United States Patent [19]

Biber

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[45] **Aug. 27, 1974**

[54] **PORTION POSITIONING APPARATUS, ESPECIALLY FOR DOUGH PORTIONS**

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[73] Assignee: **Hans Beck (Stahlbau-Fertigbau),** Augsburg, Germany

[22] Filed: **Aug. 16, 1972**

[21] Appl. No.: **281,039**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 104,292, Jan. 6, 1971, abandoned.

[30] **Foreign Application Priority Data**

Aug. 17, 1972 Germany 2141168

[52] **U.S. Cl.** ..... **214/1 BD,** 214/1 Q

[51] **Int. Cl.** **B66c 1/24**

[58] **Field of Search** ..... 214/1 BD, 1 Q

[56] **References Cited**

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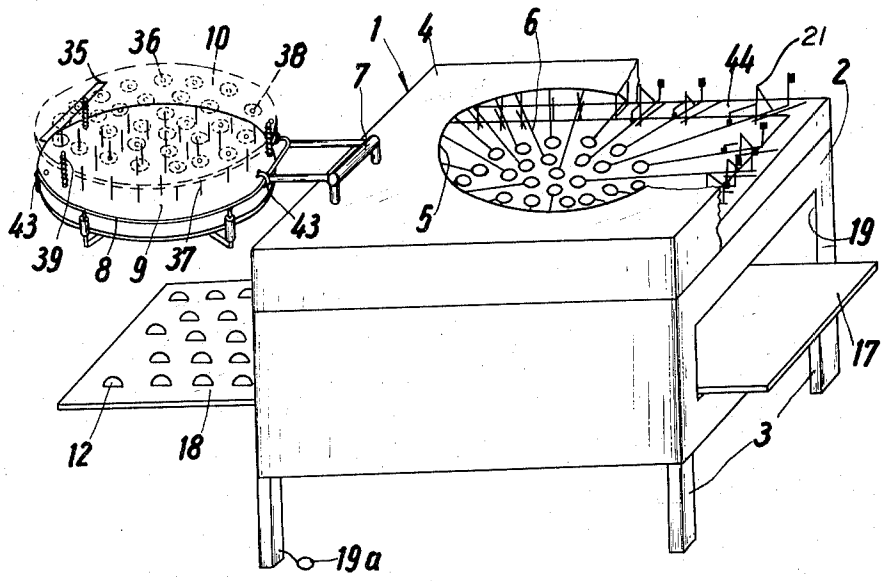
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Primary Examiner—Robert J. Spar
Assistant Examiner—George F. Abraham
Attorney, Agent, or Firm—Wolfgang G. Fasse

[57] **ABSTRACT**

Portions, such as dough portions which must retain their bottoms down position are transferred, for example from a kneading machine, to portion receiving means such as a transport band, by means of a cover member adapted to receive a kneading plate and tiltable by about 180° toward a plurality of transfer arms located above said portion receiving means and also tiltable downwardly for about 45° by the weight of a received portion, whereby each portion is delivered to the receiving means with the bottom facing downwardly. Force exerting means such as spring or counterweight return the transfer arms to their portion receiving position. Preferably, the transfer arms have portion carrying end members shaped as a ring and cooperating with ejector means which reach through the respective ring when the arms are in the portion delivering position.

37 Claims, 13 Drawing Figures



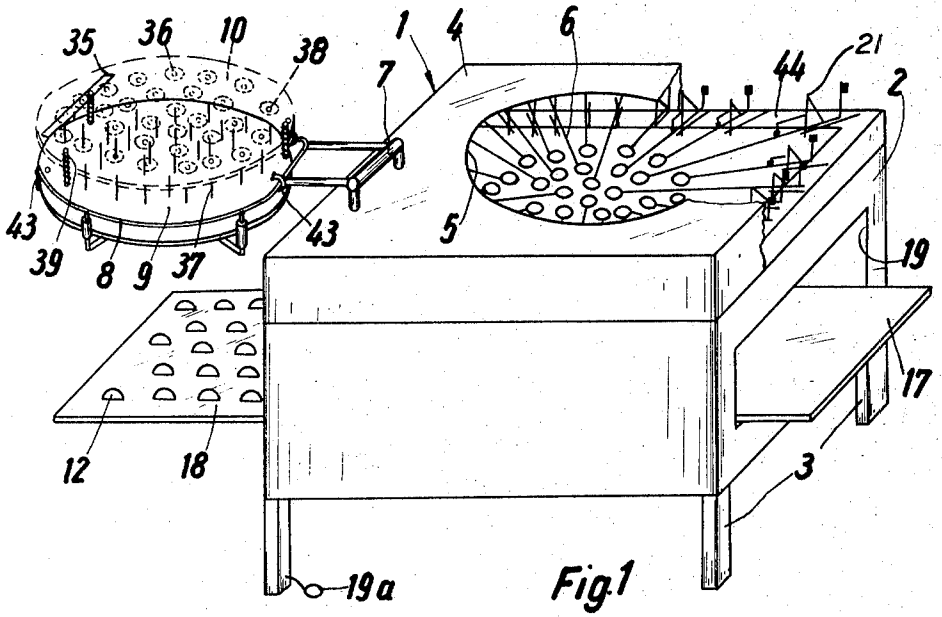


Fig.1

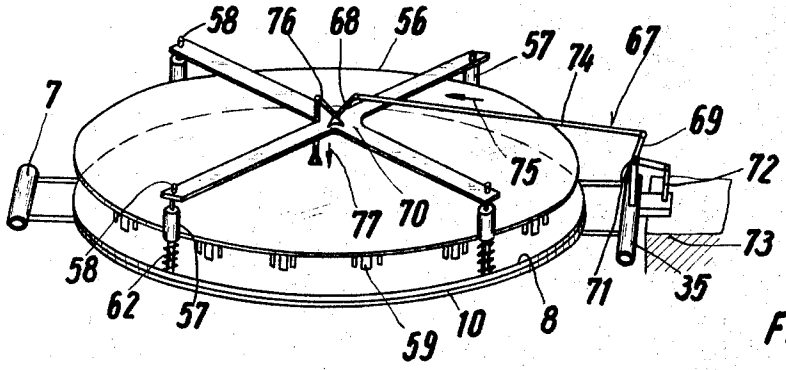


Fig. 8

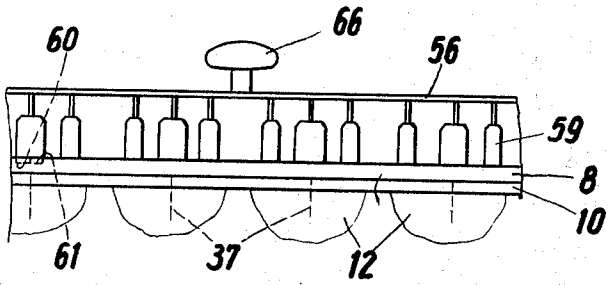


Fig.9

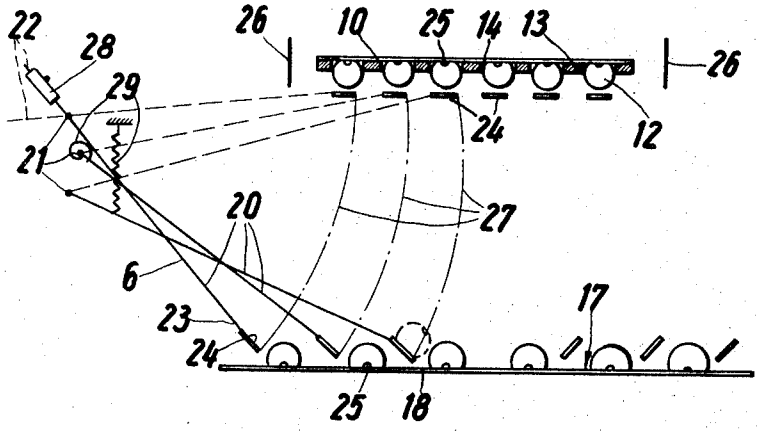


Fig. 2

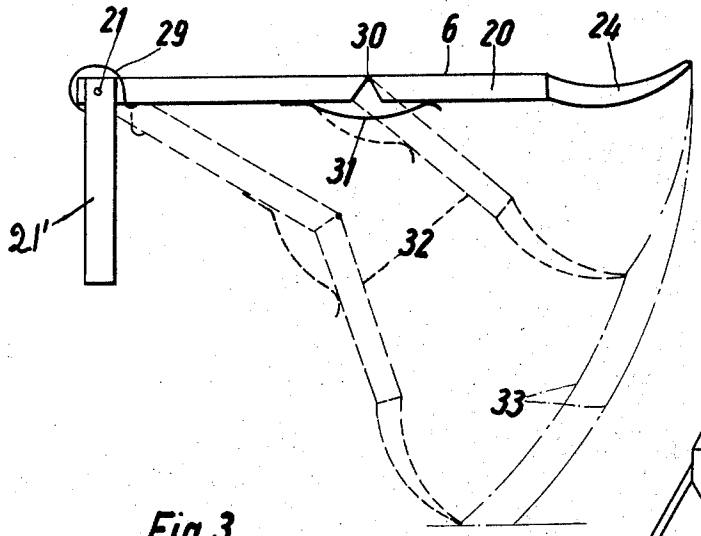


Fig. 3

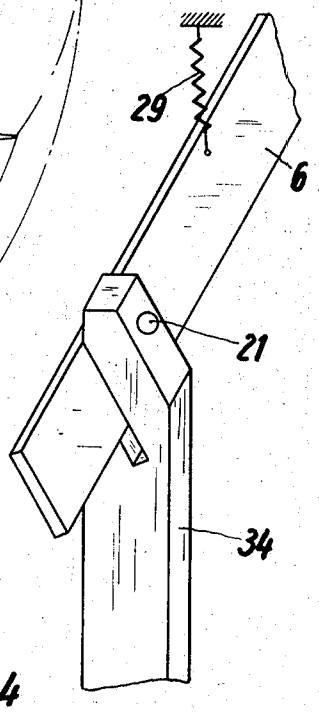


Fig. 4

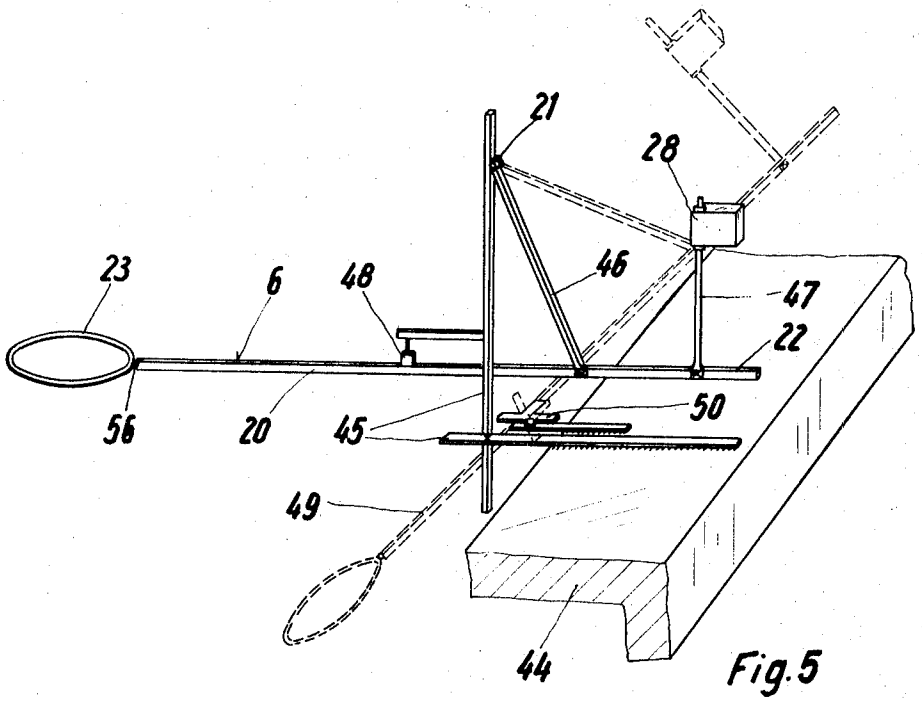


Fig. 5

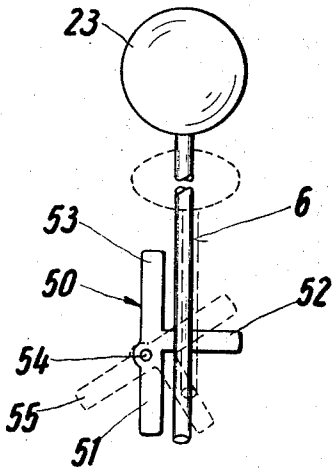


Fig. 6

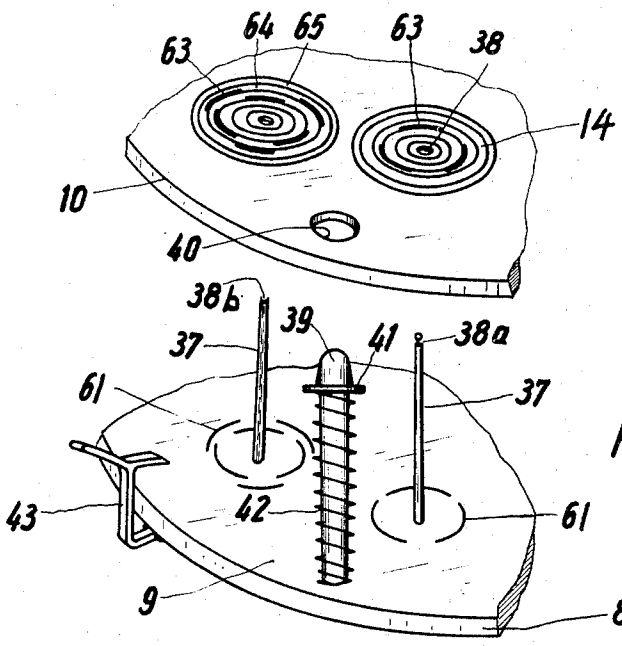


Fig. 7

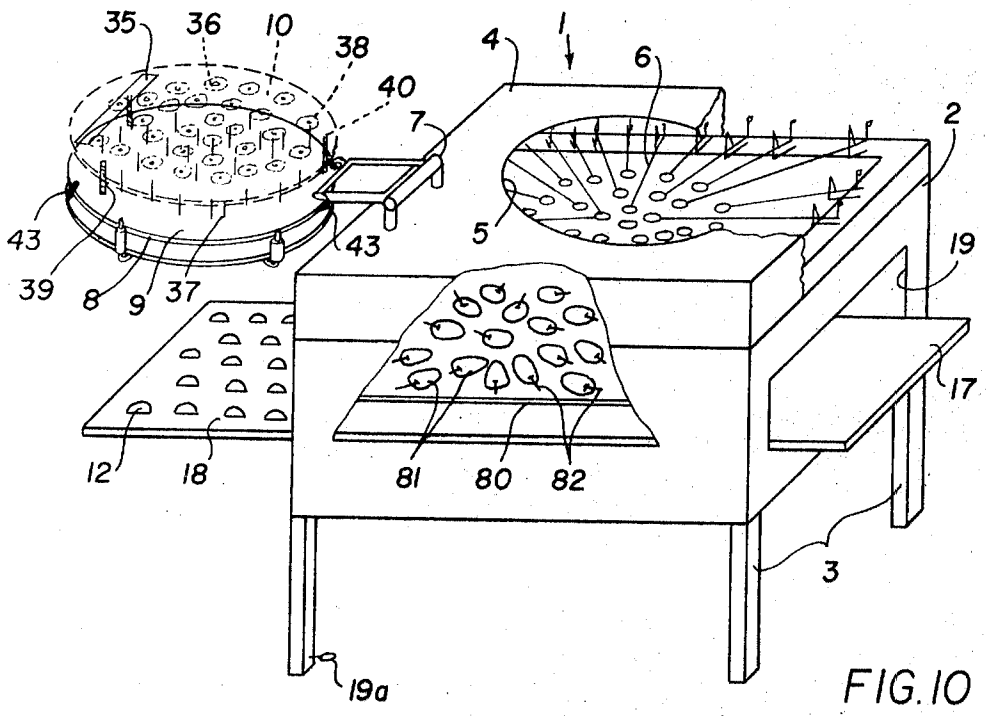

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FIG. 10

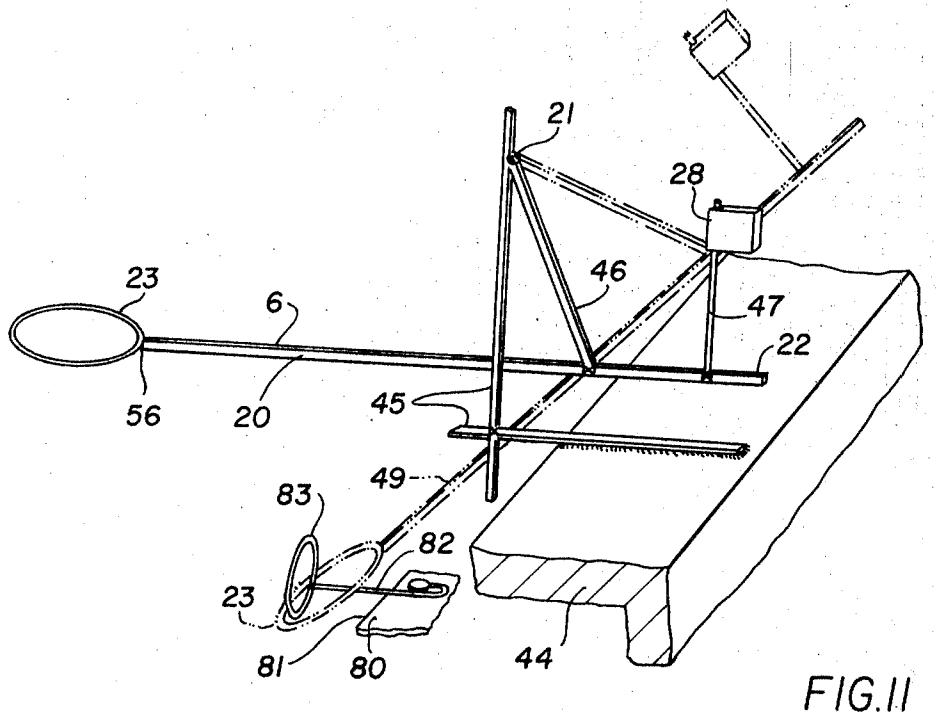

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FIG. 11

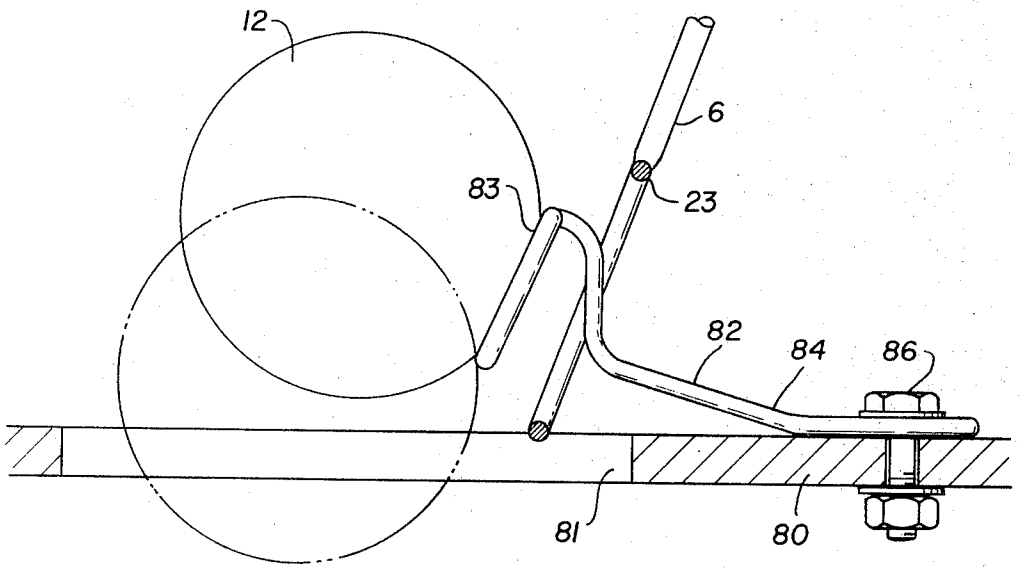


FIG. 12

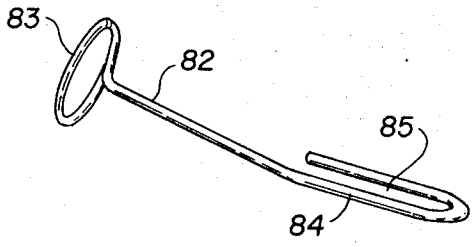


FIG. 13

PORTION POSITIONING APPARATUS, ESPECIALLY FOR DOUGH PORTIONS

This application is a continuation-in-part application of my copending patent application Ser. No. 104,292 filed Jan. 6, 1971 and now abandoned.

BACKGROUND OF THE INVENTION

The invention relates to a portion positioning apparatus, especially for kneaded dough portions from a carrier surface onto a receiving surface having an elevational position lower than said carrier surface, whereby the transfer is accomplished by movable transfer means.

For depositing kneaded dough portions it is necessary that the dough portions always face downwardly with their bottoms in order that the dough will not rip or tear during the so called rising time and so that the shaped dough portion will retain its inner tension. However, this displacing or positioning of the dough portions has caused considerable practical difficulties as far as it is to be accomplished by machines.

A conventional apparatus for the above purpose comprises distributing tubes through which the kneaded dough portions must roll or slide to a receiving surface. The proper arrival of the dough portions so that they will rest on their bottom surfaces is more or less accidental in this type of portion positioning, even if resilient means are employed for imparting to the dough portions a rotation.

Another known apparatus operates with a plurality of finger gripping means in such a manner that the dough portions are seized at the top whereupon they are lifted and laterally deposited. Although these lifting and lateral depositing movements take place in an assured manner, the gripping of the dough portions by the fingers deforms the dough portions too much, which is undesirable for their finished appearance. Besides, the dough portions tend to stick to the gripping fingers and the operational mechanism for performing said gripping and lifting as well as lateral movements is rather complicated comprising a multitude of lever and joint means which make the apparatus not only expensive but also susceptible to mechanical troubles.

OBJECTS OF THE INVENTION

In view of the foregoing, it is the aim of the invention to achieve the following objects singly or in combination:

to overcome the outlined drawbacks of prior art devices;

to provide an apparatus for displacing or positioning dough portions in a fully automatic manner, whereby disturbances of the work flow steps are to be avoided regardless of the consistency of the dough;

to provide an apparatus capable of displacing dough portions of any consistency, that is, the dough portions may have any desired moisture content and/or any desired firmness or stability;

to avoid deformations of the dough portions as well as sticking of the dough portions to the dough portion handling means;

to assure that the dough portions are quickly and simultaneously deposited in uniform positions;

to further assure that the dough portions will always be deposited on their bottom surfaces and to avoid any tendency for rolling away;

to assure the economic feasability of the present apparatus as well as its simple structure and durability;

to provide an apparatus which will function properly and safely;

to assure that two adjacent dough pieces will be maintained at a safe distance from each other so that they cannot interfere with each other and thus will be prevented from interfering with the proper work sequence;

to assure that the portions of dough will be prevented from sticking to a kneading plate or to any other means with which they might come in contact;

to provide an apparatus for exactly positioning the dough portions in a predetermined pattern, whereby the dough portions may be received, for example, in a circular positional pattern and then deposited in a longitudinal positional pattern;

to assure that the dough portions of a group are deposited simultaneously in order to save time as well as labor;

to assure a fast but nevertheless gentle removal of the dough portions from the transfer arms even if soft and/or sticky doughs are being handled;

to avoid that the transfer arms vibrate when they reach their portion delivering position; and

to provide means which will positively remove a dough portion from a transfer arm while simultaneously assuring that the removed dough portion will retain its bottom down position.

SUMMARY OF THE INVENTION

Essentially, the above objects have been achieved according to the invention by the provision of portion transfer arms which serve for displacing or positioning of the dough portions which are being separated from a supporting surface, whereby the transfer arms are tiltably supported for movement toward a portion receiving surface located at an elevation lower than the transfer arms. The transfer arms receive the dough portions initially without any rotation. Stated differently, the dough portions rest initially with their top surfaces on portion receiving ends of the transfer arms. The transfer arms receive the dough portions from carrier means at an instant when the transfer arms are in their receiving, non-moving rest position. This has the important advantage that the dough portions will retain their shape and deformations are avoided. Moreover, since the dough portions are not subjected to any change in position or shape during their transfer from their carrier means to the transfer arms it is assured that the dough portions will be deposited with their bottom surfaces on the surface of the receiving means which is located at an elevation lower than the transfer arms which in turn are located at a location slightly lower than said carrier means in their portion unloading position. This proper depositing of the dough portions with their bottom surfaces downwardly is substantially due to the simple lowering of the transfer arms because this lowering avoids any falling movements of the dough portions and thus also any rolling other than a one half turn. In this connection it is an important feature of the invention that the dough portions are deposited on their bottom surfaces regardless whether the receiving surface is a conveyor belt or a stationary receiving surface. According to the invention the portion receiving ends of the transfer arms are shaped as rings and ejector members are provided for each ring to extend

through the ring when the latter is in the portion delivering position whereby the portions are gently but positively removed from said rings.

BRIEF FIGURE DESCRIPTION

In order that the invention may be clearly understood, it will now be described, by way of example, with reference to the accompanying drawings, wherein:

FIG. 1 is a diagrammatic simplified illustration of an apparatus according to the invention with the carrier means for the dough portions tilted to an open, portion loading position;

FIG. 2 illustrates diagrammatically the portion transfer arms as well as the portion depositing motion performed by these transfer arms;

FIG. 3 shows an example embodiment of a transfer arm according to the present invention;

FIG. 4 shows an example embodiment of tilting bearing means which are provided indivdually for each portion transfer arm;

FIG. 5 illustrates another embodiment of a transfer arm according to the invention, whereby the full line illustration shows the portion receiving position of a transfer arm and the phantom line illustration shows the portion delivering position of said transfer arm;

FIG. 6 illustrates a detail feature of FIG. 5 on an enlarged scale showing a stop holding means including a stop and a retarding holder for the transfer means;

FIG. 7 is an enlarged detail view of FIG. 1 showing the carrier means in an exploded fashion, whereby the carrier means comprise a cover member and a kneading plate arranged on top of the cover member;

FIG. 8 illustrates the portion carrier means in a closed or portion unloading position including means for ejecting the dough portions in response to the closing movement;

FIG. 9 shows in a simplified form a partial side view of the carrier means including a cover member and a kneading plate as well as the device for ejecting the dough portions;

FIG. 10 is a view similar to that of FIG. 1 but ilustrating the general position of the ejector means;

FIG. 11 is a view similar to that of FIG. 5 and illustrates the operation of the ejector means;

FIG. 12 shows the ejector means in a detailed side view; and

FIG. 13 shows a plan view of an ejector member.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

Referring to FIG. 1, the present apparatus 1 comprises frame means 2 supported on legs 3 and closed by a cover means 4 having, for example, a circular opening 5 through which dough portion transfer means, such as transfer arms 6, are visible and which will be described in more detail below. A dough portion carrier means, such as a cover plate 8 is hinged, for example, by a journal or hinge means 7 to the left hand edge portion of the cover means 4, whereby the cover plate 8 is shown in its open, dough portion loading position. The cover plate 8 has an outer surface facing downwardly in the open position of the plate 8 and an inner surface 9 facing upwardly as shown. A kneading plate 10 is shown in phantom lines in FIG. 1 and is positioned on top of the outer surface 9 of the plate 8 as will also be described in more detail below.

Inside the housing or frame means 2 there is located either in a fixed or in a movable position a portion receiving means 18 having a surface 17 located at an elevation below that of the kneading plate 10 and also below that of the transfer arms 6. The receiving means 18 may be provided in the form of a withdrawing device on which the dough portions 12 are deposited in rows and arranged spaced from each other. In order to receive the receiving and withdrawing device 18 with its surface below that of the transfer arms 6, the frame 2 comprises a tunnel 19. The receiving device may also be provided in the form of a conveyor belt at least one run of which moves through said tunnel 19. The hinged cover plate 8 may be moved mechanically by hand for which purpose a handle 35 is provided. It is also possible to move the carrier means with its plate 8 by pneumatic or hydraulic means for which there is shown a foot operated starter or trigger 19*a*. In any event, the cover plate 8 is moved or tilted in such a manner together with the kneading plate 10 that the dough portions 12 will be brought into a position above the portion transfer arms 6.

The schematic illustration of FIG. 2 shows different carrier arms 6 which comprise at least one lever arm 20 supported on pivot axis 21. Each lever arm 20 may comprise an extension in the form of a second lever arm 22 which serves for a weight balancing purpose. The lever arms 20 comprise specially shaped receiving ends 23 which, for example, may be in the form of disks 24, which reach underneath the dough portions 12 when the carrier means such as the cover plate 8 is in its unloading position. The shaped ends 23 need not necessarily be in the form of a disk 24, rather it is possible to provide other shapes for receiving the dough portions. For example, such shapes may have the form of a ring, a flat funnel, a multipoint support means or any other configuration suitable for the particular type of dough to be handled. The basic direction of the disks 24 and the arrangement of their pivotal axis 21 is such that the disks extend substantially horizontally in the home or rest position of the transfer arms 6 so that the disks take up a position underneath the dough portions 12 which hang down from the carrier means such as a kneading plate 10 which has been tilted or journaled by 180° along with the cover plate 8. In the portion delivering position of the transfer arms 6 the disks 24 take up a position at an angle of about 45° relative to the surface 17 which is at a lower elevation than that of the transfer arm, whereby the dough portions 12 which were hanging down from the kneading plate 10 with their bottom surfaces 25 facing upwardly, perform a ½ or 180° revolution so that their bottom surfaces 25 come to rest on the surface 17.

The kneading plate 10 is shown to comprise kneading recesses 14 which are separated from each other by lands 13 so that the dough portions 12 which are resting in said recesses 14 are clearly separated from each other. FIG. 2 illustrates the kneading plate 10 in its unloading position inside an unloading area 26 which may be defined by the opening 5 as seen in FIG. 1. It will be noted that the support axis or pivot axis 21 of the transfer arm levers 20 are located in areas radially outwardly of said unloading area 26. Further, it will be noted that the downwardly tilting movement of the transfer arms 6 with their levers 20 causes a distributed deposition of the dough portions 12 as will presently be explained. The distribution is such that the spacings between the

dough portions **12** on the surface **17** are larger than the respective spacings as defined by the lands **13** on the kneading plate **10.** Furthermore, the transfer arms **6** are distributed around the kneading plate **10** and outside the unloading area **26** as may be seen in FIGS. **1** and **2.** Therefore, the distributed deposition of the dough portions **12** is accomplished on all sides. By using lever arms **20** of different lengths and by positioning the pivot axis **21** at different elevations it is possible to achieve differently curved especially circular depositing motions of the lever arms **20** as is indicated in FIG. **2** by the dash-dotted curves **27.** By employing the just mentioned features it is possible to distribute the dough portions **12** in a longitudinal positional pattern as seen at the left side of FIG. **1,** even though the dough portions are unloaded in a circular pattern as seen at the top of FIG. **1.** These features are especially suitable for use in conjunction with a kneading machine employing a kneading plate **10.** Thus, the present apparatus not only saves time but also can replace substantial manpower requirements.

By supporting the lever arms **20** on upright posts schematically indicated in FIG. **1** and positioned outside the peripheral area of the unloading zone **26** it is assured that the space through which the dough portions **12** must move is free of supporting means for the transfer arms, whereby not only a trouble free operation of the transfer arms **6** is possible but also the above mentioned distribution of the dough portions in a longitudinal positional pattern. In this connection it is particularly advantageous that the dough portion receiving ends of the transfer arms **6** take up a substantially horizontal position for receiving the dough portions and an angular position relative to the surface **17** for depositing the dough portions on the surface **17,** whereby the bottoms **25** face the surface **17.** The preferable angle between the surface **17** and the downwardly tilted arm is about 45°. The substantially horizontal receiving position and the just mentioned tilted delivering position assure that the dough portions are secure from rough handling and that a one half revolution is imparted to the dough portions when they are delivered to the receiving surface **17,** whereby the depositing of their bottom faces **25** is assured.

In order to tilt the transfer arms **6** back into their starting or receiving position after the dough portions **12** have been deposited, it is possible to provide different counter balancing means. For example, FIG. **2** illustrates the use of a counterweight **28** which is adjustably supported on the extension **22** of the lever arm **20.** By adjusting the position of the counterweight **28** along the length of the lever extension **22** a different advantage relative to the pivot axis **21** is accomplished and thus the effect of the counterweight is adjustable. Another possibility of returning the transfer arms **6** into their receiving positions is illustrated by means of springs **29** which may be provided in the form of spiral springs or of helical springs. A helical spring **29** is shown, for example, in FIG. **4.** The effect of the springs may also be adjusted, for example, by changing the point of connection between the spring and the lever arm so as to provide a different mechanical advantage. Preferably, the springs will be connected to the lever arm near the pivot point, that is, near the pivot axis **21.**

Although the portion transfer arms **6** have been illustrated to comprise linear or straight lever arms **20** it is to be noted that these arms could have bent shapes or angular portions, especially if the dough portions **12** in the center area of the kneading plate **10** cannot be reached with sraight transfer arms **6.** Moreover, the transfer arms may comprise several portions which are tiltable relative to each other. An embodiment of a transfer arm of this kind is shown in FIG. **3.** This transfer arm is suitable to perform a composite curved motion. The lever arm **20** is supported at its left hand end on a pivot axis **21** which in turn is supported in an upright post **21'.** A knee joint **30** is provided intermediate the ends of the transfer arm **6.** The knee joint **30** permits a tilting of the shaped end disk **24** of the lever arm **20** relative to the left hand portion of the lever arm preferably against the force of a spring such as leaf spring **31.** The tilted position of the right hand end of the lever arm is shown in the dashed line configuration **32.** The spring **31** is selected to have a force which is smaller than the force of the lever return spring **29,** whereby it is assured that upon receiving a dough portion **12** the right hand end of the lever arm **20** is tilted downwardly prior to the subsequent lowering of the entire arm **6.** In this manner the knee joint **30** causes a change in the location of the circular curve **33** as illustrated in FIG. **3.**

FIG. **4** shows a pivot means for the transfer arm **6** which comprises a bearing block **34** such as an upright post which is connected with its lower end to the frame means **2** and which is provided at its upper end with a slot for receiving an end of the transfer arm **6.** The upper portion of the bearing block **34** is slightly bent so as to locate the pivot axis **21** for the transfer arm **6** at an angle relative to a plane defined by the kneading plate **10.** This feature assures that the transfer arm **6** will be pulled sideways during its lowering movements to follow a predetermined path. Another embodiment of a portion transfer arm **6** and of pivot means for supporting the transfer arm are illustrated in FIG. **5.** The pivot means comprise a supporting structure **45** rigidly secured to a frame member **44** of the frame means or housing **2.** At the top of the upright portion of the supporting structure there is provided a pivot axis **21** for the transfer arm **6.** The transfer arm **6** comprises two rods or bars. One rod **46** is pivoted at its upper end by the axis **21.** The lower end of bar **46** is secured to the other bar **20** of the transfer arm **6** intermediate the end thereof and preferably to provide an angle between the bars **20** and **46.** Preferably the connection between the rod **20** and **46** is adjustable along the rod **20.** The shaped portion receiving end **23** of the transfer arm **6** is formed as a ring and may be adjusted to take up any angular position relative to the arm **6** by means of the pivot **56.**

The extension **22** of the rod or lever arm **20** carries the counterweight **28** which is, contrary to the showing of FIG. **2,** supported on an upright bracket **47** the lower end of which is adjustably attached to the extension **22.** The counterweight **28** is adjustable in its position along the length of the bracket **47.** The main purpose and advantage of the arrangement shown in FIG. **5** resides in the fact that the combination of the transfer arm **6** with the rod **46** which forms an angular knee shaped member and further the combination with the specially supported counterweight **28** result in advantageous motion ratios as well as force ratios, whereby a soft and careful delivery of the dough portions onto the lower surface **17** is achieved.

A buffer which is capable of elastically yielding when it is contacted by the transfer bar or lever **20** is secured to the upright member of the supporting structure **45.** The buffer **48** may be a felt padding and provides a limit stop for the upward return movement of the lever **20.** When a dough portion **12** is deposited on the receiving end **23** its weight tilts or pivots the transfer arm **6** downwardly into the dashed position **49** where again a limit stop and holding member **50** is provided in order to limit the downward movement of the transfer arm **6.**

The stop and holding member **50** is shown in more detail in FIG. **6.** The stop and holding member **50** comprises a bell crank **51** having an arm **52** which in the base or home position of the bell crank **51** interferes with the path of the transfer arm **6** while another arm **53** of the bell crank extends approximately in parallel to the transfer arm **6.** The bell crank **51** is supported on a journal or pivot **54** which extends through the bell crank **51** off-center of a point defined by the intersection of the longitudinal axis of the arm **53** and the arm **52.** When the transfer arm **6** is on its downward path toward the dashed line position **49,** the arm **6** contacts the arm **52** whereby the bell crank **51** is also brought into a dashed line position **55** as shown in FIG. **6.** As a result, when the transfer arm **6** is on its upward movement back into the portion receiving position it contacts the arm **53** of the bell crank **51,** whereby the arm **6** is pushed lightly sideways due to the eccentric or off-center position of the pivot **54.** This sideways movement of the transfer arm **6** distorts the equilibrium of the masses for a certain time until the masses are again balanced and the arm may continue its unimpeded movement upwardly to its home position. The retarding of the transfer arm **6** at the beginning of its return path has the advantage that the dough portion **12** has enough time to get off the transfer arm **6** and safely onto the surface **17** below the transfer arm. Moreover, the stop function of the stop and holding means **50** assures that the dough portion is deposited each time in the same spot. Stated differently, the stop means **50** assure the same position configuration of the dough pieces **12** for each unloading movement. Referring now to FIGS. **1** and **7** it will be noted that it is a feature of this invention to construct the carrier means to comprise a cover plate **8,** the inner surface **9** of which is adapted for receiving said kneading plate **10.** Thus, the cover plate serves several purposes. Essentially it assures that the kneading plate **10** to which the dough portions **12** are attached will always make the same tilting motion, whereby it is turned for about 180° and each time brought into the same position above the transfer arms **6.** Further, the cover plate **8** provides a good and rigid depositary surface for the kneading plate and last but not least it serves as a protective cover for the entire apparatus when it is not in use.

In order to secure the dough portions **12** in fixed positions, especially during the tilting movement of the cover plate **8** and kneading plate **10** so that these portions will remain in their fixed positions during said tilting movement, the journaled cover plate **8** of the apparatus is provided with pins **37** attached to its inner surface **9** so as to extend, substantially perpendicularly from said inner surface and to penetrate from below the kneading plate **10** when it is placed on top of the cover plate **8.** For this purpose the kneading plate **10** is provided with apertures **38** through which the pins **37** extend. These apertures **38** are located in kneading recesses **14** of the kneading plate **10** as best seen in FIG. **7.** Preferably, the apertures **38** extend centrally through each kneading recess **14,** whereby the pins **37** serve as good guide means for the dough portions **12.** It should be mentioned here that the pins **37** may be attached to the cover plate **8** in any suitable manner, for example, the pins **37** may be fastened to the inner surface **9** of the cover plate **8** and the kneading plate **10** is then placed on top of the cover plate **8** as shown in FIG. **1.** Another embodiment or possibility would be to attach the pins **37** to a separate plate (not shown) which would be provided with lever means for pressing the pins **37** through the apertures **38** in the kneading plate **10.** The pins **37** may be hollow tubes which are provided with orifices or apertures, whereby the orifice **38*a*** is provided laterally at the top of the pin **37** whereas the orifice **38*b*** is provided in the form of a longitudinal extension of the bore through the pin **37.** In the embodiment comprising the orifice **38*b*** there would normally be provided but one such orifice, whereas in the embodiment with the orifice **38*a*** there may be several such lateral orifices distributed around the circumference of the pin **37.** The pins are connected to a pressure air system (not shown) in order to provide a push-off operation for facilitating the gliding of the dough portions **12** off the pins **37.** The blower orifices **38*a*** and **38*b***, or rather the air flow under pressure through these orifices assures that the dough portions **12** glide easily off of the pins **37** without sticking thereto. This feature has the important advantage that in the unloading position after the tilting movement of the plate **8** and kneading plate **10** it is not possible for adjacent dough pieces **12** to come into dangerously close contact, wherein pieces could interfere with the precise work function of the apparatus. The friction surface of the thin pins **37** is so small that even very soft and moist doughs which are rather sticky may be handled without any difficulty and will slide off the pins **37** at the time of unloading the kneading plate **10.**

In order to facilitate the placing of the kneading plate **10** which is filled with dough portions **12** onto the inner surface **9** of the cover plate **8** which is provided with said pins **37,** there are provided on the marginal region of the inner surface **9** three guide bolts **39** which are slightly higher than the pins **37.** These three guide bolts **39** fit into three corresponding openings **40** of the kneading plate **10,** whereby the latter is centered relative to the pins **37** which thus may enter their respective apertures **38** in the kneading plate **10.** A washer **41,** supported by a spring **42,** is provided on each guide bolt **39** to provide a support for the kneading plate **10.** The kneading plate is pushed downwardly against the force of the springs **42** and when it is in its proper position the kneading plate **10** is secured in such position by locking means **43** in the form of hooks which are pivoted to the cover plate **8** and which grip around the edge of the cover plate **8** and around the edge of the kneading plate **10.** Thus, the kneading plate **10** is sufficiently secured to the cover plate **8** for the 180° tilting movement. After the unloading of the dough portions the locking means **43** are simply pivoted outwardly to free the kneading plate **10** and the springs **42** will push the kneading plate upwardly for easy removal and a new loading.

In order to assure that the dough portions **12** are released exactly and without any delay from the kneading

plate 10, the invention provides for each pin 37 at least one ejector means in the form of a push rod 59 best seen in FIG. 9. The push rod extends substantially in parallel to the respective pin and it is movable back and forth also in parallel to the longitudinal axis of the respective pin. The push rods may have any desired form and means are provided for operating all push rods simultaneously in order to assure the simultaneous discharge of all dough portions 12 in one load or group. The push rods 59 are attached to a separate presser plate 56' and extend through apertures 61 in the cover plate 8 and through respective apertures 63 in the kneading plate 10. The apertures 61 and 63 are in register with each other so that the push rod may extend through both apertures, whereby it is assured that the push rods are properly guided during their back and forth movement. Another advantage is seen in the fact that the simultaneous operation of the push rods make certain that all dough portions are discharged and none may remain sticking to its pin 37, whereby a smooth and quick unloading of all dough portions is assured. The rather speedy unloading of the dough portions as accomplished by the present invention is especially important in connection with all yeast doughs in order to avoid an overrising, especially where large quantities of doughs must be handled.

It is a further advantage of the present invention that even soft and sticky doughs will be exactly deposited on the transfer arms 6. This advantage could sometimes not be accomplished in the prior art even where these sticky doughs were handled by hand. Yet another advantage is seen in the fact that all push rods 59 become effective simultaneously so that all dough portions are ejected instantly and simultaneously, whereby the unloading of individual dough portions as well as the sequential unloading of dough portions is avoided and a substantial amount of time is saved.

Referring specifically to FIGS. 1, 8 and 9 it will be noted that the presser plate 56' is arranged above the outer surface of the cover plate 8. The presser plate 56' is guided by means of sleeves 57 which are located on upright bolts 58 secured to the cover plate. The sleeves 57 guide the presser plate 56' in such a manner that the latter cannot tilt toward the cover plate 8 nor can it be pressed away from the cover plate. As mentioned, the presser plate 56' carries the push rods 59 for positively and instantaneously removing the dough portions 12 from the kneading plate 10. Furthermore, the push rods 59 are guided with their free ends 60 in the apertures 61 of the cover plate 8. In addition, springs 62 are located between the presser plate 56' and the cover plate 8 for providing a force which tends to separate the two plates, whereby the push rods are normally held in their withdrawn position. To facilitate and simplify the drawings, the sleeves 57 and the upright bolts 58 which guide the presser plate 56' have been omitted from FIG. 9. However, FIG. 7 clearly shows the above mentioned apertures 61 in the cover plate 8 and the apertures 63 in the kneading recesses 14 of the kneading plate 10. These apertures are in register with each other so that the push rods 59 may pass in a guided fashion through both apertures. The apertures 61 and 63 are uniformly distributed along the circumference of circles 64, 65, as best seen in FIG. 7. These circles 64, 65 may have different diameters in order to assure a larger and uniformly distributed surface of contact between the push rods 59 and the respective dough portions 12 to avoid tilting of the dough portions when the push rods 59 act as ejectors for the dough portions 12.

Several possibilities may be employed for pressing the presser plate 56' with the push rods 59 toward the dough portions 12. The simplest embodiment provides a presser handle 66 as seen in FIG. 9 which will be manually operated.

Another embodiment for operating the presser plate 56' in a simple manner is shown in FIG. 8 in the form of a bell crank drive 67 comprising two bell cranks 68, 69. One bell crank is pivotally supported on a cross member 70 which in turn is held in position at its ends by the upright bolts 58 as shown in FIG. 8. The other bell crank 69 is supported by a pivot 71 attached to the handle 35 of the cover plate 8. A pivotal lever 74 interconnects two arms of the bell cranks 68, 69 and an actuating member 72 is attached to the free end of an arm of the bell crank 69. If now the cover plate 8 is tilted out of the open position shown in FIG. 1 into the closed position shown in FIG. 8 the actuating member 72 is necessarily pushed against the fixed frame member 73, whereby the interconnecting rod 74 is moved in the direction of the arrow 75, whereby the bell crank arm 76 of the bell crank 68 is moved downwardly in the direction of the arrow 77 to move the presser plate 56 in the same direction against the force of the springs 62 toward the cover plate 8. The invention is not limited to the specific means illustrated for operating the presser plate 56'.

The apparatus according to the invention operates as follows, when the dough portions 12 have been sufficiently kneaded on the kneading plate 10 in a kneading machine not shown, the dough portions rest on their bottom surfaces 25 and the kneading plate 10 is deposited on the cover plate 8 of the present apparatus in such a manner that the apertures 40 in the kneading plate 10 fit around the guide bolts 39. Thereupon the kneading plate 10 is pressed slightly downwardly and secured in its down position on the inner surface 9 of the cover plate 8 by the locking means 43. Thereafter, the cover plate 8 of the present apparatus is tilted through a half rotation into its closed position shown in FIG. 8. During this tilting movement the dough portions 12 are held securely in their recesses 14 by the respective pins 37. When the closing movement is completed the dough portions come to rest above the receiving ends or disks 24 of the transfer arms 6. When the cover plate 8 reaches its closed position, the actuating member 72 operates, through the bell crank drive 67, the presser plate 56', whereby the push rods 59 press the dough portions 12 out of the recesses 14 in the kneading plate 10 and onto the disk 24 of the transfer arm 6. As soon as the dough portions contact the transfer arms their weight tilts the transfer arms downwardly toward the lower surface 17 where the dough portions are deposited in a distributed rectangular or longitudinal fashion as explained above and again with their bottom surfaces 25 facing downwardly in contact with the surface 17.

FIGS. 10 to 13 illustrate a modification of the present invention and will now be described. Referring first to FIG. 10 this figure illustrates the apparatus according to FIG. 1, however, with the additional improvement that ejector means 82 are provided for assuring a positive removal of the dough portions 12 from the rings 23 which are attached to the ends of the transfer arms 6,

for example, by pivot means **56** as shown in FIGS. **5** and **11.** The ejector means **82** are supported by a support plate **82** which is arranged in the apparatus slightly above the dough portion receiving surface **17.** The plate **80** may, for instance, be inserted into the apparatus to glide along guide rails (not shown) attached to the inner side walls of the housing of the apparatus **1.** The plate **80** comprises apertures **81** which are shaped and located in such a manner that the dough portions **12** may easily pass through these apertures **81.**

The elements which are shown in FIGS. **10** and **11** and which have been described above with reference to FIGS. **1** and **5** will not be described again, however, it should be noted that the structure of the transfer arm means is the same. Thus, the free end **22** of the transfer arms has attached thereto the bracket **47** with an adjustable counterweight **28** all as described above. In other words, no modifications are required with regard to the transfer arms for the cooperation with the ejector means **82.**

As mentioned, the size and shape of the apertures **81** will vary depending upon the requirements resulting from the fact that the transfer arms **6** approach the plate **80** from different directions. In any event the apertures **81** will accommodate the ring shaped ends **23** of the respective transfer arms so that these ends **23** may swing through the apertures **81** and simultaneously leaving enough space for the dough portions **12** to pass through these apertures.

Referring to FIGS. **11, 12** and **13,** the ejector means **82** comprise a wire member **84** one end of which is shaped to form a ring **83** having a diameter smaller than the inner diameter of the ring ends **23** of the arms **6** so that the rings **83** may extend with play through the rings **23.** The opposite end of the wire member **84** is shaped to form a loop **85** which thus defines a longitudinal aperture through which the wire member **84** may be adjustably secured to the plate **80,** for example, by means of nuts and bolts **86** as best seen in FIG. **12.**

Preferably, the wire member **84** and the ejector ring **83** as well as the loop **85** are formed of one piece of non-corrosive material such as stainless steel or plastics material.

The ejector means operate as follows. If a transfer arm **6** which carries on its ring shaped end **23** a dough portion **12** approaches its dough portion delivering position the ejector ring **83** will touch the dough portion while the downward movement of the arm **6** and thus of the ring **23** still continues so that the ring **83** will extend through the ring **23.** During this continued downward motion of the arm **6** the dough portion **12** will thus fall down through the aperture **81** as best seen in FIG. **12,** where the downwardly passing dough portion **12** is shown in dashed lines.

Since the ejector means **82** have a fixed position the direction of passage of the dough portion **12** is determined by such position and the cooperation as just described between the two rings **23** and **83.** Thus, by readjusting the position of the ejector means **82** it is possible to correct the passage of the dough portions **12** and thus their final position on the receiving surface **17.** Especially it is possible to adjust the angular position of the ejector means relative to the transfer arm whereby the ring **83** will impart to the dough portion a slight lateral deviation from its normal path. Especially from FIGS. **12** and **13** it will be noted that a substantial improvement of the operation of the present apparatus has been accomplished by very economical and technically simple elements **80, 82** and **86.**

The combination of the ejector means with the portion transfer arms as taught by the invention has the advantage that the ejector means contact or stop the dough portions at the point on the downward path of the transfer arms which assures with certainty that the dough portions will be positioned on the receiving surface **17** with their bottoms facing downwardly. In this connection it is important that the rings **23** continue their downward movement after said contact so that the ejector means **82** extend through the rings **23** whereby the dough portions are removed from the rings **23** not only simultaneously but also each individual dough portion is removed from its ring **23** along the entire length of contact between the dough portion and the respective ring **23.** Another advantage of the invention is seen in that the time required for the transfer arms to begin their return movement is sufficient to avoid interference between the downwardly passing dough portion and the returning transfer arm. Due to the positive removal assured by the ejector means a uniform downward path is accomplished because these ejector means avoid that any individual points of the dough portions may stick to the respective ring **23.** Otherwise such sticking might influence the downward path of the dough portions by imparting a rotational movement to the dough portions. This has been obviated by the just described improvement according to the invention.

Preferably, the ejector means are also formed as a ring **83** although a disk could replace the ring **83.** However, the ring has the advantage that the ejector forces applied to the dough portion **12** along the circumference of a surface defined by the ring **83** without contacting the dough portion over the entire size of such surface. This feature reduces the danger that the dough portions might tear. Thus, the size of the ring **83** would preferably approach that of the ring **23,** however, a sufficient play will be provided so that the ring **83** may extend through the ring **23** without any difficulty. Further, the ring shape of the ejector also has the advantage of minimizing the possibility of sticking.

Making the ejector means, especially the ring **83** of corrosion resistant materials such as stainless steel or plastics material will meet the hygenic requirements applicable to such food processing apparatus.

Placing all the ejector means **82** on the plate **80** which is insertable into the apparatus after the ejector means have been attached to the plate **80** has the advantage that the assembly of the plate **80** with the ejector means may be accomplished outside the housing **2.** Moreover, since the position of the ejector means **82** is adjustable relative to the plate and thus relative to the movement of the transfer arms, it is possible to influence the downward path of the dough portions and to accomplish precisely the desired resting position of the dough portions **12** on the surface **17.** As mentioned, the longitudinal loop **85** permits the adjustment of the ejector means **82** not only back and forth relative to the ring **83** but also laterally so that the relative angular position may be adjusted to obtain, for example, a slight lateral rolling movement of the dough portions. Incidentally, due to the ejector means it is not absolutely necessary that the rings **23** in their delivering position take up an angle of about 45° relative to the surface **17.**

Although specific embodiments have been described

with reference to the accompanying drawings, it is to be understood, that it is intended to cover all modifications and equivalents within the scope of the appended claims.

What is claimed is:

1. A portion positioning apparatus, especially for portions of dough, for placing said portions from a position in which their bottoms extend downwardly into another position in which said bottoms extend again downwardly, comprising frame means, carrier means for said portions, journal means for movably connecting the carrier means to the frame means, portion transfer means, pivot means for supporting the portion transfer means for free pivotal movement in the frame means, portion receiving means located in said frame means at an elevation lower than that of said carrier means, said portion transfer means being pivotable back and forth between a first position for receiving the portions from the carrier means and a second position for delivering the portions to said portion receiving means, and means biasing said portion transfer means to said first position with a force insufficient to hold the weight of a portion od dough, whereby said portion transfer means is displaced to said second position under the weight of a portion of dough.

2. The portion positioning apparatus according to claim 1, wherein said portion transfer means comprise transfer arms pivoted to said pivot means and each having a shaped portion support end, said carrier means comprising a plate tiltable about said journal means through an angle of approximately 180° between a portion loading position and a portion unloading position, said pivot means for the portion transfer means being located in such a maner in said frame means outside an area covered by said plate in its portion unloading position, that the shaped portion support ends of the portion transfer means reach underneath the plate.

3. The portion positioning apparatus according to claim 1, wherein said portion transfer means comprise transfer arms, said pivot means comprising pivot axes for supporting said transfer arms, at least certain ones of said pivot axes having different elevational positions relative to other ones of said pivot axes, said frame means comprising an unloading area for said carrier means, said pivot means having different spacings from said unloading area.

4. The portion positioning apparatus according to claim 3, wherein said pivot means comprise posts connected with their lower ends to said frame means and having upper ends each carrying one of said pivot axes for pivoting a respective one of said arms, said pivot axes extending at an angle relative to a plane defined by said carrier means.

5. The portion positioning apparatus according to claim 2, wherein said shaped portion support ends of the portion transfer arms extend substantially horizontally underneath said plate when the transfer arms are in said portion receiving position, said shaped portion support ends extending at an angle, preferably of 45°, relative to a surface defined by said portion receiving means when the transfer arms are in said portion delivering position.

6. The portion positioning apparatus according to claim 1, wherein each of said portion transfer means comprises a transfer arm connected to said pivot means, each arm having a portion receiving end and means for adjustably interconnecting the portion receiving end to its respective arm.

7. The portion positioning apparatus according to claim 1, wherein each of said portion transfer means comprises lever means connected to said pivot means for swivelling between said portion receiving position and said portion delivering position, and force exerting means operatively connected to said lever means for returning said lever means to said portion receiving position after the lever means has been moved to the portion delivering position by the weight of a received portion.

8. The portion positioning apparatus according to claim 7, wherein said lever means are portion transfer arms each comprising a portion receiving end, knee joint means for connecting each of said portion receiving ends to its respective arm, said arms beinng movably connected to said pivot means, said knee joint means having a limited swivel range and being located between said pivot means and said portion receiving end, and resilient means operatively connected to said portion receiving end for counteracting movements of said knee joint means, said resilient means having a force which is smaller than the force of said force exerting means.

9. The portion positioning apparatus according to claim 7, wherein said lever means are arms with portion receiving ends, said pivot means being arranged in said frame means so that the portion receiving ends of the lever means constitute a substantially circular position configuration when the lever means are in their portion receiving, upper position, said portion receiving ends constituting a longitudinal position configuration when the lever means are in their portion delivering, lower position.

10. The portion positioning apparatus according to claim 7, further comprising means operatively connected to the force exerting means for varying the effect thereof.

11. The portion positioning apparatus according to claim 2, wherein each of said portion transfer means comprises lever means including two bars, connection means for connecting one bar to the other at an angle, said pivot means comprising a post and a pivot joint on said post to which said one bar is pivoted so that the other of said bars extends substantially horizontally when the transfer means are in said portion receiving position, said pivot means further comprising means for supporting said post in said frame means in a location outside an area surrounding said carrier means when the carrier means are in their portion unloading position, whereby the substantially horizontally extending bar clears said carrier means when the latter is in said portion unloading position.

12. The portion positioning apparatus according to claim 11, wherein said connection means are adjustable along the length of said other bar intermediate its ends, said portion transfer means further comprising force exerting means adjustably connected to said other bar between an end of the other bar and said connection means.

13. The portion positioning apparatus according to claim 12, wherein said force exerting means comprise an arm connected to said other bar between an end of the other bar and said connection means, and a counterweight adjustably supported along said arm.

14. The portion positioning apparatus according to claim 1, further comprising means for elastically buffering said portion transfer means when the latter return to said portion receiving position.

15. The portion positioning apparatus according to claim 1, further comprising stop holding means arranged in said frame means to cooperate with said portion transfer means for stopping said portion transfer means to limit the pivoting movement thereof in said portion delivering position and for temporarily retarding the pivoting movement of said portion transfer means back to said portion receiving position.

16. The portion positioning apparatus according to claim 15, wherein said stop holding means comprise bell crank means each having two arms, hinge means for rotatably locating said bell crank means in said frame means so that one of said arms is in the way of the corrresponding portion transfer means when the latter moves toward said portion delivering position, and that the other of said arms is in the way of said corresponding portion transfer means when the latter moves back toward said portion receiving position, whereby the movement of the portion transfer means brings the bell crank arms into their respective operative positions.

17. The portion positioning apparatus according to claim 16, wherein said hinge means are located in said bell crank means in a position off center relative to a center defined by the intersection of the longitudinal axes of said bell crank arms.

18. The portion positioning apparatus according to claim 1, wherein said portion carrier means comprise a cover member with an inner surface and an outer surface and a kneading plate, means on said inner surface for receiving said kneading plate adjacent to said inner surface, said cover member being journaled to the frame means above said portion transfer means by said journal means for moving the cover member along with the kneading plate back and forth between a portion loading position and a portion unloading position.

19. The portion positioning apparatus according to claim 18, wherein said cover member comprises a number of pins having a given length, means for holding the pins to extend out of said inner surface of the cover member, apertures in the kneading plate through which said pins extend when the kneading plate is located on said inner surface of the cover member, said portion transfer means comprising a plurality of transfer arms corresponding in number to said number of pins.

20. The portion positioning apparatus according to claim 19, wherein said kneading plate comprises a plurality of depressions facing away from said inner surface of the cover member, said apertures for the pins being located centrally in each depression, whereby the pins pass through their respective apertures when the kneading plate is placed on said inner surface of the cover member.

21. The portion positioning apparatus according to claim 19, wherein said kneading plate comprises a plurality of depressions facing away from said inner surface of the cover member said apertures for the pins being located centrally in each depression, and means for moving said pins through said centrally located apertures in the cover member, after the kneading plate has been inserted on said inner surface of the cover member.

22. The portion positioning apparatus according to claim 19, wherein said pins comprise tubular members comprising a central, longitudinal hole and orifice means in said tubular members connected to said central hole, blower means, and means for connecting the blower means to the tubular members.

23. The portion positioning apparatus according to claim 19, wherein said kneading plate receiving means comprise a number of guide studs attached to said inner surface of the cover member, and distributed along the margin of the cover member, resilient abutment means arranged for cooperation with said guide studs, said guide studs having a length exceeding that of said pins, said kneading plate having a like number of guide holes therein for receiving said guide studs.

24. The portion positioning apparatus according to claim 18, further comprising locking means pivoted to said cover member for securing the position of the kneading plate relative to said cover member.

25. The portion positioning apparatus according to claim 1, further comprising means operatively connected to said carrier means for tilting the carrier means about said journal means, and trigger means connected to said tilting means for effecting said tilting to move said carrier means sucessively back and forth between a portion loading position and a portion unloading position.

26. The portion positioning apparatus according to claim 19, further comprising push rod means arranged on said outer surface of said cover member, perforations in said cover member, respective perforations in said kneading plate adjacent to each pin and in register with said perforations in the cover member, means for moving said push rod means through said perforations substantially in parallel to said pins, all of said push rod means extending simultaneously through the cover member and through the kneading plate when the carrier means are in said portion unloading, whereby the push rods operate as ejectors for the portions on the pins.

27. The portion positioning apparatus according to claim 26, further comprising a pressure plate, means for connecting said push rod means to said pressure plate, means for movably supporting the pressure plate adjacent to said outer surface of the cover member, means operatively connected to said pressure plate for raising and lowering the pressure plate, whereby the push rod means are guided in said perforations, especially in the perforations of the cover plate.

28. The portion positioning apparatus according to claim 27, further comprising holding means for said pressure plate including stay bolts and sleeves arranged along the margin on the outer surface of said cover member for movably holding the pressure plate in position above said outer surface of the cover member, and resilient means arranged between the cover member and the pressure plate for counteracting the ejector movement of the pressure plate and returning the latter to a loading position after ejection of the portions.

29. The portion positioning apparatus according to claim 27, wherein said means for raising and lowering the pressure plate comprise a handle attached to said pressure plate.

30. The portion positioning apparatus according to claim 27, wherein said means for raising and lowering the pressure plate comprise bell crank and lever drive means as well as an actuator member, a fixed member

on said frame means positioned for cooperation with said actuator member, and means for interconnecting the bell crank and lever drive means with said actuator member, whereby the raising and lowering of the pressure plate is linked to the movement of the carrier means between said loading and unloading positions.

31. The portion positioning apparatus according to claim **1,** wherein said portion transfer means comprise transfer arms pivoted to said pivot means, each transfer arm having a ring shaped portion support end, said apparatus further comprising ejector means located in the apparatus for cooperation with the respective ring shaped portion support end of the transfer arms when these support ends are in a portion delivering position.

32. The portion positioning apparatus according to claim **31,** wherein said ejector means comprise an ejector member for each of said transfer arms, said ejector member extending through the ring shaped end of the respective transfer arm.

33. The portion positioning apparatus according to claim **32,** wherein each ejector member also has a ring shaped end arranged to extend with play through the ring shaped end of the respective transfer arm.

34. The portion positioning apparatus according to claim **32,** wherein said ejector member is made of corrosion resistant material.

35. The portion positioning apparatus according to claim **32,** wherein said ejector means comprise a connecting arm for connecting the respective ejector member to the apparatus, said connecting arm having an elongated aperture at its end opposite said ejector member, and means for adjustably securing said connecting arm through said elongated aperture to the apparatus.

36. The portion positioning apparatus according to claim **35,** wherein said ejector member, said connecting arm, and said elongated aperture are formed from one piece of wire which has formed an elongated loop at one end thereof and a ring at the other end thereof.

37. The portion positioning apparatus according to claim **32,** wherein said ejector means comprise a support plate arranged in said apparatus slightly above said portion receiving means, means for adjustably securing each ejector member to said support plate, and apertures in said support plate for said portions to fall through the support plate onto said portion receiving means.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,831,778 Dated August 27, 1974

Inventor(s) Rupert Biber

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

[30] Foreign Application Priority Data

January 10, 1970	Germany	2001020
May 21, 1970	Germany	2025018
August 17, 1971	Germany	2141168

Column 13, line 24 change "od" to --of--

Column 14, line 17 change "beinng" to --being--

Column 16, line 38 after "unloading" insert --position--.

Signed and sealed this 8th day of April 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
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