Oct. 23, 1945. J. S. BENNETT 2,387,383

STOKER

Original Filed Sept. 3, 1936

Fig. 1

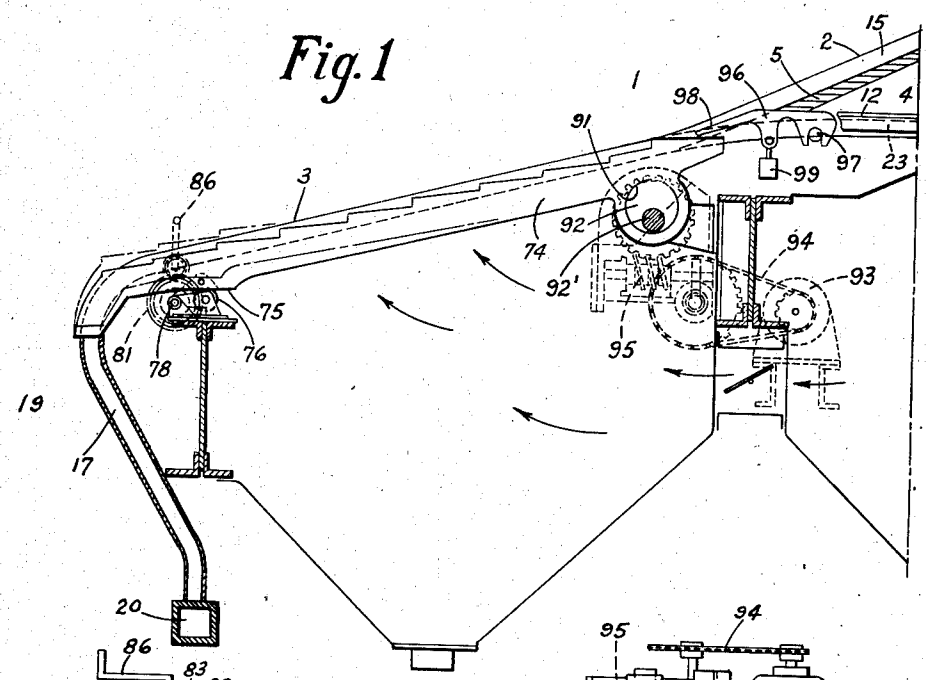


Fig. 2

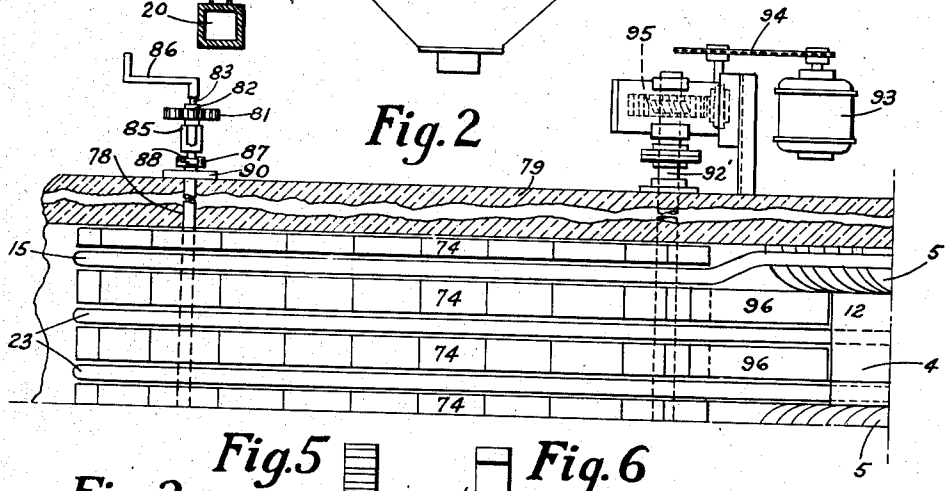


Fig. 3

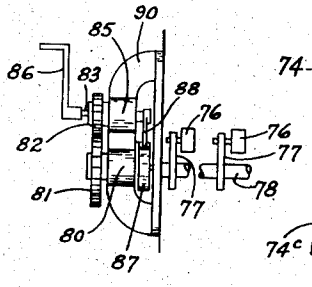


Fig. 5

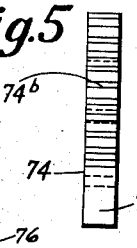


Fig. 6

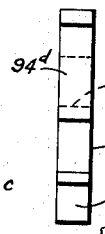


Fig. 4

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2,387,383

STOKER

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Original application September 3, 1936, Serial No. 99,234. Divided and this application November 5, 1941, Serial No. 417,919

2 Claims. (Cl. 122—376)

This application is a division of my co-pending application, Serial No. 99,234, filed September 3, 1936, and the invention herein involved relates to stokers, and more particularly to extension grates or overfeed sections of stokers of the inclined grate, multiple retort, underfeed type.

One object of the present invention is to provide a generally improved stoker which is economical in manufacture, and which insures the highest efficiencies throughout the operating range thereof.

Another object is to provide a novel overfeed section in stokers of the stated character which feeds the consumed as well as the partially consumed fuel and clinker toward an ash pocket.

A further object is to provide a novel grate section, particularly adapted for use with fluid cooled stokers of the underfeed type, the grate section being so disposed as to effectively feed fuel and residue to an ash pocket as well as to break up any clinkers forming at the top of the fuel bed.

Other and further objects will become apparent as the description of the invention progresses.

Of the drawing:

Fig. 1 is a side elevational view partly in section of the lower portion of a stoker showing the structure of the improved overfeed section thereof.

Fig. 2 is a plan view of the structure shown in Fig. 1.

Fig. 3 is a detail view of the mechanism for adjusting the lower ends of the grate bars shown in Fig. 1.

Fig. 4 is a side view of one of the extension grate bars.

Fig. 5 is an end view looking from left to right of the grate bar shown in Fig. 4, and

Fig. 6 is an end view looking from right to left of the grate bar shown in Fig. 4.

Referring to the drawing, the numeral 1 indicates generally a stoker of the inclined grate type having an upper underfeed section 2 and a lower overfeed section 3. The underfeed section consists of alternately disposed retorts 4 and tuyère rows 5. Fuel entering the stoker is fed along the underfeed section thereof in a well-known manner to the overfeed section 3 which in turn feeds it to an ash pocket 19 provided at the end of the stoker.

Each tuyère row, only one of which is shown herein, has mounted thereon a fluid conducting tube 15. These tubes extend beyond the lower ends of the tuyère rows and form a portion of the overfeed section 3. The tubes 15, as shown more particularly in Fig. 1, are bent downwardly as shown at 17 to form a portion of the ash pocket 19 and terminate in a header 20. Header 20 is connected to a boiler, not shown, by any suitable downtake connections in a well-known manner. The upper ends of tubes 15 are also connected to the boiler. Mounted in intimate contact with each dead plate 12, only one of which is shown, is a pair of tubes 23. These tubes extend upwardly from header 20 in parallel relation with the extensions of tubes 15 and terminate in a header, not shown, mounted beneath the stoker and connected to the boiler by any suitable uptake connections.

Mounted for oscillatory movement between the tubes 15 and 23 are a series of grate bars 14. Each grate bar 14 comprises an elongated body portion 14^a having an upper serrated fuel supporting and feeding portion 14^b. The rearwardly disposed end of each grate bar 14 terminates in a downwardly extending portion 14^c which forms a portion of the upper wall of the ash pocket 19. Depending from the upper, forwardly disposed end of each grate bar 14 is an arcuate portion 14^d having a relatively large circular opening 91 provided therein for receiving an operating cam as will appear more fully hereinafter.

As shown more particularly in Figs. 1 and 4, the lower edge 15 of each grate bar 14 rests upon a roller 16 rotatably mounted at the free end of an arm 17 secured to a shaft 18. Shaft 18 extends through the side wall 19 of the furnace and is journalled in a bearing 80 provided in a bracket 90 secured to the said wall. The outer end of shaft 18 has secured thereto a gear 81 which meshes with a second gear 82 mounted on a shaft 83 supported in a second bearing 85 of bracket 90. A hand crank 86 is secured to one end of shaft 83. Also secured to shaft 18 is a ratchet wheel 87 which is held against movement in one direction by a pawl 88, pivotally supported on bracket 90. Thus upon rotation of gears 82 and 81 by crank 86, arms 17 will be swung about their pivot to raise or lower supporting rollers 16 to adjust the lower ends of grate bars 14. By engagement of the pawl 88 with ratchet wheel 87 the parts are retained in adjusted position.

As shown in Fig. 1 a cam 92 is mounted in the circular opening 91 of each grate bar 14. The cams 92 are eccentrically mounted on a shaft 92' operated by an electric motor 93 through a chain and sprocket mechanism 94 and reduction gearing indicated generally at 95. Thus upon operation of motor 93, cams 92 are actuated in an orbital path, thereby imparting a reciprocatory as

well as a rocking movement to the grate bars 74. In the event it is desired to increase the effectiveness of the overfeed section, the lower ends of grate bars 74 are elevated, as shown in broken lines in Fig. 1, to bring the upper serrated edges thereof a greater distance above the tubes 15 and 23.

In order to prevent the passage of siftings past the upper ends of the grate bars 74, a series of plates 96 are provided between the dead plate 12 and the said grate bars 74. The plates 96 are disposed between the tubes 15 and 23, as shown in Fig. 2, and are pivoted near their forwardly disposed ends as shown at 97. The lower rearwardly disposed ends 98 of plates 96 engage the upper edges of the grate bars 74 and thus form a seal between the points of contact thereof. These plates are held in contact with the grate bars 74 by any suitable means, such as by weights 99.

The fluid conducting tubes 15 protect the tuyères 5 and extension grate bars 74 against the intense heat of the furnace. The tubes 23 also protect the grate bars 74, the sealing plates 96, and the dead plate 12 against the heat of the furnace. The tubes 15 and 23 also act as a slag screen chilling any molten slag forming in the fuel bed before it comes in contact with the tuyères, sealing plates, and grate bars. The tubes 15 and 23 also form a portion of the extension grate proper and constitute the front wall of the ash pocket 19.

From the foregoing description it is seen that a highly efficient overfeed section has been provided which effectively feeds the consumed or partially consumed fuel toward the ash pocket of the stoker and at the same time breaks up any clinkers forming at the top of the fuel bed.

By employing fluid cooled structures, it is also apparent that the overfeed section may be made relatively long, thus increasing the effective grate area without appreciably increasing the cost of the installation. The overfeed section just described also is of such a character that it may form the entire grate of the stoker, if it is so desired.

While the embodiment herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that the invention is not to be limited thereto, since it may be embodied in other forms, all coming within the scope of the claims which follow.

What is claimed is:

1. An inclined overfeed section for stoker furnaces, comprising a series of laterally spaced fluid conducting members, individual grate bars disposed between said members and lying in juxtaposition therewith, a support comprising an anti-friction roller for the lower end of each of said grate bars, a rocker arm for rotatably supporting each of said rollers, a shaft secured to said rocker arm, gearing for actuating said shaft to adjust the position of said rollers, means for holding said shaft in adjusted position, cam means for imparting vertical and longitudinal movements to each of said grate bars, and power means for actuating said cams.

2. An inclined overfeed section for stoker furnaces, comprising a series of laterally spaced fluid conducting members, individual grate bars disposed between said members and lying in juxtaposition therewith, a support comprising an anti-friction roller for the lower end of each of said grate bars, a rocker arm for rotatably supporting each of said rollers, a shaft secured to said rocker arm, gearing for actuating said shaft to adjust the position of said rollers, means for holding said shaft in adjusted position, cam means for imparting vertical and longitudinal movements to each of said grate bars, power means for actuating said cams, means forming a seal at the upper ends of each of said grate bars, and means for holding said sealing means in contact with said grate bars.

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