

Description

The present invention relates to an oil-overflow alarming system which is incorporated in fryer apparatus used in commercial cooking of food items such as French fries and breaded chicken, and works corresponding to opening and closing of a supply valve and a drainage valve of an oil filtering mechanism of the fryer apparatus.

In commercial cooking facilities, cooking oil in a frypot is periodically drained therefrom, filtered and cleaned by an oil filtering mechanism, and returned to the frypot to prevent deterioration of cooking oil and allow economical recycle of used cooking oil.

Even when the fryer apparatus includes a plurality of frypots, each being filled with cooking oil, the oil filtering mechanism generally includes only one oil tank with a filter element for saving the space and making the fryer apparatus compact. In this case, the oil tank has a capacity sufficient to receive the whole volume of cooking oil drained from any one of the frypots. Each frypot is connected to a drainage conduit with a drainage valve which is open and closed to initiate and terminate drainage of cooking oil from the frypot to the oil tank, and to a supply conduit with a supply valve which is open and closed to permit or preclude a flow of cooking oil received and filtered in the oil tank and returned to the frypot. Both the drainage valve and the supply valve are operated manually.

EP-A-0 333 164 discloses in detail such a 'fryer' apparatus as summarised in the preceding paragraph and the preamble of claim 1.

If a drainage valve or a supply valve of one frypot were accidentally opened while a drainage valve of another frypot is open for filtration of used cooking oil, cooking oil would overflow from said one frypot or the oil tank, risking damage to the floor or injury to an operator.

The object of the invention is to provide a novel oil overflow alarming system incorporated in a fryer apparatus.

The above and other related objects are realized by an oil overflow alarming system of the invention which is incorporated in a fryer apparatus and generates an overflow alarm according to opening and closing conditions of supply and drainage valves of frypots.

The fryer apparatus typically includes: a housing supported on a floor; a plurality of frypots disposed in a side by side arrangement in an upper portion of the housing, each being filled with cooking oil in which food items are fried or cooked; a heating unit for heating cooking liquid contained in each of the plurality of frypots; a plurality of drainage conduit units each connected to each of the plurality of frypots for draining cooking oil

therefrom, each drainage conduit having a first end connected to each frypot for receiving cooking oil drained therefrom and a second end for discharging the received cooking oil; a plurality of drainage valve units each disposed in each of the plurality of drainage conduit units, each drainage valve unit being movable between an open position and a close position to initiate and terminate drainage of cooking oil from each frypot through each discharge conduit unit; a cooking oil filtration unit for receiving cooking oil contained in one of the frypots and discharged from the second end of a corresponding drainage conduit unit and filtering the discharged cooking oil; an oil pump unit connected to the cooking oil filtration unit for returning the cooking oil filtered by the cooking oil filtration unit to one of the frypots; a plurality of supply conduit units for flowing cooking oil into each of the plurality of frypots, each supply conduit unit having a first end connected to the oil pump unit for receiving cooking oil and a second end connected to each frypot for discharging the received cooking oil thereinto; and a plurality of supply valve units each disposed in each of the plurality of supply conduit units, each supply valve unit being movable between an open position and a close position to permit and prevent flow of cooking oil into each frypot through each supply conduit unit. The fryer apparatus of the invention further includes an oil overflow alarming system, which includes: a control unit for detecting, while a drainage valve unit for one of the plurality of frypots is open to allow cooking oil contained therein to be drained into the cooking oil filtration unit through a drainage conduit unit, whether at least either a drainage valve unit or a supply valve unit of another frypot is in its open position, and outputting an overflow signal when at least either the drainage valve unit or the supply valve unit of another frypot is in its open position; and an alarm unit for receiving the overflow signal from the control unit and generating an overflow alarm.

For example, when the fryer apparatus includes a first frypot and a second frypot, the control unit of the oil overflow alarming system detects whether at least one of a second drainage valve unit and a second supply valve unit of the second frypot is in an open position while a first drainage valve unit of the first frypot is open, where cooking oil contained in the first frypot is drained into the cooking oil filtration unit to be filtered and cleaned. When at least either the second drainage valve or the second supply valve is open, the control unit outputs an overflow signal to the alarm unit, which generates an overflow alarm corresponding to the overflow signal to urge an operator to close both the second drainage valve and the second supply valve, thus preventing oil from overflowing from the

cooking oil filtration unit or the second frypot. Other preferred features are disclosed in the dependent claims 2-9.

The present invention will now be described by way of example in the following detailed non-limiting description of the preferred embodiment shown in the accompanying drawings, in which:

Fig. 1 is a partly omitted cross sectional view schematically illustrating a fryer apparatus used for commercial cooking of food items;

Fig. 2 is a front view showing the fryer apparatus of Fig. 1;

Fig. 3 illustrates a primary portion of an oil filtering mechanism;

Fig. 4 is a conceptive view showing an oil overflow alarming system of the embodiment; and

Fig. 5 is a flowchart showing a typical example of an overflow alarm routine executed by the control unit C of Fig. 4.

An oil-overflow alarming system embodying the invention is described according to the drawings.

Fig. 1 is a partly omitted cross sectional view schematically illustrating a fryer apparatus used for commercial cooking of food items; Fig. 2 is a front view showing the fryer apparatus of Fig. 1; and Fig. 3 illustrates a primary portion of an oil filtering mechanism.

The fryer apparatus of the embodiment includes a housing 1 which is supported on a floor F by wheels 1a fixed outwardly to four corners of a bottom plate 1c of the housing 1, so that the fryer apparatus is movable from one position to another desired position. A quick joint element 1b disposed on a lower front end of the housing 1 is connected to a gas supply source G. A pair of frypot systems 2 are arranged side by side in an upper portion of the housing 1. Each frypot system 2 includes a frypot element 2a filled with cooking liquid or oil, an apron member 2b horizontally extending over an upper end of the frypot element 2a, and an upright wall member 2c extending upward from a lower end of the frypot element 2a.

A pair of air chambers 3 working corresponding to a pair of pulse combustors 4 are respectively attached outside of the frypot systems 2.

Each pulse combustor 4 for heating cooking oil in the frypot element 2a includes a combustion chamber 4a screwed on an inner surface of a side wall of the frypot element 2a, and a tail pipe 4b looping and passing through the frypot element 2a. The tail pipe 4b has one end fixed to an outlet of the combustion chamber 4a and the other end piercing through a side wall of the air chamber 3 to connect with a pipe extension element 4c fixed to the side wall of the air chamber 3.

A gas supply conduit 6 with an electromagnetic valve 5 is connected to each air chamber 3. An electric fan 7 and an intake muffler 8 are also

connected to each air chamber 3 via an air supply conduit 8a.

Each pulse combustor 4 also has a silencer unit 9 including a first exhaust muffler 9a arranged in a lower rear portion of the frypot system 2, a second exhaust muffler 9b arranged in an upper rear portion of the frypot system 2 and connected to the first exhaust muffler 9a in series, and a discharge pipe 9c connected to and disposed on an upper end of the second exhaust muffler 9b for discharging combustion exhaust to the atmosphere. The first exhaust muffler 9a has a first end connected to the pipe extension element 4c, and a second end connected to a first end of the second exhaust muffler 9b. A second exhaust muffler 9b is connected on a second end or upper end thereof to the discharge pipe 9c.

An oil tank 12 with a filter element 12a for filtering cooking oil in each frypot element 2a is supported on the bottom plate 1c of the housing 1 and movable out of and into the housing 1 along a pair of L-shaped guide frames 1d. The oil tank 12 is detachably connected via a quick joint element 12b to an oil pump 13 for returning cooking oil into each frypot element 2a. Namely, the oil tank 12 is easily attachable to and removable from the fryer apparatus by connecting and disconnecting the quick joint element 12b. The oil tank 12 has a capacity sufficient to receive the whole volume of any one of the frypot elements 2a.

As shown in Fig. 3, each frypot element 2a is connected to a drainage conduit 10 with a drainage valve 10a, which is further connected to a drainage connection element 11. The oil pump 13 is connected to each frypot element 2a via a supply conduit 14 with a supply valve 14a.

In operation, when one of the drainage valves 10a is open, cooking oil contained in the corresponding frypot element 2a is discharged therefrom to the oil tank 12 via the drainage conduit 10 and the drainage connection element 11. The cooking oil received in the oil tank 12 is filtered through the filter element 12a and pumped up by the oil pump 13 to be returned to the frypot element 2a via the supply conduit 14 and the supply valve 14a.

Fig. 4 is a conceptive view showing an oil overflow alarming system of the embodiment. In the following description, the frypot elements 2a are shown by first and second frypots A and B, the corresponding drainage valves 10a by first and second drainage valves a1 and b1, and the corresponding supply valves 14a by first and second supply valves a2 and b2.

In the oil overflow alarming system of the embodiment, each of the drainage valves a1 and b1 (10a) and the supply valves a2 and b2 (14a) has a microswitch (not shown) which connects to a control unit C to output an opening or closing signal

thereto. The opening signal represents that the valve a1, b1, a2, or b2 (10a or 14a) is in its open position, and the closing signal shows that the valve a1, b1, a2, or b2 (10a or 14a) is in its close position. The control unit C outputs an alarm signal to an alarm unit D corresponding to the opening and closing signals of the drainage valves a1 and b1 (10a) and the supply valves a2 and b2 (14a).

Fig. 5 is a flowchart showing a typical example of an overflow alarm routine executed by the control unit C when the first drainage valve a1 is open to drain cooking oil from the first frypot A to the oil tank 12.

The overflow alarm routine of Fig. 5 starts when the first drainage valve a1 is open to discharge cooking oil from the first frypot A. At step S1, it is determined whether an operation switch (not shown) of the pulse combustor 4 is turned off. When the answer is NO at step S1, the program proceeds to step S2 at which the alarm unit D generates a non-cooking alarm corresponding to a non-cooking signal output by the control unit C to urge an operator to turn off the operation switch so as to prevent the frypot A from being heated without cooking oil. The control unit C outputs an end of non-cooking alarm signal to the alarm unit D to stop the non-cooking alarm when the operation switch is turned off.

When the answer is YES at step S1, the program proceeds to step S3 at which it is determined whether both the second drainage valve b1 and the second supply valve b2 of the frypot B are closed. When either the second drainage valve b1 or the second supply valve b2 is open, the program goes to step S4 at which the alarm unit D generates an overflow alarm corresponding to an overflow signal output from the control unit C to urge an operator to close both the second drainage valve b1 and the second supply valve b2. The control unit C outputs an end of overflow alarm signal to the alarm unit D to stop the overflow alarm when both the second drainage valve b1 and the second supply valve b2 are closed.

When both the second drainage valve b1 and the second supply valve b2 are closed at step S3, the program goes to step S5 at which it is determined whether the first supply valve a2 of the frypot A is open. When the first supply valve a2 is open at step S5, the program proceeds to step S6 at which the control unit C activates the oil pump 13 to permit a flow of cooking oil drained by the frypot A and filtered and cleaned by the oil tank 12 to be returned to the frypot A via the first supply valve a2.

While the oil pump 13 is driven to return the cooking oil to the frypot A, the control unit C repeatedly checks that both the second drainage valve b1 and the second supply valve b2 of the

frypot B are closed at step S7. When either the second drainage valve b1 or the second supply valve b2 is opened accidentally, the program goes to step S8 at which the alarm unit D generates an overflow alarm corresponding to an overflow signal output from the control unit C to urge an operator to close both the second drainage valve b1 and the second supply valve b2.

At the subsequent step S9, it is determined whether the first drainage valve a1 of the frypot A is closed. When the first drainage valve a1 is closed to stop drainage of cooking oil from the frypot A, the program goes to step S10 at which it is determined whether the first supply valve a2 is open. When the first supply valve a2 is closed at step S10, the program goes to step S11 at which the control unit C stops the oil pump 13. On the other hand, when the first supply valve a2 is open at step S10, the program returns to step S7.

When the first drainage valve a1 is open to continue drainage of cooking oil from the frypot A at step S9, the program goes to step S12 at which it is determined whether the first supply valve a2 is open. When the first supply valve a2 is closed at step S12, the program proceeds to step S13 at which the alarm unit D generates a pump alarm corresponding to a pump signal output by the control unit C to urge an operator to open the first supply valve a2. The control unit C outputs an end of pump alarm signal to the alarm unit D to stop the pump alarm when the first supply valve a2 is opened. When the first supply valve a2 is open at step S12, the program returns to step S7.

The alarm unit D may include one or a plurality of buzzers, lamps, or any other alarming elements to generate the non-cooking alarm, the overflow alarm, and the pump alarm.

As described above, the oil overflow alarming system of the embodiment generates the overflow alarm corresponding to the opening and closing conditions of the drainage valves and supply valves, thus effectively preventing cooking oil from overflowing from the frypot or the oil tank to damage the floor or injure the operator.

Although the fryer apparatus of the above embodiment includes a pair of frypots and other corresponding elements including the drainage valves 10a and the supply valves 14a, the fryer apparatus may include any desirable number of frypots with corresponding elements.

Claims

1. A fryer apparatus for use in commercial cooking facilities for cooking food items in cooking liquid or oil, said fryer apparatus comprising:
 - a housing (1) supportable on a floor (F) and having a bottom plate (1c) and side walls;



thereto. The opening signal represents that the valve a1, b1, a2, or b2 (10a or 14a) is in its open position, and the closing signal shows that the valve a1, b1, a2, or b2 (10a or 14a) is in its close position. The control unit C outputs an alarm signal to an alarm unit D corresponding to the opening and closing signals of the drainage valves a1 and b1 (10a) and the supply valves a2 and b2 (14a).

Fig. 5 is a flowchart showing a typical example of an overflow alarm routine executed by the control unit C when the first drainage valve a1 is open to drain cooking oil from the first frypot A to the oil tank 12.

The overflow alarm routine of Fig. 5 starts when the first drainage valve a1 is open to discharge cooking oil from the first frypot A. At step S1, it is determined whether an operation switch (not shown) of the pulse combustor 4 is turned off. When the answer is NO at step S1, the program proceeds to step S2 at which the alarm unit D generates a non-cooking alarm corresponding to a non-cooking signal output by the control unit C to urge an operator to turn off the operation switch so as to prevent the frypot A from being heated without cooking oil. The control unit C outputs an end of non-cooking alarm signal to the alarm unit D to stop the non-cooking alarm when the operation switch is turned off.

When the answer is YES at step S1, the program proceeds to step S3 at which it is determined whether both the second drainage valve b1 and the second supply valve b2 of the frypot B are closed. When either the second drainage valve b1 or the second supply valve b2 is open, the program goes to step S4 at which the alarm unit D generates an overflow alarm corresponding to an overflow signal output from the control unit C to urge an operator to close both the second drainage valve b1 and the second supply valve b2. The control unit C outputs an end of overflow alarm signal to the alarm unit D to stop the overflow alarm when both the second drainage valve b1 and the second supply valve b2 are closed.

When both the second drainage valve b1 and the second supply valve b2 are closed at step S3, the program goes to step S5 at which it is determined whether the first supply valve a2 of the frypot A is open. When the first supply valve a2 is open at step S5, the program proceeds to step S6 at which the control unit C activates the oil pump 13 to permit a flow of cooking oil drained by the frypot A and filtered and cleaned by the oil tank 12 to be returned to the frypot A via the first supply valve a2.

While the oil pump 13 is driven to return the cooking oil to the frypot A, the control unit C repeatedly checks that both the second drainage valve b1 and the second supply valve b2 of the

frypot B are closed at step S7. When either the second drainage valve b1 or the second supply valve b2 is opened accidentally, the program goes to step S8 at which the alarm unit D generates an overflow alarm corresponding to an overflow signal output from the control unit C to urge an operator to close both the second drainage valve b1 and the second supply valve b2.

At the subsequent step S9, it is determined whether the first drainage valve a1 of the frypot A is closed. When the first drainage valve a1 is closed to stop drainage of cooking oil from the frypot A, the program goes to step S10 at which it is determined whether the first supply valve a2 is open. When the first supply valve a2 is closed at step S10, the program goes to step S11 at which the control unit C stops the oil pump 13. On the other hand, when the first supply valve a2 is open at step S10, the program returns to step S7.

When the first drainage valve a1 is open to continue drainage of cooking oil from the frypot A at step S9, the program goes to step S12 at which it is determined whether the first supply valve a2 is open. When the first supply valve a2 is closed at step S12, the program proceeds to step S13 at which the alarm unit D generates a pump alarm corresponding to a pump signal output by the control unit C to urge an operator to open the first supply valve a2. The control unit C outputs an end of pump alarm signal to the alarm unit D to stop the pump alarm when the first supply valve a2 is opened. When the first supply valve a2 is open at step S12, the program returns to step S7.

The alarm unit D may include one or a plurality of buzzers, lamps, or any other alarming elements to generate the non-cooking alarm, the overflow alarm, and the pump alarm.

As described above, the oil overflow alarming system of the embodiment generates the overflow alarm corresponding to the opening and closing conditions of the drainage valves and supply valves, thus effectively preventing cooking oil from overflowing from the frypot or the oil tank to damage the floor or injure the operator.

Although the fryer apparatus of the above embodiment includes a pair of frypots and other corresponding elements including the drainage valves 10a and the supply valves 14a, the fryer apparatus may include any desirable number of frypots with corresponding elements.

Claims

1. A fryer apparatus for use in commercial cooking facilities for cooking food items in cooking liquid or oil, said fryer apparatus comprising:
 - a housing (1) supportable on a floor (F) and having a bottom plate (1c) and side walls;



a plurality of frypots (2) disposed in a side by side arrangement in an upper portion of said housing (1), each being filled with cooking oil in which food items are fried or cooked;

heating means (4) for heating cooking liquid contained in each of said plurality of frypots;

a plurality of drainage conduit means (10) each connected to each of said plurality of frypots (2) for draining cooking oil therefrom, each drainage conduit having a first end connected to each frypot for receiving cooking oil drained therefrom and a second end for discharging the received cooking oil;

a plurality of drainage valve means (10a) each disposed in each of said plurality of drainage conduit means (10), each drainage valve means (10a) being movable between an open position and a close position to initiate and terminate drainage of cooking oil from each frypot (2) through each discharge conduit means (10);

cooking oil filtration means (12, 12a) for receiving cooking oil contained in one of said plurality of frypots (2) and discharged from the second end of one of said drainage conduit means (10) corresponding to said one of frypots (2) and filtering the discharged cooking oil;

oil pump means (13) connected to said cooking oil filtration means (12, 12a) for returning the cooking oil filtered by said cooking oil filtration means to said one of frypots (2);

a plurality of supply conduit means (14) for flowing cooking oil into each of said plurality of frypots (2), each supply conduit means (14) having a first end connected to said oil pump means (13) for receiving cooking oil and a second end connected to each frypot (2) for discharging the received cooking oil thereinto; and

a plurality of supply valve means (14a) each disposed in each of said plurality of supply conduit means (14), each supply valve means (14a) being movable between an open position and a close position to permit and prevent flow of cooking oil into each frypot (2) through each supply conduit means (14), characterised in that

said fryer apparatus further comprises an oil overflow alarming system for generating an overflow alarm,

said oil overflow alarming system comprising:

control means (C) for detecting, while drainage valve means (10a) for one of said plurality of frypots (2) is open to allow cooking oil contained therein to be drained into said

cooking oil filtration means (12, 12a) through drainage conduit means (10), whether at least either drainage valve means (10a) or supply valve means (14a) of another frypot is in its open position, and outputting an overflow signal when at least either said drainage valve means (10a) or said supply valve means (14a) of said another frypot is in its open position; and

alarm means (D) for receiving said overflow signal from said control means (C) thereupon for generating an overflow alarm.

2. A fryer apparatus in accordance with claim 1, wherein said heating means comprises a pulse combustor (4).
3. A fryer apparatus in accordance with claim 2, wherein said cooking oil filtration means comprises an oil tank (12) and a filtration element (12a) fixed to a bottom of said oil tank.
4. A fryer apparatus in accordance with claim 3, wherein said cooking oil filtration means (12, 12a) further comprises a pair of L-shaped guide frames (1d), and said oil tank (12) is directly mounted on said bottom plate (1a) of said housing (1) and movable out of and into said housing along said pair of L-shaped guide frames.
5. A fryer apparatus in accordance with claim 4, said oil tank (12) is connected to said oil pump means (13) via quick joint means (12b).
6. Apparatus in accordance with claim 1, wherein said control means (C) controls said oil pump means (13) to permit or preclude a flow of cooking oil drained from one of said plurality of frypots (2), filtered and cleaned by said cooking oil filtration means (12, 12a), and returned to said one of frypots the (2) via one of said supply valve means (14a) corresponding to said one of the frypots.
7. Apparatus in accordance with claim 6, wherein said heating means comprises a pulse combustor (4) and an operation switch for activating said pulse combustor.
8. Apparatus in accordance with claim 7, wherein said control means (C) outputs a non-cooking signal when said one drainage valve means (10a) is open and said operation switch is still ON, and said alarm means generates a non-cooking alarm corresponding to said non-cooking signal.



9. Apparatus in accordance with claim 6, wherein said control means (C) outputs a pump signal when said one drainage valve means (10a) is open and one supply valve means (14a) corresponding to said one drainage valve means is closed, and said alarm means generates a pump alarm corresponding to said pump signal.

Patentansprüche

1. Fritiervorrichtung zur Verwendung in gewerblichen Garvorrichtungen zum Garen von Lebensmitteln in Garflüssigkeit oder Garöl, wobei die Fritiervorrichtung umfaßt:

ein auf einem Boden (F) abstützbares Gehäuse (1) mit einer Bodenplatte (1c) und Seitenwänden;

eine Mehrzahl von Fritierbehältern (2), die Seite an Seite in einem oberen Teil des Gehäuses (1) angeordnet sind, von denen jeder mit Garöl gefüllt ist, in welchem Nahrungsmittel frittiert oder gegart werden;

eine Heizeinrichtung (4) zum Erhitzen von Garflüssigkeit, welche in jedem der mehreren Fritierbehälter enthalten ist;

eine Mehrzahl von Ablaufleitungen (10), von denen jede mit einem der mehreren Fritierbehälter (2) verbunden ist, um Garöl aus ihm abzulassen, wobei jede Ablaufleitung ein erstes Ende, das mit jedem Fritierbehälter verbunden ist, um das Garöl aufzunehmen, das aus ihm abgelassen wird, und ein zweites Ende aufweist, um das aufgenommene Garöl abzugeben;

eine Mehrzahl von Ablaufventilen (10a), von denen jedes in einer der mehreren Ablaufleitungen (10) angeordnet ist, wobei jedes Ablaufventil (10a) zwischen einer geöffneten Stellung und einer geschlossenen Stellung verstellbar ist, um den Ablauf von Garöl aus jedem Fritierbehälter (2) durch jede Ablaufleitung (10) einzuleiten und zu beenden;

eine Garöl-Filtriereinrichtung (12, 12a), die dazu dient, Garöl aufzunehmen, das in einem der mehreren Fritierbehälter (2) enthalten ist und aus dem zweiten Ende einer der Ablaufleitungen (10) abgegeben wird, die einem der Fritierbehälter (2) entspricht, und das abgegebene Garöl zu filtrieren;

eine Ölpumpeinrichtung (13), die mit der Garöl-Filtriereinrichtung (12, 12a) verbunden ist, welche dazu dient, das Garöl, das durch die Garöl-Filtriereinrichtung filtriert worden ist, zu einem der Fritierbehälter (2) zurückzuführen;

eine Mehrzahl von Speiseleitungen (14), die dazu dienen, Garöl in jeden der mehreren

Fritierbehälter (2) fließen zu lassen, wobei jede Speiseleitung (14) ein erstes Ende, das mit der Ölpumpeinrichtung (13) verbunden ist und das dazu dient, Garöl aufzunehmen, und ein zweites Ende aufweist, das mit jedem Fritierbehälter (2) verbunden ist und das dazu dient, das aufgenommene Garöl in diesen hinein abzugeben; und

eine Mehrzahl von Speiseventilen (14a), die jeweils in einer der mehreren Speiseleitungen (14) angeordnet ist, wobei jedes Speiseventil (14a) zwischen einer geöffneten Stellung und einer geschlossenen Stellung verstellbar ist, um einen Fluß von Garöl in jeden Fritierbehälter (2) durch jede Speiseleitung (14) zu erlauben und zu verhindern, dadurch gekennzeichnet, daß

die Fritiervorrichtung weiter eine Ölüberlauf-Alarmanlage zum Erzeugen eines Überlaufalarms umfaßt,

wobei die Überlauf-Alarmanlage umfaßt:

eine Steuereinrichtung (C), welche überwacht, ob während der Zeit, in der ein Ablaufventil (10a) für einen der mehreren Fritierbehälter (2) geöffnet ist, um darin enthaltenes Garöl durch eine Ablaufleitung (10) in die Garöl-Filtriereinrichtung (12, 12a) abzulassen, mindestens entweder ein Ablaufventil (10a) oder ein Speiseventil (14a) eines anderen Fritierbehälters in seiner geöffneten Stellung ist, und welche ein Überlaufsignal ausgibt, wenn sich mindestens entweder das Ablaufventil (10a) oder das Speiseventil (14a) eines anderen Fritierbehälters in seiner geöffneten Stellung befindet; und

eine Alarmeinrichtung (D), welche das Überlaufsignal von der Steuereinrichtung (C) empfängt, um einen Überlaufalarm zu erzeugen.

2. Fritiervorrichtung nach Anspruch 1, bei der die Heizeinrichtung einen Impuls-Brenner (4) umfaßt.

3. Fritiervorrichtung nach Anspruch 2, bei der die Garöl-Filtriereinrichtung einen Öltank (12) und ein Filtrier-Element (12a) umfaßt, das an einem Boden des Öltanks befestigt ist.

4. Fritiervorrichtung nach Anspruch 3, bei der die Garöl-Filtriereinrichtung (12, 12a) weiter ein Paar L-förmiger Führungsrahmen (1d) umfaßt und der Öltank (12) direkt auf der Bodenplatte (1a) des Gehäuses (1) befestigt ist und längs des Paares L-förmiger Führungsrahmen aus dem Gehäuse heraus und in es hinein bewegbar ist.



5. Fritiervorrichtung nach Anspruch 4, wobei der Öltank (12) mit der Ölpumpeinrichtung (13) über ein Schnellverbindungs-Mittel (12b) verbunden ist. 5
6. Vorrichtung nach Anspruch 1, bei der die Steuereinrichtung (C) die Ölpumpeinrichtung (13) steuert, um einen Fluß von Garöl zu erlauben oder auszuschließen, der aus einem der mehreren Fritierbehälter (2) abgelassen, durch die Garöl-Filtriereinrichtung (12, 12a) gefiltert und gereinigt wurde und zu dem einen der Fritierbehälter (2) über eines der Speiseventile (14a) zurückgeführt wurde, das dem einen der Fritierbehälter entspricht. 10 15
7. Vorrichtung nach Anspruch 6, bei der die Heizeinrichtung einen Impuls-Brenner (4) und einen Arbeitsschalter zum Aktivieren des Impuls-Brenners umfaßt. 20
8. Vorrichtung nach Anspruch 7, bei der die Steuereinrichtung (C) ein Signal 'Nicht-Garen' ausgibt, wenn das eine Ablaufventil (10a) geöffnet ist und der Arbeitsschalter noch auf EIN steht, und die Alarmeinrichtung entsprechend dem Signal 'Nicht-Garen' einen Alarm 'Nicht-Garen' erzeugt. 25
9. Vorrichtung nach Anspruch 6, bei der die Steuereinrichtung (C) ein Pumpsignal ausgibt, wenn das eine Ablaufventil (10a) geöffnet ist und ein Speiseventil (14a), das dem einen Ablaufventil entspricht, geschlossen ist, und die Alarmeinrichtung entsprechend dem Pumpsignal einen Pumpalarm erzeugt. 30 35

Revendications

1. Appareil à frire destinée à être utilisé dans des installations de cuisson commerciales pour cuire des denrées alimentaires dans un liquide ou une huile de cuisson, ledit appareil à frire comprenant : 40
 - une enceinte (1) pouvant être supportée sur un plancher (F) et possédant une plaque inférieure (1c) et des parois latérales; 45
 - une pluralité de bacs à friture (2) disposés côte-à-côte dans une partie supérieure de ladite enceinte (1), chacun d'eux étant rempli par une huile de cuisson dans laquelle des denrées alimentaires sont frites ou cuites; 50
 - des moyens de chauffage (4) pour chauffer le liquide de cuisson contenu dans chacun de ladite pluralité de bacs à friture; 55
 - une pluralité de moyens en forme de canalisation d'évacuation (10) raccordés respectivement à ladite pluralité de bacs à friture (2)

pour en évacuer l'huile de cuisson, chaque canalisation d'évacuation possédant une première extrémité raccordée à chaque bac à friture pour recevoir une huile de cuisson qui en est évacuée, et une seconde extrémité pour évacuer l'huile de cuisson reçue;

une pluralité de moyens formant soupape d'évacuation (10a) disposés chacun dans chacun desdits moyens de ladite pluralité de moyens formant canalisation d'évacuation (10), chacun des moyens formant soupape d'évacuation (10a) étant déplaçable entre une position ouverte et une position fermée pour déclencher et interrompre l'évacuation de l'huile de cuisson à partir de chaque bac à friture (2) par l'intermédiaire de chacun des moyens formant canalisation d'évacuation (10);

des moyens (12,12a) de filtrage de l'huile de cuisson pour recevoir l'huile de cuisson contenue dans l'un de ladite pluralité de bacs de cuisson (2) et évacuée de la seconde extrémité de l'un desdits moyens formant canalisation d'évacuation (10) correspondant à l'un desdits bacs à friture (2) et filtrer l'huile de cuisson évacuée;

des moyens formant pompe à huile (13) raccordés auxdits moyens (12,12a) de filtrage d'huile de cuisson pour renvoyer l'huile de cuisson filtrée par lesdits moyens de filtrage de l'huile de cuisson à l'un desdits bacs à friture (2);

une pluralité de moyens formant canalisation d'amenée (14) pour introduire l'huile de cuisson dans chacun de ladite pluralité de bacs à friture (2), chacun des moyens formant canalisation d'alimentation (14) possédant une première extrémité raccordée auxdits moyens formant pompe à huile (13) pour recevoir de l'huile de cuisson et une seconde extrémité raccordée à chaque bac à friture (2) pour évacuer l'huile de cuisson reçue dans ce bac; et

une pluralité de moyens formant soupape d'alimentation (14a), dont chacun est disposé dans chacun de ladite pluralité de moyens formant canalisation d'alimentation (14), chacun des moyens formant soupape d'alimentation (14a) étant déplaçable entre une position ouverte et une position fermée de manière à permettre et à empêcher l'introduction d'huile de cuisson dans chaque bac à friture (2) par l'intermédiaire de chacun des moyens formant canalisation d'alimentation (14),

caractérisée en ce que

ledit appareil à frire comporte en outre un système d'alarme de débordement d'huile servant à produire une alarme de débordement,

ledit système d'alarme de débordement



d'huile comprenant :

des moyens de commande (C) pour détecter, dans le cas où des moyens formant soupape d'évacuation (10a) pour l'un de ladite pluralité de bacs à friture (2) sont ouverts pour permettre une évacuation de l'huile de cuisson, contenue dans ce bac, dans lesdits moyens (12,12a) de filtrage de l'huile de cuisson par l'intermédiaire des moyens formant canalisation d'évacuation (10), si au moins les moyens formant soupape d'évacuation (10a) ou les moyens formant soupape d'alimentation (14a) d'un autre bac à friture sont dans leur position ouverte et délivrer un signal de débordement lorsqu'au moins l'un desdits moyens formant soupape d'évacuation (10a) ou desdits moyens formant soupape d'alimentation (14a) dudit autre bac à friture sont dans leur position ouverte; et

des moyens d'alarme (D) pour recevoir ledit signal de débordement de la part desdits moyens de commande (C) pour produire une alarme de débordement.

2. Appareil à frire selon la revendication 1, dans lequel lesdits moyens de chauffage comprennent un dispositif de combustion impulsioneille (4). 25
3. Appareil à frire selon la revendication 2, dans lequel lesdits moyens de filtrage de l'huile de cuisson comprennent un réservoir d'huile (12) et un élément de filtrage (12a) fixé à un fond dudit réservoir d'huile. 30
4. Appareil à frire selon la revendication 3, dans lequel lesdits moyens (12,12a) de filtrage de l'huile de cuisson comprennent en outre un couple de cadres de guidage en forme de L (1d), et ledit réservoir d'huile (12) est monté directement sur ladite plaque de fond (1a) de ladite enceinte (1) et peut être retiré de cette dernière et y être introduit le long dudit couple de cadres de guidage en forme de L. 35
5. Appareil à frire selon la revendication 4, dans lequel ledit réservoir d'huile (12) est raccordé auxdits moyens formant pompe à huile (13) par l'intermédiaire de moyens formant joint rapide (12b). 40
6. Appareil selon la revendication 1, dans lequel lesdits moyens de commande (C) commandent lesdits moyens formant pompe à huile (13) pour permettre ou empêcher un écoulement de l'huile de cuisson évacuée de l'un de ladite pluralité de bacs à friture (2), filtrée et nettoyée par lesdits moyens (12,12a) de sépa- 45

ration de l'huile de cuisson, et renvoyée auxdits bacs à friture (2) par l'intermédiaire desdits moyens formant soupape d'alimentation (14a) correspondant à ce bac à friture. 50

7. Appareil selon la revendication 6, dans lequel lesdits moyens de chauffage comprennent une chambre de combustion impulsioneille (4) et un interrupteur de fonctionnement pour activer ledit dispositif de combustion impulsioneille. 55
8. Appareil selon la revendication 7, dans lequel lesdits moyens de commande (C) délivrent un signal d'absence de cuisson lorsque ledit moyen formant soupape d'évacuation (10a) est ouvert et ledit interrupteur de fonctionnement est encore fermé, et lesdits moyens d'alarme produisent une alarme d'absence de cuisson correspondant audit signal d'absence de cuisson. 60
9. Appareil selon la revendication 6, dans lequel lesdits moyens de commande (C) délivrent un signal de pompage lorsque lesdits moyens formant soupape d'évacuation (10a) sont ouverts et que lesdits moyens formant soupape d'alimentation (14a) correspondant auxdits moyens formant soupape d'évacuation sont fermés, et lesdits moyens de production d'alarme produisent une alarme de pompage correspondant audit signal de pompage. 65