

July 6, 1948.

D. W. SMITH

2,444,857

PIE CRIMPING DEVICE

Filed May 4, 1946

2 Sheets-Sheet 1

FIG. 1

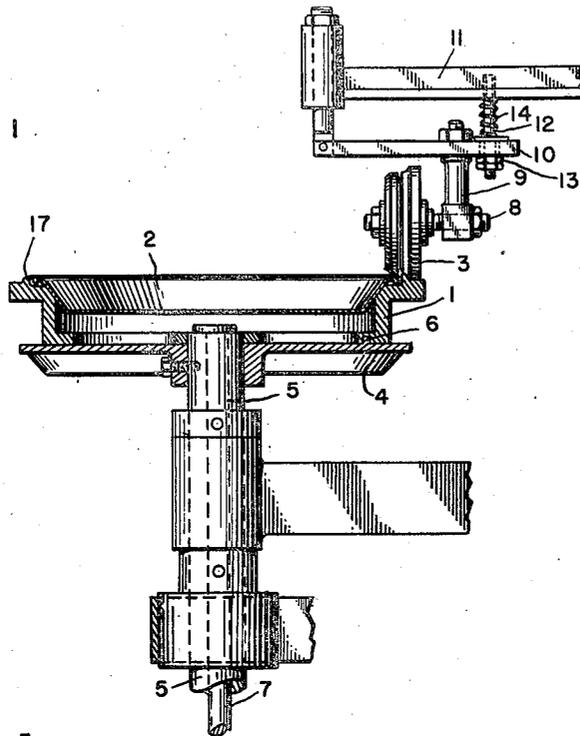


FIG. 2

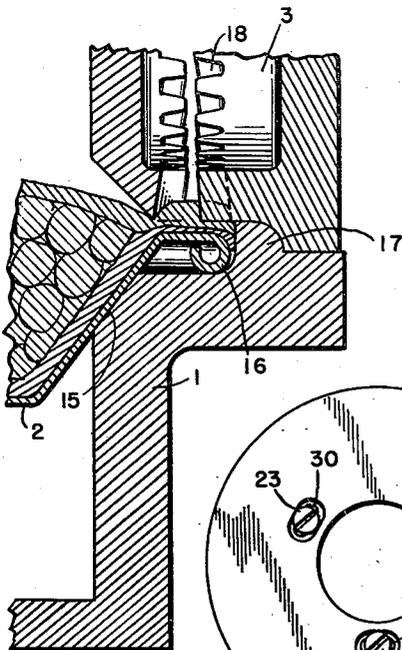


FIG. 3

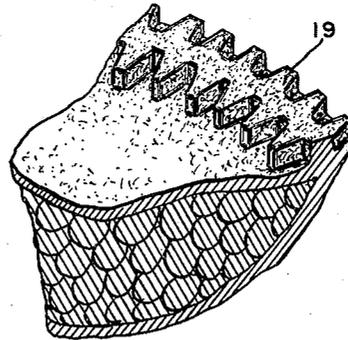
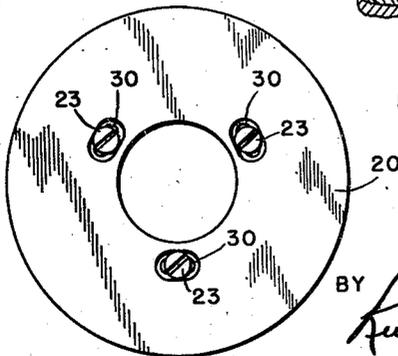


FIG. 4



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2 Sheets-Sheet 2

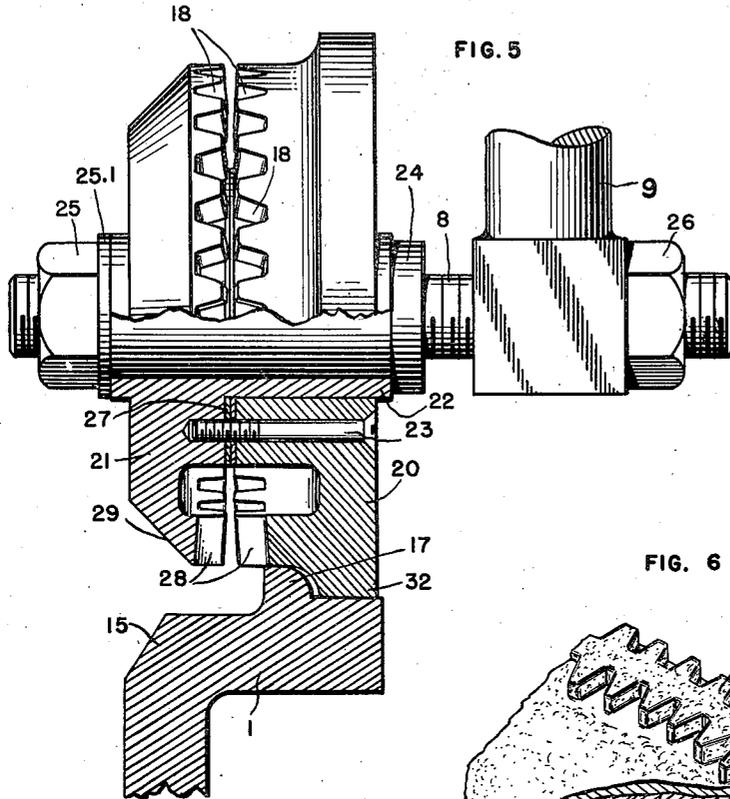


FIG. 5

FIG. 6

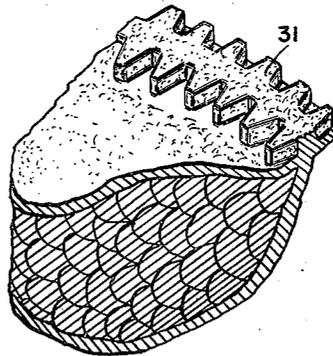


FIG. 7

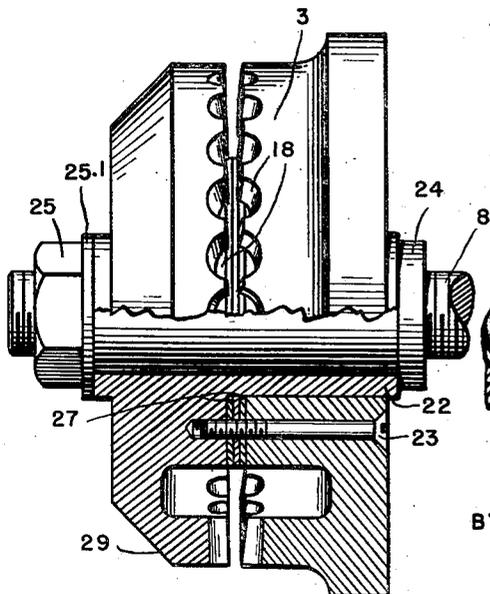
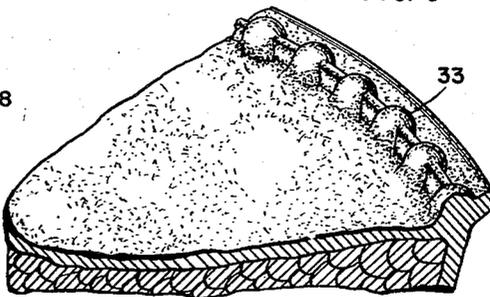


FIG. 8



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# UNITED STATES PATENT OFFICE

2,444,857

## PIE CRIMPING DEVICE

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Application May 4, 1946; Serial No. 667,344

10 Claims. (Cl. 107—49)

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This invention relates to improvements in pie-making machinery, and particularly to improved means for crimping the margin of a piecrust prior to the baking of the pie.

The main objects of this invention are to provide an improved piecrust crimping means for working the margin of a piecrust and applying thereto a bead or an embossing of predetermined design; to provide such a means that will also serve as an adjustable piecrust trimmer; to provide an improved piecrust crimping wheel; to provide an improved piecrust crimping wheel whereby the crimping operation is performed by a single rotary crimping element; to provide an improved piecrust crimping wheel arranged to be adjustable to vary the design of the bead or embossing applied to the margin of a pie during the crimping operation; to provide such a crimping wheel having a pair of coating elements, one of which is adjustable both angularly and axially to vary the design applied to the margin of a pie; and to provide an improved crimping device of simplified design and construction and which can be readily embodied in existing automatic pie-making machinery.

Specific embodiments of this invention are shown in the accompanying drawings, in which:

Figure 1 is a view in elevation and partly in section of the improved pie-crimping apparatus, showing the relation of the essential elements as they would be utilized in automatic pie-making machinery, the pie crimping means only being shown.

Figure 2 is a fragmentary sectional view showing one form of the pie crimping wheel and illustrating its manner of operation on a piecrust.

Figure 3 is a fragmentary sectional view of a pie showing one form of bead or embossing as applied to the pie margin during the crimping operation of the crimping wheel illustrated in Figure 2.

Figure 4 is a view of the outer face of the improved crimping wheel showing an arrangement by means of which the inner and outer members of the crimping wheel can be angularly adjusted relative to each other.

Figure 5 is a side elevation, partly in section, showing details of the pie crimping device shown in Figure 2, but with the coating elements of the crimping wheel adjusted angularly relative to each other to vary the design of the bead or embossing applied to the margin of a piecrust.

Figure 6 is a fragmentary sectional view of a pie illustrating the design of bead or embossing applied to the margin of a piecrust by the device as arranged in Figure 5.

Figure 7 is an edge or peripheral view, partly in section, of the crimping wheel but with a variation of the design of the peripheral indents formed in the crimping wheel, and

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Figure 8 is a fragmentary sectional view of a pie illustrating the form of bead or embossing that may be applied by the crimping wheel of Figure 7.

In the art of commercial pie-making, automatic machinery is well known for accomplishing substantially all of the various operations involved in the making of a pie and it is likewise well known to embody all of the mechanisms for the several pie-making operations in a single machine. Such automatic pie-making machinery usually involves some form of piecrust crimping mechanism and it is contemplated that the invention herein shown and described will be mainly utilized in such automatic pie-making machinery. However, since it is well known in the art to combine pie crimping devices with other apparatus in an automatic pie-making machine, only the piecrust crimping means itself will be herein shown and described, it being understood that the manner of applying the invention to automatic pie-making machines can be readily practiced by those ordinarily skilled in this art.

As shown in Figure 1 of the drawings, the piecrust crimping device comprises a pie plate holder or carrier 1 designed to receive and support a pie plate 2 and to coat with a crimping wheel, generally indicated by the numeral 3, which is disposed vertically at the margin of the carrier 1 and arranged to roll thereon in engagement with the margin of a piecrust supported in the pie plate 2.

As shown, the carrier 1 is supported on a plate or tray 4 which is fixed on a rotatable shaft 5 and which is provided with an upstanding pin, or peg 6 arranged to extend into a suitable aperture in the base of the carrier 1 to lock the carrier 1 against rotation relative to the tray 4. The carrier 1 is also centrally apertured to receive the end of the shaft 5, which shaft is hollow to permit passage of a vertically reciprocable push rod 7, which in a common and well-known manner is utilized to eject the pie plate 2 from the carrier 1 when the pie-finishing operations have been completed.

As shown in Figure 1, the piecrust crimping wheel 2 is rotatably mounted on a substantially horizontal shaft, or spindle 8, which is secured in a bracket 9 depending from a pivoted arm 10 suitably mounted on a carrying member 11. The cantilevered end of the arm 10 is supported on a rod 12, projecting downwardly from the carrier member 11, which is provided with limit nuts 13 against which the end of the arm 10 rests, and a spring 14 is disposed between the carrier member 11 and the pivoted arm 10 so as to normally urge the arm 10 downwardly against the limit nuts 13 and yet permit some vertical movement in the arm 10.

These parts are adjusted so that in normal operation the crimping wheel 3 will be forced into pressure engagement with the dough of the pie-

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crust, by the action of the spring 14, in order to accomplish the crimping and the beading or embossing operation on the piecrust, that will be hereafter described.

Referring to Figure 2 it will be seen that the carrier 1 is outwardly flanged at its upper side and has the inner upper corner of the flange beveled, as at 15, to provide a seat for the pie plate 2; and the upper surface of the carrier is arranged to receive and support the marginal flange and bead 16 of the pie plate 2. Also a quarter-rounded bead or ridge 17 is provided on the upper surface of the carrier 1, which ridge normally extends somewhat above the marginal flange of the pie plate 2, the height of the ridge 17 being such as to accommodate the thickness of the piecrust dough after it has been crimped and beaded or embossed.

As shown, the quarter-rounded bead or ridge 17 is substantially flat on its inner side and is formed so that its inner diameter will be slightly greater than the diameter of the pie plate 2. The rounded portion of the ridge 17 is on the outside and the flange or upper surface, of the carrier 1 extends somewhat beyond the ridge 17 whereby the ridge portion and the extension provides a track on which the crimping wheel 3 may roll, the outer end of the crimping wheel having its periphery formed to substantially fit the ridge 17 when the crimping wheel is in its innermost position, as shown in Fig. 2.

In the form shown in Figs. 2 and 5 the rounded portion of the bead 17 terminates at the crest of the bead, in a substantially flat surface which is marginal with respect to the flat inner side of the bead. This flat top surface of the bead constitutes the trimming area and its function will be hereinafter described.

As indicated in Figure 2, crimping wheel 3 has its periphery indented to form a series of connected openings or an irregular channel, in the peripheral surface of the wheel, as indicated at 18, so that when the crimping wheel is rolled on the margin of a pie, the dough of the crust margin will be pressed against the flange of the pie plate 2 and crimped, and a part of the dough will be forced into the indented portion or channel-like opening 18 of the crimping wheel. Thus, a marginal bead or embossing, conforming to the shape of the channel formed by the peripheral openings 18 of the crimping wheel, will be impressed into the pie dough. Such a bead or embossing on the margin of the piecrust is indicated at 19 in Figure 3.

It will be understood that as the dough of the piecrust margin is pressed under the crimping wheel 3, the margin of the top crust and the margin of the bottom crust will be forced or pinched together, at the base of the bead or embossing, and thereby substantially welded, which is one of the functions of the crimping operation.

Referring to Figure 5 it will be seen that the crimping wheel, as therein shown, comprises a pair of disc-like members 20 and 21 positioned face to face concentrically and mounted on a shaft or spindle 8. The inner disc member 21 is provided with a hub 22 projecting from its inner face and the outer disc member 20 is mounted on the hub 22 so that the two disc members will rotate together on the shaft 8, the disc members being tied or secured together by means of suitable bolts 23.

The shaft 8 is provided with a fixed or integral collar 24 against which the end of the hub 22 abuts and the crimping wheel, formed

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by the assembly of the inner and outer discs 20 and 21, is held on the shaft 8 by means of a suitable nut 25 and washer 25.1 it being understood that in mounting the crimping wheel on the shaft 8, the wheel will be left free to rotate on the shaft 8 which is threaded into a suitable tapped bore in the end of the bracket 7 and locked in position by a suitable lock-nut 26.

In the form of the crimping wheel shown in Figure 5, the margins of the inner faces of the discs 20 and 21 are provided with angularly spaced indents, somewhat in the nature of the teeth on a ring gear, so that when the discs 20 and 21 are placed face to face, the periphery of the wheel thus formed will have a series of angularly spaced peripheral openings which may or may not be connected according to whether or not the discs 20 and 21 are spaced from each other. As shown in Figure 5, the openings 18 formed by registry of the indents in the faces of the discs 20 and 21 are connected so as to form an irregular channel in the periphery of the crimping wheel, the inner and outer disc members 20 and 21 being spaced by a suitable spacer, or spacers 27.

As shown in Fig. 5, the walls 28 of the indents, and hence of the peripheral channel in the crimping wheel, are tapered so as to converge inwardly toward the axis of the wheel; and the inner margin or pie facing end of the inner disc 21 is beveled as at 29, the bevel extending to a point closely adjacent the peripheral openings 18 formed by the indents in the inner face of the disc 21.

The purpose of the beveled portion and the converging walls of the indents is to effect a crimping and pinching action on the dough of the piecrust at the same time the dough is being forced into the peripheral openings of the crimping wheel for the formation of the desired bead or embossing on the pie margin, as shown in Fig. 2.

The bevel 29 at the pie facing end of the crimping wheel avoids contact between the periphery of the wheel and the piecrust inwardly of the marginal portion of the pie that is to be crimped, thus permitting the pie-engaging portion of the periphery of the crimping wheel to knead or work the dough at the crust margin; and the inwardly converging or inclined walls of the peripheral openings in the crimping wheel serve to compress or pinch the bead formed in the dough in much the same manner as though the bead were worked up by the human manipulation.

As indicated herein, it is desired that the discs 20 and 21, comprising the crimping wheel, be shiftable angularly relative to each other, as well as adjustable axially, thereby to vary the configuration of the head or embossing worked into the margin of the pie dough. As before-mentioned axial adjustment of the disc members 20 and 21 is obtained by means of spacers or washers 27 interposed between the disc members when they are assembled.

Angular adjustment of one disc member relative to the other is obtained by providing slot-like passages in the outer disc member 20 for the screws or bolts 23 by which the disc members are tied together. Such an arrangement is illustrated in Figure 4 wherein the outer face surface of the disc member 20 is shown. The slot-like passages are indicated by the numeral 30 and it will be understood that they are arcuate so as to permit angular movement of the securing screws or bolts 23 within the passages 30. In the form shown in

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Figures 4 and 5 the securing bolts are of the flat head type and the outer margins of the slot passages 30 are beveled or countersunk to receive the flat head of the bolt or screw 23 in flush engagement.

Thus by first loosening the screws 23, the discs 20 and 21 comprising the crimping wheel may be shifted angularly to change the relation of the indents in the facing portion of the discs and then the discs may be locked in the desired relation by tightening the screws 23.

It will be observed that the relation of the indents in the facing margins of the disc members 20 and 21, as shown in Figure 5, is different than the relation indicated in Figure 2. As shown in Figure 5, the disc members have been shifted angularly to bring the indents into registry and the channel formed in the periphery of the crimping wheel is thus varied in configuration from that shown in Figure 2. The type of bead or embossing formed by the arrangement of Figure 5 is shown at 31 in Figure 6.

As shown in the drawings, the improved crimping wheel is designed to ride on the annular quarter-rounded bead 17 formed on the top surface of the carrier 1. For this purpose the outer disc 20 has its periphery shaped to substantially fit the quarter-rounded ridge or bead 17 and is provided with a flange-like portion 32 at its outer margin, which flange-like portion is designed to ride on the outer edge of the upper surface of the carrier 1. This construction permits the crimping wheel also to serve as a dough trimming device for the dough of the piecrust overhanging the bead 16 at the edge of the pie plate flange, which dough will normally overlap the ridge or bead 17 on the carrier prior to the crimping operation. Such dough will be sheared off under the rolling action of the crimping wheel on the bead or ridge 17.

As shown in Figure 2, the bead or ridge 17 is spaced slightly from the edge of the pie plate flange to permit an overhang, of piecrust dough, of  $\frac{3}{8}$  to  $\frac{1}{2}$  inch to allow for shrinkage in the dough during the baking operation. Such overhang of the piecrust dough is made possible with the present crimping device since the shearing action, during trimming, is between the periphery of the crimping wheel and the flat top surface of the bead or ridge 17, rather than at the edge of the pie plate which is the common practice.

Also, the mounting of the crimping wheel, as shown in Fig. 5, is such that the wheel assembly is adjustable horizontally with respect to the bead or ridge 17 through the threaded engagement of the spindle 8 in the bracket 9. Thus the trimming line, or line of contact between the crimping wheel and the bead, may be adjusted across the flat top surface of the bead to vary the amount of dough overhang. Such an adjustment is indicated in Fig. 5.

It will be understood that the openings in the periphery of the crimping wheel 3 may be made to give any desired configuration to the bead or embossing applied to the margin of the pie. For example, the crimping wheel in Figure 1 is provided with merely a continuous peripheral channel that is uniform in cross section throughout its length. As shown in Figure 7, the crimping wheel 3 is provided with a series of round openings in its peripheral surface which will provide a bead or embossing having a configuration like that shown at 33 in Figure 8.

In the form shown in Figure 7, the openings in the periphery of the crimping wheel may be

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made by providing semi-circular indents in the abutting faces of the disc segments comprising the crimping wheel; and in this case as well as in the arrangements shown in Figures 2 and 5, the configuration of the peripheral channel in the crimping wheel can be varied by angular adjustment of the wheel discs or by axial spacing of the discs by means of the washers 27 interposed between the discs.

It will be understood that the diameter of the crimping wheel will be such that circumference of the center line of the bead worked into the pie dough will be substantially a multiple of the circumference of the crimping wheel, or at least such that the indents and the embossing will substantially gear together on an over-ride of the wheel on the pie margin.

In the operation of the improved pie-crimping device, the carrier 1 supporting a filled pie plate is brought into engagement vertically with the crimping wheel 3, there being sufficient engaging pressure so that the crimping wheel 3 will ride on the annular bead or flange 17 on the top surface of the carrier 1. The carrier 1 is then rotated by any suitable means, not shown, the crimping wheel 3 rolling freely on the bead or ridge 17.

As the margin of the pie is engaged by the crimping wheel, the indented or channeled periphery of the crimping wheel is forced into the margin of the piecrust immediately over the flanged portion of the pie plate 2 and the overhanging portion of the pie dough is sheared off between the crimping wheel and the bead or ridge 17. Then as the carrier 1 is rotated and the crimping wheel 3 rolled on the carrier 1 and over the margin of the pie dough, the pie margin is worked by the crimping wheel so as to squeeze the upper and lower layers of piecrust dough together and at the same time force the dough to enter the openings or channel in the periphery of the crimping wheel so as to form a ridge or embossing of the desired design or configuration.

After the carrier 1 has made a complete revolution, it is disengaged from the crimping wheel and shifted on to the next operation which normally would be automatic removal of the pie plate from the carrier for transportation to the baking oven.

The main advantages of this invention reside in the simple construction and arrangement of the crimping elements and the simplicity of their operation.

Other advantages reside in the arrangement of the crimping wheel whereby both crimping and trimming operations are accomplished by a single device. Other advantages are found in the construction of the crimping wheel whereby the pattern or configuration of the ridge or embossing formed in the piecrust margin can be varied by simple adjustment of the two disc elements comprising the crimping wheel.

Still further advantages reside in the arrangement, whereby the improved piecrust crimping and trimming device can be readily installed in existing automatic pie-making machinery.

Although several specific embodiments of this invention are herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. A piecrust crimping wheel comprising an inner disc and an outer disc mounted face to face and arranged to rotate together, the margins

of the inner faces of said discs being indented to form a series of openings in the periphery of said wheel between said discs, and means to adjust one of said discs relative to the other to vary the pattern of said openings.

2. A piecrust crimping wheel comprising an inner disc and an outer disc mounted face to face and arranged to rotate together, the margins of the inner faces of said discs being indented to form a series of openings in the periphery of said wheel between said discs, the walls of the indents being inclined to converge toward the axis of said wheel, and means to adjust one of said discs relative to the other to vary the pattern of said openings.

3. A piecrust crimping wheel comprising an inner disc and an outer disc mounted face to face and arranged to rotate together, one of said discs having a hub projecting from its inner face and the other of said discs being fitted onto said hub, the margins of the inner faces of said discs being indented to form a series of openings in the periphery of said wheel between said discs, and means to adjust one of said discs relative to the other to vary the pattern of said openings.

4. A piecrust crimping device comprising a pie plate carrier arranged to receive and support an annular flanged pie plate with the flanged portion of said pie plate overlapping and resting upon the upper surface of said carrier, an annular bead on the upper surface of said carrier disposed to encircle the flanged portion of a pie plate resting on said carrier, and a crimping wheel arranged to roll upon said annular bead, said crimping wheel being disposed to overlap the flanged portion of a pie plate supported in said carrier and having its periphery indented intermediate its end faces and in the pie plate overlapping portion.

5. A piecrust crimping device comprising a pie plate carrier arranged to receive and support an annular flanged pie plate with the flanged portion of said pie plate overlapping and resting upon the upper surface of said carrier, an annular bead on the upper surface of said carrier disposed to encircle the flanged portion of a pie plate resting on said carrier, a crimping wheel arranged to roll upon said annular bead, and means to adjust said crimping wheel radially with respect to said annular bead.

6. A piecrust crimping wheel comprising an inner disc and an outer disc mounted face to face and arranged to rotate together, the margins of the inner faces of said discs being formed to provide a connected series of openings in the periphery of said wheel between said discs, and means to adjust one of said discs relative to the other to vary the pattern of said openings.

7. A piecrust crimping wheel comprising an inner disc and an outer disc mounted face to face

and arranged to rotate together, the margins of the inner faces of said discs being formed to provide a connected series of openings in the periphery of said wheel between said discs, and means to adjust one of said discs angularly relative to the other to vary the pattern of said openings.

8. A piecrust crimping wheel comprising an inner disc and outer disc mounted face to face and arranged to rotate together, the margins of the inner faces of said discs being formed to provide a continuous channel extending around the periphery of said wheel, and means to adjust one of said discs axially relative to the other to vary the width of said channel.

9. A piecrust crimping device comprising a pie plate carrier arranged to receive and support an annular flanged pie plate with the flanged portion of said pie plate overlapping and resting upon the upper surface of said carrier, an annular bead on the upper surface of said carrier disposed to encircle the flanged portion of a pie plate resting on said carrier, said bead having a flat top surface adjacent its inner margin, a crimping wheel arranged to roll upon said annular bead, and means to adjust the position of said crimping wheel radially across the flat surface of said annular bead.

10. A piecrust crimping device comprising a pie plate carrier arranged to receive and support an annular flanged pie plate with the flanged portion of said pie plate overlapping and resting upon the upper surface of said carrier, an annular ridge on the upper surface of said carrier disposed to encircle the flanged portion of a pie plate resting on said carrier, the top surface of said ridge being flat adjacent its inner margin, a crimping wheel arranged to roll upon said annular ridge, and means to adjust the location of said crimping wheel radially across the flat surface of said annular ridge.

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