BOOTH FOR MANUFACTURING AND DISTRIBUTING FOOD

Field and background of the invention

This invention relates to a booth for manufacturing and distributing food prepared under supply of energy, and more particularly to a booth having wall means to define a working space, said booth comprising at least one energy operated appliance and at least one compartment.

When preparing food under supply of energy, particularly heat energy, but also of electrical energy, manufacture in a booth represents always a certain risk. This risk is caused by the necessity of serving a multitude of customers at certain periods, such as at lunch, in a short time and most efficiently, while any carelessness can cause a fire, burns of the operator or of customers. Thus, more caution is required which leads to slower working and less efficiency. This is the case with all foodstuffs which are heated before eating, such as sausages and other meat, pizzas and other pastries, or snack food.

A further problem is caused by the fact that such a booth has often a certain working period, of which one has to make the most, after which the booth has to be dislodged to another place. Pizza booth' on the market have their appliances, such as oven, refrigerator, dough mixer and doser as well as compartments for the raw material placed separately and are delimited by a relative weak wall to reduce the weight when the booth has to move. This forces the owner or operator either to move all the appliances separately or to risk that they become damaged during transport.

Summary of the invention

Therefore, it is an object of the present invention to reduce the risk in operating a booth of the type described and, at the same time, enhance its and its operators efficiency.

This object is achieved in a surprisingly simple way in that at least one wall, which defines the working space of the booth, is formed by an upright standing first frame subdivided into at least two individual cells, which open towards said space, by at least one

strut member secured to said first frame, at least one cell receiving said at least one energy operated appliance as a module.

By combining appliances and compartments in a common frame, the wall construction is made stiffer and more robust so that the operator cannot easily overturn any of the objects in the booth, even if he works more quickly than it is possible in known booth' of this kind. The at least one strut for forming a cell will reinforce the frame in a similar way, as it is the case with latticework. In this way, the frame and the appliances form a "monolithic" block accommodating at least those parts which are energy operated and, therefore, could constitute a risk. Therefore, it will be understood that the first frame conveniently constitutes the back wall of the booth so that any risky equipment is remote from the customers. Moreover, it will become apparent that such frame-work construction forces to an extremely compact composition of compartments and appliances, thus enhancing efficient work in a small space.

The minimum equipment of such a booth will either be an oven and/or a refrigerator. Just for pizzas, however, certain appliances will add, such as a food mixer, a warm-up compartment, a dough lump doser, a shaping machine or press, a chiller and/or a heat exchanger, the latter being suitably connected to the refrigerator to use its waste heat, although it may also be connected to the oven. It is preferred that one compartment of this first frame contains an electrical control panel, e.g. an electric overload and/or electric shock save limiter circuit or switch.

By using a frame according to the invention, it is also easily possible to "modularise" the booth construction so as to adapt it to different needs, and especially to different production capabilities. To this end, it is suitably provided that at least one strut member being replaceably secured to the first frame to change at least one module. This is preferably done by using a plug-type connection so that modifying the booth can easily be done. Plug-type connections are known in a multitude of forms, as is known e.g. from US-A-5,249,823 or EP-A-0 503 914 and -0 696 685.

One problem to be solved when using a frame construction is how to obtain an easy access to the compartments and appliances. In the prior art, where each component was separate, it was less a problem to replace, mend, or clean the individual appliances. In order to solve this problem and ensure an easy access to each cell (mere compartment or with an appliance in it), it is preferred that at least one cell comprises drawer-like

means, preferably on rolls or wheels, for moving the contents of the respective cell out into the working space.

It has been stated that fire is one important risk in such booth'. Therefore, it is preferred that the first frame comprises a fire extinguisher and/or at least one fire control shutter means located at the side looking to said space, and being preferably accommodated in a casing at top of said first frame, said shutter means being particularly formed from metal. In the case of a fire control shutter, it can be of flexible, fire retardent material, such as described in US-A-5,862,851, but it will be preferred to have it formed from metal, either as a usual metal shutter or composed of metal plates extending transversely to its unrolling direction. In this latter case, the shutter will also act as a barrier against thieves. In any case, when closing the shutter over all the cells of the frame, oxygen access to any fire is, at least, reduced so that any fire will be extinguished by lack of oxygen. To this end, it is suitable to have the sides of the shutter sealed which can be done using one of the lateral guide bars described in the above-mentioned US-A-5,862,851.

To provide more storing capacity, it is preferred that the working space is defined also by a second frame opposite the first frame and being lower than the first one to form a counter or serving bench. This second frame is conveniently also subdivided into at least two individual cells, which open towards the working space, by at least one strut member secured to the second frame, wherein the second frame is free of any energy operated appliance so that all the energy operated appliances are at the back, while the "harmless" cells are in front of the customers.

Since the booth according to the present invention is much stiffer than those of the prior art, at least the first frame may comprise wheels as to be able to dislodge it more easily.

A higher safety should, of course, not be at the expenses of quality. According to another aspect of the invention, an oven is used which meets both requirements. In most known ovens, there is a concentration of heat at some places. This is both dangerous and undesirable with respect to quality of the product, particularly a pastry product (which has normally a larger size than meat products, and is therefore more delicate in equalising the heat energy). Of course, this has been recognised already in the past, and mostly air circulations have been proposed to make temperature more uniform. With pizzas,

however, normally lying on a metal baking tray, the problem is aggravated, because the top of a pizza needs another temperature than the bottom.

According to the invention, the interior of an oven or each chamber of it comprises a surface of refractory material serving as a support surface for the dough and conveying heat energy directly to it. This surface may, in addition be rotated as to be exposed uniformly to the energy of a heater, preferably arranged below. However, rotating means that double space is needed which is rather undesirable. Advantageously, the refractory surface is removably supported for cleansing and replacement. It is quite clear that heat energy control can be provided by controlling it for each chamber and/or for top and bottom of a chamber separately, preferably by a closed-loop control, i.e. having at least one respective sensor.

It has been found that using a refractory surface for receiving the dough, this has not only a beneficial effect on heat distribution, thus lowering the overall energy consumption, but also with respect to quality and taste of the pizzas. In fact, moisture evaporates from the ingredients of a pizza during baking and is received by the pores of a refractory material, such as fire-clay. In the course of further heating the dough, this moisture, which contains also flavouring substances, is transmitted back to the bottom of the pizzas, thus enriching it in flavouring agents.

When speaking about higher efficiency, especially in preparing pizzas, one retarding fact is that fresh dough needs time to rise. Of course, frozen dough might be used, but this is not possible in all cases, particularly when attaching some importance to fresh quality. Normally, dough needs a rising time of some hours. It is known that this time can be reduced to several minutes. However, in the latter case, collapse as soon as it is put out of the warming compartment. To overcome this difficulty it has been found that the use of flour that contains at least one rise controlling enzyme leads to rise a dough within 30 to 40 minutes without the risk of collapsing. Such rise controlling enzymes are preferably those of malt and/or soy beans. Preferably malt or soy flour is used in a blend with ordinary pastry flour.

Brief description of the drawings

Further details and advantages will become apparent from the following description of embodiments described with reference to the drawings in which

Fig. 1 is a perspective view of a booth according to a first embodiment of the invention; whereas

Fig. 2 depicts a perspective view of a preferred, second embodiment of the present invention of which

Fig. 3 shows a front view of the back wall formed by a three-dimensional frame, and

Fig. 4 illustrates a detail of the front counter or serving bench construction including modular struts;

Fig. 5 is a horizontal section along the line V-V of Fig. 2, whereas

Fig. 6 shows a detail VI of Fig. 5 on a larger scale and at on top level (plan view) instead of the level of line V-V;

Fig. 7 is a cross-section along the line VII-VII of Figs. 2 and 3; and

Fig. 8 is a perspective view of an oven according to the invention on a larger scale.

Detailed description of the drawings

According to Fig. 1 and 2 two booth' 1 or 1a of different appearance and structured as a "minipizzeria", are constructed of basically similar modules. The back wall of each booth is formed as a "monolithic", cellular block formed by a basic frame 2 substantially rectangular in plan view. As can be seen when comparing the views of Figs. 3, 5 and 7, the frame 2 consists of at least four uprights 3.1, 3.2, 3.3 and 3.4 interconnected by transverse girders 4.1 to 4.4 at the short sides of the rectangle (Figs. 3, 5) and at least a pair of longitudinal girders 5.1 and 5.2 (Figs. 5, 7). The longitudinal girders 5.1, 5.2 may be subdivided, if desired, by at least one upright, e.g. in the middle of their length, to avoid bending. It is clear that, in principle, this frame-work could be formed by corresponding plates which form its outside surfaces, but this is not preferred, because it adds weight, on the one hand, and it does not facilitate modular extension or reduction of the booth, on the other hand, as will become particularly apparent with reference to Fig. 6.

While the longitudinal girders 5.1, 5.2 interconnect the structure of the back side of the frame 2, the front side, facing a working space 6 (Figs. 1, 5, 7), is reinforced by a casing 7 (Figs. 1-3, 7) that extends parallel to and about in at the same level as the girder 5.1. This casing 7 houses a shutter 8 (Fig. 7) which could be of the type described in US-A-

5,862,851, i.e. made of a fire retarding fabric, but is preferably made of metal. Whenever one of the energy consuming devices, be it electric energy or heat energy, should cause a fire, closing the shutter 8 will suffocate it. To this end, the edges of the shutter 8 are preferably sealingly guided by lateral guide bars 9 (Fig. 1, 7) which can be formed in the way described in the above U.S. Patent, i.e., for example, having a sealing mass that foams under heat. If made of metal, this shutter has the additional function of a protection against thieves. Of course, if desired, the shutter 8 can be omitted, and the casing 7 replaced by another girder. Furthermore, it is to be understood that preferably a lower front girder, parallel to the back girder 5.2, is suitably provided.

In the case of the casing 7 being removed from the frame 2, it is preferred to have the shutter at the outer circumference of the booth, e.g. in a top casing 7a. In this case, the roundings of a roof module 32 (which are avoided with the roof module 32' of Fig. 1) may suitably be covered by a separate shutter. Alternatively, the shutter moves horizontally, e.g. exiting from a lateral slot 7', and may be guided in at least an upper guide bar 7a, a lower one being optionally provided on the counter 34. These alternatives are preferable over a shutter 8 on the frame 2, as depicted in Fig. 7, because it meets better hygienic requirements. A further closing facility may be formed by a door or shutter 8a (Fig. 2) running in a rail (Fig. 2, 5). It is clear that by providing an outer shutter facility at 7' or 8a, energy operated devices may also be located in the front counter 34 (Figs. 2, 5, 7) that is suitably formed by a second frame, to be described later.

The outer contours of the frame 2, formed of uprights 3.1-3.4 and girders 4.1-4.4 and 5.1, 5.2, are supplemented and reinforced by individual longitudinal and/or transverse struts 10 and 11 (only part of them are shown on dotted lines in Fig. 3) which form individual cells to receive, relative tightly, individual appliances and compartments, as described below. These struts, uprights and girders will be referred as "strut members" in the claims. It is preferred, if the struts 10, 11 are releasably secured to the girders 4.1-4.4 or 5.1, 5.2 and/or uprights 3.1-3.4 as to allow extension or reduction of the booth 1 or 1a later on. In Fig. 5, a dotted line 1' shows the outlines of an extended version of the booth 1a, e.g. after the demand of customers has exceeded the capacity of the version shown in solid lines.

Thus, the frame 2 does not only form a quite solid and "monolithic" block which gives the booth' 1, 1a high stability and forms its back wall which ordinarily was formed by a light partition wall extending along the lines of girders 4.1, 5.1 and 4.3 in Fig. 5 which was

easily liable to a fire risk, but forms also a tight structure of the individual components, thus reducing space and enhancing efficiency of work. Moreover, such a sturdy structure can easily transported as a whole without dismounting the individual components. To facilitate the transport, the frame 2 may be provided with rolls 12 (Fig. 2), e.g. supplemented by at least one locking foot 13 which can be lowered (for locking) or raised (for relief). Alternatively, the rolls 12 are vertically moveable. This is, however, not preferred.

In Fig. 3, the struts 10, 11 are shown in dotted lines. The reason is that before them the wall is suitably lined with plates 14 of fire retarding or fire proof material, such as fire clay plates. This is further measure to reduce or eliminate any fire risk. Preferably, the plates 14 (which may be provided all over the whole surface including the lateral surfaces between the transverse girders 4) are replaceably mounted by retaining clips or claws 15 (only the upper ones are shown, but preferably there are lateral ones too). In this way, they can easily be replaced or cleansed. Such plates 14 are especially useful when lining a compartment housing an energy operated device. A further measure is to provide at least one fire extinguisher, e.g. in form of nozzles 16. At the back of the plates 14, the frame 2 may either be without any lining or, preferably have metal plates, such as stainless steel plates. This protects the booth further against fire risks as well as against thieves.

Within this frame 2, the following appliances may be held tightly by struts, girders and uprights: a mixer (kneader) 17 (Fig. 1) or (Fig. 3, in a cabinet) a dough lump 17' doser having a mouth 17a (optionally also a dough drawing machine forming flat pieces); a shaping and sizing device or press 18 (Figs. 1-3) for producing a round pizza form; a refrigerator 19 and a, suitably, adjoining heat exchanger 20 for using waste heat of the refrigerator and heating a warmer compartment 21 (shown open in Fig. 3) for rising the dough. The heat exchanger 20 (or an additional one, e.g. being connected to use the waste heat of an oven 22) may also be used to warm some plates or, preferably, so-called "gastronom"-cassettes or trays in a further warmer compartment 23 up. A further suitable device is a chiller compartment 24 for receiving trays or "gastronom"-cassettes with individual portions of toppings or fillings for the pastry or pizza. At least part of these appliances can be moved out of the frame 2 into the working space 6 by a drawer-like construction known per se and being suitably on rolls, such as the rolls or balls 25 of Fig. 3, to simplify access and for cleansing. This is, for example, the case with a compartment 26 in which portions of yeast can be stored in individual trays. A further compartment 27 accommodates an electric control including safety limiting switches in case of an electric

shock or overload. Arranging such a control panel for energy supply within the frame 2 is a further measure for reducing risks, particularly if this frame 2 forms the back wall averted from any customer.

In practice, the necessary quantity of dry ingredients (flour etc.) are put into the mixer-kneader 17 and are pre-mixed before the liquids are added and mixing is continued. Conveniently, this is under the control of a timer (not shown). Then, individual dough portions are severed, suitably by the dough lump doser 17', so that individual portions are supplied by the mouth 17a. Alternatively, a mouth 17b (Fig. 7) is laterally arranged so that each individual portion can directly fall into a hopper 28 (and into one of the above mentioned "gastronom"-cassettes 29 which may contain 3x4 pieces of dough to be arranged in a matrix. In this alternative, it is preferred to have a table top cover of plastic material adopted by alimentary authorities, and the hopper 28 is integrated into the table plate 31 in such a way that its top is flush with the table's surface. Moreover, in such an alternative embodiment, the refrigerator 19 and the compartment 23 may exchange their position. Afterwards, five cassettes may be stacked on one another so that the upper one closes the respective lower one in an air tight manner. The upper-most may have a lid put on it. These cassettes may be stored in the refrigerator 19 for later use. Some of these cassettes may be put into the warmer compartment 21 for rising.

To accelerate rising without the risk of collapsing of the dough, a flour is used which, according to the invention, contains some rise controlling enzymes, such as malt enzymes including alfaamylase and/or soy enzymes, preferably with some glucose added. These enzymes may be added by adding some malt and/or soy flour. The amount of such additives depends on the rising time desired and may be from 2% by weight up to 50% by weight. Ordinarily, it will be in the range of 5 to 20% by weight, the amount of soy flour, preferably, exceeding that of malt flour. For example, the amount of soy flour may be the 1 to 3 fold of that of malt flour, particularly the double quantity.

The working space 6 (Figs. 1, 5, 7) is suitably also delimited by a counter or serving bench 34 or 34a (Figs. 1, 2), suitably formed by a front frame 102 best seen in Figs. 1 and 4. This front frame 102 may also be used for erecting the counter 34 of Fig. 2. This frame may consist of individual frame modules 102.1 to 102.3 (e.g. to enable extension or enlargement to the line 1' of Fig. 5) reinforced by outer posts 35. These posts 35 may be hollow and may extend substantially up to the counter surface 34' so that alternative support posts 36 or 36' for supporting the respective roof construction 32 or 32' may be

plugged in. In the case of the support posts 36, they carry lamps 37, on the one hand, and a longitudinal girder 5.5 for carrying the roof construction 32' on the other hand. Holes 38 for clamping the support posts 36 or 36' by clamping screws may be provided at any level desired.

In the case of support posts 36' (Fig. 2), they may carry individual roof plates 32a to 32c supplemented by plates 32d carried by the frame 2. In this way, it is easy to replace the middle roof plate 32b (also indicated in Fig. 5 in dash-dotted lines) by a broader one to achieve an enlargement up to the line 1'. To this end, a further frame module may be inserted between modules 102.1 and 102.2 (Fig. 4). In the same way, the surface 34' of the counter 34 may be modularised. The roof construction may also contain some aspiration facility for removing smells and fumes, as is indicated at 42 in Fig. 7. Such an aspiration device 42 is suitably arranged over the frame 2 near the place where the oven 22 is integrated.

In order to extend the frame 2, if desired, the upper longitudinal girder 5.2 (see Figs. 6, 7), onto which the upright is plugged through a hole 5', is hollow, as indicated by dotted lines. In this hollow girder 5.2 an extension piece 5.2' may be inserted which acts either as a girder for the extension to the line 1' (Fig. 5) itself or interconnects the girder 5.2 to a further hollow girder similar to girder 5.2 up to line 1'. For connection, the girder 5.2 and the extension piece 5.2' (at least one of them) may have a series of connection holes 46, 47 for plugging screws or bolts in at the respective one desired.

Moreover, to vary the working space 6 in depth and adapt it to individual space requirement, the counter 34 may be slidable, e.g. on wheels, in a track or rail 39 towards the frame 2 and away from it. In this case, a lateral shutter or door 8a (Fig. 2) can even be omitted, provided that the counter 34 can be locked in a position closest to the frame 2. This may also be an ideal transporting position of the whole booth 1a when moving to another place.

As best seen in Fig. 5, the counter 34 may contain a variety of compartments and/or appliances, preferably those which are not operated by energy, each compartment or appliance being held in a frame-work of struts 110. For example, a water compartment 40 may be provided which accommodates at least one basin 41 (Fig. 2, 5). Another compartment 43 may contain portions of flour corresponding to the quantity required to fill the

mixer 17 for one batch which is accommodated at its side as shown in Fig. 5. Further compartments 44, 45 may be provided for other ingredients.

In a preferred embodiment, an oven according to the invention, particularly having a plurality of completely independent (as to heat distribution) and independently controlled compartments 48 comprising each an upper electric heater 49 and a lower electric heater 50 for top and bottom of a pizza. Typically, toppings of a pizza need a higher amount of energy than the bottom, so that the upper heater 49 may be dimensioned for applying 1000 W, while the lower heater 50 gives only 500 W. The temperature may also be controlled individually by providing an upper sensor 51 and a lower sensor 52. A signal corresponding to the actual temperature measured by these sensors 51, 52 is fed to a comparator 53 and 54 respectively which receives a nominal signal from a respective setting device 55 or 56. In addition, both heaters may be controlled by a timer 57 by actuating a switch button 58 to activate the respective timing circuit, and then adjusting the timer by turning a time selector knob 59.

It has been found important to provide a refractory supporting surface 60 above the lower heater 50 so that burning the bottom of a pizza is avoided due to better heat distribution by this material. Thus, after opening a compartment door 61, the dough to be baked is laid directly onto this refractory material 60 which has the additional advantage of taking up moisture and liquid components from the pizza dough into its pores. In the course of the baking process flavour and aroma dissolved in this moisture is retransmitted and concentrated in the pizza, thus leading to better quality. This refractory supporting surface may be of fire clay and is suitably removable for cleansing and replacing, while being locked in place or simply positively held within the compartment, e.g. by a frame not shown.

It has been shown that numerous variations are possible within the scope of the present invention. Moreover, it will be clear that the invention not only solves the problems discussed in the outset, but results also in a reduction of manufacturing costs, both of the booth itself and of the product manufactured in such a booth, particularly of pizzas.

CLAIMS

1. A booth having wall means for manufacturing and distributing food prepared under supply of energy within a working space (6) defined by said wall means at least in part, said booth comprising at least one energy operated appliance and at least one compartment, **characterised in that** at least one wall means is formed by an upright standing first frame (2) subdivided into at least two individual cells, which open towards said working space (6), by at least one strut (10) member secured to said first frame (2), at least one cell receiving said at least one energy operated appliance (17-24) as a module.

2. Booth as claimed in claim 1, characterised in that said energy operated appliance (17-24) comprises at least one appliance selected from an oven (22) and a refrigerator (19).

3. Booth as claimed in claim 1 or 2, characterised in that said energy operated appliance (17-24) comprises at least one appliance selected from a food mixer (17), a dough lump doser (17'), a warm-up compartment (21), a shaping machine or press (18), a chiller (24) and a heat exchanger (20).

4. Booth as claimed in any of the preceding claims, characterised in that at least one strut member, upright or girder is replaceably secured to said first frame (2) to change at least one module, preferably by using a plug-type connection (Fig. 6).

5. Booth as claimed in any of the preceding claims, characterised in that at least one cell comprises drawer-like means, preferably on rolls or wheels (25), for moving the contents of the respective cell out into said working space (6).

6. Booth as claimed in any of the preceding claims, characterised in that said first frame (2) comprises a fire extinguisher (16) and/or at least one fire control shutter means (8) located at the side looking to said working space (6), and being preferably accommodated in a casing (7) on said first frame (2), said shutter means (8) being particularly formed from metal.

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7. Booth as claimed in any of the preceding claims, characterised in that said first frame (2) forms the back wall.

8. Booth as claimed in any of the preceding claims, characterised in that at least one section of said first frame (2) is lined by fire retarding or fire proof material, preferably by refractory material, such as fire-clay plates (14), suitably mounted in a replaceable fashion, e.g. by holding them by retaining clips or claws (15).

9. Booth as claimed in any of the preceding claims, characterised in that said working space (6) is defined also by a second frame (102) opposite said first frame (2) and being lower than the first one to form a counter or serving bench (34; 34'), said second frame (102) being also subdivided into at least two individual cells (40, 43-45), which open towards said working space (6), by at least one strut member (110) secured to said second frame (102), said second frame (102) being preferably free of any heat energy operated appliance.

10. Booth as claimed in any of the preceding claims, characterised in that at least said first frame (2) comprises wheels (12).

11. Oven, especially for a booth as claimed in any of claims 2 to 10, comprising at least one baking chamber (48) for a dough to be laid onto a supporting surface (60), **characterised in that** the supporting surface (60) is of refractory material.

12. Oven as claimed in claim 11, characterised in that the refractory supporting surface (60) is removably supported in an oven chamber (48).

13. Flour for a booth as claimed in any of claims 3 to 10, for making pastry from dough rising in one of said compartments characterised in that it contains at least one rise controlling enzyme.

14. Flour as claimed in claim 13, wherein said enzyme is selected from a malt enzyme and a soy enzyme.

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