June 30, 1936. H. N. BARUCH ET AL 2,046,051

HEATING UNIT

Filed July 21, 1933

Fig. 1.

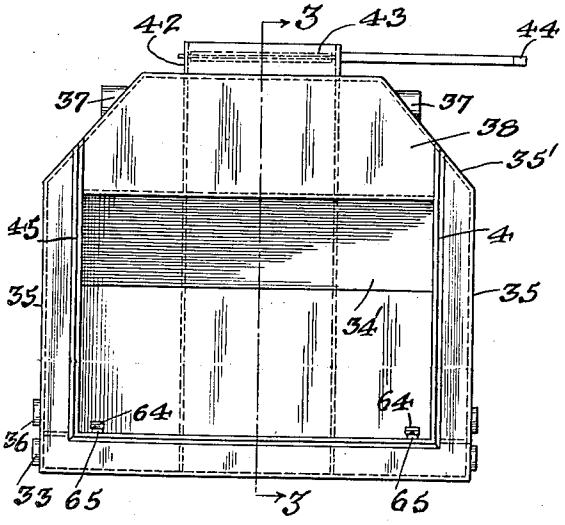


Fig. 2.

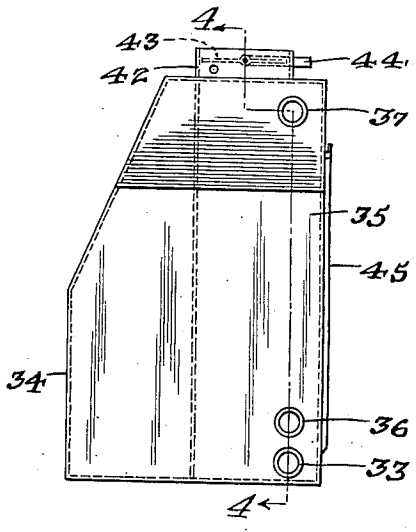


Fig. 3.

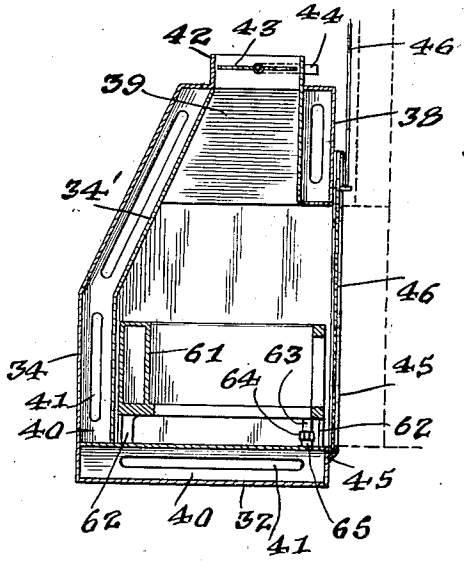
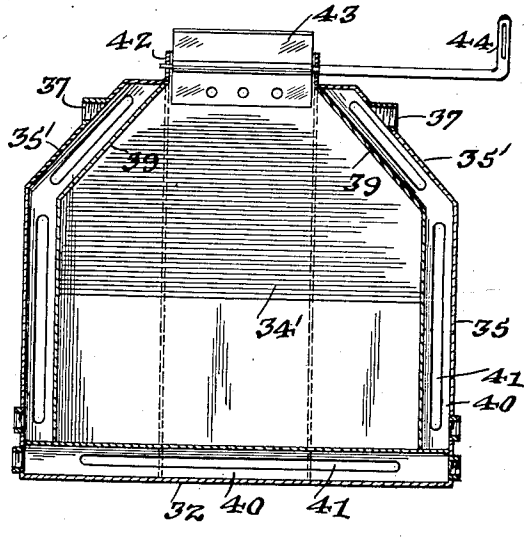


Fig. 4.



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2,046,051

HEATING UNIT

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1 Claim. (Cl. 126—132)

The present invention relates to an improved heating unit, and has the following three main objects in view; first, a unit which may be utilized as an open fire place; second, a unit which utilizes the usually wasted heat energy for operating a hot water heating system for heating adjacent rooms in the building; and third, utilizing waste heat of the unit for heating water for domestic uses.

Another object of this invention is to provide a heating unit of this character which is commercially desirable and possible so that it may be easily and cheaply produced and economically distributed and installed, and which is particularly intended for use in small houses in a temperate zone so as to eliminate the necessity of installing an independent heating system where chimneys and open fire places are provided, and which may be installed without rebuilding either the house or the fire place and chimney.

Numerous attempts have heretofore been made to produce hot water heating open fire places, water jackets and hot water circulating systems, but such prior structures were composed of a practically impossible net work of pipes, headers and the like or embodied such structural features which required them to be specially constructed in separate parts and built into the house and chimney during erection of the same, and which are prohibitive from the standpoint of cost of installation and subsequent maintenance. The purpose of this invention is to overcome these prior disadvantages and provide an extremely simple and practical structure which of itself may be in the form of a single casting or welded construction relatively light in weight and embodying certain heat absorbing and deflecting surfaces and water jackets to provide an open fire place and which prevents loss or waste of heat usually escaping up the chimney and absorbed by the walls of the fire place, which thus utilizes the greatest efficiency of the fire place by a predetermined angle of the back plate and proportions of the flue among other structural features, and which at the same time greatly reduces fire hazards and may be used with the usual chimneys and stove pipes.

A further object of the invention is to provide the open fire place unit with an open grate capable of use with coal or wood or other heating fuels, coke, oil, etc., and which may be jacketed for heating water for domestic purposes so that coals may be banked over night in the grate to maintain the water hot for use in the morning, or for other long periods of time, and to provide a grate structure which may be included in circuit with the water jackets of the unit when the two are used at the same time.

The invention also embraces a heating unit of the open fire place type which admits of the interchangeable use of an open grate or andirons, the heat from both of which is utilized for heating the water jackets of the unit and carrying out the various above mentioned objects of this invention.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claim appended hereto.

In the drawing, wherein like symbols refer to like or corresponding parts throughout the several views;

Figure 1 is a front elevation of the heating unit with parts removed and showing the position of the chimney damper.

Figure 2 is a side elevation of the same.

Figure 3 is a central transverse vertical section on the line 3—3 of Figure 1 through the unit.

Figure 4 is a longitudinal vertical section on the line 4—4 of Figure 2 through the rear portion of the unit.

The unit of the invention comprises a body portion having a bottom wall 32 which is hollow and completely enclosed to provide a water jacket and which is provided at suitable points, such as at opposite ends, with coupling flanges 33 for the circulation of water through the bottom 32 for heating the water as it passes through the bottom. The bottom section 32 is adapted to heat water for domestic purposes and may be coupled in circuit with a storage tank or the like from which the water may be drawn from time to time for use.

Mounted on the bottom 32 is a back wall 34 and end walls 35 which intercommunicate and which are adapted to be placed in circuit with a hot water heating system through the lower connecting flanges 36 and the upper connecting flanges 37.

The unit is also provided with a top front section 38 also in communication with the water jacket in the back 34 and sides 35 and which is spaced forwardly from the upper end portion of the back wall 34, as shown in Figure 3, to provide therebetween an outlet flue 39 for the products of combustion. The upper portion 34' of the back wall is inclined forwardly and terminates at its upper end in a plane spaced rearwardly of the transverse center of the unit so as to not only absorb the desired percentage of heat from the fire in the fire place but to also

deflect a desired proportion of the heat outwardly through the front of the unit and against the front wall section 38.

All of the sections of the unit may be reinforced by webs 40 welded or otherwise suitably secured therein for bracing the sections, and the webs 40 are provided with slots 41 or other suitably provided openings for admitting circulation of water through the sections in the respective domestic and hot water heating systems.

The unit may be constructed in any suitable manner, such as by casting in one piece or separate parts, or may be constructed of sheet metal welded or otherwise suitably secured together. The unit is relatively small and relatively light in weight so that it may be manufactured at a distant point and shipped to a house and installed therein as a supplementary part or attachment thereto. The unit may be readily installed within an open fire-place having a chimney, without defacing the fire-place and without requiring any extensive alteration in the interior construction thereof.

The flue 39 in the upper end of the unit is provided with a collar 42 adapted to project into the chimney 31 and may be coupled with a pipe or the like. The collar 42 carries a damper 43 which has an exterior arm or lever 44 by means of which the damper may be opened and closed. The front of the unit is provided with a flange-frame 45 open at its top and which is preferably supported at the inner marginal edges of the side sections 35 and the bottom 32 for the reception of a front damper plate or door 46 arranged to slide vertically for opening and closing the fire place.

The entire device therefore constitutes a single unit which may be placed in a fire place, and the unit is adapted to lie entirely within the front marginal walls of the fire place so that the water jacket sections are hidden from view and radiation therefrom is thus materially reduced and the fire hazard is also reduced to a minimum, and the external appearance of the unit will not mar or detract from the general appearance of a fire place.

The open grate 61 comprises a hollow body portion providing a water jacket at the back and sides of the grate. The grate is supported upon legs 62 suitably disposed at the corners or the like of the grate, and the jacketed portion of the grate 61 intercommunicates with the bottom hollow section 32 by means of spuds or nipples 63 depending from the grate behind the legs 62 thereof and connected by coupling nuts 64 or the like with correspondingly formed spuds or nipples 65 which project upwardly from the bottom section 32. The nipples 65 and the coupling nuts 64 provide a circulation between the grate 61 and the bottom section 32, so that the heat absorbed within the heating chamber by the grate will be transmitted to the heated medium in the form of water in the bottom section 32.

It will be noted from Figures 1 and 4 that the upper portions 35' of the end walls of the grate are inclined or tapered upwardly so as to converge with the upper portion 34' of the back wall. This construction prevents the too free passage of the products of combustion and heat upwardly through the unit so that the adjacent jacketed portions of the unit may remain in contact sufficiently with the hot air and gases to absorb a maximum heat radiation therefrom.

Usual safety devices protecting against over pressure may be applied as is well known in the art. It is intended to use an expansion tank or usual safety plugs on valves as now in use.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claim.

What is claimed is:—

A heating unit for use in a fireplace comprising a member having jacketed end and rear walls, a bottom wall, an inner bottom wall extending across the member and dividing the member into non-communicating upper and lower heating chambers, a jacketed grate resting on said inner bottom and adapted to absorb a portion of the heat within the member in the lower portion thereof, and a pair of pipe connections communicating the grate solely with the lower heating chamber to provide a circuit for circulation of a heated medium between said grate and lower chamber.

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