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 DEFLECTING PARTITION FOR FURNACES.
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1,014,903.

Patented Jan. 16, 1912.

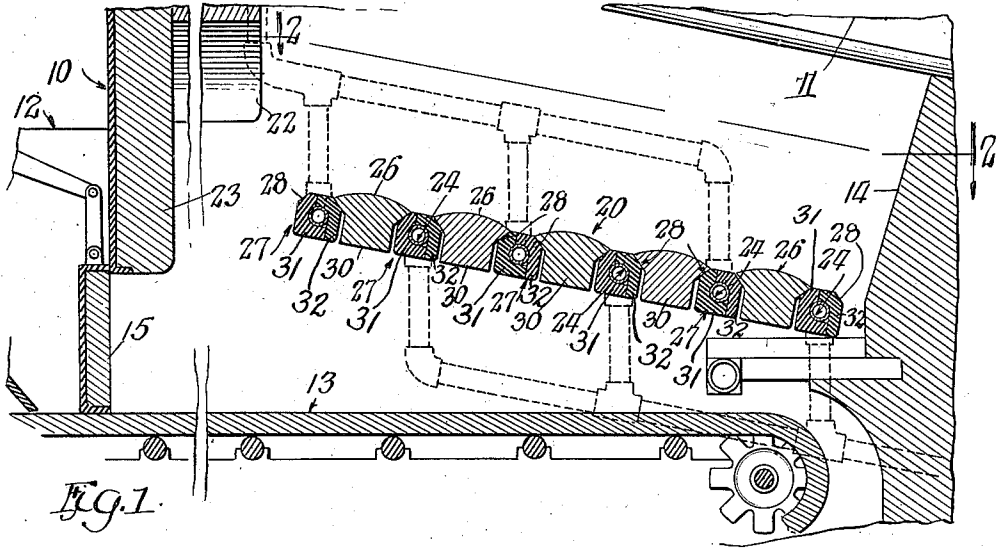
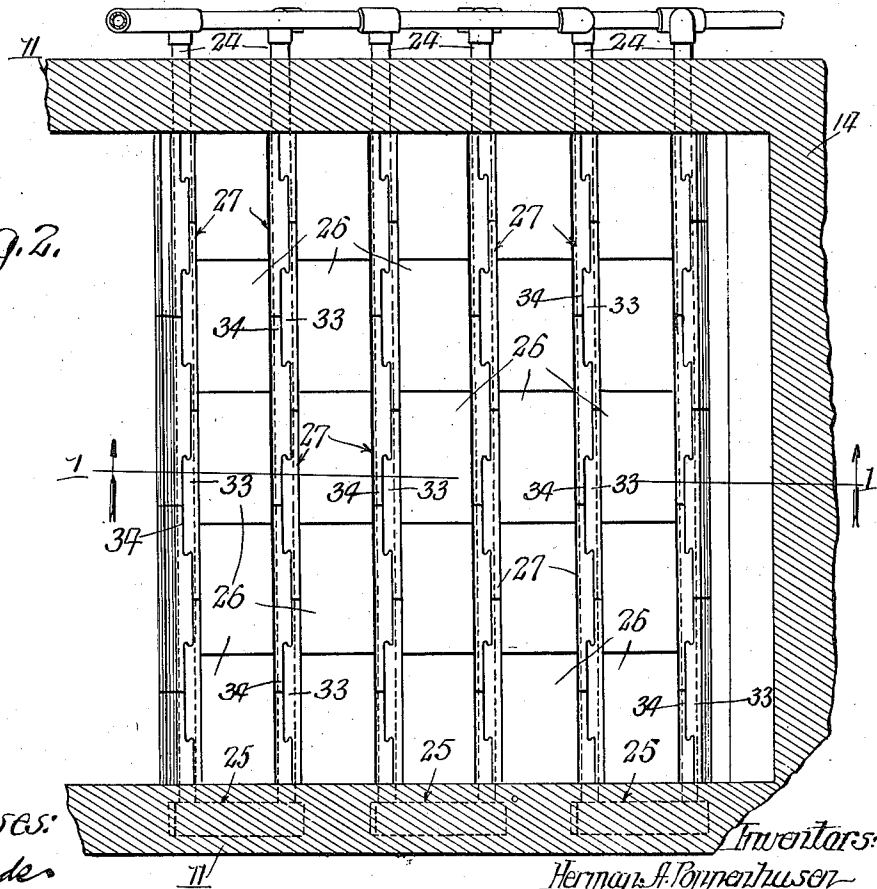


Fig. 2.



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UNITED STATES PATENT OFFICE.

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DEFLECTING-PARTITION FOR FURNACES.

1,014,903.

Specification of Letters Patent.

Patented Jan. 16, 1912.

Original application filed April 12, 1909, Serial No. 489,290. Divided and this application filed November 10, 1910. Serial No. 591,576.

To all whom it may concern:

Be it known that we, HERMAN A. POPPENHUSEN and JOSEPH HARRINGTON, citizens of the United States, of Evanston and Riverside, respectively, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Deflecting-Partitions for Furnaces; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to furnaces for steam boilers and other uses, and the invention relates more specifically to improvements in the deflecting partition, wall or arch located over the fire grate and arranged to direct the fuel gases over the burning fuel in the combustion chamber in such a way as to promote the combustion of the fuel gases.

The improvements constituting our invention are applicable to furnaces provided with automatic stoking devices or means by which the fuel is advanced through the combustion chamber as it burns; and the deflecting partition, wall or arch is located above the fuel feeding or advancing grate in such manner that the burning gases are directed forwardly over the fire bed toward the fuel feeding end of the furnace in their passage from the combustion chamber to the smoke stack.

Among the objects of the invention is to provide a deflecting partition, wall or arch of this character which may be made of relatively small depth or thickness so as to occupy but little space in the furnace, and thereby enable the height of the furnace to be materially decreased.

A further object of the invention is to simplify the construction of the deflecting partition, wall or arch, to reduce the cost thereof and to provide a simple arrangement of water cooled supporting members or girders for supporting the arch structure.

We have herein shown our invention as embodied in a furnace having a traveling chain grate by which a layer of fuel is fed from the feed end of the furnace rearwardly, but it will be obvious that it may be applied to furnaces having other forms of grates arranged to advance the fuel through the furnace during combustion thereof.

The present is a divisional application under a prior application filed by us on the 12th day of April, 1909, Serial Number 489,290.

As shown in the drawings:—Figure 1 is a vertical, longitudinal section of a boiler furnace provided with a deflecting partition, wall or arch, embodying our invention, taken on line 1—1 of Fig. 2. Fig. 2 is a horizontal section taken on the indirect line 2—2 of Fig. 1.

As shown in the drawings, 10 designates as a whole the front wall of the furnace; 11, 11 the side walls thereof; 12 the fuel feeding hopper at the front wall; 13 the traveling or chain grate upon which the fuel is fed and by which it is advanced into and through the furnace, and 14 designates the bridge wall of the furnace located at the rear of the grate. A vertically movable gate 15 controls the feed of the fuel from the hopper 12 to the traveling grate.

20 designates, as a whole, the deflecting partition, wall or arch of the furnace to which our invention relates. Said partition, wall or arch extends forwardly and upwardly from the bridge wall to a point near the front wall of the furnace, a space being left between the forward edge of the deflecting partition, wall or arch and the front wall, which space constitutes the outlet opening for the upward or outward passage of the products of combustion on their way to the smoke stack. The said deflecting partition, wall or arch may be employed with or without a coking breast or fire arch which, when employed, is located just in front, and above the forward end of, the partition, wall or arch, and extends rearwardly from a fire brick wall which constitutes part of the front wall of the furnace above the fuel feed opening thereof.

The deflecting partition, wall or arch to which our present invention relates and the means for supporting the same are constructed and arranged as follows: The deflecting partition, wall or arch consists of a plurality of tubular, metal supporting members 24, 24 arranged parallel with each other and transversely of the furnace, and fire brick members 26, 26 which extend between and are supported at their side margins on said supporting members. The supporting members are designed to be cooled by circu-

lation of water or other cooling medium therethrough. They are supported at their ends on the side walls of the furnace and extend through one side wall thereof (the left hand wall as herein shown) for connection, outside of the furnace, with circulating tubes or pipes for supplying cooling water thereto. At the other or right hand side wall of the furnace the tubular members are connected in pairs with headers 25 embodied in said latter wall, said headers affording communication between two adjacent supporting members. The supporting members may be inclosed by fire brick or tile coverings 27 to protect the same from the heat of the furnace and to avoid cooling of the heated gases by direct contact of the latter with the supporting members.

As shown in the drawings, the heat resisting covering 27 embraces a plurality of fire brick or tile sections 31 and 32, each of which is made of such cross-sectional form as to fit upon and cover a part of the circumference of the tubular member 24 and which is adapted for contact of its lateral faces with one or more like sections and in connection with the same to completely close or cover the said tubular member. Each of such sections is moreover provided with endwise extending, locking lugs 33, adapted for interlocking engagement with correspondingly shaped recesses 34 in the adjacent sections in such a manner as to prevent lateral separation of the sections and thereby retain the same in place on the tubular member 24, as shown in Fig. 2.

The members 26, which span the spaces between and are supported on the tubular members 24, 24, may be either flat or curved and are formed at their side margins to engage with supporting surfaces on the supporting members, or on the fire brick coverings therefor. As herein shown, the arch sections 26 are inclined or beveled at their side edges and fit correspondingly inclined or beveled seats 28 at the opposite upper sides of the insulating coverings. The arrangement described places the arch members and the supporting portions of the insulating coverings under compression throughout the deflecting partition, wall or arch, a condition in which fire brick, by reason of their friable nature, are least liable to breakage or injury from heat.

In order to avoid transverse pockets or recesses at the under side or face of the deflecting partition, wall or arch, and to make said underside of the arch comparatively smooth, we provide the arch sections or members 26 with filling extensions 30, 30 which extend downwardly and practically fill the spaces between the supporting members. Said filling extensions are herein shown as made integral parts of the arch members.

Preferably, when such filling extensions are

employed, they will be made of slightly less width than the distance between adjoining supporting members or the insulating coverings thereof, thereby accommodating said parts to expansion without undue stress.

It will be observed that the construction described provides a deflecting partition, wall or arch of a minimum depth, while affording means for firmly supporting the same in position over the furnace grate. By decreasing the depth of said partition, wall or arch, as compared to prior practice, we are enabled to materially decrease the height of the furnace, which is a great advantage in point of construction and compactness. The construction described possesses important practical advantages over the massive deflecting arch structure heretofore employed in furnaces which bridge between and are supported on the side walls of the furnace, not only because of the saving of space in the furnace and the lessening of the height of the furnace, but also because the arch is not so liable to break down by its own weight, and while comparatively light its construction is such as to amply support it. Moreover, our improved arch is capable of being more readily and economically repaired than the prior massive arch structures. This is obvious from a consideration of the fact that the arch members are so supported on the girders or supporting members as to be readily removed and replaced without the necessity of disturbing the structure of the whole, or any part thereof except the arch members to be removed and replaced.

We claim as our invention:—

1. A furnace provided with a deflecting partition comprising a plurality of tubular, metal, supporting members extending transversely between and supported at their ends by the side walls of the furnace, fire brick coverings upon said tubular supporting members, and fire brick members extending between and supported upon the said fire brick coverings, said members being provided with downward extensions which occupy the spaces between the said coverings and the lower faces of which are substantially in line with the lower faces of said coverings.

2. A furnace provided with a deflecting partition comprising a plurality of tubular, metal supporting members extending transversely between and supported at their ends on the side walls of the furnace, fire brick coverings upon the said tubular supporting members, and fire brick members extending between and supported upon said coverings, said coverings being provided at their upper parts with lateral, inclined bearing faces, and the fire brick members being provided at their upper parts with inclined, lateral bearing faces engaging the inclined faces on

the coverings and between said inclined bearing faces, provided with downwardly projecting extensions which occupy the spaces between the side faces of said fire brick
5 coverings and the bottom faces of which are substantially in line with the bottom faces of said coverings.

In testimony, that we claim the foregoing

as our invention, we affix our signatures in the presence of two witnesses, this 5th day 10 of November, A. D. 1910.

HERMAN A. POPPENHUSEN.
JOSEPH HARRINGTON.

Witnesses:

FRANK S. SPOLEN,
R. B. HARRIS.