May 21, 1940. A. HAUPT 2,201,231

STABILIZED TRAY OVEN

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Fig. 1

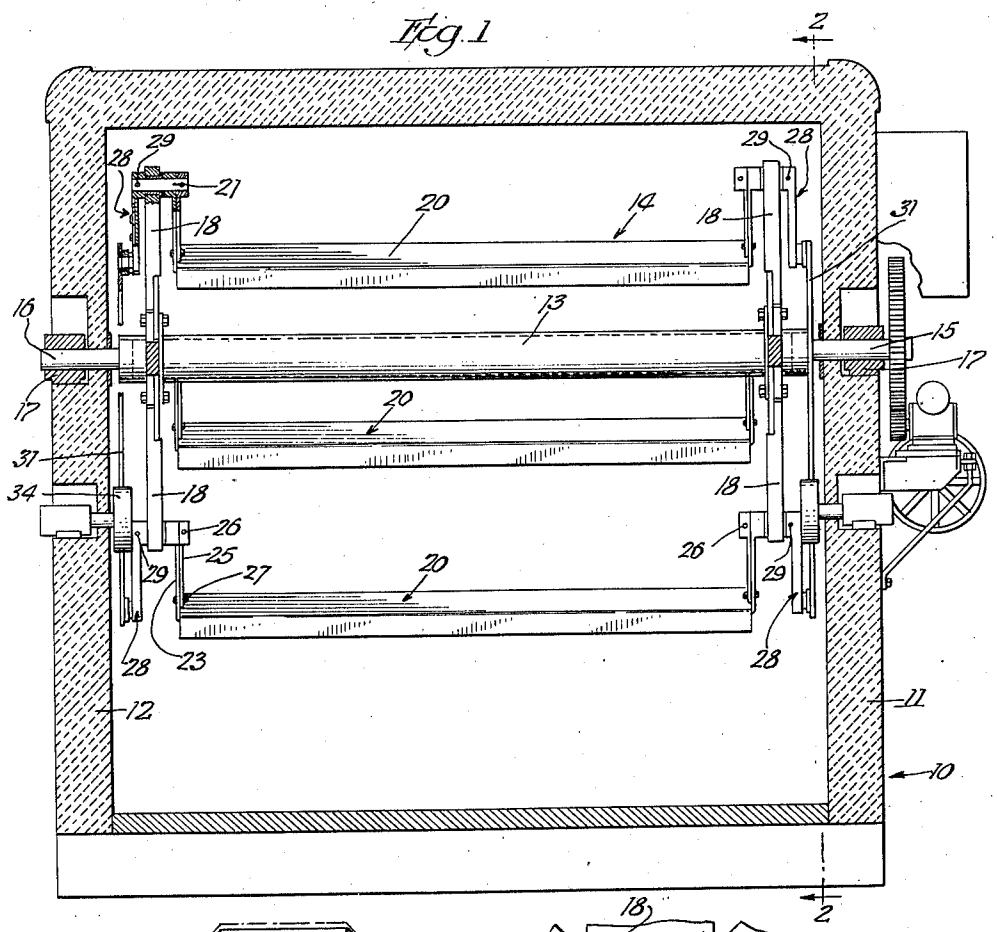
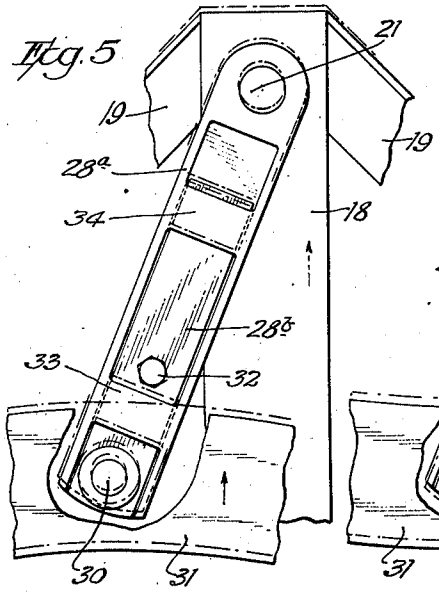


Fig. 5



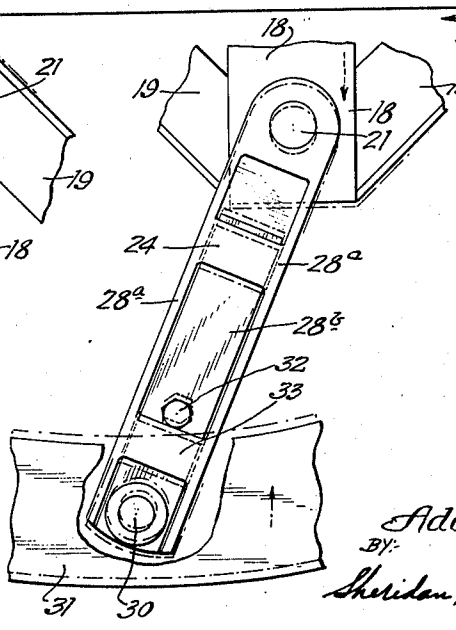


Fig. 6

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Fig. 2

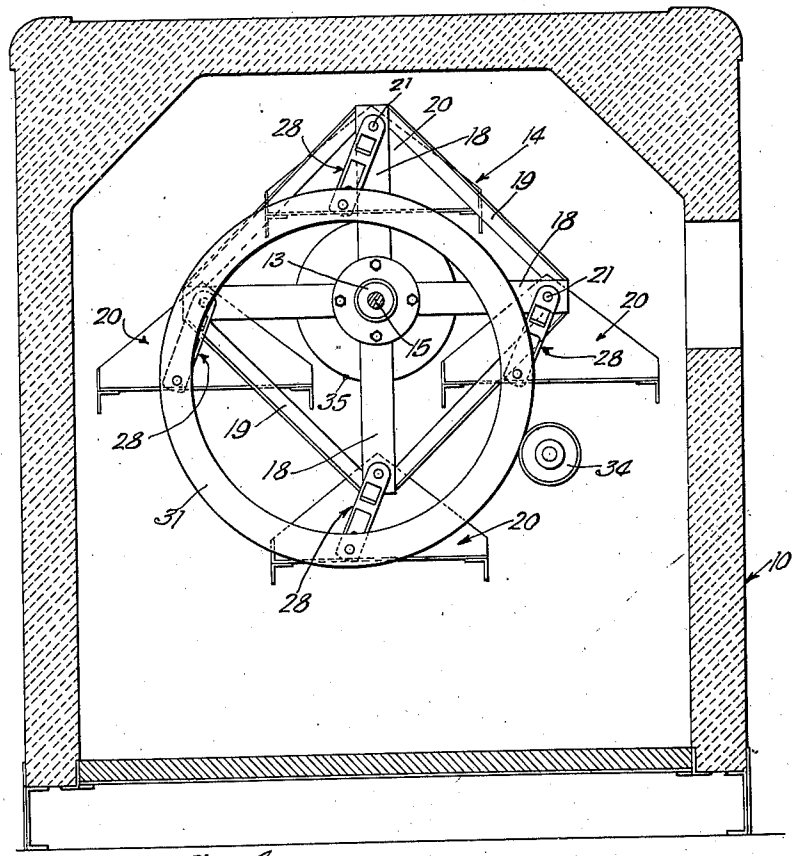
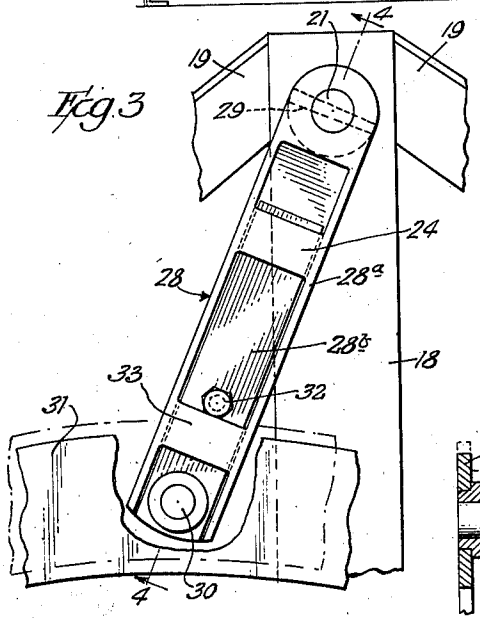


Fig. 3



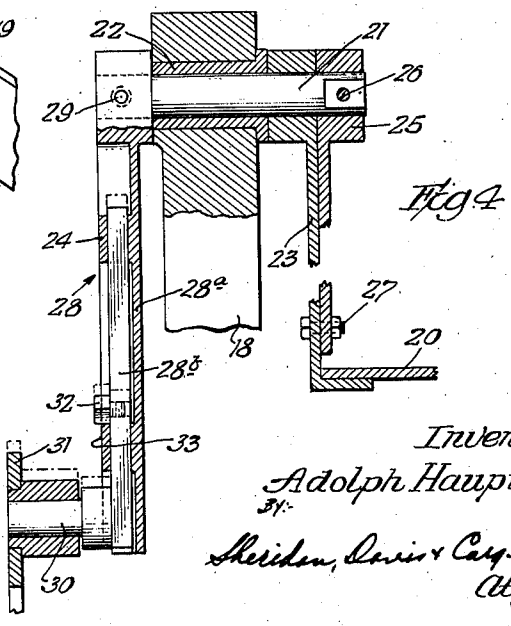


Fig 4

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Patented May 21, 1940

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UNITED STATES PATENT OFFICE

2,201,231

STABILIZED TRAY OVEN

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Application June 5, 1939, Serial No. 277,374

8 Claims. (Cl. 107—59)

This invention relates to improvements in stabilized tray ovens. In tray ovens of the reel type, stabilizing rings frequently are employed for retaining the trays in horizontal position during the rotation of the reels. The trays generally are journaled in their reel ends, or spiders, and such journals are attached by arms to the stabilizer ring or rings which retain the trays in horizontal position at all times. As the stabilizer rings and reel ends become heated they usually expand non-uniformly and to different degrees, and as a result impose strains or stresses on the journals and impair or in time destroy the bushings or bearings carried by the reel ends and through which the journals extend. Renewal of such bushings requires disuse of the ovens for a considerable period, sometimes twenty-four hours or more, and in bakeries having but one oven or having no substitute oven, such shut-downs result in series disruption of the routine of business.

The present invention has for its object the provision of compensating means which avoid the imposition of such destructive stresses on the tray bushings due to unequal expansion of the reel ends with reference to the stabilizer rings, thereby reducing the number of shut-downs required in replacing such bushings and avoiding the expenses to the baker and the inconveniences to him and to his customers resulting therefrom.

In the accompanying drawings wherein an embodiment of the invention is shown for the purpose of illustration:

Fig. 1 is a longitudinal vertical section of a conventional reel type tray oven embodying the present improvements;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged, broken elevation illustrating the upper portion of the reel end, or spider, and a stabilizing ring and one of the arms connecting the ring to a tray journal;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 3, but illustrating parts of the arm in different relative positions, such as may result from expansion of the stabilizer ring with reference to the adjacent end of the reel;

Fig. 6 illustrates the parts shown in Fig. 5 rotated from the position of Fig. 5 through an arc of 180°.

In the accompanying drawings, an oven of any suitable construction is indicated generally by the numeral 10 and comprises end walls 11 and 12 in which may be journaled the shaft 13 of the reel indicated generally by the numeral 14. The intermediate portion of the shaft 13 is illustrated as being tubular and at its ends is provided with stub shafts 15 and 16, which are journaled in suitable bushings 17 supported by the end walls 11 and 12 respectively. The particular construction of the reel is not particularly pertinent to the present improvements and in the form shown, the reel ends or spiders may be fabricated of radially extending members 18 which, for purposes of strength and rigidity, may be connected at their outer ends by members 19.

The present improvements may be employed with any other conventional or appropriate spider construction. These spiders or reel ends are carried by the shaft 13 and in turn support trays 20 of any suitable form. The trays 20 are supported on pins or journals 21 which pass through bushings 22 carried in apertures provided in the arms 18. In the oven of the particular construction disclosed, trays 20 are provided with mounting brackets 23 at the ends thereof which are loosely mounted on the inner ends of the journals 21, as shown in Fig. 4. Arms 25 are attached to the journals 21 as by set screws 26 and are attached at their lower ends to the brackets 23, such as by means of bolts 27. This particular arrangement of attaching the trays to the journals 21 is in accordance with the disclosure of the application Serial No. 199,455, filed on April 1, 1938, by William Schonwald, now Patent No. 2,161,750 and enables the trays 20 to be leveled conveniently. Briefly, the leveling arrangement comprises the formation of arcuate rows of openings of different center-to-center spacings in the arms 25 and in brackets 23. The bolts 27 pass through two openings which register when the tray is in level position. In so far as the present improvements are concerned, however, the tray brackets 23 may be attached directly to the respective journals 21.

At the opposite ends of the journals 21, arms indicated generally by the numeral 28, are provided which are secured to the journals by means of suitable screws or pins 29 and at their lower ends are provided with pins or journals 30 by means of which the arms engage and support a stabilizing ring 31. As shown in Fig. 2, this ring is eccentric with reference to the axis of the reel. As the reel rotates, the arms 28 rotate the ring 31, and the latter, as is well known, rocks the respective journals 21 as to retain the trays in

horizontal position. Where the stabilizer arms have been made heretofore of a single piece of material, radial expansion of the spiders relative to the rings have caused the imposition of destructive stresses on the bushings 22. Should the ring expand relative to the spider, it in turn, through the connection of such solid stabilizer arms, would impose similar stresses on said bushings. For the purpose of avoiding the imposition of such stresses on the bushings mentioned, the arms 28 disclosed herein are formed of two parts 28a and 28b, the former being attached to the journal 21 and the latter to the corresponding pin 30. Member 28a is provided with a longitudinal channel within which member 28b is slidable. Member 28b is provided with a suitable stop which may be in the form of a screw 32 which is adapted to engage a transverse member 33 carried by the side flanges of the member 28a. A similar bridging or transverse member 24 is provided adjacent the other end of the member 28a, which members prevent lateral displacement of the member 28b from the channel of the member 28a. The engagement of the stop member 32 with the transverse member 33 prevents withdrawal of the member 28b from the member 28a, although it will be seen that member 28b may be moved upwardly, as viewed in Figure 3, should the ring 31 expand with reference to the adjacent spider. The engagement of the members 32 and 33 of each stabilizer arm thus limits the downward telescopic movement of the two arm members 28a and 28b and supports the ring in operative position.

For the purpose of explanation, let it be assumed that all the studs 32 are in contact with the corresponding stop members 33, and that the spider only expands. Such expansion results in outward movement of the members 33, those in the upper portion of the spider (as in Fig. 5) moving upwardly, and those in the lower portion (as in Fig. 6) moving downwardly, while others move radially outwardly all in equal degree. This radial outward movement of the members 33 at the upper portion of the spider will tend to cause the member 33 to lift the ring, which burden of support will be assumed, during rotation, by the successive stops 33 as they approach the upper position of rotation. However, the ring will in fact expand to some extent when heated and hence will cause the pins 30 to move outwardly an extent corresponding to the degree of expansion of the ring and thus tend to move the studs 32 outwardly as from the dotted to the full line positions of Fig. 6. If this radial expansion is less than that of the spider, the studs 32 in the upper portion of the spider at any given movement of rotation will, by engagement with the corresponding members 33, support the ring, while if the expansion of the ring is in excess of that of the spider, those studs in the upper portion of the path of rotation will be spaced above the respective stops 33 (see Fig. 5), while the studs in the lower portion of the path of rotation (as shown in Fig. 6) will be moved into engagement with their respective stops 33 and thereby support the ring. Thus, under any condition of differential of radial expansion as between the spider and the ring, the latter is supported by the studs 32 and co-operating stops 33, either in the upper or lower position of rotation, without imposing the destructive stresses on the bushings 22 which would occur under such conditions were the stabilizer arms 28 formed of single or solid members, as generally heretofore employed.

The telescopically movable arm members 28a and 29a thus compensate for the unequal expansion of the spider with respect to the stabilizer ring and function equally well regardless of which of said elements has the greater expansion coefficient.

In Fig. 1 of the drawings stabilizer means are shown at each end of the reel but the present improvements may be employed singly, that is, at one end of the reel only, if desired. The members 25, when employed, are so adjusted as to retain the trays in level position when the usual baking temperature prevails in the oven.

In Figs. 1 and 2 of the drawings, the conventional ring support 34 is illustrated, the journal of which is mounted in the adjacent wall of the oven. The ring or rings bear against the corresponding roller or rollers for retaining them against lateral displacement with reference to their center of rotation, indicated by numeral 35.

While I have shown and described an embodiment of the improvements for the purpose of illustration, various changes may be made in the specific embodiment illustrated without departing from the spirit of the invention.

What I claim as new and desire to cover by Letters Patent is:

1. In a tray oven, a reel, trays journaled in an end of the reel and carried thereby, rotatable stabilizing means, and members operatively connecting the stabilizing means to said trays for causing said means to rotate with the reel and to retain the respective trays in horizontal positions during the rotation of the reel, each of said members comprising a pair of elements slidable relatively one to the other for preventing imposition of stresses in the tray journals due to expansion of the reel end with respect to said stabilizing means.

2. In a tray oven comprising a reel, trays journaled to the reel ends and supported thereby, a stabilizing member for retaining the trays in horizontal position during rotation thereof by said reel, and members operatively connecting said stabilizing member to the respective tray journals comprising relatively movable portions adapted to move relatively upon non-uniform radial expansion of the reel ends with respect to the stabilizing member.

3. A tray oven comprising a reel, trays journaled to the reel ends and supported thereby, a rotary stabilizing member, and arms secured to the journals of the trays and to said member for retaining the trays in horizontal position during rotation thereof and for supporting said member, said arms each comprising a pair of members self-adjustable longitudinally for avoiding the imposition of stresses on said journals upon relative radial expansion of said reel ends with respect to the stabilizing means.

4. In a tray oven, a reel provided with tray supporting ends, trays journaled in said ends and supported thereby, a ring-like stabilizing member adjacent one of said ends, and members pivotally connected to said ring at arcuately spaced points corresponding to the arcuate spacing of the trays and secured to said tray journals for retaining the trays in horizontal position during rotation thereof, said members being arranged normally to cooperate for supporting said ring and comprising a pair of relatively movable portions self-adjustable as to length upon relative radial expansion of said reel end with respect to said ring and provided with cooperating elements for successively supporting the ring during rotation of

the reel and ring in the event of such relative expansion.

5. In a tray oven, a reel provided with tray supporting ends, trays journaled in said ends and supported thereby, a ring-like stabilizing member adjacent one of said ends, and members pivotally conected to said ring and to said tray journals for retaining the trays in horizontal position during rotation thereof, said members comprising a pair of telescopic portions provided with co-operating stops for limiting telescopic movement of said portions in one direction for supporting the ring in operative position and enabling relative movement of said portions in the opposite direction to compensate for non-uniform relative radial expansion of said reel end with respect to the ring.

6. In a tray oven, the combination of a reel provided with trays journaled in the ends thereof and provided with a rotary stabilizing member adjacent one of said ends, and arms connected to said member and to the journals of said trays on said last mentioned ends for supporting and rotating said member, each of said arms comprising a pair of parts arranged for longitudinal self adjustment in accordance with relative radial expansion of the reel end with respect to said stabilizing member and each pair being provided with cooperating supporting elements whereby upon such relative expansion the arms successively support such stabilizing member during rotation of the same and said reel.

7. In a bake oven comprising a reel, trays journaled in the ends of the reel, and stabilizing means for said trays comprising a rotary ring and means pivotally secured to the ring for supportingly attaching the latter to the tray journals whereby said ring retains the trays in horizontal position said means comprising a pair of relatively movable members for accommodating radial movement of the journals relative to the corresponding pivotal axes of said members.

8. In a tray oven provided with a stabilizing member for the trays, and members each operatively connecting one of the trays to said member for transmitting stabilizing movement from said member to said trays and each comprising a pair of relatively slidable elements arranged for self adjustment for accommodating radial movement of the axes of the trays with respect to the stabilizing member.

ADOLPH HAUPT.