

Nov. 26, 1935.

T. PARMELEE

2,022,431

WATER HEATER

Filed Feb. 18, 1935

3 Sheets-Sheet 1

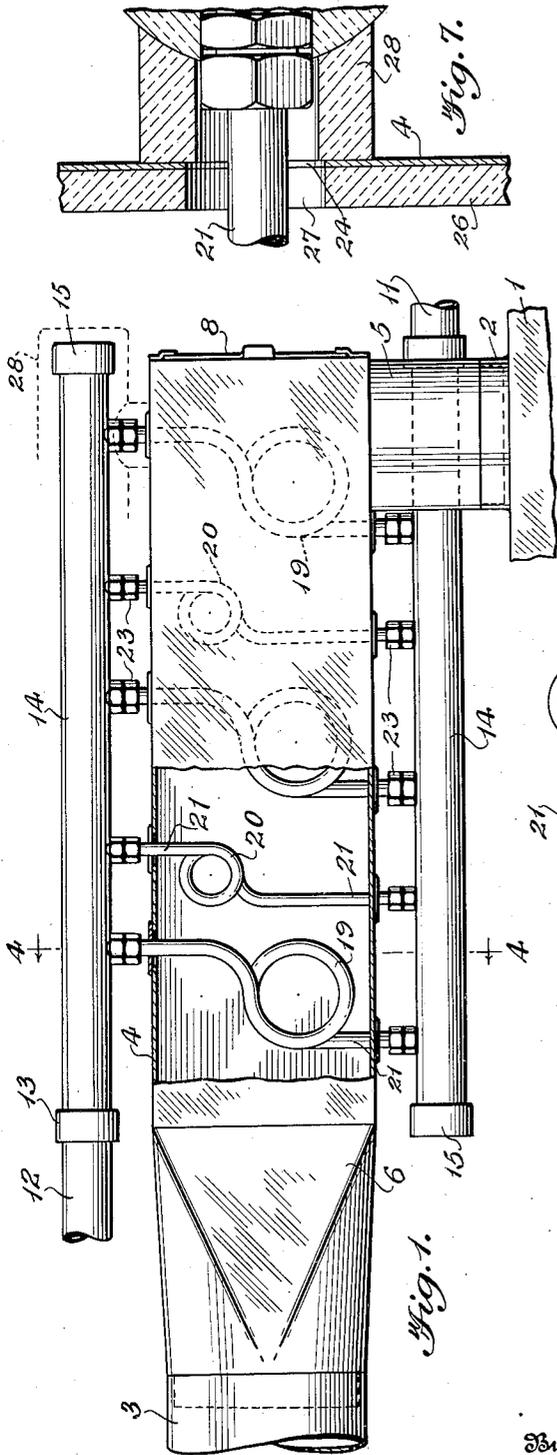


Fig. 1.

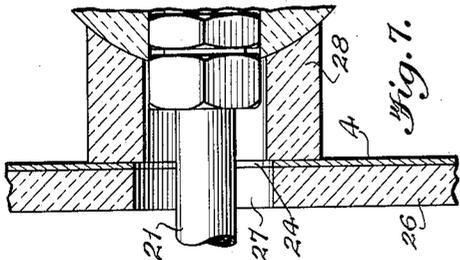


Fig. 7.

Fig. 9.

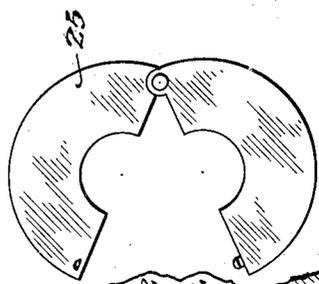


Fig. 5.

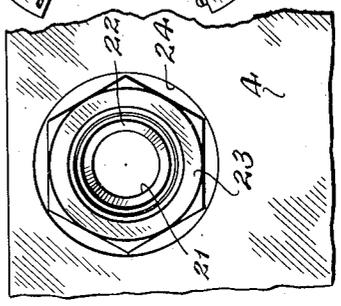
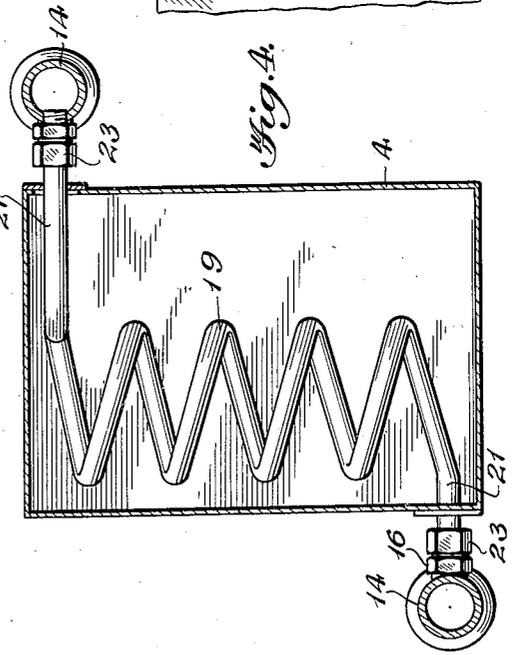


Fig. 4.



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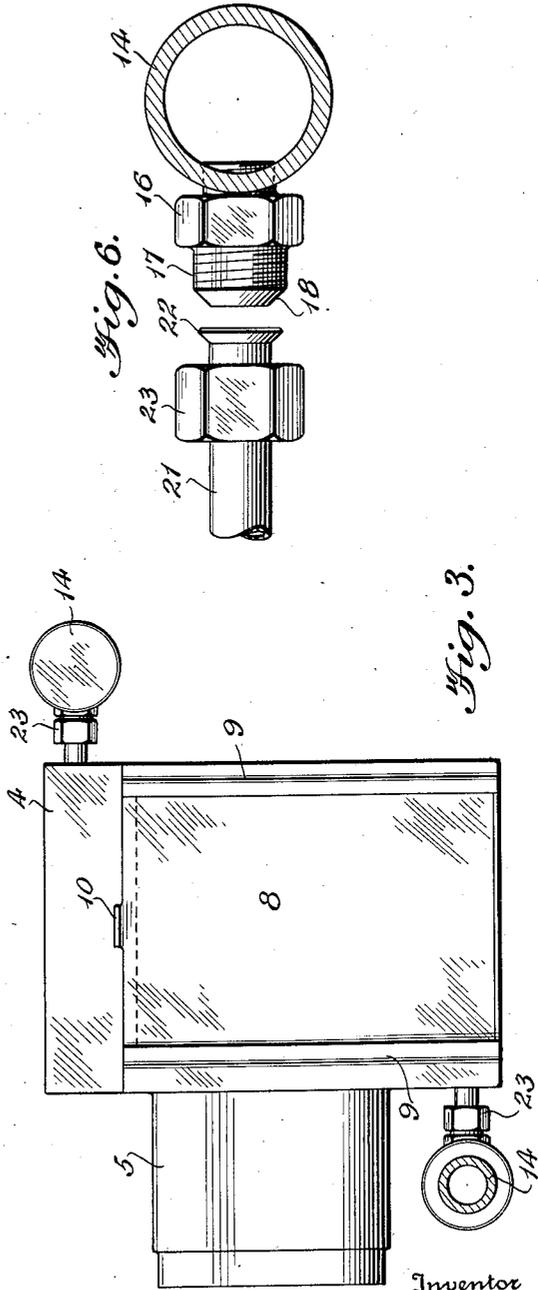
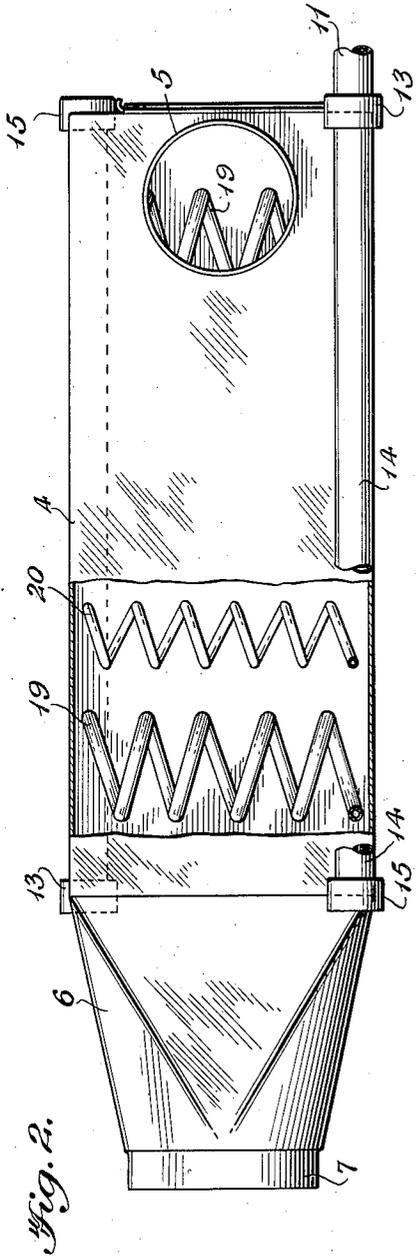
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3 Sheets-Sheet 2



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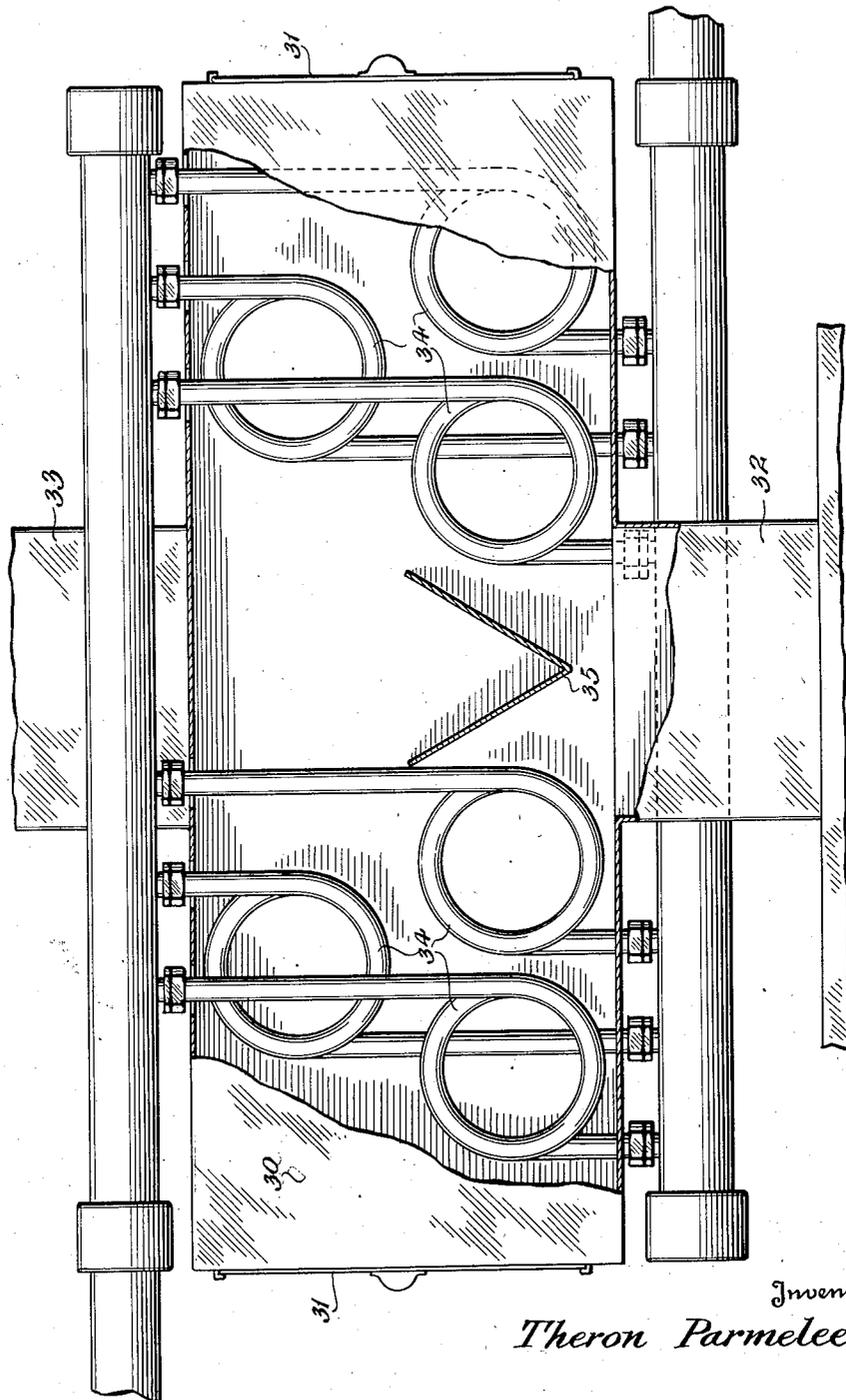
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Fig. 8.



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UNITED STATES PATENT OFFICE

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WATER HEATER

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Application February 18, 1935, Serial No. 7,086

5 Claims. (Cl. 257—235)

The present invention relates to water heaters to be used in connection with the supply of hot water to storage tanks, heating systems and the like in which the heat contained in the products of combustion arising from a stove, furnace or other heater may be utilized or exchanged instead of being permitted to escape through the chimney or flue for such heaters and be totally wasted.

One of the principal objects of the invention is to provide a water heater comprising a casing which will confine the hot gases from a heater and place within such confined area water conducting coils and such coils being so positioned and arranged as to utilize their maximum heating surfaces without materially retarding the passage of the unburnt fuel particles or smoke through such casing.

A still further object of the invention is to provide a water heater of the aforesaid character which may be permitted to be used as a section of a conventional smoke flue whereby it may be easily and readily installed by only removing one of the sections of the smoke flue and substituting the water heater therefor and one in which access may be conveniently gained when installed, for cleaning the soot or other foreign matter that accumulates therein, whereby the standards of efficiency of the heater may be maintained.

And still a further object of the invention is to provide a water heater of the character herein set forth comprising a plurality of separate and individually connected water conducting coils which may be readily and conveniently removed and new coils substituted therefor should any one coil leak or become broken.

Other objects of the invention will be in part obvious and in part pointed out hereinafter.

In order that the invention and its mode of operation may be readily understood by persons skilled in the art, I have in the accompanying illustrative drawings and in the detailed following description based thereupon, set out an embodiment of the same.

In these drawings:

Figure 1 is a plan view of my improved water heater when applied to a smoke flue and having a portion of the casing thereof broken away to show the interior thereof;

Figure 2 is a side elevation of the water heater embodying the invention when removed from the smoke flue and having a section of its casing broken away;

Figure 3 is an end elevation of my improved water heater;

Figure 4 is a vertical transverse section taken on the line 4—4 of Figure 1 in the direction of the arrow points;

Figure 5 is a detail plan view of the casing of the water heater showing one end of one of the water coils projecting through an opening within the casing;

Figure 6 is a detail side elevation of the couplings employed between the water coils and the manifolds thereof, the latter being shown in section;

Figure 7 is a detail sectional view of a slightly modified form of a connection between the casing of the water heater and one of the water manifolds;

Figure 8 is a horizontal sectional view through a water heater embodying a slightly modified form of the invention, and

Figure 9 is a plan view of one of the sealing clamps.

Referring now more particularly to the accompanying drawings wherein like and corresponding parts are designated by similar reference characters throughout the several views, I have herein shown and indicated by the numeral 1 a portion of the heater having the smoke flue 2 extending therefrom. The smoke flue may be of any conventional type or when made into sections, the various sections are so connected that the hot products of combustion arising from the fire box of the heater may travel through the smoke flue into a chimney. When applying my improved water heater to such smoke flues, one section thereof may be removed and my heater substituted therefor having one end connected to the section 2 of the smoke flue and its opposite end connected to the section 3 thereof. The water heater embodying the present invention comprises a casing 4 of a preferably rectangular configuration having a circular extension 5 projecting from one of the side walls near one end thereof and adapted to fit over the section 2 of the smoke flue extending from the heater 1. The other end of this casing 4 tapers as at 6 to a circular extension 7 and the latter is capable of fitting within one end of the section 3 of the smoke flue. The opposite end of the casing 4 has an opening whereby access may be readily gained to the interior of the casing for cleaning the soot or other foreign matter that may accumulate therein. This opening is normally kept closed by a sliding door 8. This door slides within the guideways 9 formed within the casing and is provided with a

handle 10 whereby the door may be raised in gaining access to the interior of the casing 4. Connected to a water storage or hot water heating system is the usual supply pipe 11 and the return pipe 12. Connected to the ends of these pipes 11 and 12 by means of the couplings 13 are manifolds 14. Each manifold 14 has one end closed by means of the cap 15 and has formed therein a plurality of threaded openings. Seated within each threaded opening of these manifolds is a nipple 16 having a hexangular gripping surface formed therewith whereby a suitable wrench may be connected thereto for connecting or disconnecting these nipples from the threaded openings formed within the manifolds 14. Each nipple is provided with a threaded extension 17 having a bevelled and ground tapered surface 18.

Adapted to be positioned within the casing 4 are a plurality of coils preferably made of copper and those indicated by the numerals 19 are of greater diameter than those indicated by the numerals 20. Each coil is arranged in a vertical position within the casing 4 and the larger coils 19 are arranged to one side of the center of the casing whereas the smaller coils 20 are alternately arranged between the larger coils and at the opposite side of the center line extending through the casing. The opposite ends of each coil extend in extensions 21 which latter terminate in flared flanges or projections 22 adapted to fit over the bevelled portions 18 of the nipples 16 thereby forming a ground joint between the coils and such nipples. Loosely mounted upon each extended end 21 of these coils is a nut 23 which latter is adapted to have engagement with the threaded ends 17 of its nipple 16 thereby providing not only a tight joint between the extended ends of the coils and the nipples but effecting a detachable connection whereby the coils may be readily connected to or detached from their respective manifolds. The side walls of this casing 4 are provided with openings 24 of a diameter greater than that of the nuts 23 whereby the extended ends 21 of the coils and the nuts 23 carried thereby may be passed through these openings 24 when being connected to the manifolds 14 or they may be drawn within the casing through such openings 24 when removing a coil therefrom. In order to close these openings 24 and prevent the smoke or heat escaping there-through, I provide sealing clamps 25. These clamps each consist of two hingedly connected sections adapted to fit over the extended end 21 of the coils and have a diameter larger than that of the openings 24 whereby when such sealing clamps are applied, the openings 24 will be completely closed and the heat or smoke prevented from escaping therethrough.

In Figure 7 of the drawings, I have illustrated a slightly modified form of connection between the manifold 14 and the extended ends of the water coils thereby eliminating the use of the sealing clamps 25 and permitting a suitable insulated covering to be applied. In this form of my invention, I arrange within the casing 4 and completely cover the various walls thereof with a suitable insulating material such as asbestos 26. This insulating material is provided with openings 27 alining with the openings 24 formed within the casing 4 so that the extended ends 21 of the water coils may project therethrough. A suitable covering 28 made of insulating material may extend over the manifolds 14 and the extended ends 21 of the water coils thereby not only preventing the heat or smoke from escaping but

insulating the water being supplied to or from the heater from the surrounding temperatures.

In the slightly modified form of the invention as disclosed in Figure 8 of the drawings, I have shown a water heater comprising a casing 30 having the opposite ends thereof normally closed by means of the sliding doors 31. Communicating with this casing is an inlet pipe 32 which is adapted to have connection with the stove pipe of the furnace to which it is connected, and the opposite wall of this casing is provided with an outlet pipe 33 which latter is adapted to have connection with the chimney. The water coils 34 are arranged in groups within the opposite ends of the casing 30 and positioned within the casing is a baffle plate 35 whereby the hot gases arising from the furnace will enter the casing 30 through the inlet pipe 32 and by striking the baffle 35, will be directed to the opposite ends of the casing 30. These hot gases after circulating by the water coils 34 will then be caused to flow through the outlet opening 33 and exhaust through the chimney to which the heater is connected.

From the foregoing, it is obvious that I have provided a water heater which may be easily and readily applied to the smoke flue of a stove, furnace or other heater and the heat which is usually permitted to escape through the chimney is utilized for heating water and this water may be supplied to a storage tank or ordinary heating system thereby economizing on the use of fuel. Furthermore, it is apparent that, through the construction and arrangement of the various parts herein set forth, not only a greater part of the waste heat from the heater may be utilized but the various parts of my heater may be dismantled when required in order that new parts may be readily substituted therefor for increasing the life of the water heater and thereby rendering the same commercially desirable.

Manifestly, the construction herein shown is capable of considerable modification and such modifications as come within the scope of my claims, I consider within the spirit of my invention.

I claim:—

1. A water heater comprising a casing adapted to form one section of a flue and to be connected to the chimney of a heater whereby the hot gases arising from the heater may pass therethrough, a plurality of coils positioned within said casing, said coils comprising two groups of different diameters, said group of coils of the smaller diameter being alternately arranged between the coils having the greater diameter, a water inlet, a water outlet, and means for connecting each of said coils to said water inlet and outlet.

2. A water heater comprising a rectangular hollow casing, a hot gas inlet connected to one of the side walls of said casing and communicating with the interior thereof, a reduced circular extension formed at one end of said casing and providing an outlet therefor, a closure controlled opening formed within the opposite end of said casing, a plurality of coils arranged within said casing, a water inlet, a water outlet, and means for connecting said water inlet and outlet to said coils.

3. A water heater comprising a casing having hot air inlet and outlet openings therein, one end of said casing having an opening, guideways upon said casing and arranged adjacent said opening, a door slidably mounted within said guideways for closing said opening, a plurality

of coils arranged within said casing in a vertical extended manner, extended ends upon said coils, a manifold arranged externally of said casing adjacent the lower side thereof, a water inlet communicating with said manifold, a manifold arranged externally of said casing adjacent the upper side thereof, a water outlet communicating with the last mentioned manifold, and means for detachably connecting the extended ends of said coils to said manifolds.

4. A water heater comprising a casing having inlet and outlet openings for hot gases communicating with the interior thereof, the side walls of said casing having a plurality of openings formed therein, coils arranged within said casing, extended ends upon said coils adapted to project through the openings formed within the side walls of said casing, nuts loosely carried by said extended ends of the coils, said openings within the side walls of the casing being of a larger diameter than that of the nuts carried by said extended ends whereby the nuts may readily

pass therethrough, manifolds arranged externally of said casing, water inlet and outlet openings communicating with said manifolds, a plurality of nipples mounted upon and communicating with said manifolds, said nuts having detachable connection with said nipples for connecting the extended ends of said coils thereto and a sealing clamp connected to each extended end of said coils for sealing the openings in the side walls of the casing substantially as and for the purpose specified.

5. A water heater comprising a casing having oppositely arranged inlet and outlet openings for hot gases communicating with the interior thereof, water coils positioned within said casing and arranged in groups adjacent the opposite ends thereof, and a baffle plate arranged within said casing whereby the hot gas when entering said casing will be caused to circulate about said coils.

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