July 29, 1930. H. H. WALTERS 1,771,668

SHEET METAL FIREPLACE

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Fig. 1.

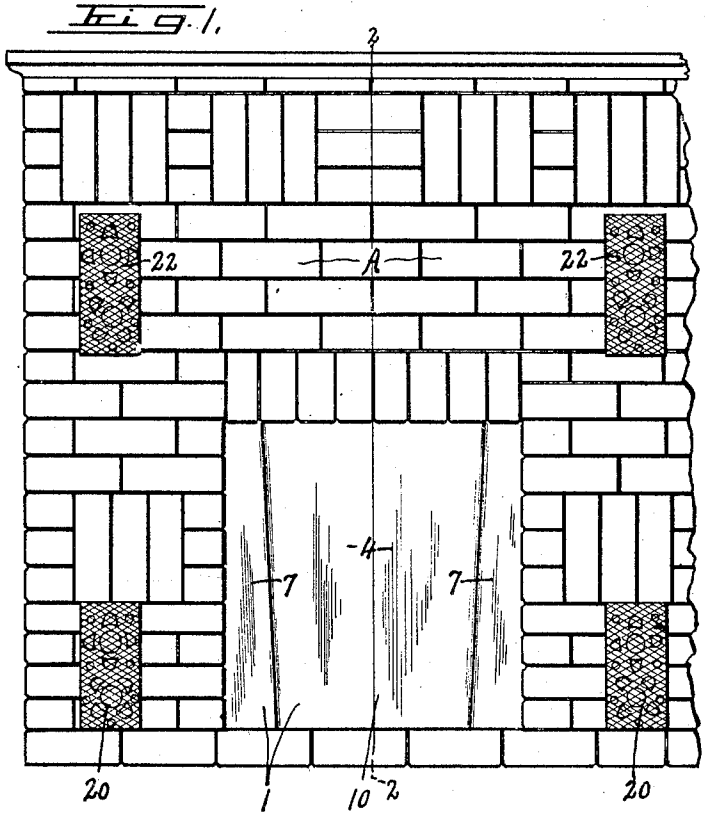


Fig. 2.

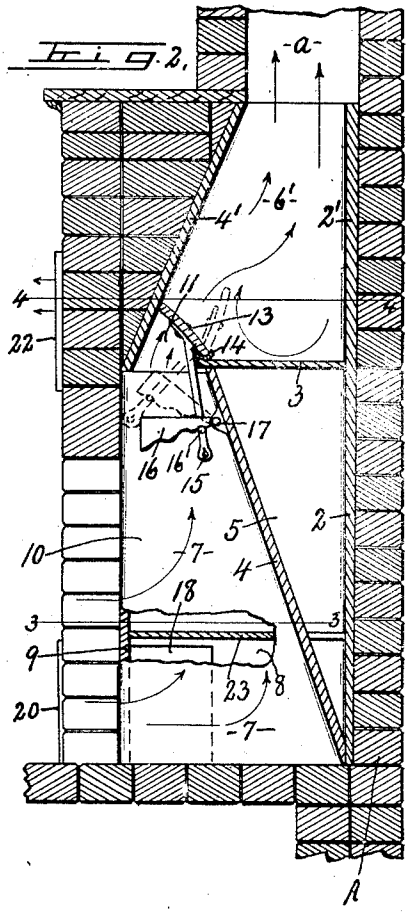
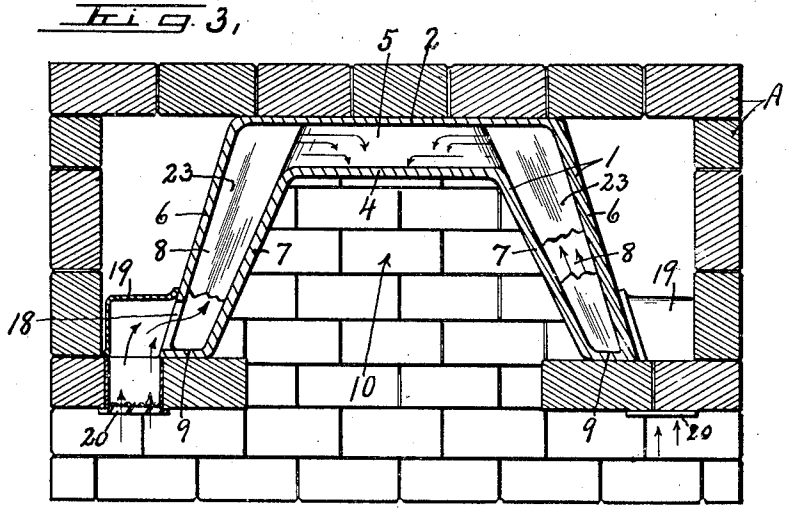


Fig. 3.



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Fig. 4.

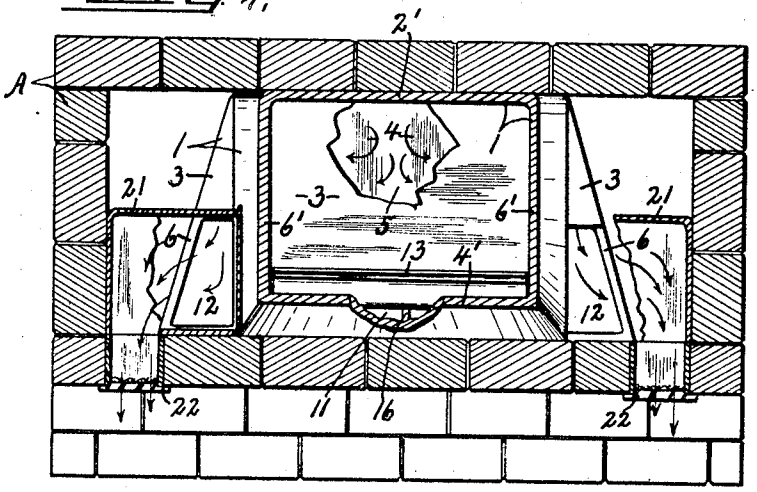


Fig. 5.

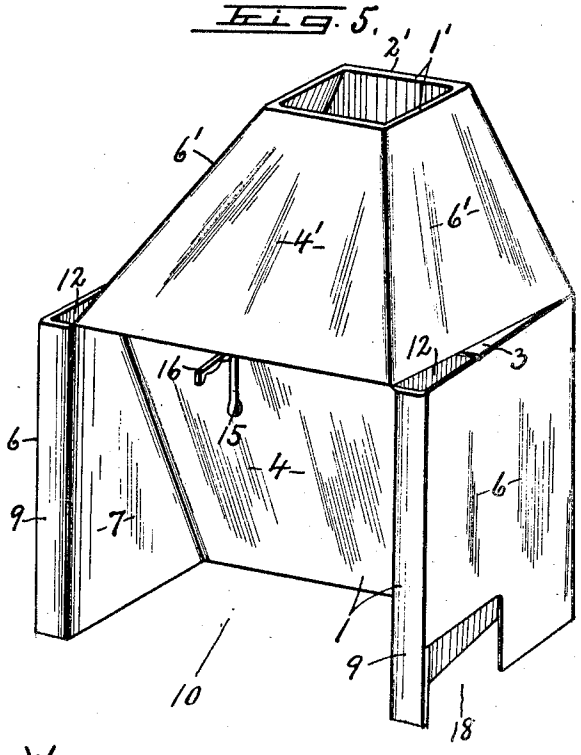
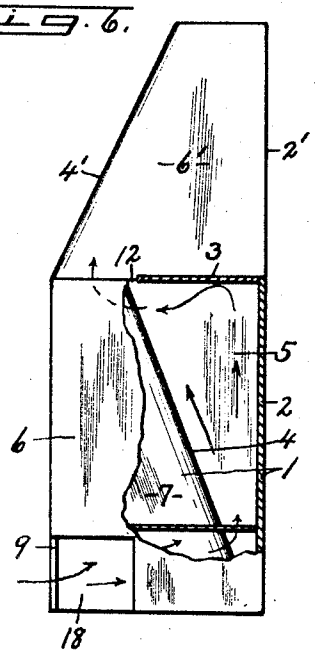


Fig. 6.



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UNITED STATES PATENT OFFICE

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SHEET-METAL FIREPLACE

Application filed May 21, 1928. Serial No. 279,392.

This invention relates to an all-metal open fireplace unit adapted to be installed in existing chimneys without material alteration thereof, but is preferably incorporated in said chimneys during the process of construction so that the cost of such installation may be mainly offset by the saving of expensive labor and materials required in the construction of brick or other mason work fireplaces.

The main object is to provide an all-metal fireplace unit having a combustion chamber of relatively large capacity and a suitable smoke hood communicating therewith together with a main air heating chamber and supplemental air-heating and circulating chambers provided with cold air inlets leading to the main heating chamber and warm air outlets leading from said chamber arranged in such manner that the cold air inlets may receive cold air from the outside of the building, from the cellar or from the room in which the fireplace is installed while the warm air outlets may be connected to suitable grilles in the face of the chimney adjacent the fireplace or at any other level.

Another object is to provide the supplemental air circulating chambers with baffle plates between the cold air inlets and warm air outlets for deflecting the cold air from the lower portions of the supplemental chambers to the main heating chamber from which the warm air is delivered through the outlets and into the room to be heated.

A further object is to extend the air chambers entirely across the opposite ends and rear of the combustion chamber and to construct the walls of the combustion chamber in such manner as to afford a maximum heat transfer area between the combustion chamber and air chambers and thereby to obtain a more rapid transfer of the heat to the circulating air than has heretofore been practiced.

A further object is to construct the hollow side walls of the combustion chamber so that they may diverge forwardly at such angles as will radiate the heat from the walls of the combustion chamber into the room and at the same time to make the lower end of the smoke hood substantially rectangular and of about the same width as the back plate of the shell so that the opposite sides of the hood may fall within the outer walls of he supplemental air chambers to permit the formation of warm air exits leading from the supplemental chambers at the outside of the base of the hood.

A further object is to extend the front plate of the shell upwardly and forwardly in an inclined plane to approximately the base of the hood but some distance to the rear thereof so as to form a smoke outlet leading from the combustion chamber into the hood.

A further object is to provide the main heating chamber with a top plate or closure extending the entire distance between the outer side plates and united to the upper edge of the front plate of the shell or back wall of the combustion chamber to form a gas-tight joint therewith and also to receive and support a suitable damper which is movable to and from a position across the smoke outlet to control the escape of the products of combustion.

Other objects and uses relating to specific parts of the device will be brought out in the following description.

In the drawings:—

Figure 1 is a face view of a portion of a fireplace construction with my improved all-metal fireplace shell therein.

Figure 2 is a vertical sectional view taken in the plane of line 2—2, Figure 1.

Figure 3 is a horizontal sectional view taken in the plane of line 3—3, Figure 2, except that one of the cold air inlets is shown in section.

Figure 4 is a horizontal sectional view taken in the plane of line 4—4, Figure 2.

Figure 5 is a perspective view of the detached all-metal fireplace unit.

Figure 6 is a side elevation, partly in section, of the same unit.

As illustrated, the fireplace forming the subject matter of this invention is made of boiler iron or other relatively heavy sheet metal and comprises a lower or main heating section —1— and an upper smoke hood section —1'— permanently assembled end to end

one upon the other to form a unitary structure.

The main heating section —1— comprises, in this instance, an upright substantially flat back plate —2—, a top plate —3— extending forwardly from the back plate —2— some distance above the lower edge thereof and a front plate —4— inclined upwardly and forwardly from the lower edge of the back plate to the front edge of the top plate —3— thereby forming a main heating chamber —5— of substantially triangular cross section from front to rear with its larger or wider portion adjacent the top —3—.

The rear edge of the top plate —3— and lower edge of the front plate —4— are welded or otherwise permanently secured to the back plate —2— to form gas-tight joints therewith while the intersecting portions of the top plate —3— and front plate —4— are similarly welded for the same purpose.

Suitable upright side plates —6— are permanently united at their rear edges to the opposite upright edges of the back plate —2— to extend forwardly therefrom in diverging planes equal distances from the back plate.

Additional upright side walls —7— are integrally united at their rear edges to the opposite upright edges of the front plate —4— to extend forwardly equal distances therefrom in diverging planes and in spaced relation to the side plates —6— so as to form intervening supplemental heating chambers —8— which communicate with the main chamber —5—.

The front edges of the side plates —5— and —7— terminate in a vertical plane substantially parallel with the plate —2— and are united to each other by relatively narrow connecting plates —9— forming the front walls of the supplemental chambers —8—.

The opposite side plates —6— and —7— extend forwardly some distance beyond the front edge of the top plate —3— to form hollow side walls of a combustion chamber —10— while the rear and front plates —2— and —4— form the hollow rear wall of the combustion chamber.

The front edges of the inner plates —7— are disposed in approximately the same vertical planes as the opposite upright edges of the back plate —2— at right angles thereto while the bottom of the hood —1'— is rectangular and of approximately the width of the back plate —2— and extends forwardly from the back plate to the front edges of the inner plates —7— and therefore somewhat beyond the front edge of the top plate —3— to form an intervening smoke passage —11—, as shown in Figure 2.

It further follows that the lower edges of the opposite side walls as —6'— of the hood extend diagonally across the upper ends of the hollow side walls of the combustion chamber and are united to the upper face of the top plate —3— and to the adjacent portions of the upper edges of the inner plate —7— in front of the top plate —3— to form gas-tight joints with those parts and also to form warm air outlet openings —12— between the upper ends of the front plates and front edge of the adjacent portions of the top plate —3—, as shown in Figure 5, said exit openings being disposed at the outer sides of the base of the hood —1'— and are, therefore, cut off from communication with the combustion chamber.

The back wall of the hood —1'— is united to the back wall —2— of the heater section to form a continuation thereof in the same plane although its opposite side edges taper upwardly toward the vertical center of the heater.

In like manner, the opposite side walls —6'— taper upwardly from the base of the hood while the front wall as —4'— of the hood tapers upwardly from its lower edge toward the back wall —2'—, as shown more clearly in Figures 5 and 6.

The lower portion of the front wall —4'— of the hood —1'— forms the front wall of the smoke exit —11— which is controlled by a damper —13— having its lower edge resting in a grooved seat —14— on the front edge of the top plate —3— and its upper edge movable toward and from the front wall —4'— of the hood to control the escape of the products of combustion and draft through the passage —11—.

The damper —13— extends from side to side of and between the side walls of the hood —1'— and in all positions of adjustment inclines upwardly at an angle to and above the top plate —3— so that when opened or closed it will prevent down-draft through the passage —11— into the combustion chamber.

Any suitable means may be provided for opening and closing the damper and for this purpose it is provided with a crank arm —15— rigid thereon and extending into the upper portion of the combustion chamber where it is readily adjustable for operation either by hand or some suitable implement and is held in its adjusted position by the detent —16— hinged at —17— to the front wall of the heating section, as shown in Figure 2.

The lower ends of the outer upright side plates —6— of the heater section —1— are provided near their front edges with lateral cold air inlet openings —18— to which may be connected any suitable construction of cold air conduits —19— leading to exterior grille plates —20— for directing the cold air into the lower ends of the supplemental chambers —8—.

In a similar manner the warm air outlets —12— may be connected to suitable conduits —21— leading to exterior grille plates —22— for directing the heated air to the interior of the room in which the fireplace is located or to any other room desired.

The entire sheet metal fireplace unit including the conduits —19— and —20— may be inclosed in the chimney, as —A—, or other masonry for protective or ornamental purposes, except that the front of the combustion chamber is left open as usual in ordinary fireplaces.

The grille plates —20— and —22— for the cold air inlet conduits —19— and warm air outlet conduits —21— are shown as incorporated in the front face brick or tiling of the chimney closely adjacent their respective openings —18— and —12—, but obviously the conduits —19— and —21— may be extended to the exterior of other portions of the chimney without departing from the spirit of this invention.

It will be observed upon reference to Figure 2 that the upper truncated end of the hood —1'— communicates directly with the smoke flue as —*a*— of the chimney in a plane directly over the top plate —3— of the main heating section of the sheet metal fireplace so that the products of combustion in the combustion chamber —10— impinging against the front plate —4— and inner side plates —7— are deflected forwardly and upwardly through the outlet —11— and thence rearwardly and upwardly along the front wall —4'— of the hood into the smoke flue —*a*—, the amount of draft and smoke outlet being controlled by the position of the damper —13—.

Under these conditions the greater portions of the area of the front wall —4— and side wall —7— are directly exposed to the heat in the combustion chamber —10— and this heat is instantly transferred to the air chambers —5— and —8—, the heated air then escaping through the outlets —12—, conduits —21— and grilles —22— into the room to be heated while the cold air continues to flow in at the lower ends of the chambers —8—.

In order to increase the efficiency of the fireplace suitable baffle plates —23— are placed in the lower portions of the chambers —8— in planes just above the cold air inlet openings —18— to extend from front to rear and from side to side of said chambers so that the cold air entering the inlets —18— will be deflected rearwardly into the lower portion of the main heating chamber —5— where the heat is most intense after which the heated air is expanded laterally into the chambers —8— and thence forwardly and upwardly across the highly heated plates —7— to escape outwardly through the upper outlet openings —12— and through the adjacent conduits —19— and grilles —20—.

It will be noted that the lower edge of the damper —13— is loosely seated in the grooved bearing —14—, Figure 2, and therefore, the damper may be removed by upward displacement from said bearing and drawn downwardly through the passage —11— and thence outwardly through the front of the combustion chamber or by reverse movements may be replaced upon the bearing —14—, it being understood that the detent —16— may be rocked upwardly out of engagement with the keeper —15— when the damper is being placed in operative position or removed.

Otherwise the heater section —1— and hood section —1'— and also the several plates forming those sections are permanently secured to each other to form gas-tight joints and also to constitute a unitary structure capable of being easily and quickly installed and faced with brick or tiling for ornamental purposes without the employment of particularly skilled workmen in the construction of masonry fireplaces.

What I claim is:—

A sheet metal fire place comprising a hollow U-shaped shell having its opposite sides diverging forwardly from the back and its inner back plate inclined upwardly and forwardly from the lower edge of its outer back plate in a plane some distance to the rear of the front edges of the sides, a hood mounted on the upper end of the shell to extend from front to rear thereof and having its opposite sides extended from the upper rear corners of the shell to the upper inner front corners of the forwardly diverging sides of the shell, the upper ends of the opposite sides of the shell being provided with warm air exit openings at the outside of the adjacent portions of the hood, and means for closing the remaining portions of the upper end of the shell between the inner and outer walls thereof.

In witness whereof I have hereunto set my hand this 10th day of May, 1928.

HERBERT H. WALTERS.