

No. 698,801.

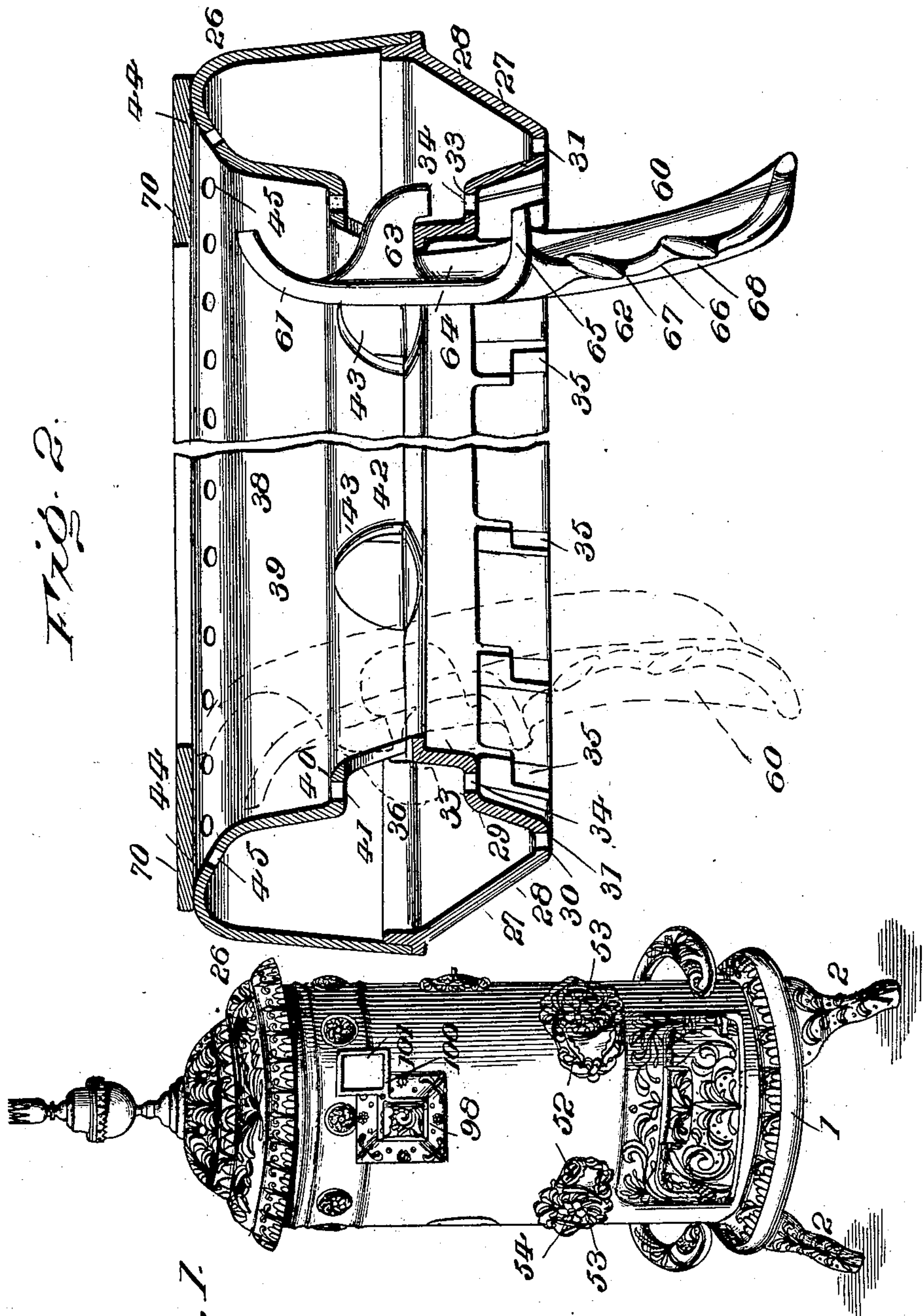
Patented Apr. 29, 1902.

E. R. CAHOONE.
HEATING STOVE.

(Application filed Mar. 5, 1901.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses
Wm. J. Jacob
H. J. Hartman

Inventor
Edwin R. Cahoon

J. M. Smith

Attorney

No. 698,801.

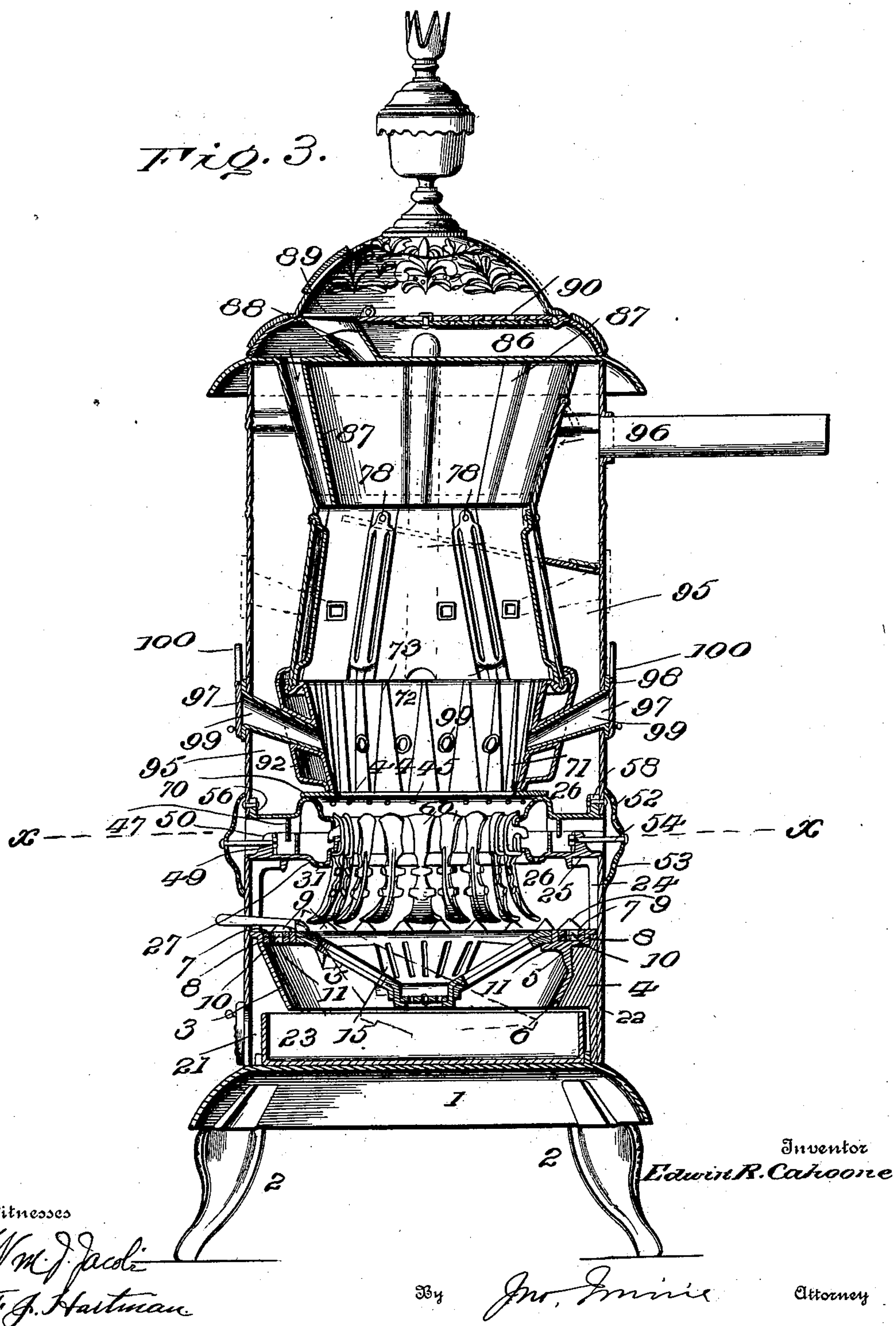
Patented Apr. 29, 1902.

E. R. CAHOONE.
HEATING STOVE.

(Application filed Mar. 5, 1901.)

(No Model.)

5 Sheets—Sheet 2.



No. 698,801.

Patented Apr. 29, 1902.

E. R. CAHOONE.
HEATING STOVE.

(Application filed Mar. 5, 1901.)

(No Model.)

5 Sheets—Sheet 3.

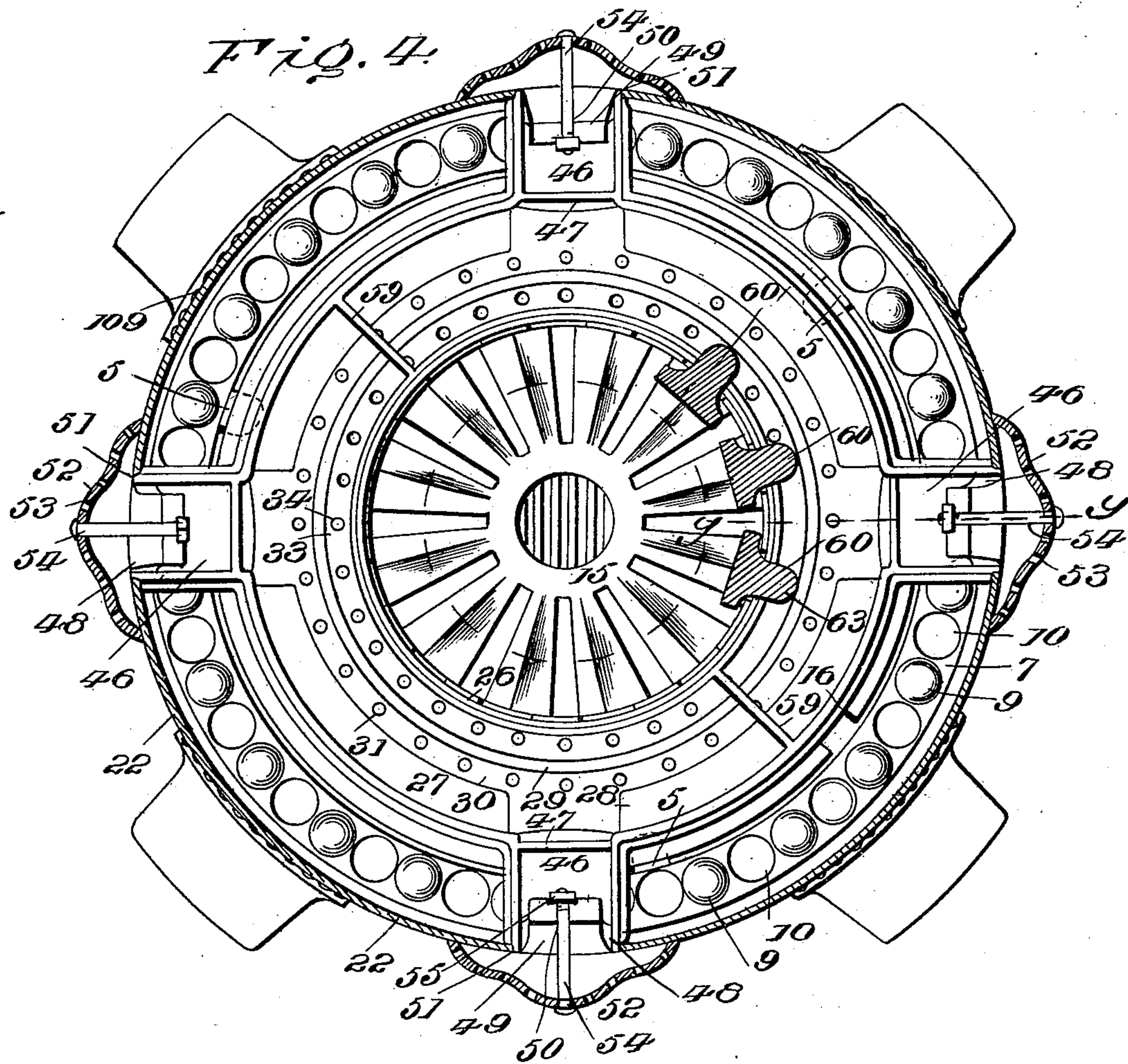
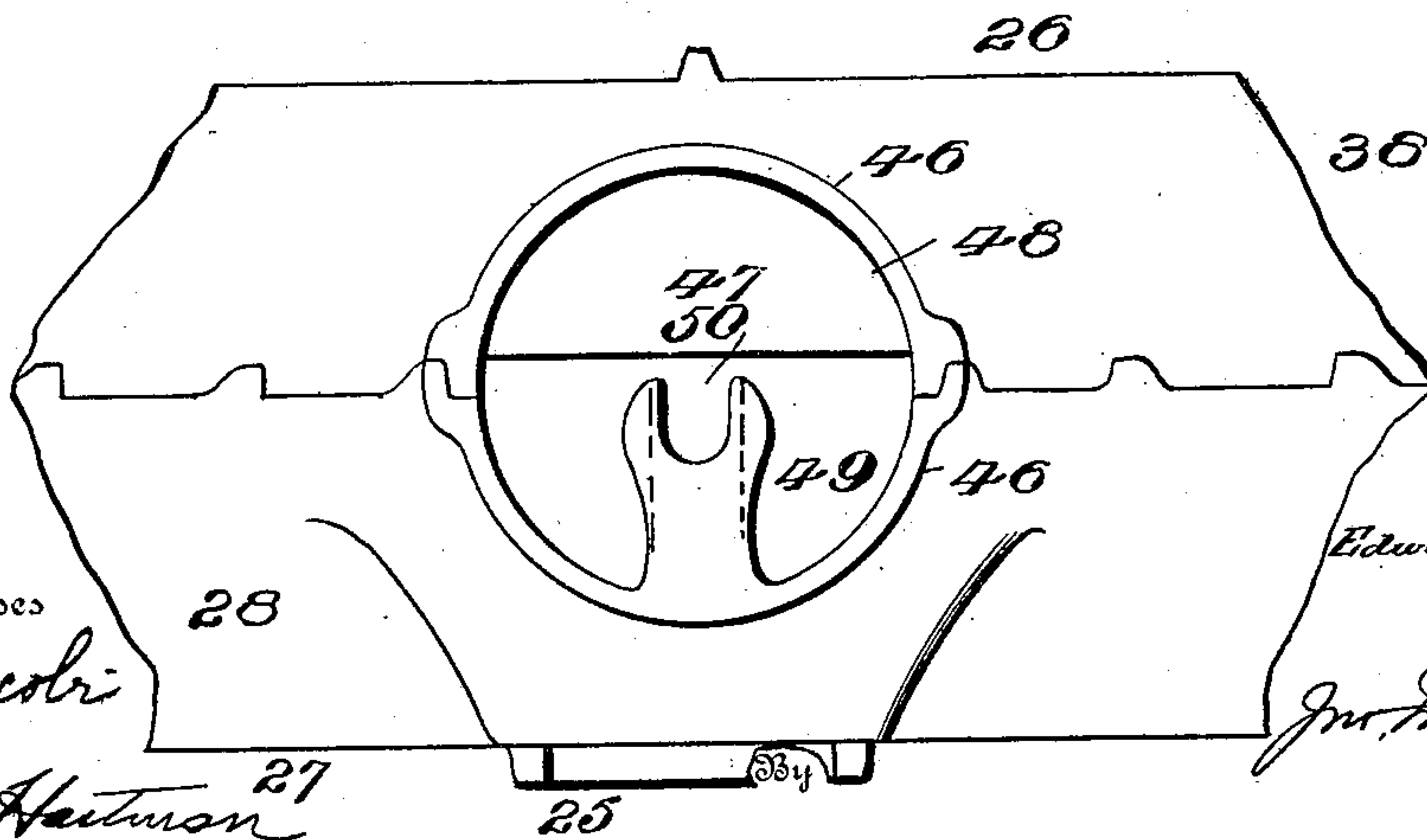


Fig. 5.



Witnesses
Wm. Jacob
F. J. Heaton

Inventor
Edwin R. Cahoon

John M. Smith
Attorney

No. 698,801.

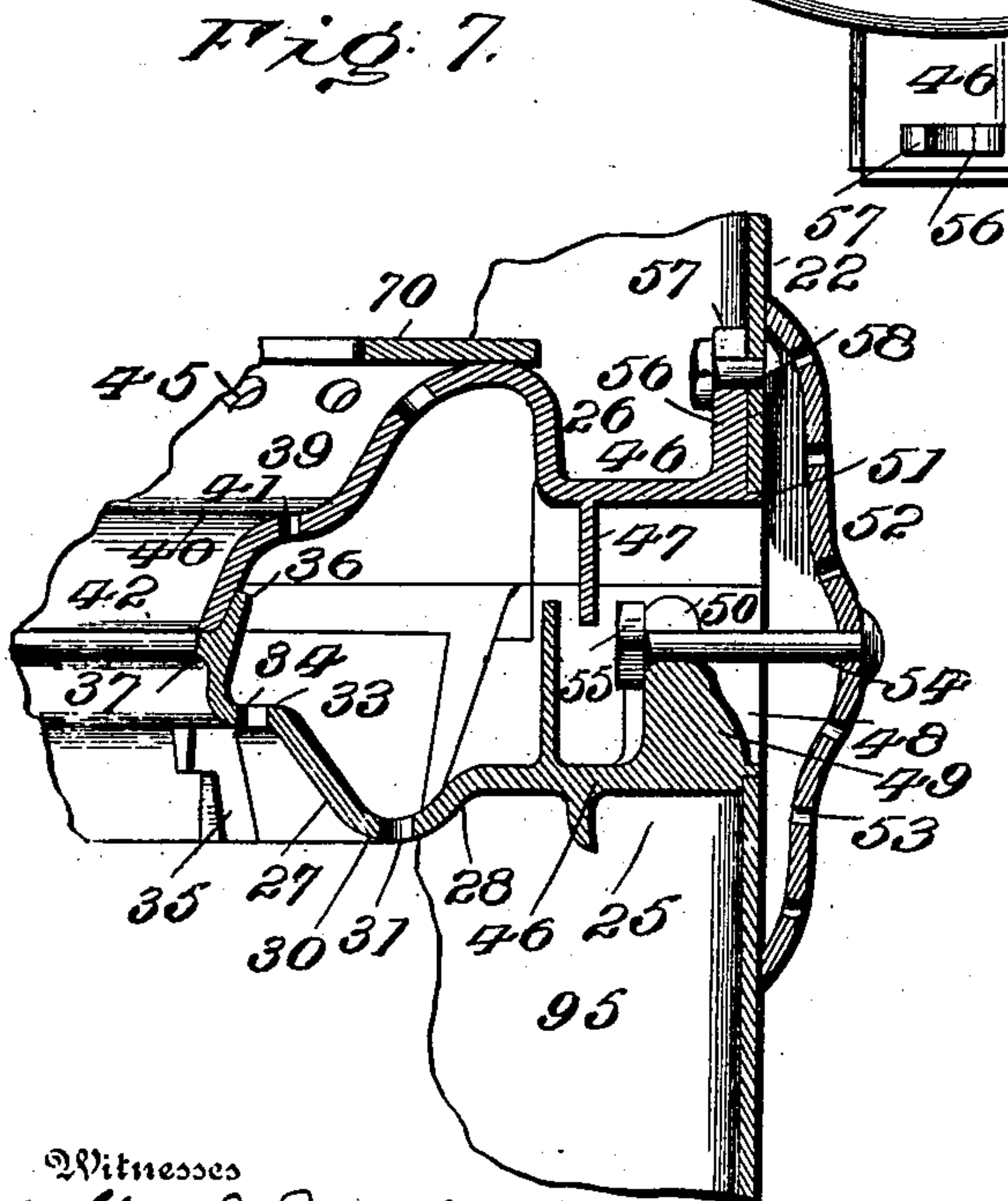
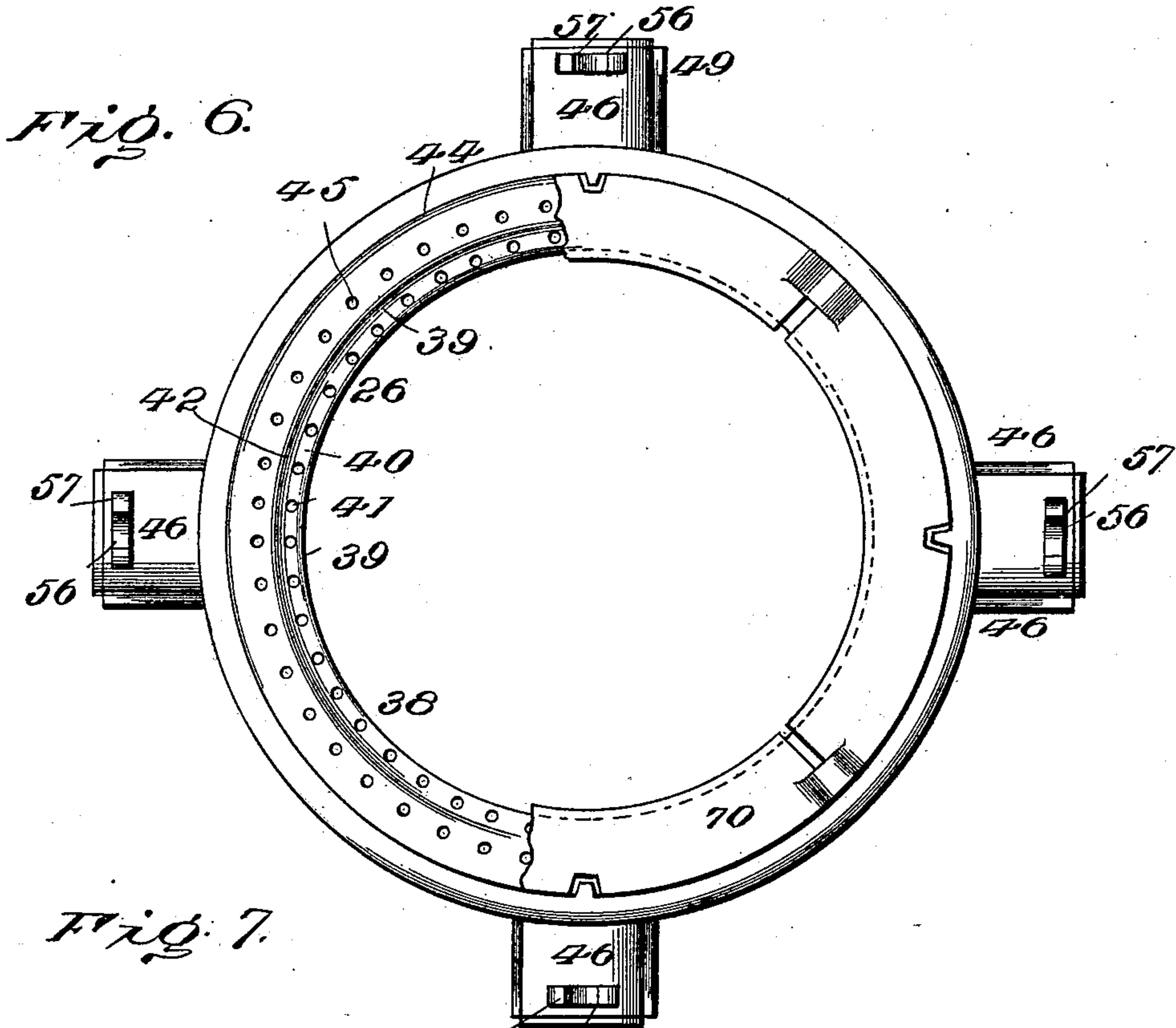
Patented Apr. 29, 1902.

E. R. CAHOONE.
HEATING STOVE.

(Application filed Mar. 5, 1901.)

(No Model.)

5 Sheets—Sheet 4.



Witnesses

Wm. J. Jacobi
F. J. Natunau

Inventor
Edwin R. Cahoon

John J. Smith

Attorney

No. 698,801.

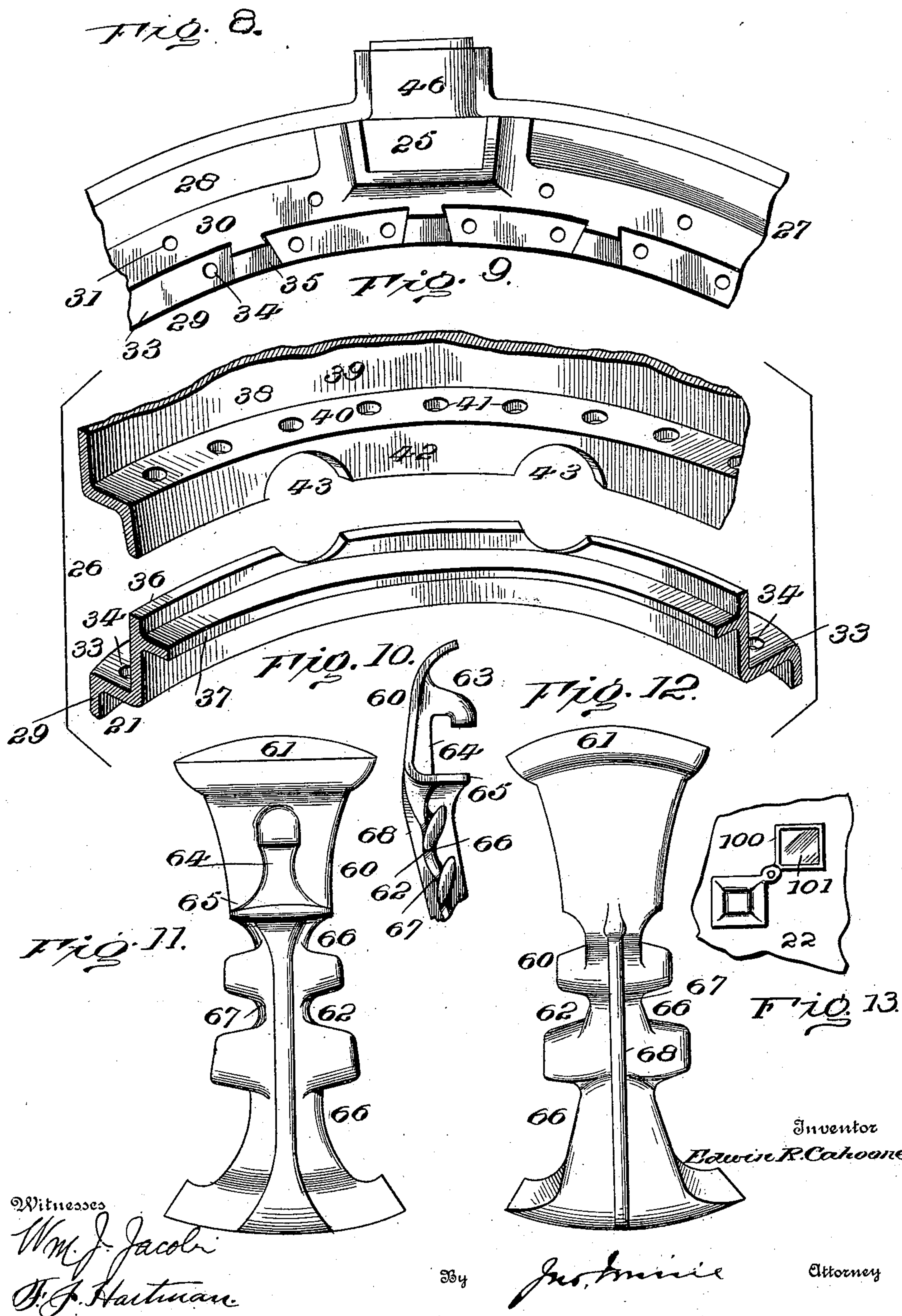
Patented Apr. 29, 1902.

E. R. CAHOONE.
HEATING STOVE.

(Application filed Mar. 5, 1901.)

5 Sheets—Sheet 5.

(No Model.)



UNITED STATES PATENT OFFICE.

EDWIN R. CAHOONE, OF NEWARK, NEW JERSEY.

HEATING-STOVE.

SPECIFICATION forming part of Letters Patent No. 698,801, dated April 29, 1902.

Application filed March 5, 1901. Serial No. 49,818. (No model.)

To all whom it may concern:

Be it known that I, EDWIN R. CAHOONE, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Heating-Stoves, of which the following is a specification.

This invention relates to improvements in heating stoves or furnaces for burning soft or bituminous coal, and more especially to the particular form of fire-pot, together with the means employed for distributing the air thereto.

The object of the invention is to provide an air-heating chamber at a point where heated air is most needed to produce good combustion. This feature consists, essentially, of a chamber surrounding the fire-pot, and has suitable openings to introduce the desired amount of heated air to the fuel, together with means whereby said supply can be regulated.

A further object of the invention is to so arrange the air-heating chamber to support a series of pendent portable bars, each of said bars being provided with means which coact with said air-heating chamber for readily attaching and detaching the same.

The invention further contemplates many details of construction to be hereinafter referred to and more fully pointed out in the claims.

In the drawings, Figure 1 is a perspective view of my improved stove. Fig. 2 is a transverse section of my improved air-heating chamber, showing the manner of supporting the bars forming the lower part of the fire-pot. Fig. 3 is a transverse section taken centrally through the stove. Fig. 4 is a partial horizontal section taken about on the line xx of Fig. 3. Fig. 5 is a detail side elevation of the air-heating chamber, illustrating the air-introducing duct. Fig. 6 is a plan view of the air-heating chamber. Fig. 7 is a detail vertical section taken on the line yy of Fig. 4. Fig. 8 is a detail bottom plan view of the air-heating chamber. Fig. 9 is a detail perspective view of the meeting edges of the two sections forming the air-heating chamber. Fig. 10 is a detail side elevation of one of the bars forming the fire-pot. Figs. 11 and 12 are respectively rear and front views of the same.

Fig. 13 is a detail front view of a double door for covering the air-introducers.

Referring to the drawings, 1 indicates a stove-base, on which is mounted the main structure, the whole being supported by legs 2. A suitable distance above the base 1 is an annulus 3, supported on standards 4, the latter resting on seats formed with the base. The annulus is of a peculiar formation, having inwardly-projecting lugs 5 and an annular inwardly-inclined flange 6. The lugs 5 are hollow and form sockets for the upper end of the standards 4, and the outer edges of said lugs are beveled to conform to the flange 6, so as to make an uninterrupted inclination of the annulus to allow a free passage for the ashes to drop to the ash-pan below. Supported on the lugs are two rings 7 and 8, the upper ring 7 being rotatable and having a series of upwardly-projecting cone-shaped lugs 9 and openings 10. The lower ring is stationary and has a series of openings 11, adapted to register with the openings 10 when the upper ring is oscillated. The function of this feature is to rid the structure at this point of ashes and small fuel that may accumulate thereon.

A grate 15 rests on the lugs 5 and has on its periphery a notch 16 to permit the placing of the grate on said lugs. The grate is passed into the ash-pit 21 in an inclined position, as shown in dotted lines in Fig. 3, the rear being seated on two of the lugs 5, and the notch 16 in the grate is brought directly in line with the remaining lug, whereupon the front of the grate is raised until it is above the plane of said remaining lug, where it is given a slight turn, which movement locks it in position.

When the parts thus far described are so assembled, a slight space is formed between the outer wall 22 and the periphery of the grate, and in this space are the rings 7 and 8, causing the ashes accumulated therein to fall into the ash-pan 23 when the ring 7 is shaken. The ashes as they fall on the inclined flange 6 of the annulus will be directed to the ash-pan, thus avoiding the possibility of any accumulation of ashes or dirt between the pan and the outer wall of the stove.

Standards 24 rise from the annulus 3 and fit in seats 25 to support in a fixed position

the air-heating chamber 26. This chamber is preferably made up of sections bolted or otherwise secured together, the whole forming one of the salient features of my invention. The bottom section 27 is composed of an outer and an inner wall 28 and 29, tapering down toward their lower ends to the bottom 30, wherein is formed a series of air-exit openings 31. In the inner wall 29 is formed a step or shoulder 33, provided with a series of perforations 34, and said wall is further provided with a series of notched lugs 35. Extending from the upper edges of the lower section are vertical flanges 36 and horizontal flanges 37, the two completing a seat for the upper section 38. This section 38 is approximately U shape in cross-section, except that its inner wall 39 has an inwardly-projecting flange 40 at its lower end, which is provided with a series of vertical air-exit perforations 41, and on the inner inclined portion 42 of the section 38 are a number of larger openings 43. The upper inner edge 44 of the section 38 is slightly inclined toward the center and is provided with a series of air-exit perforations 45.

Extending out from the sections 27 and 38 at desirable points are semicircular lugs 46, each having a baffle-plate 47, and when said sections are placed together they form air-inlet flues 48. In each lower lug 46 is a vertical boss 49, having in the upper end a notch 50. The flues 48 register with openings 51 in the stove-wall 22, and over said openings are placed ornamental plates 52, perforated at 53 and having passed through its center a bolt 54, the inner end of the bolt being seated in the notch 50 and is held therein by a nut 55, said nut fitting between flanges formed on the inner sides of the bosses 49. By means of this construction the parts can be quickly assembled and bolted, and should access to the chamber be desired through the flues 48 the screws 54 are released, the plate 52 is slightly raised to disengage the nut and bolt from the notch, when it can be withdrawn. Lugs 56, having a crotch 57 in their upper ends, project from the upper section 38 and are designed to more effectually secure the ring 26 in position, a bolt 58 passing through the crotch and a perforation in the casing, which clamps the parts together. To prevent the uneven distribution of the heated air to the fire-pot, partitions 59 are arranged in the air-heating chamber, forming practically two separate compartments. These plates insure the air being directed to each side of the ring.

Hung in the openings 43 are portable bars 60, composed of a head 61 and a depending reduced portion 62, the former having an outwardly-projecting hook 63, a web 64, and a horizontal bearing-flange 65. The reduced portion 62 has its sides notched at 66, and on its inner face are a number of grooves 67 and a central rib 68.

The pendent portable bars are located at the point where the fire is usually the greatest and where, as a rule, the stove requires re-

pairs first, and it is my purpose to make these bars as described, so that they may be quickly attached by any one of ordinary intelligence.

The hook 63 is slipped into the opening 43 and fits down over the upper edge of the inner wall of the lower section 27, and the flange 65 fits under the notched portion of the lugs 35. A bar when it is being positioned is slipped in the opening at an incline, as shown in dotted lines in Fig. 2, and is dropped until it rests against the lower section, in which position the flange 65 will slip under the lug 35 and will by reason of its weighted lower end 62 assume the position shown in full lines in the drawings.

The numeral 70 represents a ring resting on the hot-air chamber 26 and is designed to perform a double function, to wit: The inner side, which extends toward the center, overlaps the annular chamber 26 and deflects the streams of heated air coming through the perforations 45 down into the bed of the fuel, and the upper portion of the fire-pot and magazine is supported by said ring. The fire-pot and magazine may be, if desired, made in one piece. However, the practical construction will be to make it in two sections 71 and 72. The section 71, together with the series of portable bars 60, constitutes the fire-pot. In many instances the section 71 will have a series of vertical grooves 73, which taper from the top. However, in many instances the grooves will be omitted. The tapering grooves permit the heated air to spread and be forced in continuous currents down and around the body of fuel, tending to mix with the newly-generated gases, such mixture causing the gases to be more susceptible to ignition, as it reaches the lowest point in the fire-pot, where the mass of fuel is the hottest. The upper end of the section 71 is beveled, so as to offer as little resistance to the coal and incoming air-currents as possible.

The top of the stove 86 may be of any usual construction and is provided with a number of depending air-inlet tubes 87 and a fuel-inlet 88, provided with a door 89. The tubes are preferably formed by making a plate provided with ribs which bear against the wall of the magazine, completing the tubes or ducts. The tubes or ducts taper in cross-section and incline toward the center of the fuel, directing a series of regular currents of heated air thereto, the admission of said air being regulated by a damper 90.

Surrounding the lower part 72 of the fuel-magazine and the upper part of the fire-pot is a water-jacket 92, provided with the usual inlet and outlet pipes. It is my purpose to preferably make this feature around the fire-pot, this to be determined according to the many varying circumstances which arise in placing a stove of this character.

Between the outer wall or casing 22 and the fuel-magazine and fire-pot is a space or

exit-passage 95, through which the products of combustion pass on the way to the exit-flue 96. Extending from the outer wall 22 across the passage 95 and through the upper part 71 of the fire-pot is what I shall term a "combined air-introducer and sight-opening" 97. The device consists of an outer flange 98, bearing against the outer side of the wall 22, an incline bevel-chute 99 having its lower end reduced to form a flange to fit snugly the opening in the fire-pot section 71. A double door 100 is hinged to the flange 98, one of said doors being made solid, so as to entirely cut off the opening in the chute, and the other door comprises a frame having mounted therein a piece of mica 101, so as to enable one to see the incandescent mass of fuel in the fire-pot. While I am aware that air-introducers and sight-openers are old in this art, I am not aware of such a construction being placed to direct a regular supply of heated air to the fuel-bed where it is the hottest and at the same time exposing to the operators the condition of the incandescent fuel. One or more of these air-introducers may be used, as may be deemed most advisable, one or a series being located above the bed of the fuel in the fire-pot and working in conjunction with those entering the fire-pot will furnish ample air to rush a fire.

The operation is substantially as follows: Fuel is fed through the feed-opening 88 to the fire-pot. The fire is started and air is drawn downwardly through the fuel from the top, working its way through the fuel and the grooves in the fire-pot section 71, where it is disseminated, after which it escapes, with the products of combustion, through the slots formed between the pendent portable bars 60 to the space 95 to the exit-flue 96. If the fire does not ignite as rapidly as the operator thinks it should, and it is to be forced, one or more of the air-introducers 99 are opened and heated currents of air are directed into the body of fuel, which after it mixes and ignites the unburned gases in the fire-pot, passes into the space 95, thence to the chimney. This is equally so with the air introduced from the heated air-chamber 26, the various air-currents from the chamber 26 being so directed as to create a series of resistances between the air and gas in the fire-pot. For instance, the currents of air coming from the perforations 45 strike the ring 70, which deflects the air toward the center of the fuel, and air-currents coming from the perforations 41 in a vertical direction meet the broken molecules of gas caused by the mixing of the upper air-currents again causes a continued mixing action. Further than this air-currents are delivered horizontally through the openings 43, in which are seated the hooked ends of the portable bars 60, the openings 43 of necessity being larger in diameter than the hooks. This action once more breaks up the gas and mixes it. As the products escape into the space 95 through the outlets formed between the portable bars, the

products are once more subjected to highly-heated air-currents, which tends again to break up and spread the molecules of gas, whereupon said products are made more susceptible to ignition.

The parts forming this stove structure are so constructed as to enable almost any individual part to be adjusted or replaced independent of the other, and, further than this, utilization of the various parts to support and hold each other in position, as shown most clearly in the drawings, is, so far as I am aware, decidedly unique and practical in the art. For instance, the portable bars render it possible to repair quickly and easily any part of this most important feature of the stove—namely, the fire-pot.

From the foregoing description, taken in connection with the accompanying drawings, it will be seen that I have provided a heating-stove extremely neat in appearance, durable in character, and simple and effective in operation.

Having thus described my invention, what I claim is—

1. In a stove, the combination with a fire-pot, a grate, and means provided with individual openings for supporting the fire-pot, said fire-pot being constructed in sections the lower section being made up of a series of pendent portable bars having means projecting from each bar which fits into one of the individual openings in the supporting means, substantially as set forth.

2. A stove comprising a casing, a grate, a fire-pot, said fire-pot being constructed in sections, the lower section being made up of a series of pendent portable weighted bars, and means provided with individual openings for supporting said bars, a hook on the rear of each bar which is adapted to fit in one of the individual openings of the support and a flange on each bar below said hook to fit under a flange of the support, the lower weighted end of the bars forcing the lower flange of the bars in position substantially as set forth.

3. A stove comprising a casing, a grate, a fire-pot, said fire-pot being partly constructed of a series of portable pendent bars, a lug on each bar, a flange below said lug, a support provided with individual openings to accommodate said lugs, seats being formed in said support for the flange of the bars, substantially as set forth.

4. A stove comprising a casing, a grate, a fire-pot, said fire-pot being partly constructed of a series of portable bars, means for supporting said bars, said means comprising a hook member and a flange below said member, and a supporting-ring said ring being provided with openings forming seats for the hook members and a bearing surface or support for the lower flange on the bars, substantially as set forth.

5. A stove comprising a casing, a grate, a fire-pot, said fire-pot being partly constructed of a series of portable bars, a support for said

bars, and means on each bar which coacts with the support whereby said portable bars have to be swung in or rocked toward the center of the stove and then lifted up, to dis-
 5 engage them for removal from which position they can be removed, substantially as set forth.

6. A stove comprising a casing, a grate, a fire-pot, said fire-pot being partly constructed
 10 of a series of pendent portable bars, and a support on which the bars are hung, each bar being provided with means wholly at the upper portion for engaging the support, and being held in position thereto by its free lower
 15 weighted end, substantially as set forth.

7. A fire-pot constructed in sections, the lower section being made up of a series of pendent portable bars, means for supporting the bars, each bar being provided wholly at its
 20 upper portion with a device for engaging the means on which the bars are supported said device being held in locked proper position to the support by the weighted lower free end of said bars, substantially as set forth.

8. A stove comprising a casing, a grate, a fire-pot, said fire-pot being constructed in sections, the lower section being made up of a series of portable bars, an air-heating chamber surrounding said pot and said lower sec-
 25 tion of the fire-pot having openings which communicate with the air-heating chamber, means for supplying air to said air-heating chamber, and means on each pendent bar and the wall of the air-heating chamber for
 30 supporting said bars, substantially as set forth.

9. A stove comprising a casing, a grate, a fire-pot, the lower end of said fire-pot being composed of a series of pendent portable
 40 bars, an air-heating chamber surrounding the fire-pot, means on the air-heating chamber for supporting said bars, and means for supplying air to and distributing air from said chamber, substantially as set forth.

10. A stove comprising a casing, a grate, a fire-pot, the lower end of said fire-pot being composed of a series of pendent portable bars, an air-heating chamber having a series
 50 of exit-openings therein which surround the fire-pot, said air-heating chamber being made in sections and supporting the portable bars, and means for supplying air to said chamber, substantially as set forth.

11. A stove comprising a casing, a grate, a fire-pot, said fire-pot having its lower portion composed of a series of pendent portable bars, an air-heating chamber made in sections and surrounding said bars, each of said sections
 55 having coincident openings forming rests for the pendent bars and a series of air-exit openings, and means for supplying air to said chamber, substantially as set forth.

12. A stove comprising a casing, a fire-pot, a space being formed between said fire-pot and
 65 casing, a grate, and a series of combined air-introducers and sight-openings communicating with said fire-pot at a point where the

fuel becomes incandescent, said introducers communicating with the atmosphere and extending across the aforesaid space for heat-
 70 ing the ingoing air, substantially as and for the purpose specified.

13. A stove comprising a casing, a grate, a fire-pot, a series of combined air-introducers and sight-openings communicating with the
 75 fire-pot at a point where the fuel becomes incandescent, double door having one of its panels of solid opaque formation and its other panel covered with a transparent material whereby the air-introducers may be either
 80 shut off entirely or the condition of the fuel may be exposed.

14. A stove comprising a casing, a grate, means for supporting said grate, a fire-pot constructed in sections the lower section of said
 85 fire-pot being made up of pendent portable bars, means for independently supporting said bars, an air-heating chamber having a series of air-exits surrounding the portable bars, a plate or flange on said chamber adapted
 90 to deflect the air-currents coming from the air-heating chamber through the air-exits toward the bed of the fuel, and means for supplying air to the air-chamber, substantially as set forth.

15. A stove comprising a casing, a grate, a fire-pot, the lower portion of said fire-pot being constructed of a series of pendent portable bars, an air-heating chamber surround-
 100 ing said lower portion of the fire-pot, said air-heating chamber being made up of sections having exit perforations and extensions, the extensions of the sections when placed together forming tubes for the introduction of
 105 air, and means for holding the portable bars, said means being provided with openings, and a series of lugs below said openings on the lower section, substantially as set forth.

16. A stove comprising a casing, a grate, a fire-pot, said fire-pot being constructed in
 110 two sections the upper section being grooved vertically the grooves tapering from the top toward the bottom and the lower section being made up of a series of pendent portable bars, means for supporting the upper section, and
 115 means for supporting the pendent portable bars, substantially as set forth.

17. A stove comprising a casing, a grate, a fire-pot, said fire-pot being partly constructed of a series of portable pendent bars, each bar
 120 being weighted at the lower ends, and means supporting said bars wholly at the upper portion, the lower ends of said bars being free when in place, substantially as set forth.

18. A stove comprising a casing, a grate, a fire-pot, said fire-pot composed of an upper
 125 member and a lower member made up of portable bars, a support intermediate the upper and lower members on which the upper member rests and to which the bars forming the
 130 lower member hang, the lower free ends of the bars being free, a space being formed between the fire-pot and casing which communicates with the fire-pot through slots formed

intermediate the bars, and a flue communicating with said space, substantially as set forth.

19. A stove comprising a casing a fire-pot 5 having spaced pendent portable bars at the lower portion, a perforated air-heating chamber surrounding the upper ends of the bars and to which said bars are attached, radial flues opening to the atmosphere to supply air 10 to said chamber, baffle-plates in one or more of said flues, a space being formed between the fire-pot and casing which communicates with said fire-pot at the lower end, a flue communicating with said space and means for 15 delivering air downwardly through the fuel, substantially as described.

20. A stove comprising a casing, a fire-pot made up of sections, an air-heating chamber interposed between said sections of the fire-pot, portable bars supported on said air-heating 20 chamber which form the lower section of the fire-pot, a separate member seated on the air-heating chamber to support the upper section of the fire-pot, means for introducing air 25 to the fuel through the walls of the upper section, a space being formed between the fire-pot and casing and a flue communicating with said space, substantially as set forth.

21. A fire-pot comprising a series of portable 30 pendent bars, each bar having outwardly-projecting means at its upper portion to fasten it in position, the lower ends being free, an air-heating chamber, means for supplying air to said chamber, individual openings in 35 the inner wall of said chamber in which fit the outwardly-projecting means of the bars to fasten them in position, said openings being larger than the outwardly-projecting means of the bars forming air-exits, substantially 40 as set forth.

22. A fire-pot comprising pendent portable bars, a support for the bars, said support being provided with a series of openings and a 45 flange under said openings, and projections on each bar which coact with said openings and flanges when the parts are assembled, the projections being arranged in such relation to the support that the bars have to be 50 moved in and up to be released, substantially as set forth.

23. A fire-pot comprising a support having openings, a flange on said support which is located under said openings, a series of, portable 55 bars, each bar having a hook-shaped lug and a flange which is parallel with and is lo-

cated under said lug, the upper end of said bar overhanging the lug while the lower end is free, substantially as set forth.

24. A fire-pot comprising upper and lower sections, the lower section being made up of 60 a series of portable bars, an air-heating chamber intermediate the fire-pot sections which supports the fire-pot, means for supplying air to said chamber, a series of exits being formed in said chamber to deliver air to the 65 fuel at different angles and levels, and a second series of exits being formed in the air-heating chamber for delivering currents of air to the escaping gases outside of the portable bars, substantially as set forth. 70

25. A fire-pot, comprising upper and lower sections, and an air-heating chamber interposed between and supporting said sections, means for supplying air to said air-heating 75 chamber, a plurality of angularly-arranged exits being formed to introduce heated air at the juncture of the upper section of the fire-pot and the air-heating chamber, and a series of vertical exits being formed below said exits and outside the lower section to introduce 80 heated-air currents to meet and mix with the escaping gases, substantially as described.

26. A fire-pot comprising upper and lower sections, the latter having a series of slots at the lower portion, an air-heating chamber, 85 means for supplying air to said chamber, a series of exits being formed in the air-chamber to introduce currents of heated air to the fuel at different angles and levels, and two sets of exits being formed in the lower portion 90 of the air-heating chamber to deliver currents of heated air downwardly and outside the lower section of the fire-pot to meet and mix with the escaping products of combustion, substantially as set forth. 95

27. A portable section for a fire-pot consisting of a head, the lower end of which is turned out, a hook-shaped lug also projecting outwardly from said head and above the out-turned end thereof, and a depending reduced 100 portion extending from the head and provided with ribs and notches to form air-exits when two or more of said sections are assembled.

In testimony whereof I have hereunto set my hand in the presence of two subscribing 105 witnesses.

EDWIN R. CAHOONE.

Witnesses:

GEO. E. FRECH,

W. A. WILLIAMS.