March 18, 1941. E. H. STALL ET AL 2,235,090

METHOD OF FORMING RANGE PLATFORM AND BACK SPLASHER STRUCTURES

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Fig. 1.

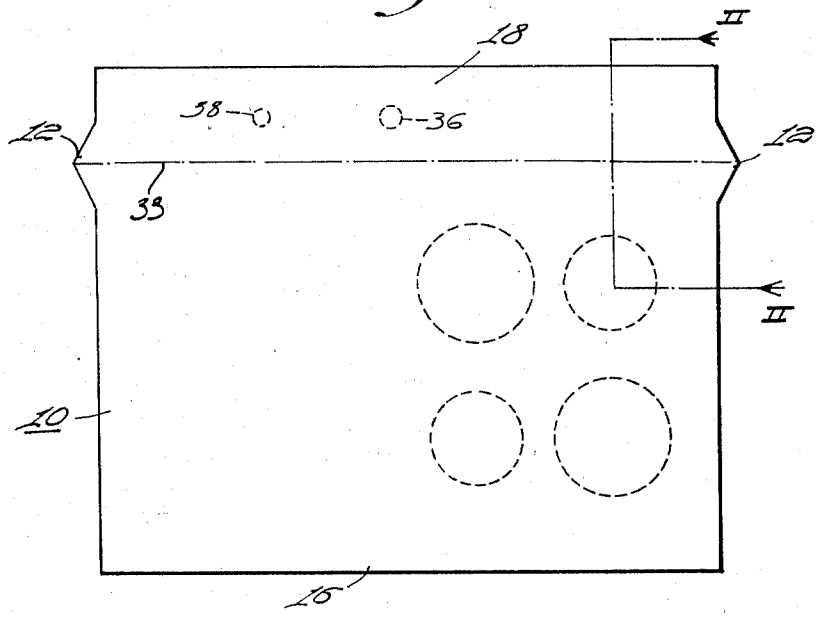



Fig. 2.

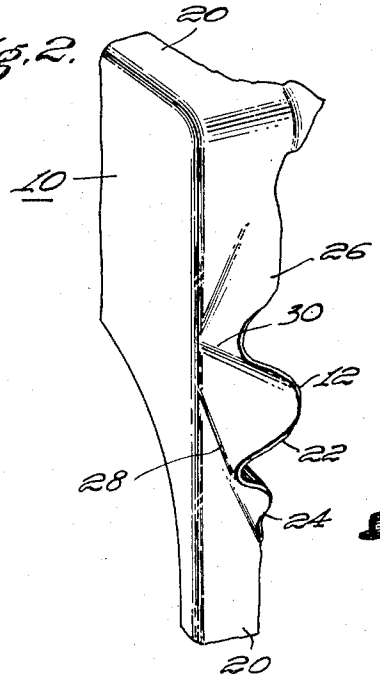
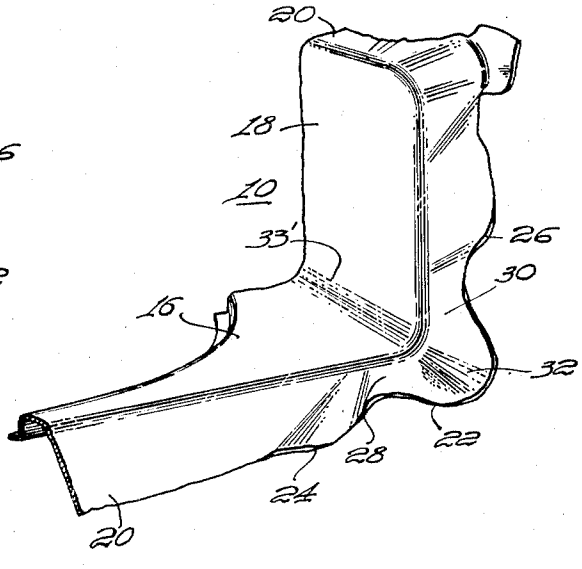



Fig. 3.




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METHOD OF FORMING RANGE PLATFORM AND BACK SPLASHER STRUCTURES

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Fig. 4.

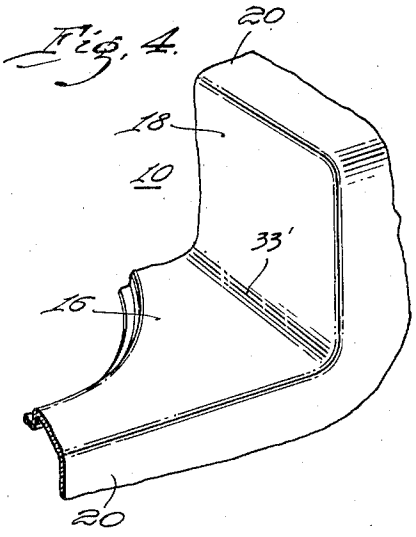



Fig. 5.

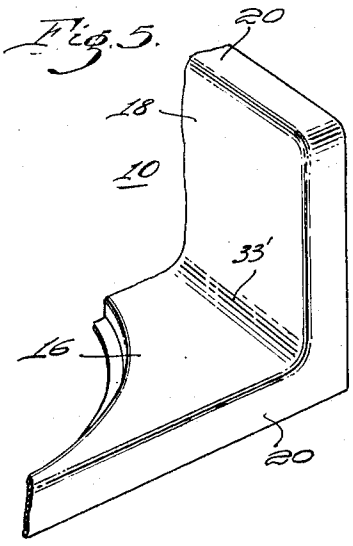
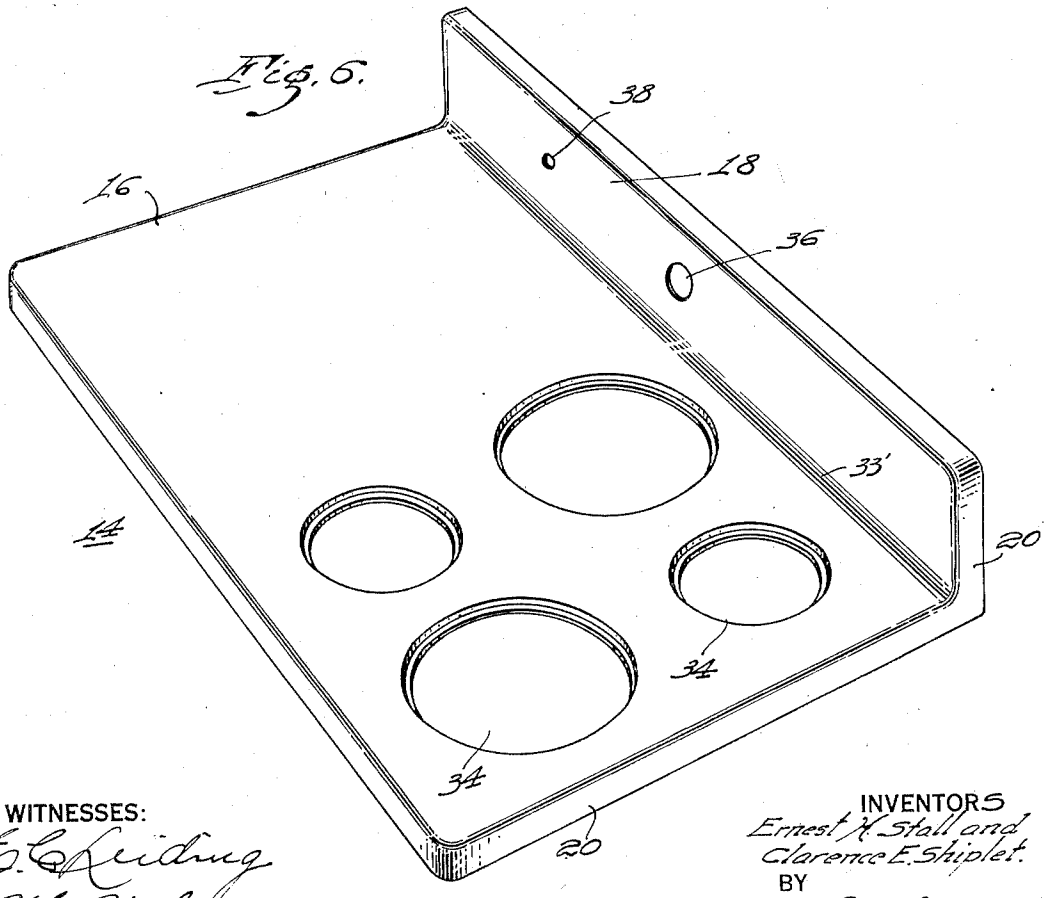



Fig. 6.




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# UNITED STATES PATENT OFFICE

2,235,090

## METHOD OF FORMING RANGE PLATFORM AND BACK SPLASHER STRUCTURES

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Application January 26, 1939, Serial No. 252,930

6 Claims. (Cl. 113—116)

Our invention relates to ranges, and more particularly, to a method of forming a unitary platform and back splasher structure therefor.

In range structures known to the art in which the platform and back splasher are formed from a single sheet, it has been customary to introduce a gusset within the ends or corners of the bend between the platform and back splasher. This procedure has been followed because it has heretofore been impossible to bend the back splasher substantially normal to the platform and to form desirable depending edges or flanges of substantial width thereon, without rupturing the material in the outer portion of the depending edge at or about the bend.

It is, therefore, an object of our invention to provide an integral unitary range platform and back splasher structure, with the back splasher positioned substantially normal to the platform, and which has depending wide edges formed as a part of the integral structure and void of ruptures at the bends thereof.

In addition to using a gusset, several attempts have been made to form a unitary range platform and back splasher structure without employing such gussets. In all such known attempts the depending edge adjacent the bend between the back splasher and platform had to be cut away because of the rupturing difficulty noted above. In some cases, the entire edge has been cut away at the bend while in other cases a small portion of the bend has been left integral with the structure. However, in no known case has there been a unitary range back splasher and platform structure which has uniform depending edges extending along the structure and adjacent the bend between the platform and back splasher, which is a preferred form of structure for modern ranges.

It is, therefore, a further object of our invention to provide a unitary range platform and back splasher structure which has a uniform depending flange or edge about the sides thereof and which is of substantially the same size at the bend between the platform and back splasher as it is around the rest of the structure.

A further object of our invention is to provide a method of forming a unitary range platform and back splasher structure in which the back splasher is bent substantially normal to the platform, and depending edges are formed substantially normal to the platform and back splasher without the aid of preformed gussets.

Another object of our invention is to provide a method of forming one portion of a sheet of metal at a desired angle to another portion thereof and to form a depending edge integral therewith of appreciable depth substantially normal to both portions of the sheet at the bend therebetween.

Another object of our invention is to provide an efficient, inexpensive method of forming a unitary range platform and back splasher of the character set forth, free of any inserts, separate gussets, or the like.

Other objects of our invention will either be pointed out specifically in the course of the following description of a device embodying our invention, or will be apparent from such description.

In the accompanying drawings,

Figure 1 is a plan view of a blank used in forming a range platform and back splasher structure embodying our invention;

Figs. 2, 3, 4 and 5 are fragmentary perspective views, taken along lines corresponding to line II—II of Fig. 1, illustrating progressive steps of the method used in forming the structure embodying our invention; and

Fig. 6 is a perspective view of the completed range platform and back splasher formed in accordance with our invention.

Referring to the accompanying drawings, we show a blank sheet of metal 10 having a protruding ear or corner portion 12 integral therewith at each side thereof near the upper corners of the sheet, which through a series of operations hereinafter described is formed into an angular structure, in this instance an integral range platform and back splasher 14, having a platform 16 and a back splasher 18, with a continuous integral depending edge or down-turned flange 20 of appreciable and substantially uniform depth located thereon.

The ears 12 are substantially triangular in shape and are integral with the sheet 10. In addition, the ears 12 are located on the line about which the back splasher is to be bent. This procedure is in contrast with the use of inwardly extending separate gusset members which are used in a well known manner; namely, notches are cut within the sheet and are located on either side thereof, the sheet is then bent along a line joining the notches, and then preformed gussets are positioned within the notches and attached to the sheet. On the other hand, ears 12 in our invention provide additional material which permits the desired bending and flanging operations without rupturing the material; in particular, the back splasher 18, constituting a portion of the sheet of metal is bent upwardly from the platform 16, constituting a second portion of the sheet, and the depending edge or flange 20 is located at the bend therebetween and integral with the sheet. Thus the ears 12 may provide additional material to permit such edge to be formed of appreciable depth, up to say two and a half inches, and substantially normal to both the platform 16 and back splasher 18 without causing a rupture therein as such edge is formed.

Although we have shown and described the ears 12 for providing the extra metal required to form the continuous flange around the bend, this extra metal could be provided by any other satisfactory means, for example, a sheet large enough to provide this extra metal in the margin could be used satisfactorily but this would involve a waste of material since all of the margin not required to form the flange must be trimmed off during the final step. Consequently, the economical method would require the provision of the ears 12. For the sake of simplicity and clearness, the shaping or treatment of only one corner of the sheet 10 is shown in Figs. 2 to 5, inclusive. However, it will be understood that the opposite corner is shaped in a similar manner, which need not be illustrated.

Apertures 34, 36 and 38 are formed within the metallic sheet 10, illustrated by dotted circles in Fig. 1, so as to be located within the platform and back splasher structure 14 in the desired position for surface units, oven vents, clock mountings, etc. These apertures may be formed within the structure, preferably before the process steps hereinafter described, and if desired, are finally trimmed in, say, the last step of the process so that suitable units may be readily placed therein. However, it is to be understood that such apertures may be formed in the structure in any desired step of the process.

The first step (see Fig. 2) in forming the range platform and back splasher structure 14 in accordance with our invention comprises rough forming the edge or down-turned flange 20 in the sheet 10 and producing wavy scallops or undulations in the ear or corner portion 12 and the margin adjacent the same. A large main wave or undulation 22 is formed in substantially the center of the protruding corner portion 12 with minor waves or undulations 24 and 26, one at either side thereof. The main wave or undulation 22 may be described as being substantially semi-conical in shape, with the edges 28 and 30 thereof being substantially in the plane of the sheet 10. It will be understood that in addition, the axis of the main wave located on the other side of the sheet is preferably substantially in line with the axis of main wave 22 and along the line of the bend as hereinafter described. However, it is to be understood that a single ear 12 may be used on the sheet 10 and that the remaining portion of the sheet may be formed in any desired manner. At the conclusion of the first step it will be noted that the sheet 10 is, in this instance, substantially of the general shape illustrated in Fig. 2, with the depending edge 20 formed about the outer edge thereof with the waves or undulations 22, 24 and 26 located in the ear or corner portions 12.

It will be understood from the foregoing that the forming of the scallops or undulations in the ear 12 and the margin adjacent the same stretches the material in the ear and the margin so that after the sheet 10 has been bent to form the back splasher at an angle to the platform, the ear 12 and the margin adjacent the same may be bent substantially normal to both the back splasher and the platform at the bend therebetween to form a continuous smooth flange about the bend without rupturing the material adjacent the bend.

The second step (see Fig. 3) comprises bending, say, the back splasher portion 18 of the sheet 10 substantially normal to the platform portion 16 of the sheet 10, the back splasher portion 18 being the upper portion of that shown in Fig. 1. It will be appreciated that the back splasher portion 18 is bent substantially along a line 33 joining the outer apices of the triangular ear or corner portions 12, as illustrated in Fig. 1, or along a line 33' joining the axes of the main waves or undulations 22 illustrated in Fig. 3.

The edges 28 and 30 of the main wave or undulation 22 in the structure shown in Fig. 3, lie substantially in the plane of the platform 16 and back splasher 18, respectively. The wave or undulation 22 is, however, necessarily reshaped from that illustrated in Fig. 2. However, the central portion 32 thereof is still substantially inclined downwardly or backwardly with respect to the hypothetical line 33 about which the back splasher was bent. Thus the central portion 32 of the wave 22 is also backwardly inclined with respect to both the back splasher 18 and platform 16. In view of the wave or undulation 22 and auxiliary waves or undulations 24 and 26 joining the flat portions of the edges 20 to the main wave or undulation 22 positioned at the bend between the back splasher 18 and the platform 16, it is obvious that additional material is provided at such bend, where needed, by the ear or corner portion 12.

The third step in this instance (see Fig. 4), comprises a rough flattening or straightening formation of the edge 20 about the bend between the platform 16 and back splasher 18. The additional material provided by the gussets or corner portions 12 and formed into the irregularly shaped waves or undulations 22, 24, 26, as hereinabove described, permits the flattened edge 20 to be of appreciable depth and to be formed substantially normal to both the platform 16 and back splasher 18 at the bend therebetween. The exterior line of edge 20 adjacent to the bend between the platform 16 and back splasher 18 is necessarily left in somewhat an irregular shape by this step in the process due to the rough formation of such flattened edge from the additional material in the waves 22, 24 and 26. However, it will be noted that the edge 20 adjacent to the bend between the platform 16 and back splasher 18 is formed to the desired flattened shape without rupturing the material, because of the additional material available in such flattening step in the waves or undulations 22, 24 and 26 formed from the integral gusset or corner portions 12.

The final step (see Fig. 5) in the method of forming the integral platform and back splasher structure 14 or of forming a depending edge in a corresponding shaped sheet of metal comprises a finished formation and trim thereof. This step straightens out any kinks in the platform 16 and back splasher 18, and in addition, puts the final form on the integral edge or flange 20. In addition, the final step lines up the entire structure so as to be in proper shape for, say, incorporation in the finished range body (not shown). The edge 20 formed in the final step is thus normal to the platform portion 16 and the back splasher portion 18, and is free from any ruptures or kinks. In other words, the depending edge portion 20 has been formed of a uniform appreciable depth substantially around the whole back splasher and platform structure 14 without the aid of any additional gusset member or inserts being attached thereto, and without the necessity of welding or brazing any rupture or tears therein.

It is, therefore, obvious that our invention provides a method of forming an integral range

platform and back splasher structure in which the back splasher is bent substantially normal to the platform and depending edges of appreciable depth are formed substantially normal to the platform and back splasher without the aid of preformed gussets or inserts being attached thereto, and without producing any ruptures in the edges at the bend between the back splasher and the platform.

In addition it is obvious that one or more such bends may be formed in sheets of metal for other applications using formed sheets, such as refrigerators, in which it is desired to form one portion of a sheet normal to a second portion of such sheet and to form an integral edge of appreciable depth substantially normal to both portions without using an inserted corner portion.

It is to be understood that due to particular shop tool limitations or the like, in some cases it may be necessary to use several smaller or intermediate steps or operations corresponding to each step hereinabove described in the method of forming a structure in accordance with our invention.

It will, therefore, be understood that these and various other changes may be made in the method of forming a device in accordance with our invention without departing from the spirit and scope thereof, and we desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art and the appended claims.

We claim as our invention:

1. The method of producing an angular structure from a single sheet of material which comprises forming oppositely-disposed concave upward scallops in the margin of opposite sides of said sheet and bending down the rest of said margin to form a flange along the sides of said sheet except where said scallops are formed therein, bending the sheet along the line joining the apices of oppositely-disposed concave upward scallops, said line extending substantially normal to the lines along which said margin is bent down, and bending the portion of the margin having the scallops so as to be in line with the flange formed by bending down the margin around the sheet.

2. The method of forming an integral range platform and back splasher and the like from a single sheet of material which comprises forming oppositely-disposed concave upward scallops in the margin of opposite sides of said sheet and bending down a margin to form a flange along the sides of said sheet except where said scallops are formed in said margin, bending a portion of the sheet at an angle from the main portion of the sheet along a line through the apices of the oppositely-disposed concave upward scallops, said line extending substantially normal to the lines along which said margin is bent down, bending said portions having said scallops substantially normal to both the platform and the back splasher at the bend therebetween, and drawing out the scallops to form a continuous smooth flange about the bend.

3. The method of forming an angular structure from a single sheet of material having an ear substantially in the plane thereof which comprises bending down a margin to form a flange along the edge of said sheet except where said ear extends from the same and forming a concave-upward scallop in said ear and the margin adjacent the same, bending the sheet along a line through the apex of said scallop to form the desired angle without rupturing the material adjacent the bend, said line extending substantially normal to the line along which said margin is bent down, bending said ear and the margin adjacent the same substantially normal to the respective portions of said sheet.

4. The method of producing an integral range platform and back splasher from a single sheet of material having an integral protruding portion substantially in the plane thereof and extending therefrom which comprises forming a depending flange substantially normal to the sheet and forming a plurality of concave-upward scallops within the protruding portion and the margin adjacent said portion, bending the sheet along a line through the apex of the central scallop to form the back splasher substantially normal to the platform, said line extending substantially normal to the line along which said flange is bent down, and bending said protruding portion and the margin adjacent the same so as to form a continuous flange substantially normal to both the back splasher and the platform at the bend therebetween, and straightening out the scallops to form a continuous smooth flange about the bend.

5. The method of forming a bend and a continuous depending flange in a sheet of material having an ear substantially in the plane thereof, said flange forming a predetermined angle with all portions of the sheet at the bend, which comprises bending down said flange along the edge of said sheet except where said ear extends therefrom, forming a plurality of concave-upward scallops in said ear and the margin adjacent the same, bending the sheet along a line through the apex of one of said scallops, said line extending substantially normal to the line along which said flange is bent down, and bending said ear and the margin adjacent the same to be in line with the depending flange and to form said angle with the portions of the sheet at the bend.

6. The method of forming a substantially 90° bend and a continuous depending flange in a metal sheet having a part protruding therefrom substantially in the plane thereof, said flange being substantially normal to all portions of the metal sheet at the bend, which comprises bending down the flange along the edge of the metal sheet except where the protruding part extends therefrom, forming a plurality of concave-upward scallops in said protruding part and the margin adjacent the same, bending said metal sheet along a line which extends through the apex of an intermediate scallop, said line extending substantially normal to the line along which said flange is bent down, bending said protruding part and the margin adjacent the same so as to be in line with the depending flange and normal to all portions of the sheet at the bend, and drawing said scallops to form a continuous smooth flange around the bend.

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