

W. CLERKIN.
FURNACE.

APPLICATION FILED MAR. 18, 1909. RENEWED AUG. 18, 1911.

1,011,411.

Patented Dec. 12, 1911.

3 SHEETS-SHEET 1.

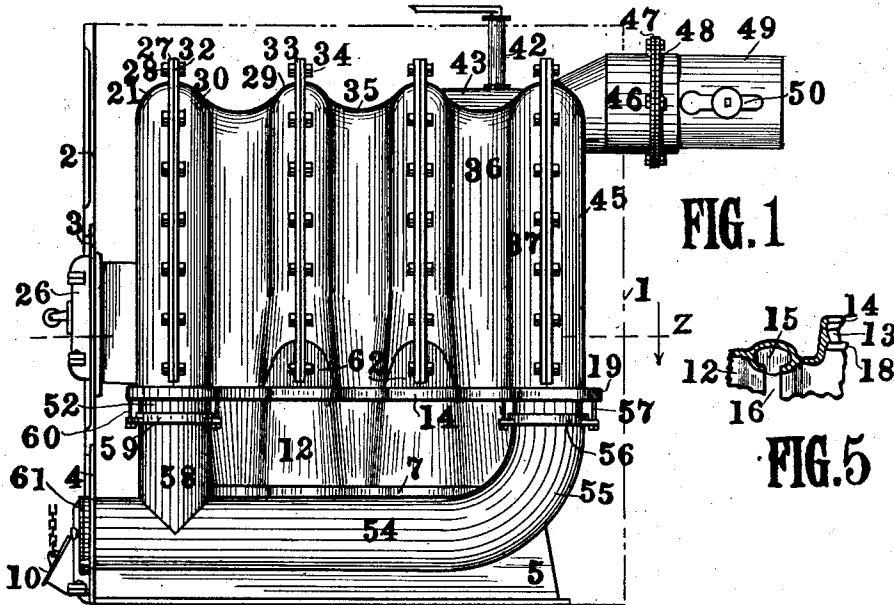


FIG. 1

FIG. 5

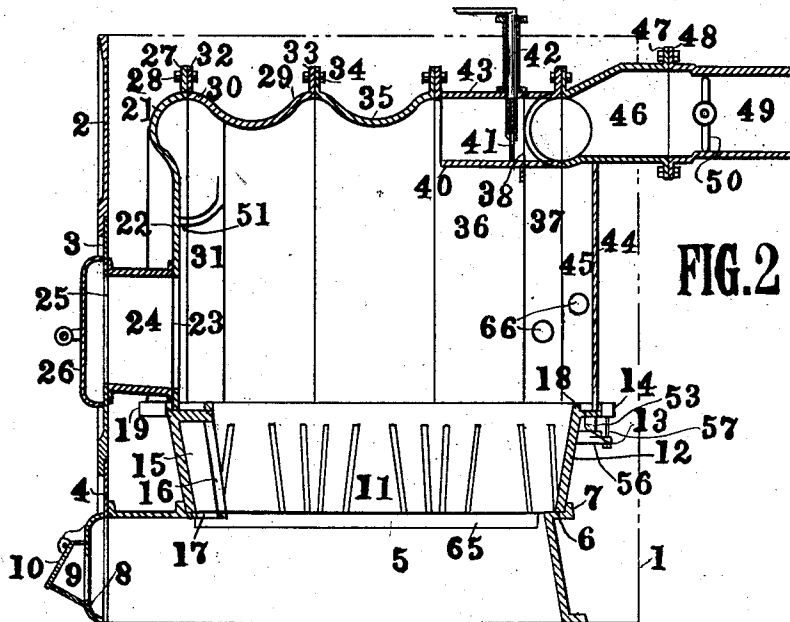


FIG. 2

WITNESSES

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3 SHEETS-SHEET 2.

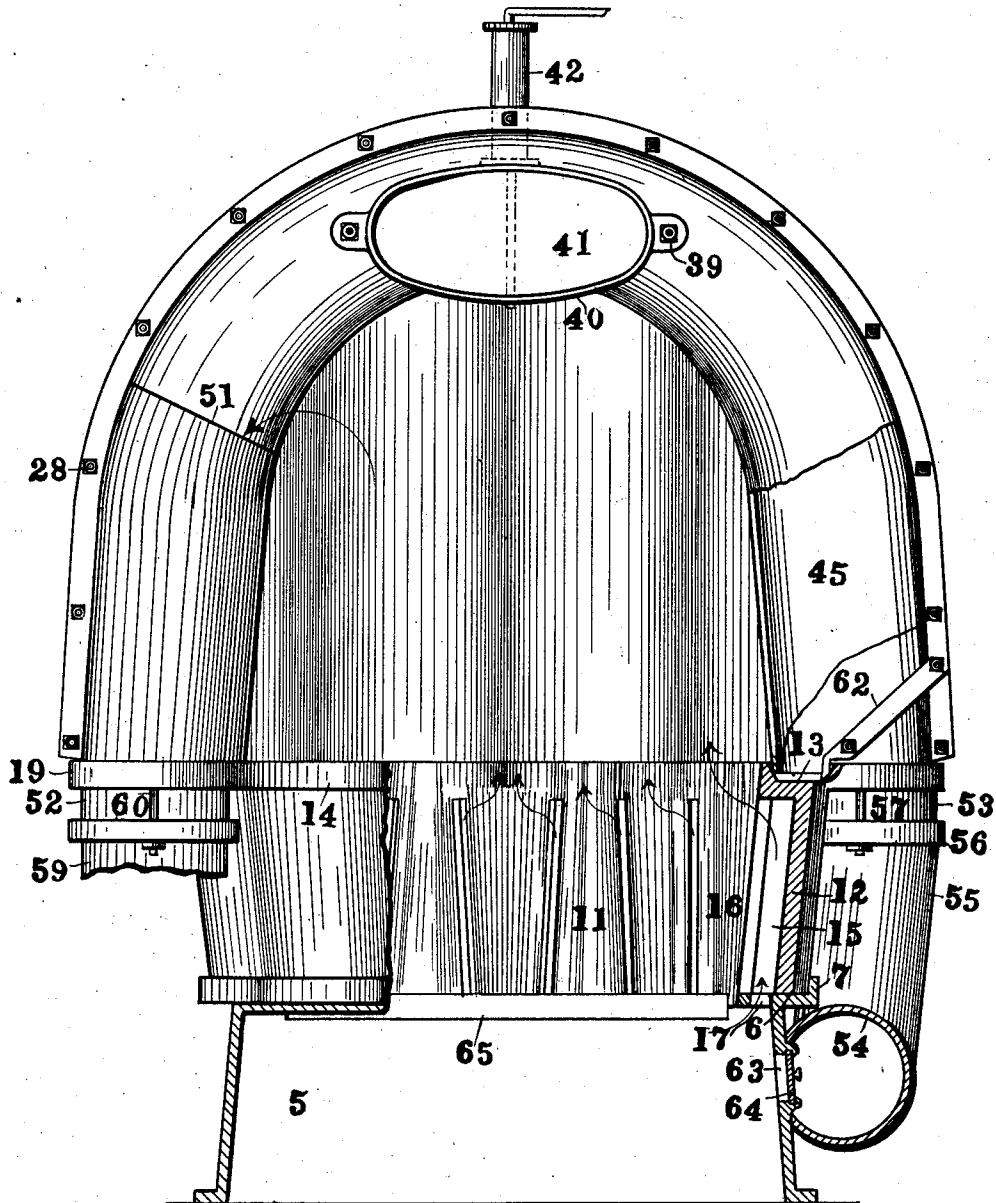


FIG. 3

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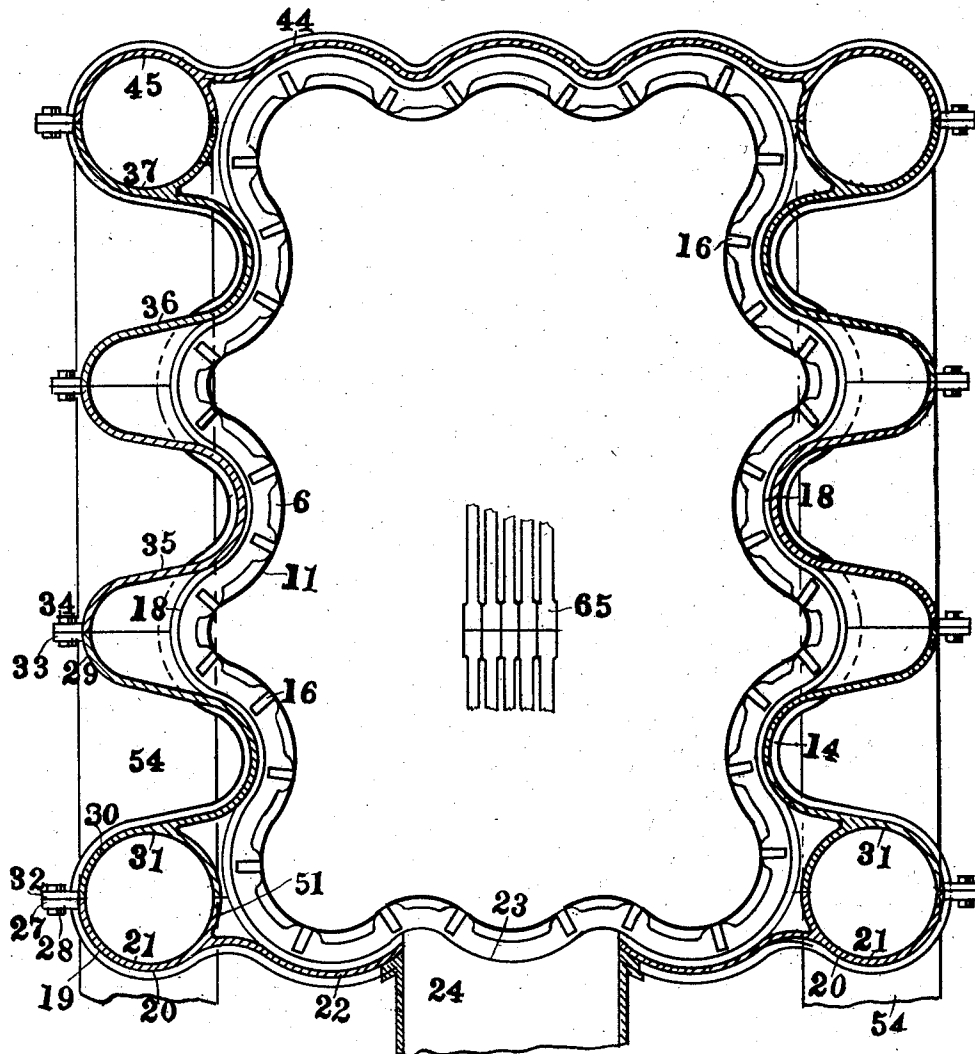
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3 SHEETS-SHEET 3.

FIG. 4



WITNESSES

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UNITED STATES PATENT OFFICE.

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FURNACE.

1,011,411.

Specification of Letters Patent.

Patented Dec. 12, 1911.

Application filed March 18, 1909, Serial No. 484,214. Renewed August 18, 1911. Serial No. 644,894.

To all whom it may concern:

Be it known that I, WILLIAM CLERKIN, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to heating furnaces for buildings, apartments, etc. and the object thereof is to provide a furnace of the general type known as hot-air furnaces especially designed for use in buildings of the larger type such as stores, halls, school-houses, churches, etc., the construction of which embodies a plurality of sections adapted to be united together for forming the body portion of the combustion chamber of the device, so made that the size of the furnace may be varied by increasing the number of sections employed.

The invention contemplates the construction of a furnace embodying an ash-pit mounted on which is a fire-pot adapted to support a radiator constituting the upper portion of the combustion chamber, said radiator comprising end sections united by one or more intermediate sections, the number of sections employed being governed by the size of the building to be heated or the amount of radiating surface required to properly and efficiently heat the air.

A further object of the invention is to provide an improved fire-pot for the device preferably formed as a unitary article having in the walls thereof a plurality of upwardly-extending slotted cells to permit the entrance of air from the ash-pit to the interior of the combustion chamber, so distributed as to cause the greatest efficiency in the use of the fuel employed.

In constructing the fire-pot the invention contemplates forming the side walls thereof with a sinuous or undulating conformation so that any undue expansion or contraction, due to the presence or absence of heat in any portion of the fire-pot will not cause cracking or breaking of the wall thereof, but on the contrary, the uneven expansion or contraction will be taken care of by the resiliency or elasticity of the wall of said fire-pot, due to its being constructed with a sinuous or undulating wall.

A further object of this invention is to

so form the wall of the fire-pot that each cell formed therein, used for conducting air from the ash-pit to the interior of the combustion chamber will be provided with an inclosing rounded wall projecting both outwardly and inwardly beyond the normal outlines of the main wall itself.

A still further object of the invention is to provide suitable flues so arranged that the products of combustion from the combustion chamber may be passed either directly to the offtake flue in order to produce intense combustion, or if desired, conveyed rearwardly and from thence downwardly into an indirect flue for conveying the gases from the fire through a flue or flues positioned within the casing walls of the furnace adjacent the ash-pit and from thence to the main off-take flue of the furnace.

The invention also contemplates connecting the ash-pit by a passage capable of being closed, with the offtake flue of the furnace in such a manner that when ashes are being removed the normal draft of the offtake flue when said passage is opened to the ash-pit will carry all dust and fine ashes out of the furnace and prevent the escape of the same into the room or apartment in which the furnace is located.

With the foregoing and other objects in view, the invention consists in the novel construction, combination and arrangement of parts constituting the invention to be hereinafter specifically described and illustrated in the accompanying drawings which form a part hereof wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings, in which similar reference numerals indicate like parts in the different figures: Figure 1 is a view in side elevation of a furnace embodying this invention. Fig. 2 is a vertical, longitudinal, sectional view of the device shown in Fig. 1. Fig. 3 is a view of the device shown in Fig. 1 looking from the left thereof with a portion of the mechanism shown in section and with other parts broken away to better illustrate the internal construction of the device. Fig. 4 is a transverse sectional view on line

Z of Fig. 1 through the radiator of the furnace; and Fig. 5 is a perspective view showing in section a portion of the fire-pot wall to illustrate the manner of forming the air cells therein.

Referring to the drawings in detail, the reference numeral 1 denotes the furnace casing, which for the purpose of this invention may be constructed in any approved manner and of any approved material and is preferably rectangular as shown in the drawings by dotted lines.

The front of the furnace is customarily composed of a plurality of members 2, 3 and 4 mounted upon each other and suitably supported to constitute a portion of the furnace casing. Within the casing 1 is an ash-pit 5 preferably having inwardly-inclined rear and side walls, with the upper portion thereof provided with a seat 6 surrounded by an upwardly-extending marginal flange 7. The front open portion of the ash-pit is arranged to abut against the rear face of the member 4, the latter being provided with an opening to establish communication with the interior of the ash-pit and this opening is arranged to be closed through the medium of a door 8 provided with a small opening 9 closed by a door 10. The seat 6 is provided at preferably regularly-recurring intervals with a plurality of openings 17, for a purpose to be stated and the outer marginal portion of this seat is upwardly-turned to constitute said flange 7 which is preferably bent inwardly and outwardly upon curvilinear lines to give the same a sinuous contour in order to adapt it to properly receive and engage the lower end of a fire-pot arranged to be mounted thereon.

In practice, if the furnace is to be erected upon the floor of an apartment provided with a suitable floor such as concrete, the latter constitutes the bottom of the ash-pit, but if the furnace is to be erected in an apartment where no floor is provided, a sheet of suitable material may be placed under the ash-pit to constitute a bottom therefor.

The fire-pot of the device comprises a body portion 11 having approximately the shape of an inverted frustum of a pyramid with the wall 12 thereof formed with a sinuous or undulating contour and with the lower end thereof of an appropriate size and formation to rest upon the seat 6 of the ash-pit and to conform in shape thereto. The sinuous convolutions of the wall of the fire-pot will preferably be approximately fashioned as shown in Fig. 4 wherein they are shown much larger and entirely different from the ordinary fluting or corrugating imparted to the fire-pots now in common use. The upper portion of the fire-pot is provided with a laterally-extending flange 13 constituting a seat for a radiator adapt-

ed to be mounted thereon, the general shape of which corresponds with the general outline of the wall 12 and is provided with an upwardly-extending outer marginal flange 14 somewhat similar to the flange 7 of the ash-pit.

In the wall 12 of the fire-pot are a plurality of spaced upwardly-extending air cells 15 preferably elliptical in contour and of such a size that the wall or shell of metal surrounding them will extend both outwardly and inwardly, as clearly shown in Fig. 5, thereby imparting to the wall of the fire-pot a corrugated or fluted conformation and as these corrugations or flutings imparted to the wall of the ash-pit by the formation therein of the cells 15 are smaller than the general sinuous or undulating conformation of the wall of the fire-pot, it will be seen that the latter embodies the general appearance of being formed upon sinuous lines with a plurality of spaced corrugations of smaller dimensions than the general undulations of the wall 12. The inner portion of the wall which includes the cells 15 is provided with upwardly-extending slots 16 extending approximately the full length of the cells 15 so that air passing upwardly through the cells will have free entrance to the interior of the fire-pot. In positioning the fire-pot on the seat 6 of the ash-pit it will be so placed that the cells 15 will be in registering relation with the series of elliptically-shaped openings 17 formed in said seat, so that the air from the ash-pit may have free passage upwardly through the openings 17 and from thence through the cells 15 and slots 16 to the interior of the fire-pot or combustion chamber of the device.

From the foregoing it will be seen that the wall of the fire-pot is doubly corrugated, the sinuous formation of the wall constituting large corrugations and the rounded portions thereof surrounding each of the cells 15 forming smaller corrugations within the larger corrugations. The upper portion of the ash-pit is also provided interiorly with an upwardly-extending flange 18 formed parallel with the flange 14 and spaced therefrom sufficiently to allow for the mounting of a radiator on the seat 13.

The fire-pot is preferably constructed in the general form of a parallelogram, approximately as shown in Fig. 4 with the seat 13 and its marginal flanges 14 and 18 extending upon sinuous lines, excepting at the corner portions of the imaginary parallelogram the seat 13 is extended outwardly beyond the normal outlines of the balance of the radiator in circular formation to constitute looped portions 20. The extended portions 20 of the seat 13 are designed to receive and support a portion of a radiator to be later described. The marginal flanges 14 of the

main portions of the fire-pot are also extended and surround the looped portions 20 of the fire-pot and are indicated in the drawings by the reference numeral 19 so that
 5 from this it will be seen that at extreme corners of the fire-pot the outer marginal flange surrounding the seat 13 in the upper portion of the fire-pot, together with the seat itself, are extended to form vertical
 10 openings to constitute portions of the flue system or passages for the products of combustion from the fire-pot.

The radiator which is adapted to be seated upon the fire-pot just described comprises a
 15 plurality of sections arranged to be secured together by holdfast devices and embodies two portions hereinafter denominated the front and rear sections having interposed between them other sections constituting in
 20 connection therewith the radiator proper. The front end section comprises a unitary body formed with semi-circularly-shaped lateral portions 21 each of which is adapted to be seated on an extended portion 20 of the
 25 fire-pot and from thence the semi-circular portion is extended upwardly in the form of an arch continuously from side to side of the device. The side portions of the member 21 are connected by a wall 22 formed
 30 upon vertically sinuous lines with the lower edge or bottom thereof adapted to be mounted on an appropriate portion of the seat 13 of the fire-pot and conform in general contour therewith. The front wall 22 is provided with a suitable opening 23 from which
 35 extends a fuel pouch 24 to the member 3 of the casing of the furnace, which is provided with a suitable opening 25 closed by a feed door 26 to permit ready access from the exterior of the furnace to the combustion
 40 chamber thereof.

The construction of the fuel pouch, its position and the feed door by which it is closed may be varied or changed in any
 45 manner desired by the manufacturer or user of the device to adapt it to the requirements to which the furnace is to be subjected. The outer face of the end section just described is provided with an outwardly-extending flange 27 provided with suitable
 50 apertures to receive holdfast devices 28 by which the next section is secured thereto. The inner parts of the semi-circular portion 21, indicated by the reference numeral 51 are interrupted as shown in Fig. 2 for a purpose to be later described. The next section of the radiator comprises a body portion approximately U-shaped in transverse
 55 section with a deep groove or channel formed therein and with outwardly and divergent ends 29 and 30. The portion 30 of this member is provided with a semi-circular portion 31 to cooperate with the semi-circular portion 51 of the member 21 and
 60 constitute in connection therewith a down-

draft flue. The portion 31 extends upwardly a distance equal to the portion 51 of the member 21 so that a passage is formed to permit the escape of the products of combustion downwardly therethrough. This
 70 second section is mounted, as are all the sections of the radiator upon the seat 13 of the fire-pot and extends in the shape of an arch thereover and is provided with a flange 32 arranged to abut against the flange 27 of
 75 the end section 21 and to be securely united therewith through the medium of the holdfast devices 28. The rear wall or portion 29 thereof is also provided with a flange 33 having perforations to receive holdfast devices 34 for fixedly uniting it to the next
 80 complementary section. The next section, designated by the reference numeral 35 is similar in all respects to the section last described and is also provided with a flange
 85 adapted to abut against the flange 33 and be secured thereto by the holdfast devices 34. Any number of these intermediate sections may be employed to erect a furnace of the desired capacity.
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As shown in the drawings, the next section 36 is provided with a semi-circular portion 37 similar to the portion 30 of the section next to the first or front section. This
 95 semi-circular portion 37 forms a continuous arch across the entire furnace and is provided near its upper central portion with an opening 38. Secured by suitable means such as bolts 39 to the front face of this section 36 and in registering relation with the opening 38 is a tubular member 40 constituting
 100 the entrance to the direct offtake flue. Mounted on this tubular member 40 is a damper 41 provided with an operating handle suitably mounted in a pipe 42 extending outside of the furnace casing 1 and preferably suitably closed to prevent the escape of the gases from the radiator. At
 105 the point where the tubular member 40 is secured to the side of the member 36 the latter is slightly upwardly-bent at 43 to give sufficient room to permit the positioning of the tubular member and the damper 41. The rear end section, hereinafter designated by the reference numeral 44 is provided
 110 with a semi-circular portion 45 registering with the semi-circular portion 37 and forming in connection therewith an uptake flue. The portion 45 of the end member 44 is formed so as to lie in parallel alignment with the sections heretofore described and the wall thereof extending between the semi-circular portion 45 is formed upon
 115 sinuous lines to be mounted in the seat 13 of the fire-pot, as has been described with reference to the wall of the front section. The upper central portion of the member 44 is provided with an offtake flue 46 having a flange 47 at its outer end adapted to be
 120 secured to the flanged end 48 of a pipe 49
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constituting a portion of the offtake flue. This latter member is provided with a damper 50 having a weighted handle.

Depending from the seats 20 which form the front corner extended portions of the fire-pot and which are adapted to receive the semi-circular members 21 and 31 of the radiator are short tubular members 52 and depending from the extended portion of the seat 13 which receives the semi-circular portions 37 and 45 of the rear member of the radiator are similar tubular members 53. These tubular members are formed integral with the fire-pot and constitute portions of the flue system of the device.

Positioned on both sides of the ash-pit of the device is a pipe 54 each having one end 55 thereof upwardly bent and provided with a flange 56 united with one end of one of the tubular members 53 by means of bolts 57. Extending upwardly from each pipe 54 and in open communication with the interior thereof is a pipe 58 constituting an air passage or flue, the upper end of which is provided with a flange 59 arranged to be united to its respective tubular member 52 by means of bolts 60. The front ends of each of the pipes 54 extend to the plate 4 of the front of the furnace casing and the latter is provided with registering openings closed through the medium of doors 61 so that access may be had to the interior of the flues at any time for the purpose of cleaning them or removing obstructions therein.

All soot and fine ashes deposited upon the inner surfaces of the flues formed by the members 21 and 31 37 and 45, will under ordinary conditions, be deposited or fall downwardly into the pipe 54 from whence they may be removed through the openings closed by the doors 61, thereby furnishing ready means for cleaning the flue system of the furnace. The soot and any incombustible matter deposited on the interior of the intermediate sections will be precipitated into the fire-pot of the furnace and this is aided by the fact that the lower portions of the intermediate sections of the radiator are inclined at 62 to assist in conveying all matter deposited on these sections into the fire-pot.

In order to prevent dissemination of fine ashes into the apartment in which the furnace is located, when removing the ashes from the ash-pit the pipes 54 are preferably positioned snugly against the sides of the ash-pit and are cut away or provided with openings registering with suitable openings 63 in the side wall thereof which are closed by a gate 64, which when opened permit the draft in the flue system of the furnace to withdraw all dust and fine ashes suspended in the ash-pit through the flue system to the chimney of the building.

As shown in the drawings the pipes 54 are cut away and positioned in engaging relation with the side walls of the ash-pit and each opening 63 is placed so as to register with the cut away portion of the pipe 54, but it will be obvious that other means for establishing communication between the interior of the ash-pit and the interior of the horizontal pipes or flues 54 may be employed without departing from the scope of this invention.

In practice, the furnace will be provided with a grate, designated in the drawings by the reference numeral 65 but as the same forms no part of this invention and any form of grate may be employed which is desired, only the position thereof is shown in the drawings.

In operation, when fire is started in the fire-pot, in order to induce intense combustion at the commencement of the operation the dampers 41 and 50 are opened so as to permit the products of combustion to pass through the tubular member 40 and outwardly through the offtake flues 46 and 49 to the chimney of the building and this passage of the products of combustion from the combustion chamber can be maintained until the fire has been thoroughly started or may be employed at any time when desired to increase the intensity of the combustion. As soon as the fire has been thoroughly started, or it is desired to increase the radiating surface of the furnace which will be exposed to the heated products of combustion from the fire-pot, the damper 41 is closed and the damper 50 partially closed which causes a part of the products of combustion to pass forwardly and upwardly into the flues formed by the semi-circular portions 21 and 31 and from thence downwardly through the flues 58 to the flues 54 from which they pass outwardly through the passage formed by the cooperating and registering members 37 and 45 to the offtake flues 46 and 49. If desired, one or more openings 66 may be formed in the main uptake flue formed by the members 37 and 45 which will permit portions of the products of combustion to pass therethrough into the direct flue of the furnace and from thence outwardly through the chimney. The damper 50 in the offtake pipe 49 may be employed at any time to change or regulate the draft produced by the chimney of a building, thereby regulating the intensity of combustion in the combustion chamber, but as this damper is a common expedient in the construction and use of furnaces, a further description thereof is believed to be unnecessary.

Under service conditions, when the damper 41 is closed, in a furnace constructed as hereinbefore described, approximately about two-thirds of the products of combustion

from the fire-pot will pass forwardly therefrom through the openings formed between the semi-circular portions 51 and 31 and from thence downwardly through the pipes 52, 58 and 54 and from thence upwardly through the flues formed by the semi-circular portions 37 and 45 to the offtake flue, and it is intended that approximately one-third of the products of combustion from the firepot will pass upwardly through the apertures 66 in the members 37 and 45. By thus dividing the products of combustion arising from the fire-pot and causing portions thereof to pass in different directions the liability of intense heat being generated in one portion of the radiator is reduced and thus the danger of burning out or cracking of the radiator through intense heat directed to one portion thereof is approximately eliminated.

It will be noted that the indirect flues comprising the pipes 54 and 58 constitute heat-radiating pipes as well as passages for the escape of the products of combustion, and as the lower or horizontal pipe 54 extends to and communicates through a suitable opening with the outer wall of the casing, provision is made for the ready cleaning of the indirect flue from accumulated ashes and soot and any appreciable amount of ashes which are drawn from the ash-pit through the opening 63 into the flue system of the furnace may be removed through the opening which is closed by the door 61, thus combining an indirect flue for the flue which constitutes a radiating surface, as well as a cleaning out means for substantially the entire flue system of the furnace. Further, this flue system by communicating through a suitable opening with the ash-pit also serves to provide offtake means for the dust and fine ashes arising when the ash-pit is being cleaned.

I am aware that a circular fire-pot provided with a corrugated surface is not new.

I am also aware that a fire-pot provided with air cells formed in the wall thereof upwardly-extending and provided with openings communicating with the interior of the fire-pot is not of itself new and these I do not claim, but a fire-pot, the wall whereof is provided with continuous sinuations of comparatively large radii, within which are smaller corrugations, said smaller corrugations surrounding the upwardly-extending air cells in the wall thereof, said air cells provided with slotted openings to establish communication with the interior of the fire-pot, is in my opinion, new.

Heretofore in the construction of fire-pots having corrugated walls, the sharpness of the contour of the corrugations has been so great that intense heat directed to any particular point of the fire-pot was very liable to cause such increased expansion of the

wall at that point that cracking of the same frequently occurred, thus ruining the entire fire-pot; but it will be noted in this invention that the sinuations are comparatively large and provision is thus made for an unusual amount of expansion of the fire-pot in substantially any direction and this is accentuated by the use of the smaller corrugations employed on the large sinuations.

What I claim and desire to secure by Letters Patent, is:—

1. A heating furnace comprising in combination an ash-pit provided with an opening in its upper portion, a seat having a sinuous contour surrounding said opening, a fire-pot mounted on said seat the wall of which is sinuously-fashioned to conform to the outlines of said seat, said wall provided at its upper portion with a seat conforming to the sinuations of the wall thereof, said seat having an extended looped portion projecting beyond the normal outlines of said fire-pot wall provided with an opening, a radiator comprising a plurality of arch-shaped registering sections adapted to be united together, the portions of two of said sections provided with abutting portions to constitute an air passage in open communication with the combustion chamber positioned on the extended portion of said seat and a flue leading from the opening in the looped portion of said seat to the offtake flue of said furnace.

2. A heating furnace comprising in combination an ash-pit provided with an opening in its upper portion, a seat having a sinuous contour surrounding said opening, a fire-pot mounted on said seat the wall of which is sinuously-fashioned to conform to the outlines of said seat, said wall provided at its upper portion with a seat conforming to the sinuations of the wall thereof, said seat provided with an upwardly-extending marginal flange and an extended looped portion projecting beyond the normal outlines of said fire-pot wall provided with an opening, a radiation comprising a plurality of dome-shaped registering sections adapted to be united together, the portions of two of said sections provided with abutting portions to constitute an air passage positioned on the extended portion of said seat and communicating with the combustion chamber and a flue leading from the opening in the looped portion of said seat to the offtake flue of said furnace.

3. A heating furnace comprising in combination an ash-pit provided with an opening in its upper portion, a seat for a fire-pot surrounding said opening, a fire-pot mounted on said seat provided near the upper portion thereof with a sinuously-fashioned seat to support a radiator, the lateral portions of said latter seat provided with oppositely-disposed open-looped extending portions

projecting beyond the normal outlines of the wall of said fire-pot, a radiator mounted on said latter seat comprising a plurality of sections adapted to be united together, two of said sections provided with semi-circular abutting portions arranged to be seated on the looped portions of said latter seat, said semi-circular abutting portions extending upwardly a determinate distance to constitute a portion of a down-draft flue in communication with the combustion chamber and pipes constituting flues communicating through the openings in the looped portions of said latter seat with said down-draft flues and extending to and communicating with the main offtake flue of the device.

4. A heating furnace comprising in combination an ash-pit provided with an opening in its upper portion, a seat for a fire-pot surrounding said opening, a fire-pot mounted on said seat provided near the upper portion thereof with a sinuously-fashioned seat to support a radiator, an upwardly-extending marginal flange surrounding said latter seat, the lateral portions of said latter seat provided with oppositely-disposed open-looped extending portions projecting beyond the normal outlines of the wall of said fire-pot, a radiator mounted on the seat on said fire-pot comprising a plurality of sections adapted to be united together, two of said sections provided with semi-circular abutting portions arranged to be seated on the looped portions of said latter seat, said semi-circular abutting portions extending upwardly a determinate distance to constitute a portion of a down-draft flue in communication with the combustion chamber and pipes constituting flues communicating through the openings in the looped portions of said seat with said down-draft flues extending to and communicating with the main offtake flue of the device.

5. A heating furnace comprising in combination an ash-pit provided with an opening in its upper portion, a seat for a fire-pot surrounding said opening, a fire-pot mounted on said seat provided near the upper portion thereof with a sinuously-fashioned seat to support a radiator, said latter seat provided with a pair of oppositely-disposed laterally-extending looped portions projecting beyond the normal outlines of said fire-pot each provided with an opening, a radiator section comprising a pair of cooperating members each provided with semi-circular abutting portions adapted when in cooperation to constitute uptake flues extending from the openings in the looped portions of said seat in an arch formation over the combustion chamber of the device, an offtake flue communicating with the interior of the passage formed by said semi-circular members and extending to a suitable chimney and a down-draft flue to establish communication from the interior of said radiator to each of said openings in said seat and from thence by said passage to said offtake flue formed by said semi-circular members.

6. A heating furnace comprising in combination an ash-pit provided with an opening in its upper portion, a seat for a fire-pot surrounding said opening, a fire-pot mounted on said seat provided with a seat to support a radiator, said latter seat provided with a plurality of outwardly-extending portions projecting beyond the normal outlines of the wall of said fire-pot and arranged in pairs, the members of each pair of extended portions being oppositely-disposed with respect to each other, each of said extended portions provided with an opening, a radiator adapted to be mounted on the seat on said fire-pot comprising end sections embodying semi-circularly-formed portions arranged to be seated on the members of one pair of the oppositely-disposed extended portions of said fire-pot seat, said semi-circular portions extending continuously in an arch formation from side to side of said device, the space intervening between the semi-circular portions of each end section being inclosed by a wall, intermediate sections interposed between said end sections, said intermediate sections having a sinuous cross-sectional formation, the intermediate sections adjacent said end sections provided with semi-circular portions adapted to cooperate with the semi-circular portions of said end sections to constitute in connection therewith air passages or flues, the semi-circular portion of the section adjacent the front end section interrupted to permit the products of combustion from the fire-pot to pass downwardly into the flue formed by said semi-circular portion and the cooperating part of said end section, the semi-circular portion of the section adjacent the rear end section formed continuously cooperating with the continuously-formed semi-circular portion of said end section, said end section provided with an offtake flue extending from the upper central part thereof, the semi-circular portion of the adjacent member thereof opposite said offtake flue provided with a tubular member to establish communication from the interior of said fire-pot, said tubular member provided with a damper for controlling the passage of fluid therethrough, a pipe constituting a flue positioned adjacent said ash-pit, the front end of said pipe extending to the outer casing of the furnace, a door to establish communication with the interior of said pipe, said pipe provided with a branch extending to the opening in one of the extended portions of said fire-pot seat on which is sustained the front end section of said furnace, the opposite end of said pipe extending to

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and communicating through an opening in the rear portion of said fire-pot with the main offtake flue formed by the semi-circular portions of the rear end section and the adjacent intermediate section.

5 7. A heating furnace comprising in combination an ash-pit provided with an opening in its upper portion, a seat for a fire-pot surrounding said opening, a fire-pot mounted on said seat the upper portion of the wall of which is provided with a seat for a radiator, said latter seat provided with laterally-extending portions, a radiator mounted on said latter seat comprising a plurality of sections secured together, the sections at the front end of said fire-pot forming passages communicating with said fire-pot and constituting downdraft passages for the escape of the products of combustion therefrom, the sections of the radiator at the rear of said fire-pot mounted on a portion of the extensions of said seat forming upwardly-

extending uninterrupted direct draft passages, openings in the wall of said rear radiator sections to receive a portion of the products of combustion from said fire-pot, a flue extending from the downdraft passages at the front of said furnace to communicate with the direct draft passages at the rear of said fire-pot, whereby the products of combustion from the fire-pot may escape in a plurality of directions, said flue extending to and communicating with a suitable opening in the casing of the furnace to permit access to said flue for cleaning purposes and a door to close said opening in said casing.

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

WILLIAM CLERKIN.

Witnesses:

GLENARA FOX,
C. E. HUMPHREY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."