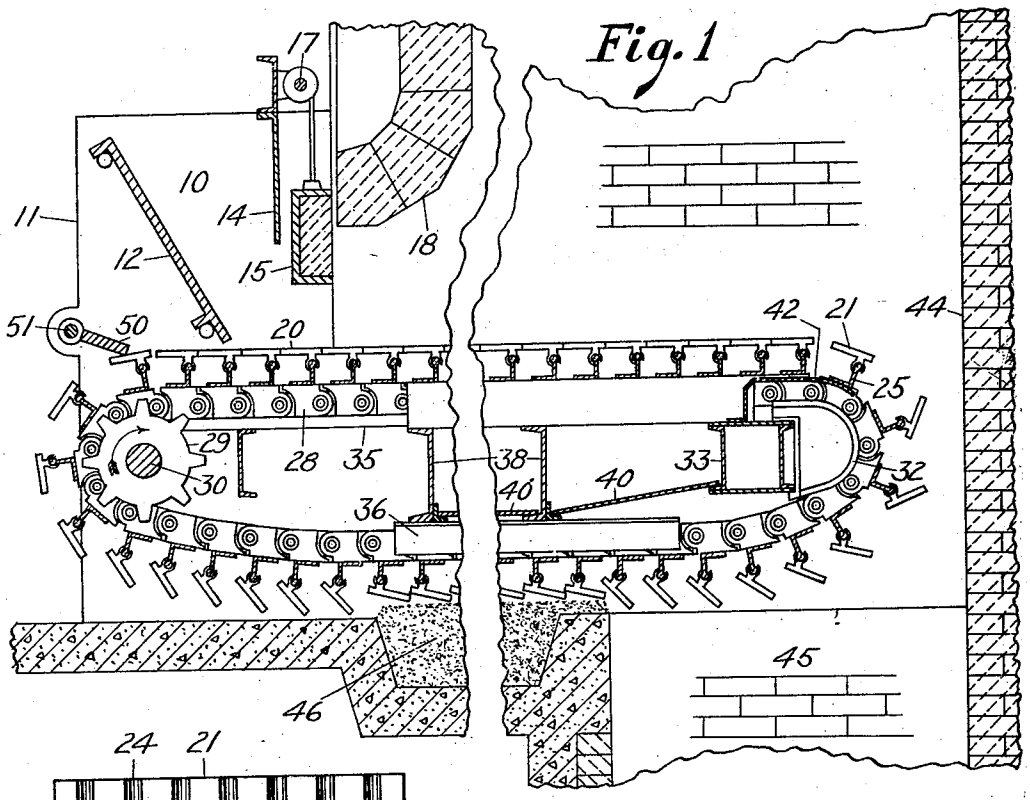
June 3, 1930. W. D. YERRICK ET AL 1,761,029

TRAVELING GRATE STOKER

Filed June 12, 1926

Fig. 1



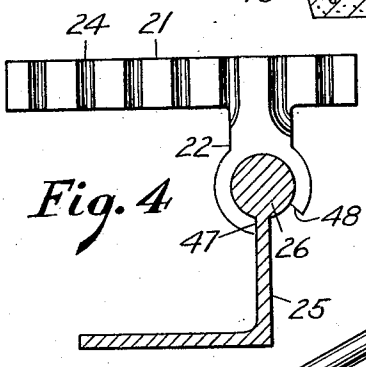


Fig. 4

Fig. 2

Fig. 3

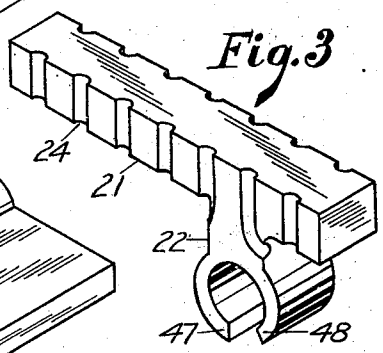
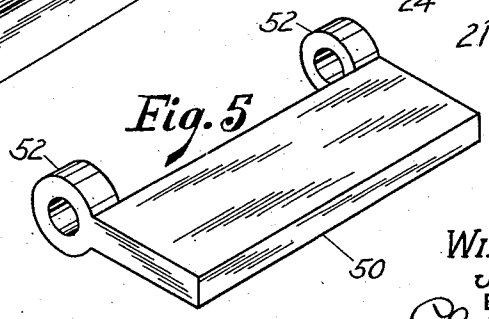


Fig. 5



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Patented June 3, 1930 1,761,029

UNITED STATES PATENT OFFICE

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TRAVELING-GRATE STOKER

Application filed June 12, 1926. Serial No. 115,622.

This invention relates to traveling grate stokers, and more particularly to traveling grate stokers in which the fuel supporting surfaces are carried on endless chains.

In stokers of this type the fuel is fed onto the grate from a hopper usually arranged at the front of the furnace. The fuel is then carried into the furnace, where combustion takes place, and the ash is deposited at the rear. The grate at this point loops down around some suitable support, and returns along the bottom of the stoker to the front of the furnace. The fuel supporting members, or grate clips, separate to a certain extent in going around the support at the rear of the stoker, and this causes a part of the fine ash to become entrapped by the grate clips and carried on their inner surfaces in their return path, to be eventually deposited in a heap at the stoker front. Such an accumulation at this point is very objectionable. It is not only unsightly, but also requires frequent attention on the part of the operators to keep it removed. In many plants hoppers have been built beneath the front of the stokers to collect this material. Such hoppers add to the cost of installation, and take up valuable space in the boiler house.

It is accordingly one object of this invention to provide a traveling grate which will automatically deposit the incombustible matter at the rear of the stoker in the receptacle provided therefor, and in which the tendency for the clips to carry the ash towards the front of the stoker is minimized.

The grate clips of traveling grate stokers are usually iron castings rather loosely fitted to their support. It frequently happens, therefore, that a clip will not fall properly into place as it revolves about the driver at the front of the stoker, and so travels through the furnace with one end projecting above the level of the other clips and into the fuel bed. This causes the projecting clip to become rapidly burned. This condition is aggravated by the enlarged air opening resulting from the displacement of the clip, which permits a localized blast of air to impinge on the fuel adjacent to said clip, accelerating combustion at this point.

It is accordingly another object of this invention to provide means for causing each grate clip to assume its proper position relative to its support before passing under the hopper into the furnace, so as to eliminate unnecessary burning of the clips, and thus increase the life of the grate surface.

In accordance with our invention, we provide a traveling grate stoker in which the fuel supporting members are so mounted as to form a substantially continuous surface during their rearward movement into the furnace and are so arranged that before returning to the stoker front they will automatically assume such a position as to cause the major portion of the ashes carried by them to be deposited in the ash pit or other proper receptacle, and minimize the accumulation of ashes on the inner surface of the clip. This is preferably accomplished by providing a pivoted support for the grate clips, with stops to limit the extent of movement in either direction, whereby the clips take a horizontal position when carrying fuel into the furnace, and assume a position at a substantial angle to the horizontal when starting back, so that the accumulated ash will easily slide off. If desired, the force of gravity may be utilized to accomplish this result, by mounting each clip on a support spaced from its center of gravity in the direction of travel, or by otherwise producing an unbalanced condition.

In order to insure that each clip will assume its proper position before passing under the hopper, we provide at this point a suitable member extendinig across the width of the stoker, and placed closely adjacent to the fuel supporting surface. This is so arranged that any projecting grate clips will strike against it and thereby be forced into place. If desired, this member may be pivotally mounted, so as to be held by gravity against the grate clips. It may also be formed in a plurality of sections across the width of the stoker.

Referring to the drawings, in which like reference numerals indicate like parts:

Fig. 1 is a longitudinal section of a stoker

illustrating one embodiment of our invention;

Fig. 2 is a perspective view of a supporting bar formed to carry a number of grate clips;

Fig. 3 is a perspective view of a grate clip;

Fig. 4 is a detail showing a grate clip mounted on the supporting bar; and

Fig. 5 is a perspective view of a grate leveling member.

The embodiment of our invention illustrated in the drawings comprises walls of suitable construction arranged to form a furnace. Mounted adjacent to the front wall is a fuel hopper 10 formed by a side frame 11 at each side of the stoker and plates 12 and 14 placed between them. In order to control the thickness of the fuel bed, we may provide an adjustable gate 15, arranged to be raised or lowered by rotating shaft 17. Adjacent to the gate 15 and inside the furnace, a suitable ignition arch 18 may be arranged to ignite the incoming fuel by heat reflected and radiated therefrom.

Beneath the hopper 10, and so placed as to withdraw fuel therefrom, is a substantially horizontal traveling grate 20, arranged to move slowly into the furnace and supply fuel for combustion. The grate is preferably composed of a number of individual grate clips 21, each clip being provided with a supporting arm 22 near its rearward end. If desired, slots 24 may be provided at each side, to facilitate the passage of air between adjacent clips. The clips may be supported on suitable cross members, such as supporting bars or grate angles 25, each angle having at the edge of one flange a substantially cylindrical bearing surface 26. It will be understood that these grate angles extend across the entire width of the stoker, and each one supports a number of clips which are placed side by side and are assembled by sliding them on from the ends of the grate angles.

The grate angles 25 are preferably supported on and carried by two or more heavy endless travelers, such as chains 28. The number of these chains may depend upon the width of the stoker. These chains may be driven at the front of the stoker by sprocket wheels 29 mounted on shaft 30. This shaft may be supported by suitable bearings in the side frames 11, and is rotated in the direction shown by the arrow by any suitable source of power. At the rear, the chains may pass around stationary semi-circular tracks 32 mounted on a heavy girder 33. In moving horizontally into the furnace, the chains may rest on tracks 35, and on their return they may be carried on tracks 36, in accordance with the usual practice.

Air for combustion may be brought in from the sides of the stoker into the space beneath the fuel supporting portion of the grate, whence it passes upward through the grate and the fuel bed. This space beneath the fuel bed is preferably divided into compartments by means of cross beams 38. Fine coal sifting between the grate clips may be collected on bottom plates 40 in each compartment, and removed through suitable cleanout doors in the side walls. Mounted on the rear girder 33, closely adjacent to the grate angles 25, and between the chains 28, are ash guards 42. These cause all fine ash which may fall between the clips where they first break apart to be caught on their upper surfaces and carried toward the rear of the furnace. At the rear of the stoker we may provide a bridge wall 44, which forms the rear wall of an ash pit 45. In order to prevent leakage of air into the furnace through the space between the grate and the floor, we prefer to form a shallow pit and fill it with cinders to form a cinder-seal 46.

The grate clips 21 are so arranged on the grate angles 25 that they may rock freely about the cylindrical bearing surface 26. We prefer to allow approximately 45 degrees of movement, and it is evident from an inspection of Fig. 4 that the amount of revolution will be determined by the location of the shoulders 47 and 48 on the arm 22. As the clips are carried downward at the rear of the stoker, the center of gravity of each clip will be brought to the rear of its support, and the clips will revolve about the bearing 26 until the limit of this movement is reached as determined by shoulder 48. It is evident then that during their travel along the bottom of the stoker, the clips will be held at an angle of approximately 45 degrees with the horizontal. In passing over the cinder-seal 46, the clips are free to swing backward as they make contact with the cinders. At the front of the stoker the clips are carried upward around the sprocket wheels 29, and gravity will cause them to assume the position shown in Fig. 4, as determined by shoulders 47.

Occasionally an individual clip in going around the driver or sprocket wheel 29 will not fall into position and will project above the grate. In order to overcome this difficulty and prevent the subsequent burning of the projecting clip, we prefer to provide means at the stoker front to force every projecting clip into its proper position before it passes under the coal hopper. This may be accomplished by a member 50, arranged in front of the hopper plate 12, and closely adjacent to the grate surface. If desired, this member 50 may be pivoted on a bar 51 extending between the side frames 11, and passing through ears 52 integral with the member, so that it will rest by gravity on the grate surface. On wide stokers we prefer to make these members in a plurality of sections as indicated in Fig. 5 which lie end to end across the width of the stoker. It is evident

that projecting clips will strike this member and assume their proper position.

In the operation of the stoker, fuel is gradually fed from hopper 10 onto the moving grate 20 and beneath the adjustable gate 15. As it passes into the furnace, the fuel is ignited by heat reflected and radiated by arch 18. Air passes upward through the grate and combustion is completed as the fuel bed is carried towards the bridge wall. At the rear, the clips pass downward around the tracks 32, and revolve about their bearings 26, so that when started on their return path they are in the position shown in Fig. 1, and all ash which may have accumulated on their surfaces is free to slide off into the ash pit 45. The clips pass next over the cinder-seal 46 and upward around sprocket wheels 29 at the front, where they assume their original positions, and any projecting clips are forced into place by contact with the member 50.

It will be evident to those skilled in the art that we have provided a very efficient traveling grate stoker, in which ash deposit at the stoker front and burning of the grate clips has been reduced to a minimum. In this way we have eliminated much of the expense and loss of time caused by replacement of the grate elements and removal of ash accumulation at undesired points. We have, moreover, done away with the necessity of installing expensive and bulky hoppers beneath the front of the stoker.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. A stoker comprising a fuel hopper, an endless traveler to carry fuel therefrom into the furnace, fuel supporting members pivoted on said traveler, and means on said members to limit the pivotal movement thereof in each direction so that the members will each assume a fuel supporting position when moving inwardly and will depend in an ash dumping position when returning outwardly.

2. A stoker comprising a fuel feeding hopper, an endless traveler to carry fuel therefrom into the furnace, grate clips, and supports for the clips, said supports being secured to the traveler, and said grate clips being pivotally mounted on the supports and provided with shoulders so located that the clips are held in a horizontal position when traveling inwardly without resting one on another, and depend under the influence of gravity when returning outwardly.

3. A stoker comprising an endless traveler to carry fuel into a furnace, a fuel hopper to load fuel thereon, fuel supporting members loosely mounted on said traveler, and a member mounted in front of the fuel loading position and arranged close to the normal path of the tops of said members so as to force any projecting members into the proper position before fuel is deposited on them.

4. A stoker comprising a fuel hopper, an endless traveler to carry fuel therefrom into a furnace, fuel supporting members loosely mounted on said traveler, and a movable member located in front of the hopper and arranged to rest by gravity on the tops of said members as they pass successively thereunder and thereby force any projecting fuel supporting member into the proper position before fuel is deposited thereon.

5. A stoker comprising a fuel hopper, an endless traveler to carry fuel therefrom into a furnace, fuel supporting members loosely mounted on said traveler, and a member pivotally mounted in front of said hopper and arranged to rest by gravity on the tops of the fuel supporting members as they pass successively thereunder and thereby cause the members to form a substantially continuous surface before receiving the fuel from the hopper.

6. A stoker comprising a fuel hopper, an endless traveler, fuel supporting members pivotally mounted on the traveler, means to hold them in a fuel supporting position while traveling on the upper run and permit them to turn and dump deposits thereon when traveling on the lower run, and means located in front of the hopper and close to the normal fuel supporting position of the tops of said members which will contact with any member not correctly located for supporting the fuel and force it to turn on its pivot to such normal position.

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