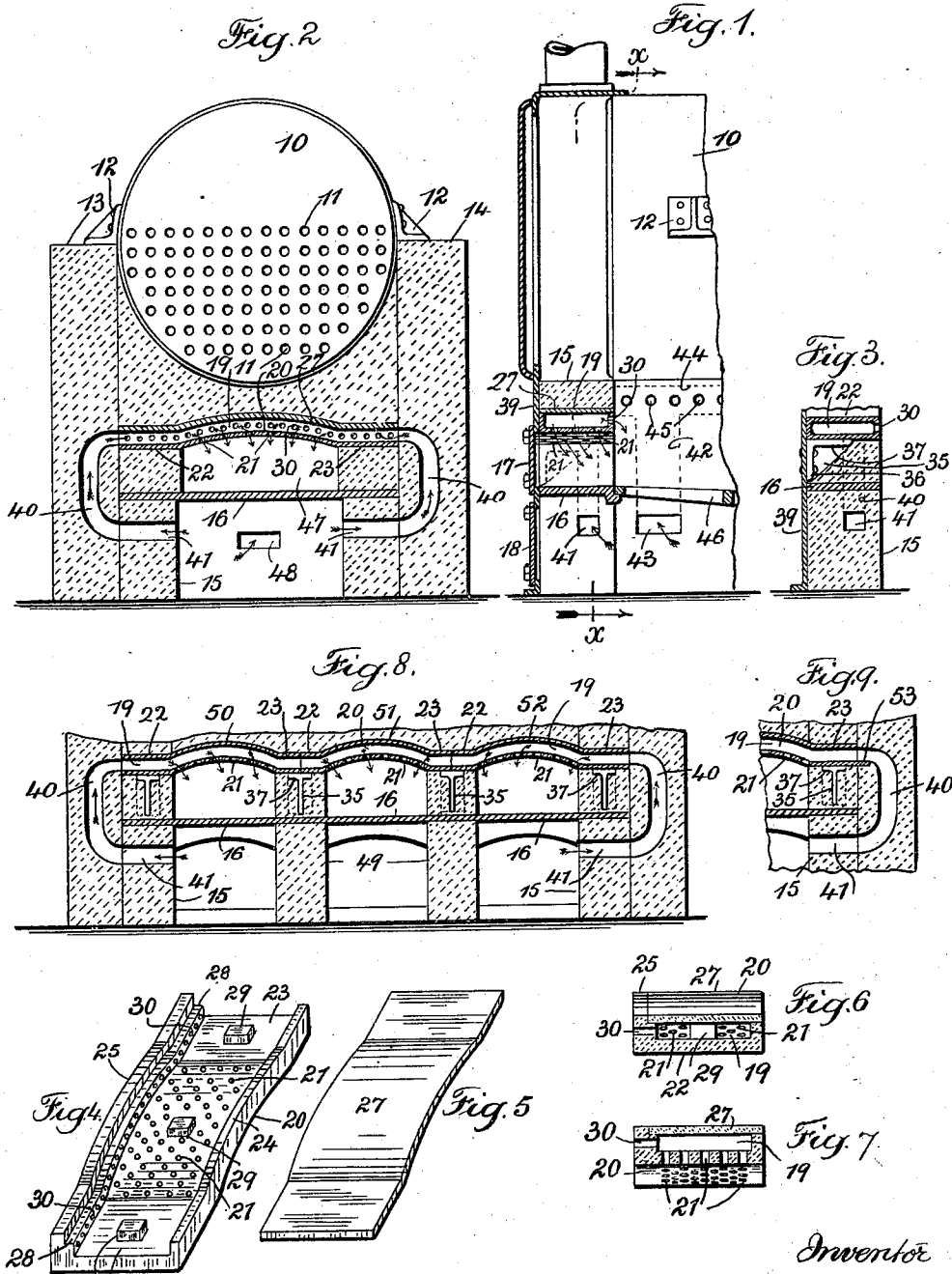


G. S. GALLAGHER.
STEAM BOILER FURNACE.
APPLICATION FILED JULY 7, 1909.

966,680.

Patented Aug. 9, 1910.



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UNITED STATES PATENT OFFICE.

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STEAM-BOILER FURNACE.

966,680.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE S. GALLAGHER, a citizen of the United States of America, residing in the borough of Manhattan, city, county, and State of New York, have invented an Improvement in Steam-Boiler Furnaces, of which the following is a specification.

My invention relates to steam boiler furnaces and particularly to means for effecting and directing drafts of heated air therein, with the primary object of utilizing the products of combustion as completely as possible.

In carrying out my invention, I employ in conjunction with the usual boiler and the setting therefor in which and beneath the boiler there are the customary grate bars above which there is a combustion chamber and beneath which there is the usual ash pit, an arched shell set or built in the front wall and forming the upper lining of the fuel opening, the bottom of this arched shell above the fuel opening being provided with a plurality of apertures and the inner side of the said arched shell being also provided with a series of apertures whereby air may be passed from the front wall of the boiler to and over the front central portion of the fire, with passage-ways forming air-flues extending therefrom and opening into the ash-pit for the supply of air. I also prefer to employ a plurality of metallic or other supports built into the front wall in such a manner as to carry the said arched members, and all of which will be hereinafter more particularly described.

In the drawing, Figure 1 is a partial elevation and a partial central longitudinal section of a steam boiler furnace embodying my present invention. Fig. 2 is a section on line *x, x*, Fig. 1 looking from left to right. Fig. 3 is a section taken through the front wall of the boiler illustrating the manner of supporting the arched shell on the support brackets. Fig. 4 is a perspective view of the arched shell employed in carrying out my invention showing the cover thereof removed. Fig. 5 is a perspective view of the cover of the arched shell. Fig. 6 is a section through the end portion of the arched shell. Fig. 7 is a section through the central por-

tion of the arched shell. Fig. 8 is a transverse section taken through the front wall of the boiler looking to the front thereof, to illustrate the manner in which a plurality of arched shells made in accordance with my invention may be employed in a battery of boilers, and Fig. 9 is a longitudinal section showing a modified form of arched shell.

Referring particularly to the drawing, I employ as is usual a boiler shell indicated at 10 which may or may not be provided with the customary boiler tubes 11. At the opposite sides thereof the boiler shell is preferably provided with series of lugs or brackets 12 by which the same is supported upon the side walls 13 14 respectively forming part of the boiler inclosure, which latter is completed by a front wall 15 and a rear wall which is not shown in the drawing.

In the front wall 15 there is a fuel opening provided with a fuel door 17 and an ash-opening provided with an ash door 18 and a division plate 16 is preferably employed to separate the fuel opening from the ash opening.

In the front wall of the furnace and preferably immediately above the fuel door therein and forming the top of the fuel opening, I employ a hollow shell member which is substantially arched and which preferably comprises a channel indicated at 19 and which as illustrated, is centrally arched as indicated at 20. The bottom portion of the arch is preferably provided with a series of apertures 21 and the end portions of this channel member are preferably straight and in alinement and these end portions of the arched shell are indicated at 22 23 respectively.

On the respective sides of the channel member there are ribs 24 and 25 and the inner rib 25 on its inner side is provided with a groove forming a shoulder 28 on which one edge of a cover member 27 for this arched shell is adapted to rest; the opposite edge of the cover resting on the top of the rib 24 of the said channel member. Interiorly and in any suitably spaced apart positions, the channel member is provided with blocks or lugs 29 which also assist in maintaining the cover member 27 in shape and in position. The rib 25 beneath the

shoulder 28 therein is provided with a series of apertures 30 preferably extending from one end of the channel member to the other.

In setting the hereinbefore described channel members in the front wall of the boiler structures, I prefer to employ brackets preferably made of any suitable metal and having arms 36 and 37 of substantially equal length, and a central web 35. These brackets are preferably riveted or otherwise secured to the front plate 39 of the boiler so as to support the channel members in such a manner as to be practically independent of the front wall support and by so doing, in case the front wall becomes broken from any cause whatsoever the channel members will not become displaced thereby, and in repairing the front wall in such an event it will not be necessary to re-set the channel members.

In the front wall of the boiler on either side of the ash opening therein and extending into the side walls of the boiler there are air-flues 40 leading from openings 41 in the sides of the ash opening to the opposite ends of the air-flue extending through the channel member, and in this construction as will be apparent, the heated air from the ash pit is conveyed through the air-flues 40 to the arched channel member and thence through the apertures 21 and 30 therein to the fire-chamber of the boiler. I also prefer to provide air-flues 42 on opposite sides of the boiler and in the side walls thereof; each of said flues leading from an opening 43 in the ash pit beneath the grate bars 46 to an air-flue or air-passageway 44 extending along in each side wall of the boiler longitudinally thereof and provided with apertures 45 by means of which the heated air is supplied to the fire-chamber along the sides of the boiler. I also prefer to employ a bridge-wall indicated at 47 Fig. 2, and provided with an air-flue 48, or a plurality of the same leading to apertures in or at the top of the bridge-wall in order that the heated air may also be supplied to the fire-chamber above the bridge-wall.

By reference to Fig. 8 it will also be apparent, that the improved arched shell members may be employed in a battery of boilers, the division walls of which are indicated at 49 and the arched channel members 50, 51 and 52, and it will also be understood that while I have illustrated a battery of three boilers in Fig. 8, that the arched shell members may be similarly employed in a battery comprising any number of boilers. The arched shell member is made in separable parts and is used as hereinbefore described and particularly illustrated for the details of its construction in Figs. 4, 5, 6 and 7. Figs. 1, 2, 3, 8 and 9 are illustrative of the application of this arched shell mem-

ber without entering into the details of the construction thereof, but these figures do show associated details.

By reference to Fig. 8 it will be understood that the separate arched member in each boiler is so connected to the similar arched members of adjacent boilers that there is provided a continuous air-flue or passageway extending from one side of the boiler to the other irrespective of the number of boilers contained in the battery. Also by reference to Fig. 9, it will be seen that I may provide the extremities of the straight end portions of the arched members with lugs 53 which extend into the side walls of the boiler inclosure and aid in the support of the arched members.

I claim as my invention:

1. In a steam boiler furnace and in combination with inclosing and supporting walls provided with a fuel opening and an ash pit, a hollow shell member consisting of a channel part having one plain side rib and one shouldered side rib and a cover part fitting over the plain side rib and into the shoulder of the other side rib, said parts collectively having a central arched portion and integral open end portions that are straight and in substantial alinement, the end portions being built into the wall forming the sides of the fuel opening and the central arched portion forming the top of the fuel opening, and a support for the wall above, the adjacent walls having air flues which lead out from the open end portions and downward and which open into the ash pit, and the hollow shell member provided with series of air discharge apertures.

2. In a steam boiler furnace, a hollow shell member consisting of a channel part having one plain side rib and one shouldered side rib of greater depth with series of air discharge apertures through the shouldered side rib only near its base, a cover part fitting over the plain side rib and into the shoulder of the other side rib, said parts collectively having a central arched portion, in the bottom of which are air discharge openings and integral open end portions that are straight and in substantial alinement.

3. In a steam boiler furnace, a hollow shell member consisting of a channel part having one plain side rib and one shouldered side rib of greater depth with series of air discharge apertures through the shouldered side rib only near its base, a cover part fitting over the plain side rib and into the shoulder of the other side rib, said parts collectively having a central arched portion, in the bottom of which are air discharge openings and integral open end portions that are straight and in substantial alinement, the central arched portion form-

ing the top of the fuel opening and a support for the wall above, pier blocks coming beneath said end portions and forming the sides of the fuel opening, suitable support
5 members secured to the front wall of the furnace, coming beneath said end portions and built into the said pier blocks or wall

parts to support the hollow shell member in the event of damage to the pier blocks.

Signed by me this 29th day of June 1909.

GEORGE S. GALLAGHER.

Witnesses:

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