Oct. 27, 1959 R. D. BREMER ET AL 2,910,570

DOMESTIC APPLIANCE

Filed March 24, 1958 2 Sheets-Sheet 1

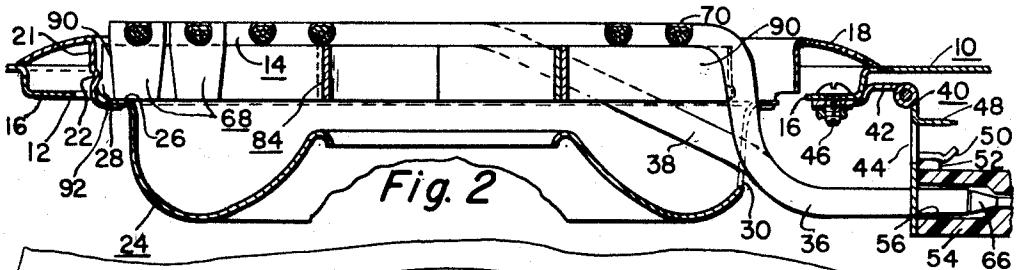


Fig. 2

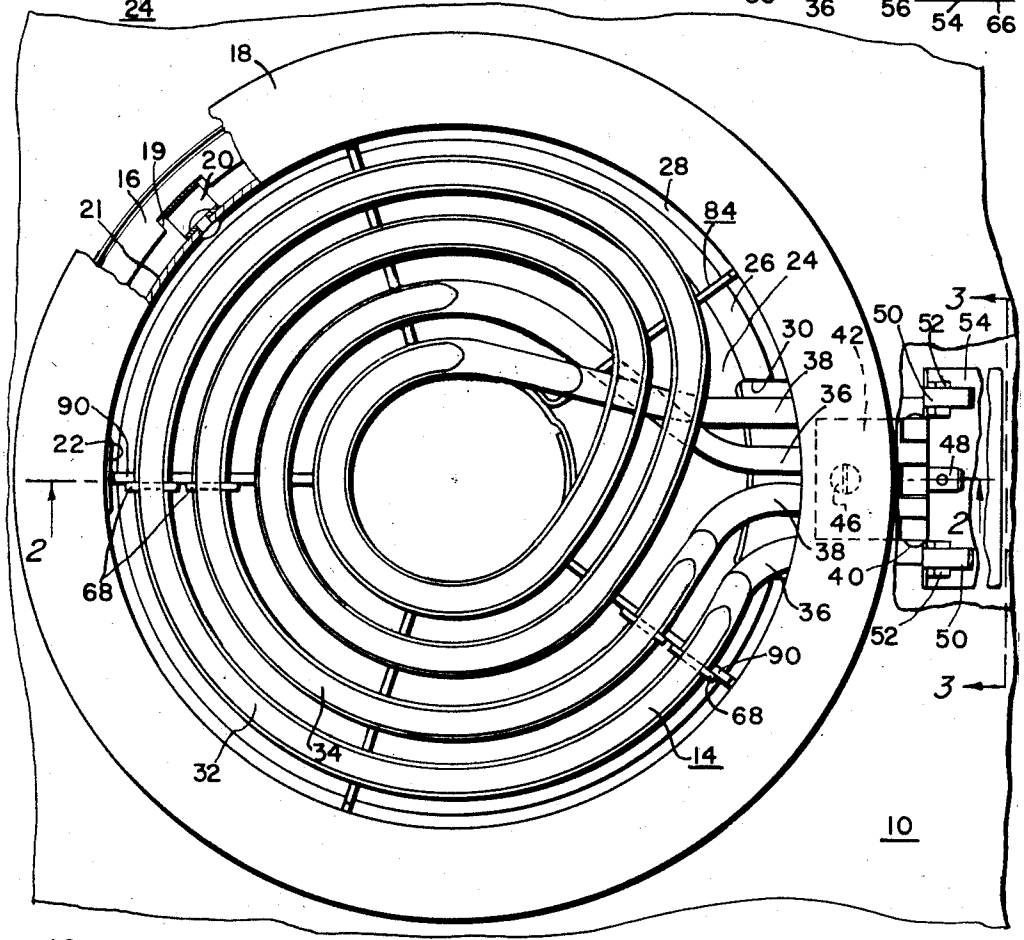


Fig. 1

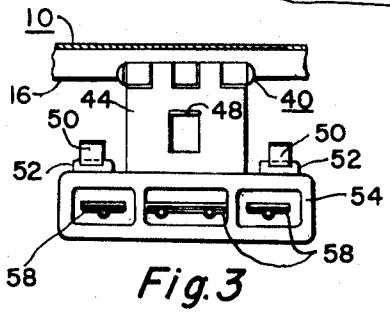


Fig. 3

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DOMESTIC APPLIANCE

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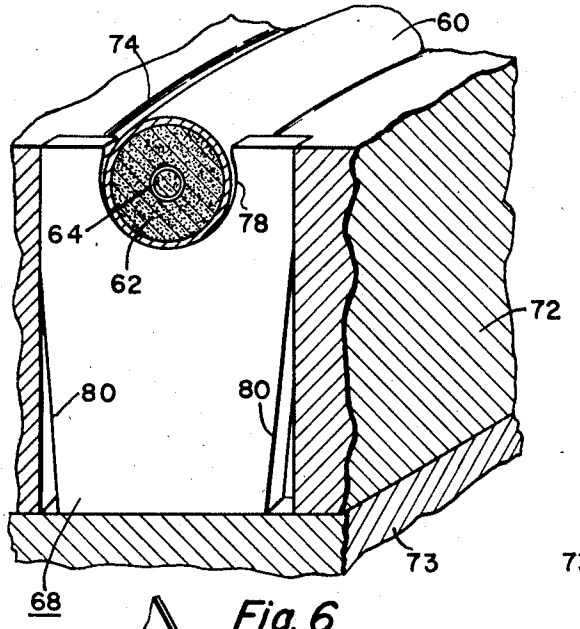


Fig. 6

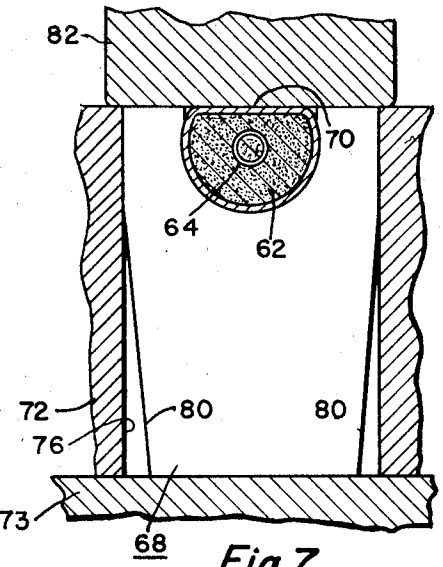


Fig. 7

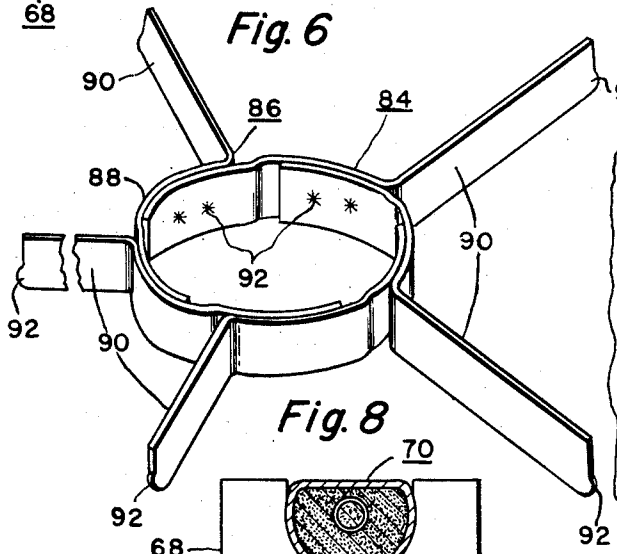


Fig. 8

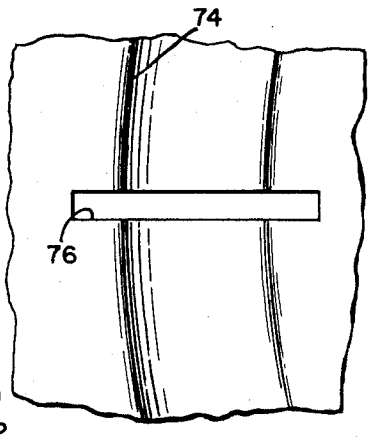


Fig. 5

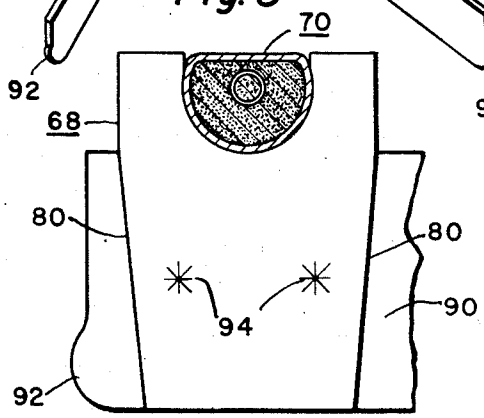


Fig. 4

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DOMESTIC APPLIANCE

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Application March 24, 1958, Serial No. 723,193

8 Claims. (Cl. 219—37)

This invention relates to a domestic appliance and more particularly to a surface cooking unit for an electric range and to the method for assembling same.

In the manufacture of electric ranges a vast number of surface cooking units are assembled each year. Therefore, these units must be assembled in a manner which will do the job quickly and economically and, at the same time, maintain a high standard of quality.

Accordingly, it is an object of this invention to provide a surface cooking unit comprised of a heating element, a support spider and a mounting bracket which can be assembled quickly with a minimum of manufacturing steps.

It is a more specific object of this invention to provide a method whereby a tubular heating element may be joined to its support bracket in the same operation which flattens the top surface of the tubular element.

An additional object of this invention is to fabricate a surface cooking unit support spider from a plurality of identical segments.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred form of the present invention is clearly shown.

In the drawings:

Figure 1 is a plan view of a surface cooking unit for an electric range with parts broken away to show a trim ring attachment means;

Figure 2 is a side sectional view taken along line 2—2 of Figure 1;

Figure 3 is an elevational view taken along line 3—3 of Figure 1 and showing the cooking unit mounting hinge;

Figure 4 is a fragmentary sectional view showing the assembly of heating element, mounting bracket and support spider;

Figure 5 is a fragmentary plan view of a bottom die including a mounting bracket receiving slot;

Figure 6 is a fragmentary perspective view of a heating element supported in a bottom die prior to being assembled to a mounting bracket;

Figure 7 is a fragmentary sectional view of a top and bottom die after having compression-assembled a heating element and mounting bracket; and

Figure 8 is a fragmentary perspective view of the cooking unit support spider.

In accordance with this invention, as best seen in Figures 1 and 2, a range top **10** is provided with an opening **12** adapted to receive a surface cooking unit, shown generally at **14**. The range surface opening **12** is defined by an annular horizontal flange **16** depending slightly from the range surface **10**. An ornamental trim ring **18** overlies the range opening **12** and carries several peripherally arranged U-shaped springs **20** which snap fasten the trim ring **18** to notches **19** in opening flange

16. A depending flange **21** of trim ring **18** is formed with an embossment **22** adapted for securely positioning the cooking unit **14**, as will be more fully described hereinafter. Centrally located beneath the cooking unit **14** is a drip pan **24** having an upper peripheral flange **26** adapted to overlie a trim ring support shoulder or ledge **28**. At one point in the periphery of drip pan **24**, an opening **30** provides a passageway for the lead-in portions of the cooking unit from the terminal block located beneath the range surface **10**.

The cooking unit **14** is comprised of an outer heating element **32** and an inner heating element **34** which may be independently selectively energized to give a cooking unit of either the conventional 6″ or 8″ size. The coils forming the elements **32, 34** are adapted to lie in concentric relationship to each other with their terminal portions **36, 38** respectively, depending through drip pan opening **30** where they may be hingedly mounted to the range surface **10**. This mounting of the terminal portions **36, 38** is accomplished by a hinge **40** having an arm **42** in fixed relation to the range opening flange **16** and a support arm **44** for pivotally securing the terminal portions **36, 38** of the heating elements. Any suitable fastening means such as a nut and bolt **46** may be used to affix the hinge arm **42** to the range opening flange **16**. The depending hinge arm **44** is provided with separate horizontally arranged apertures (not shown) to receive each of the terminal portions **36, 38**. To secure the terminal portions within the apertures, the arm **44** may be staked to the terminal portions **36, 38** by an up-setting process in the area of the flange **44** immediately surrounding these terminal portions. In addition to pivotally supporting the cooking unit terminal portions, the hinge flange **44** serves also as a terminal plate and, in this respect, carries a struck-out portion **48** to receive a conventional ground wire (not shown) and spring tabs **50** which cooperate with protuberances **52** molded on a terminal block **54** of plastic or other suitable insulating material. The terminal portions **36, 38** of the cooking unit **14** reside within a cavity **56** in the terminal block through which they connect to terminal blades **58**. In a conventional manner, electrical conductors (not shown) may then be plugged into the receptacle or terminal block **54** to engage each of the blades **58** and thereby place cooking unit **14** in condition to be electrically energized. Within the range opening **12**, the heating elements **32, 34** are carried by a spider or support structure, shown generally at **84**. The radially outer extremities of the spider arms **90** rest on the flange **26** of the drip pan **24** which is, in turn, supported by the ledge **28** of the trim ring **18** to position firmly the cooking unit **14** in horizontal relationship to the range top or surface **10**. The spider **84** is attached to the heating elements **32, 34** by a plurality of brackets or tabs **68** in any conventional manner such as a welding process. A more complete description of the heating brackets **68** will be given hereinafter in connection with the method of joining bracket, spider and heating element.

The fabrication and assembly of cooking unit **14** will best be understood with reference to Figs. 4 through 8 wherein the novel concepts of this invention are illustrated. In assembling the cooking unit **14**, a round tubular element **60** is filled with a quantity of magnesium oxide **62** in which a resistance wire **64** is centrally retained. Upon completion of the filling of tube **60**, plugs **66** are inserted in the ends of tube **60** to seal the tube ends and to hold the ends of the resistance wire **64** in spaced relation to the tube. The tubular element **60**

is then roll swaged to compact the magnesium oxide after which the element 60 is wound to form the spiral configurations of the heating elements 32 and 34. These spiralled heating elements 32, 34 must now be assembled into a comparatively rigid cooking unit 14. Furthermore, it is desired to flatten the upper surface 70 of the heating elements to achieve a greater contact surface for the cooking utensils to be reposing thereon and also to compact additionally the magnesium oxide within the tube. In order to attach the formed heating elements to the required number of mounting brackets 68 and to provide the substantially flat surface 70, a die-forming process is used. In serving these ends, a bottom die 72, resting on a shoe 73, is formed with a spiral depression or channel 74 which is complementary to the convolute configuration imparted to the heating elements 32 and 34. In this regard, it should be apparent that separate dies will be needed for the differently sized heating elements 32 and 34. The heating elements thus formed are then placed within the channel or depression 74 and held firmly thereby. Provided also in the bottom die 72 is a mounting bracket receiving slot or pocket 76 in which the mounting bracket 68 is inserted prior to the placing of the heating element within the channel 74.

The mounting bracket 68 is formed with a circular opening 78 having a slightly greater diameter than the exterior dimension or diameter of the heating elements 32, 34 when in this tubular form 60. Furthermore, the bracket 68 is shaped with tapered portions 80 to facilitate removal of the bracket from the bracket support pockets 76. To so configure the bracket 68, a punching process will simultaneously form the taper 80 and the openings 78 in one operation.

With the brackets 68 in slots 76 and tubular element 60 in bottom die channel 74, a top die 82 is brought down into engagement with bottom die 72. Since the tubular element 60, projects above the surface of bottom die 72, the top die 82 compresses the tubular element 60 to form a flat surface 70 on a top portion thereof. In this process, the tubular element 60 is compressed into engagement with the slightly larger opening 78 in support bracket 68 and is thereby securely locked to this bracket. Although but two brackets are shown affixed to each of the heating elements 32, 34, it should be understood that any desired number may be attached merely by placing additional slots 76 in bottom die 72 and filling the slots with the additional brackets.

This invention also contemplates the formation of a novel and simple support spider, shown generally at 84 (Fig. 8), to which the heating elements 32 and 34 may be attached. The spider is formed with a plurality of identical segments 86 having an arcuate section 88 and a substantially radially extending support arm 90. Since the elements 86 are identical, the various arcuate portions 88 may be assembled in overlapping relationship and fastened together as by a welding operation at 92. At the outer extremity of the support arm 90, a cooking unit locking protuberance or projection 92 is formed to cooperate with trim ring embossment 22, as will be described more fully hereinafter.

After the die forming process, the heating elements 32 and 34 with the compression attached brackets 68 are lifted from the bottom die 72 and placed in interfitting relationship to each other with their terminal portions 36, 38 extending in one direction. This grouping of elements 32, 34 is next rested on the support spider 84 and rotated slightly until brackets 68 are in juxtaposition with the respective support arms 90 of the spider. Next, the bracket 68 is joined to spider arm 90 in any conventional manner as by welding at 94 (Fig. 4). Attachment of the heating elements 32, 34 to the hinge 40 is accomplished by inserting the terminal portions 36, 38 through hinge arm or terminal plate 44 as described hereinbefore. The terminal block 64 may then be forced into place with the protuberances 52 thereon engaging spring retention tabs 50 on the terminal plate 44. With the heating elements 32, 34, the bracket 68, the support spider 84 and the hinge 40 thus joined to form the cooking unit 14, assembly of this unit to the range surface 10 is all that remains.

While holding the cooking unit 14 approximately within the range opening 12, the support arm 42 is bolted to the range opening flange 16. The trim ring spring tabs 20 are next snapped into place over the range opening flange 16 with the embossment 22 opposite the hinge mounting location. The cooking unit 14 is now in position to be pivotally moved between a raised position for cleaning and a seated position for cooking. A latching function follows when the protuberance 92 of support arm 90 engages and snaps over trim ring embossment 22.

While the embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In a method for attaching a mounting bracket to a tubular heating element, comprising; the steps of; forming an opening at one end of said bracket to receive said tubular element, said opening having a reduced entrance portion, placing said tubular element in said opening, and compressing said tubular element into retaining engagement with said reduced entrance portion.

2. In a method for attaching a mounting bracket to a tubular element, comprising the steps of; forming an opening in said bracket to receive said tubular element, placing said tubular element in said opening, and pressing said tubular element into retaining engagement with said opening.

3. In a method for attaching a mounting bracket to a cylindrical heating element, comprising the steps of; forming an opening adjacent one end of said bracket to receive said cylindrical element, said opening having a reduced neck portion; placing said cylindrical element in said opening, and swaging said cylindrical element into retaining engagement with said reduced neck portion.

4. In a method for forming a flat surfaced cooking unit having a tubular heating element, a plurality of adjoined support arms and a mounting bracket, including the steps of; overlapping a portion of said support arms to define a cylinder, securing said overlapped portions and turning the remaining portions of said support arms radially outwardly to form a cooking unit support spider, forming an opening in said mounting bracket to receive said tubular element, said opening having a reduced entrance portion, placing said tubular element in said opening, and compressing said tubular element into retaining engagement with said opening, and fastening said bracket to said support arms.

5. A surface heating unit for an electric range, comprising; a cylindrical heating element, a support spider and a mounting bracket press-fitted to said cylindrical element and welded to said spider.

6. A heating unit, comprising; a tubular heating element, a support member and a connecting bracket press-fitted to said tubular element and attached to said member.

7. A heating unit, comprising; a tubular heating element, a support assembly having a plurality of sections, said sections having inner arcuate portions in overlapping relationship and outer substantially radially extending sections, means for joining said overlapping portions, and a heating element mounting bracket in swage fit relationship to said heating element and in affixed relationship to said support assembly.

8. A heating unit, comprising; a tubular heating element, a support assembly having a plurality of sections, said sections having inner arcuate portions in overlap-

ping relationship and outer substantially radially extending sections, means for joining said overlapping portions, and a heating element mounting bracket in swage fit relationship to said heating element and in affixed relationship to said support assembly, whereby a portion of said mounting bracket overlies a portion of said heating element.

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