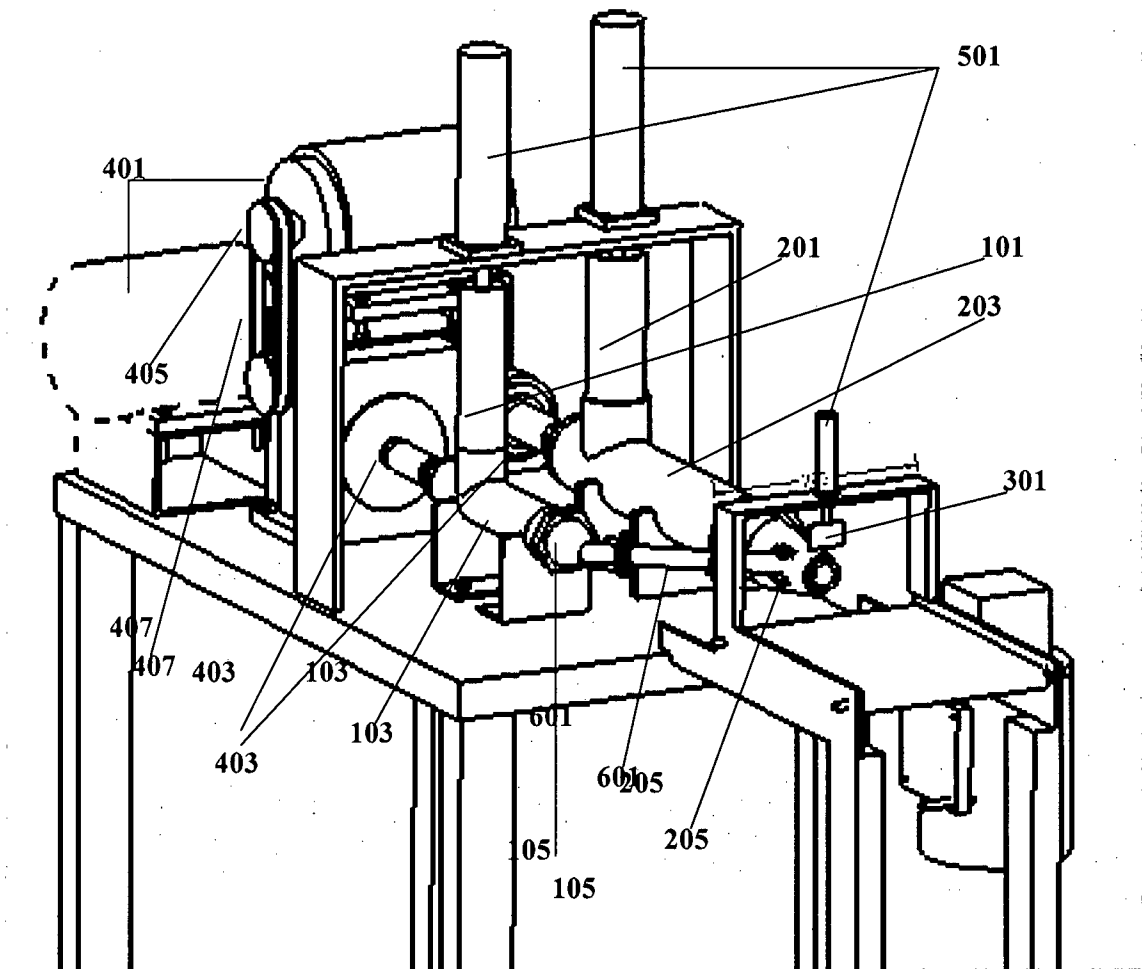


FIG.1

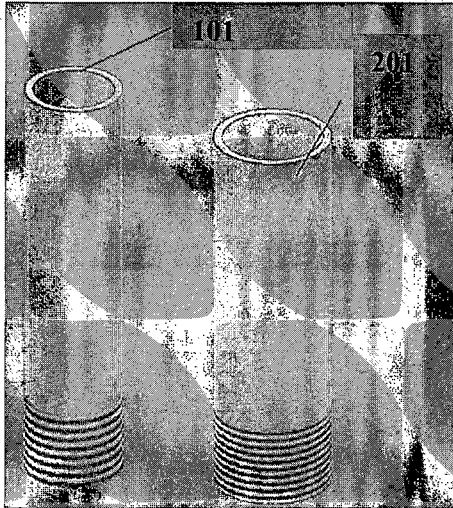


FIG. 2

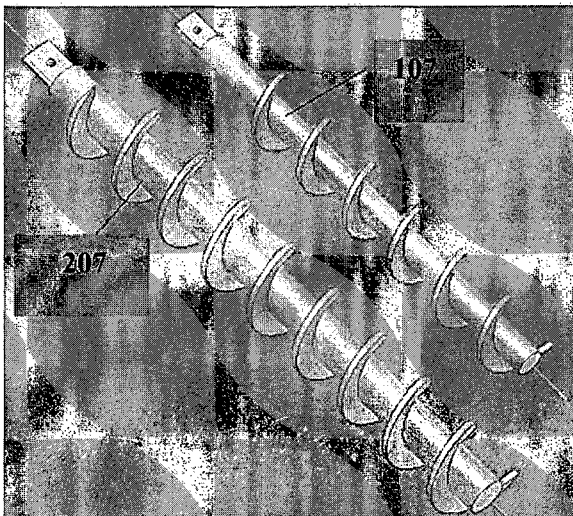


FIG. 3

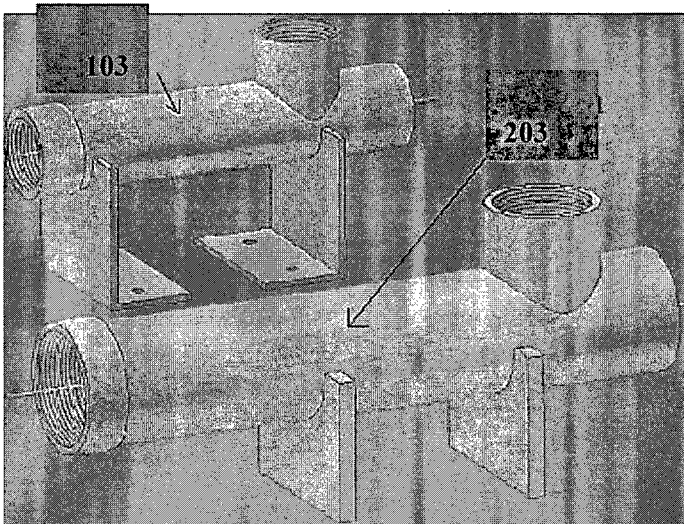


FIG.4

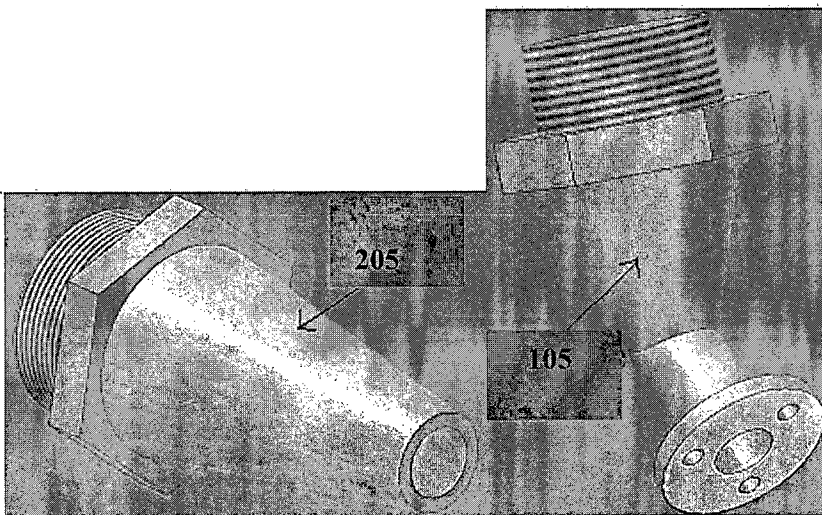


FIG.5