Sept. 20, 1955 L. D. HOULIS 2,718,200

REEL ASSEMBLIES FOR TRAY TYPE REVOLVING OVENS

Filed June 20, 1949 3 Sheets-Sheet 1

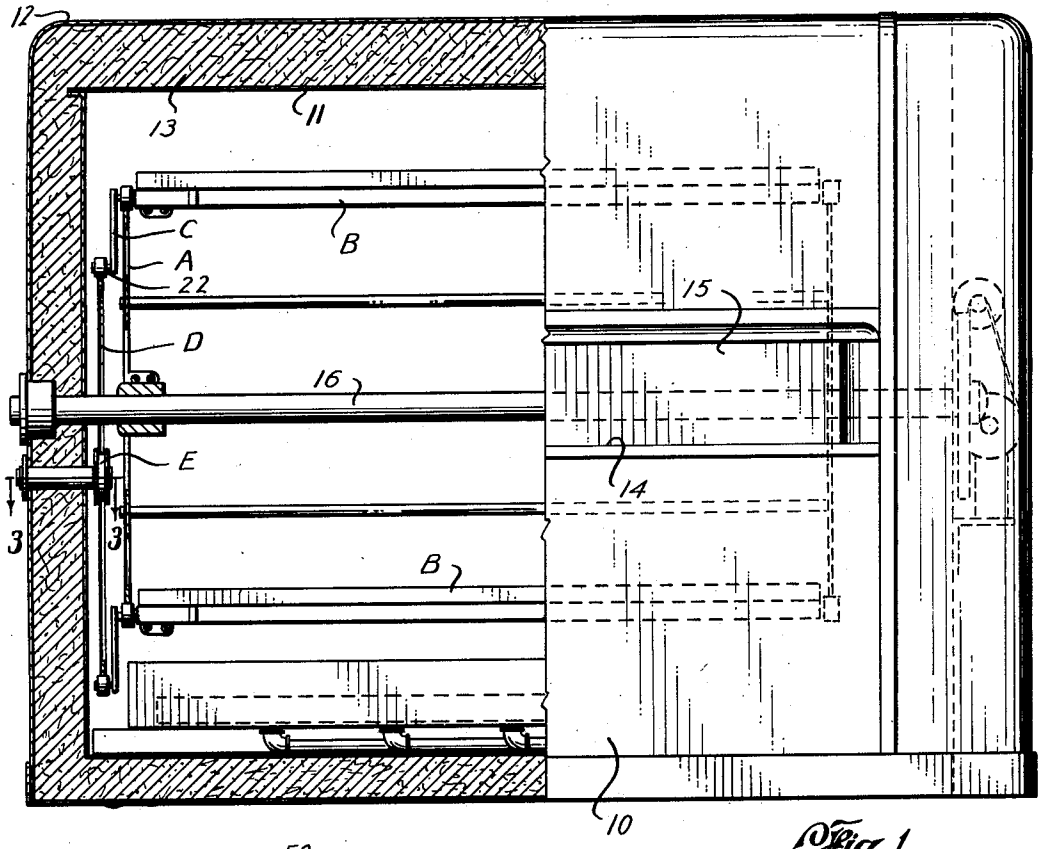


Fig. 1

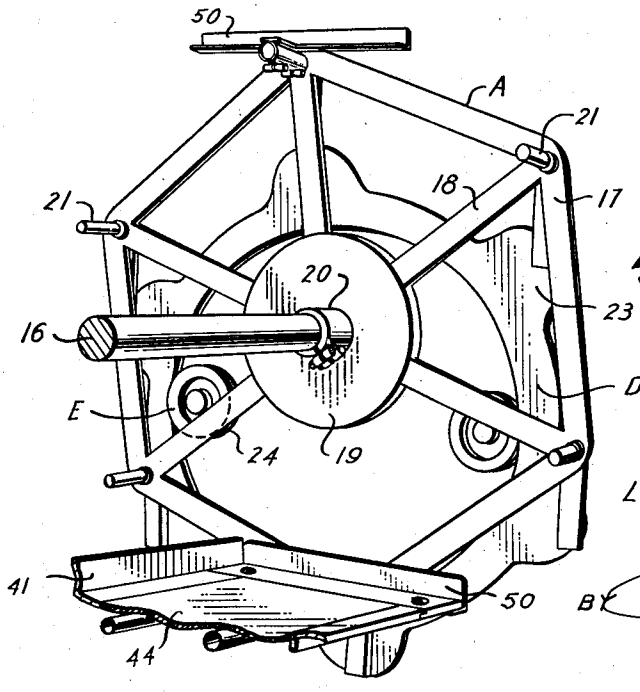


Fig. 2

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REEL ASSEMBLIES FOR TRAY TYPE REVOLVING OVENS

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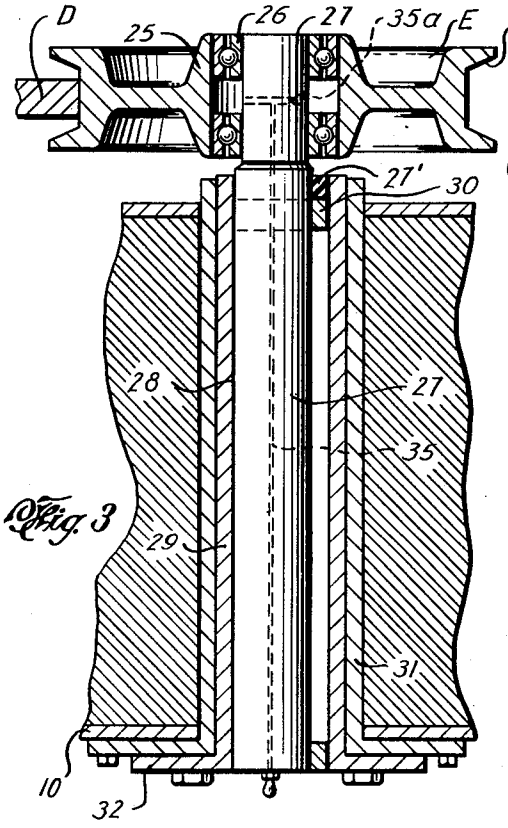


Fig. 3

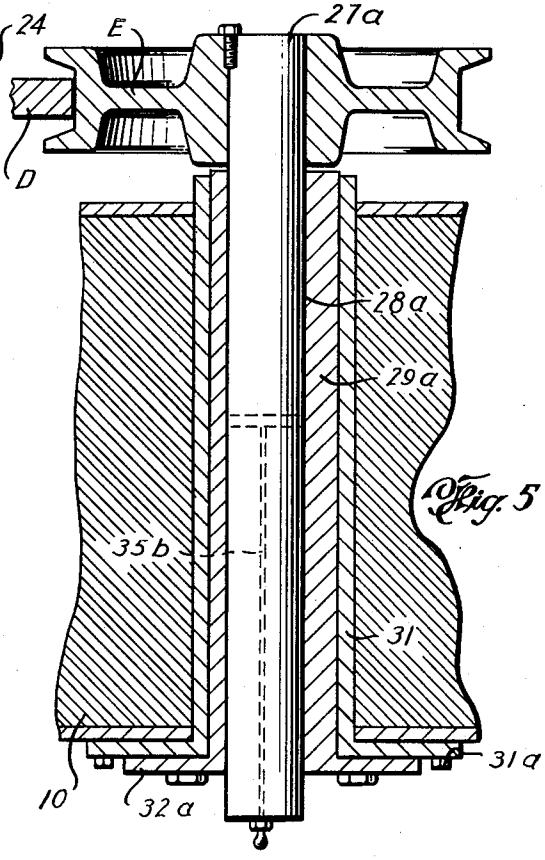


Fig. 5

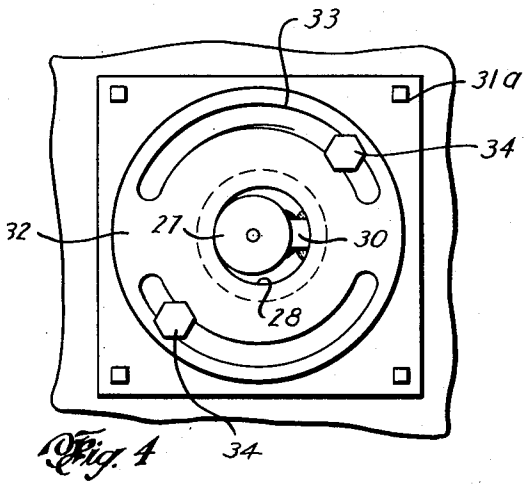


Fig. 4

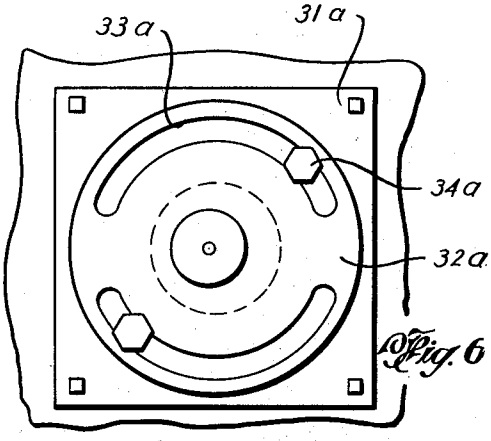


Fig. 6

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REEL ASSEMBLIES FOR TRAY TYPE REVOLVING OVENS

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Fig. 7

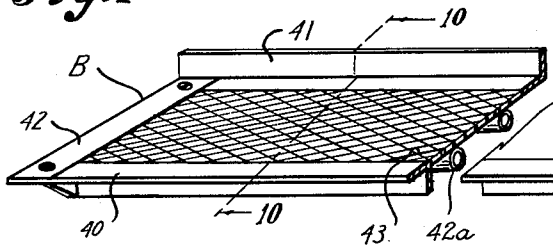


Fig. 8

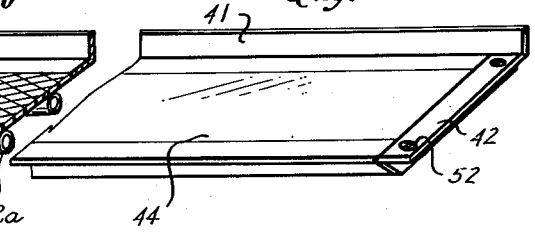


Fig. 9

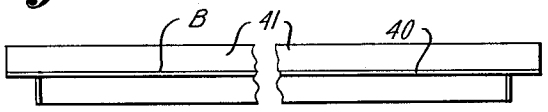


Fig. 10

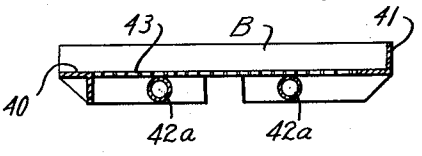


Fig. 16

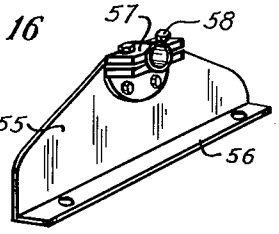


Fig. 13

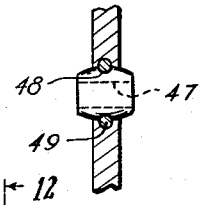


Fig. 14

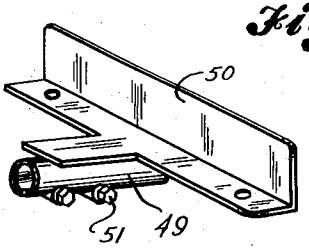
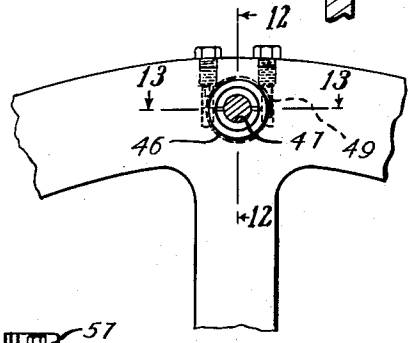


Fig. 11



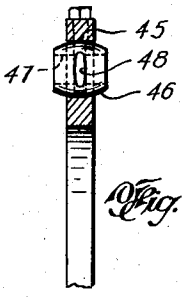


Fig. 12

Fig. 17

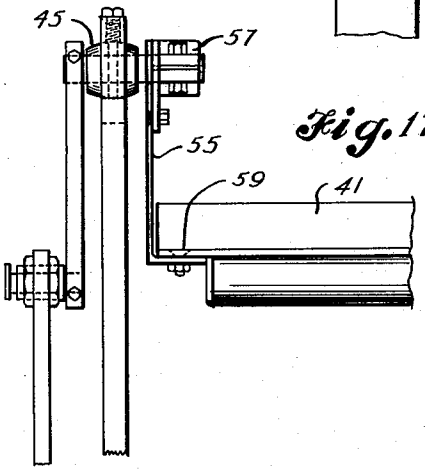
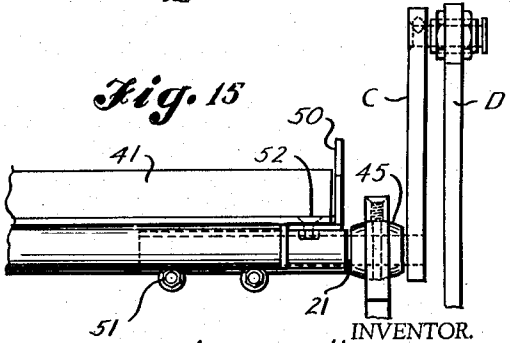


Fig. 15



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REEL ASSEMBLIES FOR TRAY TYPE REVOLVING OVENS

Louis D. Houlis, Dallas, Tex.

Application June 20, 1949, Serial No. 100,202

17 Claims. (Cl. 107—59)

This invention relates to new and useful improvements in reel assemblies for tray type revolving ovens.

One object of the invention is to provide an improved reel assembly for bakers' ovens which is extremely simple in construction and which is readily applicable to any of the usual revolving tray type bakers' ovens now in general use.

An important object of the invention is to provide a reel assembly for tray type revolving ovens and having an improved stabilizer mounting which is readily adjustable from the exterior of the oven, whereby proper operation of the reel is assured under all temperature conditions.

Another object is to provide a reel assembly for bakers' ovens, wherein a stabilizing ring is associated with the reel for stabilizing the trays of said reel during rotation of the reel; said assembly including means coacting with the stabilizer ring for properly guiding said ring in its rotative movement and being readily accessible from the exterior of the oven, whereby accurate adjustment of said guide means may be accomplished during operation of the oven.

Still another object is to provide a reel assembly, of the character described, having an improved tray unit and mounting for attaching the unit to the reel in a desired manner, whereby each tray may be suspended from the reel by a hanger or may, if desired, be of the so-called hangerless type; the mounting being such that the tray unit is interchangeable with either type of suspension.

A further object is to provide an improved tray unit structure for the reel assembly of an oven which is so constructed that any desired type of surface, such as solid, perforated or screened, may be applied thereto; said structure being readily applicable to a hanger suspension on the reel or to axial mounting on the supports provided therefor on the reel, whereby the said structure is interchangeably usable as a hanger-type or a hangerless tray.

Still another object is to provide an improved tray mounting for reel assemblies which includes a simply constructed, self-aligning bearing member for supporting the tray unit on said reel.

Other and further objects of this invention will appear from the following description.

In the accompanying drawings which form a part of the instant specification, are to be read in conjunction therewith, and wherein like reference numerals are used to indicate like parts in the various views:

Figure 1 is a view partly in section and partly in elevation of a bakers' oven having a reel assembly, constructed in accordance with the invention, mounted therein,

Figure 2 is an isometric view of one of the reel members and illustrating its associated stabilizing rings,

Figure 3 is a horizontal cross-sectional view taken on the line 3—3 of Figure 1,

Figure 4 is an end elevation viewing the structure of Figure 3 from the exterior of the oven,

Figure 5 is a view similar to Figure 3 showing a slightly modified form of mounting for the stabilizer guide wheels,

Figure 6 is an end elevation of the parts shown in Figure 5 viewing the same from the exterior of the oven,

Figure 7 is a partial isometric view of the tray structure illustrating the same covered by a perforated screen,

Figure 8 is a view similar to Figure 7 illustrating the tray having a solid plate covering,

Figure 9 is a side elevation of one of the trays,

Figure 10 is a transverse sectional view taken on the line 10—10 of Figure 7,

Figure 11 is an enlarged elevation of the bearing which mounts the supporting pin for the trays,

Figure 12 is a vertical sectional view taken on the line 12—12 of Figure 11,

Figure 13 is a horizontal cross-sectional view taken on the line 13—13 of Figure 11,

Figure 14 is an isometric view of the bracket which mounts the trays axially of the supporting pin on the reel,

Figure 15 is a partial side elevation of the bracket shown in Figure 14 and illustrating a tray attached to the reel,

Figure 16 is an isometric view of a hanger for the trays, and

Figure 17 is a partial side elevtaion illustrating the mounting of the tray by means of the hanger upon said reel.

In the drawings, the numeral 10 designates a bakers' oven which may be of the usual construction consisting of an inner wall 11 and an outer wall 12 having suitable insulating material 13 therebetween. The front wall of the oven has an access opening 14 which is adapted to be opened and closed by the usual sliding door 15.

Mounted within the interior of the oven upon a longitudinally extending shaft 16 is a reel assembly and said assembly includes spaced end members A which are connected by trays B. Each tray is connected through a link C with a stabilizer ring D and the end members A are clamped or otherwise fastened on the rotatable shaft 16. The stabilizer ring D is guided in its movement by flanged guide wheels E and said ring functions to stabilize the trays B as the reel assembly rotates within the oven.

Each end member A of the reel is formed of a generally annular rim 17 which is illustrated as hexagonal and the rim is connected by spokes 18 with a central disc or plate 19. A clamping collar 20 which is preferably formed integral with the disc 19 is adapted to be clamped onto the shaft 16. A plurality of supporting stub shafts 21 extend inwardly of the rim 17 and are arranged to support the trays B as will be hereinafter explained in detail.

As the reel members A having the trays B extending therebetween rotate due to a rotation of the main shaft 16, the trays have a tendency to undergo a swinging movement due to the revolving motion of the reel and in order to stabilize the trays each stub shaft 21 to which the trays are secured has its outer end connected with one of the links C, said link being suitably secured on the stub shaft. Each link has its opposite end pivotally connected by a pivot pin 22 with an enlargement or projection 23 formed on the stabilizing ring D. The inner periphery of the stabilizing ring engages within the grooves 24 of the guide wheels E. The guide wheels are disposed in the same horizontal plane on opposite sides of the vertical center of the oven and as is clearly shown in

Figure 2 said guide wheels function to support and guide the rotation of the stabilizing ring D.

For proper operation of the ring it is desirable that the guide wheels E have a firm engagement with the inner periphery of the stabilizing ring D and because the oven is operated throughout a range of temperatures it is desirable that the guide wheels E be adjustable with respect to the stabilizing ring D, whereby variations in the inner peripheral diameter of the ring due to temperature changes may be compensated for.

The mounting of the guide wheels E is clearly shown in Figures 3 and 4 and each wheel includes a central or axial bore **25** mounted on bearings **26** which surround the extending end of an adjusting shaft **27**. The shaft **27** extends through the bore **28** of an elongated sleeve **29** and as is clearly shown in Figure 4, the bore **28** of the sleeve **29** is larger in diameter than the external diameter of the shaft **27**, whereby said shaft may be disposed at one side of the bore in offset relationship thereto. For maintaining the shaft **27** in offset or eccentric relationship to the bore of the sleeve, a pair of spacer blocks **30** are insertable within the bore **28** between the shaft **27** and the wall of the bore (Figure 3). Each spacer block is adjacent one end of the shaft and is welded or otherwise secured in position, being fastened to the external surface of the shaft and the inner wall of the sleeve. The sleeve **29** is rotatable within a tubular housing **31** which extends entirely through the housing wall and which has a substantially square shaped flange **31***a* which is bolted or otherwise secured in position on the outer wall of the oven **10**. The shaft **27** and sleeve **29** also extend through the oven wall and at the inner end of the sleeve a suitable insulating material **27′** seals the bore of said sleeve to close that portion of the bore between the shaft and the sleeve. The outer end of the sleeve **29** is formed with a circular flange **32** which overlies the flange plate **31***a* of the housing **31** and the circular flange **32** is formed with a pair of arcuate slots **33**. Locking bolts **34** extend through the slots and thread into the flange plate **31***a* of the housing and when tightened down lock the flange **32** and sleeve **29** against rotation.

It will be evident that since the shaft **27** on which each guide wheel E is mounted is disposed eccentrically with respect to the sleeve **29** and its flange **32** that a rotation of the flange and wheel within the housing **31** will change the position or axial center of the shaft **27** with respect to the vertical center of the side wall of the oven. Such adjustment of the shaft **27** will move the guide wheel E carried thereby with respect to the inner periphery of the stabilizing ring D and therefore a positive adjustment of each guide wheel with respect to the stabilizer ring may be accomplished. A suitable lubricating passage **35** may be drilled through the shaft **27** and may have lateral passages **35***a* for lubricating the bearings **26** of each guide wheel.

It is pointed out that when the oven is under a normal room temperature prior to operation the guide wheels E may engage the inner periphery of the stabilizing ring D with the desired frictional contact. Subsequent operation of the oven which increases the temperature within the interior of the oven will result in an expansion of the stabilizer ring D, in which event the guide wheels E do not engage said ring properly to produce most efficient stabilizing action. If such is the case it is only necessary to loosen the locking bolts **34** and rotate the sleeve **29** and shaft **27** within the tubular housing **31**. Because of the eccentric mounting of the shaft **27** relative to the sleeve **29**, a rotation of the sleeve will result in changing the position of the shaft with a resultant change in the position of the guide wheel carried by the inner end of such shaft. Thus, it is possible to accurately adjust the guide wheels E with respect to the stabilizing ring D while the oven is in operation and after such adjustment is made to firmly lock the wheels in their adjusted positions. The adjustment is very simple and is readily accessible from the exterior of the oven.

A slightly modified form of mounting for each guide wheel E is illustrated in Figures 5 and 6. In these figures each guide wheel is illustrated as secured to a shaft **27***a* whereby rotation of the guide wheel will rotate said shaft. The shaft extends through a bore **28***a* of an adjusting sleeve **29***a* and the bore is formed eccentrically of the external surface of the adjusting sleeve. The sleeve **29***a* extends through the tubular housing **31** which is mounted in the wall of the oven and said sleeve has an external circular flange **32***a* overlying the flange plate **31***a* of the housing. The flange **32***a* has arcuate adjusting slots **33***a* and locking bolts **34***a*.

The modified form of mounting for each guide wheel as shown in Figures 5 and 6 is adjustable in the same manner as the form shown in Figures 3 and 4, that is, the adjusting sleeve **29***a* is rotated and due to the eccentric location of the shaft **27***a* with respect to said sleeve the axis of the shaft end with the guide wheel E mounted thereon is varied with respect to the periphery of the stabilizer ring. The shaft **27***a* is rotatable with the guide wheel E rather than having the guide wheel mounted on the bearings **26** and rotatable about the shaft as in the form shown in Figure 3. In Figure 5 the lubricator passage **35***b* provides for lubricating the external surface of the shaft **27***a* since said shaft is rotatable within the eccentric bore **28***a* of the adjusting sleeve **29***a*.

The trays B which extend between the reel members A may be mounted directly upon the stub shafts **21** of the reel members or it may be preferable to suspend said trays from a hanger whereby the tray proper is below or out of alignment with the axis of said stub shaft. A tray which is interchangeably applicable to either the hanger or the hangerless type of mounting is illustrated in Figures 7–17. As is clearly shown in Figures 7–10 the tray B may be constructed of a pair of angle bars **40** and **41** which are connected at their ends by flat bars **42** whereby a substantially rectangular shaped tray is provided. Longitudinally extending, spaced tubular rods **42***a* extend between the end bars **42** and impart rigidity to the tray. A screen type grill **43** may be supported upon the rods and may be welded or otherwise secured within the frame, or as shown in Figure 8 a solid plate **44** may be disposed within the frame. The welded construction of the tray makes for simplicity and the use of the tubular supporting rods gives the tray ample support longitudinally to assure that the tray will remain level at all times thereby insuring that the reel to which the tray is attached will operate smoothly.

In mounting the tray shown in Figures 7–10 on the reel members A each reel member is formed with an opening **45** having an aligning bearing member **46** positioned thereon. Each bearing (Figure 13) has a central bore **47** and diametrically opposed recesses **48** in its outer wall and retaining screws **49** which thread downwardly through the rim of the reel member A and engage the recesses **48** to retain the bearing **46** in place within the ring. The stub shaft **21** extends through the bore of the bearing and has its outer end attached to one of the links C which connect said stub shaft with the stabilizer ring D. The inner end of the shaft extends inwardly from the bearing and for mounting the tray B directly upon the shaft a split clamp **49** (Figure 14) is provided. This clamp has an angular bracket **50** welded or otherwise secured thereto and said clamp and bracket are adapted to be attached on the inwardly extending end of the shaft as illustrated in Figure 15. Tightening bolts **51** associated with the split clamp firmly attach the clamp to the inwardly extended end of the stub shaft **21**. The tray B has its end plates **42** adapted to overlie the base portion of the angular bracket **50** and to be secured thereto by suitable bolts **52**. It will be evident that with the brackets **50** positioned on the stub shafts of the spaced reel members A, the tray B may extend between said reel members and may be secured to the angular brackets **50**. Thus, the trays are disposed in substantial alignment with the

stub shafts and provide a mounting which is generally referred to as the hangerless type.

When it is desired to mount the trays by means of a hanger arrangement the angular brackets **50** are removed from the stub shafts and in place thereof hanger members **55** are attached to said shafts. As is shown in Figures 16 and 17 each hanger member **55** comprises a plate having an inwardly directed flange **56** at its lower portion with a clamping collar **57** secured to its upper portion. The clamping collar is adapted to be engaged over one of the stub shafts **21** and tightened thereon by means of tightening bolts **58**. With such arrangement the hanger plates depend downwardly and locate the flange **56** in a plane below the axis of the stub shaft **21**. Each tray B has its end plates **42** resting upon the flanges **56** of each hanger member and said plates are secured to the flanges by suitable bolts **59**. The mounting for the stub shafts **21** is identical regardless of whether the tray is supported by the hanger members **55** or by the angular brackets **50**.

From the foregoing it will be seen that a very simple type of tray structure is provided and said tray, together with the brackets **50** and hanger elements **55**, makes it possible to support the trays in any desired manner. In other words, the trays may be located in alignment with the stub shafts **21** of the reel or may be just as readily supported by the hanger members in a plane below said shafts. The only change which is necessary to convert the tray from a hangerless type to a hanger type is to substitute the hanger members **55** for the angular brackets **50**. This change may be accomplished quickly and easily because such elements are attached to the shaft by clamping collars.

The particular features of the tray structure are desirable since various bakers have preference with respect to the type of suspension for the tray. Proper operation of the reel assembly and stabilizing of the trays during their revolving travel within the oven are assured because of the adjustable feature of the guide wheels E. As has been noted the wheels may be readily adjusted with respect to the inner periphery of the stabilizing ring D from exteriorly of the oven which makes it possible to carry out an adjustment to compensate for variations in the inner peripheral diameter of the stabilizing ring, as caused by changes in temperature conditions within the oven. Since the adjusting means is readily accessible from the exterior of the oven the adjustment of the guide wheels may be carried out while the oven is in operation.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having described the invention, I claim:

1. The combination with an oven, of a reel assembly including, a rotatable reel within the oven having trays which are movable in a revolving path when the reel is rotated, stabilizing means, associated with the reel for stabilizing the trays in their revolving movement, and means operable from exteriorly of the oven for adjusting the stabilizing means to compensate for variations in the stabilizing means due to temperature.

2. The combination with an oven, of a reel assembly including, a rotatable reel within the oven having trays which are movable in a revolving path when the reel is rotated, stabilizing means associated with the reel for stabilizing the trays in their revolving movement, and means operable from exteriorly of the oven for adjusting the stabilizing means to compensate for variations in the stabilizing means due to temperature, and means for locking the stabilization means in adjusted positions.

3. The combination with an oven, of a reel assembly including, a rotatable reel within the oven having trays which are movable in a revolving path when the reel is rotated, a stabilizer element associated with the reel and trays thereof for stabilizing said trays in their revolving movement, guide members engaging said element to control the path of movement of the element during rotation of the reel, and means operable from exteriorly of the oven for adjusting said guide members with respect to the stabilizer element to compensate for variations in the stabilizing means due to temperature.

4. The combination with an oven, of a reel assembly including, a rotatable reel within the oven having trays which are movable in a revolving path when the reel is rotated, a stabilizer element associated with the reel and trays thereof for stabilizing said trays in their revolving movement, guide members engaging said element to control the path of movement of the element during rotation of the reel, means operable from exteriorly of the oven for adjusting said guide members with respect to the stabilizer element to compensate for variations in the stabilizing means due to temperature, and means for locking the stabilizing element in adjusted positions.

5. A reel assembly for ovens including, a pair of spaced reel members rotatably mounted within an oven, longitudinal trays connected to said members and movable in a revolving path when the reel members are rotated, stabilizing means associated with the trays and with one of said reel members for stabilizing said trays in their movement, and means operable from the exterior of the oven for adjusting the stabilizing means to compensate for variations in the stabilizing means due to temperature.

6. A reel assembly for ovens including, a pair of spaced reel members rotatably mounted within an oven, longitudinal trays connected to said members and movable in a revolving path when the reel members are rotated, a stabilizing element adjacent one of the reel members and having connection with the member and with the trays attached thereto, guide means engaging the stabilizing element for guiding it in its movement, and means operable from the exterior of the oven for adjusting said guide means with respect to the stabilizing element to compensate for variations in the stabilizing means due to temperature.

7. A reel assembly for ovens including, a pair of spaced reel members rotatably mounted within an oven, longitudinal trays connected to said members and movable in a revolving path when the reel members are rotated, a stabilizing element adjacent one of the reel members and having connection with the member and with the trays attached thereto, guide means engaging the stabilizing element for guiding it in its movement, means operable from the exterior of the oven for adjusting said guide means with respect to the stabilizing element, and means also operable from the exterior of the oven for locking the guide means in adjusted positions.

8. In a baking oven having a revolving tray type reel and having a stabilizer ring associated with the reel, the improvement which resides in individually adjustable guide rollers co-acting with the stabilizer ring, and means extending and operable from the exterior of the oven for individually adjusting said guide rollers with respect to the stabilizer ring.

9. The combination with a stabilizer ring for a tray-type revolving reel of an oven, of guide wheels adapted to engage the inner periphery of said stabilizer ring, a shaft on which each guide wheel is mounted, and means operable from the exterior of the oven for varying the position of the shaft relative to the stabilizer ring to adjust the guide wheel relative to the ring.

10. The combination with a stabilizer ring for a tray-

type revolving reel of an oven, of guide wheels adapted to engage the inner periphery of said stabilizer ring, a shaft on which each guide wheel is mounted, a rotatable adjusting sleeve surrounding the shaft and extending through the wall of the oven with its outer end accessible from the exterior of the oven, and means for mounting the shaft eccentrically within the sleeve whereby rotation of the sleeve changes the position of the shaft and its guide wheel relative to the stabilizer ring.

11. The combination as set forth in claim 10, wherein each guide wheel is rotatable on its shaft.

12. The combination as set forth in claim 10, wherein each guide wheel is fixed on its shaft and wherein each shaft is rotatable within its adjusting sleeve.

13. The combination with a stabilizer ring for a tray-type revolving reel of an oven, of guide wheels adapted to engage the inner periphery of said stabilizer ring, a shaft on which each guide wheel is mounted, a rotatable adjusting sleeve surrounding the shaft and extending through the wall of the oven with its outer end accessible from the exterior of the oven, means for mounting the shaft eccentrically within the sleeve whereby rotation of the sleeve changes the position of the shaft and its guide wheel relative to the stabilizer ring, and means also operable from the exterior of the oven for locking each sleeve in its adjusted position.

14. As a sub-combination in an oven, a tray adaptable for mounting on a reel including, a generally rectangular shape frame formed of frame bars welded to each other, tubular supporting elements extending longitudinally of the frame, a supporting member secured within the frame and resting upon the tubular elements, the frame bars, elements and member being welded to each other, a mounting unit adapted to be secured to each end of the tray, each mounting unit comprising an angular bar having a clamping collar secured to its under side, each clamping collar being adapted to be attached to the usual reel of an oven, whereby said tray is suspended from said reel.

15. In a reel-type baking oven comprising a walled enclosure defining a baking chamber, a reel mounted in said chamber for rotation about a substantially horizontal axis, said reel comprising a pair of axially spaced-apart end plates, a plurality of circumferentially spaced apart trays, pivotally mounted on said end plates, a plurality of control arms each arm being rigidly attached at one end to one end of a tray, a ring pivotally connected to the other ends of said arms at substantially

equal, circumferentially spaced points; the improvement comprising a roller positioned to engage the marginal edge of the ring to confine it to a predetermined path of travel, incident to rotation of the reel, and mounting means for said roller journaled in the wall of the oven about an axis located eccentrically to the axis of said roller, said means having portions accessible externally of the oven and being rotatably adjustable for varying the position of the roller and thereby varying the path of travel of said ring.

16. The combination with an oven, of a reel assembly including, a rotatable reel within the oven having trays which are movable in a revolving path when the reel is rotated, a stabilizer element associated with the reel and trays thereof for stabilizing said trays in their revolving movement, guide means engaging said element to control the path of movement of the element during rotation of the reel, and means operable from exteriorly of the oven for adjusting said guide means with respect to the stabilizer element to compensate for variations in the stabilizing means due to temperature.

17. The combination with an oven, of a reel assembly including, a rotatable reel within the oven having trays which are movable in a revolving path when the reel is rotated, a stabilizer element associated with the reel and trays thereof for stabilizing said trays in their revolving movement, guide means engaging said element to control the path of movement of the element during rotation of the reel, means operable from exteriorly of the oven for adjusting said guide means with respect to the stabilizer element to compensate for variations in the stabilizing means due to temperature, and means for locking the stabilizing element in adjusted positions.

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