

Description

This invention relates to a pressure cooker, and more specifically, to a large capacity cooker of the type wherein the food being cooked, such as chicken parts, is immersed in a heated vat containing the cooking oil.

BACKGROUND OF THE INVENTION

Pressure cookers generally comprise a vat or cooking vessel of a size to receive a wire basket in which the product to be cooked is placed and then immersed in the cooking oil contained in the vat. The vat is closed by a lid which is sealed to the top of the vat, whereupon the product is cooked for the desired length of time under heat and pressure. Following the cooking cycle, the pressure in the vat is relieved and the lid opened, whereupon the product is removed from the wire basket, the customary practice being to transfer the cooked product to trays which are of a size to be received in a holding and/or display cabinet where the cooked product is retained under controlled conditions until served. Depending upon the size of the food service facility and/or the demand for the products, many facilities utilize banks of two, three or more conventional pressure cookers to meet the demand.

Efforts have hitherto been made to provide large capacity pressure cookers, including units having two or more cooking vats which may be used simultaneously. Such large capacity pressure cookers have met with limited acceptance due to their size, difficulties in operation and maintenance, as well as their complexity. These factors have made it impractical for the cookers to be operated by personnel lacking the size and physical strength to cope with the rigors of the manual operations required to operate the equipment. Efforts to mechanize the operation of the units, as by means of electro-mechanical or hydraulic controls for raising and lowering the lids of the vats, have produced more problems than they have solved, particularly insofar as maintenance problem and attendant down-time are concerned.

US-A-4721094 discloses a pressure cooker according to the preamble of claim 1. The cooker comprises a housing in which is mounted an open-topped vat for receiving cooking oil, a horizontally disposed lid hinged between a closed position in which it seals and is seated upon the top of the vat and an open position, a locking latch positioned to retain the lid in its closed position and including a handle for moving the locking latch from an inoperative position, in which the lid is free to be opened and closed, to an operative position, in which the locking latch engages the lid against the top of the

vat, and a releasable securing means operative to secure the handle against movement when the locking latch is in its operative position.

The releasable securing means comprises a second handle and a cam, operation of which seals the lid on top of the vat and tensions the locking latch, preventing it from being opened.

FR-A-2439574 discloses a pressure cooker in which the lid is mounted for arcuate, substantially vertical movement, during which its horizontal orientation is maintained. The lid is attached to one end of a parallelogram articulation, the other end being fixed relative to the housing of the cooker.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a pressure cooker including a new mechanism allowing the lid to be opened easily by the average worker without undue physical exertion.

Accordingly, the invention provides a pressure cooker comprising a housing in which is mounted an open-topped vat for receiving cooking oil, a horizontally disposed lid movable between a closed position in which it seals and is seated upon the top of the vat and an open position, carrier means for product to be cooked mounted on the underside of the lid and positioned to enter the vat as the lid is moved to its closed position, a locking mechanism positioned to retain the lid in its closed position and including a handle for moving the locking mechanism from an inoperative position, in which the lid is free to be opened and closed, to an operative position, in which the locking mechanism engages the lid against the top of the vat, and releasable securing means operative to secure the handle against movement when the locking mechanism is in its operative position characterized by means mounting the lid for vertical movement relative to the vat including a pair of vertically extending guide rails at the rear of the housing, a carriage movably mounted on the guide rails, a pair of mounting arms engaging opposite sides of the lid and secured to the carriage for movement therewith and a counterbalancing mechanism associated with the carriage to assist in moving the lid vertically from its open position, in which it is elevated relative to the vat, to its closed position, by the locking mechanism being mounted on the housing and acting to seal the lid against the top of the vat when in its operative position, and by the securing means comprising a releasable latch.

Preferably, the cooking vat of the present invention will be of a size to cook ten heads of chicken at a time, although the size and capacity of the vat does not constitute a limitation on the invention. It is also preferred that the vat have an upper cooking zone and a lower cool zone, the two

zones being connected by a tapered annular wall surface which causes particles of food dropping from the carrier trays to be collected in the bottom of the vat, thereby effectively enhancing the useful life of the cooking oil. The cool zone in which the food particles are collected will preferably have the capacity to collect the cracklings and other droppings from a full day's cooker operation.

It will be understood that the cooker also will be provided with the usual controls for establishing the desired cooking cycles and for otherwise controlling the operation of the cooker.

DESCRIPTION OF THE DRAWINGS

Figure 1 is a front elevational view of a cooker in accordance with the invention.

Figure 2 is a side elevational view, with parts broken away and others shown in phantom, taken from the left side of Figure 1.

Figure 3 is a rear elevational view of the cooker showing the carriage and counterbalancing mechanism when the lid is in the closed position.

Figure 4 is a rear elevational view similar to Figure 3 showing the position of the carriage and counterbalancing mechanism when the lid is in its fully elevated position.

Figure 5 is a top plan view of the cooker showing the lid and the associated locking and latching mechanisms.

Figure 6 is a fragmentary side elevational view showing the lid and locking mechanism in the fully locked position.

Figure 7 is a fragmentary side elevational view similar to Figure 6 showing the handle of the locking mechanism in the elevated position.

Figure 8 is a fragmentary side elevational view similar to Figure 7 showing the locking mechanism in the fully open position.

Figure 9 is an enlarged, exploded perspective view illustrating the details of the locking mechanism.

Figure 10 is an enlarged, perspective view showing the locking mechanism of Figure 9 in the fully assembled position.

Figure 11 is an enlarged, fragmentary elevational view showing additional details of the locking mechanism.

Figure 12 is an enlarged, vertical sectional view illustrating the latching mechanism for preventing accidental disengagement of the locking mechanism.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to Figures 1 and 2 of the drawings, the cooker comprises a generally rectangular

housing 1 having an essentially table-top height upper surface 2, the housing enclosing a rectangular cooking vat 3, the open top 4 of which projects upwardly above the upper surface 2 of housing 1. A control module 5 is mounted on the front wall of the housing 1 for controlling the various functions of the cooker.

The top 4 of the vat 3 is adapted to be closed by a lid 6, preferably formed from cast aluminum, the lid having perforated lugs 7 on its rear edge (best seen in Figure 5) which are rotatably journaled on a rod 8, the opposite ends of which are received in mounting arms 9 and 9a, the lugs 7 and rod 8 forming a hinge by means of which the lid 6 may be pivoted from a horizontal to a vertical position for cleaning purposes. The lid is normally maintained in the horizontal position by means of studs 10 which engage in upwardly opening slots 11 in the mounting arms 9, 9a.

At its forward end, the lid 6 mounts a bail-shaped handle 12 by means of which the lid may be raised and lowered vertically relative to the vat 3 by means of the counterbalancing mechanism to be hereinafter described; or, in the alternative, the handle 12 may be used to pivot the lid to a vertical position for cleaning purposes.

On its under surface, as seen in Figure 2, the lid 6 is provided with hangers 13 adapted to detachably receive a carrier 14 having longitudinally extending support rods 15 lying at vertically spaced apart intervals, the support rods 15 being positioned to receive the flanged side edges 16 of wire product trays 17. With this arrangement, the wire trays may be readily inserted in the carrier 14 and seated on the support rods 15 from the front of the cooker. In normal use, each of the trays will be filled with the product to be cooked and then inserted in the carrier. As previously mentioned, the wire trays 17 are of the same size as the trays normally used in a holding or display cabinet, and consequently, once the product has been cooked, the trays may be transferred directly from the cooker to the cabinet without disturbing the cooked product. The carrier itself may be readily removed from the lid for cleaning purposes, or when it is desired to clean the lid itself.

The Counterbalancing Mechanism

The raising and lowering of the lid is implemented by the counterbalancing mechanism as seen in Figures 3 and 4, and to this end, a supporting frame comprising an inwardly opening pair of U-shaped guide rails 18, 18a is secured to the rear of the housing 1, the guide rails being interconnected by a top frame member 19 and a bottom frame member 20. The frame is covered by opposing side panels 21, 21a, and a top cover panel 21b.

As seen in Figure 2, a rear cover panel 22 is also provided. The guide rails 18,18a are positioned to receive the sets of guide rollers 23,23a rotatably mounted on the side frame members 24,24a which, together with the cross members 25 and 26, define a carriage adapted to move longitudinally relative to the guide rails 18,18a. The rearmost ends of the mounting arms 9,9a are fixedly secured to the uppermost ends of the side frame members 24,24a, respectively, thereby mounting the lid 6 for vertical movement with the carriage.

In order to facilitate ease of operation, a pair of three-ply counterbalancing cables is provided. While only a single cable is required to produce the desired counterbalancing effect, a second cable is provided as a back-up, the second cable being in a trailing or non-loaded passive mode. The cables, indicated at 27,27a, are anchored at their innermost ends to cross member 25 forming a part of the moveable carriage (see also Figure 2), the cables extending upwardly where they pass around a first pair of pulleys 28,28a mounted on top frame member 19, the cables then extending downwardly where they pass around a second pair of pulleys 29,29a mounted on the cross member 25 forming a part of the carriage, the cables then extending upwardly where they pass around a third pair of pulleys 30,30a which are also mounted on the top frame member 19 at right angles to the pulleys 28,28a, the distal ends of the cables being affixed at 30,30a to the counterweight 31, which, as best seen in Figure 2, lies rearwardly of the U-shaped guide rails 22,22a. In order to facilitate free movement of the portions of the cables extending between the second and third sets of pulleys, i.e., between the pulleys 29,29a and 30,30a, the counterweight 31 is recessed at 32,32a to receive the respective pulleys. The counterweight 31 will be chosen so as to effectively counterbalance the weight of the lid 6 so that the force required to raise and lower the lid is reduced to an easily manageable level. The three-ply cable illustrated provides a 3-1 ratio.

As previously indicated, one of the cables is active and the other is passive. Thus, the cable 27 may comprise the active cable and will bear the full weight of the lid 6, the carriage and the counterweight. The cable 27a, on the other hand, will be slightly longer than the cable 27 and hence will be in a trailing or non-loaded passive mode, its purpose being to serve as a back-up in the event of a malfunction in the cable 27 and/or its related pulleys.

Lid Locking Mechanism

In order to seal the lid 6 to the open top 4 of the vat 3, the lid 6 is provided on its opposite sides

with an opposing pair of slotted locking ears 33,33a, seen in Figures 5-8. The locking ears project forwardly and are adapted to receive an opposing pair of locking members, indicated generally at 34,34a, the locking members having forwardly projecting locking arms 35,35a interconnected at their outermost ends by a handle 36, the handle 36 extending outwardly beyond the handle 12 for the lid 6.

Details of the construction of the locking members 34,34a are shown in Figures 9 and 10, it being understood that the two locking members are identical to each other, and consequently only the locking member 34 will be described.

The locking arm 35 mounts at its inner end a U-shaped bracket indicated generally at 37, the bracket having an end wall 38 and opposing side walls 39 and 40, each of the side walls being provided with a pin-receiving opening 41 and a cam roller 42 mounted adjacent its lowermost forward corner. The pin-receiving openings 41 are adapted to receive and rotatably journal the opposite ends of a transverse pin 43 extending through the upper end of locking shaft 44 when the U-shaped bracket 37 is fitted within the opposing U-shaped bracket 45, the opposing U-shaped bracket 45 having an end wall 46 and a pair of opposing side walls 47 and 48. The side walls 47 and 48 each has an elongated slot 49 at its lowermost edge, the slots 49 being partially cut away so as to seat on a collar 50 which is welded to the U-shaped bracket 45, the collar 50 being of a size to slidably receive the locking shaft 44. When in the assembled position, the cam rollers 42 engage in the slots 49 and seat on the collar 50, in the manner seen in Figure 9.

As best seen in Figure 11, the collar 50 has a downwardly projecting threaded sleeve 51 on which is threaded an adjustment ring 52 through which the locking shaft 44 also freely passes.

At its lowermost end, the locking shaft 44 mounts a cross pin 53, the opposite ends of which are adapted to be received in a mounting block, generally indicated at 54. The mounting block is adapted to be mounted on the upper surface 2 of the housing 1 underlying the ear 33. The mounting block is composed of opposing parts 55,55a which are adapted to be secured together and to the upper surface of the housing after they have been assembled with the locking shaft 44 and cross pin 53. To this end, the opposing parts 55,55a define an elongated cavity 56 having a tapered forward end 57 and a vertical rear end 58. Each of the parts 55,55a has a transverse bore, indicated at 59,59a, adapted to rotatably journal the opposite ends of the cross pin 53, thereby pivotally mounting the lower end of the locking shaft 44 in the mounting block 54 when the parts are assembled.

Referring next to Figure 8, which shows the locking mechanism in the unlocked position, it will be seen that the locking shaft 44 is tilted forwardly and the locking member 34 is free from engagement with the slotted locking ear 33. When in this position, the lid 6 may be lifted upwardly, as indicated by the arrows A, by means of the handle 12 and the counterbalancing mechanism previously described. When it is desired to lock and seal the lid against the upper end 4 of the vat 3, the operator will lift the handle 36 to the position illustrated in Figure 7, such movement causes the locking member 34 to move to a position overlying the ear 33, the locking shaft 44 moving from the inclined position seen in Figure 8 to the upright position seen in Figure 7. It will be noted that when the locking member is moved to the position shown in Figure 7, the cam roller 42 lies at the forward end of the elongated slot 49, whereupon continued inward movement of the locking member 34 and downward movement of the handle 36 will bring the locking member to the condition illustrated in Figure 6, in which it will be seen that the cam roller 42 has shifted its position to the opposite end of the slot 49 in which position it lies beyond the dead center of the shaft 44. As best seen in Figure 11, this movement effectively causes the adjustment ring 52 to press downwardly against the upper surface of the locking ear 33, thereby effectively clamping the lid 6 against the top of the vat. In this connection, the sealing pressure exerted on the ear 33 and hence on the lid 6 can be effectively varied by adjusting the position of the adjustment ring 52 which, as it is moved downwardly relative to the collar 50, will exert increased pressure on the locking ear and lid.

It also will be noted in Figure 11 that the ear 33 is provided with a shoulder 60 which effectively acts as a stop to prevent possible outward movement of the locking member once the adjustment ring 52 has been seated on the ear and clamped in place.

When it is desired to unlock the lid 6, the arm 32 is lifted upwardly, thereby causing the cam rollers 42 to resume the position seen in Figure 7, thereby permitting the locking member 34 to be moved forwardly so that it resumes the position shown in Figure 8.

The Safety Latch

In order to ensure that the locking members 34,34a will not be accidentally released while the vat is under pressure, a safety latching mechanism is provided which prevents the handle 36 from being lifted when a cooking cycle is in progress and the vat is under pressure. In addition, the latching mechanism is constructed so that the vat

will remain vented and hence incapable of being pressurized unless and until the latching mechanism is in its operative position.

Referring now to Figure 5, the latching mechanism is mounted within a housing 61 lying at the forward end of the vat 3, the latching mechanism having latching pins 62,62a projecting outwardly from its opposite ends which, when extended are adapted to overlie the locking arms 35,35a, respectively, thereby preventing the locking arms and the handle 36 from being raised. The latching pins 62,62a are adapted to be actuated by the latch fingers 63,63a at their respective inner ends which are moveable from the latched position shown in solid lines to the unlatched position shown in dotted lines.

The operation of the latching mechanism can be best understood by reference to Figure 12 wherein it will be seen that each of the latching pins is bias to its extended position by means of springs 64,64a, respectively, which surround the latch pins and extend between the collars 65,65a secured to the latch pins and sleeves 66,66a which freely surround the latch pins and are fixedly secured to the housing 61. With this arrangement, the latch pins 62,62a may be deflected inwardly against the compression of their respective springs and locked in the retracted position by the engagement of the latch fingers 63,63a in the slot 67. When so engaged, the free ends of the latch pins 62,62a are displaced inwardly so as to permit upward movement of the locking arms 35,35a.

In order to ensure that the latching pins are in their extended positions during operation of the cooker, microswitches 68,68a are positioned to be actuated when the locking pins 62,62a are in their retracted position. The microswitches 68,68a are operatively connected to the solenoid valve of a pressure relief device, indicated at 69 in Figure 2, the actuation of either of the microswitches 68,68a serving to open the pressure relief valve 69 and hence vent the pressure in the vat 3. Thus, if an attempt is made to disengage either of the latching pins 62,62a during the cooking cycle, the pressure relief valve 69 will be opened and the vat will be vented to condensation tank 70 through conduit 71, the condensation tank being vented to the outside air through vent conduit 72. Alternatively, the microswitches may be connected to a warning light circuit forming a part of the control module 5, which will give a visual and/or audible warning if the latching pins are retracted, as well as open the opening of the pressure relief valve 69.

In the event the latching pins are not in the latched position at the start of a cooking cycle, the microswitches may be connected to a warning light on the control module indicating that the latching pins are not in their operative position, and the

microswitches also can be utilized to maintain the pressure relief valve 69 in the open position, thereby preventing the buildup of pressure in the cooking vat unless and until the locking mechanism has been properly latched.

The Cooking Vat

In order to optimize the utilization of the cooking oil and permit all-day operation without undue contamination of the cooking oil, the cooking vat 3, as seen in Figure 2, is divided into an upper cooking zone 73 and a lower cool zone 74, the zones being interconnected by the tapered annular wall 75. The cool zone is substantially smaller than the cooking zone and preferably comprises from 20-30% of the volume of the vat. Heating elements 76 line the walls of the vat in the lower portion of the heating zone to heat the cooking oil to the desired cooking temperature.

The heated cooking oil in the cooking zone will circulate within the cooking zone and in so doing will cause cracklings and other fall-off from the product being cooked to slide-off the tapered annular wall 75 for deposit in the cool zone 74, which remains essentially quiescent. With this arrangement, the cooking oil in the cooking zone remains essentially free from contaminants. Preferably, the tapered annular wall 75 will have an angle of inclination from the horizontal of from 22-26°, which has been found to effectively displace contaminants from the tapered wall surfaces while maintaining the cool zone in essentially quiescent condition and at a substantially lower temperature than the temperature of the oil in the cooking zone, thereby minimizing the cooking of the cracklings and other contaminants which, if the continued to cook, would further contaminate the cooking oil.

When it is desired to remove the collected contaminants and replace the cooking oil, the operator actuates handle 77 at the front of the cooker, which causes discharge valve 78 to open, thereby discharging the contents of the vat into the underlying collection tank 79 through discharge conduit 80. In order to prevent accidental opening of the discharge valve 78 when the vat is under pressure, locking mechanism of known character may be utilized to prevent the discharge valve from being opened unless the vat is vented.

As will now be evident, the present invention provides a large capacity pressure cooker which nonetheless is easy to manually operate, and which is provided with numerous safety features to ensure safe and efficient operation. In addition to the safety features discussed above, the cooker may be provided with other conventional safety features, such as the dead-weight valve 81 seen in Figures 1, 2 and 5 which will vent the vat if a predeter-

mined pressure is exceeded; and a separate solenoid valve may be provided in conduit 71 to release the pressure in the vat at the end of the cooking cycle, such valve being operated by the control module 5.

It will of course be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.

Claims

1. A pressure cooker comprising a housing (1) in which is mounted an open-topped vat (3) for receiving cooking oil, a horizontally disposed lid (6) movable between a closed position in which it seals and is seated upon the top (4) of the vat (3) and an open position, carrier means for product to be cooked mounted on the underside of the lid (6) and positioned to enter the vat (3) as the lid (6) is moved to its closed position, a locking mechanism (34, 34a) positioned to retain the lid (6) in its closed position and including a handle (36) for moving the locking mechanism (34, 34a) from an inoperative position, in which the lid (6) is free to be opened and closed, to an operative position, in which the locking mechanism (34, 34a) engages the lid (6) against the top (4) of the vat (3), and releasable securing means (62, 62a) operative to secure the handle (36) against movement when the locking mechanism (34, 34a) is in its operative position characterized by means mounting the lid (6) for vertical movement relative to the vat (3) including a pair of vertically extending guide rails (18, 18a) at the rear of the housing (1), a carriage (25, 26) movably mounted on the guide rails (18, 18a), a pair of mounting arms (9, 9a) engaging opposite sides of the lid (6) and secured to the carriage (25, 26) for movement therewith and a counterbalancing mechanism associated with the carriage (25, 26) to assist in moving the lid (6) vertically from its open position, in which it is elevated relative to the vat (3), to its closed position, by the locking mechanism (34, 34a) being mounted on the housing (1) and acting to seal the lid (6) against the top (4) of the vat (3) when in its operative position, and by the securing means comprising a releasable latch (62, 63).
2. A pressure cooker as claimed in claim 1 in which the counterbalancing mechanism comprises a cable (27) secured at one end to the carriage (25, 26) and at its opposite end to a counterweight (31), the cable (27) passing around at least a first pulley (28) fixedly secured



microswitches also can be utilized to maintain the pressure relief valve 69 in the open position, thereby preventing the buildup of pressure in the cooking vat unless and until the locking mechanism has been properly latched.

The Cooking Vat

In order to optimize the utilization of the cooking oil and permit all-day operation without undue contamination of the cooking oil, the cooking vat 3, as seen in Figure 2, is divided into an upper cooking zone 73 and a lower cool zone 74, the zones being interconnected by the tapered annular wall 75. The cool zone is substantially smaller than the cooking zone and preferably comprises from 20-30% of the volume of the vat. Heating elements 76 line the walls of the vat in the lower portion of the heating zone to heat the cooking oil to the desired cooking temperature.

The heated cooking oil in the cooking zone will circulate within the cooking zone and in so doing will cause cracklings and other fall-off from the product being cooked to slide-off the tapered annular wall 75 for deposit in the cool zone 74, which remains essentially quiescent. With this arrangement, the cooking oil in the cooking zone remains essentially free from contaminants. Preferably, the tapered annular wall 75 will have an angle of inclination from the horizontal of from 22-26°, which has been found to effectively displace contaminants from the tapered wall surfaces while maintaining the cool zone in essentially quiescent condition and at a substantially lower temperature than the temperature of the oil in the cooking zone, thereby minimizing the cooking of the cracklings and other contaminants which, if the continued to cook, would further contaminate the cooking oil.

When it is desired to remove the collected contaminants and replace the cooking oil, the operator actuates handle 77 at the front of the cooker, which causes discharge valve 78 to open, thereby discharging the contents of the vat into the underlying collection tank 79 through discharge conduit 80. In order to prevent accidental opening of the discharge valve 78 when the vat is under pressure, locking mechanism of known character may be utilized to prevent the discharge valve from being opened unless the vat is vented.

As will now be evident, the present invention provides a large capacity pressure cooker which nonetheless is easy to manually operate, and which is provided with numerous safety features to ensure safe and efficient operation. In addition to the safety features discussed above, the cooker may be provided with other conventional safety features, such as the dead-weight valve 81 seen in Figures 1, 2 and 5 which will vent the vat if a predeter-

mined pressure is exceeded; and a separate solenoid valve may be provided in conduit 71 to release the pressure in the vat at the end of the cooking cycle, such valve being operated by the control module 5.

It will of course be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.

Claims

1. A pressure cooker comprising a housing (1) in which is mounted an open-topped vat (3) for receiving cooking oil, a horizontally disposed lid (6) movable between a closed position in which it seals and is seated upon the top (4) of the vat (3) and an open position, carrier means for product to be cooked mounted on the underside of the lid (6) and positioned to enter the vat (3) as the lid (6) is moved to its closed position, a locking mechanism (34, 34a) positioned to retain the lid (6) in its closed position and including a handle (36) for moving the locking mechanism (34, 34a) from an inoperative position, in which the lid (6) is free to be opened and closed, to an operative position, in which the locking mechanism (34, 34a) engages the lid (6) against the top (4) of the vat (3), and releasable securing means (62, 62a) operative to secure the handle (36) against movement when the locking mechanism (34, 34a) is in its operative position characterized by means mounting the lid (6) for vertical movement relative to the vat (3) including a pair of vertically extending guide rails (18, 18a) at the rear of the housing (1), a carriage (25, 26) movably mounted on the guide rails (18, 18a), a pair of mounting arms (9, 9a) engaging opposite sides of the lid (6) and secured to the carriage (25, 26) for movement therewith and a counterbalancing mechanism associated with the carriage (25, 26) to assist in moving the lid (6) vertically from its open position, in which it is elevated relative to the vat (3), to its closed position, by the locking mechanism (34, 34a) being mounted on the housing (1) and acting to seal the lid (6) against the top (4) of the vat (3) when in its operative position, and by the securing means comprising a releasable latch (62, 63).
2. A pressure cooker as claimed in claim 1 in which the counterbalancing mechanism comprises a cable (27) secured at one end to the carriage (25, 26) and at its opposite end to a counterweight (31), the cable (27) passing around at least a first pulley (28) fixedly secured

relative to the guide rails.

3. A pressure cooker as claimed in claim 2 in which the cable (27) also passes around a second pulley (29) mounted on the carriage and a third pulley (30) fixedly secured relative to the guide rails (18, 18a).

4. A pressure cooker as claimed in claim 2 or claim 3 in which the counterbalancing mechanism includes a second cable (27a) and pulley (28a) corresponding to the first-named cable (27) and pulley (28), and wherein one of the cables (27) is active and the other (27a) passive, the passive cable (27a) serving as a back-up in the event of failure of the active cable (27).

5. A pressure cooker as claimed in any preceding claim including a pair of locking ears (33, 33a) fixedly secured to the opposite sides of the lid (6), the locking mechanism comprising a pair of locking members (34, 34a) mounted on the housing on opposite sides of the lid (6) and engageable with the locking ears (33, 33a), the handle (36) being operatively connected to each of the locking members (34, 34a).

6. A pressure cooker as claimed in claim 5 in which the locking ears (33, 33a) are slotted (49) and each of the locking members (34, 34a) comprising a locking shaft (44) pivotally connected at one end to the housing (1) and operatively connected at its opposite end to the handle (36), the locking shafts (44) being engageable with the slotted locking ears (33, 33a) when the locking members (34, 34a) are in the operative position.

7. A pressure cooker as claimed in claim 6 in which each of the locking shafts (44) includes a locking collar (50), each of the locking shafts (44) is pivotally connected at its opposite end to a first bracket (37) operatively connected to the handle (36) for movement therewith, and each of the brackets (37) mounts at least one cam roller (42) engageable with one of the locking collars (50).

8. A pressure cooker as claimed in claim 7 in which each of the locking collars (50) mounts a second bracket (45) adapted to mate with the first bracket (37), the second brackets (45) each having at least one elongate slot (49) therein positioned to receive the cam roller (42) mounted on the corresponding first bracket (37), each of the slots (49) being positioned to permit the corresponding cam roller (42) to

move from a first position in which it lies on one side of the longitudinal axis of the corresponding locking shaft (44) to a position in which the cam roller (42) lies on the opposite side of the longitudinal axis of the corresponding locking shaft (44).

9. A pressure cooker as claimed in claim 7 or claim 8 in which each of the locking shafts (44) mounts an adjustment ring (52) engageable with the corresponding locking ear (33, 33a) on the lid (6).

10. A pressure cooker as claimed in any one of claims 7-9 in which each of the first brackets (37) is operatively connected to the handle (36) by means of an elongate locking arm (35, 35a).

11. A pressure cooker as claimed in any preceding claim including elongate locking arms (35, 35a) connecting the handle (36) to the locking mechanism (34, 34a), and wherein the latch comprises displaceable latching pins (62, 62a) engageable with the locking arms (35, 35a).

12. A pressure cooker as claimed in claim 11 including resilient springs (64, 64a) normally biasing the latching pins (62, 62a) to their locking arm engaging positions, and latch fingers (63, 63a) for displacing the latching pins (62, 62a) to disengage the locking arms (35, 35a).

13. A pressure cooker as claimed in claim 11 or claim 12 including a pressure relief device (69) operative to vent the vat (3) when at least one of the latching pins (62, 62a) is displaced from its locking arm engaging position.

14. A pressure cooker as claimed in any preceding claim in which the cooking vat (3) has an upper cooking zone (73) and a lower cool zone (74) having cross-sectional dimensions smaller than the cooking zone (73), the zones (73, 74) being interconnected by a tapered annular wall (75), heating elements (76) in the cooking zone (73), and a drain (78) at the bottom of the cool zone (74).

15. A pressure cooker as claimed in claim 14 in which the cool zone (74) comprises 20-30% of the volume of the vat (3), and wherein the annular tapered wall (75) is inclined downwardly at an angle of from 20°-26° from the horizontal.



16. A pressure cooker as claimed in any preceding claim including a carrier (14) comprising an opposing pair of hangers (13) adapted to be detachably connected to the undersurface of the lid (6), the hangers (13) mounting pairs of longitudinal support rods (15) lying in vertically spaced apart relation, each of the pairs of support rods (15) being adapted to receive a product tray (17), the hangers (13) and support rods (15) being dimensioned to receive product trays (17) of a size which may be inserted in a product holding cabinet.

17. A pressure cooker as claimed in any preceding claim in which the lid is also mounted for pivotal movement relative to its mounting means.

Patentansprüche

Druckkocher, umfassend ein Gehäuse (1), in welchem ein oben offener Bottich (3) zur Aufnahme von Kochöl gelagert ist, einen horizontal angeordneten Deckel (6), der zwischen einer geschlossenen Stellung, in der er abdichtet und auf der Oberseite (4) des Bottichs (3) sitzt und einer offenen Stellung beweglich ist, Trägermittel für zu kochendes Produkt, die auf der Unterseite des Deckels (6) angeordnet und so positioniert sind, daß sie in den Bottich (3) eintreten, während der Deckel (6) in seine geschlossene Position bewegt wird, ein Sperrmechanismus (34, 34a), der so positioniert ist, daß er den Deckel (6) in seiner geschlossenen Position hält und einen Handgriff (36) umfaßt, um den Sperrmechanismus (34, 34a) von einer Ruhestellung, in der der Deckel (6) frei geöffnet und geschlossen werden kann, in eine Arbeitsstellung bewegt wird, in der der Sperrmechanismus (34, 34a) den Deckel (6) gegen die Oberseite (4) des Bottichs (3) presst und lösbares Sicherungsmittel (62, 62a), die wirksam werden, um den Handgriff (36) gegen Bewegung zu sichern, wenn der Sperrmechanismus (34, 34a) sich in seiner Arbeitsstellung befindet, gekennzeichnet durch Mittel, die den Deckel (6) zur Vertikalbewegung relativ zum Bottich (3) lagern, und ein Paar von vertikal sich erstreckenden Führungsschienen (18, 18a) an der Rückseite des Gehäuses (1) umfassen; durch einen Wagen (25, 26), der beweglich auf den Führungsschienen (18, 18a) gelagert ist; ein Paar von Lagerarmen (9, 9a), die gegenüberliegende Seiten des Deckels (6) erfassen und gegen den Wagen (25, 26) zur Bewegung hiermit gesichert sind und Gegengewichtsausgleichsmechanismus in Zuordnung zum Wagen (25, 26), um dazu beizutragen, den Deckel

(6) vertikal aus seiner offenen Stellung, in der er relativ zum Bottich (3) sich in einer erhöhten Stellung befindet, in seine geschlossene Stellung zu bewegen, wobei der Sperrmechanismus (34, 34a) auf dem Gehäuse (1) gelagert ist und dahingehend wirkt, den Deckel (6) gegen die Oberseite des Bottichs (3) zu bewegen, wenn dieser sich in seiner Arbeitsstellung befindet, und durch Sicherungsmittel, die einen lösbaren Riegel (62, 63) umfassen.

2. Druckkocher wie in Anspruch 1 beansprucht, bei dem der Gegengewichtsausgleichsmechanismus ein Kabel (27) umfaßt, das an einem Ende am Wagen (25, 26) und am gegenüberliegenden Ende an einem Gegengewicht (31) befestigt ist, wobei das Kabel (27) um wenigstens eine erste Blockrolle (28) verläuft, die fest relativ zu den Führungsschienen gesichert ist.

3. Druckkocher nach Anspruch 2, bei dem das Kabel (27) auch um eine zweite, auf dem Wagen gelagerte Blockrolle (29) läuft und eine dritte Blockrolle (30) fest relativ zu den Führungsschienen (18, 18a) gesichert ist.

4. Druckkocher nach Anspruch 2 oder 3, bei dem der Gegengewichtsausgleichsmechanismus ein zweites Kabel (27a) und eine Blockrolle (28a) entsprechend dem erstgenannten Kabel (27) und der Rolle (28) umfaßt und wobei eines der Kabel (27) aktiv und das andere (27a) passiv ist, wobei das passive Kabel (27a) als Reserve für den Fall des Versagens des aktiven Kabels (27) dient.

5. Druckkocher nach einem der vorhergehenden Ansprüche mit einem Paar von Sperraugen (33, 33a), die fest an gegenüberliegenden Seiten des Deckels (6) gesichert sind, wobei der Sperrmechanismus ein Paar von Sperrelementen (34, 34a) umfaßt, die auf dem Gehäuse auf sich gegenüberliegenden Seiten des Deckels (6) angebracht und in Eingriff mit den Sperraugen (33, 33a) bringbar sind, wobei der Handgriff (36) wirksam mit jedem der Sperrelemente (34, 34a) verbunden ist.

6. Druckkocher nach Anspruch 5, bei dem die Sperraugen (33, 33a) geschlitzt (49) sind und jedes der Sperrelemente (34, 34a) eine Sperrwelle (44) umfaßt, die verschwenkbar an einem Ende am Gehäuse (1) angeschlossen und wirksam am gegenüberliegenden Ende an den Handgriff (36) angeschlossen ist, wobei die Sperrwellen (44) in Eingriff bringbar mit den geschlitzten Sperraugen (33, 33a) sind, wenn



die Sperrelemente (34, 34a) sich in der Arbeitsstellung befinden.

7. Druckkocher nach Anspruch 6, bei dem jede der Sperrwellen (44) einen Sperrbund (50) umfaßt und jede der Sperrwellen (44) schwenkbar am gegenüberliegenden Ende mit einer ersten Konsole (37) verbunden ist, die wirksam mit dem Handgriff (36) zur Bewegung hiermit verbunden ist und jede der Konsolen (37) wenigstens eine Nockenrolle (42) lagert, die mit einem der Sperrbünde (50) in Eingriff bringbar ist. 5
8. Druckkocher nach Anspruch 7, bei dem jeder der Sperrbünde (50) eine zweite Konsole (45) lagert, die so ausgebildet ist, daß sie mit der ersten Konsole (37) zusammenpasst, wobei die zweiten Konsolen (45) je wenigstens einen länglichen Schlitz (49) hierin haben, der so positioniert ist, daß er die auf der entsprechenden ersten Konsole (37) gelagerte Nockenrolle (42) aufnimmt, wobei jeder der Schlitz (49) positioniert ist, um es der entsprechenden Nockenrolle (42) zu ermöglichen, sich aus einer ersten Position, in der er sie auf einer Seite der Längsachse der entsprechenden Sperrwelle (44) liegt, in eine Position zu bewegen, in der die Nockenrolle (42) auf der gegenüberliegenden Seite der Längsachse der entsprechenden Sperrwelle (44) liegt. 10
9. Druckkocher nach Anspruch 7 oder 8, bei dem jede der Sperrwellen (44) einen Stellring (52) lagert, der in Eingriff mit dem entsprechenden Sperrauge (33, 33a) auf dem Deckel (6) bringbar ist. 15
10. Druckkocher nach einem der Ansprüche 7 bis 9, bei dem jede der ersten Konsolen (37) wirksam mit dem Handgriff (36) mittels eines länglichen Sperrarms (35, 35a) verbunden ist. 20
11. Druckkocher nach einem der vorhergehenden Ansprüche, längliche Sperrarme (35, 35a) umfassend, die den Handgriff (36) mit dem Sperrmechanismus (34, 34a) verbinden und wobei der Riegel verschiebbare Riegelstifte (62, 62a) aufweist, die mit den Sperrarmen (35, 35a) in Eingriff bringbar sind. 25
12. Druckkocher nach Anspruch 11, elastische Federn (64, 64a) umfassend, die normalerweise die Riegelstifte (62, 62a) gegen ihre Sperrarm erfassenden Positionen vorspannen sowie Riegelfinger (63, 63a), die die Riegelstifte (62, 62a) verdrängen, um die Sperrarme (35, 35a) ausser Eingriff zu bringen. 30

13. Druckkocher, beansprucht in Anspruch 11 oder 12, eine Druckentlastungseinrichtung (69) umfassend, die wirksam wird, um den Bottich (3) zu entlüften, wenn wenigstens einer der Riegelstifte (62, 62a) aus seiner, den Sperrarm erfassenden Position verdrängt ist.

14. Druckkocher nach einem der vorhergehenden Ansprüche, bei dem der Kochbottich (3) eine obere Kochzone (73) und eine untere Kühlzone (74) mit Querschnittsabmessungen aufweist, die kleiner als die Kochzone (73) sind, wobei die Zonen (73, 74) durch eine sich verjüngende Ringwand (75) miteinander verbunden sind und Heizelemente (76) in der Kochzone (73) sowie ein Ablauf (78) am Boden der Kühlzone (74) vorgesehen sind.

15. Druckkocher nach Anspruch 14, bei dem die Kühlzone (74) 20% bis 30% Volumen des Bottichs (3) umfaßt und wobei die sich verjüngende Ringwand (75) nach unten unter einem Winkel von zwischen 20° bis 26° gegen die Horizontale geneigt ist.

16. Druckkocher nach einem der vorhergehenden Ansprüche, einen Träger (14) umfassend, der ein sich gegenüberstehendes Paar von Hängern (13) aufweist, die so ausgebildet sind, daß sie abnehmbar mit der Unterseite des Deckels (6) verbunden sind, wobei die Hänger (13) Paare von länglichen Trägerstangen (15) lagern, die in vertikaler Anstandsbeziehung zueinander liegen, wobei jedes der Paare von Trägerstangen (15) so ausgebildet ist, daß es ein Produktblech (17) aufnimmt, wobei die Hänger (13) und die Trägerstangen (15) so dimensioniert sind, daß sie Produktbleche (17) einer Größe aufnehmen, die sich in ein Produkthaltegehäuse einführen lässt.

17. Druckkocher nach einem der vorhergehenden Ansprüche, bei dem der Deckel auch zur Schwenkbewegung relativ zu seinen Lagermitteln gelagert ist.

Revendications

1. Appareil de cuisson sous pression, comprenant un carter (1), dans lequel est montée une cuve (3) à partie supérieure ouverte, en vue de recevoir de l'huile de cuisson, un couvercle (6), disposé horizontalement, déplaçable entre une position fermée dans laquelle il est fermé de façon étanche et siège sur la partie supérieure (4) de la cuve (3) et une position ouverte, un moyen support, pour le produit à cuire, monté sur la face inférieure du couvercle (6) et



positionné pour pénétrer dans la cuve (3), lorsque le couvercle (6) est déplacé à sa position fermée, un mécanisme de verrouillage (34, 34a), positionné de façon à retenir le couvercle (3) dans sa position fermée et comprenant une poignée (36) destinée à amener le mécanisme de verrouillage (34, 34a), depuis une position non active dans laquelle le couvercle (6) est libre d'être ouvert et fermé, dans une position active dans laquelle le mécanisme de verrouillage (34, 34a) applique le couvercle (6) contre la partie supérieure (4) de la cuve (3), et un moyen de fixation (62, 62a) amovible, fonctionnant de façon à fixer la poignée (36) pour empêcher tout mouvement lorsque le mécanisme de verrouillage (34, 34a) se trouve dans sa position active, caractérisé par des moyens permettant le montage du couvercle (6) en vue de lui permettre un déplacement vertical par rapport à la cuve (3), moyen comprenant une paire de rails de guidage (18, 18a) s'étendant verticalement, placés à l'arrière du carter (1), un chariot (25, 26) monté déplaçable sur les rails de guidage (18, 18a), une paire de bras de montage (9, 9a) s'appliquant sur les côtés opposés du couvercle (6) et fixés au chariot (25, 26) en vue de se déplacer conjointement avec lui, et un mécanisme d'équilibrage associé au chariot (25, 26), en vue de contribuer au déplacement du couvercle (6) verticalement, depuis sa position ouverte, dans laquelle il est en position relevée par rapport à la cuve (3), à sa position fermée, au moyen du mécanisme de verrouillage (34, 34a) monté sur le carter (1) et agissant de façon à isoler de façon étanche le couvercle (6) contre la partie supérieure (4) de la cuve (3), lorsqu'il est dans sa position active, et par le moyen de fixation comprenant un verrou (62, 62a) désolidarisable.

2. Appareil de cuisson sous pression selon la revendication 1, dans lequel le mécanisme d'équilibrage comprend un câble (27) fixé à une extrémité du chariot (25, 26) et, à son extrémité opposée, à un contre-poids (31), le câble (27) passant autour d'au moins une première poulie (28), montée fixe par rapport aux rails de guidage.

3. Appareil de cuisson sous pression selon la revendication 2, dans lequel le câble (27) passe également autour d'une deuxième poulie (29) montée sur le chariot et d'une troisième poulie (30) montée fixe par rapport aux rails de guidage (18, 18a).

4. Appareil de cuisson sous pression selon la revendication 2 ou 3, dans lequel le mécani-

sme d'équilibrage comprend un second câble (27) et une poulie (28a), correspondant aux premiers câble (27) et poulie (28) précités, et dans lequel l'un des câbles (27) est actif et l'autre (27a) passif, le câble passif (27a) servant de double de sécurité dans le cas d'une défaillance du câble actif (27).

5. Appareil de cuisson sous pression selon l'une quelconque des revendications précédentes, comprenant une paire d'oreilles de verrouillage (33, 33a) montées fixes sur les côtés opposés du couvercle (6), le mécanisme de verrouillage comprenant une paire d'organes de verrouillage (34, 34a) montés sur le carter, sur les côtés opposés du couvercle (6) et susceptibles de venir en contact avec les oreilles de verrouillage (33, 33a), la poignée (36) étant reliée de manière active à chacun des organes de verrouillage (34, 34a).

6. Appareil de cuisson sous pression selon la revendication 5, dans lequel les oreilles de verrouillage (34, 34a) sont fendues (49) et chacun des organes de verrouillage (34, 34a) comprenant un arbre de verrouillage (44) relié en rotation, à une extrémité, au carter (1) et relié de manière active, à son extrémité opposée, à la poignée (36), les arbres de verrouillage (44) étant susceptibles de s'engager sur les oreilles de verrouillage fendues (33, 33a) lorsque les organes de verrouillage (34, 34a) sont en position active.

7. Appareil de cuisson sous pression selon la revendication 6, dans lequel chacun des arbres de verrouillage (44) comprend une collerette de verrouillage (50), chacun des arbres de verrouillage (44) étant relié en rotation, à son extrémité opposée, à un premier support (37) relié de manière active à la poignée (36) pour se déplacer avec elle et chacun des supports (37) servant à monter au moins un galet suiveur de came (42), susceptible de s'appliquer sur l'une des collerettes de verrouillage (50).

8. Appareil de cuisson sous pression selon la revendication 7, dans lequel chacune des collerettes de verrouillage (50) est montée sur un second support (45) configuré pour s'adapter avec le premier support (37), les seconds supports (45) ayant chacun au moins une fente (49) allongée, qui y est positionnée de façon à recevoir le galet suiveur de came (42) monté sur le premier support (37) correspondant, chacune des fentes (49) étant positionnée de façon à permettre au galet suiveur de came (42) correspondant de se déplacer, depuis une



première position dans laquelle il repose d'un côté de l'axe longitudinal de l'arbre de verrouillage (44) correspondant, dans une position dans laquelle le galet suiveur de came (42) repose sur le côté opposé de l'axe longitudinal de l'arbre de verrouillage (44) correspondant.

9. Appareil de cuisson sous pression selon la revendication 7 ou la revendication 8, dans lequel chacun des arbres de verrouillage (44) est montée sur une bague de réglage (42) pouvant s'appliquer sur l'oreille de verrouillage (33, 33a) correspondante sur le couvercle (6).

10. Appareil de cuisson sous pression selon l'une quelconque des revendications 7 à 9, dans lequel chacun des premiers supports (37) est relié de manière active à la poignée (36) au moyen d'un bras de verrouillage (35, 35a) allongé.

11. Appareil de cuisson sous pression selon l'une quelconque des revendications précédentes, comprenant des bras de verrouillage (35, 35a) allongés reliant la poignée (36) au mécanisme de verrouillage (34, 34a) et dans lequel le verrou comprend des tiges de verrouillage (62, 62a) déplaçables, susceptibles de s'appliquer contre les bras de verrouillage (35, 35a).

12. Appareil de cuisson sous pression selon la revendication 11, comprenant des ressorts élastiques (64, 64a) poussant normalement les tiges de verrouillage (62, 62a) à leurs positions de contact avec le bras de verrouillage et des doigts de verrouillage (63, 63a), destinés à déplacer les tiges de verrouillage (62, 62a), pour dégager les bras de verrouillage (35, 35a).

13. Appareil de cuisson sous pression selon la revendication 11 ou la revendication 12, comprenant un dispositif de sécurité de pression (69), fonctionnant pour purger la cuve (3), lorsqu'au moins l'une des tiges de verrouillage (62, 62a) est déplacée, depuis sa position de contact avec le bras de verrouillage.

14. Appareil de cuisson sous pression selon l'une quelconque des revendications précédentes, dans lequel la cuve de cuisson (3) possède une zone de cuisson supérieure (73) et une zone de refroidissement inférieure (74), ayant des sections transversales de dimensions inférieures à celles de la zone de cuisson (73), les zones (73, 74) étant interconnectées à l'aide d'une paroi annulaire (75) conique, des éléments de chauffage (76) étant situés dans la

zone de cuisson (73) et une purge (78) étant disposée à la partie inférieure de la zone de refroidissement (74).

15. Appareil de cuisson sous pression selon la revendication 14, dans lequel la zone de refroidissement (74) fait de 20 à 30 % du volume de la cuve (30) et dans laquelle la paroi annulaire conique (75) est inclinée vers le bas, suivant un angle de 20° à 26° par rapport à l'horizontale.

16. Appareil de cuisson sous pression selon l'une quelconque des revendications précédentes, comprenant un support (14), comprenant une paire d'organes de suspension (13) opposés, adaptés pour être reliés de façon amovible à la face inférieure du couvercle (6), les organes de suspension (13) servant à monter des paires de tiges-supports (15) longitudinales étant espacées verticalement, chacune des paires de tiges-supports (15) étant adaptée pour recevoir un plateau à produits (17), les organes de suspension (13) et les tiges-supports (15) étant dimensionnés pour recevoir des plateaux à produits (17) de dimensions leur permettant d'être insérés dans une armoire de stockage de produits.

17. Appareil de cuisson sous pression selon l'une quelconque des revendications précédentes, dans lequel le couvercle est également monté de façon à permettre un mouvement de pivotement par rapport à son moyen de montage.

