Aug. 6, 1929. G. A. KOHOUT 1,723,182

STOKER FURNACE WITH INSIDE HOPPER

Filed June 15, 1925 2 Sheets-Sheet 1

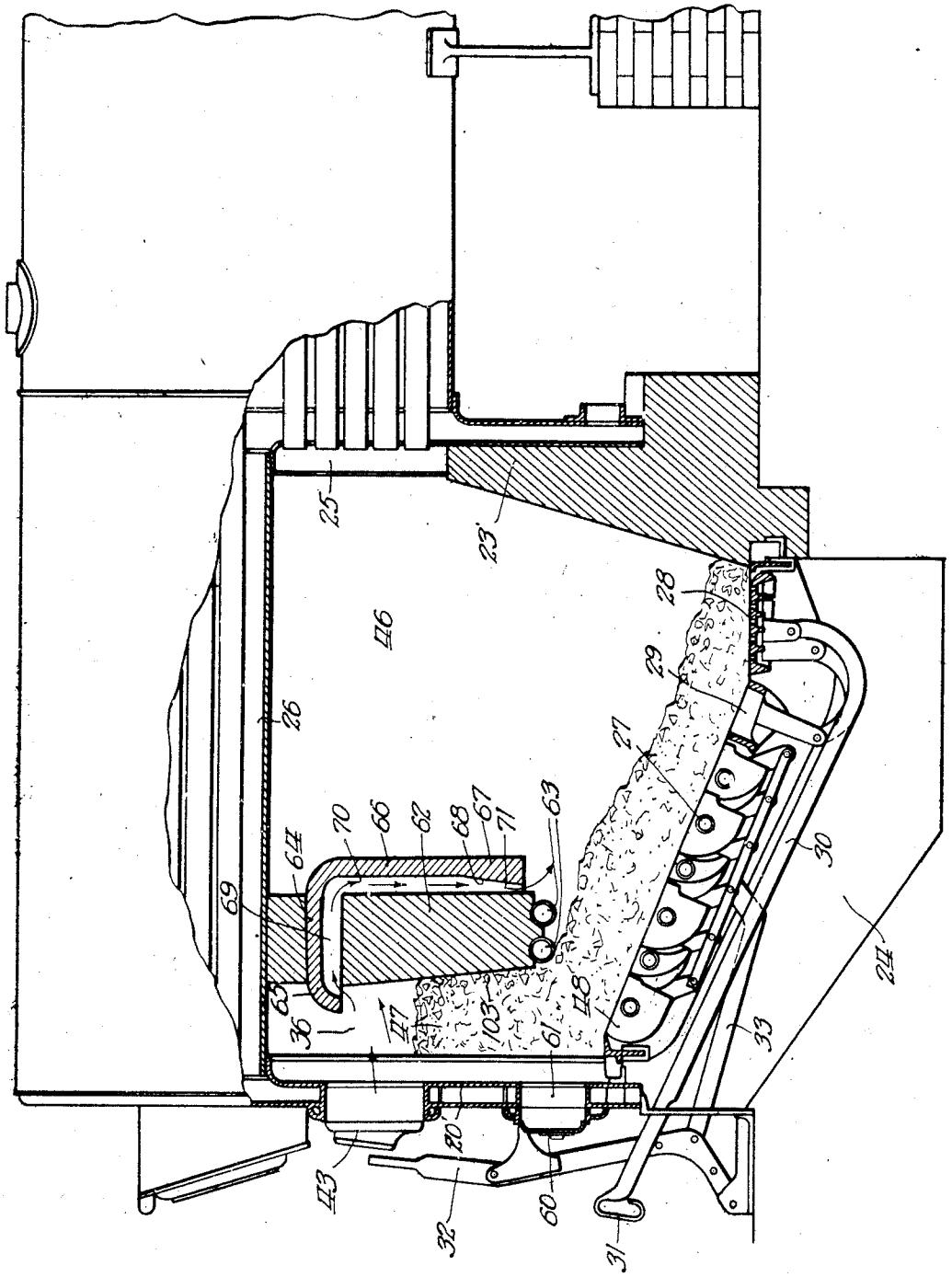


Fig. 1.

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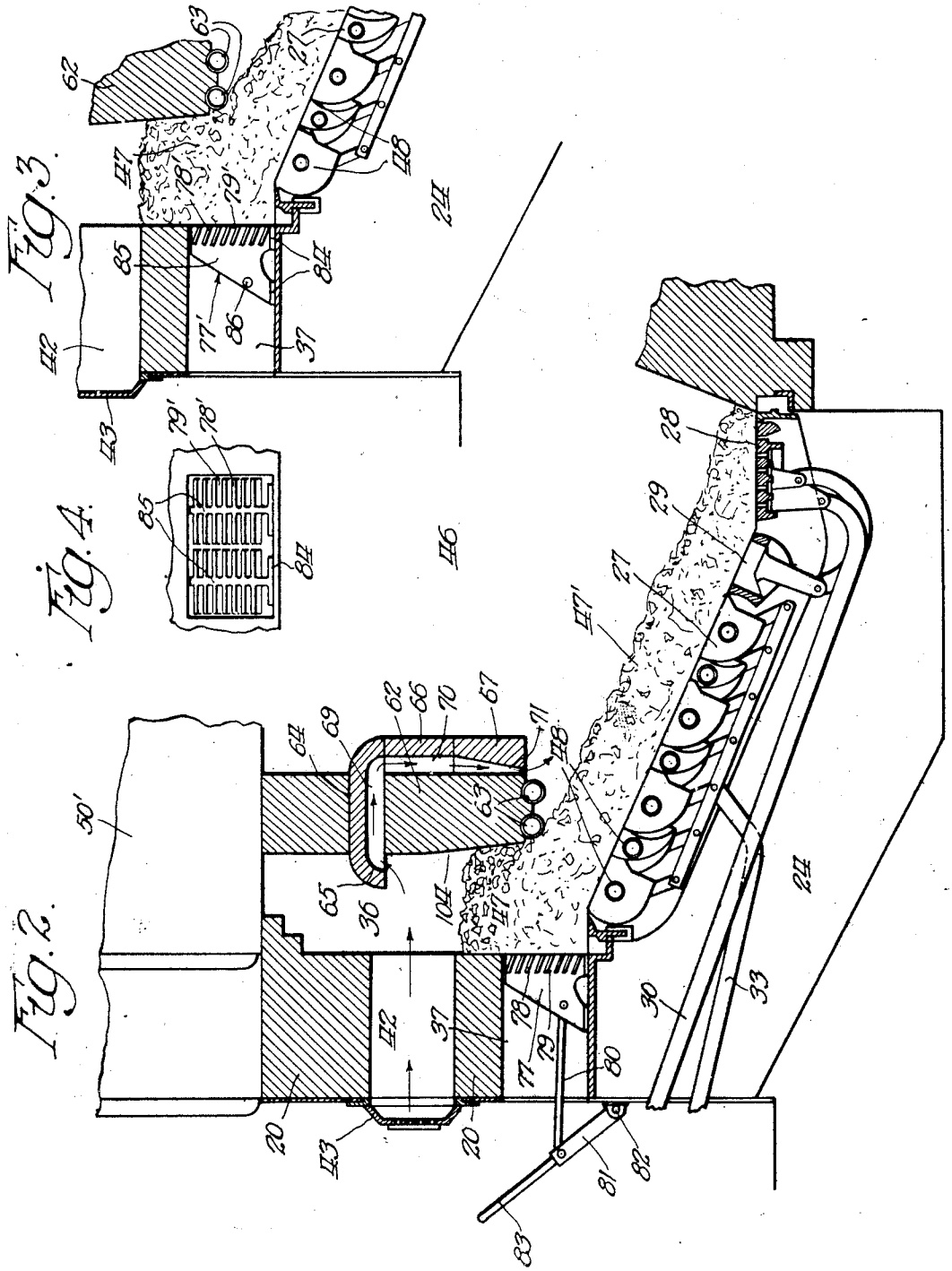


Fig. 3.

Fig. 4.

Fig. 2.

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Patented Aug. 6, 1929. 1,723,182

UNITED STATES PATENT OFFICE.

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STOKER FURNACE WITH INSIDE HOPPER.

Application filed June 15, 1925. Serial No. 37,136.

My invention relates to furnaces and more particularly to a furnace provided with a hopper from which a stoker is adapted to convey fuel into the combustion chamber.

It is a purpose of my invention to provide a furnace that is provided with an internal hopper and a combustion chamber and which is provided with means for conveying fuel from the hopper to the combustion chamber under a wall that divides the furnace into a hopper and a combustion chamber.

More particularly it is a purpose of my invention to provide a furnace with an arch near one wall thereof so as to provide a hopper between said wall and said arch, said furnace being provided with a stoker, a portion of which extends into the hopper and forms the bottom thereof and which furthermore extends under said arch and into a combustion chamber on the opposite side of the arch from said hopper so that the operation of the stoker will carry the fuel from the hopper into the combustion chamber.

It is a further purpose of the invention to provide a device of the above mentioned character in which the arch is provided with passages or ducts extending therethrough so that any gases distilled off from the fuel in the hopper may pass from the hopper into the combustion chamber and so that air admitted through the front wall of the furnace may also pass through said ducts mingling with the gases distilled from the fuel to aid in the combustion thereof. The hopper will act as a coking chamber due to the fact that the heat of the fire will coke the fuel in said hopper adjacent the incandescent fuel on the stoker. Some of the gases generated by the coking portion will pass under the arch and a small amount thereof may pass through the openings or ducts extending through the arch.

If desired, an auxiliary means may be provided for advancing the fuel into the combustion chamber, said means being preferably in the form of a pusher member or members provided in the fire door opening in the front wall of the furnace, thus locating the same adjacent the bottom of the hopper formed by the forward end of the stoker. In the arrangements shown and described the stoker acts not only as a stoker grate, but also as a means for conveying fuel from the hopper into the combustion chamber. Thus the fuel feeding operation from the hopper into the combustion zone of the furnace is carried on simultaneously with the advancing of the fuel toward the discharge end of the stoker by a single operation.

The forward face of the arch is preferably inclined so that the hopper widens toward the bottom thereof, to facilitate the feeding of the fuel therefrom.

Other objects and advantages of the invention will appear as the description of the accompanying drawings proceeds. However, I desire to have it distinctly understood that I do not intend to limit myself to the exact details shown or described but that I intend to include as part of my invention all such obvious changes and modifications of parts as would occur to a person skilled in this art and as would fall within the scope of the claims.

In the drawings:

Fig. 1 is a longitudinal sectional view of a portion of a furnace and the adjoining portions of a boiler embodying my improved construction;

Fig. 2 is a fragmentary sectional view of a modification showing an auxiliary fuel feeding member cooperating with the stoker;

Fig. 3 is a fragmentary longitudinal sectional view of a portion of the furnace showing removable grate-like members for closing the usual fire door opening;

Fig. 4 is an inside fragmentary elevational view of the grate-like members.

Referring in detail to the drawings, in Fig. 1 is shown a furnace having a front wall 20, side walls, a bridge wall 23 and an ash pit 24, the top and rear of said furnace being completed by means of the fire box boiler 25 having a crown sheet at 26 forming the top of the fire box. Mounted within said furnace is the stoker grate 27, the form shown being substantially that shown in my Patent No. 1,355,095 in which the individual members or grate bars cooperate to advance the fuel from the upper to the lower end thereof. At the lower or discharge end of the stoker 27 is provided an ash dumping section 28 and a fuel retaining member 29 which are operated by means of the operating bar 30 provided with a handle 31, the stoker being operated by means of the handle 32 which is connected with the stoker grate 27 by means of a bar or link 33.

Mounted within the furnace is the arch 34 which extends from the crown sheet 26

downwardly toward the stoker grate 27, but is spaced therefrom as will be clear from Fig. 1. The arch shown in Figs. 1 and 2 is preferably a built-up brick arch which is sprung or arched at the bottom.

The furnace is provided with a fuel feeding door 43, which may have means therein for admitting air into the furnace. A lower door 60 is also provided which may be provided with means for regulating the passage of air through the opening 61 in the front 20.

Mounted within the furnace is the arch 62 which is mounted upon a pair of water tubes 63 and which is preferably made of tile, being provided with a section comprising a horizontally extending portion 64, a forwardly extending downturned lip portion 65, a vertically extending back portion 66, and a thickened lower end portion 67 having an inclined wall portion 68 to thus define a passage having a horizontally extending portion 69 connected with the vertically extending portion 70 and having a reduced discharge opening 71. Said arch 62 divides the furnace into a hopper 36 and a combustion chamber 46 as previously described, the fuel 47 being fed from the hopper 36 by means of the stoker grate 27, while the operating handle 32 thereof is oscillating, due to the fact that certain of the stoker bars 48 are located at the bottom of the hopper and move the fuel underneath the arch 62 and into the combustion zone on said stoker grate. In the arrangement of the invention shown in Fig. 5, the air and gases mixed therewith coming from the fuel 47 first pass through the arch and then downwardly and are discharged adjacent the bottom edge of the arch at the rear thereof closely adjacent the incandescent fuel whereby any combustible gases discharged through the opening will be burned immediately after leaving the ducts or passageways provided in the arch.

In the arrangement shown in Fig. 2, the same form of arch is used as shown in Fig. 1 and the same numerals are applied to the various parts thereof. The same form of stoker grate is also shown which is operated in the same manner as previously described. However, the arch is shown as being applied to a furnace under a horizontal tubular boiler 50′ and the usual fire brick front wall 20 is provided which has the usual fire door opening 37 therein and is provided with the additional fuel feeding opening 42. However, instead of closing the usual fire door opening 37 by means of loose bricks, a plurality of pusher blocks 77 are provided which may be used to substantially close the opening, said pusher blocks being provided with transverse bars 78 between which the air spaces 79 exist so that a small amount of air may enter through the same. Said pusher blocks preferably have pivotally connected thereto links 80 which are pivoted to the levers 81 which are in turn pivoted to the front of the furnace by means of the brackets 82 and which are operated by means of the handle 83. The upper or fuel feeding opening 42 is provided with a door 43 that is of the same construction as shown in Fig. 1. In this arrangement, the pusher blocks 77 act as supplemental or auxiliary fuel feeding means which may be used for pushing the fuel 47 under the arch 62 in addition to the feeding that is obtained by means of the tilting of the stoker bars 48 provided on the stoker 27. It will be obvious that as the handle 83 is moved toward the furnace front, a block 77 will be moved toward the arch 62 and will push the fuel toward the arch and downwardly on the stoker into the combustion chamber 46, the hopper 36 serving the same purpose and being formed in the same manner between the arch 62 and the front wall 20 as previously described.

Instead of providing pusher blocks, stationary grate-like closure members may be provided for the opening 37 as shown in Figs. 3 and 4. Said members may be made in substantially the same manner as the members 77 shown in Fig. 2 comprising the bottom flanges 84, the vertically extending ribs 85 and the laterally extending closely spaced ribs or grate-like members 78′ between which the air spaces 79′ are provided. Any desired number of the members 77′ may be provided in the opening 37 in order to close the same. In Fig. 4, two of said members are shown side by side. The members 77′ are provided with openings 86 in the ribs 85, said ribs extending rearwardly as shown clearly in Fig. 3 so that a hook or bar may be inserted in the openings 86 to pull out the members 77′ should it be desired to have access to the lower part of the hopper or to feed fuel through the lower or usual fire door openings.

Having thus described my invention what I desire to claim and secure by United States Letters Patent is:

1. In a device of the character described a furnace having a stoker therein extending from one wall of said furnace toward the opposite wall thereof and a wall in said furnace spaced from said first mentioned wall to provide a hopper therebetween, said stoker passing under said last wall, said last wall forming the forward wall of the combustion chamber of the furnace and said stoker conveying fuel from said hopper into said combustion chamber, said first mentioned wall having a fuel feeding opening therein and said last wall having ducts therein extending from the upper portion of said hopper rearwardly and downwardly to the lower forward portion of said combustion chamber.

2. In a device of the character described a furnace having a stoker therein extending from one wall of said furnace toward the opposite wall thereof, a wall in said furnace spaced from said first mentioned wall to provide a hopper therebetween, said stoker passing under said last wall, said last wall forming the forward wall of the combustion chamber of the furnace and said stoker conveying fuel from said hopper into said combustion chamber, auxiliary means for conveying fuel from said hopper into said combustion chamber and means for conducting gases from above the fuel in said hopper rearwardly and downwardly through said last wall into said combustion chamber.

3. In a device of the character described a furnace having a stoker therein extending from one wall of said furnace toward the opposite wall thereof and a wall in said furnace spaced from said first mentioned wall to provide a hopper therebetween, said stoker passing under said last wall, said last wall forming the forward wall of the combustion chamber at the furnace and said stoker conveying fuel from said hopper into said combustion chamber, said hopper increasing in size toward the bottom thereof, said arch having ducts therein leading from the upper portion of said hopper into the lower forward portion of the combustion chamber.

In witness whereof, I hereunto subscribe my name this 15th day of May, A. D. 1925.

GEORGE A. KOHOUT.