Oct. 8, 1935. G. F. CROSIAR 2,016,276

COIL FOR BOILERS

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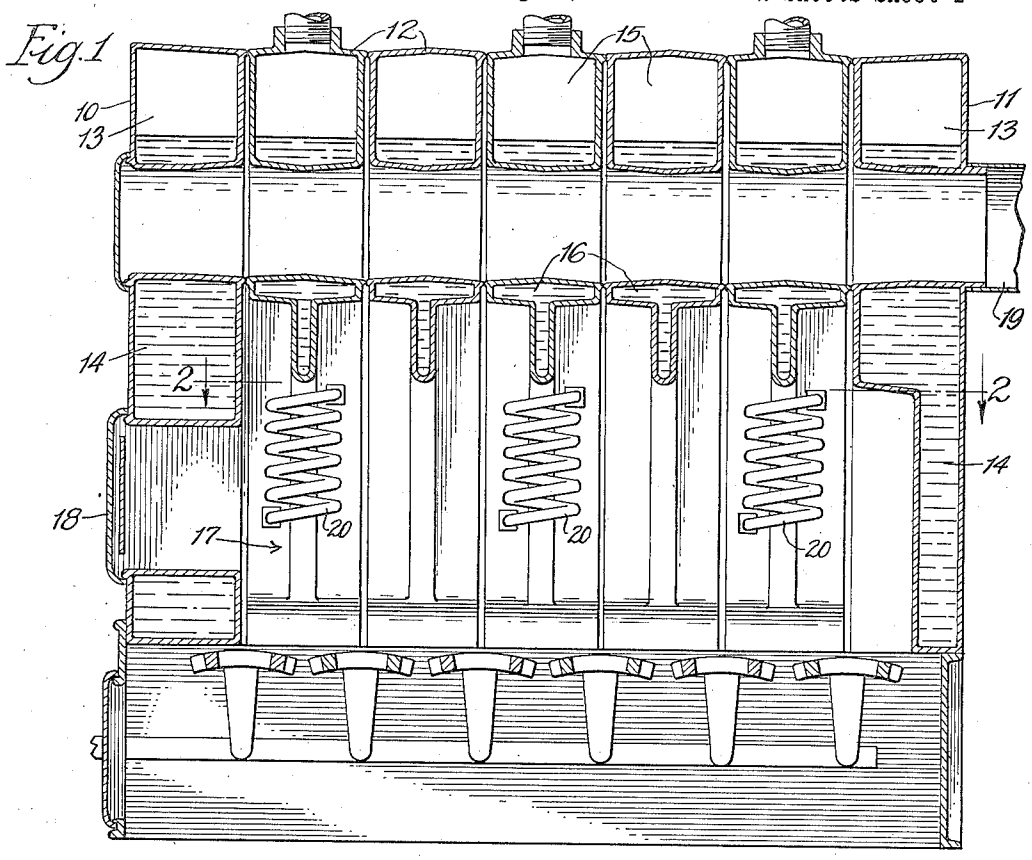
Fig. 1



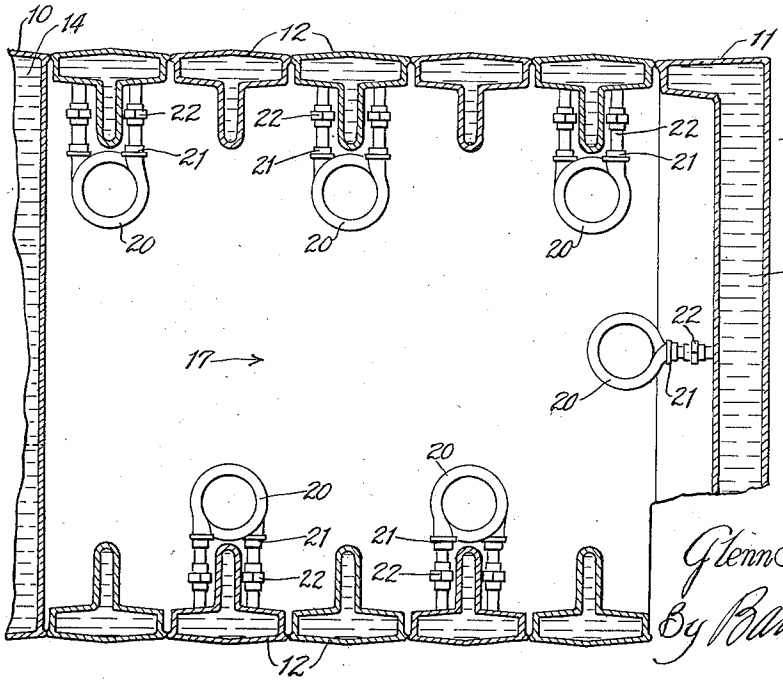


Fig. 2

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Fig. 3

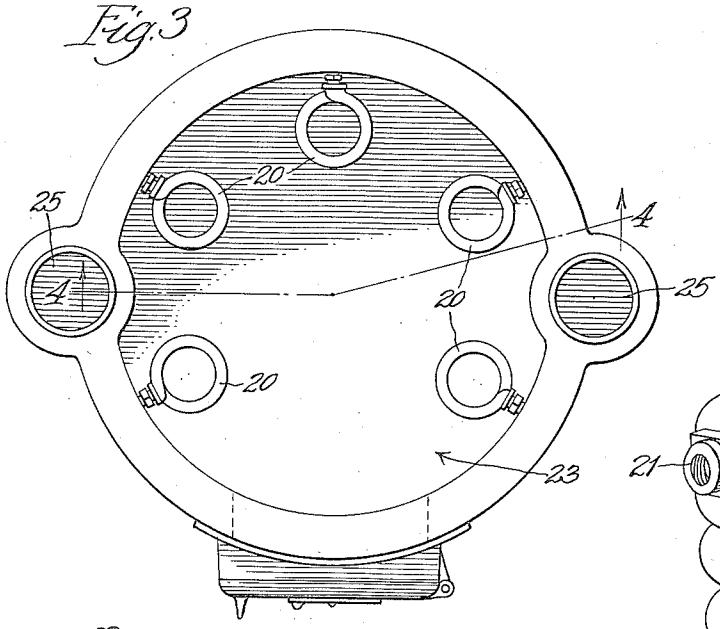


Fig. 5

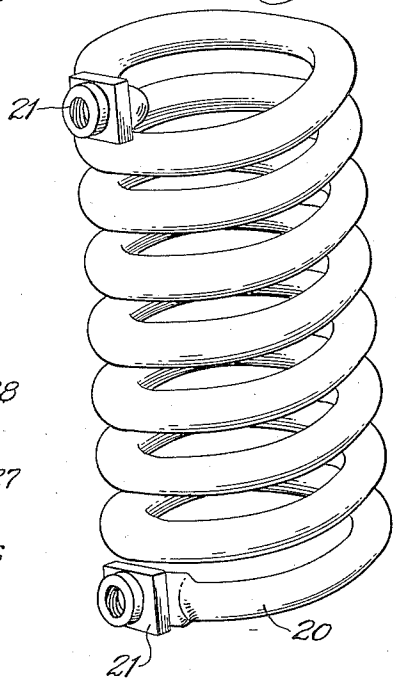
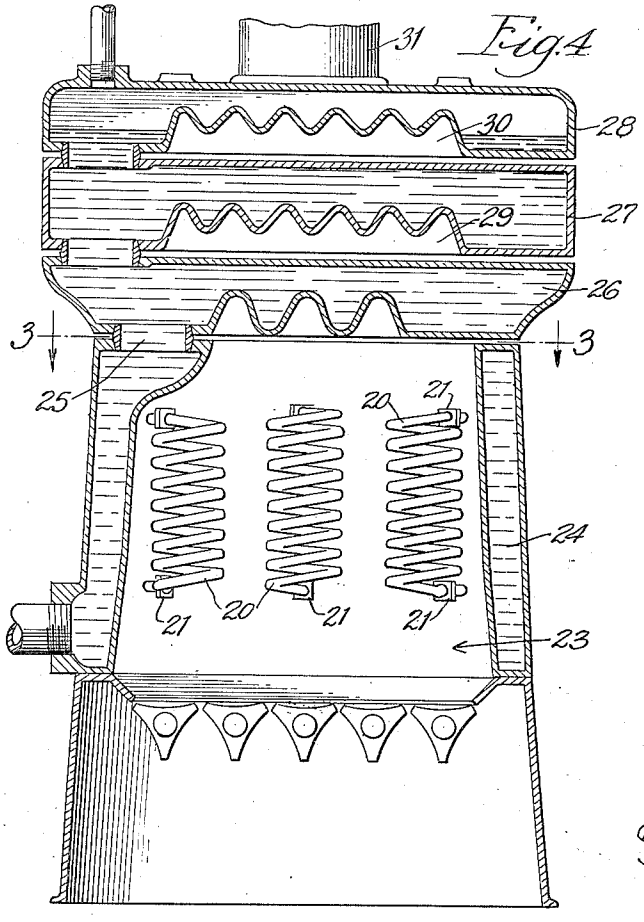


Fig. 4



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Patented Oct. 8, 1935 2,016,276

UNITED STATES PATENT OFFICE

2,016,276

COIL FOR BOILERS

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Application August 4, 1934, Serial No. 738,398

3 Claims. (Cl. 122—135)

The present invention is directed to the provision of heating coils within the fire chamber of the boiler of a heating plant for the purpose of enlarging the radiating surface and increasing the generating capacity of the boiler.

The coils of the present invention are intended to fit into boilers of standard construction and as an addition thereto, and are particularly designed to increase the heating capacity of boilers employing gas as the heating medium, although equally adapted for use in boilers employing oil or solid fuel for heating.

In particular, the coils of the present invention (preferably of copper) are intended for insertion in furnaces of cast iron construction having relatively thick or massive metal walls, which well serve for the retention and distribution of heat, and which in conjunction with the copper coils serve to rapidly distribute the heat conserved in the iron of the furnace through the copper of the coils, so that water within the furnace will be rapidly and effectively heated, with a minimum expenditure of fuel, particularly gas, which under modern practice is subject to thermostatic control and is frequently turned down, in which cases, however, the heat conserved within the heavy walls of the furnace will be distributed through the copper coils and expended in the heating of the water for considerable periods of time after the fuel supply has been reduced or entirely cut off. This circumstance renders the use of the coils of the present invention of particular advantage in case of gas heating, in which heretofore the manifold advantages of gas as a fuel have been in some measure nullified by the cost of an excessive amount of gas which has not heretofore been advantageously employed in furnaces of standard construction.

Further objects and details will appear from a description of the invention in conjunction with the accompanying drawings, wherein,—

Figure 1 is a sectional elevation through the center of a square boiler of standard construction, showing the method of installing the coils of the present invention;

Fig. 2 is a sectional plan view of the same;

Fig. 3 is a sectional plan view of a round boiler of standard construction;

Fig. 4 is a sectional elevation of the same; and

Fig. 5 is a perspective of one of the coils employed in the present invention.

As before stated, the present invention is applicable for use in connection with numerous boilers of standard construction, and it will be understood that the boilers herein shown and described serve merely by way of exemplification, and that the present invention is not therefore directed to specific features in the arrangement of the flues and water passages of the boilers.

The square boiler shown in Figs. 1 and 2 comprises a front section 10, a rear section 11, and intermediate sections 12, as is common in cast iron boilers of this type. The end sections are cored to afford the usual water chambers 13 and 14, and likewise the intermediate sections are cored to afford water chambers 15 and 16, which water chambers in the various sections are in suitable communication with one another through ducts or passages, which need not be herein described but which are well understood by those skilled in the art.

The intermediate sections are of T-shape in cross section and are arched in the center to afford a combustion chamber 17 which extends from front to rear of the furnace and is closed in front by a door 18.

The combustion chamber, as before stated, may be fitted for the combustion of gas or oil, or for the retention of solid fuel, and the products of combustion are carried over and through the sections in any suitable and well known manner and find egress through a flue or passageway 19, it being understood that in respect to the formation and location of the flues or passageways, the furnace follows the customary practice in the construction of cast iron furnaces built up of sections in the manner shown and that it is not deemed necessary to set forth in detail the manner in which the products of combustion are carried through the furnace for ultimate discharge into the stack or chimney.

In equipping a furnace of this character with the coils of the present invention, the side walls, and if desired the rear wall, of the combustion chamber are tapped at suitable points, and the coils 20 are arranged vertically around the walls of the combustion chamber. As shown, the coils along one of the side walls of the combustion chamber are tapped into alternate sections of the structure, and along the opposite side walls are tapped into the intermediate sections, and, as shown, one or more coils may be likewise tapped into the rear section depending upon the number and space arrangement of the coils which it is deemed desirable to employ in a furnace of given structure and capacity.

It will be understood that the particular spacing and arrangement observed in fitting the coils in place will in each instance be determined by local conditions and that the arrangement here

shown and described serves merely for the purpose of exemplifying the practice of the present invention.

Each of the coils 20 is composed of copper, and the ends of the coils 21 are secured through suitable pipe connections 22 directly into the cast iron wall of the water chamber formed within the cored interior of the section, which water chambers in conjunction constitute the lower legs of a water jacket.

Suitable supply and return connections are provided in the customary manner, and the presence of the coils, which are located along the side walls of the combustion space and at the rear end thereof and in line with the travel of the heated gases, greatly increases the radiating capacity of the boiler by affording a greatly extended direct radiating surface of copper which very quickly transmits the heat to the water within the coils and promotes a rapid circulation, both by reason of the proximity of the coils themselves to the line of flow of the heated gases and also by reason of the fact that the heat stored within the cast iron walls of the furnace sections is readily and rapidly transmitted to the copper of the coils, and thus serves to maintain the heating effect and the rapidity of circulation even after the gas or other heating medium has been reduced or turned off, with a consequent diminution in the amount of fuel required.

In Figs. 3 and 4, a similar arrangement of coils is shown as applied to the combustion chamber of a round cast iron boiler of standard construction. In this case, the combustion chamber 23 is formed within the interior of a water jacket 24 which connects through a duct 25 with the lowermost of a series of upper sections 26, 27, 28, which sections afford communicating flue passages 29 and 30, the uppermost of which connects with the stack 31. The coils 20 are arranged at recurrent intervals around the cylindrical inner wall of the combustion chamber and in direct communication with the water space, so that they function in a manner similar in all respects to that previously described.

In locating and arranging the coils, it is desirable in all cases to locate them at substantially the level of the combustion zone, so that they will be immediately acted upon by the flames and products of combustion and will be subjected to a maximum heating effect which by reason of their location and of the high conductivity of the copper induces a very rapid circulation or pumping action for the water, and thereby serves to increase the water flow throughout all portions of the water jacket.

The arrangement is one which permits the coils to be readily installed in numerous types of boilers of standard construction employed for steam or heat water heating, since the method of installation merely requires the drilling of the walls of the combustion chamber and the connection of the ends of the coils in order to establish communication with the water jacket afforded within the walls of the cast iron boiler, thus providing a convenient and efficient method of increasing the efficiency of boilers already in service.

I claim:

1. In combination with a furnace having cast iron vertical walls cored to afford a water jacket surrounding a combustion chamber, a plurality of vertically standing coils arranged in close proximity to the vertical walls of the combustion chamber, leaving the center of the combustion chamber open and unobstructed by the coils, the upper and lower ends of the coils being entered through the walls of the combustion chamber and in communication with the water space, the coils standing at substantially the level of the combustion zone and surrounding the combustion zone.

2. In combination with a furnace having spaced vertical walls affording a water jacket surrounding a combustion chamber, a plurality of vertically standing copper coils arranged in close proximity to the vertical walls of the combustion chamber leaving the center of the combustion chamber open and unobstructed by the coils, the upper and lower ends of the coils being entered through the walls of the combustion chamber and in communication with the water space, the coils standing at substantially the level of the combustion zone and surrounding the combustion zone.

3. In combination with a furnace having a cast iron boiler with cored walls affording a water jacket having vertical inner walls surrounding a combustion chamber, a plurality of vertically extending copper coils arranged in close proximity to the vertical walls of the combustion chamber, leaving the center of the chamber open and unobstructed by the coils, the upper and lower ends of the coils being entered through the walls of the combustion chamber and in communication with the water space, the coils standing at substantially the level of the combustion zone and surrounding the combustion zone.

GLENN F. CROSIAR.