Sept. 4, 1928. 1,683,082

L. S. LAWSON

HEATER

Filed Oct. 10, 1924 4 Sheets-Sheet 1

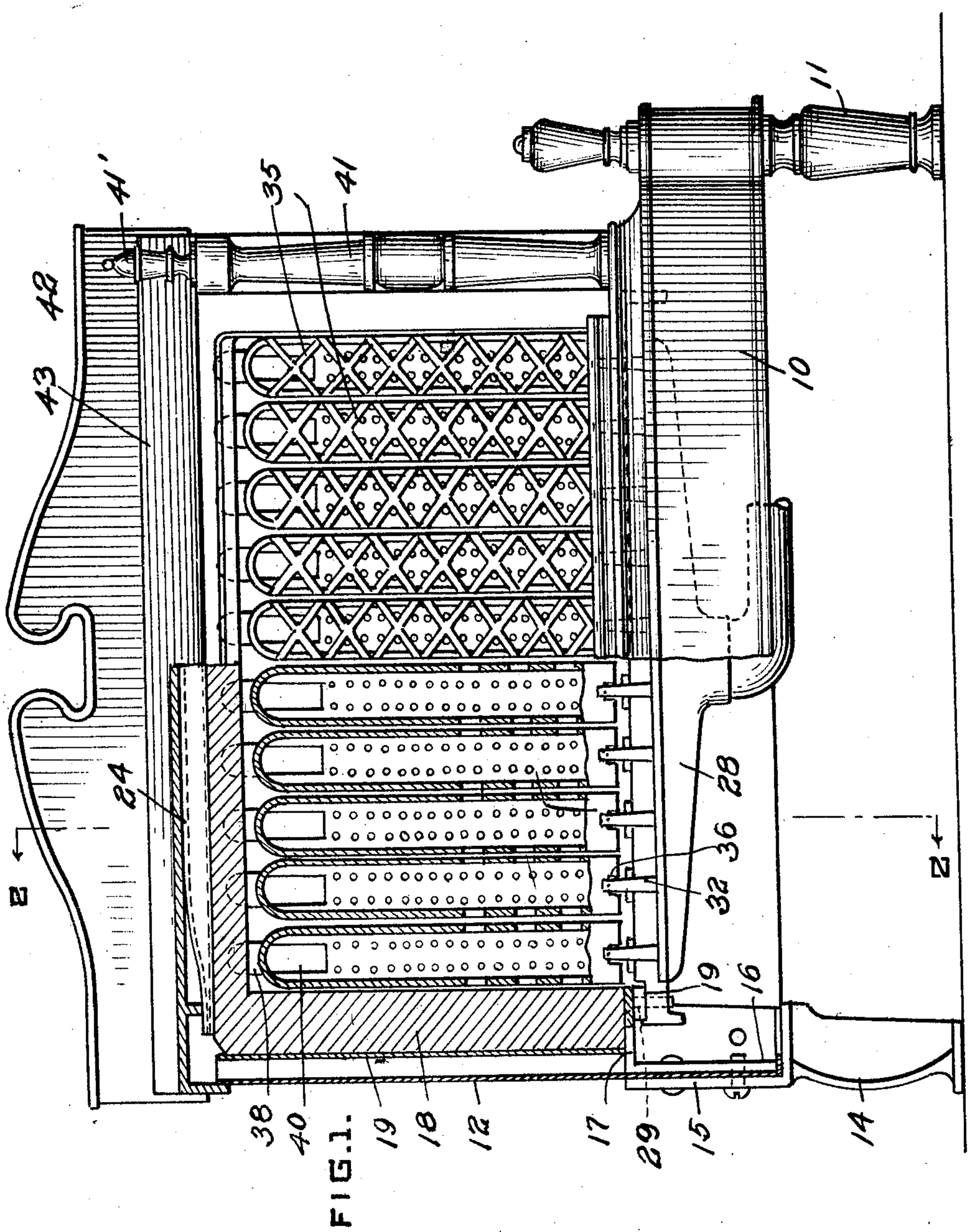

FIG. 1.

WITNESSES
J. Herbert Bradley

INVENTOR
Lindley S. Lawson
By Green & McCallister
His Attorneys

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L. S. LAWSON

HEATER

Filed Oct. 10, 1924 4 Sheets-Sheet 2

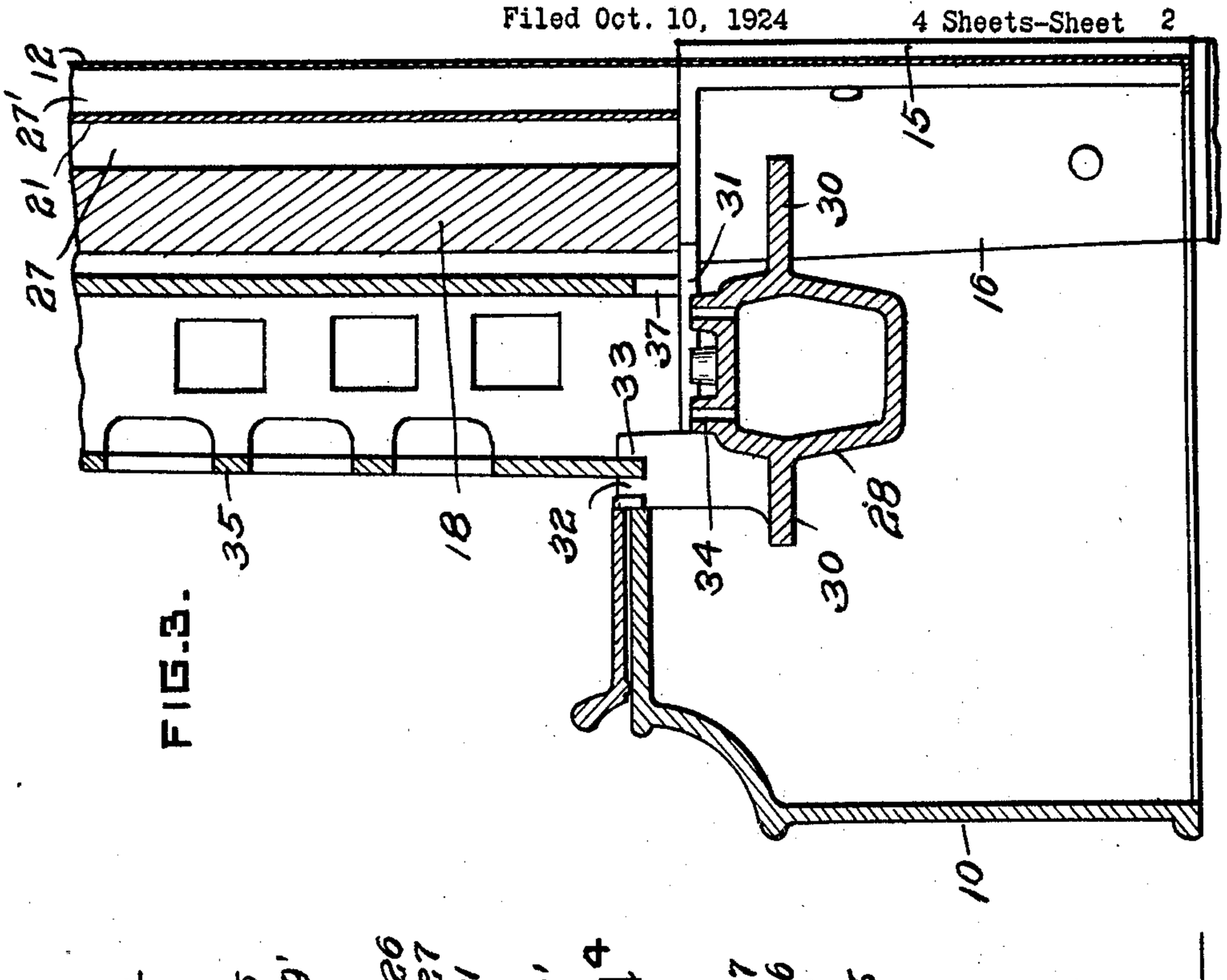

FIG. 3.

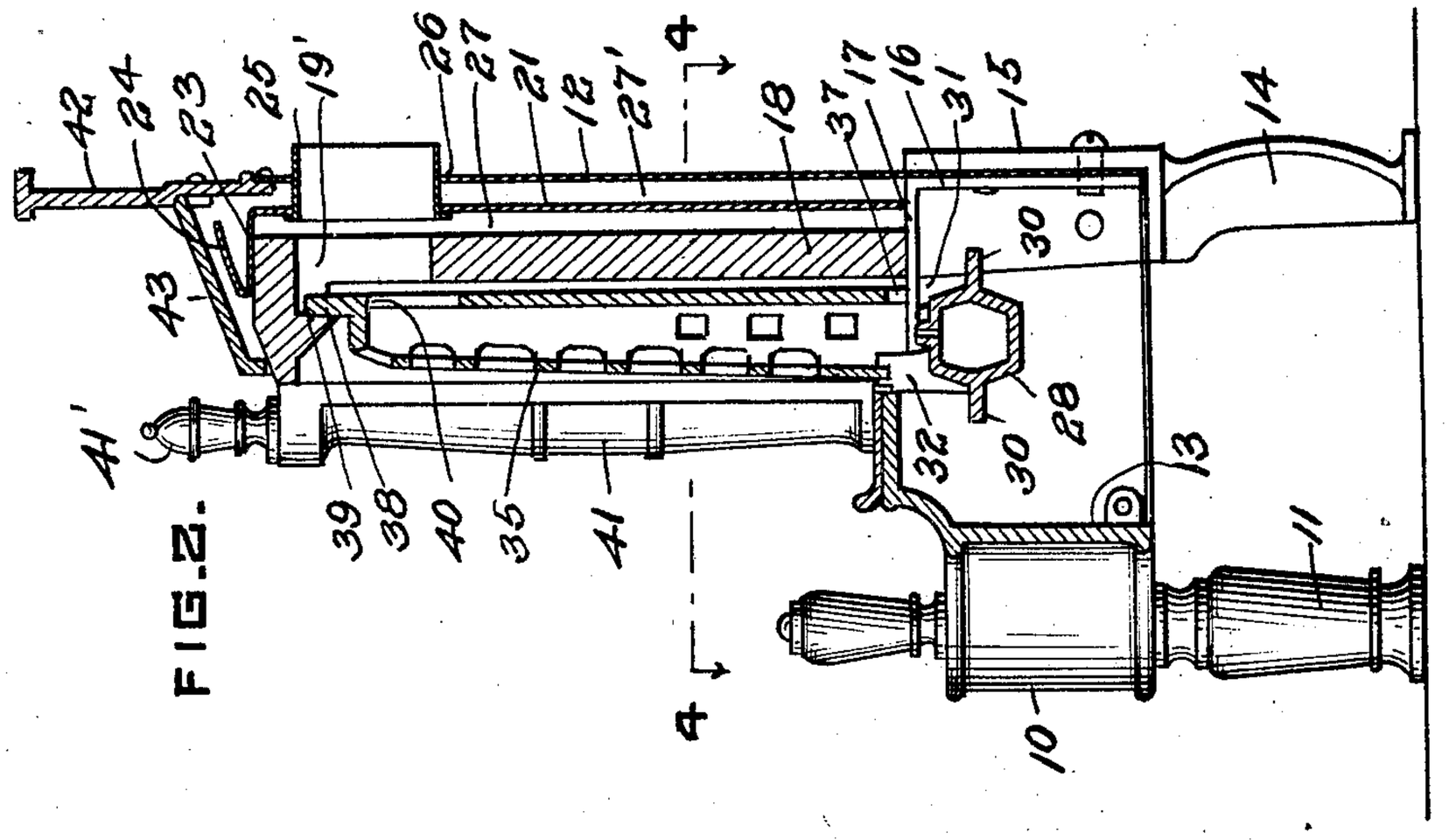

FIG. 2.

WITNESSES
J. Hebert Bradley.

INVENTOR
Lindley S. Lawson
By Green & McCallister
His Attorneys

Sept. 4, 1928.

1,683,082

L. S. LAWSON

HEATER

Filed Oct. 10, 1924

4 Sheets-Sheet 3

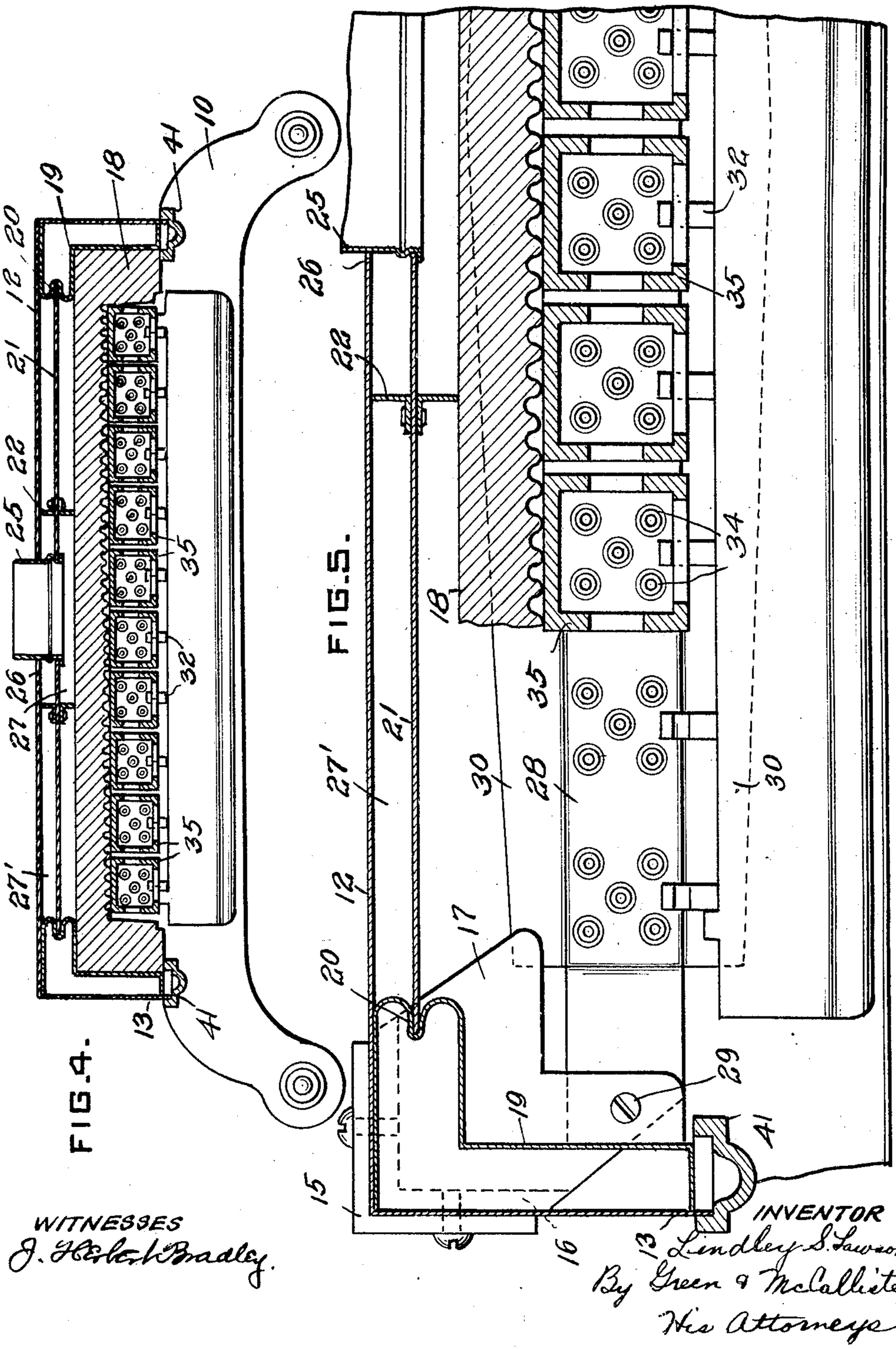

FIG. 4.

FIG. 5.

WITNESSES

J. Herbert Bradley.

Sept. 4, 1928.

1,683,082

L. S. LAWSON

HEATER

Filed Oct. 10, 1924

4 Sheets-Sheet 4

FIG.7.

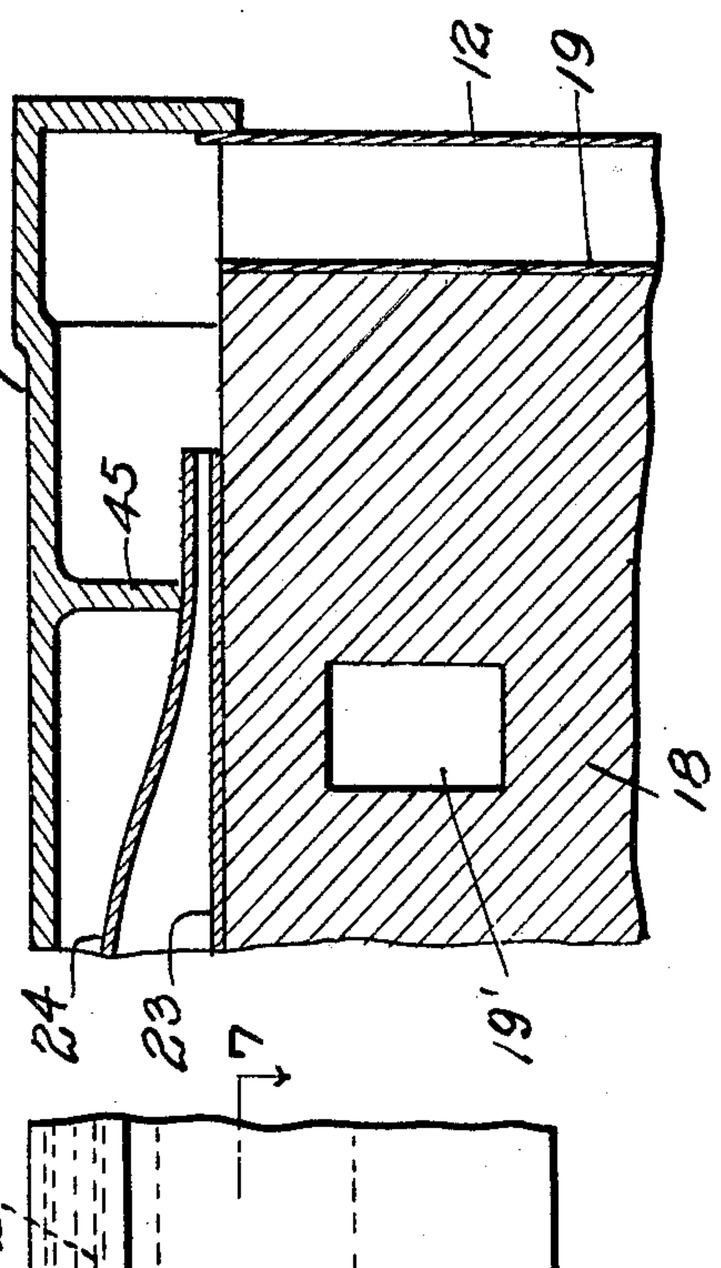

FIG.9.

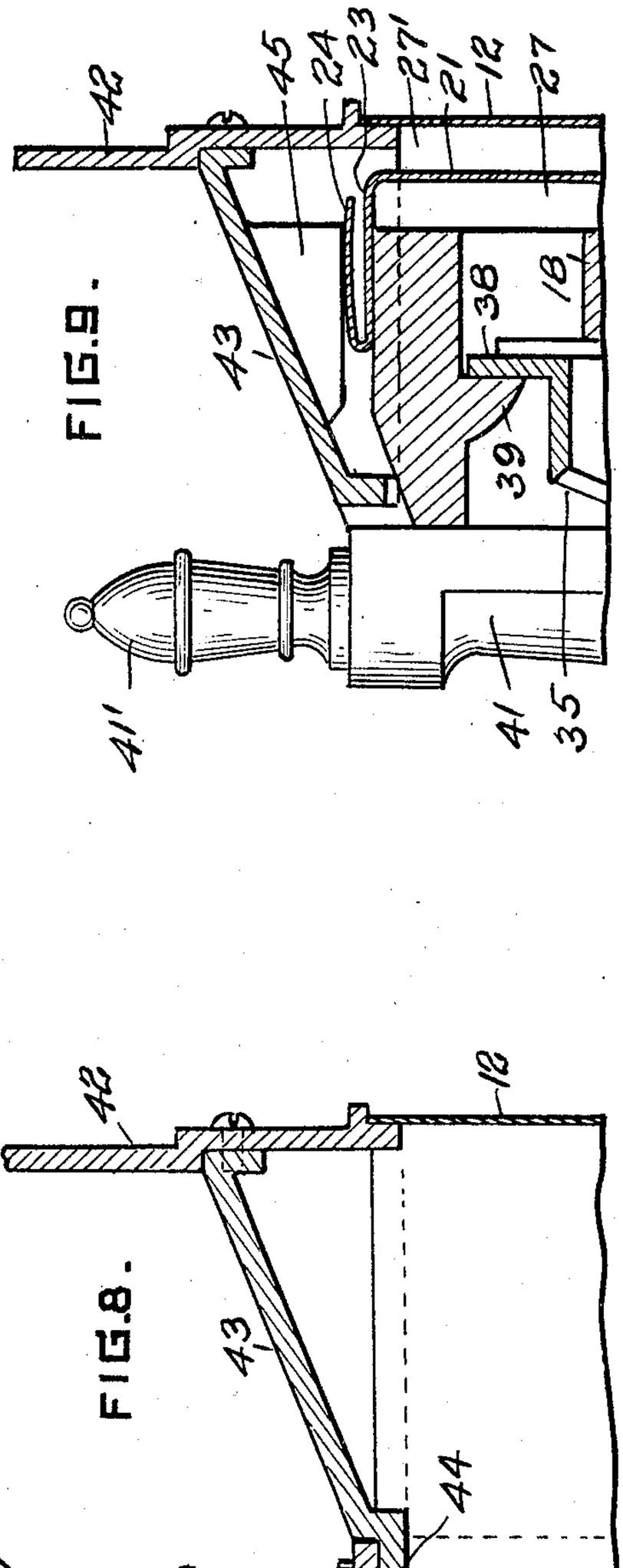

FIG.6.

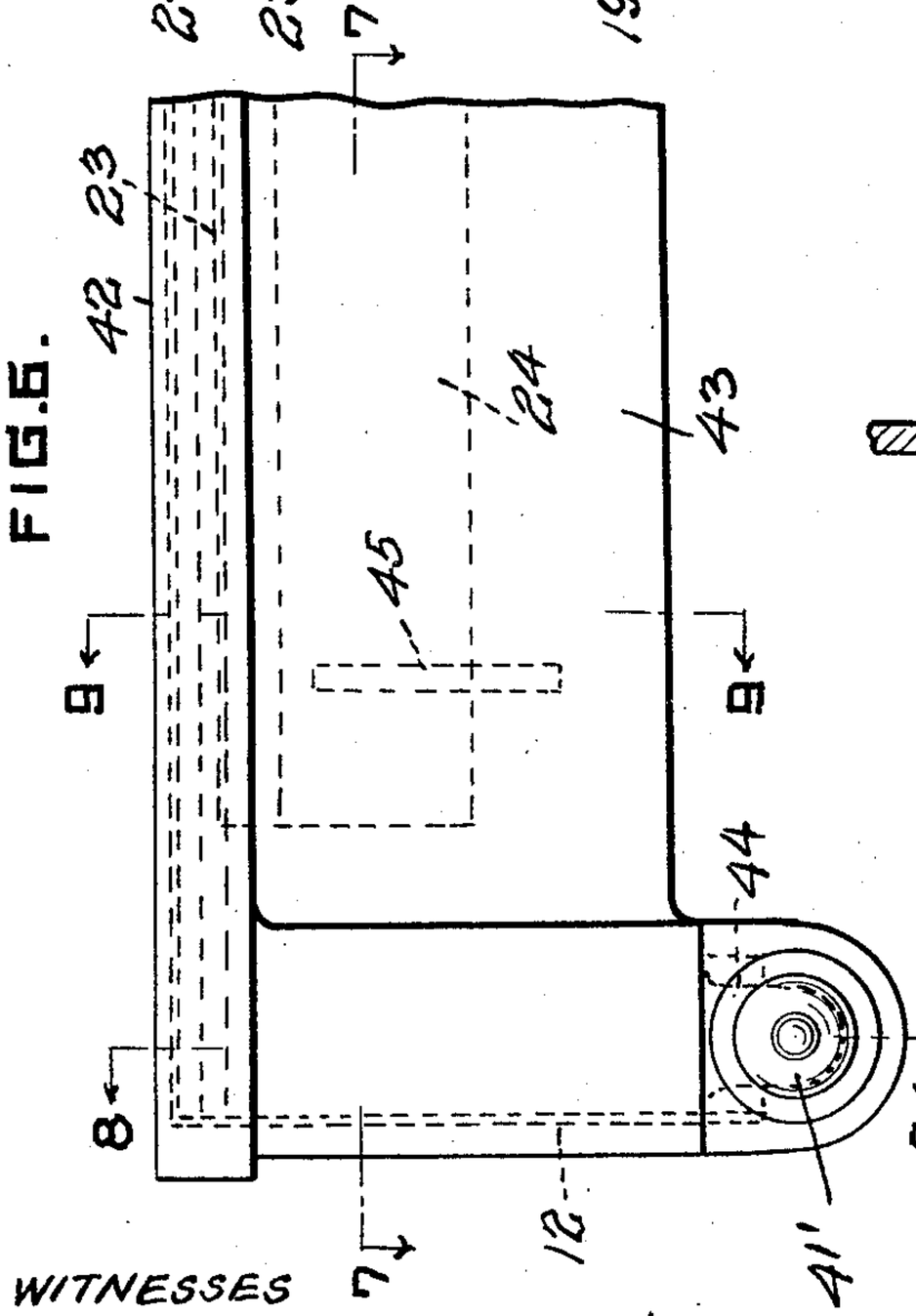

FIG.8.

WITNESSES

J. Hobart Bradley.

INVENTOR

Lindley S. Lawson

By Green & McCallister

His attorneys

Patented Sept. 4, 1928. 1,683,082

UNITED STATES PATENT OFFICE.

LINDLEY S. LAWSON, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO LAWSON MANUFACTURING COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

HEATER.

Application filed October 10, 1924. Serial No. 742,821.

Ths invention relates to gas stoves and more particularly to the type known as radiant heaters.

An object of the present invention is to provide a device of the type set forth in which the elements are so constructed and arranged that more perfect combustion of the gas is obtained than has heretofore been possible.

Stoves of the type set forth have heretofore been provided with a metal shield across the bottom of the stove below the burner for the purpose of overcoming any danger of igniting the floor or support on which the stove was mounted, due to the passage of heat downwardly. Such shields have been provided so as to comply with the requirements of the fire underwriters.

A further object of this invention is to provide a stove which is so constructed and arranged that all necessity for such a shield is eliminated and which at the same time complies with all requirements of said underwriters.

A still further object is to provide a new means for supporting the radiants without the usual bail across the tops thereof, so as to render them easily removable for cleaning and repairing.

A still further object is to produce a construction which will provide ample secondary air for combustion purposes.

A still further object is to provide a heater of the type set forth which will be simple and cheap to manufacture and assemble, rugged in construction and highly efficient in operation.

These and other objects which will be apparent to those skilled in this particular art are attained by means of this invention, one embodiment of which is shown in the accompanying drawings, in which Figure 1 is a front elevation, partly in vertical section, of one form of apparatus constructed in accordance with this invention. Fig. 2 is a vertical cross section on the line 2—2 of Fig. 1. Fig. 3 is a similar view on an enlarged scale showing the burner and associated structure. Fig. 4 is a horizontal cross section on the line 4—4 of Fig. 2. Fig. 5 is a similar view on an enlarged scale with certain of the elements removed. Fig. 6 is a top plan view of one end of the heater. Fig. 7 is a longitudinal section on the line 7—7 of Fig. 6, while Figs. 8 and 9 are transverse sections on the lines 8—8 and 9—9, respectively, of Fig. 6.

The particular embodiment of this invention which has been chosen for the purposes of illustration includes a front casting 10 which is suitably mounted upon front supporting legs 11. The legs 11 are detachable so that any form or design thereof may be used. The sides and back of the stove are formed by a sheet metal housing 12, the lower front sections 13 of which, see Fig. 2, are rigidly secured to the casting 10. The rear legs 14 of the stove have vertically extending angles 15 which embrace and support the rear corners of the housing 12 and the housing is rigidly held in position by means of inner angle pieces 16 which fit within the corners of the housing and cooperate with the angles 15 so as to clamp the corners of the housing between them through the medium of bolts or similar devices.

Each angle piece 16 is provided at its top with a horizontally extending shelf or plate 17 which plates cooperate to form spaced supports for a fire back 18 which is provided with the usual series of openings 19′ adjacent the top thereof for the escape of flue gases. L-shaped spacers 19, formed of sheet metal, are provided between each corner of the housing and the adjacent corner of the fire back for maintaining the latter in proper position.

These spacers, being of sheet metal, are yieldable and automatically compensate for the difference in expansion between the fire back and the frame 12. so as to hold the former securely in position at all times whether the stove is lighted or not.

As shown in Figs. 4 and 5 the opposed faces of the spacers 19 have vertically extending grooves 20 for receiving the edges of a false back or partition 21 which is provided between the rear wall of the fire back and the back wall of the housing 12. The partition is held in proper position by angles 22 which are secured thereto and which engage the housing 12 on one side and the fire back 14 on the other. The top of the partition 21 has a horizontal, forwardly extending leg 23 which contacts with the top surface of the fire back 18. The leg 23 is bent backward

upon itself so as to form a yielding surface 24 for a purpose to be described. A flue 25 is mounted in the partition 21 and extends through a suitable opening 26 in the housing 12 so as to provide a means of escape for the flue gases rising through the openings 19′ at the top of the fire back. It will be apparent that a heat insulating air chamber 27 is formed by the fire back 18, the partition 21 with its flange 23 and the spacers 19 so that there is no outlet for the flue gases from the stove, except through the proper passage, namely, the flue 25. A dead air space 27′ is also thus formed which acts as a heat insulator and prevents radiation of heat from the back and top of the stove.

A burner 28 is rigidly mounted on the bottom of the shelves 17 by means of screws 29 or similar devices and parallel to the fire back 18. The burner is provided with laterally extending arms or flanges 30 which form an efficient means for preventing the escape or radiation of heat downwardly past the burner and eliminates all danger of fire risk without the necessity of the metal shield heretofore generally employed in stoves of this type. By mounting the fireback upon the spaced supporting plates or shelves 17 practically the entire length of the bottom face thereof is free of any any obstruction and the burner is so supported from the shelves 17 and so located with relation to the bottom face of the fire back that a space 31 of substantial width is provided throughout the length of the burner for the admission of secondary air to the radiants.

The burner is provided with a plurality of vertically extending lugs 32 having notches 33 in their top faces, there being one lug in front of each set of gas nozzles 34. A radiant 35 is supported on each lug over each set of gas nozzles and the bottom front edge of each radiant has a notch 36 which seats within the notch 33 in the supporting lug so as to hold each radiant in proper position. Each lug is of such height that the radiants are supported in spaced relation to the burner so as to provide a space around the bottom of each radiant for the admission of secondary air which is drawn through the space between the fire back and the burner and into each radiant above the gas nozzles. A notch 37 is formed in the bottom rear edge of each radiant to render them easily removable as hereinafter described. Each radiant has an upwardly extending flange 38 which engages the rear of a shoulder 39 formed in the forwardly extending overhanging portion of the fire back in front of each opening 19′. An opening 40 is formed in the back wall of each radiant and communicates with one of the openings 19′ of the fire back for the escape of the flue gases.

By supporting the radiants in this manner the removal of the individual radiants from the heater and their replacement is materially simplified. For example, in order to remove a radiant from the stove it is only necessary to lift it vertically so as to free the notch 36 from the lug 32 after which the lower end of the radiant may be swung forwardly and the element removed. In swinging the lower end forward the notch 37 passes over the lug 32. In replacing the radiants the reverse operation is easily accomplished.

The forward vertical edges of the housing 12 fit within pillars 41 which are supported upon the casting 10 and may be of any desired form or design. A vertically extending back 42 is mounted upon the top of the housing 12 and is securely held in position by means of a stove top 43 which is fastened to the back and which has forwardly projecting lugs 44, see Fig. 8, seating within the pillars 41 to which they are secured by means of bolts depending from finials 41′.

As above described the forwardly extending leg 23 of the partition 21 is bent backwardly so as to form a yielding surface or support 24. This support is arched as shown in Fig. 7 and the stove top 43 is provided with flanges 45 which press upon the yielding support 24. Between the flanges 45 the support 24 yieldingly and directly engages the inner face of the top 43. This construction results in a rigid structure which at the same time is adapted to yield as a result of the differences in the co-efficients of expansion of the fire back and the metal parts. As above described the L-shaped spacers 19, being made of sheet metal, are also adapted to yield under the same influence.

In operation the combustion of the gas is made complete by the plentiful supply of secondary air which is freely admitted to each radiant through the space between the bottoms thereof and the burner plate as above described. The radiants are accordingly heated to a high degree of incandescence with the result that the utmost heat possible is obtained from the stove for a given amount of gas. The products of combustion escape through the flue 25. Although no fire shield is provided across the bottom of the stove all danger of igniting the floor as a result of the downward escape of heat is eliminated by the flanges 30.

Although I have described and illustrated a particular embodiment of this invention, I do not wish to be limited to the specific details thereof, but what I claim as new and desire to secure by Letters Patent is:

1. The combination in a gas heater of a fire back, a burner located in front of said fire back, radiants supported in operative relation to said burner and means for supporting said fire back and said burner located at each end thereof.

2. The combination in a heater of a front member, a sheet metal housing connected

therewith, means for supporting the rear of said housing, a burner, a fire back and shelves on said supporting means for supporting said fire back and said burner.

3. The combination in a heater of a front member, a sheet metal housing connected therewith, supports for said housing engaging the rear corners thereof, angle pieces engaging said corners and cooperating with said supports to rigidly hold said housing, a burner, a fire back and a shelf on each of said angle pieces providing spaced supports for supporting said fire back and said burner.

4. The combination in a gas heater of a front member, a sheet metal housing connected therewith, supports for said housing engaging the rear corners thereof, braces engaging said corners and cooperating with said supports to rigidly hold said housing, a burner, a fire back, and means on said braces for supporting said fire back and said burner.

5. The combination in a gas heater, of a fire back, radiants mounted in front of said fire back and a burner located in operative relation to said radiants and provided with means for preventing the radiation of heat downwardly past said burner.

6. The combination in a gas heater, of a fire back, radiants mounted in front of said fire back and a burner located in operative relation to said radiants and provided with horizontally extending flanges for preventing the radiation of heat downwardly past said burner.

7. The combination in a gas heater, of a front member, a sheet metal housing, a fire back supported within said housing, spacers between said fire back and said housing and a partition engaging said spacers and cooperating with said fire back so as to form a flue for the escape of gases.

8. The combination in a gas heater, of a front member, a sheet metal housing, a fire back supported within said housing, yielding spacers between said fire back and said housing and a partition engaging said spacers and cooperating with said fire back to form a flue for the escape of gases.

9. The combination in a gas heater, of a front member, a sheet metal housing, a fire back supported within said housing, grooved yielding spacers between said fire back and said housing and a partition having its edges engaging the grooves of said spacers and cooperating with said fire back to form a flue for the escape of gases and with said housing to form a heat insulating air space.

10. The combination in a gas heater, of a front member, a sheet metal housing, a fire back supported within said housing, yielding spacers between said fire back and said housing, a partition engaging said spacers and contacting with the top of said fire back so as to form a heat insulating chamber therebetween, a flue outlet secured to said partition and extending through said housing and means for yieldingly pressing said partition into contact with the top of said fire back.

11. The combination in a gas heater, of a front member, a sheet metal housing connected therewith, supports for said housing engaging the rear corners thereof, braces engaging said corners and cooperating with said supports to rigidly hold said housing, a burner, a shelf formed on said braces for supporting said fire back and said burner, yielding spacers supported on said shelves between said fire back and said housing, flue openings in the top of said fire back, a partition engaging said spacers and cooperating with said fire back to form a flue for the escape of gases, a flange on said partition extending over said fire back and means for yieldingly pressing said flange into engagement with the top of said fire back so as to form a heat insulating chamber therebetween.

12. The combination in a gas heater, of a burner provided with a plurality of spaced lugs each having a notch in the upper surface thereof and radiants supported on said burner and provided with apertures adapted to cooperate with said notches for positioning said radiants.

13. The combination in a gas heater, of a fire back, having shoulders across the top thereof, a burner mounted in front of said fire back and provided with a plurality of spaced lugs, radiants having shoulder engaging flanges adapted to be supported in front of said fire back on said lugs and to be lifted vertically for removal therefrom.

14. The combination in a gas heater, of a fire back, having shoulders across the top thereof, a burner mounted in front of said fire back provided with a plurality of sets of nozzles, a lug in front of each set of nozzles, having a notch in the top face thereof, a radiant provided with a shoulder engaging flange at the top thereof and a notch in its bottom edge adapted to cooperate with the notch in said lug for supporting said radiant in spaced relation to said burner.

15. The combination in a gas heater of a burner provided with a plurality of sets of gas nozzles, a radiant associated with each set of nozzles and a radiant supporting lug on said burner in front of each set of nozzles for supporting the associated radiant in spaced relation to said burner.

16. The combination in a gas heater of a burner provided with a plurality of sets of gas nozzles, a radiant associated with each set of nozzles and a radiant supporting lug projecting above each set of nozzles for supporting the associated radiant in spaced relation to said burner.

17. The combination in a gas heater of a burner provided with a plurality of gas nozzles, radiants associated therewith, radiant supporting lugs on said burner in front of

said nozzles for supporting said radiants in spaced relation to said burner and a notch in the bottom of each radiant at the rear thereof for facilitating removal from said burner.

18. The combination in a gas heater of a burner provided with a plurality of gas nozzles, radiants associated therewith, radiant supporting lugs on said burner in front of said nozzles for supporting said radiants and a notch in the bottom of each radiant at the rear thereof for facilitating removal from said burner.

19. The combination in a gas heater of a burner, radiants, means for supporting said radiants on said burner, a fireback and spaced supports for holding both said fireback and said burner arranged so as to provide a continuous passage below said fireback for the admission of secondary air to said radiants.

20. The combination in a gas heater of a fireback, a burner located in front of said fireback, radiants positioned in operative relation to said burner and spaced means for supporting both said fireback and said burner.

21. The combination in a gas heater of a housing, a burner mounted within said housing, a fireback associated with said burner, a partition spaced from the rear of said fireback and provided with an extension along the top thereof and means for pressing said extension into engagement with the top of said fireback.

22. The combination in a gas heater of a housing, a burner mounted within said housing, a fireback associated with said burner, a partition spaced from the rear of said fireback and provided with a forwardly projecting flange along the top thereof and means for yieldingly pressing said flange into engagement with the top of said fireback.

23. The combination in a gas heater of a housing, a stove top mounted thereon, a burner mounted in said housing, a fireback associated with said burner, a sheet metal partition spaced from the rear of said fireback and provided with a forwardly projecting flange extending over the top of said fireback, said flange having a backwardly bent portion forming a yielding surface and flanges on said stove top for engaging said yielding surface so as to press said forwardly projecting flange into engagement with said fireback.

In testimony whereof, I have hereunto subscribed my name this 4th day of October, 1924.

LINDLEY S. LAWSON.