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(54) Title: COOKING APPARATUS

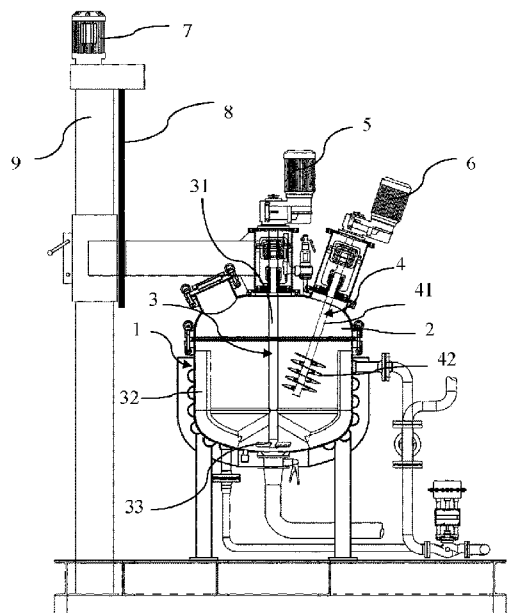


Figure 1

(57) Abstract: The present invention relates to a cooking apparatus comprising: a cooking vessel (1); a scraper means (3) having a scraper shaft (31) extending into the cooking vessel, and a scraper (32) disposed on the scraper shaft and adapted to scrape off ingredients sticking on an internal surface of the cooking vessel; and a spiral mixer (4) having a mixer shaft (41), to which a spiral element (42) extending inside the cooking vessel is attached.



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
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the earlier application (Rule 4.17(iii))*

COOKING APPARATUS

TECHNICAL FIELD

The invention relates to a cooking apparatus particularly for homogenous and viscous compositions, such as congee compositions, which is capable of improving the mixing and cooking efficiency of such a homogenous and viscous composition.

BACKGROUND OF THE INVENTION

During the preparation process of homogenous and viscous compositions, such as concentrated congee, ingredients with different densities, such as mushroom, nuts, or beans, may be added into the congee body and mixed with it homogeneously. However, current cooking apparatus in the market cannot meet this requirement, and the ingredients could not be well distributed in the final product.

An existing cooking apparatus in the market comprises a scraper and a mixing mechanism which provides a high shear force. This cooking apparatus can mix the ingredients into the cooking composition, but cannot mix them homogeneously and will break e.g. the rice grains to very small pieces or even a paste owing to high shearing force of the mixing mechanism.

For the existing cooking apparatus, the issue with homogenous viscous compositions is that it is difficult to mix them in a manner that does not disrupt the structure of the ingredients and still provides a good distribution of the ingredients throughout the viscous compositions, such as congee compositions. This is important because once the compositions are cooked, it is discharged from the cooking vessel (for instance from the bottom of the cooking vessel) to a filling apparatus by a pump or other means.

As the densities of the ingredients are different from each other, in particular different from the congee body, when the ingredients are added to the congee during cooking, the ingredients are not well distributed in the congee body, and the ingredients remain at the top of the congee body and are not capable to distribute well in the middle and bottom of the congee. As a result, the congee composition at the bottom of the cooking vessel will contain less ingredients than the congee composition at the top of the cooking vessel. The consequence is that the packs filled at the beginning

will have different ingredients content than the packs filled at the end of the filling process. The next consequence is that the labelling of the packs may be wrong because packs have only one kind of label, but as explained before, the actual mixing and filling process does not allow for a good distribution throughout the composition. In order to avoid wrong labeling, a solution could be to discard the first packs and the last packs. But this causes a considerable loss.

For instance, in a congee composition, it is desirable that the different ingredients such as mushroom, peanut, nuts, beans, seafood and preserved egg are well distributed in the congee composition, and still keep a good structure of such ingredients, so that the consumers can easily identify and feel the different ingredients.

The prior art relates to a cooking apparatus comprising a cooking tank and a scraper. The scraper cannot scrap sufficiently congee off the tank wall, especially the vertical part of this tank, which will easily lead to congee sticking on the wall, possible burnt composition, poor mixing.

Accordingly, there exists a need for a cooking apparatus that is designed to improve the mixing and cooking of a congee product, and prepare a congee product, in which the structure of the ingredients will not be broken and the ingredients are distributed well throughout the product.

SUMMARY OF THE INVENTION

The objective of the present invention is to provide a cooking apparatus which is particularly adapted to cook homogenous viscous compositions, such as a congee composition, and is capable of mixing them in a manner that does not break the structure of the ingredients and still provides a good distribution of the ingredients throughout the composition.

In one solution, the present invention provides a cooking apparatus particularly for homogenous viscous compositions, comprising: a cooking vessel for containing and cooking food materials; a scraper means which includes a scraper shaft extending into the cooking vessel and a scraper disposed on the scraper shaft and adapted to scrape off ingredients sticking on an internal surface of the cooking vessel; and a spiral mixer having a mixer shaft, to which a spiral element extending inside the cooking vessel is attached. The scraper is particularly suited to sufficiently scrape off the ingredients sticking on the internal surface of the cooking vessel during cooking process to prevent burning. In addition,

the combination of the spiral mixer having the spiral element with the scraper means is capable to mix e.g. congee compositions sufficiently, thereby achieving well distribution of the ingredients in the congee body without disrupting structure integrity of the ingredients.

According to a preferred aspect, the scraper shaft of scraper means may be vertically oriented and centrally located in the cooking vessel, and the mixer shaft may be arranged such that the mixer shaft is at an angle of 0-45 degrees, preferably 15-45 degrees from the scraper shaft.

In an aspect, the scraper may include at least one scraping element connected to the scraper shaft, the scraping element being configured to scrape off ingredients sticking on the bottom and sidewall of the internal surface of the cooking vessel. By providing the scraper of such configuration, not only the ingredients sticking on the bottom of the cooking vessel but also the ingredients sticking on the sidewall can be scraped off when the scraper means is rotating, thus preventing burning on the bottom and sidewall of the cooking vessel during the cooking process.

Preferably, the scraping element includes a first segment matched with the bottom of the cooking vessel and a second segment matched with the sidewall of the cooking vessel, the second segment having a length somewhat shorter than or substantially equal to the length of the sidewall. When the cooking vessel includes a curved bottom and vertical sidewall, for example, the first segment is curved accordingly to match the shape of the curved bottom, and the second segment is configured to be of a linear shape to match the shape of the vertical sidewall. The scraping element of such configuration ensures that the compositions comprising different ingredients move away from the internal surface of the cooking vessel regularly during the cooking process and is capable of scraping off the ingredients on the internal surface sufficiently and facilitates heat transfer in the compositions.

In another aspect, two scraping elements may be provided, which are arranged symmetrically on the scraper shaft. Alternatively, only one or any other suitable number of scraping elements may be provided.

In a further aspect, the scraper shaft is provided with a stirring blade at an end adjacent to the bottom of the cooking vessel to prevent food materials depositing near the center of the bottom.

Preferably, in the spiral mixer, the mixer shaft is and the spiral element may be formed into one piece. This spiral mixer is of a simple structure, during rotation, the food material may be lifted or

lowered based on the rotating direction or the direction of spiral of spiral element to achieve a better mixing.

In another aspect, the cooking apparatus further comprises a vessel cover for enclosing the cooking vessel, on which vessel cover the scrape mechanism and the spiral mixer are rotatably
5 mounted.

Still in another aspect, the cooking apparatus further comprises a first drive device located outside of the cooking vessel, wherein the first drive device is coupled with the scraper shaft to rotate the scraping means at a speed of 10~50 rpm.

In a further aspect, the cooking apparatus further comprises a second drive device located outside
10 of the cooking vessel, wherein the second drive device is coupled with the mixer shaft to rotate the spiral mixer at a speed of 80-300 rpm, preferably 100-300 rpm, more preferably 200-300 rpm.

Preferably, the spiral element has a height in a vertical direction equal to or greater than a quarter of the height of the cooking vessel such that it can extend into the ingredients to be mixed perfectly during the mixing process to achieve mixing of high efficiency.

In an aspect, the present invention also relates to a use of the above cooking apparatus cooking
15 for homogenous viscous compositions, wherein the homogenous viscous compositions may comprise a congee composition comprising rice, beans, and other cereals and ingredients with different densities.

These and additional features and advantages are described herein, and will be apparent from
20 the following figures and detailed description of the apparatus in this invention. The description of the invention in relation to the drawings is not intended to limit the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a schematic view of a cooking apparatus according to an embodiment of the
25 invention;

FIG. 2 illustrates another view of the cooking apparatus shown in FIG. 1, with the vessel cover being opened.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Herein, the term “congee composition” refers to a composition comprising rice, beans, nuts, peanuts, and other cereals, and other ingredients with different densities.

Herein, the term “congee body” refers to a cooking mixture of water and rice.

FIG. 1 shows a cooking apparatus according to an embodiment of the invention, which is designed in particular for cooking homogenous viscous compositions, such as a congee composition. During the preparation process of congee, ingredients such as mushroom, peanut and so on, need to be added into the congee and mixed with it homogeneously and the structure of the ingredients will not be disrupted.

In this embodiment, the cooking apparatus comprises a cooking vessel 1 for containing and cooking food materials, a vessel cover 2, a scraper means 3 and a spiral mixer 4. For example, the cooking vessel 1 is configured that it has a U-shaped vertical cross section and an internal wall including a bottom and vertical sidewall. The scraper means 2 includes a scraper shaft 31 extending into the interior of the cooking vessel 1, the scraper shaft is preferably oriented vertically and arranged centrally in the vessel cover 2, and two scraping plates 32 mounted on the scraper shaft 31. A drive means 5, such as an electric motor, is located outside of the vessel cover 2 and connected to the scraper shaft 31 for driving the scraper means 2 to rotate. The electric motor 5 may drive the scraper means to rotate either in a clockwise direction or in a counterclockwise direction.

In this embodiment, the two scraping plates 32 have an identical structure and shape and are arranged symmetrical relative to the scraper shaft 31. The scraping plates 32 include a curved first segment matched with the shape of the bottom of the internal wall of the cooking vessel, and a linear second segment matched with the shape of the vertical sidewall thereof, wherein the second segment has a length that is slightly shorter than or substantially equal to the length of the vertical sidewall. The scraper plates are configured in such a manner that not only the food ingredients sticking to the bottom of the vessel but also the food ingredients sticking to the entire vertical sidewall can be scraped off when the scraper means 3 is rotating, during mixing the food materials such as congee composition of different ingredients, so as to prevent burning on the internal surface of the cooking vessel. It should be appreciated that the structure and number of the scraping plates illustrated herein are

exemplary only, and the number may be one, three or more, and the structure and shape of the scraping plates may also be different, which is also encompassed in the scope of the present invention.

The spiral mixer 4 in this embodiment includes a spiral element 42 and a mixer shaft 41. A drive means 6, e.g. an electric motor, is located outside of the vessel cover 2 and coupled with the mixer shaft 41 to drive the spiral mixer 4 to rotate. The spiral element 42 is disposed at a distal end of the mixer shaft 41 and extending inside the cooking vessel. The term “distal end” herein refers to an end of the mixer shaft 41 extending into the interior of the vessel. The main function of the spiral mixer 4 is to cooperate with the scraper means 3 so as to well mix the ingredients in homogenous viscous compositions without disrupt the structure of these ingredients.

In an example, the spiral mixer 4 is preferably a helicoidal endless screw in which the mixer shaft 41 is integrated with the spiral element 42. The spiral element 42 has a height in the vertical direction preferably equal to or greater than a quarter of the height of the vessel. As an alternative, the spiral element 42 may be fixedly connected to the mixer shaft 41 by means of e.g. welding. By using such a spiral mixer, the cooking food ingredients such as congee composition may be pressed or lifted according to the direction of spiral (e.g. left hand or right hand) of the spiral element 42 and the rotating direction of the spiral mixer 41 during the mixing process to achieve a better mixing.

In the foregoing embodiment, the spiral mixer 4 may be mounted in such a manner that the mixer shaft 41 is at an angle of 0-45 degrees, preferably 15-45 degrees from the scraper shaft 31. During the mounting process, it is necessary to ensure that the scraper means 3 and the spiral mixer 4 do not interfere with each other during the rotation.

By providing the cooking apparatus comprising the spiral mixer 4 and the scraper means 3 of such configuration, the ingredients such as mushroom, peanut, seafood and preserved egg are mixed with the congee body homogeneously while the structure integrity of the ingredients are secured at the same time, which makes consumers identify and feel different ingredients easily.

In order to ensure highly efficient heat transfer in the cooling vessel 1 during the cooking process and prevent overcooking of some ingredients or burning on the internal surface of the vessel, the scraper means 3 may be driven by the drive device 5 to rotate at a rotation speed of 10-50 rpm and the spiral mixer 4 is driven by the drive device 5 to rotate at a rotation speed of 80-300 rpm, preferably

100-300 rpm and more preferably 200-300 rpm for mixing about 4-15 minutes. It should be appreciated that the mixing time is exemplary only, and the scraper means and the spiral mixer may be operated over a suitable period of time.

5 The illustrated cooking vessel 1 includes a discharge opening 10 disposed in the bottom, from which the congee composition is discharged once cooked, for pumping towards a filling apparatus (not shown). Preferably, a stirring blade 33 is provided at an end of the scraper shaft 31 adjacent to the bottom of the cooking vessel 1 to prevent food material depositing near the discharging opening 10 in the bottom of the cooking vessel.

10 The vessel cover 2 is movable up and down, and as shown in FIG. 2, the vessel cover may be driven along a drive shaft 8 by means of the electric motor 7 mounted on a supporting column 9 at the time of carrying out other operations after the cooking, such that the vessel cover is movable upward away from the cooking vessel 1, together with the scraper means and the spiral mixer.

Further, if necessary, the cooking apparatus according to the present invention may be provided with two or any suitable number of spiral mixers.

15 When preparing homogenous viscous compositions such as a congee composition containing multiple ingredients, the cooking apparatus of the invention can be operated following the steps of: putting a given quantity of water into the cooking vessel and activating the scraper means to mix at a speed of 10-40 rpm, preferably 40 rpm; adding a given quantity of food material; heating about 20 minutes from a normal temperature to 90-95°C and keeping this temperature for 10-20 minutes; 20 adding other ingredients such as peanut, mushroom or other cereals and etc., then activating the spiral mixer to rotate at a speed of 80-300 rpm, preferably 100-300 rpm, more preferably 200-300 rpm for mixing e.g. 4-15 minutes; finally, stopping the scraper means and the spiral mixer and opening the discharging opening to feed the final homogenous viscous compositions into the filling tank for filling. By virtue of these steps, it is possible to produce homogenous viscous compositions that are 25 perfectly mixed and maintain structure integrity of the ingredients so that consumers can identify and feel the different ingredients in the viscous compositions easily.

Any reference to prior art documents in this specification is not to be considered an admission that such prior art is widely known or forms part of the common general knowledge in the field.

Although the invention has been described by way of example, it should be appreciated that variations and modifications may be made without departing from the scope of the invention as defined in the claims. Furthermore, where known equivalents exist to specific features, such equivalents are incorporated as if specifically referred in this specification.

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Claims

1. A cooking apparatus comprising:

a cooking vessel;

5 a scraper means having a scraper shaft extending into the cooking vessel, and a scraper attached to the scraper shaft and adapted to scrape off ingredients sticking on an internal surface of the cooking vessel; and

a spiral mixer having a mixer shaft , to which a spiral element extending inside the cooking vessel is attached.

10 2. The cooking apparatus according to claim 1, wherein the scraper shaft is vertically oriented and centrally located in the cooking vessel, and the mixer shaft is arranged such that the mixer shaft is at an angle of 0-45 degrees, preferably 15-45 degrees from the scraper shaft.

3. The cooking apparatus according to claim 1 or 2, wherein the scraper comprises at least one scraping element connected to the scraper shaft for scraping off ingredients sticking on the bottom
15 and sidewall of an internal surface of the cooking vessel.

4. The cooking apparatus according to claim 3, wherein the scraping element comprises a first segment matched with the bottom of the cooking vessel and a second segment matched with the sidewall of the cooking vessel, the length of the second segment being slightly smaller than or substantially equal to that of the sidewall.

20 5. The cooking apparatus according to claim 3, wherein the at least one scraping element comprises two scraping elements arranged symmetrically relative to the scraper shaft.

6. The cooking apparatus according to any of claims 1 to 5, wherein the scraper shaft is provided with a stirring blade at the end thereof adjacent to the bottom of the cooking vessel.

7. The cooking apparatus according to any of claims 1 to 6, wherein the mixer shaft is and the
25 spiral element are formed into one piece.

8. The cooking apparatus according to any of claims 1 to 7, wherein the cooking apparatus further comprises a vessel cover on which the scraper means and the spiral mixer are mounted.

9. The cooking apparatus according to any of claims 1 to 8, wherein the scraping means is rotated

at a speed of 10~50 rpm..

10. The cooking apparatus according to any of claims 1 to 9, wherein the spiral mixer is rotated at a speed of 80-300 rpm, preferably 100-300 rpm, more preferably 200-300 rpm.

11. The cooking apparatus according to any of claims 1 to 10, wherein the spiral element has a length in a vertical direction equal to or greater than a quarter of the height of the cooking vessel.

12. Use of the cooking apparatus according to any of claims 1 to 11 for cooking homogenous viscous compositions.

13. The use according to claim 12, wherein the homogenous viscous compositions comprise a congee composition comprising rice, beans, other cereals as well as ingredients with different densities.

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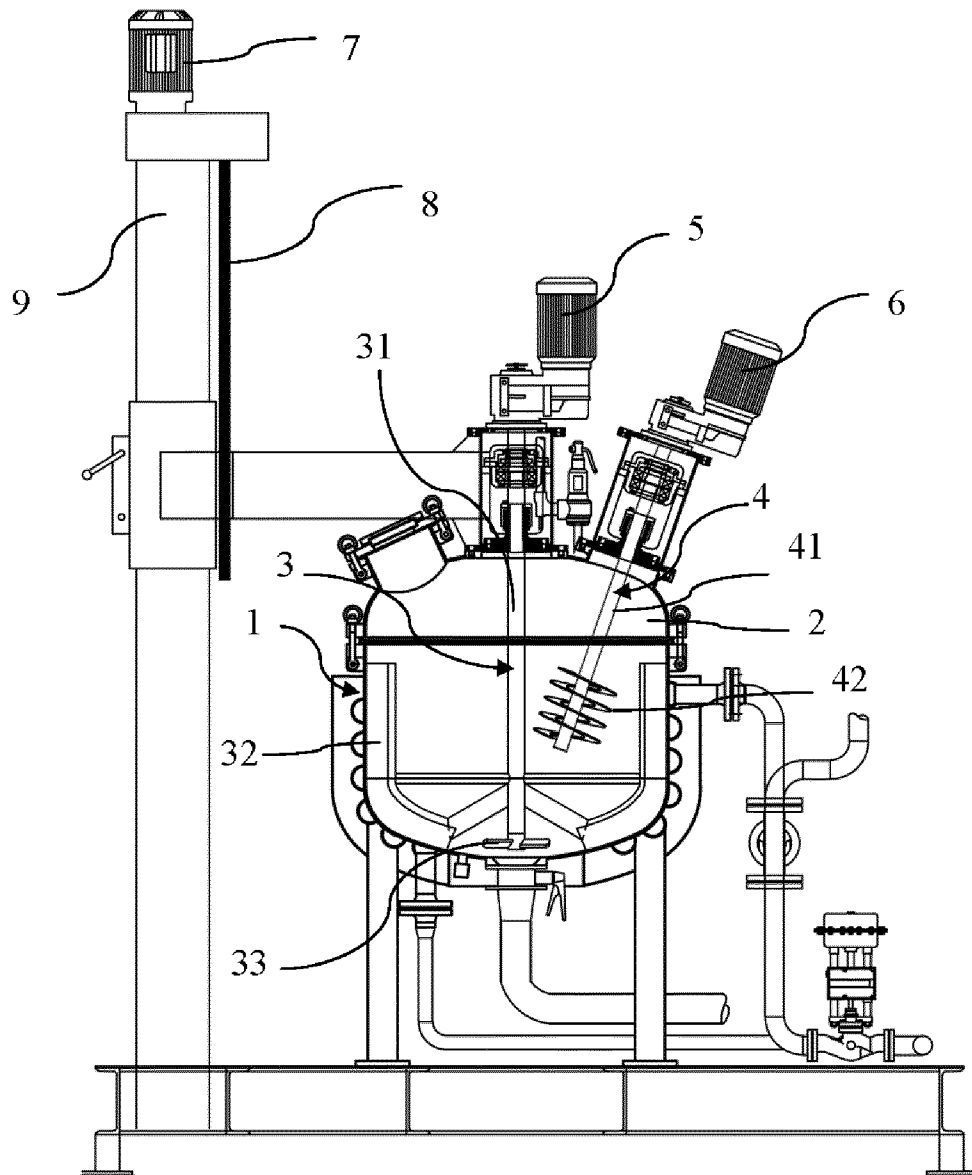


Figure 1

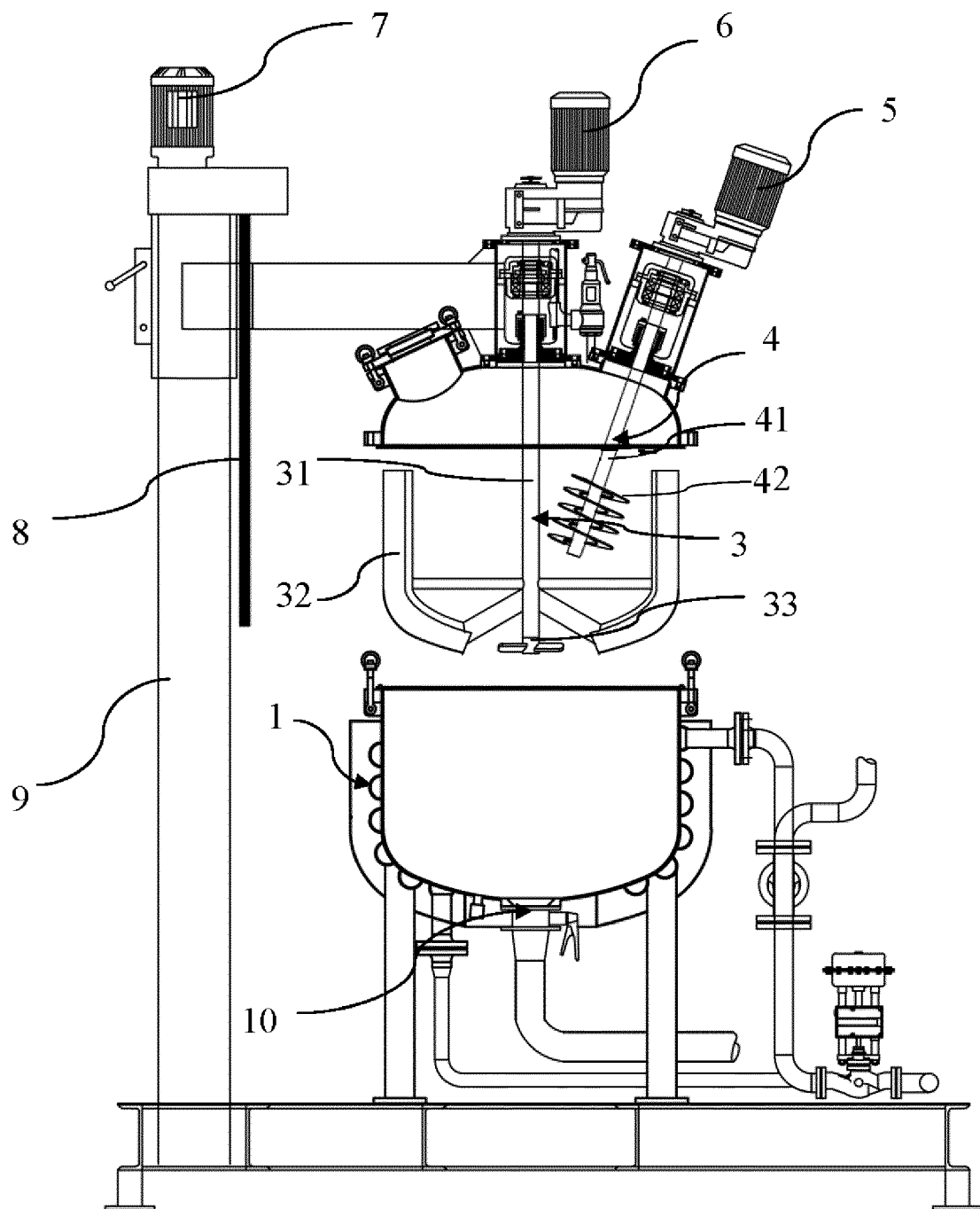


Figure 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/080759

A. CLASSIFICATION OF SUBJECT MATTER INV. B01F7/00 B01F7/02 B01F7/16 B01F7/18 B01F13/10 B01F15/06 ADD. According to International Patent Classification (IPC) or to both national classification and IPC														
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A47J B01F A23L Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data														
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>JP 2000 342951 A (KAJIWARA KOGYO) 12 December 2000 (2000-12-12) abstract figures 1,2,4 paragraphs [0012] - [0026], [0030] - [0033] -----</td> <td>1,3,6-13</td> </tr> <tr> <td>X</td> <td>JP 2001 238805 A (KAJIWARA KOGYO) 4 September 2001 (2001-09-04) abstract figures 1,2,4,6,10 paragraph [0033] -----</td> <td>1-3,6-13</td> </tr> <tr> <td>X</td> <td>US 3 482 823 A (RECHTIN CLARENCE R) 9 December 1969 (1969-12-09) figures 1-9 column 2, line 10 - column 5, line 8 ----- -/--</td> <td>1-4,7-13</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	JP 2000 342951 A (KAJIWARA KOGYO) 12 December 2000 (2000-12-12) abstract figures 1,2,4 paragraphs [0012] - [0026], [0030] - [0033] -----	1,3,6-13	X	JP 2001 238805 A (KAJIWARA KOGYO) 4 September 2001 (2001-09-04) abstract figures 1,2,4,6,10 paragraph [0033] -----	1-3,6-13	X	US 3 482 823 A (RECHTIN CLARENCE R) 9 December 1969 (1969-12-09) figures 1-9 column 2, line 10 - column 5, line 8 ----- -/--	1-4,7-13
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☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.														
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family														
Date of the actual completion of the international search 14 March 2016		Date of mailing of the international search report 18/03/2016												
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Krasenbrink, B												

INTERNATIONAL SEARCH REPORT

International application No
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Information on patent family members

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