J. JUNGERS.

SECTIONAL HEATER.

APPLICATION FILED AUG. 10, 1917.

1,374,575. **Patented Apr. 12, 1921.**

2 SHEETS—SHEET 1.

FIG. 1.

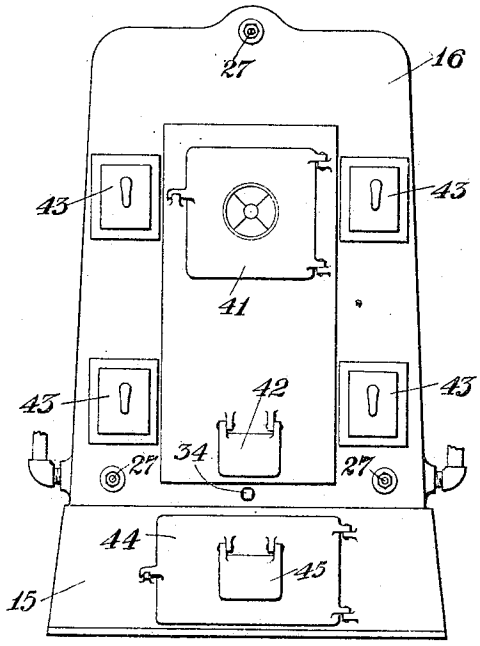


FIG. 2.

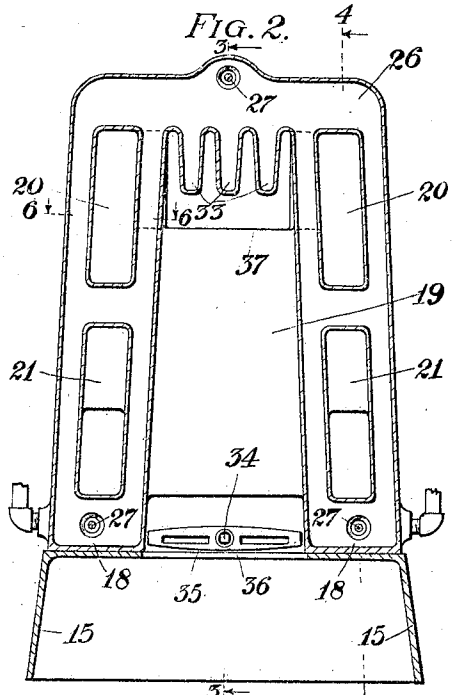


FIG. 3.

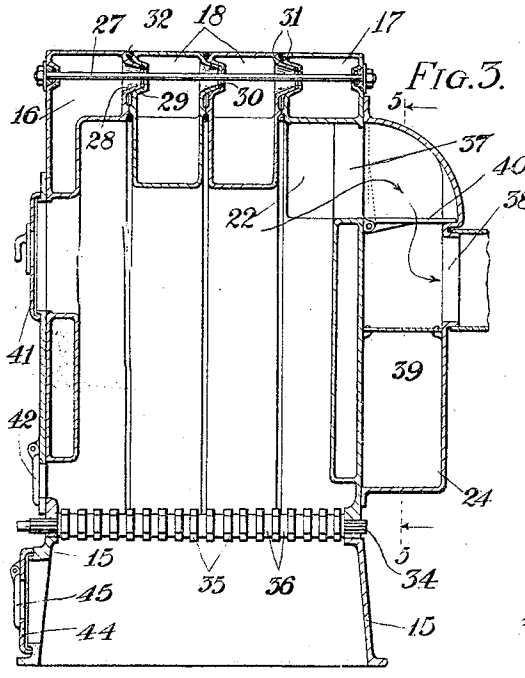
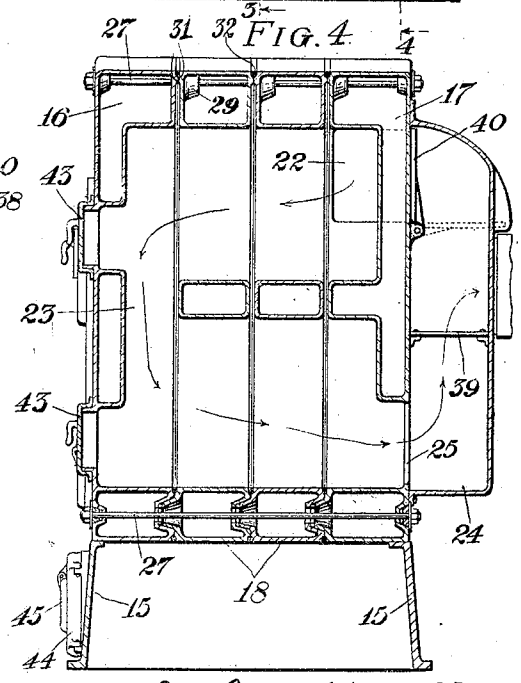


FIG. 4.



WITNESSES.

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2 SHEETS—SHEET 2.

FIG. 8.

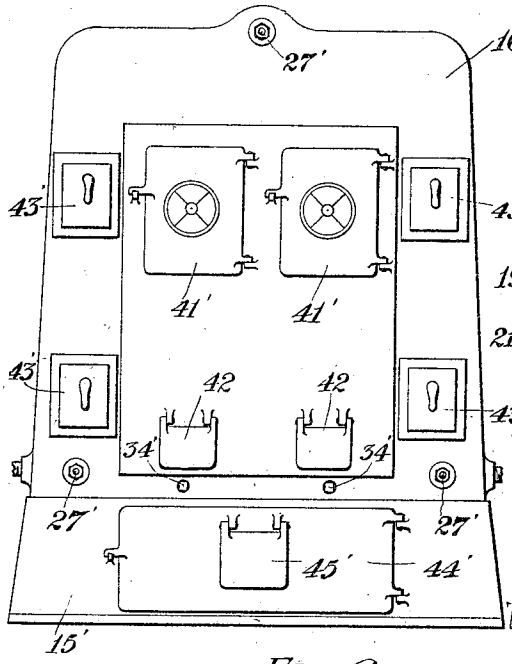


FIG. 9.

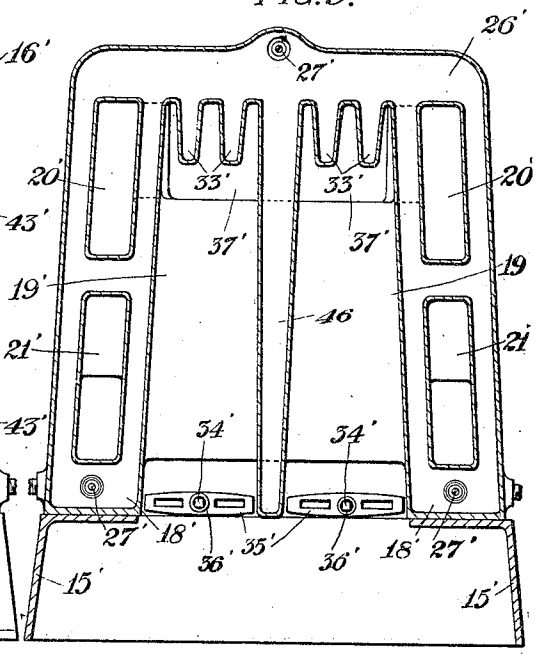


FIG. 6.

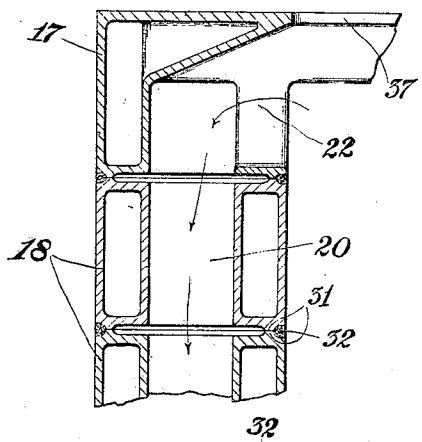


FIG. 5.

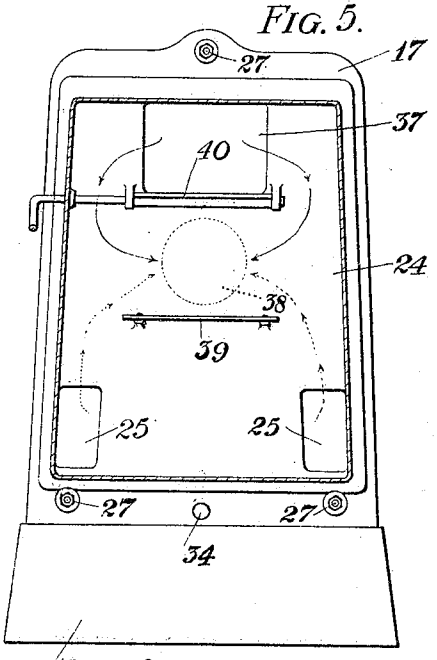


FIG. 10.

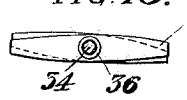


FIG. 7.

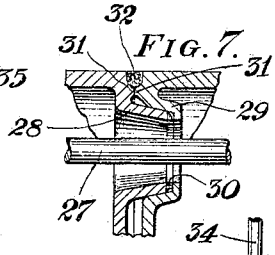
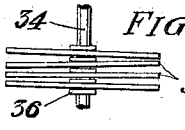


FIG. 11.



WITNESSES.

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JOHN JUNGERS, OF GRAFTON, WISCONSIN.

SECTIONAL HEATER.

1,374,575. Specification of Letters Patent. Patented Apr. 12, 1921.

Application filed August 10, 1917. Serial No. 185,468.

To all whom it may concern:

Be it known that I, JOHN JUNGERS, a citizen of the United States, and resident of Grafton, Ozaukee county, Wisconsin, have invented new and useful Improvements in Sectional Heaters, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention has for its object to provide a sectional heater for domestic heating purposes which will be more efficient because of increased area of exposed surface to the combustion chamber and the flues therefrom, and which will be more flexible in its operation.

Another object of the invention is to provide such a sectional heater with a deep downwardly flaring fuel chamber which will permit of deep banking of fuel to maintain a low fire for a long period of time, thus permitting the furnace fire to be kept low and lighted and in condition to be forced at any time during a spell of mild weather.

Another object of this invention is to perfect details of construction in a furnace of this type.

With the above and other objects in view the invention consists in the sectional heater as herein claimed and all equivalents.

Referring to the accompanying drawings in which like characters of reference indicate the same parts in the different views:

Figure 1 is a front view of a furnace constructed in accordance with this invention;

Fig. 2 is a transverse sectional view thereof;

Fig. 3 is a longitudinal sectional view of the heater through the fuel chamber on the plane of line 3—3 of Fig. 2, the damper being shown in the open position for direct draft connection;

Fig. 4 is a longitudinal sectional view thereof through one of the return draft flues on the plane of line 4—4 of Fig. 2, the damper being shown in its closed position for the indirect draft connection;

Fig. 5 is a sectional rear view through the smoke box on the plane of line 5—5 of Fig. 3 with the damper in its open position, full line arrows indicating the course of the direct draft to the smoke pipe opening and dotted line arrows indicating the course of the indirect draft;

Fig. 6 is a detail sectional view on the plane of line 6—6 of Fig. 2, showing the manner of connecting the sections together;

Fig. 7 is another detail view showing the manner of passing the tie rods through the furnace sections;

Fig. 8 is a front view of a double heater constructed in accordance with this invention;

Fig. 9 is a transverse sectional view thereof;

Fig. 10 is an end view of the grate showing the independent vertical movement of the grate bars; and,

Fig. 11 is a plan view of a portion thereof showing the independent horizontal movement of the grate bars.

In these drawings 15 indicates a furnace base forming the ash pit, and of such a size as to accommodate the superstructure of as many sections as desired. The body of the furnace proper is made up of hollow sections; the front section 16 and rear section 17 and intermediate sections 18. The intermediate sections are of uniform structure so that the furnace may be enlarged or reduced at will by adding or removing them. When assembled the sections produce a central fuel chamber 19 which flares downwardly or increases in sectional area toward the lower end thereof. On either side of the fuel chamber 19 is an upper flue 20 and the lower flue 21, the former having connection with the fuel chamber through the opening 22 in the rear section 17 and the lower flue 21 having communication with the upper flue 20 through an opening 23 in the front section 16 and having communication with a smoke box 24 on the back of the rear section through an opening 25 in the rear section. The walls surrounding the fire chamber 19 and the flues are hollow to constitute a water jacket 26.

The sections are held together by tie rods 27 passing through them with nuts threaded thereon. The tie rods preferably pass through the water jacket portions of the sections and desirably at the three points indicated in order that warping and expansion may not interfere with the proper fit of the parts. The tie rods pass through the interfitting tapering couplings 28 and 29 formed on the sections which have a gasket of asbestos or other suitable material there-

between that will maintain the joint water tight. At a short distance from their outer edges the sections are provided with raised beads 31 which bear against one another when the sections are fitted together and provide a groove between the sections which is filled with asbestos or other suitable packing 32. These abutting beads, furthermore, serve to hold the inner portions of the edges of the sections spaced apart so that a greater surface is exposed to the action of the gases passing through the flues.

At the top of the fuel chamber the intermediate sections 18 are provided with fins or projections 33 which further increase the area of surface exposed to the action of the heat.

The grate comprises a rod 34 which is preferably hexagonal in cross section between its bearing ends and has grate bars 35 mounted on it, the rod passing through similarly shaped but slightly larger openings in the grate bars so that the grate bars are free to rock and tilt thereon. The grate bars are, furthermore, held apart by spacers 36 between them which permit of the bars moving slightly in a horizontal plane to change their angularity with relation to each other in addition to the limited loose movement on the rod in a vertical plane. This freedom of the grate bars to move scissors-like and to move farther apart at either end is to facilitate the passage of clinkers or other comparatively large hard bodies between them. The play is very limited and will not permit the fuel to run through, though it does facilitate the shaking operation by making the bars slightly independent.

As seen in Fig. 5, the two openings 25 from the lower flues enter the smoke box 24 at the opposite lower corners thereof, while a direct draft opening 37 from the top of the fuel chamber 19 enters said smoke box at the middle of the upper portion thereof. The smoke pipe opening 38 is just beneath the opening 37, while a baffle plate 39 extends from front to rear of the smoke box just beneath the smoke pipe opening 38.

A valve 40 is located in the smoke box for closing the direct draft opening 37 and in the open position permits the smoke and gases to pass directly from the fuel chamber 19 through the direct draft opening 37 to the smoke pipe opening 38. When the valve is in closed position, however, the smoke and gases from the fuel chamber 19 pass out through openings 22 into the upper flues 20 to the front of the furnace, then down through openings 23 to the lower flues 21, then to the back of the furnace through openings 25 and smoke box 24 around baffle plate 39 to the smoke pipe opening 38. The direct draft connection thus imposes the least resistance to the flow of smoke and gases to the chimney, while the indirect draft connection requires it to travel through a circuitous path to which a maximum heating surface is exposed. The water jacket extends across the front and the rear of the furnace, the latter portion being heated from the smoke box as well as from the fuel chamber and the flues, while the front portion of the water jacket has openings therethrough to accommodate the fuel feed door 41, the grate cleaning door 42 and the flue cleanout doors 43. The base is provided with the usual ash pit door 44 and draft door 45.

Communication from the water jacket of one section to the water jacket of the next is made through the openings of the interfitting couplings 28 and 29 which are of larger diameter than the tie rod 27.

A heater constructed in accordance with this invention is very efficient because of the large area of exposed surface and because of the deep downwardly flaring fuel chamber which permits of economy in fuel at times when it is only desired to keep a low fire. The depth of the bed of fuel maintained by the usual practice of filling the fuel chamber level with the feed opening or above, insures a gradual coking of the fuel under a light draft so that the fire may burn for several days without any attention being given to the furnace while the furnace is checked. Whenever more heat becomes necessary the fire will quickly respond to a change in draft and the necessity for rebuilding fires after short periods of inactivity is overcome.

The downward flaring side walls of the fuel chamber provide for an unobstructed passage for the settling of the fuel and the ashes while the grate construction is such as to assist in freeing itself from clinkers or the like by reason of the limited freedom of the grate parts.

It is obvious that various changes may be made in the construction of the furnace without departing from the invention. For instance the furnace may be made double as shown in Figs. 8 and 9, wherein practically the same construction is followed, the exception being that a hollow partition 46 projects downwardly to divide the fuel chamber into two separate fuel chambers 19′. This necessitates the substitution of two separate grates 34′ for the single grate. With this construction the operation is the same as before, except that either section of the fuel chamber may be used separately at times when the full heating capacity is not required.

I therefore desire it to be understood that this invention is not limited to any specific form or arrangement of parts except in so far as such limitations are specified in the claim.

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

In a sectional water heater, the combination of hollow front, back and intermediate sections secured together to form a water jacket inclosing a narrow, deep central fuel chamber having a charging opening at its upper end, each of said sections having a water jacket space at their sides and top, the front section having a water jacket extending across the front thereof, the rear section having a water jacket extending across the rear thereof, upper and lower flues in the sides of each of the sections communicating at their forward ends through a passage in the front section, the upper flues communicating at their rear ends with the upper portion of the fuel chamber, a smoke box extending across the rear section and covering the rear side of the water jacket space of this section, said smoke box having a valve-controlled passage communicating with the fuel chamber, openings in its sides communicating with the rear ends of the lower flues, and an intermediate discharge opening, and a baffle plate in said smoke box below said discharge opening to direct the gases from the flues to the sides of said smoke box.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN JUNGERS.

Witnesses:
WM. F. SCHANEN,
ELSIE WEYKER.