July 17, 1934. A. C. STRAND 1,967,136

SECTIONAL WATER HEATER

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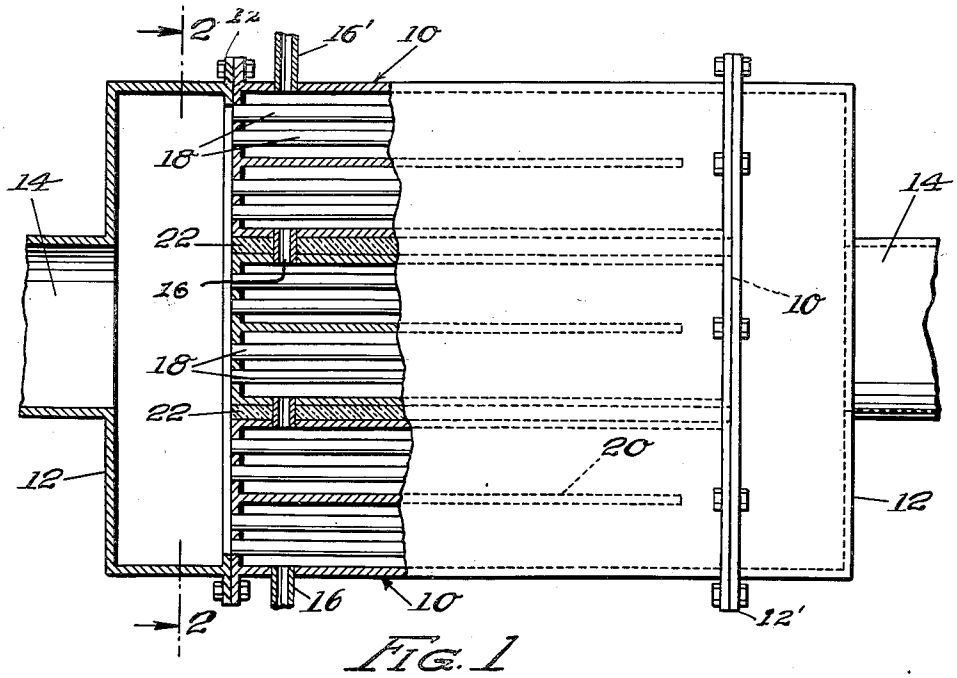
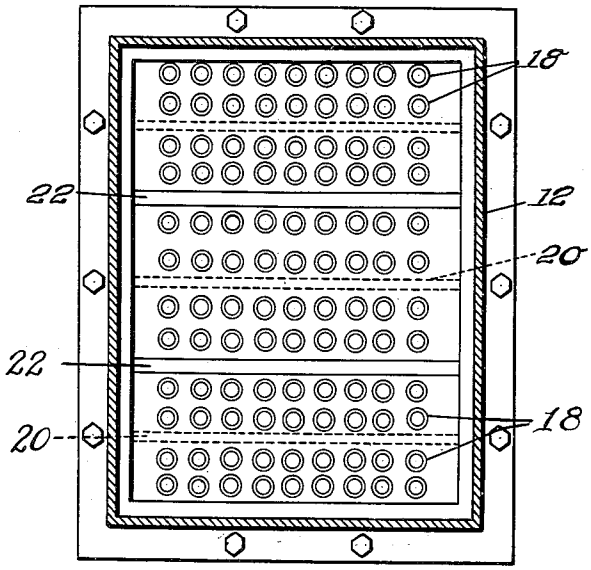


FIG. 1



AXEL C. STRAND
INVENTOR

PER Gust Hjelm

ATTORNEY

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SECTIONAL WATER HEATER

Axel C. Strand, Chicago, Ill.

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1 Claim. (Cl. 257—236)

This invention relates to improved sectional water heaters, and has to do with particular improvements in the utilization of waste heat from flues or chimneys of boilers, furnaces or the like.

One of the important objects of this invention is the provision of means for constructing the heating unit of a plurality of interchangeable sections.

Another important object is the provision of means for insulating each section of the unit from the adjacent section.

Another and still further important object of this invention is the provision of means for the ready passage of water from one section of the heater to an adjoining section.

Still another and further important object of this invention is the provision of means whereby a single baffle plate directs the flow of water through each section of the heater.

Other and further important objects of the invention will be apparent from the disclosures in the accompanying drawing and following specification.

The invention, in a preferred form, is illustrated in the drawing and hereinafter more fully described.

In the drawing:

Figure 1 is a side elevation of the improved sectional water heater of this invention with parts broken away to show in sectional detail certain portions of the unit.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1, looking in the direction indicated by the arrows.

As shown in the drawing:

The reference numeral 10 indicates in a general way the casing of the improved sectional water heater, which is preferably the shape of a rectangular parallelopipedon, although the sections may be made in any other desired or convenient form.

Suitable headers 12, as best shown in Fig. 1, are used to position the heater of the invention in the smoke flue line in the furnace or boiler. The headers are provided with flanges 12′ suitable for attachment to flanges on the ends of the casing 10 and with nipples 14 for connecting the heater to the smoke flue. The headers are interchangeable and may be made with different sized nipples to accommodate the particular sized smoke flue where an installation is to be made. The headers may further vary in size so as to be used to form a two-section unit, a three-section unit, or whatever sized unit is to be put into operation. The drawing shows a three-section unit.

Each section has aligned openings at the top and bottom for receiving and holding nipples 16 which form passageways or pipes for the flow of water into and out of the sections.

Mounted in each section is a plurality of longitudinally disposed pipes 18 as best shown in certain sectional views of Figure 1 and the sectional view of Figure 2, these pipes being suitably mounted in the ends of the sections to form a water-tight container. Hot gases from the smoke flue flow through the nipple 14 into the inlet header 12, then through the pipes 18 in all the sections into the outlet header from which they are discharged through the outlet nipple 14 into the smoke flue.

A baffle plate 20 is mounted in the interior of each section as best shown in Figure 1, and allows water to flow through the section in a circuitous route only. Water to be heated enters the lowermost section through the lower nipple 16 and is directed to the opposite end of the section by the baffle plate, thence to the discharge nipple 16′ at the top of the heater.

It will be evident that by restricting the flow of water through the relatively small openings between the sections and by directing said water over the entire length of the pipes in all sections, all of the heating surfaces of said pipes are utilized and furthermore, the heating area may be increased or decreased by the addition or removal of sections.

When a plurality of sections is used to form a unit, heat insulating material 22 is used between the sections as best shown in Figure 1. The insulating material serves to keep the cold water in one section from cooling the water in other sections and further tends to retain the heat when fires are allowed to go down, as during the night. The water in one section is very well heated before entering the adjacent section, as convection is retarded owing to the restricted size of the communicating nipples.

It will be evident that herein is provided a simple, yet a very efficient and economical means for utilizing the waste heat from furnaces, boilers, or the like which usually escapes through the flue or chimney.

The units may be easily and quickly increased or decreased in size, by the addition or removal of sections, to meet any desired requirement. Furthermore, as each section is heat insulated,

a suitable storage container for hot water is provided.

The fact that each section of the unit is separate and distinct, and is also insulated from the remaining sections by heat insulating material which extends horizontally and laterally between the sections, provides a multiple sectional heating unit wherein water or other fluid can be economically and quickly heated, and without any loss of time or heating material.

Transfer of heat from the flue gases to the cold water in each section is continuously taking place as long as any hot flue gases are passing through the device. The warmed water in each section will rise to the top thereof and will be retained in the top. As only a very small amount of this warmed water escapes into the next upper adjoining chamber or section through convection, obviously any water drawn off will be from the top of the uppermost section, thereby affording a practically instantaneous source of hot water. Furthermore, when such water is drawn off, an influx of water of a lower temperature takes place into the bottom of the section, this cooler water being from the upper portion of the next adjacent lower section.

As the arrangement of parts is simple, no skill or special knowledge of heating equipment is necessary for the installation or maintenance of the sectional water heater of this invention.

I am aware that many changes may be made and numerous details of construction varied throughout a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than as necessitated by the prior art.

I claim as my invention:

A heater, including in combination, a sectional casing adapted to be inserted in the flue line of a furnace, headers for the casing, a nipple on each header for fitting into the flue line, means for securing the casing sections and headers together into a single unit, heat insulating material between the casing sections, means for allowing water to pass from one section to another, said means comprising inlet and outlet pipes fitting into adjacent sections and passing through the insulating material, said pipes being of restricted diameter to minimize convection, baffle means in each section for further minimizing convection and pipes passing longitudinally through the sections for the passage of flue gases therethrough, said pipes additionally acting as baffles for the water in the sections.

AXEL C. STRAND.