Dec. 4, 1945. S. H. HOBSON ET AL 2,390,438

RANGE CONSTRUCTION

Filed March 2, 1942 3 Sheets-Sheet 1

Fig. 1

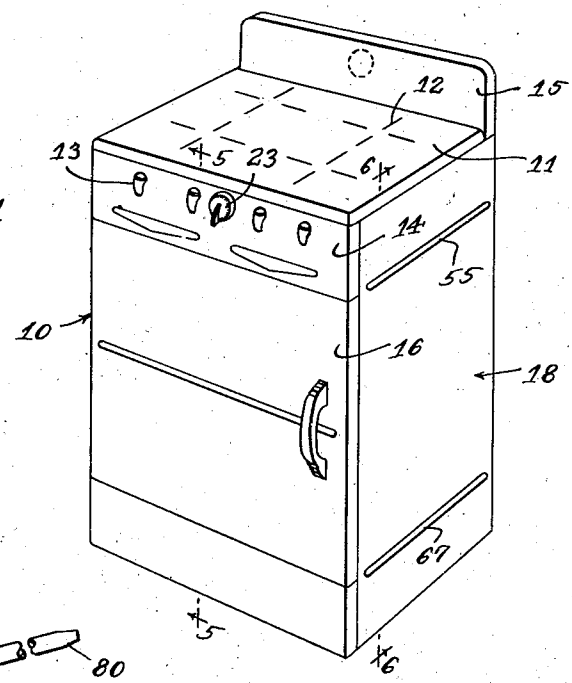


Fig. 4

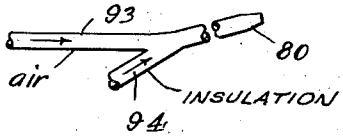


Fig. 2

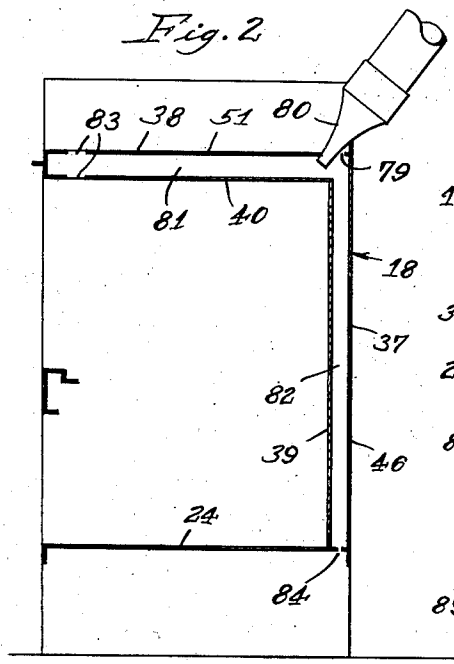
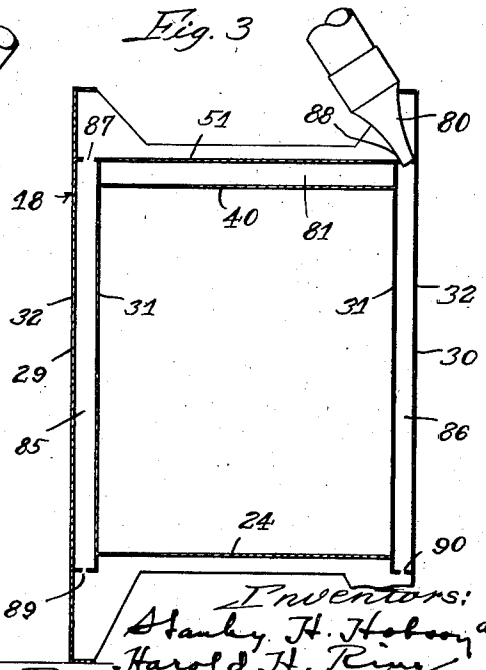


Fig. 3



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RANGE CONSTRUCTION

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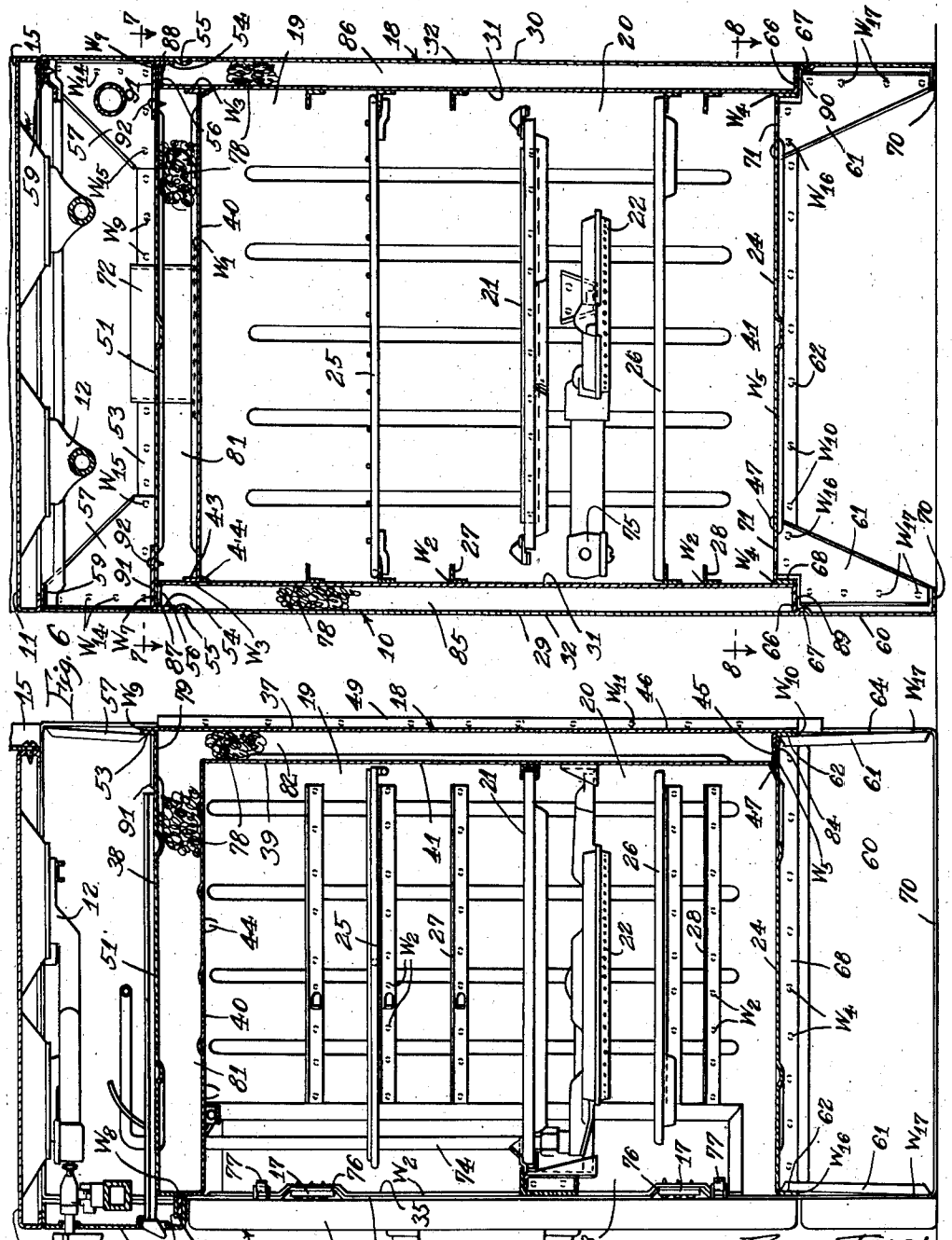


Fig. 6

Fig. 5

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RANGE CONSTRUCTION

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Fig. 7

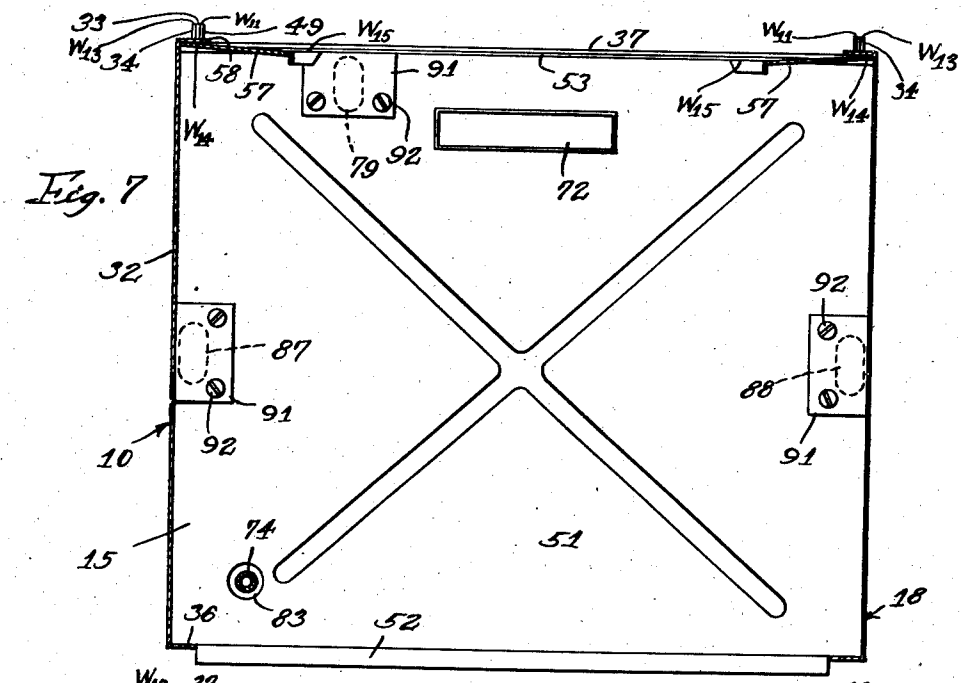
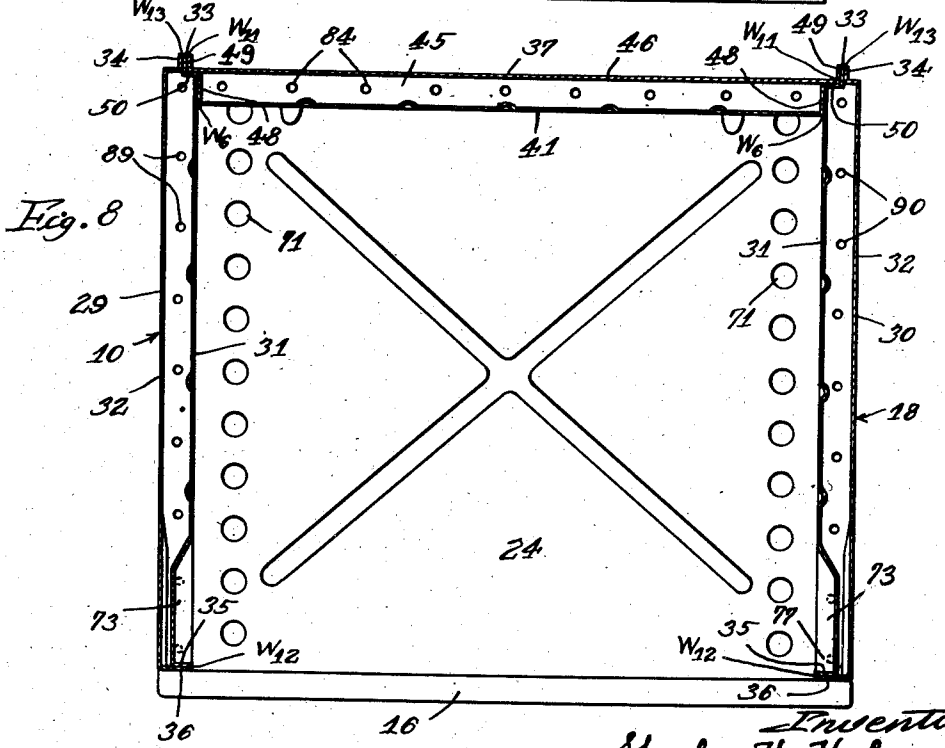


Fig. 8



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UNITED STATES PATENT OFFICE

2,390,438

RANGE CONSTRUCTION

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Application March 2, 1942, Serial No. 432,976

11 Claims. (Cl. 220—10)

This invention relates to a new and improved construction for domestic cooking ranges.

Ranges have heretofore been insulated by filling the oven walls with rock wool put in by hand, the least accessible places having required special methods that involved the making up of a blanket of insulation and the introduction of the completed blanket down into the space to be filled. In other words, the insulation of the range involved too many added stove assembling operations and took too much time and involved too much labor cost, besides adding to the general assembling cost because of the delays and complications necessitated thereby. Furthermore, the old method of applying the insulation material necessarily imposed many limitations upon the design and construction of the range to permit applying the insulation by that method. It is therefore the principal object of our invention to provide a new and improved method of making hollow walled cooking ranges and filling the hollow walls with insulation, the filling consisting in blowing in the insulation after the range body is substantially completely assembled, as distinguished from applying the insulation during the assembling of the range, whereby to speed up production and reduce cost while still obtaining as good if not a better job of insulation.

A salient feature of the range construction provided in accordance with our invention consists on the one hand in providing filler openings at the juncture of two hollow walls so that both walls may be speedily filled with the blower nozzle at the one location, and by the provision, on the other hand, of bleeder holes in all of said hollow walls at the ends remote from the filler openings to insure complete filling of the walls and avoid the likelihood of building up back pressure which would tend to slow up if not prevent completion of the filling operation.

Another important object of the invention consists in the provision of a range constructed substantially entirely of sheet metal parts spot welded together as distinguished from the use of angle iron frame work and the bolting thereon of sheet metal parts, in accordance with the old practice.

A salient feature of the present construction is the fact that the sheet metal inner and outer shells for the hollow walled range body have their panels formed to provide outwardly directed flanges arranged to be placed in lapped relation and spot welded together, the flanges in all instances being so directed that they can be entered conveniently between the electrodes of the welder for speedy welding and proportionately lowered cost.

Other objects and advantages of the invention will appear in the following detailed description, in which reference is made to the accompanying drawings, wherein—

Figure 1 is a perspective view of a cooking range made in accordance with our invention;

Figs. 2 and 3 are diagrammatic sectional views in vertical planes at right angles to one another, illustrating the method of blowing in the insulation, these views being related to Figs. 5 and 6, respectively;

Fig. 4 is a diagrammatic illustration of the apparatus employed for blowing in the insulation;

Figs. 5 and 6 are a central longitudinal vertical section and a vertical cross-section through the range, these views being taken on the lines 5—5 and 6—6 of Fig. 1, respectively, and

Figs. 7 and 8 are horizontal sections taken on the correspondingly numbered lines of Fig. 6.

The same reference numerals are applied to corresponding parts throughout these views.

The range indicated generally by the reference numeral 10 in Fig. 1 is of a small and compact design intended for use in small homes and apartments, and to be available at appreciably less cost than the average domestic cooking range. It should be understood that while we have illustrated the invention as embodied in a range of this description, the invention is by no means to be regarded as limited in its application to such a range, inasmuch as most of the features of the present invention are applicable to ranges generally.

In the range shown, there is a cooking top 11 having four burners, as indicated at 12, controllable by knobs 13 projecting from the front panel 14 that closes the burner box compartment under the cooking top. A splasher back panel is indicated at 15 behind the cooking top 11. 16 is the oven door hinged, as indicated at 17, to the body 18 of the range below the front panel 14 to afford access to the baking oven 19 and broiler oven 20. The oven bottom 21 separating the broiling oven from the baking oven is disposed over the burner 22 mounted in the broiling oven. The dial 23 at the middle of the front panel 14 controls the delivery of gas to the oven burner 22 and adjusts the oven thermostat (not shown) which in turn regulates the flow of gas to the burner 22 to maintain a predetermined temperature in the oven 19. 24 is the bottom of the broiling oven, and at 25 and 26 are indicated the usual oven rack and broiler pan, respectively, mounted on ledges 27 and 28 in the two ovens.

The body or chassis of this range, in accordance with our invention, is made up entirely of

sheet metal panels spot welded together. In other words, there is no angle iron frame work of any kind. Nearly all of the welded joints are designated in Figs. 5–8, as W_1, W_2, etc. Thus the two side walls **29** and **30** are formed by inner and outer sheet metal panels **31** and **32** welded together by flanges **33** and **34** at W_{13} at the back of the range, these flanges projecting rearwardly from the range in the manner indicated in Fig. 8. These panels are similarly welded together along the front at W_{12} by means of the flanges **35** and **36** which project inwardly from the opposite sides of the front of the range, as clearly appears in Fig. 8. The rear wall **37** and top wall **38** of the oven are also hollow walls. A single L-shaped panel **39** provides an inner top wall **40** and inner rear wall **41**. The front end of the inner top wall **40** is flanged forwardly, as at **42**, and there are upwardly projecting flanges **43** along the opposed longitudinal edges, where the wall **40** rests on eyebrow projections **44** struck inwardly from the inner side walls **31** and is welded at W_3. The lower end of the inner rear wall **41** has a rearwardly projecting flange **45** to space the wall **41** from the outer rear wall **46**. Eyebrow projections **47** struck upwardly from the bottom wall **24** locate the wall **41** when it is welded at W_5. Rearwardly projecting flanges **48** are provided on the opposed longitudinal edges of the inner rear wall **41** and have abutment with and are welded at W_6 to the inner side walls **31**. The outer rear wall **46** has rearwardly projecting flanges **49** which are spot welded at W_{11} to the flanges **33** and **34** previously mentioned. The offsetting of the flanges **33** laterally with respect to the inner side walls **31** provides shoulders at **50** for abutment with the outer rear wall **46** so that the rear wall **37** is accurately located relative to the side walls **29** and **30**. The overlapping relationship also assures much greater rigidity in the structure as a whole and relieves the spot welded connections at **33—34—49** of excessive strain.

The outer top wall **51** has a forwardly projecting flange **52** formed on the front end thereof spot welded at W_8 to the flange **42** on the inner top wall **40**. An upwardly projecting flange **53** is provided on the rear end of the outer top wall **51** and is spot welded at W_9 to the upper end of the outer rear wall **46**. Downwardly projecting flanges **54** are provided on the opposed longitudinal edges of the wall **51** and have abutment with the outer side walls **32** just above inwardly struck rib portions **55** on said walls. The omission of welds at **54—55** is important because the outer side walls are thereby left unmarred and the enamelled surfaces are smooth and there is avoided likelihood of enamel peeling off the weld spots. The wall **51** is welded at W_7 to the flanges **56** which project outwardly from the upper ends of the inner side walls **31**. The outer side walls **32** extend above the top wall **38** of the oven to form the sides of a burner box compartment under the cooking top **11**, and there are gusset plates **57** at the rear of this compartment which are welded at W_{14} along the vertical edge portion to the inwardly bent vertical flanges **58** on the side walls **32**, and are welded at W_{15} along their horizontal lower edge portions to the upwardly bent flanges **53** on the outer top wall **51** of the oven. The cooking top **11** and splasher back panel **15** are suitably secured in place on top of the inwardly bent flanges **59** provided on the upper end of the outer side walls **32**.

The outer side walls **32** also extend below the bottom wall **24** to form the side walls of the base **60**. Gusset plates **61** are provided at the front and rear of the range and are spot welded at W_{16} along their upper end portions to the downwardly bent flanges **62** on the front and rear ends of the bottom wall **24**. The rear one of these flanges **62** is spot welded to the lower end of the outer rear wall **46**, as indicated at W_{10}. Inwardly directed flanges **64** on the lower end of the outer side walls **32** are spot welded to the vertical edge portions of the gusset plate **61**, as indicated at W_{17}. The lower ends of the inner side walls **31** have outwardly projecting flanges **66** which, like the flanges **56**, serve to space the inner walls **31** from the outer walls **32**, and they have contact with the outer walls **32** above the ribs **67** struck inwardly from the outer side walls **32**. The same advantage is gained by the elimination of welds at **66—67**, as at **55**. Downwardly bent flanges **68** on the opposed longitudinal edges of the bottom wall **24** are spot welded, as indicated at W_4, to the lower end portions of the inner side walls **31**. In that way the lower end portion of the range is also rendered quite rigid even though there is no reinforcing angle iron frame work. The lower ends of the outer side walls **32** have inwardly projecting flanges **70** to rest on the floor.

In assembling the range body **18**, certain subassemblies are welded first, as, for example, the flue **72** is welded to the top wall **40**, as at W_1, and strips **27** and **28** are welded, as at W_2, to the side walls **31**. Then the inner shell for the body is fabricated by welding the walls **24**, **41**, **40**, **41** together at W_3—W_6. These welding operations are simple because all flanges to be welded project outwardly relative to the inner shell. The front cross-bar is next welded in place in the inner shell. Then the outer top wall **51**, the first part of the outer shell, is welded onto the upper ends of the inner side walls **31** at W_7 and to the front end of the inner top wall **40** at W_8. Next, the outer rear wall **37** is welded at W_9 to the top wall **51**, at W_{10} to the bottom wall **24**, and at W_{11} to the inner side walls **31**. Next, the outer side walls **32** are welded at their front and rear edges to the inner side walls **31** as at W_{12}—W_{13}, thus completing the outer shell for the range body. It will be evident from the drawings that the welds W_7—W_{13} are also simple to effect, inasmuch as all of the flanges concerned project outwardly relative to the inner and outer shells and are, therefore, easily accessible. Gusset plates **57** and **61** are finally welded in place, as previously described, at W_{14}—W_{17}.

The range chassis in the skeleton form, diagrammatically indicated in Figs. 2 and 3, having the sheet metal parts thereof welded together, as above described, is dipped in ground coat enamel and fired, after which an outer finish coat is sprayed on the exterior and the structure again fired. In the dipping, it should be evident that all of the crevices left between the various parts, where they have been spot welded together, will be filled, and when the structure is thereafter fired the oven will accordingly be sealed against seepage of moisture and heat out of the oven space and into the spaces between the oven walls. The likelihood of rusting is therefore reduced to a minimum, because any moisture present will have contact only with enameled surfaces. The oven furthermore can be cleaned easily, there being no crevices in which moisture, dirt, and grease can collect. Fresh air is admitted to the bottom of the broiler oven **20** through holes **71** provided in the bottom wall **24**

in two rows along the side walls 29 and 30. This air supports combustion at the burner 22, and the products of combustion from the burner circulate upwardly through the baking oven 19 around the opposite sides of the oven bottom 21 and are exhausted from the top of the oven 19 through the flue 72 into the burner box compartment and out through the open rear end of said compartment, the flue 72 being near said opening, as indicated in Fig. 7.

The inner side walls 31 of the oven have their front end portions struck outwardly to provide the vertical channels 73, one side of which is defined by the flanges 35 by means of which the inner side walls are spot welded to the flanges 36 on the outer side walls. These channels 73 are provided partly in order to provide the flanges 35 and enable spot welding of the walls together in the manner stated and partly to provide a space for the gas supply pipe 74, which is extended downwardly from the burner box compartment 56 in the channel 73 to the mixer 75 of the burner 22. The flanges 35 and 36 on the one side wall 29 are struck inwardly to provide seats 76 for application of one leaf of each of the hinges 17, the other leaves being, of course, fastened to the door 16. In that way the inside of the door is arranged to lie substantially flush with the range front defined by the flanges 36. The flanges 35 and 36 on the other side wall 30 together define a flange serving as a striker plate, behind which the rollers 77 on suitable spring type detents are arranged to engage to hold the door 16 releasably in closed position. The channel 73 in the side wall 30 therefore provides a space to accommodate these rollers 77.

After the range chassis shown diagrammatically in Figs. 2 and 3 has been enameled, as above described, and before the door 16 or any other parts have been assembled thereon, the same is insulated by blowing in the insulation material, indicated at 78 in Figs. 5 and 6. An opening 79 is provided in the rear portion of the outer top wall 51 to admit the insulation discharge nozzle 80, so that insulating material, such as rock wool or any other material suitable for the purpose and capable of being blown in in the manner stated, can be delivered into the spaces 81 and 82 in the top and back walls of the oven from the one point 79. In blowing the insulation into the top space 81, the nozzle 80 will, of course, be inclined about as indicated in Fig. 2, or even more toward the direction of the front of the range. The holes indicated at 83 are provided in the inner and outer top walls 40 and 51 near the front of the range, and are provided primarily for extension through the oven top wall 38 of the gas supply pipe 74 leading to the burner 22. However, in the blowing-in of the insulation, these holes will allow the escape of air so that there will be no tendency to develop back pressure in the space 81. Some additional holes may be provided in the outer top wall 51 in remote relation to the nozzle hole 79, if desired, for the escape of air, but are not at present considered necessary, inasmuch as the nozzle 80 in the blowing-in of insulation into the space 81 may be directed first toward the right hand front corner of the range, and most of the space 81 can be filled before any material is allowed to collect in the vicinity of the holes 83. In that way the holes 83 will remain open for free escape of air until the space 81 is nearly filled. The operator after a little experience will have no difficulty in completely filling the space 81 and very little, if any, insulation will be blown out through the holes 83. After the pipe 74 has been entered through the holes 83, the inner hole in the wall 40 can be sealed in any suitable manner so that the insulation material will not be left exposed in the oven at that point. A row of small holes 84 is provided at the lower end of the space 82 in the back wall 37, these holes being in registering relation in the flange 45 on the inner rear wall 39 and in the bottom wall 24, as clearly indicated in Fig. 5. These holes permit the escape of air in the blowing-in of insulation into the space 82, during which operation the nozzle 80 will of course be directed downwardly into said space instead of as it is shown in Fig. 2. The insulation will, therefore, have a tendency to rush to the bottom of the space 82 instead of lodging at some intermediate point and causing a void in the filling operation. There are enough of these holes 84 and the holes are large enough to allow for the desired escape of air even after a certain amount of insulation has been blown in and has covered these holes, the material permitting seepage of air through it readily enough for this purpose. In that way there is no danger of back pressure being built up in the space 82 to interfere with the filling operation. In a similar manner the spaces 85 and 86 in the side walls 29 and 30 are adapted to be filled, nozzle holes being provided at 87 and 88 in the top wall 51 in register with holes in the flanges 56, as indicated in Fig. 6, and rows of smaller holes 89 and 90 being provided at the lower ends of the spaces 85 and 86 for the escape of air similarly as in the case of the holes 84. The holes 89 and 90 are provided in the flanges 66 on the lower ends of the inner side walls 31, as clearly appears in Fig. 6. Cover plates 91 are provided for the nozzle holes 79, 87, and 88 and are suitably secured in place by screws 92 so that there is no insulation material exposed in the burner box compartment.

While any suitable or preferred insulation blowing apparatus may be employed, the type we have used and found satisfactory for the purpose is one in which the air under pressure is delivered through one duct, as indicated at 93 in Fig. 4, and the insulation material, delivered from a beater, is conducted through a duct 94 for entrainment with the air from the duct 93 and out through the nozzle 80. The blowing-in of insulation takes very little time as compared with the insulation of ranges by the old method, and there is more assurance of the walls being completely filled when filled in this way, thus insuring better all around efficiency for the range.

It is believed the foregoing description conveys a good understanding of the objects and advantages of our invention. The appended claims have been drawn with a view to covering all legitimate modifications and adaptations.

We claim:

1. In an insulated cabinet construction, the combination of a bottom wall and hollow top, back, and opposed side walls, the interior of the top wall having open communication at the rear thereof with the interior of the back wall at the top thereof, and the outer wall of said structure having an opening provided therein at the juncture of said top and back walls adapted for the introduction of a nozzle to discharge insulation material into said hollow top and back walls under air pressure, the outer wall of said hollow top wall having one or more exhaust openings provided therein forwardly spaced from and in remote relation to the nozzle opening, and said hollow back wall having one or more exhaust openings downwardly spaced from and in remote

relation to the nozzle opening, and the outer wall of each of said hollow side walls having an opening at the top end thereof adapted for the introduction of a nozzle to discharge insulation material into said hollow side walls under air pressure and said hollow side walls having one or more exhaust openings provided therein remote from the nozzle opening.

2. A structure as set forth in claim 1, wherein the exhaust openings are small in relation to the nozzle openings provided for introduction of the insulation material under air pressure, the structure including closures for the last-mentioned nozzle openings.

3. A hollow walled sheet metal cabinet structure, comprising top and bottom walls and a rear wall, and opposed hollow side walls each comprising inner and outer substantially vertical sheet metal walls in spaced substantially parallel relation, the front edge portion of at least one outer side wall being bent inwardly substantially at right angles to define an attaching flange, the vertical edge of which is in a plane substantially coincident with the plane of the adjacent inner side wall, the inner side wall having its front portion bent outwardly into substantially parallel offset relation to the remainder thereof and having the front edge portion bent inwardly substantially at right angles to define an attaching flange narrower than the aforesaid flange and disposed in abutment with the rear surface of the aforesaid flange on the outside of the said hollow walls of said cabinet and secured thereto.

4. A hollow walled sheet metal cabinet structure comprising top and bottom walls and a rear wall, and opposed hollow side walls each comprising inner and outer substantially vertical sheet metal walls in spaced substantially parallel relation, the front edge portion of at least one outer side wall being bent inwardly substantially at right angles to define an attaching flange the inner side wall having its front edge portion bent inwardly substantially at right angles to define an attaching flange narrower than the aforesaid flange and disposed in abutment with the rear surface of the aforesaid flange on the outside of the said hollow walls of said cabinet and secured thereto, and a door for closing the open front of the cabinet having hinges therefor mounted on said secured together attaching flanges.

5. A hollow walled sheet metal cabinet structure, comprising top and bottom walls and a rear wall, and opposed hollow side walls each comprising inner and outer substantially vertical sheet metal walls in spaced substantially parallel relation, the front edge portion of at least one outer side wall being bent inwardly substantially at right angles to define an attaching flange the inner side wall having its front edge portion bent inwardly substantially at right angles to define an attaching flange narrower than the aforesaid flange and disposed in abutment with the rear surface of the aforesaid flange on the outside of the said hollow walls of said cabinet and secured thereto, and a door for closing the open front of the cabinet having hinges therefor mounted on said secured together attaching flanges, said door having the back surface thereof substantially flush with the other surface of said secured together attaching flanges, the latter having portions thereof bent inwardly into substantially parallel offset relation to the remainder thereof to provide depressed seats for mounting the attaching portions of the hinges thereon.

6. A hollow walled sheet metal cabinet structure, comprising top and bottom walls and a rear wall, and opposed hollow side walls each comprising inner and outer substantially vertical sheet metal walls in spaced substantially parallel relation, the front edge portion of at least one outer side wall being bent inwardly substantially at right angles to define an attaching flange the inner side wall having its front edge portion bent inwardly substantially at right angles to define an attaching flange narrower than the aforesaid flange and disposed in abutment with the rear surface of the aforesaid flange on the outside of the said hollow walls of said cabinet and secured thereto, and a door for closing the open front of said cabinet hingedly mounted at one vertical edge portion thereof on the other side wall of said cabinet, said door having on its other vertical edge portion detent means for engagement behind the secured together attaching flanges on the first mentioned side wall.

7. A welded sheet metal cabinet structure comprising, in combination, an inner welded sheet metal shell and an enclosing outer sheet metal shell in spaced relation to the inner shell and welded thereto, the inner shell comprising bottom, side, top, and back walls having edge portions which are flanged outwardly relative to the shell, the flanges of the back and top walls being welded in abutment with the inner surfaces of the side walls in inwardly spaced relation to the outwardly directed flanges of said side walls, the bottom wall being welded to the lower portions of the side and back walls, and the outer shell comprising a top wall welded to the flanges on the upper ends of said first named side walls and having flanges on the edges thereof, one of which is welded to the edge of the first top wall, a back wall having flanges on the lateral edges thereof welded to the inner side of the flanges on the rear edges of said first named side walls, and having its upper and lower ends welded to the rear edges of the second named top wall and aforesaid bottom wall, respectively, and side walls having abutment with the flanges on the lateral edges of the second named top wall and having flanges on the rear edges welded to the outer sides of the flanges on the rear edges of the first side walls, the front edges of said second named side walls being secured to the front edges of the first named side walls.

8. A hollow walled sheet metal cabinet structure, comprising top and bottom walls and a rear wall, and opposed hollow side walls each comprising inner and outer substantially vertical sheet metal walls in spaced substantially parallel relation, the front edge portion of at least one outer side wall being bent inwardly substantially at right angles to define an attaching flange, the inner side wall having its front edge portion bent inwardly substantially at right angles to define an attaching flange narrower than the aforesaid flange and disposed in abutment with the rear surface of the aforesaid flange on the outside of the said hollow walls of said cabinet and secured thereto, and a door for closing the open front of the cabinet hingedly mounted at one vertical edge portion thereof on hinges mounted on said secured together attached flanges, said door having the back surface thereof substantially flush with the outer surface of said secured together attaching flanges, the latter having portions thereof bent inwardly into substantially parallel offset relation

to the remainder thereof to provide depressed seats for mounting the attaching portions of the hinges thereon, said door having on its other vertical edge portion detent means for engagement behind the secured together attaching flanges on the other side wall of said cabinet.

9. A welded sheet metal cabinet structure comprising, in combination, an inner welded sheet metal shell and an enclosing outer sheet metal shell in spaced relation to the inner shell and welded thereto, the inner shell comprising side, top, and back walls having edge portions which are flanged outwardly relative to the shell, the flanges of the back and top walls being welded in abutment with the inner surfaces of the side walls in inwardly spaced relation to the outwardly directed flanges of said side walls, and the outer shell comprising a top wall welded to the flanges on the upper ends of said inner side walls and having flanges on the edges thereof, one of which is welded to the edge of the first top wall, a back wall having flanges on the lateral edges thereof welded to the inner side of the flanges on the rear edges of said inner side walls, and having its upper end welded to the rear edge of said outer top wall, and side walls having abutment with the flanges on the lateral edges of said outer top wall and having flanges on the rear edges welded to the outer sides of the flanges on the rear edges of said inner side walls, the front edges of said outer side walls being secured to the front edges of said inner side walls.

10. A welded sheet metal cabinet structure comprising, in combination, an inner welded sheet metal shell and an enclosing outer sheet metal shell in spaced relation to the inner shell and welded thereto, the inner shell comprising bottom, side, and back walls having edge portions which are flanged outwardly relative to the shell, the flanges of the back wall being welded in abutment with the inner surfaces of the side walls in inwardly spaced relation to the outwardly directed flanges of said side walls, the bottom wall being welded to the lower portions of the side and back walls, and the outer shell comprising a back wall having flanges on the lateral edges thereof welded to the inner side of the flanges on the rear edges of said inner side walls, and having its lower end welded to the rear edge of the aforesaid bottom wall, and side walls having flanges on the rear edges welded to the outer sides of the flanges on the rear edges of said inner side walls, the front edges of said outer side walls being secured to the front edges of said inner side walls.

11. A welded sheet metal cabinet structure comprising, in combination, an inner welded sheet metal shell and an enclosing outer sheet metal shell in spaced relation to the inner shell and welded thereto, the inner shell comprising side and back walls having edge portions which are flanged outwardly relative to the shell, the flanges of the back wall being welded in abutment with the inner surfaces of the side walls in inwardly spaced relation to the outwardly directed flanges of said side walls, and the outer shell comprising a back wall having flanges on the lateral edges thereof welded to the inner side of the flanges on the rear edges of said inner side walls, and side walls having flanges on the rear edges welded to the outer sides of the flanges on the rear edges of said inner side walls, the front edges of said outer side walls being secured to the front edges of said inner side walls.

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