

Feb. 28, 1933.

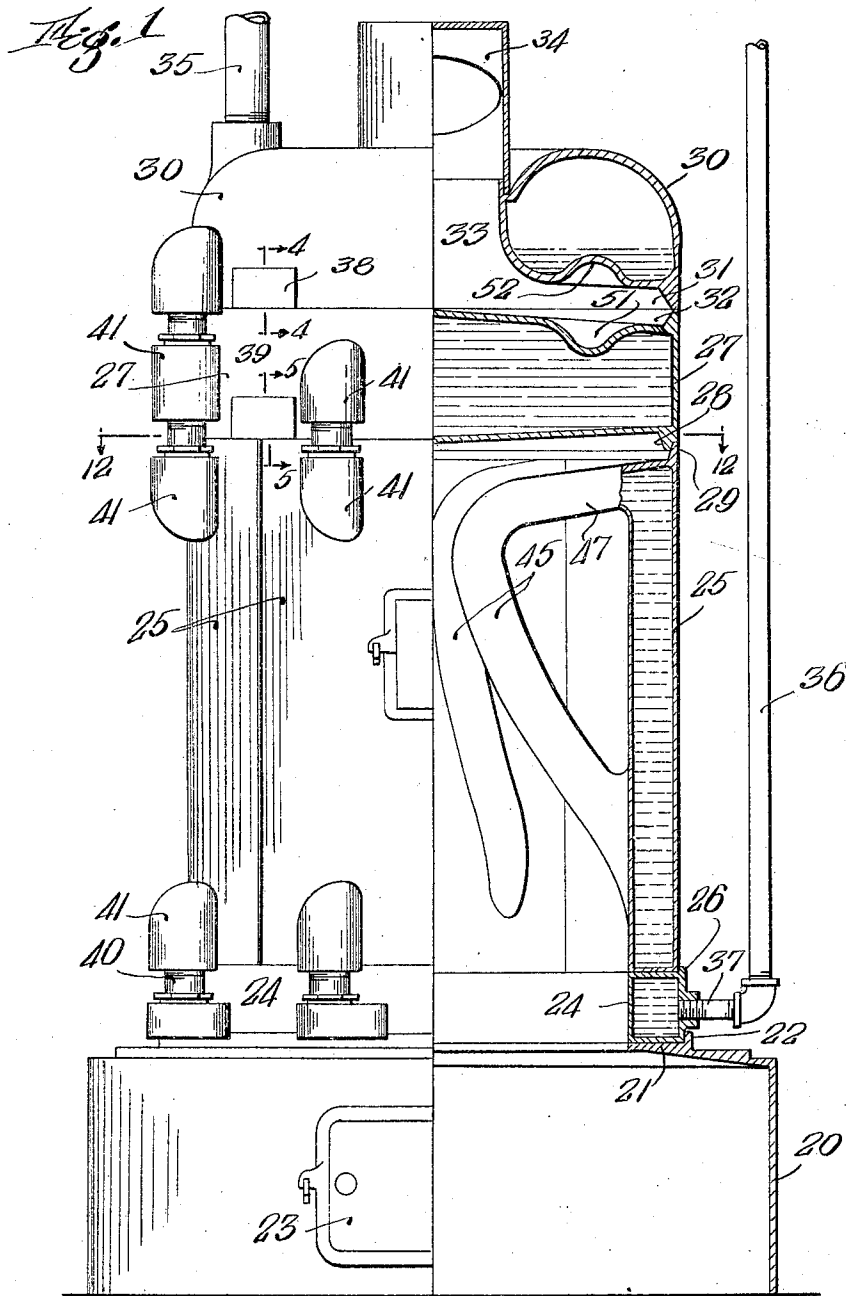
H. J. WALKER

1,899,541

HEATER CONSTRUCTION

Filed Aug. 27, 1932

4 Sheets-Sheet 1



Inventor
Hugh J. Walker
By Arthur D. Hanson
att'y.

Feb. 28, 1933.

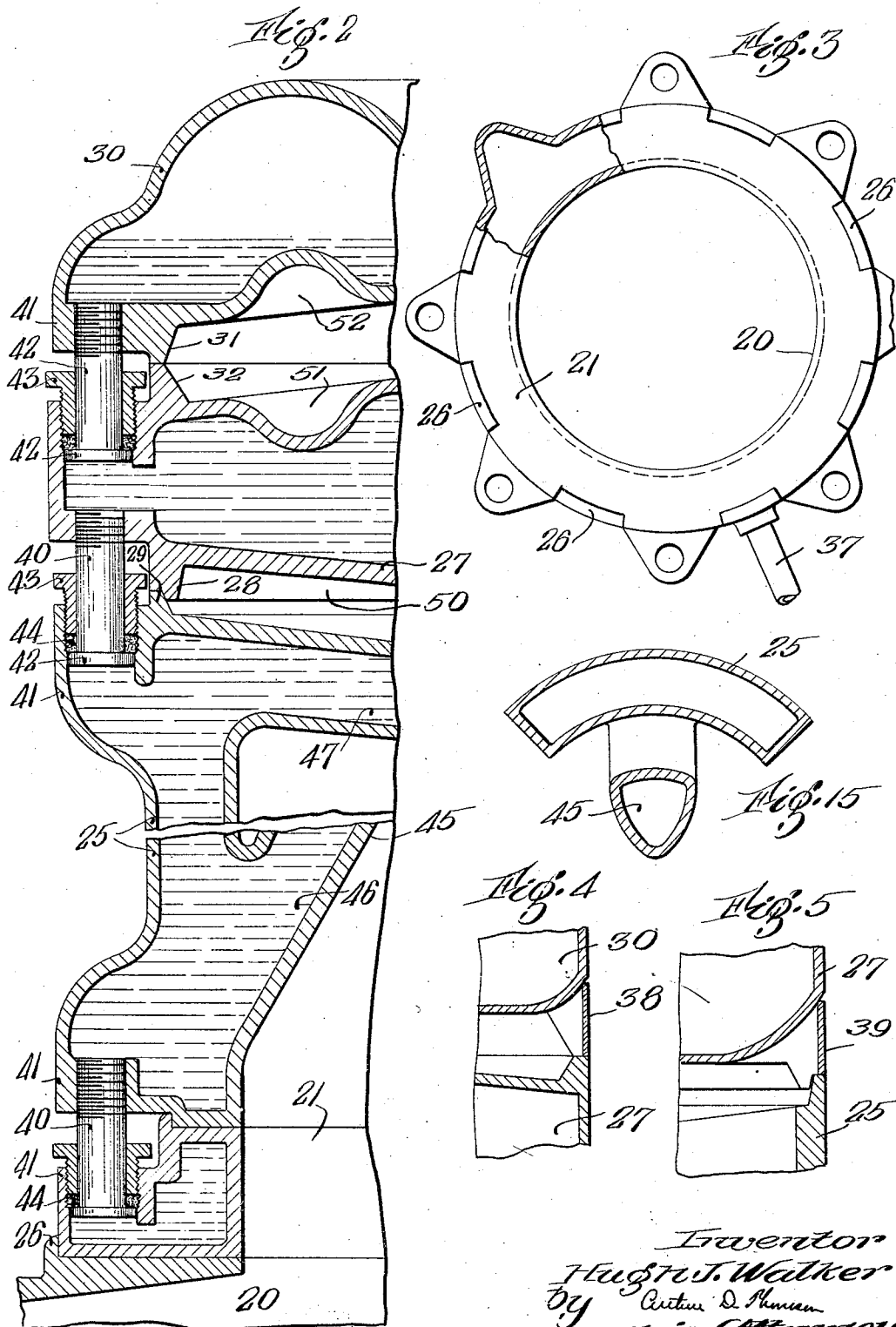
H. J. WALKER

1,899,541

HEATER CONSTRUCTION

Filed Aug. 27, 1932

4 Sheets-Sheet 2



Inventor
H. J. Walker
By Arthur D. Mumma
his Attorney.

Feb. 28, 1933.

H. J. WALKER

1,899,541

HEATER CONSTRUCTION

Filed Aug. 27, 1932

4 Sheets-Sheet 3

Fig. 6

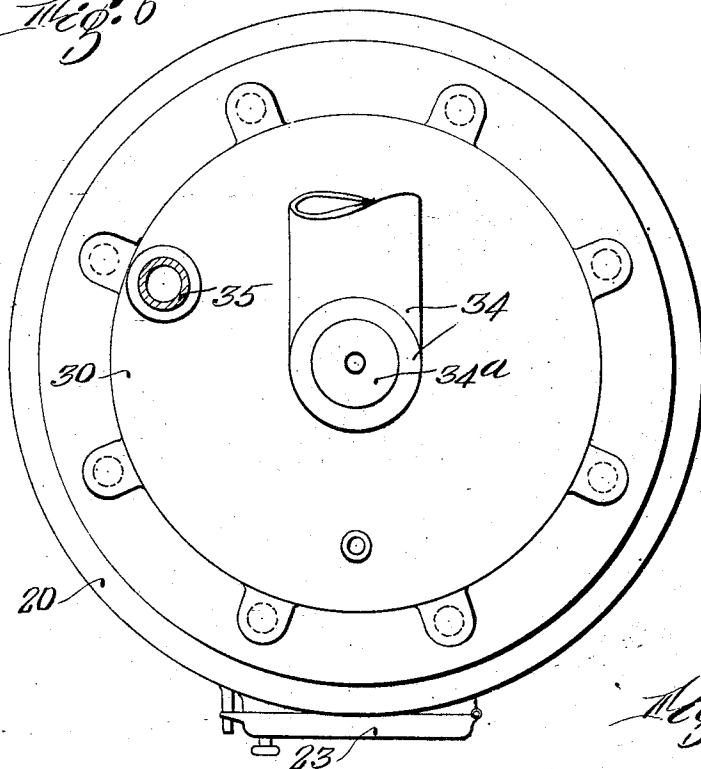


Fig. 9

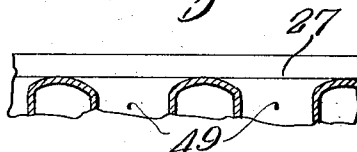


Fig. 8

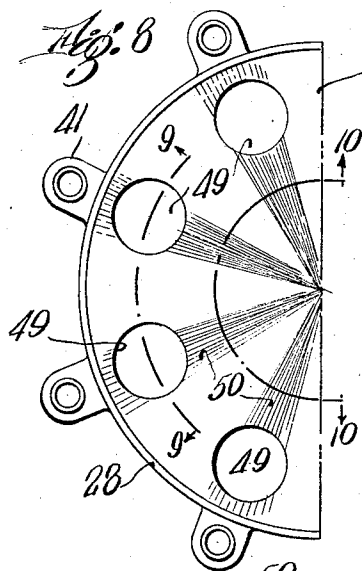


Fig. 7

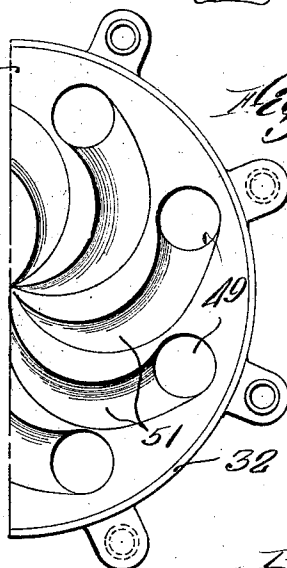


Fig. 10



Inventor
Hugh J. Walker
By *Arthur D. Hansen*
His Attorney.

Feb. 28, 1933.

H. J. WALKER

1,899,541

HEATER CONSTRUCTION

Filed Aug. 27, 1932

4 Sheets-Sheet 4

Fig. 11

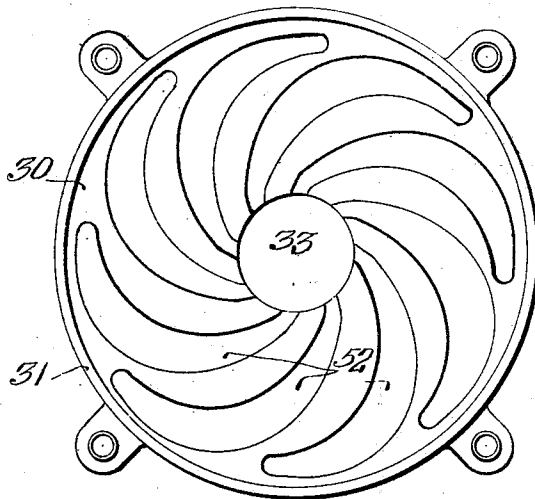


Fig. 13

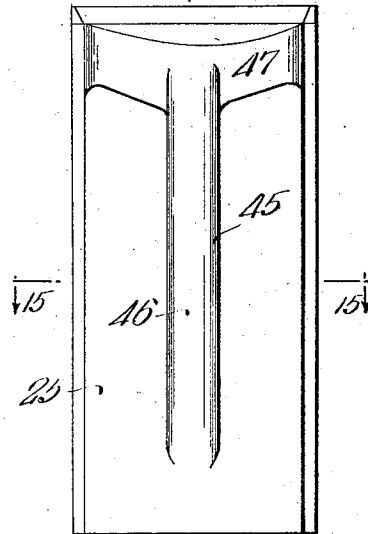


Fig. 12

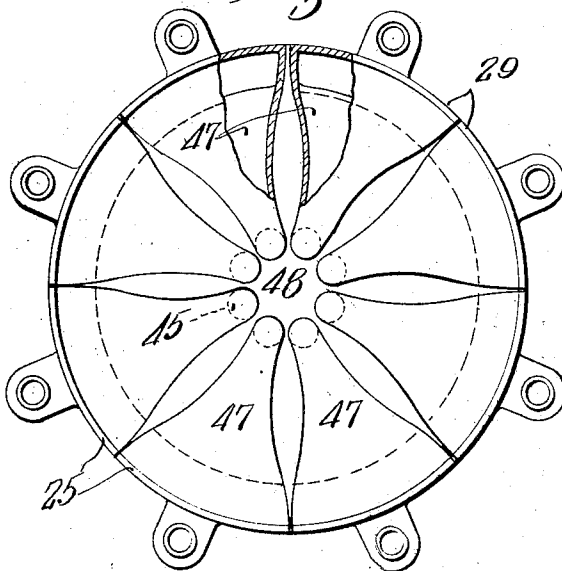
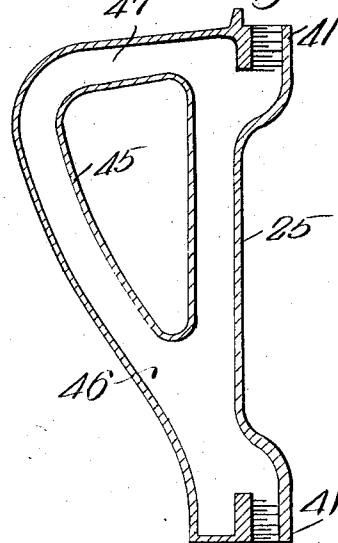


Fig. 14



Inventor
Hugh J. Walker
By *Arthur D. Hanson*
his Attorney.

UNITED STATES PATENT OFFICE

HUGH J. WALKER, OF WOBURN, MASSACHUSETTS

HEATER CONSTRUCTION

Application filed August 27, 1932. Serial No. 630,676.

This invention relates to domestic heating plants and pertains more particularly to sectional steam boilers adapted especially for use with oil burners. The principal purpose of the invention is to provide a sectional boiler which may be quickly and easily assembled by interconnecting several cast iron units specially constructed to furnish adequate water capacity and to ensure proper and efficient heat circulation over an unusually large surface area without sacrifice of compactness and economy.

Further objects of the invention reside in the structural features of the boiler herein-after described in connection with the accompanying drawings illustrating a preferred embodiment of the invention, and will be pointed out in the appended claims. Except as these improvements are set forth in the claims, however, it will be understood that the details of structure may be varied to suit particular purposes without departing from the essence of this invention which is intended to include all modifications and equivalents of the specific elements herein disclosed.

In the drawings,

Fig. 1 is a front view of the improved boiler partly in elevation and partly in vertical section;

Fig. 2 is a fragmentary section to larger scale, similar to that of Fig. 1 but taken on through the nipples connecting the assembled sections;

Fig. 3 is a plan, partly in section, of a bottom water ring of the boiler;

Figs. 4 and 5 are enlarged detail sections taken on lines 4—4 and 5—5 respectively of Fig. 1;

Fig. 6 is a plan view of the boiler, showing the top section or head thereof;

Fig. 7 is a top view of one-half of the next lower-most or intermediate boiler section;

Fig. 8 is a bottom view of Fig. 7;

Figs. 9 and 10 are fragmentary sections taken on lines 9—9 and 10—10 respectively of Fig. 8;

Fig. 11 is a bottom view of the top section or head;

Fig. 12 is a view taken on line 12—12 of

Fig. 1, showing the tops of several interfitted segmental boiler sections located between the intermediate unit shown in Figs. 7 and 8, and the base ring illustrated in Fig. 3;

Fig. 13 is an inside elevation of one of the segmental sections; and

Figs. 14 and 15 are sectional views taken in lines 14—14 and 15—15 respectively of Fig. 13.

In the particular embodiment chosen for the purpose of illustration, the boiler is mounted upon a suitable base 20 the top of which is preferably formed with a flat, annular seat 21 and an outer, annular flange 22. The base may have the usual service door 23, and provides a pit or chamber particularly adapted for an oil-burning unit; although it may be equipped with a common type of grate for burning coal, coke or wood. The boiler proper comprises several cast iron water sections or units which are fitted compactly together and interconnected by nipples which also serve as water conduits between the respective sections.

In the order of their normal assemblage, these units include a base ring 24 which fits upon the seat 21 within the flange 22; a plurality of complemental side segments 25 which nest together in the form of a composite cylinder and seat upon the base ring within spaced, arcuate flanges 26 upstanding therefrom; a sub-head or intermediate section 27 having an annular bottom flange 28 fitting within the upstanding peripheral lip formed by the tops 29 of the juxtaposed segmental units 25; and a top section or head 30 having a bottom rim 31 engaging a complemental rim 32 of the intermediate unit, the head having a central flue 33 leading to a smoke-pipe 34 of usual construction and a union communicating with a main steam pipe 35. The flue 34 may have a cleanout cover 34a through which the vapor conduits of the upper and intermediate sections may be reached with a brush or scraper. A return line 36 leads to the base ring 24, as indicated at 37. Cleanout covers 38 and 39 respectively, may be provided in the head and sub-head units, as indicated in Figs. 1, 4 and 5.

As mentioned above, the several sections

are joined by conduits or nipples, these preferably being of the type best shown at 40 in Fig. 2. The nipples are connected to outwardly projecting bosses formed on the adjacent sections and generally indicated by the numeral 41. In each instance, the nipple is preferably threaded in the boss of the upper member or unit and is provided with a flanged lower end 42 which fits into the complementary boss of the next lower unit. A nut or gland 43 on the nipple may then be screwed into the lower boss which has a larger bore than the complementary upper boss to compress packing material 44 against the flange 42 and expand the packing to provide a water-tight union. It will be observed that each of the side or wall segments 25 (here shown as eight in number) is provided with a water connection at both the top and bottom thereof, said connections being joined by the nipples 40 to complementary connections of the base ring and intermediate sections respectively; whereas the top section or head has but four connections nipples to alternate bosses of the sub-head. This arrangement ensures uniform heating and circulation of water through the wall units, while providing an adequate number of symmetrically located connections from the sub-head 27 to the main steam head 30.

It will also be noted that each of the cast iron side segments 25 is formed with an integral inwardly extending arm or tube 45 which is relatively narrow at its bottom portion 46 and broad at its top 47, thereby exposing an unusually large heating area to the direct heat of the burner or coal fire and the hot gases of combustion. Furthermore, the broad tops of these by-pass tubes tend to confine the heat within the combustion chamber and to ensure complete combustion, while the spaces between adjacent tubes and the central opening 48 shown in Fig. 3 affords adequate circulation of the gases through the flue openings 49 of the sub-head 27 (Figs. 7 and 8).

These openings are arranged in spaced circumferential relation near the periphery of the intermediate section, the bottom surface of which is convex and formed with radial heat grooves or channels 50 leading to the respective flues 49. The upper surface of section 27 is also generally convex and has a series of tapered, spiral shaped grooves 51 leading from the flues 49 to the center or axis thereof. These spiral channels cooperate with complementary grooves 52 in the concave bottom plate of the steam head 30 in conveying the exhausted gases with a swirling motion to the central flue 33 which leads directly to the smoke pipe 34, thus increasing the draft action of the boiler without material loss of effective heat.

From the foregoing it is evident that a heating plant (whether of steam or hot wa-

ter) constructed and assembled in the manner herein disclosed, is unusually efficient in operation, relatively simple and inexpensive to manufacture and install, and suitable for fuel of any desired type. The interfitted, segmental wall castings are particularly important in achieving these beneficial results, for their integral, inwardly offset water tubes or arms expose a very large heating surface directly in the path of the flame of an oil burner or the burning coals of a grate fire, without the necessity of providing separate water tubes or other complicated and expensive fluid conduits.

The improved type of unions or nipple connections between the heater sections also simplifies the assembly and avoids the necessity of exact machinery of the complementary, bore-threaded bosses, while providing secure and water-tight connections. In large size heaters, however, a yoke-type union may be employed in place of these nipples, in accordance with common practice; and it will be understood that the dimensions and structural details of the heater may be varied to suit particular conditions of use without departing from the essence of the invention as defined in the appended claims. The heater may be suitably insulated by a jacket or coating, or it may be enclosed within an insulating casing, if desired.

I claim:

1. A heater of the class described comprising a base section, separable upright wall sections, and a top section, and fluid conduits interconnecting the respective wall sections with the base and top sections, the respective wall sections having integral, inwardly directed arms providing offset water tubes extending radially toward the center of the heater, and said tubes being narrow at their bottoms and relatively broad at their tops.

2. A heater of the class described comprising a base section, separable upright wall sections arranged in juxtaposed, peripheral relation upon said base, an intermediate section fitting upon the tops of the wall sections, a top section seated on said intermediate section, and nipples interconnecting the respective wall sections with the base and intermediate sections, certain of said nipples being also connected to the top section, the wall sections being segmental in configuration and providing a substantially circular body, the several sections interfitted with each other and having intercommunicating water chambers, the intermediate section having spaced flues arranged radially near its periphery and the top section having a centrally located flue, and said top and intermediate sections having channels in their surfaces for directing consumed gases toward the respective flues.

3. A heater of the class described comprising a base section, separable upright wall

sections arranged in juxtaposed, peripheral relation upon said base, an intermediate section fitting upon the tops of the wall sections, a top section seated on said intermediate section, and nipples interconnecting the respective wall sections with the base and intermediate sections, certain of said nipples being also connected to the top section, the wall sections being segmental in configuration and providing a substantially circular body, the several sections interfitted with each other and having intercommunicating water chambers, the intermediate section having spaced flues arranged radially near its periphery and the top section having a centrally located flue, and each wall section having an offset vertically extending water tube projecting radially toward the center of the heater body, the top portions of said tubes being broader than the bottom portions thereof.

In testimony whereof I affix my signature.
HUGH J. WALKER.

25

30

35

40

45

50

55

60

65