

June 14, 1932.

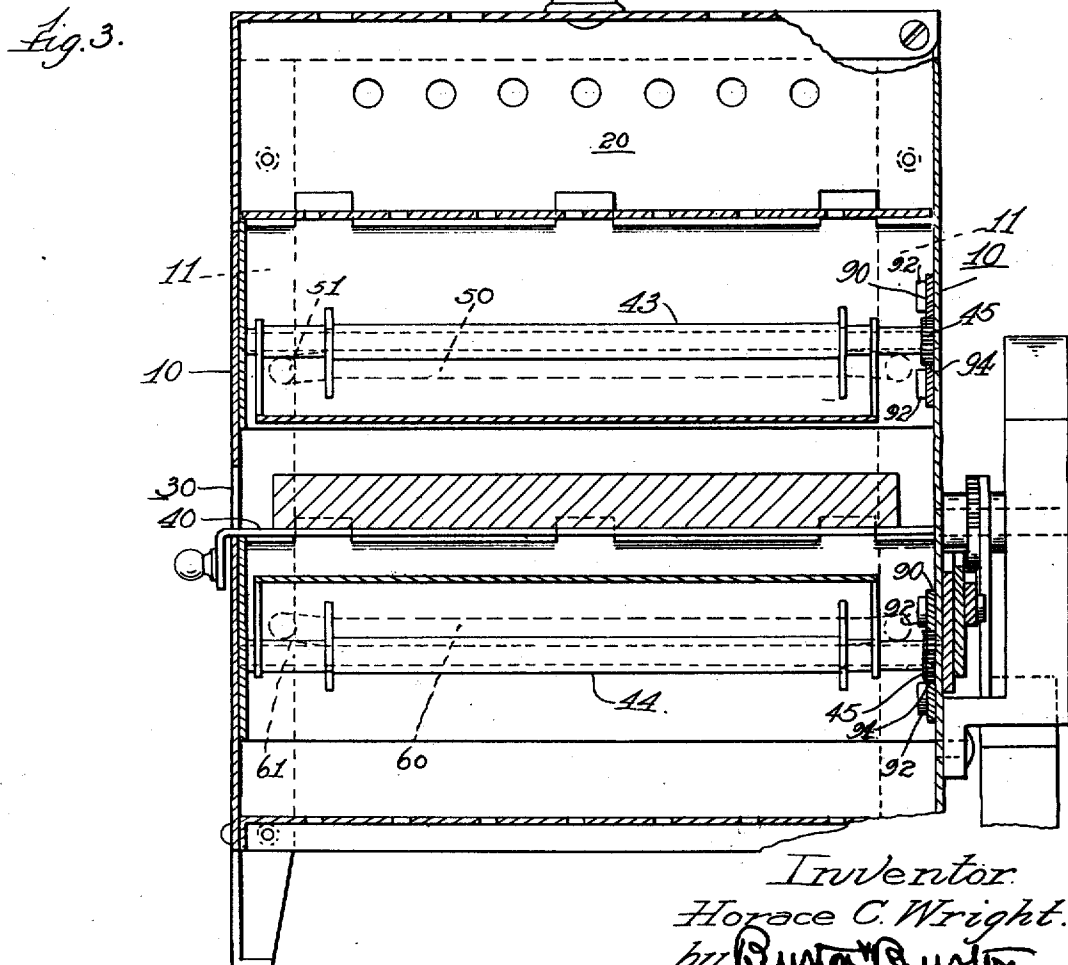
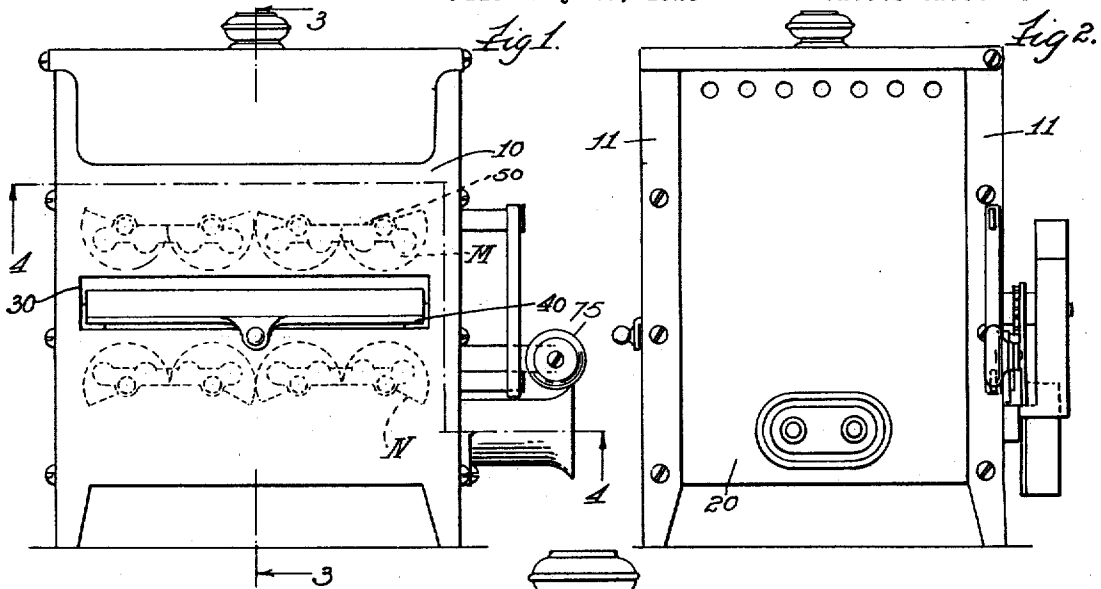
H. C. WRIGHT

1,862,733

ELECTRIC TOASTER

Filed May 29, 1929

4 Sheets-Sheet 1



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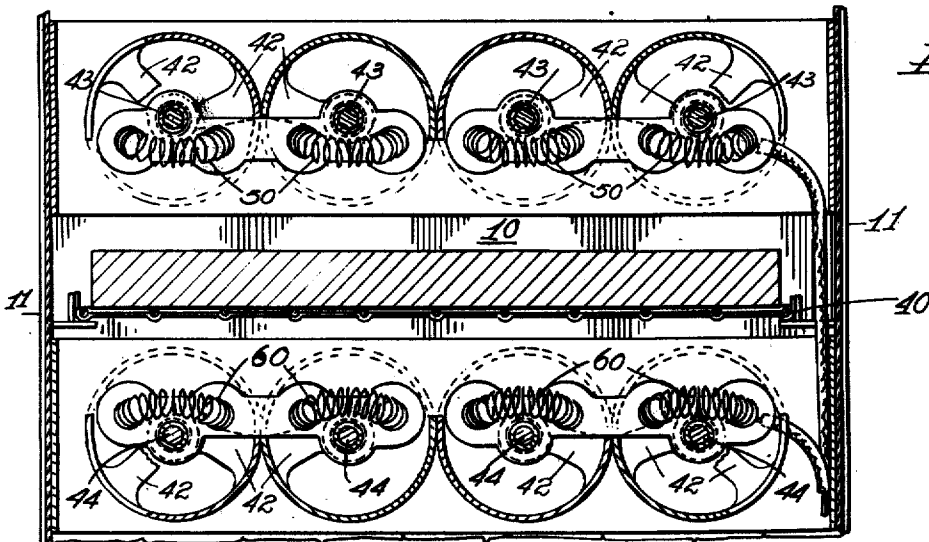
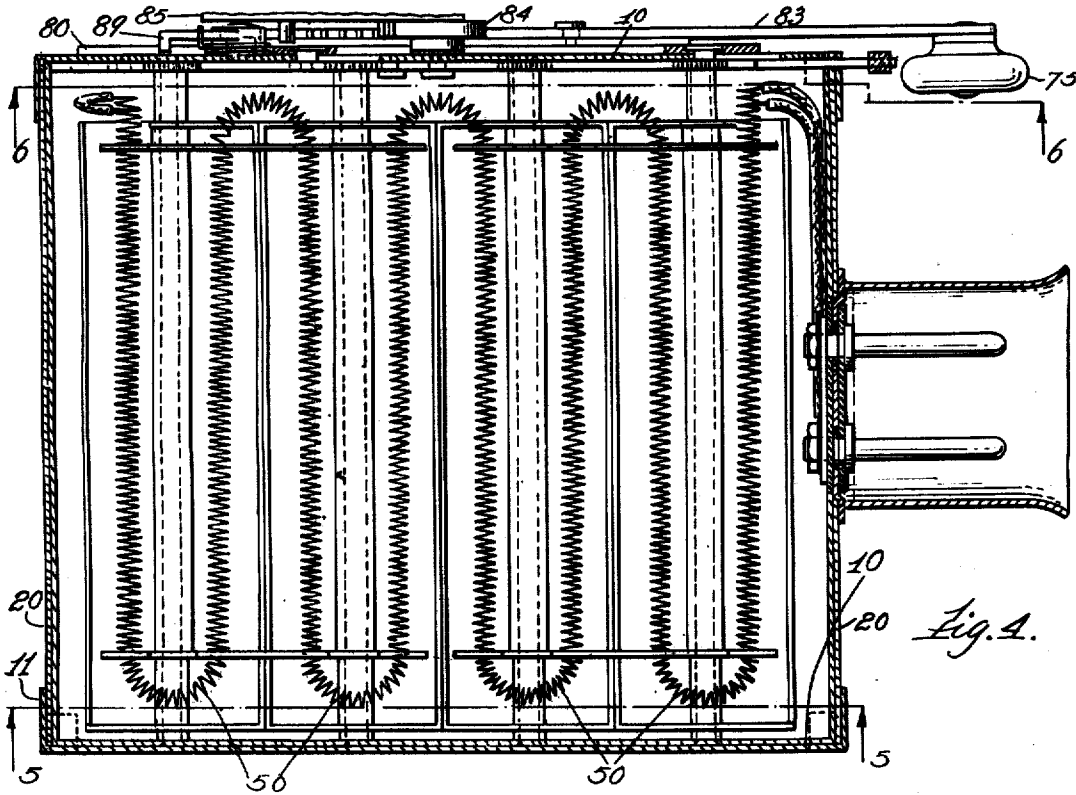
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ELECTRIC TOASTER

Filed May 29, 1929

4 Sheets-Sheet 2



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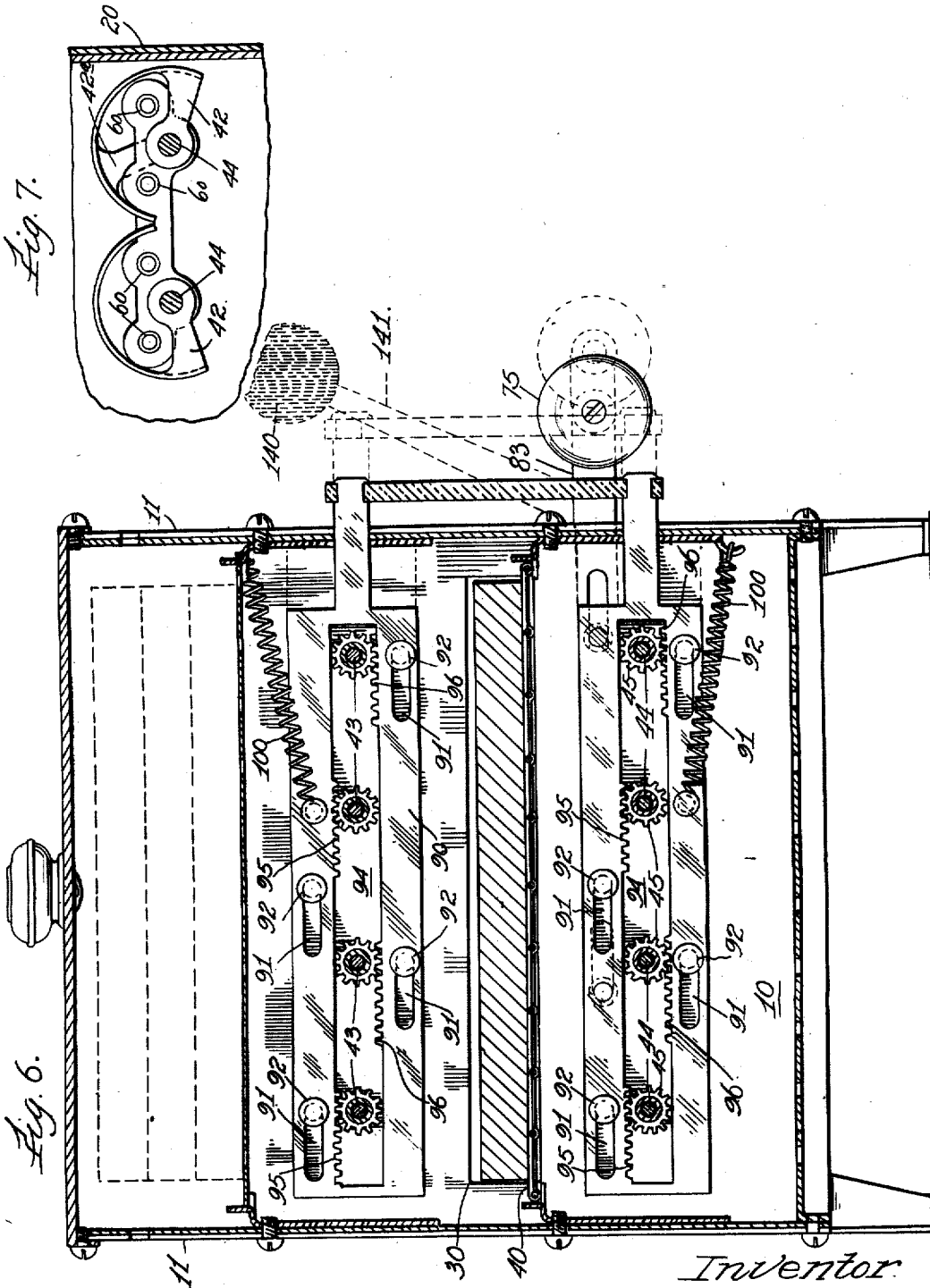
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ELECTRIC TOASTER

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4 Sheets-Sheet 3



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ELECTRIC TOASTER

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4 Sheets-Sheet 4

Fig. 9.

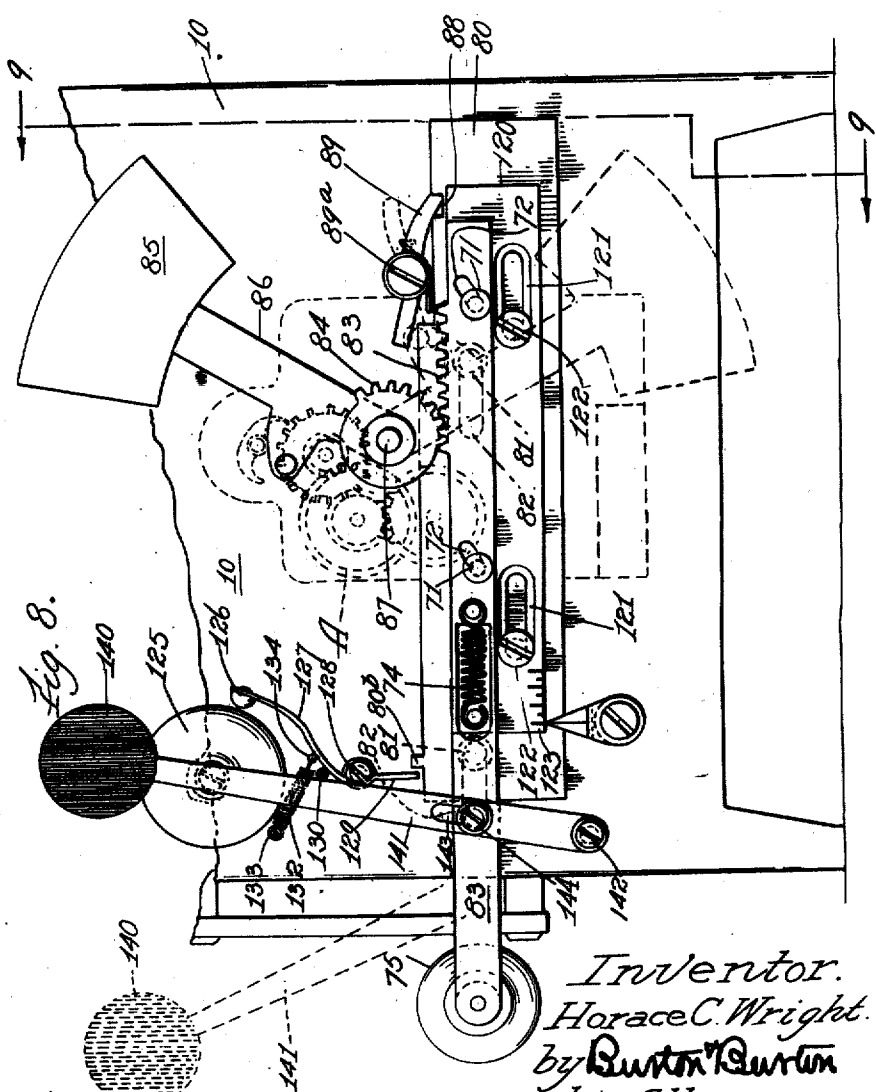
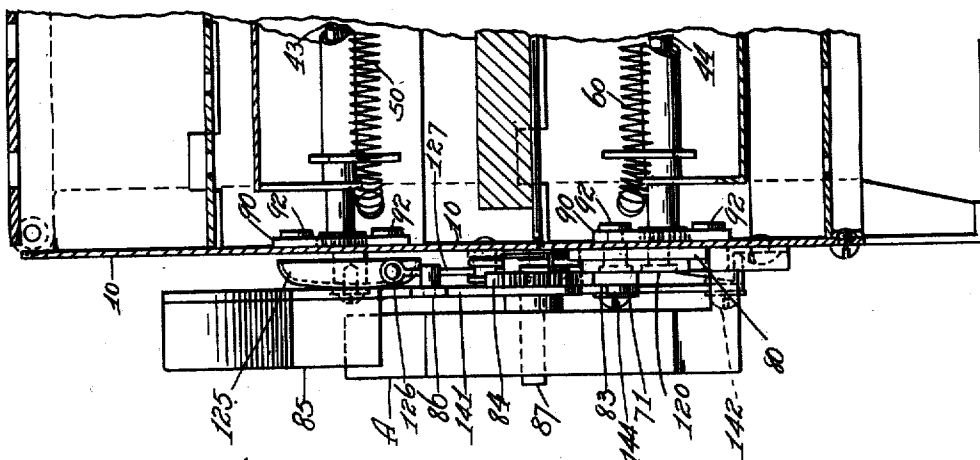


Fig. 8.

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UNITED STATES PATENT OFFICE

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ELECTRIC TOASTER

Application filed May 29, 1929. Serial No. 366,105.

The purpose of this invention is to provide an improved form of device for heat treatment of food and other substance requiring limited time exposure to the heat means, including such devices as toasters. It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:—

10 Figure 1 is a front elevation of an apparatus embodying this invention.

Figure 2 is a right hand end elevation of the same.

15 Figure 3 is a section at the line 3—3 on Figure 1.

Figure 4 is a section at the line 4—4 on Figure 1.

Figure 5 is a section at the line 5—5 on Figure 4.

20 Figure 6 is a section at the line 6—6 on Figure 4.

Figure 7 is a fragmentary view of a portion of Figure 5.

Figure 8 is a rear side elevation.

25 Figure 9 is a section at the line 9—9 on Figure 8.

The structure shown will be first described in general terms without reference to specific parts.

30 It consists of a frame structure in which there are arranged in horizontal planes two heating units each comprising a succession of parallel courses of spirally coiled high resistance wire, commonly employed for such purposes. Between these two heating units there is provided a suitable support for the article to be heat-treated, as a slice of bread to be toasted.

35 Associated with each unit there are provided devices which are hereinafter referred to as reflector-shields mounted in the relation to the units respectively for alternatively standing at the side opposite the position of the article to be heat-treated for reflecting the heat onto the article, or being interposed between the heating unit and said article to shield the latter from the heat.

40 These reflector shields are each semi-cylindrically concavo-convex in transaxial section, and rendered highly reflective at the concave

side and relatively nonreflective on the convex side; and they are pivotally mounted at the axes of their cylindrical forms respectively with the concave side toward the heating unit when they are standing at the side 55 of said heating unit opposite the position of the article to be treated; so that when they are rocked about the axis for interposing them between the heating unit and the article treated they present the convex side to the article, and the concave side reflects the heat back onto the heating unit away from the article.

For compactness and simplicity of construction each reflector-shield is dimensioned for spanning and serving as reflector-shield 65 for two adjacent courses of the heating coil; and said reflector-shields are dimensioned as to the diameter of their cylindrical form for meeting lateral edge to lateral edge when assembled, each facing the pair of coils which it serves.

The reflector-shields have each at each end a radial lug or flange affording means for mounting it at the axis of the cylindrical form in the frame structure; and, as shown, each has a rock shaft extending longitudinally through it, connecting the radial arms of its opposite ends, said rock shaft being journaled in the frame structure. And at 75 one end each rock shaft is provided with a pinion for engaging the rack teeth of a bar mounted slidably on the frame and connected for actuation longitudinally in one direction to rock the reflector-shields into heat-reflecting position, and in the opposite 85 direction to rock them into shielding position.

The rack bar is connected to the frame structure by a spring which is tensioned for retracting and holding the rack bar at the end of its range of sliding at which the reflector-shields are held in shielding position; and a catch is provided for engaging the bar to lock it at the opposite limit of its range, to which it is drawn by the operator for setting the reflector-shields in reflecting position when a slice of material to be treated has been placed in position between the heating units. This catch is connected with a timing device of any familiar type, consist- 100

ing of a spring or weight-driven gear train governed by an escapement device, having its winding shaft connected with a rack bar so as to be operated for winding the train in the movement of the rack bar for setting the reflector-shields in position, the train comprising a part actuated in or by the train for tripping and releasing the catch when the train has run for a length of time predetermined by adjustment provided in the train mechanism.

Referring to the drawings:—

The frame structure comprises front and rear uprights, 10, 10, each being a sheet metal stamping formed with flanges, 11, 11, at the vertical edges, producing right angle corners for stiffening and affording means for securing longitudinal frame plates, 20, 20, tying the uprights, 10, 10, together in a rigid frame structure. The front and rear uprights, 10, have each a rectangular slot, 30, forming the entrance for the slice of material to be heat-treated; and a support for the slice is formed by bars or rods, 40, extending between the two standards at the plane of the lower margin of said slot, 30.

Above the horizontal zone of the slot, 30, there is suitably mounted, extending between the standards, an upper heating unit, 50, and below the plane of said slot there is mounted a lower heating unit, 60, each consisting of a heating coil arranged in parallel courses and formed continuously by 180° bends between adjacent courses alternately at front and rear, as seen at 51 and 61 respectively.

The semi-cylindrical concavo-convex reflector-shields are provided in two sets for co-operating respectively with the upper and lower heat units; and in each set they are of two forms, M and N, alternating with each other in order transversely of the courses of the heating coil. The two forms differ only in respect to the side from which the radial lug, 42, projects to the axis of the cylindrical form, as may be noticed in Figure 5. For the upper set of reflector-shields the rock shafts, 43, connecting the front and rear lugs of each reflector-shield, are journaled in the standards at a plane slightly above the plane of the upper heating unit, and the rock shafts, 44, for the lower set have similarly journaled in the standards at a plane similarly below the lower plane of the coils forming the lower heating unit.

The expedient of mounting the rock shafts offset from the planes of the heating coils respectively away from the zone of the slot, 30,—that is, away from the position of the slice to be heat-treated,—permits the radial lugs extending from one lateral limit of the semi-cylindrical form of the reflector-shield to avoid interference with either of the two heating coil courses which are embraced by the reflector-shield, notwithstanding each re-

flector shield is rocked from position concave toward said embraced courses below the same to a position concave toward said courses above the same, as may be seen by comparison of Figures 5 and 7, the angle through which the reflectors are rocked being less than 180°, by an amount which accommodates the width of the lug, so that the diametric plane of the reflector-shield is inclined to the horizontal plane in opposite directions at said two positions of the reflector-shield.

The successive shields of each set are dimensioned and their shafts are spaced so that at either position adjacent shields are in touch with each other at their proximate edges, so that the entire set completely spans the entire heating unit to which it pertains, both in the position opposite the heat-treated element for reflecting the heat to the latter, and in the position in which they are interposed between the heating unit and the heat-treated element for shielding the latter from the heat.

Pinions, 45, are mounted upon the rear ends of the rock shafts, 44, respectively, and on the rear standard there is mounted slidably the cam bar, 90, slotted as seen at 91 for its slidable mounting on suitable studs, 92, fixed in said rear standard. The bar, 90, has a longitudinal slot, 94, at the middle of its width whose opposite edges are formed with racks, 95, at the upper edge, and 96 at the lower edge of the slot for engaging at opposite sides the pinions, 45, 45, on alternate shafts, 44, 44, so that in each movement of the rack bar alternate rock shafts and the reflector-shields which they carry are rocked in opposite directions for reversing the position of the reflectors with respect to the heat unit to which they pertain, this reverse action being in accordance with the reverse position of the lugs of adjacent reflectors, that is, as being respectively at the opposite limits of their 180° arcuate form.

In view of the circumstance that the continuous coil which forms each heating unit may—and as shown does—have both terminals at the same end of the unit,—considering the longitudinal dimension of the unit being the direction of the longitudinal extent of the courses,—it is possible to provide the outer reflector-shields each with an additional radial lug at the rear end as indicated at 42^a, the lug being at a transverse plane rearward of the terminal of the coil, so that the coil does not interfere with the lug, 42^a, swinging past it in the rocking movement for reversing the position of the reflector-shield.

A stretched spring, 100, is provided connecting the cam slide bar, 90, with the frame, said spring reacting for stressing the slide cam bar in the direction for rocking the reflector-shields from the position for reflect-

ing the heat onto the article to be treated, to their position for shielding the article from the heat; that is to say, from the position shown in Figures 5 and 9 to the position shown in Figures 1 and 3.

For rocking and holding the reflector-shields at heat-reflecting position, a dog, 89, is pivoted at 89^a on the rear upright, 10, for engaging a notch, 88, in a bar, 80, which is rigid with the slide cam bar, 90, as hereinafter particularly described.

To provide for automatically terminating the toasting operation by automatic retraction of the cam slide bar, 90, after a predetermined period, and to provide for adjustment to vary the duration of the heating period, the construction shown is in detail as follows:

The slide cam bar, 90, mounted as described for sliding on the rear frame upright, 10, carries rigid with it by means of tie bolts, 81, which extend through slots, 82, in said rear upright, 10, a parallel bar, 80, immediately behind said upright, 10. The bar, 80, carries a rack, 83, which engages a winding gear, 84, of the timer train, A, which is a weight-operated train, the operating weight, 85, being carried on a lever arm, 86, at the rear end of the winding shaft, 87.

The bar, 80, has a notch, 88, positioned for engagement of the dog, 89, above mentioned, which is pivoted on the rear upright, 10, and spring stressed for engaging the notch, 88, when the bar is in the position to which it will be moved with the slide cam bar, 90, in setting the reflector-shields at reflecting or non-toasting position.

The rack bar, 83, is mounted on the bar, 80, by studs, 71, 71, which engage inclined slots, 72, 72, in the rack bar, 83; and a spring, 74, operates to retract the rack bar, 83, so that sliding in the inclined slots, 72, on the studs, 71, it is held normally out of engagement with the winding gear, 84. The rack bar, 83, has a handle, 75, and serves as the means for moving the slide cam bar, 90, to set the reflector-shields at toasting position.

The initial part of the movement of the rack bar, 80, for such setting causes it to slide to the inclined slots, 72, on the studs, 71, up into engagement with the winding gear, 84; and the remainder of the movement winds up the train, lifting the weighted lever from the dotted line position shown, releasing the dog, 89, and letting it down to ride on the upper edge of the bar, 80, so that on the completion of the setting movement of the reflector-shields and winding movement of the timing train, A, the dog, 89, engages the notch, 88, in the bar, 80, and locks the parts at toasting position. Upon the operator releasing the handle, 75, the rack bar, 83, is retracted along the oblique slot, 72, out of engagement with the winding gear, 84; so that on the running down of the train, causing the weight,

by means of a stud, 86^a, on the lever arm, 86, encountering the tail, 89^a, of the dog 89, to trip the dog, 89, out of the notch, 88, of the bar, 80, permitting the slide cam bar 90 to be retracted by its spring, 100, the rack, 83, is out of engagement with the winding gear, and the train is therefore ready to be rewound, and the parts are returned to initial position ready for re-setting.

To provide for adjustment to vary the duration of the toasting period, the winding rack, 83, is mounted on the bar, 80, not directly, but by means of an intermediate bar, 120, which is adjustable longitudinally of the bar, 80, as indicated by slots, 121, and securing screws, 122, and carries a reading point, 123, for reading on a graduated scale, 124, formed on the bar, 80, and graduated in minutes of the toasting period.

If the maximum toasting period is wanted, the rack bar, 83, will be set so that the rack teeth engage the winding gear at the start of the setting movement; and if a shorter period is desired, the bar, 120, will be adjusted on the bar, 80, to set the foremost teeth of the rack bar, 83, more or less back from the winding gear, 84; so that the complete stroke for setting the slide cam bar, 90 at locked position, will rotate the winding gear, 84, and wind up the operating weight less or more, so that it will run down and release the dog in less than the full running time.

It will be readily understood that without departing from the invention as herein disclosed, a wide variety of timing devices and operating connections of the same may be arranged to co-operate with the means for setting the reflector shields at reflecting or shielding,—toasting and non-toasting,—positions; and I wish it to be understood that I do not limit myself to the particular means and devices shown for that purpose.

Also in respect to the means for operating the reflector shields to set them alternatively at reflecting and shielding position, a variety of constructions may readily be devised which will not depart from the substance of the present invention, and I do not limit myself specifically to the rack and gear means shown, although the same may be claimed as preferred means for the purpose.

For giving the operator notice of the completion or termination of the heat treatment there may be provided either an audible or a visual signaling device, and both an audible and a visual signal are embodied in the construction as illustrated in the drawings.

The audible signal consists of a bell indicated at 125 with a hammer seen at 126, carried on a spring arm, 127, of which the wire or rod forming it is coiled about a pivot screw, 128, set into the rear side of the rear upright, 10, and having an operating terminal extending down from the coil as seen at 129 into the path of a tooth, 80^b, project-

ing upward from the upper edge of the bar, 80, a stop stud, 130, being carried by the upright, 10, for stopping the hammer-carrying arm, 127, holding the hammer head out of touch with the bell, a stretched spring, 132, being provided attached at 133 to the rear upright, 10, and at 134 to the arm, 127, operating for holding the hammer arm against said stop. The operation of this bell signal is that in the manually-performed movement for setting the reflector screens at heat-treating position, the tooth, 80^b, passes by the end of the terminal, 130, which, due to the coil, 128, yields flexibly to permit the tooth to pass, and then snaps back to the position shown in Figure 8, without operating the hammer-carrying arm, 127, by reason of the latter being stopped, as mentioned, against the stop, 131; and in the return movement of the bar, 80, under the reaction of the spring, 100, the tooth, 80^b encountering the terminal, 130, rocks the entire hammer-carrying member, retracting the hammer from the bell, and when the tooth has passed the end of the terminal the spring, 134, retracting the arm, 127, against the stop, 131, rings the bell.

The visual signal shown in the drawings consists of a flag, 140, carried on an arm, 141, pivoted at 142 at the rear side of the rear upright, 10, said arm having a slot, 143, in which a stud, 144, carried by the rack bar, 88, is engaged for swinging the flag from full-line position behind the rear upright, 10, to dotted line position where it is exposed forwardly in the movement of the bar, 8, due to the reaction of the spring, 100, retracting the operating cam bar for resetting the reflector screens at screening position and terminating heat treatment. When the parts are operated for setting the reflector screens at reflecting or heating position, the flag is carried back to full line position behind the apparatus out of sight of the operator.

I claim:—

1. In an electric toaster and the like in combination with a heating coil arranged in successively parallel courses, a series of semi-cylindrical concave reflector-shields each pivoted for rocking from one side to the opposite side of a limited number of said courses for alternately shielding the toast from and exposing it to concentrated reflection of the heat of the coil.

2. In an electric heat-treatment apparatus a heat unit comprising a succession of parallel courses of heating coil, and a support for the article to be heat-treated mounted in a plane parallel to said courses and spaced therefrom, a succession of semi-cylindrically concave reflector-shields each axially pivoted parallel to a limited plurality of said courses for rocking from a position between the coil and the support convex toward the support, and the position at the opposite side of the

coil from the support concave toward the support.

3. An electric heat-treatment device comprising a carrier for an article to be heat-treated; a heat-treatment unit consisting of a succession of parallel courses of heating coil, and reflector-shields each facing a limited plurality of said courses, each pivoted longitudinally of the coils and arranged for rocking from a position at the side of the coils opposite the carrier to a position between the coils and the carrier; whereby said reflector-shields serve alternately as reflectors for directing the heating of the coils onto the heat-treated article on the carrier, and for shielding said article from the heat of the coils.

4. An electric heat-treatment device comprising a carrier for an article to be heat-treated, a heat-treatment unit consisting of a succession of parallel courses of heating coil and reflector-shields having one side highly reflective and the opposite side relatively non-reflective, each of said reflector-shields facing a limited plurality of said courses and each pivoted longitudinally of the coils for rocking from a position at the side of the coils opposite the carrier with the reflective side facing the carrier to a position between the coils and the carrier, whereby said reflector-shields serve alternately for concentrating the heat of the coils on the article to be heat-treated and for shielding said article from the heat of the coils.

5. In the structure defined in claim 4, the reflector-shields being semi-cylindrically transaxially concave at the side facing the coils, whereby when at the position at the opposite side of the coil from the carrier they serve to concentrate reflected heat on the article being treated.

6. In the structure defined in claim 4, the reflector-shields being semi-cylindrically transaxially concavo-convex and mounted with the concave side toward the coils when the reflector-shield is positioned at the opposite side of the coils from the carrier; whereby at that position the reflector-shields serve to concentrate reflected heat on the article to be heat-treated, and at the reverse position having their convex side toward the carrier and tending to diffuse the radiated heat.

7. In the construction defined in claim 4, the reflector-shields being each cylindrically transaxially concavo-convex with the concave side relatively reflective, and the convex side relatively nonreflective, and having at its opposite ends radial lever arms by which it is pivotally mounted and arranged each to span two adjacent courses of the coil and the 180° bend by which said courses are continuous with each other.

8. In the construction defined in claim 4, the reflector-shields being each cylindrically transaxially concavo-convex with the concave sides relatively reflective and the con-

vex sides relatively nonreflective, and having at its opposite ends radial lever arms by which it is pivotally mounted, the pivotal axis being offset from the plane in which the courses are parallel at the opposite side from the carrier, and the radial arms of the several reflector-shields being extended alternately from the opposite ends of the arcs of their concavo-convex curvature.

9. The construction defined in claim 4 comprising a frame structure in which the reflector-shields are pivotally mounted, said reflector-shields having their pivots at one end extended and furnished with gear pinions, a rack bar mounted on the frame structure having racks arranged to engage consecutive pinions respectively at opposite sides thereof, and means for reciprocating the rack bar for rocking the reflector-shields, whereby consecutive shields are rocked in opposite directions.

10. In a heat treatment apparatus, a heating unit mounted in fixed position; a carrier for the article to be treated mounted fixedly with respect to the heating unit, and means for concentrating the heat radiated from the heating unit on the article on the carrier, said means being mounted for movement back and forth between a position for directing the radiated heat toward the article and a position for directing the heat away from the article treated.

11. A heat treatment apparatus comprising a holder for the article to be heat treated; a heating unit having a succession of parallel heat-radiating elements and a reflector shield having one side highly reflective and another side relatively non-reflective, each of said reflector shields being mounted facing a limited number of said parallel heat-radiating elements, and each being pivoted for rocking about an axis parallel to said parallel elements from a position at the side of said elements opposite the holder with the reflector side facing the heating elements to a position between said elements and the holder.

12. A heat treatment apparatus comprising a holder for the article to be heat treated, and heat radiating units mounted fixedly with respect to the position of the holder at opposite sides of the position of the center of the holder, heat-directing means mounted with relation to the heat-radiating units respectively for movement back and forth between positions for directing the radiated heat toward the position of the article on the holder and position for directing the radiated heat away from said position of the article.

13. A heat treatment apparatus comprising a holder for an article to be heat treated, two heat-radiating units having each a group of longitudinally parallel heat-radiating elements and a group of reflector-shields associated with each of said units, each reflector shield being mounted facing and spanning

transversely a limited number of said parallel radiating elements, each of said reflector shields being pivoted for rocking about an axis parallel to said parallel elements from a position at the side of said elements opposite the holder with the reflector side facing the heat-radiating elements to a position between said elements and the position of the article carried by the holder.

14. The construction defined in claim 4 comprising a frame structure in which the reflector-shields are pivotally mounted, the latter having their pivots at one end extended and furnished with gear pinions, a rack bar mounted on the frame structure having rack elements engaged with the pinions respectively, and means for actuating the rack bar at will in one direction for rocking the reflector-shields to position them at the opposite sides of the coils from the carrier for reflecting the heat of the coils toward the carrier, and spring means for actuating the rack bar in the opposite direction.

15. In a heat-treating apparatus in combination with a heating element a support for the article to be heat treated, a screen arranged to be movably interposed between the heating element and the article on the support, spring means for holding the screen element normally in screening position, means for manually withdrawing it from such position, and releasable locking means for holding it out of screening position, means for releasing the locking device to permit the retraction of the screen to screening position, and an audible signal arranged to be operated by the return movement of the screen to screening position.

16. In a heat-treating apparatus in combination with a heating element a support for the article to be heat treated, a screen arranged to be movably interposed between the heating element and the article on the support, spring means for holding the screen element normally in screening position, means for manually withdrawing it from such position, and releasable locking means for holding it out of screening position, means for releasing the locking device to permit the retraction of the screen to screening position, a visual signal and automatic means for operating to render it visible upon the return movement of the screen to screening position.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 22d day of May, 1929.

HORACE CALDWELL WRIGHT.