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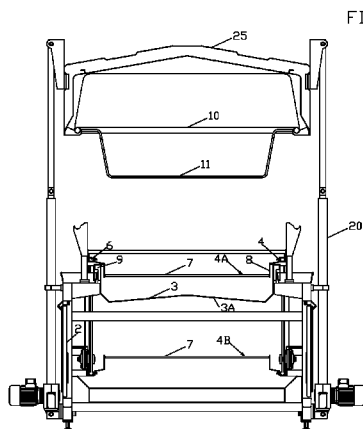
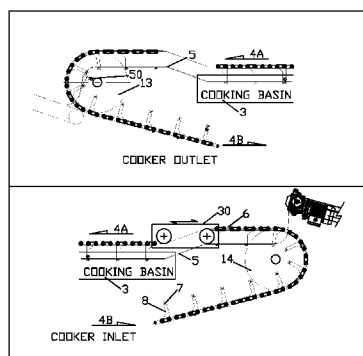
(54) **Title:** APPARATUS FOR COOKING PUFF PASTRY

FIG. 1

(57) **Abstract:** Apparatus (1) for cooking puff pastry (5), of the type comprising an external framework 2, with vertical uprights and isolation walls, for sustaining and supporting the means constituting the machine; cooking means such as at least one steel tank 3, inside said framework 2, adapted to contain cooking water, at least one transport system 4, for picking up and conveying the puff pastry 5 to be immersed in the tank 3. The transport and conveyance system 4 is formed by a series of rods/bars 7 spaced from each other and arranged transverse to the advancement of the pastry 5 in the tank 3; the transmission system for the rods/bars 7 and the pastry 5 is outside the cooking tank. The cooking tank 3 has a bottom 3A with section that allows the passage of vapor, thus creating a vapor-water heat exchange by means of the tank itself; the vapor passing into the bottom 3A transfers heat to the sheet.



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- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *of inventorship (Rule 4.17(iv))*

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DESCRIPTION

TITLE: APPARATUS FOR COOKING PUFF PASTRY

5 FIELD OF APPLICATION OF THE INVENTION

The present finding is inserted in the field of industrial apparatuses for cooking puff pastry and more precisely relates to a continuous cooker device.

STATE OF THE ART

10 Cooker devices for cooking puff pastry are known. The devices of the prior art comprise at least one belt made of plastic mesh (unichain - intralox) or stainless steel which carry the puff pastry - in advancement - inside a tank containing boiling water by means of heat exchanger systems.

15 A first drawback of the prior art is given by the fact that since the transport system is immersed in the tank, it is hard to clean; in addition, over time the starch infiltrates between the meshes and it is necessary to frequently replace both the chains and the belt parts, and in any case the total replacement of the
20 transport unit is required at least once a year.

In addition, systems like those described do not even allow partial lifting of the belt in order to facilitate the cleaning, but rather the complete extraction of the belt is necessary.

Another drawback is relative to the heating system, since
25 currently the following are used:

- heat exchangers outside the tank plus recirculation pump or
- exchangers immersed in the tank
- systems of direct injection of vapor into the tank

5 In the first case, one must insert water in the tank with recirculation pump and create turbulence that tends to move the pastry; in the second case, the starch encrusts the exchanger, which prevents the cleaning; in the third case, direct vapor, it is necessary to use sanitary vapor, and in addition this creates
10 turbulence and causes movements of the pastry.

Further drawback of the prior art is given by the fact that the return of the conveyor belt occurs in the cooking tank itself; in addition, above all for the large-size tanks, there are different foam/starch concentrations between the zones close to the
15 overflow point and those far from this point.

In any case, the cleaning of the system is not optimal, not even with the belts lifted, due to the greater difficulty in accessing the tank (due to the presence of the belts, even if these are lifted) and for the possible presence of heat exchangers.

20 EXPOSITION AND ADVANTAGES OF THE FINDING

Object of the present finding is to remedy the above-lamented drawbacks by providing a cooker apparatus comprising a conveyance system constituted by a series of rods/bars made of stainless steel and spaced from each other, in order to facilitate
25 the cleaning as well as allow a free view of the cooking tank.

A second object of the finding is to supply a transmission system for the steel rods/bars (and hence of the pastry) outside the cooking tank, so as to limit if not eliminate the contact with starches and boiling water, as well as limit/eliminate
5 maintenance.

Another object is to be able to have a cooker with partial exit system for the bars forming the surface of advancement from the water level (30). This occurs with the arrangement of means for lifting the cooking surface defined by the rods in order to give
10 flexibility in the cooking times (immersion in water), in the case of production of puff pastry of different sizes (different pastry advancement speeds).

Another object is to create a vapor-water heat exchange by means of the same cooking tank; the bottom of the tank
15 comprising at least one air space on the bottom for the passage of the vapor; this will allow:

- the use of non-food grade vapor
- increasing the turbulence of the vapor itself between the plates, so as to improve the heat exchange
- 20 - increasing the exchange surface (the entire bottom of the tank)
- limiting the quantity of water since the tank can only contain the pastry and not heat exchange elements
- facilitating the cleaning since it is internally smooth,
25 without any internal element.

Another object is to have a cooker with lower tank separated from the cooking tank, in order to be able to wash/sanitize the round bars before their return into the cooking tank, also using directed nozzles so as to be able to wash the more difficult parts of the rods and thus ensure a complete
5 sanitification.

With regard to the extraction of the starch from the cooking water (such problem discussed above), now the entire perimeter of the tank allows the overflow of the cooking water and hence
10 the discharge of the surface foams, with improved and more uniform quality of the cooking water.

In order to facilitate the automatic exit of the pastry at the end of the cooker, a valve-controlled device has been inserted that allows directing a water jet that assists the extraction of the
15 pastry sheet.

Said objects and advantages are all achieved by the cooking apparatus, object of the present finding, which is characterized for that provided in the below-reported claims.

BRIEF DESCRIPTION OF THE FIGURES

20 This and other characteristics will be more visible from the following description of several embodiments illustrated as a merely non-limiting example in the enclosed set of drawings.

- Figure 1: illustrates the cooking apparatus, object of the finding, in machine cleaning configuration,
- 25 - Figure 2: illustrates the cooking apparatus object of

the finding in cooking configuration.

DESCRIPTION OF THE FINDING

With particular reference to figures 1 and 2, reference number 100 indicates in its entirety a continuous cooker apparatus, i.e. machinery adapted to cooking puff pastry; driving means immerse the pastry inside a tank containing boiling water, maintaining it for the necessary cooking time.

As said above, the prior art makes use of a transport system/means composed of at least one conveyor belt made of metal net, or alternatively made of plastic modular elements.

The present device 1 has an external framework 2, with vertical uprights and isolation walls, for sustaining and supporting the means constituting the machine.

More precisely, the presence of cooking means is observed, such as at least one steel tank 3, situated inside said framework 2, by means of supports 9; the tank being adapted to containing boiling water through the exchange system described below.

In addition, the presence of at least one transport system 4 is observed, for picking up and conveying the puff pastry 5 to be immersed in the tank 3.

The transport system 4 completes a closed-loop path on respective wheels 13 and 14, one of which serves as driving means for a pair of catenaries 6; the wheels 13 and 14 are placed at the start and end of the line, i.e. at the ends of the cooker 1.

The catenaries 6 are arranged longitudinally and on the

external sides of the tank 3.

Therefore, and with reference to the figures, the transport system 4 identifies two advancement surfaces 4A and 4B: the first upper surface is adapted to carry the pastry 5 in advancement and immersion in the tank 3, while the other lower surface is external and actuates the empty return phase below said tank 3.

Said catenaries 6 in turn carry - in advancement - a plurality of bars/sections 7 spaced from each other so as to form the relative aforesaid surface 4A or 4B. Said bars/sections 7 are made of stainless steel and arranged transverse to the advancement of the pastry 5 in the tank 3.

It is specified that with the term bars/sections 7, it is desired to indicate a type of means with any section and nearly linear extension typical of rods, bars or sections. This allows the simplest replacement of the rods as well as facilitated cleaning thereof, with respect to the mesh systems of known type.

As is inferred from the figures, the transmission system constituted by the catenaries 6 and relative drive wheels 13, 14 is situated outside the tank; in order to allow the bars/sections 7 to be immersed in the tank 3 between the bars 7 and the catenary 6, spacer means are interposed which in the embodiment are vertically-arranged rods 8.

The catenary 6 - rods 8 - bars 7 set is maintained together by coupling systems of known type. In other words, each branch 4A and 4B of advancement in the tank and return therefrom,

according to the illustrations, is U-shaped with the ends of said "U" retained by the catenaries, while the rest is retained by the described set 7 and 8.

The system for conveying the pastry 5 comprises, in addition to the movable advancement 4A, also a fixed system 10 adapted to maintain said pastry 5 in position and preventing the free floating thereof.

The system 10 comprises a series of pressure elements 11 such as bars or drawn elements or alternatively a planar surface. Preferably the pressure elements 11 are not arranged like the underlying support sections 7, but rather are arranged like a fishbone, hence angled, with respect to the advancement of the pastry 5 inside the tank 3.

The cooker 1 also comprises lifting means 20 respectively for:

- a covering cover 25, lifting relative to the structure 2,
- the pressure element system 10, lifting relative to the cover (25).

Preferably said lifting means are cylinders with pneumatic or electromechanical actuation.

With reference to figure 1, the cooker 1 is observed in cleaning configuration; all the actuation means 20 have been actuated: the system 10 is spaced with respect to the surface 4A of the bars 7, and the cover 25 is lifted.

That described above allows having a cooker with total

lifting system that is convenient for cleaning; while the partial extraction (first few meters) will serve to give flexibility in the cooking times (immersion in water) in the case of production of puff pastry of different sizes (different pastry advancement speeds), using a trolley movement system (30) that allows the
5 partial extraction of the pastry slide surface formed by the rods (4A), which can be manually or automatically actuated.

With reference to figure 1, the cooker 1 is observed in a possible pastry 5 loading configuration; in such case, the surface
10 4A is arranged in position inside tank 3 and beneath the free surface of the cooking water, while the system 10 is lifted to allow the pastry 5 to be picked up in driving; once the loading of the pastry is executed, cover and system 10 are lowered and arranged as in figure 2, the pastry 5 is situated between the
15 surface of the movable bars 7 and that of the fixed means 11 and advances by means of the advancement of the bars 7, which are themselves in turn driven by the external means 6.

With regard to the vapor-water heat exchange, this is obtained by means of the same cooking tank 3; the bottom 3A of
20 the tank in fact comprises a double bottom made of metal sheets welded together, in a manner such that, at their interior, a passage section for the vapor is created. The vapor passing into the bottom 3A transfers heat to the sheet, which in turn heats the water and brings it to a boil.

25 In the embodiment, reference is made to an apparatus 1 for

cooking puff pastry 5 with means 30 for modifying the immersion point of the rods 7, relative to the structure 2 and tank 3. The means 30 are arranged in pairs at the start of the cooking line such that it is possible to vary the immersion point.

5 Nevertheless, without departing from the protective scope, there may also be more than two pairs of means 30, arranged at the other end in a manner so as to vary the entry or exit of the pastry 5 into/out of the tank: the partial extraction (first few meters) serves to give flexibility in the cooking times (immersion
10 in water) in the case of production of puff pastry of different sizes.

 Finally, the tank 3 is provided with perimeter overflow which allows the overflow of the cooking water over the entire perimeter thereof and hence the discharge of the surface foams, with improved and more uniform quality of the cooking water.

15 In proximity to the toothed exit wheel (13), a device (50) was placed that is adapted to direct a water jet directly on the pastry in a manner so as to facilitate the automatic exit thereof from the cooker, preventing the pastry from returning onto the return surface (4B) formed by the rods.

20

CLAIMS

1. Apparatus (1) for cooking puff pastry (5), of the type comprising an external framework (2), with vertical uprights and isolation walls for sustaining and supporting the means constituting the machine; cooking means such as at least one steel tank (3), inside said framework (2), and adapted to contain cooking water, at least one transport system (4) for picking up and conveying the puff pastry (5) to be immersed in the tank (3); characterized in that said transport and conveyance system (4) is formed by a series of rods/bars (7) spaced from each other and arranged transverse to the advancement of the pastry (5) in the tank (3); and characterized in that the transmission system for the rods/bars (7) and the pastry (5) is outside the cooking tank.
2. Apparatus (1) for cooking puff pastry (5) according to claim 1 characterized in that it comprises means (30) for varying the point of immersion of the rods (7), relative to the structure (2) and tank (3).
3. Apparatus (1) for cooking puff pastry (5) according to claim 1 characterized in that the cooking tank (3) has a bottom (3A) with section that allows the passage of vapor, thus creating a vapor-water heat exchange through the tank itself; the vapor passing into the bottom (3A) transfers heat to the sheet.

4. Apparatus (1) for cooking puff pastry (5) according to claim 1 characterized in that said transmission system completes a closed-loop path on respective end wheels (13) and (14), one of which serves as driving means for a pair of catenaries (6); said catenaries (6) are arranged longitudinally and on the external sides of the tank (3) and they in turn carry – in advancement – the plurality of bars/sections (7) spaced from each other so as to form two advancement surfaces (4A) and (4B), of which the upper surface (4A) is adapted to carry the pastry (5) in advancement and immersion in the tank (3), while the second lower surface (4B) is situated outside the tank for the empty return phase.
5. Apparatus (1) for cooking puff pastry (5) according to claim 4 characterized in that between the bars (7) and the catenary (6), spacer means (8) are interposed that are arranged vertically.
6. Apparatus (1) for cooking puff pastry (5) according to claim 1 characterized in that the system (4) for conveying the pastry (5) comprises a fixed system (10) that is adapted to maintain said pastry (5) in position, preventing it from freely floating.
7. Apparatus (1) for cooking puff pastry (5) according to claim (6) characterized in that the system (10) comprises a series of pressure elements (11), such as bars or drawn elements

or alternatively a planar surface; said pressure elements (11) not being arranged as the underlying support sections (7) but arranged angled with respect to the advancement of the pastry (5) within the tank (3).

5 8. Apparatus (1) for cooking puff pastry (5) according to claim 2 characterized in that the lifting means (30) are arranged in pairs on both sides of the tank and operate so as to vary the entry point of the relative catenary; more than two pairs may also be provided and the added means will be arranged
10 in an intermediate position with respect to the end ones so as to delay or anticipate the entry or exit of the pastry (5).

9. Apparatus (1) for cooking puff pastry (5) according to claim 1 characterized in that the tank (3) comprises an overflow of the cooking water over the entire perimeter thereof.

15 10. Apparatus (1) for cooking puff pastry (5) according to claim 1 characterized in that at the exit of the pastry, in proximity to the toothed wheel (13), it comprises a device (50) adapted to direct a water jet directly on the pastry in a manner so as to facilitate the automatic exit thereof from
20 the cooker.

FIG. 1

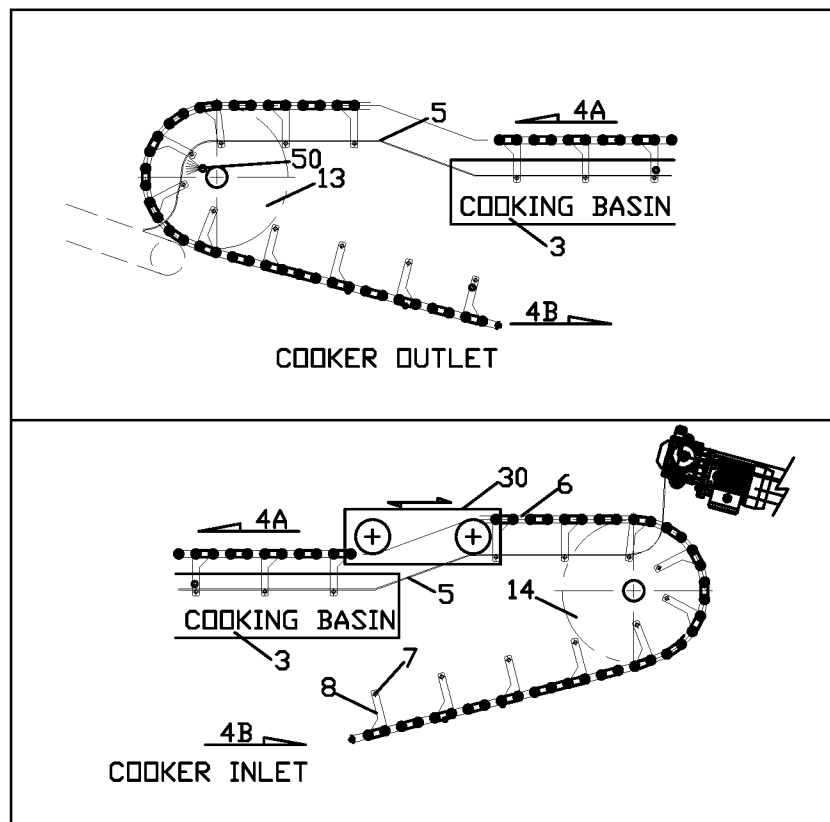
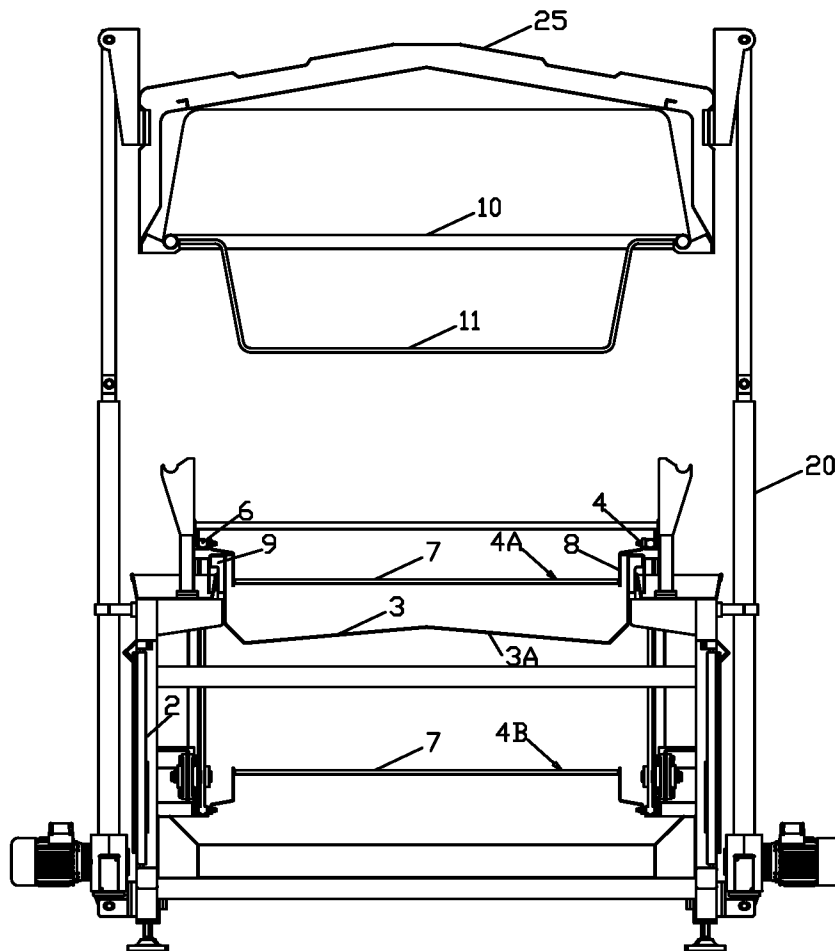


FIG. 2

