

AUTOMATIC FLIPPING MECHANISM FOR FOOD PRODUCT

This invention relates to the automatic flipping of certain food product such as 'otak-otak' or fish paste by using a sliding mechanism, which flips the food product at predetermined time intervals. The grilling of certain food product requires frequent flipping in order for it to be cooked uniformly.

BACKGROUND OF THE INVENTION

A common example of a food product used is 'otak-otak', which is fish paste filled in coconut leaves or banana leaves, and it is cooked by grilling until it hardens. The 'otak-otak' is commonly consumed with a local delicacy called 'Nasi Lemak' and is commonly served in banquets and functions. It is also being sold in most food centres; hawker stalls and in renowned and posh restaurants all over Singapore.

The cooking of 'otak-otak' requires frequent flipping from side to side. This is usually being done manually every half-a-minute or so until the 'otak-otak' is cooked, which normally occur when the leaves covering the fish paste get burnt. Under normal circumstances, an 'otak-otak' seller would place a batch of about 8 pieces of 'otak-otak' over a gas-stoved griller and will start to flip the 'otak-otak' every half-a-minute or so. He needs to monitor the 'otak-otak' closely otherwise it may get burnt on one side or even on both sides. The 'otak-otak' seller would not be able to do other things once the 'otak-otak' is on the griller.

This method of cooking the 'otak-otak' has many disadvantages; it is time consuming and requires close monitoring. It may also pose a danger to the 'otak-otak' seller of being burnt because of the frequent handling of the 'otak-otak' near to the stove.

OBJECTS OF THE INVENTION

The objects of the automatic flipping mechanism are:

- (i) To eliminate the close monitoring needed for grilling of certain food product;
- (ii) To eliminate the risk of being burnt because of the frequent flipping of the certain food product during grilling; and
- (iii) To ensure that food product are not over-cooked or under-cooked.

SUMMARY OF THE INVENTION

The automatic flipping mechanism for food product is attached to a gas-operated griller, and a motion controller.

The gas-operated griller is a standard item and is available from commercial supplier.

The flipping mechanism has two units, one is stationary while the other can move to and fro parallel to the stationary unit. Both parts are fabricated using corrosion resistant material and the stationary unit is attached with a few curved cams. These cams are distributed at equal distances and allow the food product to be placed at a distance apart from one another. The movable

unit is attached with angled cams and when it slides forward, the cams will push the food product against the curve-shaped cams, which will then flip the food product. The flipping will complete when the movable unit slides backwards.

The movements are controlled by means of an electrical motor attached to a linear gearbox. An electrical circuit using relays and timers is connected to determine the sequence of the sliding and limit switches are used to control the stroke of the movements.

Another aspect of the invention is the modular concept. Another set of flipping mechanism can be attached to the main flipping mechanism by means of a connecting rod and the movements of the movable unit can be transferred to it. This concept allows multiple flipping mechanisms to be used with only one motion controller. The maximum number of flipping mechanism depends on the size of the grillers.

Figure 1 shows the automatic flipping mechanism for food product; the gas-operated griller and the motion controller.

Figure 2 shows the flipping process when the angled cams move toward the curved cams.

Figure 3 shows how multiple flipping mechanisms can be connected to the main flipping mechanism.

- 10 Movable unit
- 20 Stationary unit
- 30 Angled cam
- 40 Curved cam
- 50 Gas-operated Griller
- 60 Electrical Motor
- 70 Electrical Circuit Compartment
- 80 Start button
- 90 Reset button
- 100 Connecting rod

DETAILED DESCRIPTION OF THE INVENTION

With reference to Figure 1, the automatic flipping mechanism for food product is attached to a gas-operated griller **50** and is moved by means of an electrical motor **60**. The electrical circuit is housed in the electrical circuit compartment **70**.

The profiles of the of the angled cam **30** and curved cam **40** are tested and refined by trial and error method. The distance apart is enough to hold a normal size 'otak-otak' or certain food product. The angled cams and curved cams are being held to the frames of the movable unit **10** and stationary unit **20**. The attachment of the angled cams and curved cams can be done by riveting or welding. The stationary unit **20** is fixed on to the gas-operated griller **50** and the sliding of the movable unit **10** is guided to move above the gas-operated griller **50**.

The cycle begins when 'otak-otak' or certain food product is being placed on the spaces between the angled cams **30** and curved cams **40** and followed by the activation of the start button **80**.

After the preset time of the first timer, the electrical motor **60** will be activated and cause a movement of the movable unit **10** which is connected to the rack of the linear gear box. The stroke of the movement is controlled by the position of a limit switch. When the limit switch is triggered, it will cause the movable unit **10** to return to its original position, which is also determined by the position of a limit switch. This will continue repeatedly until the preset time

of the second timer is reached and the process will stop. The end of the process is indicated by the pilot light of the start button **80** and can be included with the sound of a buzzer. The food product will then be removed and the next batch is placed on the griller for the new cycle.

In case where more than one set of flipping mechanism is to be used, it can be attached to the main flipping mechanism by means of a connecting rod **100**. The movements of the movable unit will be transmitted to the subsequent flipping mechanisms through the connecting rod/s **100**. This concept allows multiple flipping mechanisms to be used with only one motion controller. The maximum number of flipping mechanism depends on the size of the grillers.



CLAIMS

1. An automatic flipping mechanism for food product, attached to a gas-operated griller **50** comprising:
 - Movable unit **10** attached with angled cams at equal spacings and sliding above the gas-operated griller **50** within a pair of guides, and
 - Stationary unit **20** attached with curved cams at equal spacings fixed on to the gas-operated griller **50**.
 - Connecting rod/s **100** for attaching the main flipping mechanism to multiple sets of flipping mechanism.
2. An automatic flipping mechanism for food product as claimed in Claim 1 wherein the movable unit **10** with the angled cams and the stationary unit **20** with the curved cams are made of material resistant to corrosion and contamination.
3. An automatic flipping mechanism for food product as claimed in Claim 1 wherein the profiles of the angled cams **30** and curved cams **40** are shown in Figure 2.
4. An automatic flipping mechanism for food product as claimed in Claim 1 wherein the stroke of the movement of the movable unit **10** is controlled by the position of 2 limit switches.



5. An automatic flipping mechanism for food product as claimed in Claim 1 wherein the flipping of 'otak-otak' or certain food product is carried out when the angled cams **30** pushes the 'otak-otak' against the curved cams **40**.
6. An automatic flipping mechanism for food product as claimed in Claim 1 wherein connecting rod/s can be used to transfer the movement of the movable unit **10** to multiple sets of flipping mechanism.