Nov. 30, 1926.

A. HOLBEK

1,608,745

FIREPLACE FURNACE

Filed March 9, 1926

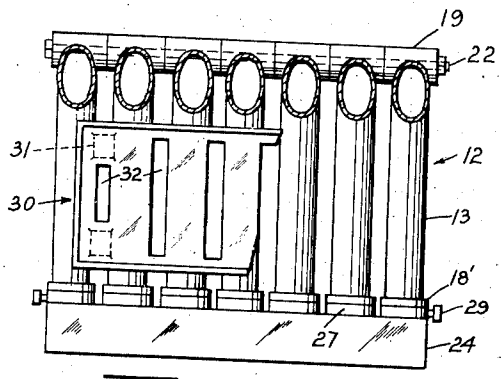


Fig. 1

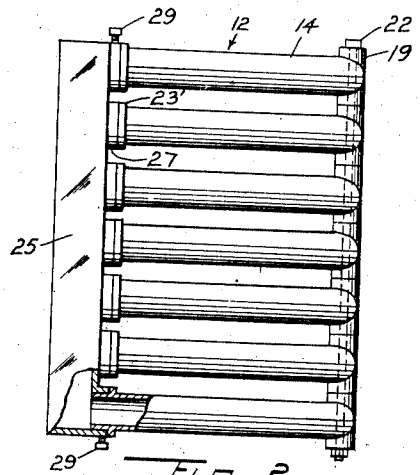


Fig. 2

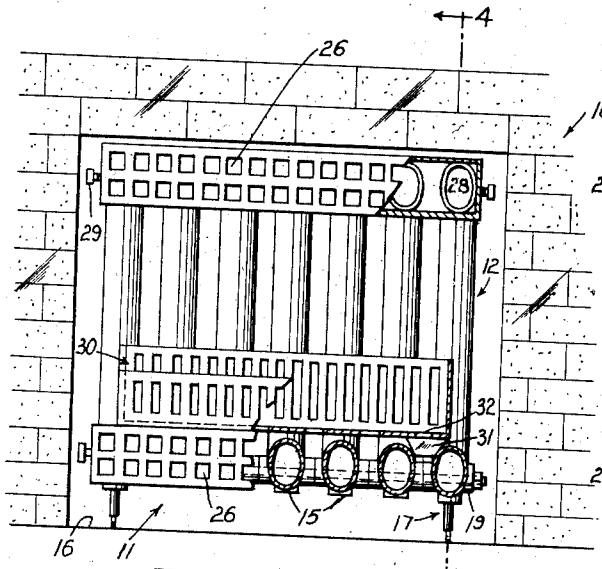


Fig. 3

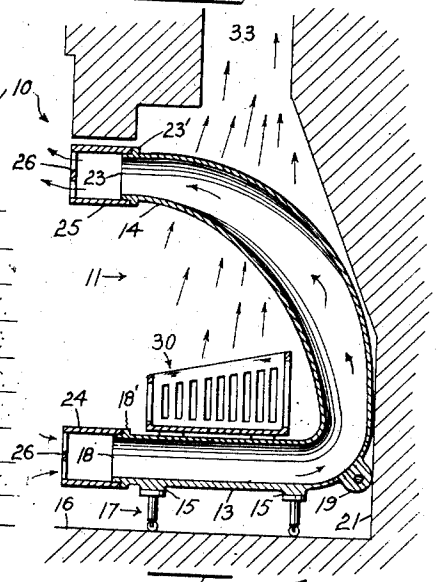


Fig. 4

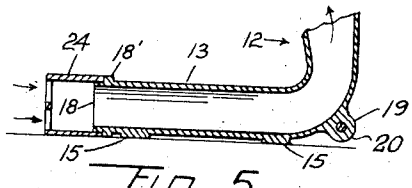


Fig. 5

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UNITED STATES PATENT OFFICE.

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FIREPLACE FURNACE.

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My invention relates to heating units for fireplaces, and more particularly to a fireplace furnace for open fireplaces.

The heating unit in the common fireplace of the present day is the familiar basket-like grate and it burns solid fuel. It is a well-known fact that a great percentage of the heat from a construction of this character passes direct through the flue of the chimney and is wasted, thereby rendering the heating unit a cheerful but inefficient heater.

An important object of my invention is to intercept the waste-heat gases just referred to by an improved furnace structure adapted to take the place of the present grate, burn the same type of fuel, and adapted to convert the waste heat to a saving and do useful work.

Another object is the provision of a furnace consisting of a built-up structure of identical heat-absorbing sections and identical receiving and dispensing headers, the finished structure being adapted to be easily slid into and out of a fireplace, whether new or old, thereby rendering the flue, fireplace and furnace most accessible for inspection, repair and cleaning.

Another object is to incorporate in the invention a grate to burn small solid fuel, and which grate may be removed when burning large fuel such as blocks or logs of wood.

A further object is the provision of a furnace consisting of but few simple cast elements needing substantially no machining, so that the invention may be manufactured at a low cost and sold at a reasonable price.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where I shall outline in full that form of the invention which I have selected for illustration in the drawings accompanying and forming part of the present application. In said drawings I have shown one form of my invention, but it is to be understood that I do not limit myself to such form, since the invention, as expressed in the claims, may be embodied in a plurality of forms.

Referring to said drawings:

Figure 1 is a sectional plan of the invention, with the upper half thereof and a portion of the grate removed;

Fig. 2 is a full plan with a top corner partially broken away;

Fig. 3 is a front elevation of the furnace set within a fireplace, certain parts being broken away to clarify the construction;

Fig. 4 is a sectional side elevation of Fig. 3 along the line 4—4;

Fig. 5 is a vertical section through a fragment of the invention showing a section resting directly upon a floor surface.

The numeral 10 indicates a fireplace and in which my furnace 11, as a unit, may be rolled or slid therein, and just as easily removed therefrom as a unit for purposes heretofore mentioned.

The furnace is composed of a plurality of preferably identical cast-iron sections 12, U-shaped in formation and tubular throughout, and with no recesses, projections or perforations therein, so that the interior walls thereof will be smooth and continuous to induce an efficient circulation of heated air to pass through the section. As fireplaces vary in width, it is obvious that any number of sections may constitute an installation. The lower leg 13 of each section may be positioned substantially horizontal while the upper leg 14 may be curved for effective flame contact and ease of passage of the heated air therethrough. On the bottom of each leg 13 are a pair of bosses 15 for supporting the section upon a floor surface 16 or to receive roller supporting means 17 to facilitate the moving of an assembled unit furnace. On the lower leg and opposite the open end 18 thereof is an external lug 19 formed so that its extreme surface 20 opposite the said open end does not project beyond the bottom of the section at the U-bend, so that there will be no wall interference at the back 21 of the fireplace when the furnace is positioned in the fireplace.

The lug 19 is formed transversely to the section and projects a predetermined and equal distance from each side of the section, so that when the desired number of sections are placed lug to lug, as shown to advantage in Figs. 1 and 2, and a bolt 22 inserted through the holes of the lugs and gradually tightened, the sections resting with their bosses upon the floor surface will align themselves, by their weight, in spaced relation and also so that their open ends 18 and 23 will lie in a perpendicular plane.

24 and 25 are headers preferably identical in shape and size, for simplicity in construction and cheapness in manufacture, and have their front faces 26 grilled and their

rear faces formed with projecting rings 27 surrounding openings 28 of a shape to easily receive the ends 18 and 23. Collars 18' and 23' on the section ends serve as supporting stops for the headers, and set screws 29 at the ends of the headers serve to firmly secure the headers and sections together thereat. The rings 27 are spaced on the headers to align and register with the ends of the previously assembled sections 12.

A grate 30 is provided for the removable mounting thereof upon the lower legs 13 of the assembled unit. Upon the outside bottom of the grate are cast wedge-shaped projections 31 in pre-determined spaced relation to accomplish the means for the mounting in a ready, non-slip manner. The said bottom of the grate has transverse slots 32 provided therethrough in registry with the spaces between each section for an uninterrupted vent air passage for the combustion of the solid fuel in the grate. The remaining portion of the bottom of the grate is solid and covers the lower legs of the sections and thereby protects them from the direct heat of the burning fuel, should the latter be small chunks of fuel. When large chunks of fuel or logs are desired to be burned, the grate may be removed if desired.

In operation, the flames from the fuel in their passage through the flue 33 of the chimney are intercepted by the major portion of the tubular sections 12 and are thus confined to rise and pass between the sections, and as a consequence must impart the heretofore waste heat to the metal of the sections and the unconstrained air in the latter. And, as one header is within close proximity of the floor and the other header spaced above and therefrom, it is obvious that a circulation of air must traverse through the furnace. Therefore, heated air must issue from the grilled face of the upper header into the room, and the cooler air of the room next to the floor must enter the lower header for the replacement of the out-going heated air, and the velocity of the interchange of air varies with the intensity of the temperature of the fire.

Straight arrows indicate the path of the flames to and through the flue 33, and curved arrows indicate the course of the air traveling through the furnace and issuing into the room at the top of the furnace.

I claim:

1. In a fireplace furnace, a plurality of U-shaped tubular sections, each section having an exterior lug provided with a hole therethrough, and a bolt the size of said holes adapted to be inserted through the said holes for aligning and securing the sections together in spaced relation; said lugs being wider than said sections whereby the lug of each section abuts the lug of an adjacent section to determine the spaced relation and to provide a rigid assembly.

2. In a fireplace furnace, a plurality of U-shaped tubular sections, provided with open ends, each section having an exterior lug provided with a hole therethrough, and means adapted to be inserted through the said holes for aligning and securing the sections together in spaced relation; one leg of each section provided with a boss for supporting the section on a floor surface whereby the open ends of the sections will be positioned in a plane; and a grate adapted to be removably positioned on the sections at the side thereof opposite to the said bosses.

3. A fireplace furnace comprising a plurality of U-shaped open-ended tubular sections, one leg of each section adapted to be positioned horizontally and the bottom side of the leg provided with a pair of bosses and the said leg further provided opposite to its open end with a transversely positioned lug of a length greater than the transverse diameter of the tubular section, a rod adapted to be inserted through the lugs to align and secure the sections together in spaced relation and so that when the assemblage is set with its bosses upon a floor surface the open ends of the sections will be in alignment, and headers provided with openings to receive the ends of the sections in the spaced relation determined by the lugs, the said ends supporting the headers, and the latter provided with grilled faces for circulatory purposes, the said tubular sections being identical and the said headers also being identical.

4. A fireplace furnace comprising a plurality of U-shaped open-ended tubular sections, one leg of each section adapted to be positioned horizontally and the bottom side of the leg provided with a pair of bosses and the said leg further provided opposite to its open end with a transversely positioned lug of a length greater than the transverse diameter of the tubular section, a rod adapted to be inserted through close-fitting holes in the lugs to align and secure the sections together in spaced relation and so that when the assemblage is set with its bosses upon a floor surface the open ends of the sections will be in alignment, and headers provided with openings to receive the ends of the sections in the spaced relation determined by the lugs, the said ends supporting the headers, and the latter provided with grilled faces for circulatory purposes, and means carried by the headers to secure the latter to the assembled sections whereby a unit structure is formed.

5. A structure as set forth in claim 4 and in which roller means is provided in a plurality of bosses for moving the furnace in and out of a fireplace.

6. A structure as set forth in claim 4 and in which a grate is provided having a bottom with downward projections for positioning the grate on the lower legs of the sections, and the bottom further provided with openings in spaced relation to the projections adapted to register with the open spaces between the sections for permitting the air to pass therebetween and through the grate from the floor, the balance of the grate bottom being adapted to protect the sections thereunder from the direct heat rays from the burning fuel.

In testimony whereof, I affix my signature.

ANTON HOLBEK.