

**No. 698,796.**

**Patented Apr. 29, 1902.**

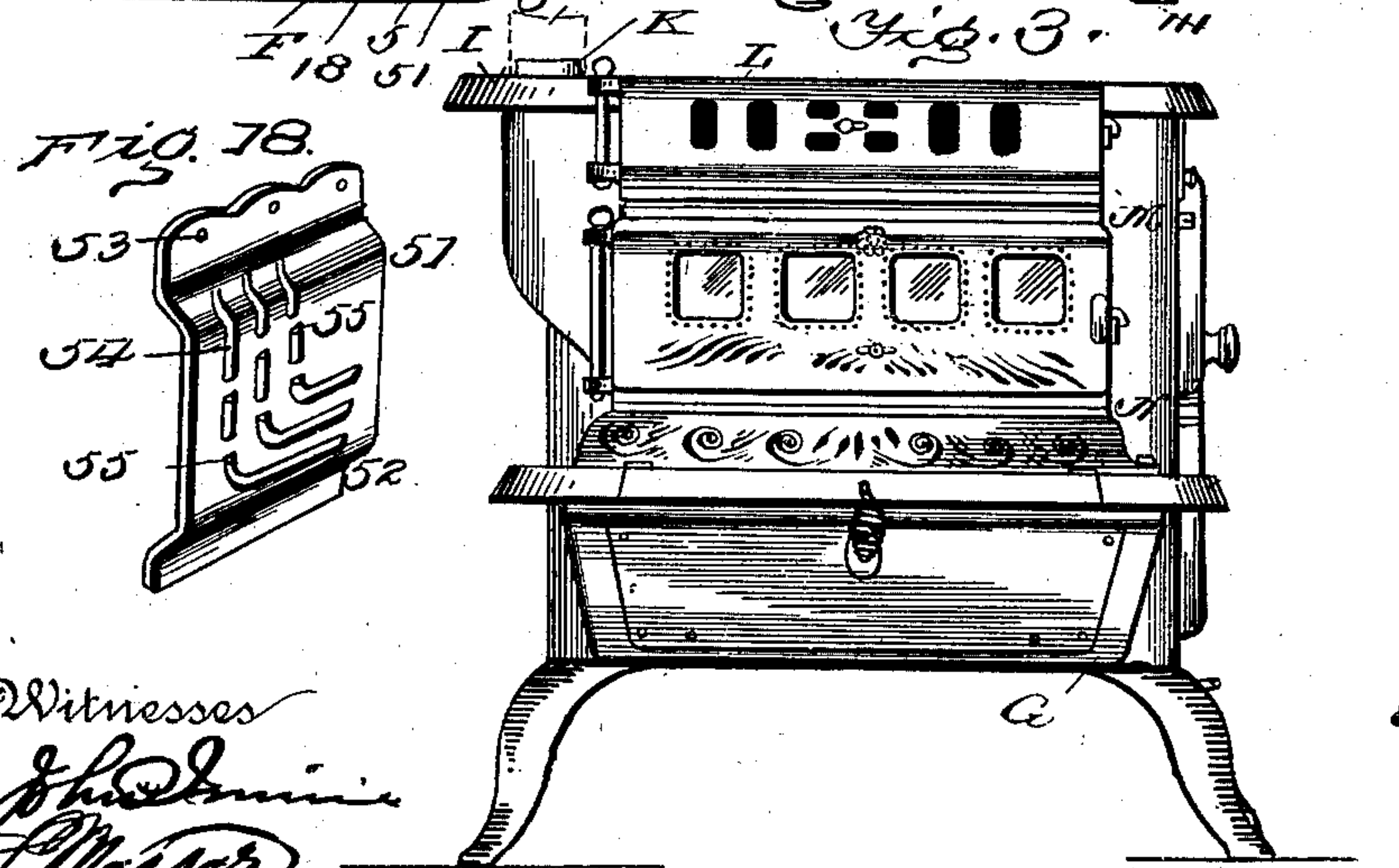
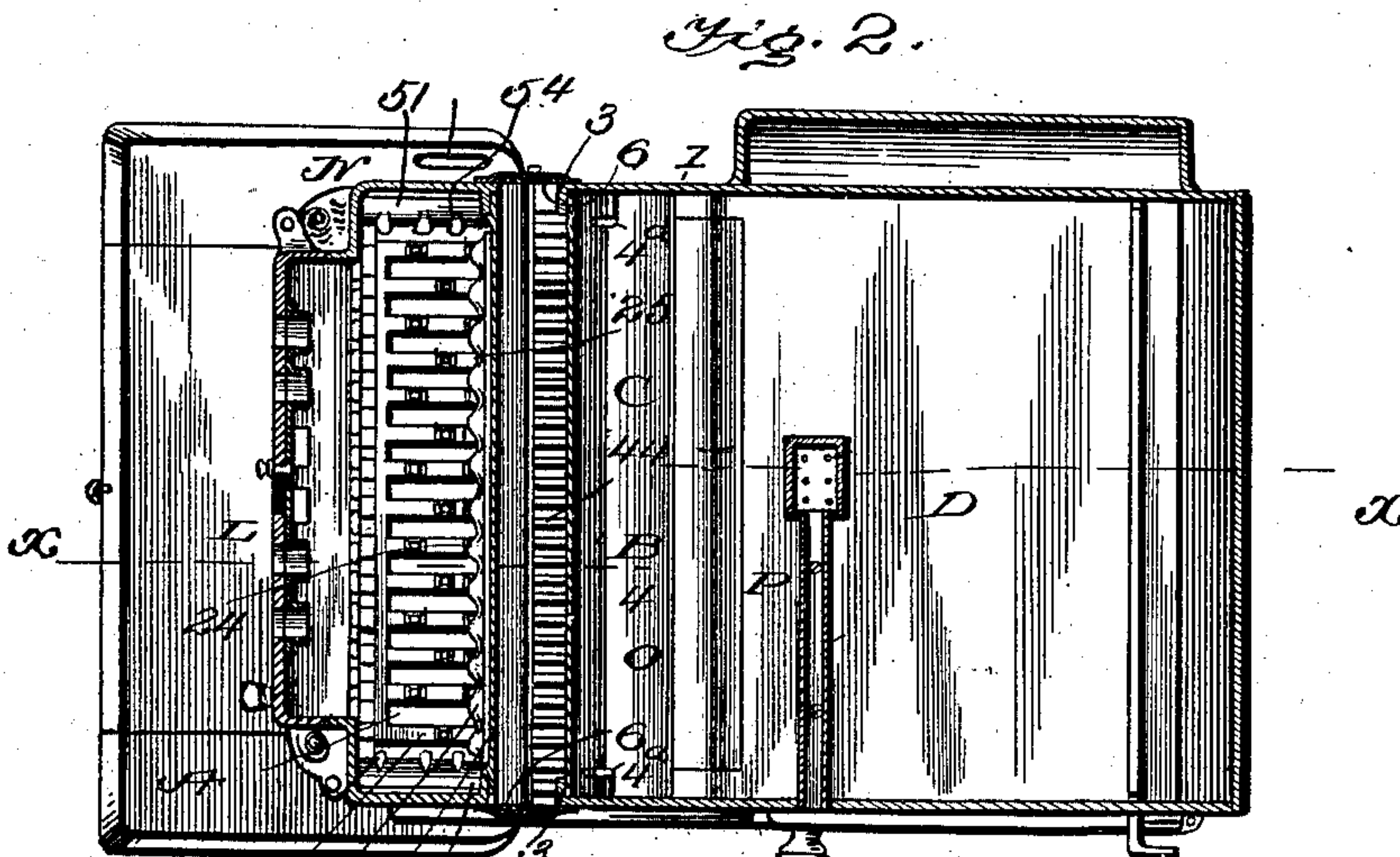
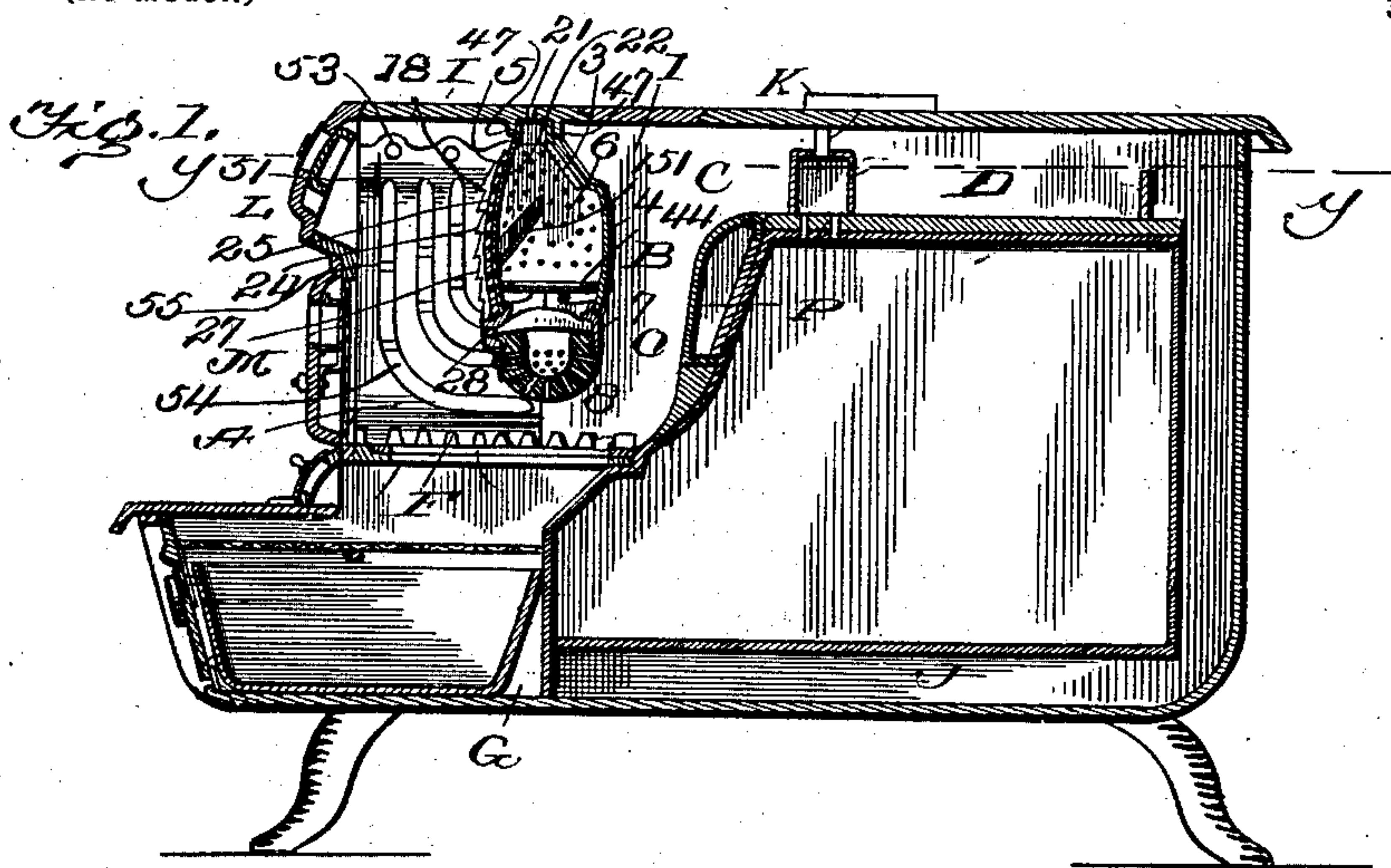
**E. R. CAHOONE.**

**STOVE OR RANGE.**

(Application filed Feb. 4, 1897.)

(No Model.)

**3 Sheets—Sheet 1.**



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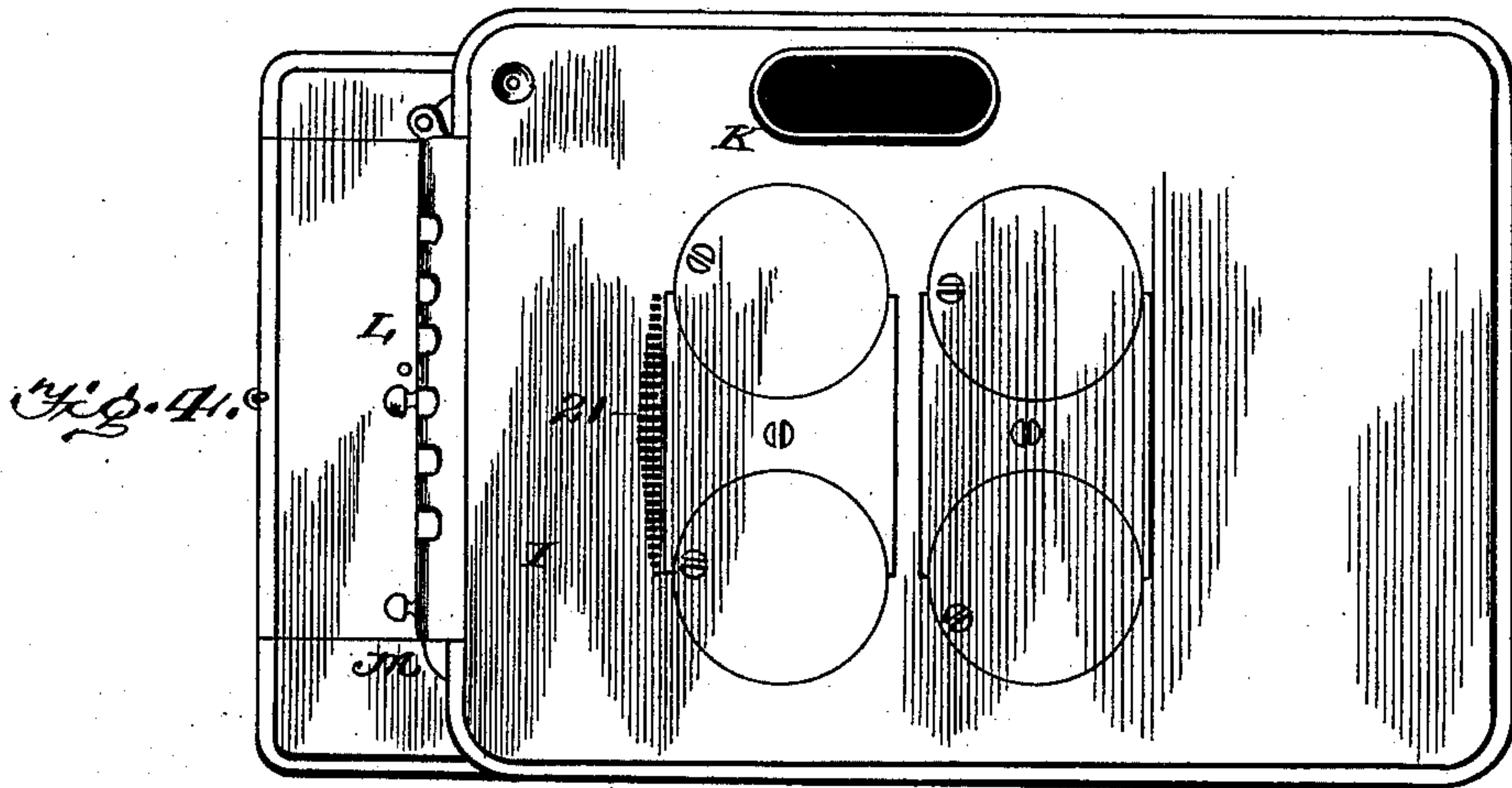
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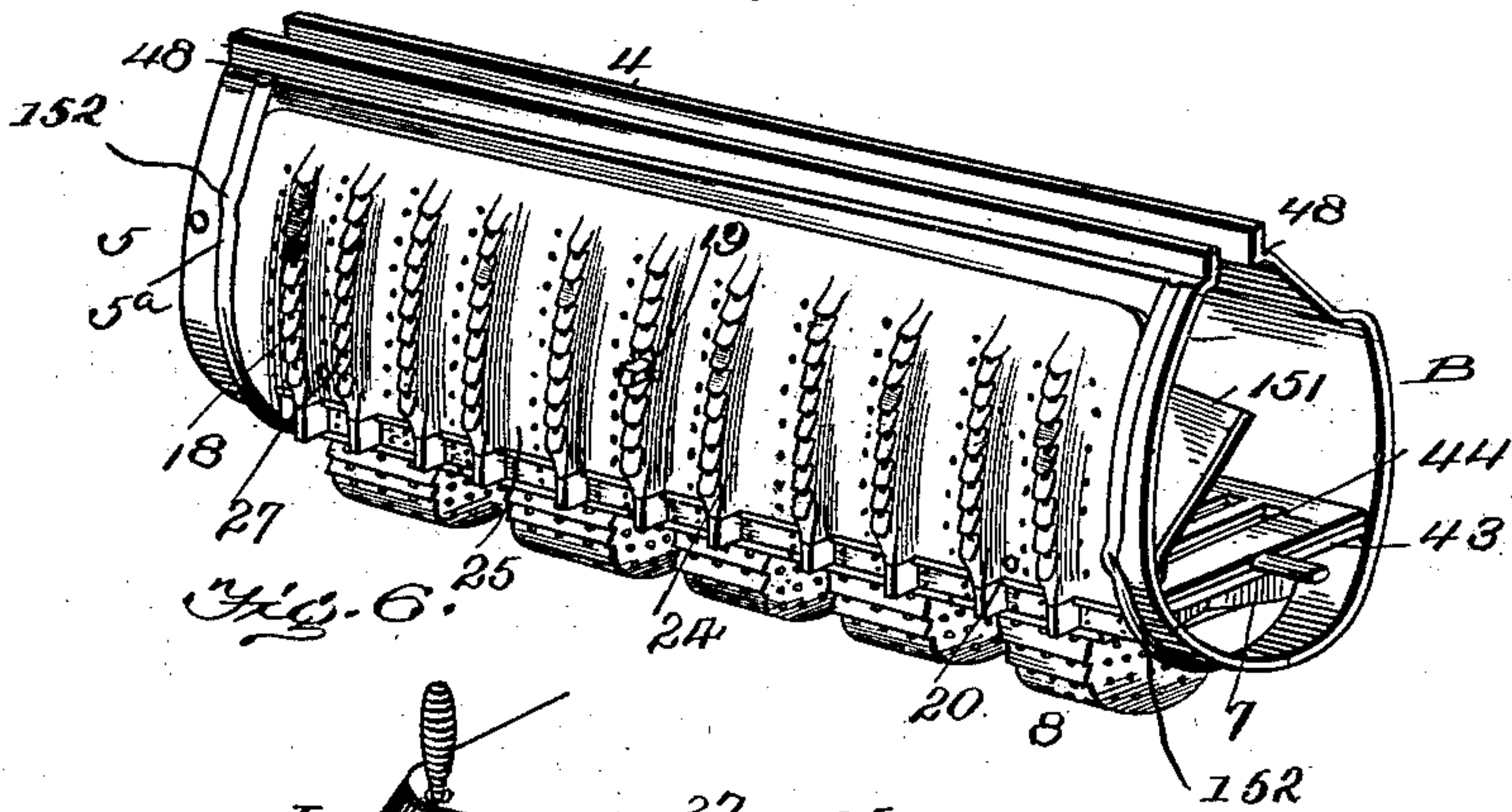
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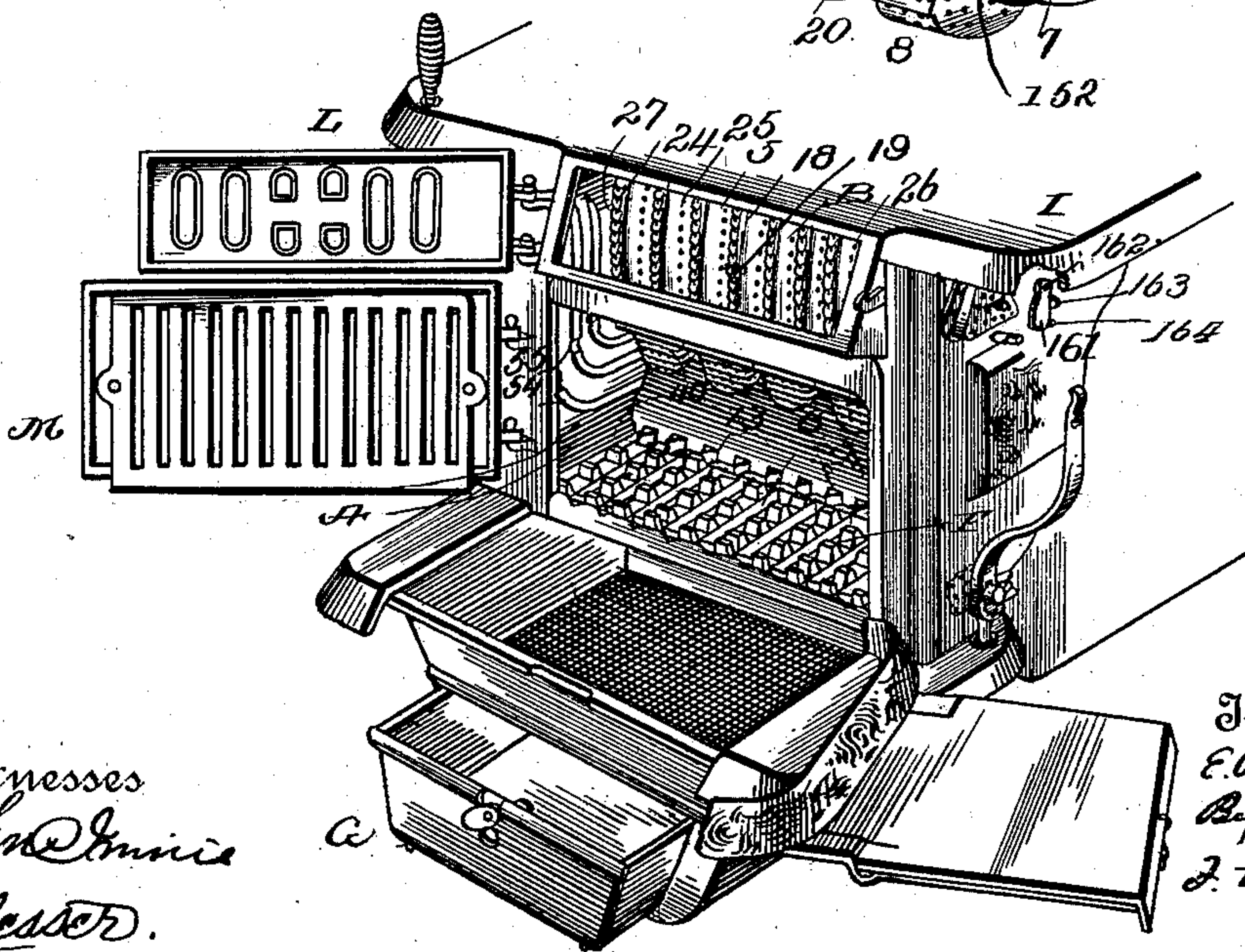
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*Fig. 5.*



*Fig. 6.*



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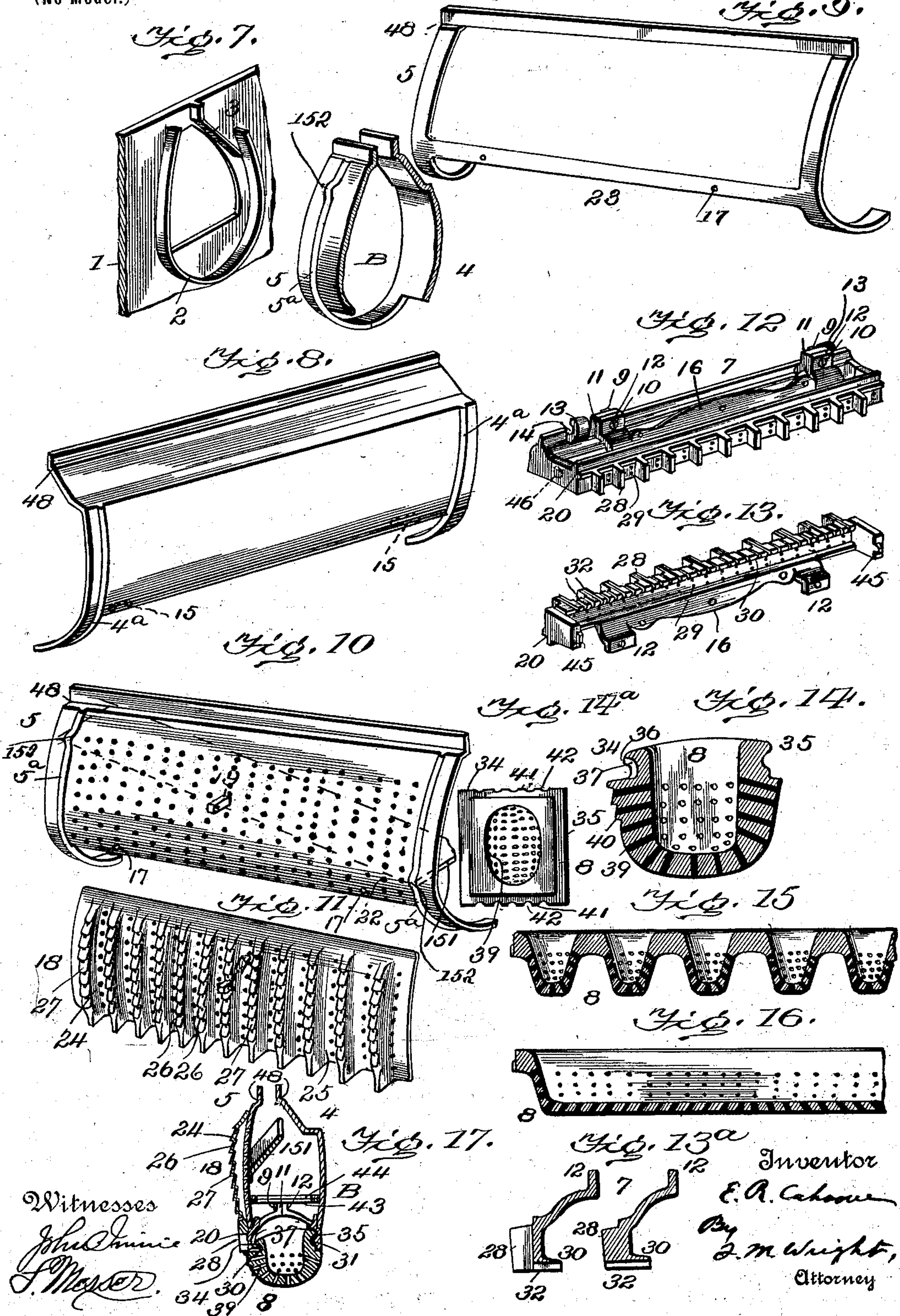
E. R. CAHOONE.

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(Application filed Feb. 4, 1897.)

(No Model.)

3 Sheets—Sheet 3.





# UNITED STATES PATENT OFFICE.

EDWIN R. CAHOONE, OF NEWARK, NEW JERSEY.

## STOVE OR RANGE.

SPECIFICATION forming part of Letters Patent No. 698,796, dated April 29, 1902.

Application filed February 4, 1897. Serial No. 621,994. (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 certain new and useful Improvements in Stoves or Ranges, of which the following is a specification.

My invention relates to improvements in stoves or ranges, and especially such as are illustrated and described in my former United States patents, No. 540,716, June 11, 1895, and No. 550,865, December 3, 1895. In these patents I have for purposes of illustration shown my invention applied to cooking-stoves, and the cooking-stoves shown are adapted for producing substantially complete combustion of coals rich in hydrocarbons and for this purpose comprise an air-duct depending from the top of the stove and dividing the stove-chamber into a fuel-magazine in front and a flue to the rear of said duct. Thus a contracted neck is formed at the bottom of the rear side of the fire-box, and combustion of the fuel is at this point completed by means of a plentiful supply of hot air discharged at this point from the pendent heated-air duct or partition. In addition various other means are shown for supplying the air to the fuel at the points most needed for combustion.

In my present invention the general construction of the stove is of the character described in my said patents; but I have devised various improvements in the details thereof which have for their object to render the stove or range more durable to resist the action of intense heat, more economical in the original cost of manufacture, more easily put together and taken apart, and having, moreover, novel features of construction adding to its general convenience and utility.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of the stove, taken on the line *x x* of Fig. 2. Fig. 2 is a horizontal section of the stove, taken on the line *y y* of Fig. 1. Fig. 3 is a front view. Fig. 4 is a top plan view of the same. Fig. 5 is a detail perspective view of the air-duct and its attachments. Fig. 6 is a perspective view of the front portion of the stove open. Fig. 7 is a perspective view of a portion of the inner surface of a side of the stove and a portion of the air-duct adjacent thereto, show-

ing the means for mounting the latter. Fig. 8 is a perspective view of the rear section of the air-duct. Fig. 9 is a similar view of the front section, and Fig. 10 is a similar view of a modification thereof. Fig. 11 is a view of the air-duct shield or burner-plate. Fig. 12 is a perspective view of the shoe detached. Fig. 13 is a view of one section of said shoe. Fig. 13<sup>a</sup> shows two transverse sections thereof. Figs. 14 and 14<sup>a</sup> show my preferred form of shoe-tip. Figs. 15 and 16 show as modifications continuous tips extending the length of the shoe. Fig. 17 is a cross-section of the air-duct as a whole. Fig. 18 shows an end plate of the fire-box.

A represents the fuel-magazine; B, the pendent air-duct; C, the flue at the back of said duct; D, the flue over the oven; E, the oven; F, the bed on which the fuel rests; G, the ash-box; H, the ash-pan in said box; I, the stove-top or top plate in which are the usual pot-holes.

J is the flue under the oven.

K is the collar to receive the stovepipe.

L is the charging-door for supplying fuel to the magazine A.

M is the hinged stove-front as a whole.

N is the swinging removable hearth-plate.

O is the concave back wall of the flue C, and P is the water-back, which forms the upper part of said back wall.

The term "fuel-magazine" as used throughout this description and the claims is intended to refer to a fuel-magazine as generally understood or to a fire-pot.

The air-duct or partition B is in my improved stove supported not from the top plate of the stove, but from the sides thereof, and for this purpose I provide on the inner surface of each side, as shown in Fig. 7, two flanges 2 3, of which the flange 2 extends down the whole front of the air-duct, around the bottom thereof and up the rear to about one-half the height of the duct, and the other, 3, extends in a slanting direction, as shown, for the remainder of the height. Within the flange 2 and without the flange 3, and thus resting on both flanges of each side of the stove, is supported the rear section 4 of the air-duct, and within the front portion of the flange 2 is also supported the front section 5 thereof. Air is admitted to the interior of the



air-duct from the sides of the stove through apertures therein, and for this purpose I preferably provide removable apertured plates 6, fitting in the sides of the stove opposite to the ends of the air-duct, as shown in Fig. 1. The sections 4 5 of the air-duct are provided with ribs 4<sup>a</sup> 5<sup>a</sup>, disposed parallel with the sides and at a distance therefrom corresponding to the width of the flanges 2 3 on the sides of the stove. Each duct-section is cut away at its lower portion, as clearly shown in Figs. 8, 9, 10, and it will be seen that when said sections are laid in or on the flanges the lower ends of the vertical edges of the sections meet, and the sections are held in place without bolting or riveting, but solely by the configuration of the flanges on which they rest. When so put together, the cut-away portions at the bottom are adapted to receive a shoe 7, which is also formed in two sections, as clearly shown in Fig. 12, and is provided with shoe-tips 8. When said tips have been inserted between said shoe-sections, the sections are secured together, preferably by means of nuts 9 and screws 10, the latter passing through registering holes in lugs 11 12, extending inwardly and upwardly from the shoe-sections. Upon the back of the rear shoe-section adjacent to the lugs 12 are provided socket-pieces 13, having concave sockets 14, which register with and are adapted to rest against round short rod-like protuberances 15, extending from the inner surface of the rear duct-section. Extending upwardly from the front shoe-section are lugs with apertures 16, and in the lower edge of the front duct-section are holes 17, which register with the holes 16. By inserting nails in the registering holes 16 17 the shoe 7 is held to the duct against vertical displacement, while the engagement of the protuberance 15 with the sockets 14 also holds the shoe against vertical displacement.

Upon the front air-duct section 5 is supported a shield or burner-plate 18. (Illustrated in detail in Fig. 11.) Said shield is secured to the front air-duct section 5 by means of a lug 19 on the duct-section passing through a hole in the burner-plate and being there secured by a nail, the lower edge of said shield resting on a ledge or shoulder 20 of the shoe.

I will now describe in detail the construction of these parts whereby air is freely admitted through the air-duct to the point of complete combustion.

The stove plate or top 1 has a row of holes 21, which admit air to the duct from the top, and, as has been before stated, air is or can be admitted from the sides between the flanges 2 3. The portion of the front duct-section underlying the shield may either have a single large hole therethrough, as shown in Fig. 9, or may have numerous small perforations 22, as shown in Fig. 10. The latter construction is to be preferred with fuel which burns quickly and with great heat. The former

construction leaves a strip 23, to which the shoe is secured, as has been before explained. The shield 18 is preferably formed with ribs 24 and grooves 25, the ribs being hollow and both ribs and grooves being perforated, as at 26. The ribs are serrated vertically, so as to form ledges 27, each ledge overhanging a perforation 26 in the rib. This construction tends to prevent the perforations in the projecting ribs being closed by the particles of the coal or ashes as the latter settle in the fuel-magazine. The construction of alternating grooves and hollow ribs with numerous air-holes therein effectually prevents burning of the shield 18, it being remembered that the most intense heat does not occur at this point, but at the contracted neck at the bottom of the fire-box. Upon the inner side of one of the air-duct sections, preferably the front section, as shown in dotted lines in Fig. 10, is secured a strip 151, extending the whole length of the air-duct on a slant from one end to the other, said strip extending inwardly beneath the row of holes 21 and serving to catch any water that may be spilled upon the top of the stove and conduct it on at the sides. For this purpose the duct section and strip 151 are cast with corresponding indentations 152, fitted together, putty being placed in the angle at said indentations, and the section and strip are riveted or otherwise fastened together below said indentations. The shoe 7 is in like manner designed and constructed to resist great heat and furnish an ample supply of air for combustion, and for this purpose the front section is provided with ribs 28, registering with the ribs 24 of the shield, so as to form continuations of the latter, so that liability of the coal to be arrested in its descent or feed is avoided. Between the ribs 28 are air-holes 29. The shoe-tips 8 are held in place by means of inwardly-extending flanges 30 31 on the shoe-sections. Of these the front flange 30 is grooved on its under and rear surfaces, as shown at 32, Fig. 13<sup>a</sup>, to form air-inlets to the fuel-box, the rear flange 31 not being so grooved. My preferred form of shoe-tip is that shown in Figs. 14, 14<sup>a</sup> and comprises a hollow block of fire-brick held between the two sections of the shoe by engagement of the flanges 34 35 with the flanges 30 31 of the shoe-sections, the groove or underhung part 36 of the shoe-tip, against which the front flange 30 abuts, being grooved, as shown, to register with grooves 37 in the rear and under surfaces of the flange 34 of the front shoe-section to provide air-passages from the air-duct to the fire-box. To facilitate the escape of the air, the flange 30 is made thin, so as not to wholly fill the groove 37 in the front section below the flange 34. I preferably employ a number of shoe-tips, each separably removable; but I may also use a single tip extending the whole length of the shoe, either with recesses, as shown in Fig. 15, similar to those formed by adjoining separable shoe-tips or without such recesses, as shown in Fig. 16.



Except for obvious necessary changes the construction is similar to that of the separable shoe-tip. Such shoe-tip is provided on all sides with perforations leading to the fire-box from the hollow interior of the tip, so that air can be very freely supplied to thoroughly complete the combustion of the fuel. Above each row of holes 39, in the front side of the shoe-tip, I provide overhanging ledges 40, similar to the ledges 27 in the ribs of the shield, preventing said holes from being filled up by the descending fuel. On each side of each separable tip is formed a rib or flange 41, these ribs on adjacent tips abutting against each other, so as to form an air-space above said ribs, said ribs being notched or grooved vertically, as shown at 42, so as to form air-passages from said space to the fire-box. The pendent portion of the tip is considerably underhung at each side to allow free access of the air to the fuel at the contracted neck. It also allows free passage of the gases of combustion from the fuel-box to the back flue C. I further provide a damper for regulating the supply of air through the air-duct. This comprises a perforated bed 43, secured between the front and rear duct-sections, and a perforated slide 44, arranged to be operated by a suitable handle at the side of the stove, the perforations in these two parts being adapted to register with each other when the damper is open to admit air to the point of maximum combustion. This construction enables me to regulate the draft or, if desired, entirely cut off the supply in the air-duct, accomplishing by one operation what has heretofore required the manipulation of several dampers.

I will now point out some of the advantages obtained from these improvements over the construction shown in my former patents.

One of the most important features is the construction whereby the stove can be readily adapted for different varieties of fuel. Very bituminous coals need a more contracted throat than coals of the semi-anthracite variety. It is therefore very important to adapt the stove for the locality to which it is to be shipped and the nature of the coal there used or to be used with the stove, and this must be done with as little expense as possible and with the removal and substitution of as few parts as possible. Upon an examination of the construction of the shoe now used by me it will be seen that the variation in the contraction of the neck can be effected by providing a set of shoes of uniform pattern in all respects, except as to the height of the face of the shoe on which the ribs are situated. All that is necessary then is to select a shoe of such height as will give the desired contraction of the neck, the other parts remaining the same. Hence by providing a removable shoe which fits within the air-duct and with the shoe tip or tips forms the lower edge of the duct as a whole I am enabled to adjust the height of said duct, and therefore the

height of the flue-neck, as may be desired for different varieties of fuel. It is further to be observed that by my improvements the interior of the fire-box is rendered extremely durable whatever be the degree of heat which may be obtained. At the point of maximum intensity shoe-tips of fire-clay are provided, which will withstand a far greater heat than could be produced in a household stove or furnace. The iron portion of the duct above the shoe-tips besides being farther away from the point of extreme heat is protected from the action of the heat by means of numerous air-passages, the indraft of air serving to reduce the temperature at the sides of the fire-box. By making the shoe-tips of fire-clay instead of iron not only do I provide a more durable construction, but I am enabled to furnish the same with a greater number of air-holes than would be the case with iron tips by reason of the difficulty of casting the latter with numerous air-holes and the expense of drilling them. Furthermore, it is to be observed that the nails by which the shoe is suspended from the air-duct and the bolts by which the shoe-sections are held together are all inclosed and shielded from the direct action of the fire. In actual trial with a stove constructed in accordance with these improvements it has been found that after prolonged combustion and intense heat in such a stove the iron parts of the duct were not even blistered, and the nails, bolts, and nuts above referred to showed substantially no change from their original condition and were removed without difficulty.

A further important advantage attendant upon these improvements is the ease with which the parts can be removed or replaced. Thus, should it be desired to remove one of the shoe-tips, this can be done from the front of the stove by raising the shield 18, removing the nails from the holes 16 17, when the shoe will drop down, then removing the bolts and nuts 9 and 10, when the shoe-sections come apart and the shoe-tips can be removed. To facilitate the fitting of the shoe-sections together, they are provided at the ends with registering projections and recesses 45 46.

By making the duct-sections to rest on the flanges on the sides of the stove instead of depending from a plate forming a separable portion of the stove-top the duct can be more readily placed in position and the stove-plate is not weakened by the insertion of a piece extending almost the whole width, as in my former construction. In order to provide a tight fit at the top of the duct, I provide ribs 47, which depend from the under side of said plate and rest upon shoulders 48, formed in the air-duct sections. The space between the ribs 47 and the adjacent portions of the duct, sections is packed with putty, as is usual, to make a tight joint. Other advantages arising from the construction are that the duct-sections are easier to cast and are better supported on the stove. The necessity of fitting



at the bottom and the expense of bolts, drilling holes, &c., at the top and bottom is avoided.

The end shields 51, which line the ends of the fire-box, have shoulders 52 at the bottom to rest upon the fire-bed and are provided at the top with screw-holes 53, wherewith to be secured to the sides of the stove. They have ribs 54, which are disposed vertically for the most part and at the lower end turn with a curve to the rear, the effect being to turn the currents of air toward the contracted neck at the bottom of the air-duct. For the same purpose these ribs have horizontal notches 55.

It is desirable occasionally to rake the fire at the bottom of the flue C at the back of the pendent air-duct or partition. For this purpose communication is provided from the outside by means of an aperture in the side of the stove to the rear of said partition between the oven-door and the open-work panel that covers the openings into the air-duct. Through this aperture a poker may be inserted to rake the fire at the back of the air-duct. This opening is closed by a button 161, pivoted at the top at 162, so as to swing to the left under the open-work panel, which latter is undercut or beveled to receive the button thereunder. Said button is provided with a nib or lug 163 to push it by to close the aperture, and the side of the stove has a stop 164 to limit the pivotal movement of the button.

I claim—

1. In a stove, the combination with the sides thereof provided with integral inwardly-extending flanges, and a removable air-duct having a sectional shoe-frame at its lower end, said shoe-frame supporting a perforated tip or tips, substantially as set forth.

2. In a stove, the combination with the sides of the stove, provided with integral inwardly-extending flanges which conform to the configuration of an air-duct supported by said flanges, and an air-duct made in sections said air-duct supporting at its lower portion one or a series of removable tips, substantially as described.

3. In a stove, the combination with the sides, of a fuel-magazine therebetween, integral inwardly-extending flanges projecting within the fuel-magazine and from said stove sides, a removable sectional air-duct supported thereby, and adjustable means in the lower portion of the air-duct for supporting a removable tip or tips, substantially as set forth.

4. In a stove, the combination with the sides of the stove, of a sectional air-duct therebetween open at the ends, said sides being open opposite to said ends, and supports or seats on said sides arranged around said openings which support and lock said duct, substantially as described.

5. In a stove, the combination with the sides of the stove having openings therein, of an air-duct therebetween opposite to said openings and supported or seated on said sides, and a stove-top having depending

flanges lying against the upper edges of each side of the duct, substantially as described.

6. In a stove, the combination with the sides of the stove having openings therein, of an air-duct therebetween opposite to said openings, and supported on said sides, and having shoulders at its upper edges, and a stove-top having depending flanges forming a joint with said shoulders, substantially as described.

7. In a stove, the combination with the sides of the stove, of an air-duct therebetween, said sides being each provided with two flanges, one extending around the bottom of said duct and outside the same, and the other inside the duct and below the upper portion of the same, said duct being supported at each end on said flanges, substantially as described.

8. In a stove, the combination with a pendent air-duct, the ends of the duct having air-inlets, and a damper located within said air-duct below the air-inlets, substantially as described.

9. In a stove, the combination with a pendent air-duct, extending transversely of the stove, a damper located across said air-duct, consisting of a stationary slotted section, supported by the air-duct, and a movable slotted section located on top of the stationary section, capable of transverse movement by a handle from the outside of the stove, substantially as described.

10. In a stove, the combination of a stove-top plate having air inlets or perforations, an air-duct extending downwardly from said top plate below said air-inlets, and a drip water or liquid conduit disposed within the duct to catch water passing through said air-inlets and conduct the same to the outside of the stove, substantially as described.

11. In a stove, the combination of the air-duct open at the bottom, tip or tips removably secured in a shoe-frame locked to the side walls of the air-duct, and located in or across the openings, substantially as described.

12. In a stove, the combination with a perforated pendent air-duct, a perforated corrugated shield located on the front side of said air-duct the ridges of the corrugated shield having ledges which overhang the perforations, and air-chambers formed between the front wall of the air-duct and the extended corrugations of the shield, substantially as described.

13. A pendent air-duct provided with a sectional shoe detachably secured thereto for supporting one or more tips, substantially as described.

14. In a stove, the combination with the sides thereof, a pendent air-duct composed of sections, and a detachable sectional shoe with tips secured thereto, substantially as set forth.

15. In a stove, the combination of the air-duct open at the bottom and the shoe-sections inserted in or across said openings, and removably secured to said duct, said sections having projections extending within said duct,



whereby said sections may be united, substantially as described.

16. In a stove, the combination of the air-duct open at the bottom, and the shoe-sections inserted in or across said openings, and removably secured to said air-duct, said sections being provided with the inwardly and upwardly apertured lugs 11, 12, for uniting the same, substantially as described.

17. In a stove, the combination of the air-duct open at the bottom, and the shoe inserted in or across said opening, said shoe having a pivotal or trunnion engagement with one side of the duct, and a positive detachable connection with the opposite side, substantially as described.

18. In a stove, the combination of the air-duct open at the bottom, and the shoe inserted in or across said opening, said duct and shoe having the sockets 14 and half-trunnions 15 registering with each other at one side, and a positive detachable connection at the opposite side, substantially as described.

19. In a stove, the air-duct comprising two sections, the front section having a cut-away portion at the bottom, a longitudinal strip, and a hole above said strip, in combination with a shoe inserted in or across said cut-away portion and secured to said strip, and a shield covering said hole, substantially as described.

20. A detachable shield for a pendent air-duct, having a series of vertically-arranged perforated corrugations the ridges of said corrugated shield having ledges which overhang the perforations said shield being attached to the air-duct by a bolt projecting from the latter through a perforation in the shield, and locked thereto by suitable means, substantially as described.

21. In a stove, the combination of an air-duct, a ribbed shield therefor, and a shoe carried at the bottom of said duct, said shoe having ribs continuous with the ribs of the shield, substantially as described.

22. In a stove, the combination of an air-duct, a shoe therefor, and a tip held in said shoe, said shoe having ribs extending substantially flush with the front face of said tip, substantially as described.

23. In a stove, the combination of an air-duct, a removable shoe held thereto, and a removable tip held within said shoe, substantially as described.

24. In a stove, the combination of an air-duct, a sectional removable shoe held thereto, and a plurality of removable shoe-tips held between the sections of the shoe, substantially as described.

25. In a stove the combination of an air-duct, flanged shoe-sections held to said duct, and a shoe-tip supported by the flanges of the shoe-sections, substantially as described.

26. In a stove, the combination of an air-duct, shoe-sections held to said duct having terminal registering projections and recesses for distancing said shoe-sections, and a shoe-

tip held between said sections, substantially as described.

27. In a stove, the combination of an air-duct, a shoe held to said duct having a front grooved flange, and a shoe-tip supported by said flange, and having grooves registering with the grooves of the flange, substantially as described.

28. In a stove, the combination with an air-duct, of a hollow perforated shoe-tip of fire-brick, or the like refractory material, secured on the lower edge of said duct and having a flange projecting forwardly under said duct to protect the same from the action of the heat, substantially as described.

29. In a stove, the combination with an air-duct open at the bottom, of a plurality of hollow perforated shoe-tips arranged side by side and having air-exits formed between each other when placed within said duct, substantially as described.

30. In a stove, the combination with an air-duct, of a plurality of hollow perforated shoe-tips supported on the bottom of said duct, side by side, having registering grooves on their contiguous faces, substantially as described.

31. In a stove, the combination with an air-duct of a hollow perforated shoe-tip having front and rear flanges to support the same within the duct, and adjustable means secured to the duct for supporting said shoe-tips, substantially as described.

32. In a stove, the combination with an air-duct, of a plurality of shoe-tips arranged side by side therein, each having overhanging flanges at the sides, engaging the flanges of adjoining tips to form flues thereunder, substantially as described.

33. In a stove, the combination of a fuel-bed, a top plate, and an air-duct extending downward from the top plate to a short distance from the fuel-bed, to form a contracted neck or fuel-passage, the contraction of said neck being proportioned to the character of fuel used, whereby different varieties of fuel can be used, substantially as described.

34. In a stove, the combination with a depending air-duct supported at the sides of the stove, means in the front of the stove for regulating the draft, a damper arranged in the flue behind the fuel-chamber, air passages or ducts in side plates inside the fuel-chamber, said air-passages leading from near the top of the chamber down and curved into the ends of the air-duct, substantially as described.

35. In a stove, the combination with the sides thereof, an air-duct made in two sections, two flanges for supporting said duct projecting from and formed with said sides one of said supports extending from near the top, down and then up and terminating at a point a greater distance from the top than the opposite side, the other support starting between the upper ends of the former support and extending toward the rear below the



upper end of the rear portion of said former support, substantially as described.

36. In a stove, the combination with the sides thereof, supports projecting from said sides, the shape of which conforms to the configuration of an air-duct supported thereby, a sectional air-duct seated or supported therein, the upper ends of said sections being so bent as to form a reduced neck when placed together, the lower central portion of each section being cut out, and a shoe carrying a tip or tips located in the space in the bottom of the air-duct, substantially as described.

37. In a stove, the combination with the sides, of supports integral therewith for supporting a removable air-duct, means for supporting a frame in the lower portion of the air-duct, and said frame supporting one or more tips, substantially as described.

38. The combination with a fuel-magazine of a stove divided by a removable sectional air-duct, of a sectional frame in the lower portion of said air-duct, means for locking the same to said air-duct, and perforated shoe-tips locked and supported therein, said tips having grooves which register with grooves in the frame forming air-passages when said tips and frame are placed together, substantially as set forth.

39. A frame for supporting tips at the lower portion of a removable air-duct made in two sections, means for locking the parts of said frame together, and means for locking shoe tip or tips therein, substantially as described.

40. In a stove, the combination with an air-duct, composed of sections and open at the bottom, the front section being of a skeleton formation, a shield secured to the front section, and means for supporting said air-duct, substantially as described.

41. In a stove, the combination with an air-duct composed of sections and open at the bottom, the front section being of skeleton formation, a shield secured to the front section, and means projecting from the stove sides for supporting and locking the duct-sections in a fixed position, substantially as described.

42. In a stove, the combination with an air-duct composed of sections and open at the bottom, the front section being of skeleton formation, a shield secured to the front section, a shoe-frame supported in said open bottom, one or a plurality of shoe-tips detachably secured to said shoe-frame, and means for supporting and locking the duct-sections in a fixed position, substantially as described.

43. In a stove, the combination with an air-duct composed of sections and open at the bottom, the front section being of skeleton formation, a shield secured to the front section, a separable shoe-frame having inturned flanges at the lower end supported in said open bottom of the air-duct, one or a plurality of shoe-tips having overhanging flanges at the upper ends said flanges resting on the inturned flanges at the lower end of the shoe-

frame, and means for supporting and locking the air-duct sections in a fixed position, substantially as described.

44. In a stove, the combination with the fuel-magazine, a separable air-duct open at its bottom and supported in said fuel-magazine, one or a series of perforated shoe-tips supported in the open end of the air-duct, means for supplying air to said air-duct, and means on the sides of the fuel-magazine for supplying air to the sides of the fuel, said means comprising a shield having a series of interrupted downwardly-extending and rearwardly-curved ribs leading to the air-duct, substantially as described.

45. In a stove, the combination with the sides of the stove provided with inwardly-extending flanges, and a removable sectional air-duct located between said sides, the air-duct sections being locked together and supported by the flanges projecting from the stove sides, substantially as described.

46. In a stove, the combination with the sides of the stove provided with inwardly-extending flanges, a removable sectional air-duct located between said sides, the air-duct sections being locked together and supported by the flanges projecting from the stove sides, a detachable shoe-supporting frame locked in the open end of the air-duct, and a series of detachable shoe-tips supported in said shoe-frame, substantially as described.

47. In a stove, the combination with a fuel-magazine, of a partition or air-duct therein, and a shield secured to said air-duct or partition, said shield being provided with a series of perforations vertically arranged, and ledges or overhanging flanges projecting over said perforations, substantially as described.

48. In a stove, the combination with a fuel-magazine, of a partition or air-duct therein, a vertically-ribbed shield secured to said air-duct or partition, said ribs being provided with a series of perforations, and ledges or overhanging flanges projecting over said perforations, substantially as described.

49. In a stove, an air-duct, a shield attached to said air-duct, corrugations in said shield, said corrugations having perforations and ledges or flanges overhanging said perforations.

50. In a stove, the combination with an air-duct, open at the bottom and made in two sections, means having depending spaced-apart projections secured in the open bottom for distributing air to the fuel, means for supporting said air-duct, and a corrugated shield attached to the air-duct, substantially as described.

51. In a stove, the combination with an air-duct open at the bottom, a loosely-fitting tip secured in said open bottom forming air-exits between the duct and tip, and a perforated shield attached to said air-duct the shield being so positioned as to form an air-chamber between said shield and air-duct, substantially as described.

52. In a stove, the combination of an air-



duct, a plurality of tips each comprising a reduced securing end and a depending end, said depending ends adapted to form spaces or notches between each other when secured to the air-duct, substantially as described.

53. In a stove, the combination with an air-duct, and a plurality of tips each comprising a reduced securing end and depending lower end, said depending ends adapted to form spaces between each other when secured to the air-duct, and a series of openings communicating with the air-duct being formed in the meeting ends of the tips, substantially as described.

54. In a stove, the combination with a pendant air-duct supported by the stove sides, means for supplying air to the ends of said duct, and a plurality of removable means in the lower end of said duct whereby air-exits are formed therebetween for distributing air to the fuel, substantially as described.

55. In a stove, the combination with an air-duct means for supporting said duct, means for supplying air to the ends of said duct, a plurality of perforated tips supported in the lower end of said duct and means in said duct for regulating the exit of air through the perforations in said tips, substantially as described.

56. In a stove, the combination with an air-duct made in sections, a perforated corrugated shield attached to the front section, forming air-passages between the duct and said shield, a removable shoe-frame in the lower end of said duct, a plurality of spaced-apart tips removably secured in said shoe-frame forming air-exits between said tips, and means in the air-duct for regulating the admission of air, substantially as described.

57. In a stove, the combination with a fuel-magazine, an air-duct, means for introducing air to said duct, means for introducing air to the fuel-magazine, means removably secured in the lower end of the air-duct for supporting a plurality of removable spaced-apart tips and means in the air-duct for regulating the supply of air to the fuel-magazine, substantially as described.

58. In a stove, the combination with a fuel-magazine, an air-duct open at the bottom, said air-duct comprising a frame, a perforated shield removably secured to said frame, a shoe-frame hinged in the bottom of said duct, and a series of tips removably secured in said frame, substantially as described.

59. In a stove, the combination with a fuel-magazine, an air-duct, means for supporting said duct, and means hinged in the lower portion of said duct for distributing air to the fire-pot, substantially as described.

60. In a stove, the combination with a fuel-magazine, an air-duct, means for supporting said duct, a shoe-frame hinged in the lower portion of said duct, and a plurality of tips removably secured in the shoe-frame, substantially as described.

61. In a stove, the combination with a fuel-magazine, an air-duct open at the bottom, a sectional shoe-frame hinged in said open end and having a series of notches and projections, a plurality of tips locked in said sectional frame each tip having a series of notches, and a shield provided with ribs secured to the air-duct the ribs being in alignment with the ribs on the shoe-frame, and the notches in the tips and shoe-frame being in continuity with each other to form air-exits, substantially as described.

62. In a stove, the combination with an air-duct made in sections, a perforated corrugated shield attached to the front section, forming air-passages between the duct and said shield, a removable shoe-frame in the lower end of said duct, a plurality of spaced-apart shoe-tips removably secured in said shoe-frame forming air-exits between said tips, and means for regulating the admission of air, substantially as described.

63. In a stove, the combination with a fuel-magazine, an air-duct, means for introducing air to said duct, means for introducing air to the fuel-magazine, means removably secured in the lower end of the air-duct for supporting a plurality of removable spaced-apart tips and means for regulating the supply of air to the fuel-magazine, substantially as described.

64. In a stove, the combination with the sides of the stove provided with integral, inwardly-extending flanges, and a sectional air-duct located between said sides, said air-duct being supported and locked together by the integral flanges projecting from the stove sides, substantially as described.

65. In a stove, the combination with the sides of the stove provided with integral inwardly-extending flanges, and a removable air-duct having a sectional shoe-frame at its lower end, and removable means secured within said frame for distributing heated air, substantially as described.

66. In a stove, the combination with the sides of the stove provided with integral inwardly-extending flanges and a removable air-duct having a removable shoe-frame at its lower end, and removable means secured within said frame for distributing heated air, substantially as described.

67. In a stove, the combination with a fuel-magazine, an air-duct open at the bottom, said air-duct comprising a frame, a perforated shield removably secured to said frame, a shoe-frame hinged in the bottom of said duct, and a series of tips having air-spaces between each other and removably secured in said frame, substantially as described.

68. In a stove, the combination with a fuel-magazine, an air-duct open at the bottom, means for introducing air to said duct, means for introducing air to the fuel-magazine, means secured in the lower end of the air-duct for supporting a plurality of removable



spaced-apart tips, and means for regulating the supply of air to the fuel-magazine, substantially as described.

69. In a stove, the combination with the sides of the stove provided with integral inwardly-extending flanges, a removable air-duct having a shoe-frame at its lower ends, and removable means within said frame for distributing air, said means having a plurality of depending portions which form a series of spaces for the free liberation of the air, substantially as described.

70. In a stove, the combination with the sides of the stove provided with integral inwardly-extending flanges, a removable air-duct having a shoe-frame at its lower end, and a plurality of tips having spaces between each other which communicate with the air-duct for the exit of air, substantially as described.

71. In a stove, the combination with an air-duct, open at the bottom and made in two sections, means for supporting said air-duct, a plurality of devices secured in the open bottom for distributing air to the fuel, said devices being spaced apart at the upper securing ends to form air-exits, and a shield attached to the air-duct, substantially as described.

72. The combination with an air-duct made in two sections and supports projecting from the stove sides, the supports locking and holding said sections of the air-duct together, substantially as described.

73. In a stove, the combination with a pendant air-duct open at the bottom, tips removably secured in a shoe-frame locked to the duct, substantially as described.

74. In a stove, the combination with an air-duct, a tip or tips on the lower end of said

duct, each of said tips having a flange projecting forwardly under said duct to protect the same from the action of the heat, substantially as described.

75. In a stove, the combination with a fuel-magazine, an air-duct, means for introducing air to said duct, means for introducing air to the fuel-magazine, means removably secured to the lower end of the air-duct for supporting a plurality of removable spaced-apart tips, and means for regulating the exit of air from the duct to the fuel-magazine, substantially as described.

76. In a stove, the combination with the sides of the stove, flanges projecting inwardly from said sides and a removable air-duct having a sectional shoe-frame at its lower end, and removable means secured within said frame for distributing heated air, substantially as described.

77. In a stove, the combination with a fuel-magazine, an air-duct supported therein, said air-duct being made in sections, supports projecting from the sides of the stove, said supports locking and holding the sections together, and a plurality of tips supported at the lower end of the sectional air-duct.

78. In a stove, the combination with an air-duct made in two sections, and supports projecting from the stove sides, the supports locking and holding said sections of the air-duct.

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

EDWIN R. CAHOONE.

Witnesses:

W. C. KING,

J. M. VAN FLEET.