

No. 679,240.

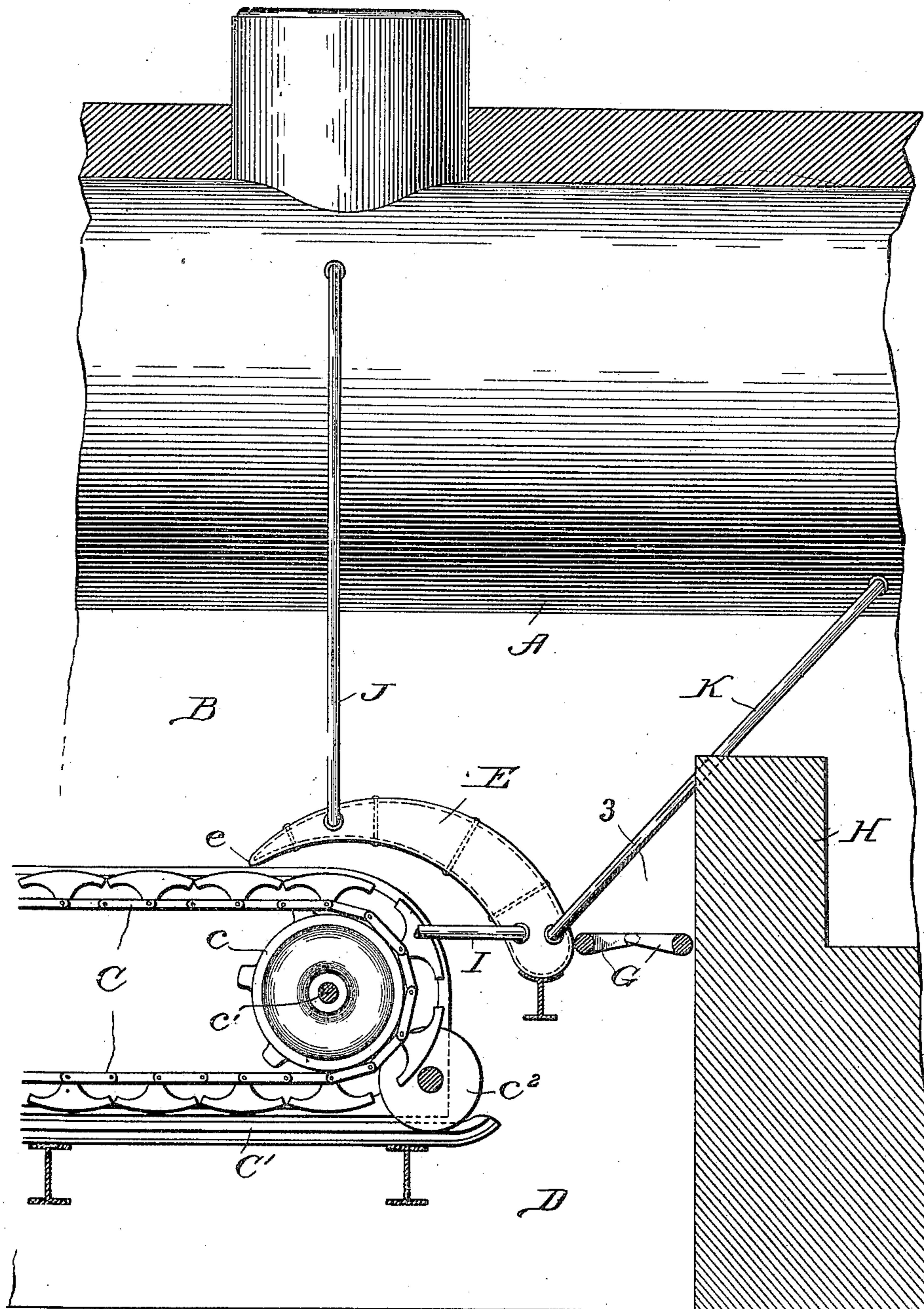
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D. J. MCKENZIE & F. SARGENT.

FURNACE.

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(No Model.)



Witnesses:

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Inventors:-

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By *Thomas T. Friedman*,  
Att'y

# UNITED STATES PATENT OFFICE.

DOUGAL J. MCKENZIE AND FREDERICK SARGENT, OF CHICAGO, ILLINOIS;  
SAID MCKENZIE ASSIGNOR TO THE MCKENZIE FURNACE COMPANY, OF  
SAME PLACE.

## FURNACE.

SPECIFICATION forming part of Letters Patent No. 679,240, dated July 23, 1901.

Application filed August 6, 1900. Serial No. 26,040. (No model.)

*To all whom it may concern:*

Be it known that we, DOUGAL J. MCKENZIE and FREDERICK SARGENT, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to that class of furnaces which are provided with grates of the endless traveling type, and especially to the means by which the larger portion of the ashes and unconsumed fuel may be taken from such grate and retained for a time to be entirely consumed, all of which will more fully hereinafter appear.

The object of the invention is to provide a furnace having an endless traveling grate with means for scraping the unburned fuel and material therefrom at or near the discharging end of such grate and retaining it for a time to entirely consume it; and the invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawing the figure represents a broken vertical sectional view of a portion of a furnace and boiler constructed in accordance with and illustrating our improvements.

In the art to which this invention relates it is well known that the use of traveling grates or so-called "mechanical stokers" is quite economical in that one man can attend to a large number of boilers and furnaces with the least amount of manual exertion and practically regulate the stoking of the furnace, so as to get an even heat on the boiler and a uniform supply or generation of steam, all of which is fully appreciated by those skilled in the art. At the same time it will be understood that the ashes passing over and off from the discharging end of such grate contain fuels or materials which are not entirely consumed, and it is for the purpose of remedying this defect or objection by providing means to catch this unconsumed fuel and retain it for a time in the fire-box or furnace, so that it can be entirely consumed, that our invention is principally designed.

In illustrating and describing our inven-

tion we have illustrated and described it in connection with a well-known type of boiler—viz., a flue-boiler; but this is merely done for the purpose of disclosing our invention and to enable those skilled in the art to practice the same, though of course it will be understood that we do not intend to limit our invention to this particular type of boiler, as it can be applied to any and all types of boilers with very slight changes in construction and arrangement, all of which can be accomplished by the exercise of mere mechanical skill. Our reason for not showing the various modifications and types of boiler to which it can be applied is to prevent multiplicity of drawings and description thereof, which would only result in confusion, prolixity, and ambiguity.

In constructing a furnace in accordance with these improvements a boiler A, of any desired type, is used, having a fire-box or fuel-chamber B, in which is mounted an endless movable or traveling grate C. As is usual in such grates they are moved on wheels or pulleys *c*, in turn rotating on and in connection with shafts *c'*, the whole of which are supported upon trucks *c''*, moving upon tracks *C'*. Arranged directly underneath or adjacent to the endless traveling grate is an ash-pit D, ordinarily arranged to receive the ashes as they pass over the rear or discharging end of the grate.

Ordinarily unless suitable means be provided to prevent it the ashes would carry over with them such parts or portions of fuel as remained unconsumed, partially consumed, or coked, which material would be lost unless afterward subjected to the operation of picking and screening. In order, however, to prevent this objectionable and expensive feature, a hollow scraper E is provided and mounted in position, so that its forward scraping end *e* practically contacts the upper surface of the grate. This scraper is made in the shape of a curved horn and extends rearwardly from the grate, but not quite to the bridge-wall H, forming between it and the bridge-wall a supplementary combustion-chamber 3, as it were, the lower part of which is closed by a shaking dumping-grate G, upon which the unburned or coked fuels may be

caught, retained for a time, and entirely consumed. As is well known, the particular location in which this scraper is arranged is objectionable in that it is subjected to  
 5 exceedingly high temperatures, and unless suitable means be provided to prevent it would soon be destroyed. In order, however, to remove this objectionable feature,  
 10 the scraper is made hollow and formed of steel plates riveted or otherwise bolted together, so as to form a hermetically-sealed pocket of such strength as to resist the ordinary boiler-pressures. This pocket is connected by means of a pipe I with a source of  
 15 feed-water supply, which water-supply is first passed through the pocket to preliminarily heat it, and from which it passes up through a pipe J, which connects with the upper portion of the boiler, so that as this highly-heated  
 20 water enters the boiler the steam-globules escape therefrom and mingle with the superheated steam. At times, however, it is necessary to shut off the feed-water; but some means should be provided to permit a circulation of water through this hollow scraper.  
 25 For this purpose a second pipe K is provided which connects with the hollow pocket and with the boiler at the lower portions thereof in such a manner that the specific gravity of  
 30 the water may be taken advantage of to provide for the circulation of water through the pocket of the scraper, and thus preserve the same from rapid disintegration, while at the same time presenting an additional surface  
 35 to the furnace to assist in the more rapid generation of steam.

In operation the fuel may be supplied to the endless traveling grate in any desired manner and so that it is practically consumed  
 40 during the movement of the same before it reaches the discharge end of the grate. As the fuel, consumed and unconsumed, reaches the discharge end of the traveling grate it is forced onto and over the curved end of the  
 45 scraper until it passes into the supplementary chamber *e* and is there caught on the auxiliary grate G to remain until such time as it is entirely consumed or dumped.

We claim—

50 1. In a furnace of the class described, the combination of an endless traveling grate, a supplementary burning-grate, and a scraper

arranged intermediate the traveling and supplementary grates so as to scrape the fuel therefrom and deliver it to the supplementary  
 55 grate where it may be retained and entirely consumed, substantially as described.

2. In a furnace of the class described, the combination of an endless traveling grate, a supplementary grate upon which fuel may be  
 60 retained for a time, a hollow scraper arranged adjacent to the discharge end of the traveling grate to scrape the fuel therefrom and deliver it to the supplementary grate upon which it may be retained and entirely consumed, and  
 65 means connecting the hollow scraper with the source of feed-water supply and the water-space of the boiler for a circulation of water therethrough and to prevent the rapid burning or destruction of the same, substantially  
 70 as described.

3. In a furnace of the class described, the combination of an endless traveling grate, a supplementary grate arranged to the rear of  
 75 the same, a hollow curved scraper arranged adjacent to the discharge end of the endless traveling grate and intermediate it and the supplementary grate so as to catch or scrape the unburned fuel on the traveling grate and deliver it to the supplementary grate, and  
 80 pipes connecting the hollow scraper with the upper and lower water and steam spaces of the boiler to provide for a circulation of water therethrough, substantially as described.

4. In a furnace of the class described, the  
 85 combination of an endless traveling grate, a supplementary grate arranged to the rear of the same, a hollow steel scraper arranged adjacent to the discharge end of the endless traveling grate and intermediate it and the  
 90 supplementary grate so as to catch or scrape the unburned fuel on the traveling grate and deliver it to the supplementary grate, and pipes connecting the hollow curved scraper with the upper and lower water and steam  
 95 spaces of the boiler and with the source of feed-water supply to provide for a circulation of water therethrough at any and all times, substantially as described.

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Witnesses:

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