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J. E. PINGUELY,
STOVE OR FURNACE.
APPLICATION FILED JUNE 2, 1913.

Patented Aug. 29, 1916.
2 SHEETS—SHEET 1.

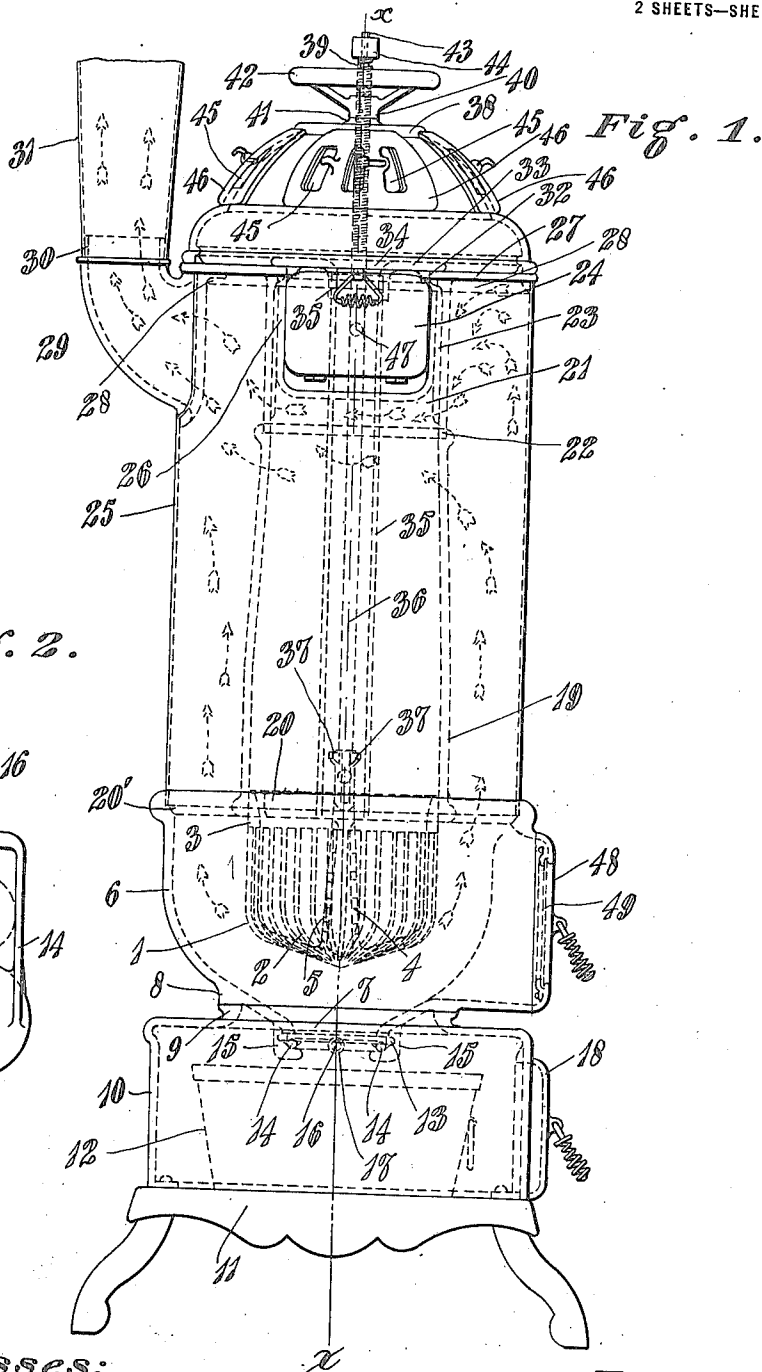


Fig. 2.

Fig. 1.

Witnesses:

Clarence Verdes
Catherine Doran

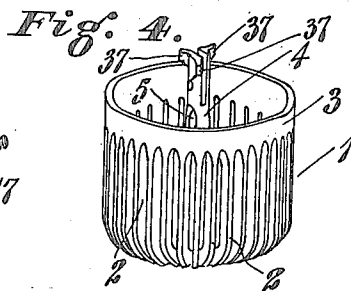
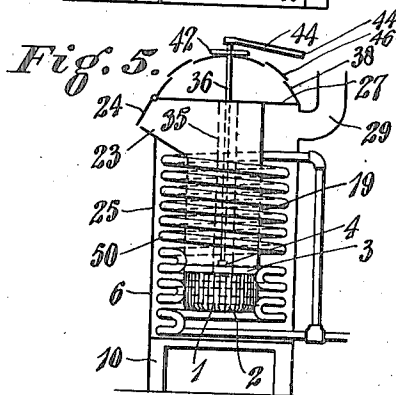
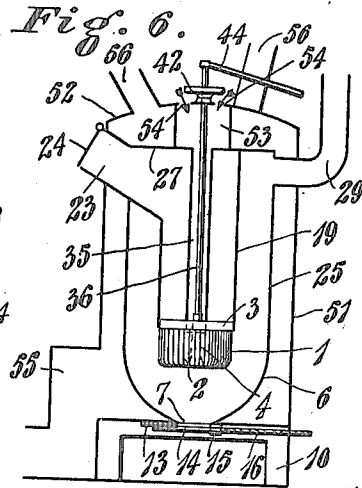
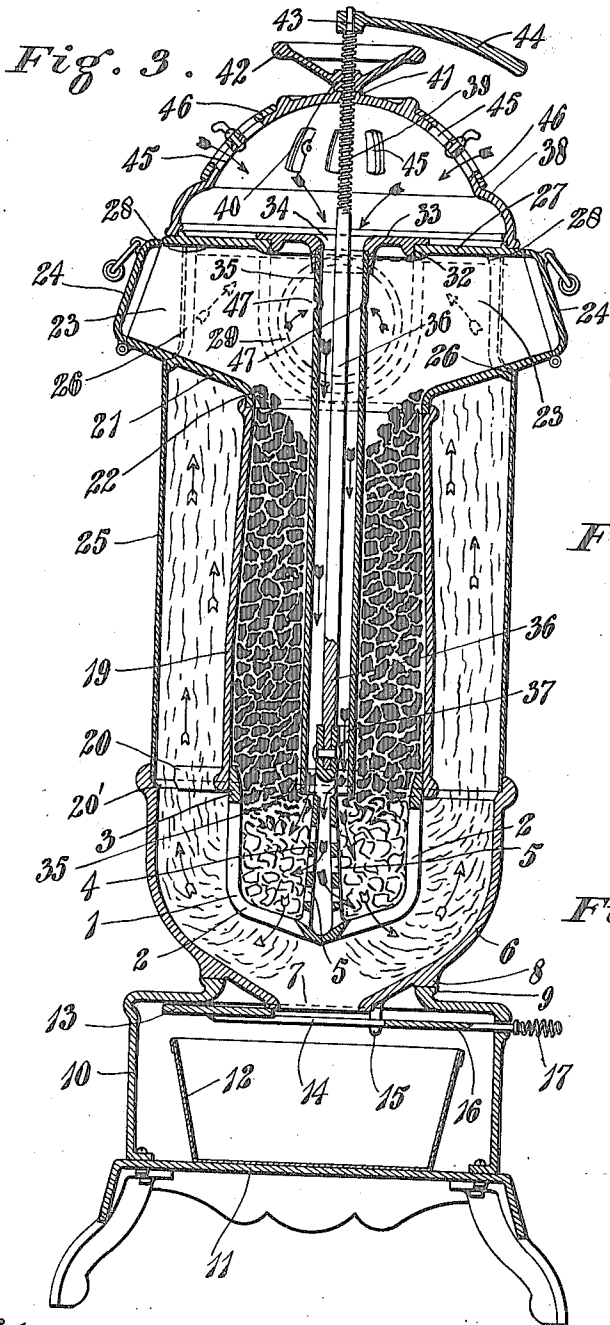
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2 SHEETS—SHEET 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

JULIUS E. PINGUELY, OF MELBOURNE, KENTUCKY.

STOVE OR FURNACE.

1,196,145.

Specification of Letters Patent.

Patented Aug. 29, 1916.

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To all whom it may concern:

Be it known that I, JULIUS E. PINGUELY, a citizen of the United States, residing at Melbourne, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Stoves or Furnaces, of which the following is a specification.

My invention relates to magazine stoves and the object is to provide a more efficient operation and more accurate and economical control of the operation of the stove or furnace.

My invention consists in the parts and in the details of construction and arrangement of parts as will hereinafter be more fully described and claimed.

In the drawings: Figure 1 is a side elevation of a stove constructed according to my invention. Fig. 2 is a detail plan view of the cut-off provided between the fire-box and the ash-pit, the dotted circle representing the opening, so as to indicate the normal position of the cut-off relative to said opening. Fig. 3 is a vertical cross-section on the line $x-x$ of Fig. 1. Fig. 4 is a detail perspective view of the grate. Fig. 5 is a diagrammatic sectional front elevation of a modification showing how a water-heating furnace is constructed according to my invention. Fig. 6 is a similar illustration of another modification showing an air-heating furnace constructed according to my invention.

I have chosen to illustrate in detail the construction of a stove for local use, and which resembles in outward appearance the numerous forms of base-burning stoves. In this stove the grate 1 is in the form of a basket, mainly cylindrical in shape and composed of a series of bars 2 extending downward from an upper rim 3 and radially inwardly and downwardly inclined to form the bottom of the basket, there joining a central upright stem 4. This stem 4 is preferably hollow and flaring downwardly, with its lower end at the bottom of the grate closed, and provided with a series of lateral apertures or slots 5, opening out into the interior of the grate. The fire-box 6 has an upper cylindrical part surrounding the grate 1, and has a lower part tapering

below the grate, with its walls kept far enough from the grate to provide a considerable space down around and below the grate. The lower part of the fire-box 6 has the opening 7, and is provided with a flange 8 that rests on a corresponding flange 9 on the ash-pit 10 which has its bottom formed by the base 11 of the stove. The ashes drop from the grate 1 and the fire-box 6 through the opening 7 into the ash-pan 12 placed in the ash-pit. The sliding cut-off 13 has parallel bars 14 sliding between lugs 15 on the lower part of the fire-box 6 and these bars 14 are joined together and connected with a handle bar 16 that extends through an opening in the side of the ash-pit 10 and receives a handle 17. The parts are so proportioned that when the cut-off is pushed inward across the top of the ash-pit it clears the opening 7, but when it is pulled outward it will close the opening 7. The ash-pit 10 has a door 18 in front for removal of the ash-pan and the ashes. Normally this door 18 is kept closed and excludes air from the ash-pit, while the cut-off is pushed inward leaving a free passage through the opening 7 for the ashes, as above described.

The magazine 19 is an upright tube with its lower part approximately cylindrical, and of diameter to admit the basket-shaped grate 1 and allow the grate to slide up and down inside this lower end freely and avoid clogging by fuel dust or ashes between the rim 3 of the grate and the interior of the magazine. This magazine 19 is supported by radial arms 20 that have their outer ends resting against a ledge 20' around the interior of the fire-box 6 close to its upper edge or rim. This magazine and the grate 1 sliding therein are thus maintained upright and concentric with the fire-box 6.

The upper part of the magazine preferably tapers slightly from its upper end down to its lower cylindrical part to avoid clogging of the fuel therein. Upon said upper end, the top 21 is mounted, having a circular lower neck 22 that fits within the upper rim of the magazine 19. This top 21 has chutes 23 that lead from the right and left down toward the magazine 19, and it is through these chutes 23 that fuel is supplied to the magazine 19. The outer ends

of the chutes 23 are provided with doors 24 to close them when fuel is not being supplied to the stove.

An upright cylindrical shell 25 has its lower end resting within the upper rim of the fire-box 6 around the outer ends of the arms 20 of the magazine 19, and this shell 25 is cut out near its upper end to allow the chutes 23 to pass laterally through it, and is joined to them by means of flanges 26 around the outside of each chute. The top 21 comprises the upper plate 27, which has an annular downward extending flange 28 around against which the upper end of the shell 25 fits. Thus, an annular space is inclosed all around the magazine 19 being continuous with the annular space around the grate in the fire-box 6, and extending up to the top 21. The upper part of the shell 25 is also cut out to allow the passage therethrough of the elbow 29, which has a collar 30 receiving the stove pipe 31 in the usual manner.

The upper plate 27 of the top 21 has a central opening 32 of about the same diameter as that of the interior of the magazine 19, and a lid 33 closes this opening 32. The lid 33, in turn, has a central opening 34, up into which an air-supply tube 35 fits and extends down through the magazine 19 to the bottom thereof, and concentric therewith.

The central stem 4 of the grate 1 projects up into the bottom part of this tube 35 and a rod 36 enters a slot in the upper end of the stem 4 to be bolted or riveted therein as indicated. Radial lugs 37 on the upper part of the stem 4 bear out against the inner sides of the tube 35 and maintain the lower end of the tube 35 centrally of the magazine while allowing the grate 1 to move up and down in the lower end of the tube.

The upper end of the stem 4 is open to its hollow interior, previously described, allowing some of the air to pass down into the interior of the stem and out through the slots 5.

Resting on the upper plate 27 of the top 21 is a dome 38, and the rod 36 extends up through the top of the dome and has threads 39 from near its upper end downward for a considerable distance. A nut 40 fits on these threads 39 and bears down against the boss 41 on the upper surface of the dome 38 around the rod. This nut 40 is the hub of the hand wheel 42, and, as the hand wheel is turned one way or the other, the grate 1 is raised or lowered in the lower end of the magazine 19. The upper end of the rod 36 has a flattened part 43, and a wrench or handle 44 may be applied thereto to turn the rod 36, and with said rod the grate 1. By thus turning the grate alternately to the right and left with quick reversal of mo-

tion, the ashes may be shaken from the grate to clear the spaces between the grate bars 2 when required.

The dome 38 has draft inlets 45 about mid-way of its height, and sliding dampers 46 may be adjusted to entirely close or open these inlets.

The central draft tube 35 has perforations 47 through its walls near its upper end in the interior of the top 21, through which limited communication is possible from the magazine interior to the inside of the tube 35 above the level of the fuel in the magazine, and interior of the tube.

The fire-box 6 has a door 48 in front, located above the door 18 of the ash-pit, so that free access may be had to the interior of the fire-box and to the grate 1 therein. This door is preferably provided with a panel 49 of transparent material, through which the light of the fire may be seen from the outside of the stove when the door is closed.

With solid fuel, especially bituminous coal, supplied to the magazine 19 through the chutes 32 in pieces small enough to readily pass down through the annular space around the central draft tube 35, the lower end of this body or column of fuel will be carried in the grate 1, where it is accessible for lighting by opening the door 48 in the front of the fire-box 6. While thus lighting the fire the cut-off 13 may be drawn under the opening 7 in the bottom of the fire-box to hold the kindling material in the fire-box under the grate. Also while thus lighting the fire the grate may, if strong draft is required to start the fire, be lowered to expose the entire draft-outlet area between the bars 2 of the grate. This is the position of the grate as shown in the drawings. When the grate is thus lowered, the sliding damper 46 in the dome 38 should be adjusted to afford the maximum area of the draft inlets 45. The ash-pit door 18, the fuel doors 24 and the fire-box door 48 should all be closed and these doors as well as joints between the ash-pit and the fire-box, between the fire-box and the shell 25, and between this shell and the top 21, and between said top and the dome 38, should be as nearly air-tight as possible. Then the draft will be in through the inlets 45, the dome 38 and down through the central draft tube 35 to the center of the grate 1 and the slotted stem thereof, and from there out through the ignited fuel into the fire-box 6 around and under the grate, from which space it will be upward through the annular space 28 around the magazine 19 and inside the shell 25, and up to the top of this shell and out through the elbow 29 and pipe 31. The top 21 with its lateral chutes 23 forms a baffle in the upper region of the stove opposite the outlet formed through the

elbow 29 and causes the heated gases resulting from the combustion to be distributed through the space inside the drum 25 instead of directly flowing around the sides of the magazine 19 over to the elbow 29, which would overheat the shell in this region and not provide the desired heating of the shell in the opposite region or front of the stove. The large black arrows indicate the flow of air and the large white arrows indicate the flow of the products of combustion, in Fig. 3. In Fig. 1 the dotted arrows indicate approximately the flow of the products of combustion as influenced by the baffle which the chutes 23 afford in the upper part of the stove. By thus retarding the outflow of the gases, causing them to reverberate within the shell 25 to a considerable extent, the combustion will be more complete. By having the lateral chutes 23 entering the magazine from opposite direction, they not only constitute a baffle in the upper part of the stove, but the fuel is supplied more evenly to the magazine.

With the body of fuel, especially bituminous coal, held in the magazine 19 with the heated products of combustion passing upward around outside of the magazine, and with the air practically excluded from the interior of the magazine 19 and head 21 by the closing of the fuel doors 24, a coking process will, to some extent, be carried on in the fuel, with combustible gas rising from the fuel into the interior of the top 21, where it will pass into the central draft tube 35 through the perforations 47 and be mixed with the air passing down therethrough and carried with said air among the ignited fuel in the grate 1, where said gas will be thoroughly consumed. It will be understood that no great volume of gas will be produced and the empty space above the fuel in the interior of the top will be ample for any slight accumulation of the gas should it sometimes be produced in excess of the rate at which it may flow through the perforations 47 and mix with the air. This space will be so large in proportion to any volume of gas likely to accumulate that there will be no danger of explosion upon opening of the fuel doors 24. This is true also in regard to fine dust, as this will also be drawn into the perforations 47 and carried with the air down to the grate, avoiding the danger of dust explosion often present in large stoves or furnaces upon opening of the fuel door.

After the fire is thoroughly started, the cut-off 13 is pushed inward and the ashes from the kindling material and from the grate may be dropped to the ash pan 13. When it is desired to remove the ashes from the ash-pit 10 during the operation of the stove, the cut-off 13 on the grate 1 is pulled

out to close the opening 7 before opening the ash-pit 18, thus preventing any draft through the ash-pit directly up to the grate 1, which would cause a slight back-draft up through the central draft tube 35 and out through the draft inlets 45 in the dome 38 into the room. For the same reason the fire-box door 48 should not be opened frequently during operation of the stove, but if it is found necessary to open this door during the operation, the dampers 46 should be adjusted to close the draft inlets 45 in the dome 38.

Should the grate 1 become clogged as is the case with some fuels, such as those containing a considerable amount of sulfur, it may ordinarily be relieved by the use of a poker inserted through the fire-box door 48 and plied between the grate bars, turning the grate by means of the shaker handle 44 at the upper end of the rod 36 so that all of the spaces between the bars of the grate may be reached from the front.

For thoroughly cleaning the stove, the interior is accessible down through the magazine 19 upon removal of the dome 38 and lid 33 together with the draft tube 35, the hand wheel 42 being unscrewed from the rod 36 to allow this and the grate 1, with its rod 36 dropping to the bottom of the fire-box 6.

Regulation of the heat produced by the stove and regulation of fuel consumption in proportion therewith is possible by the up and down adjustment of the grate 1, since this adjustment has the effect of decreasing or increasing the grate surface. Mere regulation of the amount of air supplied generally results in production of a large amount of smoke containing elements which should have been burned. A mere regulation of draft outlet generally results in diverting the products of combustion to the room, poisoning the air thereof, and a simultaneous use of both means of regulation only increases the difficulty. By regulating the grate area and correspondingly regulating the air inlet area, a true regulation of the combustion is effected, and it will generally be found unnecessary to change the draft outlet area, once that has been properly proportioned. Furthermore, by having the basket-like grate 1 suspended, with not only all of its sides, but its entire bottom open, the maximum of grate area is afforded with a minimum of mass of burning fuel. This is a condition obtained in large furnaces with large flat grates by spreading the fuel thinly and evenly over such grates, but in a stove or small heating furnace the volume or thickness of the fire-bed is generally far too great in proportion to the grate area. This proper proportioning of grate area to the mass of burning fuel results in more perfect combustion. With the basket-like grate thus exposing all of its sides and bot-

tom from the end of the magazine and with a provision of up and down adjustment the mechanism is as effective for regulation of combustion and attendant economy of fuel as is the adjustable wick of a lamp or oil stove.

Where a water heating furnace is to be constructed according to my invention, as shown in Fig. 5, the fire-box 6 and shell 25 are uniformly cylindrical around the magazine 19, and water tubes 50 are coiled around in the annular space around said magazine and around the grate 1 at the lower end thereof. The other parts correspond to those hereinbefore described, as numbered.

The hot air furnace illustrated in Fig. 6 is similar to the stove described, except that, as in Fig. 5, and for the same reason, only one chute 23 and one fuel door 24 are shown, while the flue 29 leads from the shell 25 at the other side, and the casing 51 surrounds the shell 25 and has the dome 52 thereover, which displaces the dome 38 of the stove and the water-heating furnace illustrated. To supply air to the central draft tube 35, a chamber 53 is inclosed within the casing 51 and dome 52 around the upper end of the draft tube 35, and draft inlets 54 are provided through the dome 52 into this chamber 53. It will be understood that these inlets may be opened or closed or regulated in any desired manner. The casing 51 has the cold-air duct 55 leading to it, and has the warm-air ducts 56 leading from it.

It will be understood that the various constructional details may be varied according to the size and nature of the stove or furnace, as this example will illustrate, but that the operation of the apparatus will be similar in each instance.

It will be understood that I am not limited to the precise details of construction illustrated and described herein, but

What I claim as new and desire to secure by Letters Patent is:

1. In a stove or furnace, an upright magazine having its lower end part open, a basket shaped grate movable up and down in and having its rim substantially in contact with the open interior of the lower end part of the magazine, a draft tube extending down through the magazine to the vicinity of said grate, and means for supporting said grate and adjusting said grate up and down in said lower end part of the magazine, said magazine receiving fuel around said draft tube to be supplied downwardly to said grate.

2. In a stove or furnace, an upright magazine, a grate adjustable up and down in fuel-confining relation with the interior of the lower part of the magazine and its rim in contact with the interior of the lower end of the magazine, a draft tube extending down through the magazine, and means for supporting said grate and adjusting said grate up and down in the lower end of the magazine, said magazine receiving fuel around said draft tube to be supplied downwardly to said grate, the parts of said magazine and said grate having said fuel-confining relation being of substantially circular cross section whereby said grate is rotatable in said magazine, and said supporting and adjusting means comprising means for rotating said grate.

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Witnesses:

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