P. J. HARLEMAN.

MECHANICAL STOKER.

APPLICATION FILED AUG. 16, 1906.

944,551.

Patented Dec. 28, 1909.

2 SHEETS—SHEET 1.

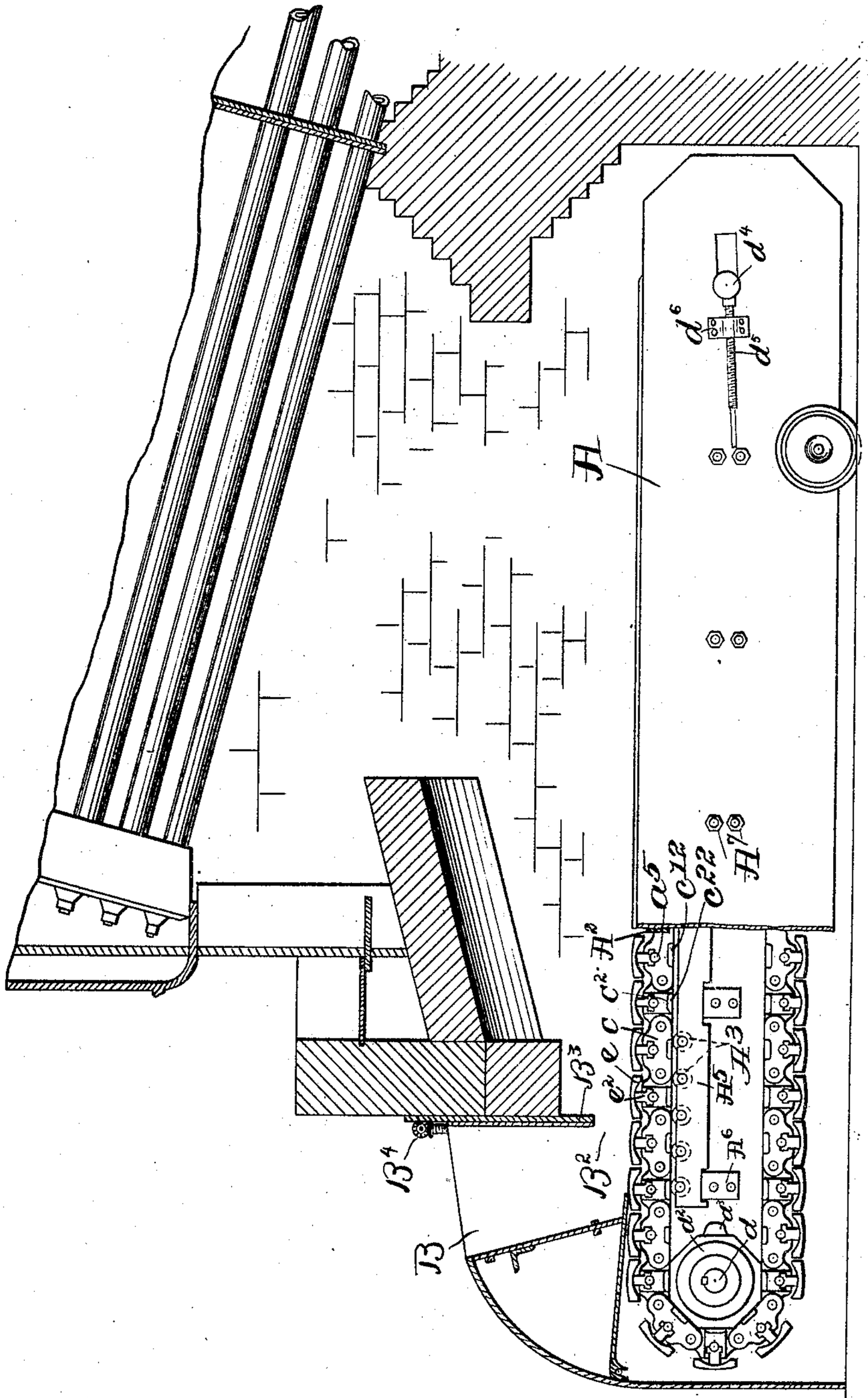

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

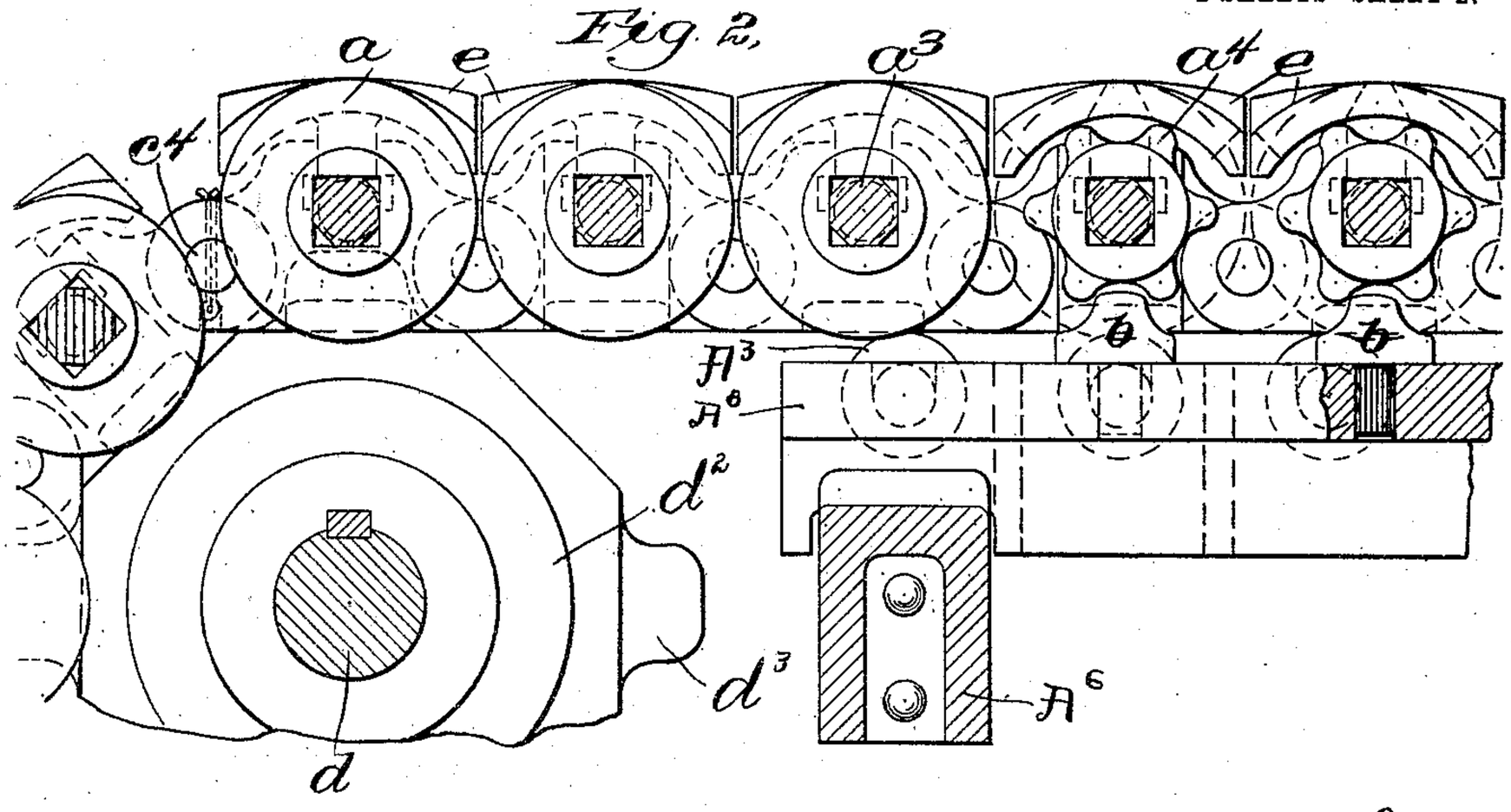


Fig. 3.

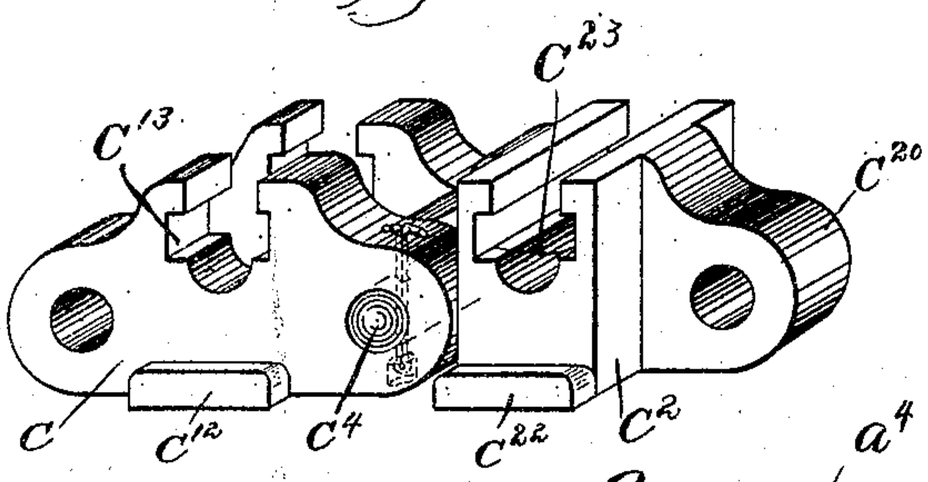


Fig. 4.

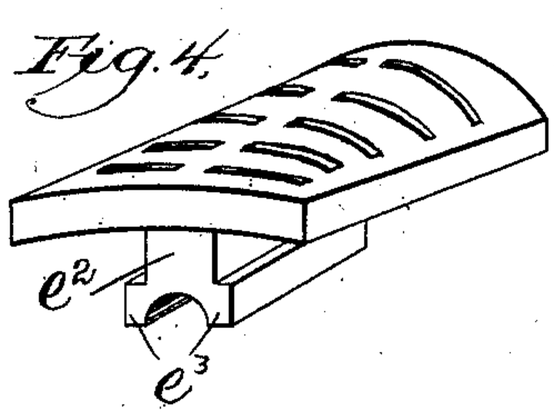
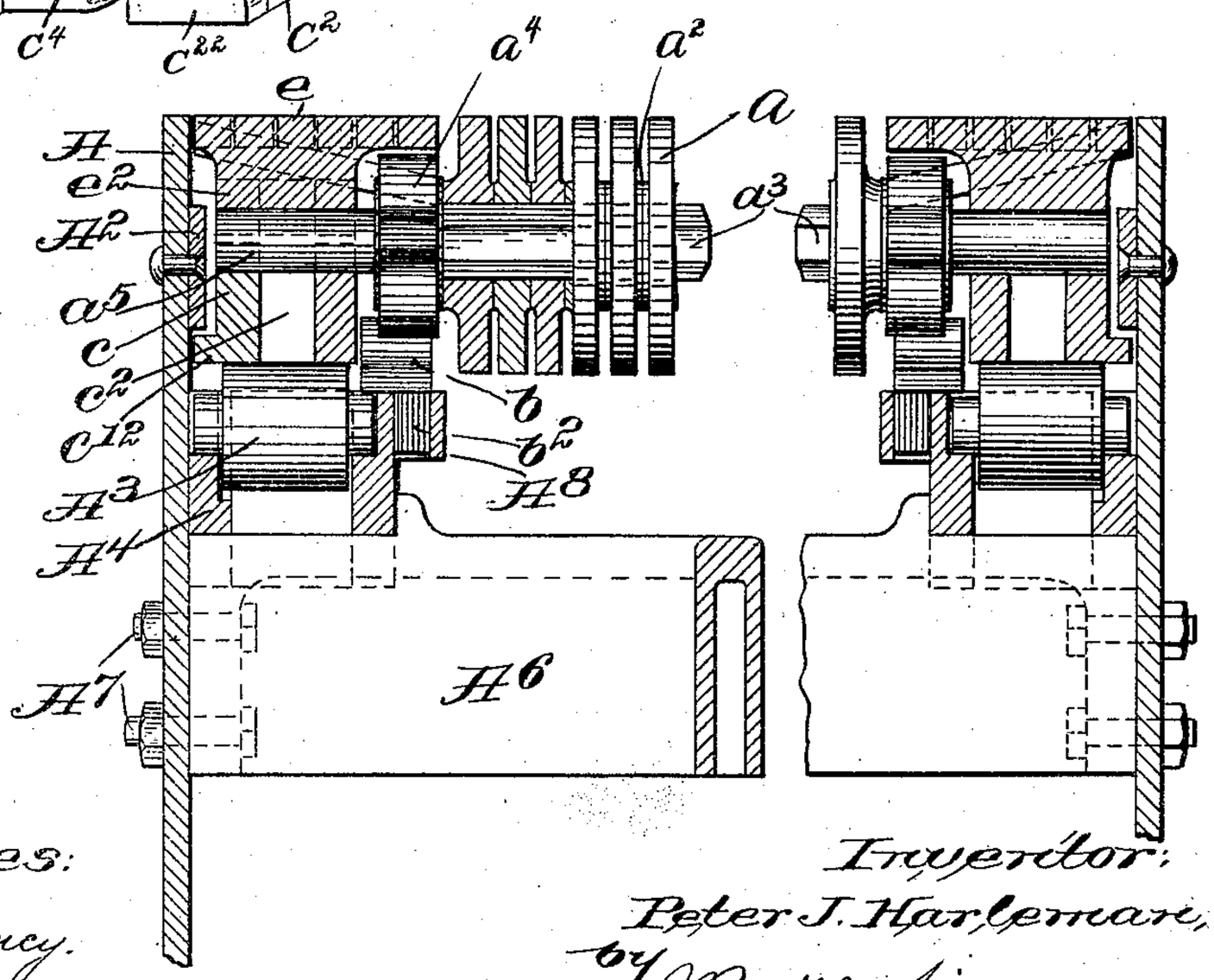


Fig. 5.



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UNITED STATES PATENT OFFICE.

PETER J. HARLEMAN, OF BOSTON, MASSACHUSETTS.

MECHANICAL STOKER.

944,551. Specification of Letters Patent. Patented Dec. 28, 1909.

Application filed August 16, 1906. Serial No. 330,785.

To all whom it may concern:

Be it known that I, PETER J. HARLEMAN, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Mechanical Stokers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a mechanical stoker of the traveling grate type, in which the fuel is fed by gravity upon the grate bars and is carried along through the furnace during combustion.

The invention is embodied in a stoker of the traveling grate type, and relates mainly to novel features of construction and arrangement whereby the grate bars are kept clear of slag, and prevented from clogging, while the fuel is continually agitated, so that combustion takes place readily throughout the mass.

A further feature of the invention consists in means for protecting the endless chains, each link of the chain having a protecting member which also serves to protect an operating device for producing the rotating movement of each grate bar which takes place in the travel of the chain.

A further feature of the invention consists in a novel construction and arrangement of the driving chain for the grate bars which facilitates the removal of any one link or grate bar if one needs to be replaced.

Figure 1 is a side elevation, partly in section, of a boiler provided with a stoker embodying the invention; Fig. 2 is an enlarged detail in section, on two different vertical planes, part being shown on a plane outside of the driving sprockets for the grate bars, and part through the grate bars themselves; Figs. 3 and 4 are perspective views showing details of the chain; and Fig. 5 is a transverse section through one of the grate bars and the chain links connected therewith, the parts being broken, as is necessary to show the entire width of the grate.

In accordance with the invention, each grate bar consists in a series of disks a separated from each other by means of hubs a^2. As best shown in Fig. 5, these disks are assembled upon an octagonal rod a^3 which extends across from one side of the fire pot to the other, the said rod being further provided with a sprocket wheel a^4, the teeth of which are arranged to be engaged in the travel of the grate bars by projections b which extend longitudinally through the fire pot at opposite sides thereof, as indicated in Figs. 2 and 5.

The ends of the octagonal rods a^3 are cylindrical, as indicated at a^5, so as to be capable of rotation in the chain links c, c^2 which produce the traveling movement of the grate bars in conjunction with a mechanically rotated shaft d carrying a sprocket d^2. In the construction shown, the sprocket d^2 is provided with four teeth d^3 so spaced as to engage alternate links of the traveling chain, which construction admits of making the chain of substantially uniform width throughout its entire length, as will be hereinafter described.

The link construction is best shown in Figs. 3, 4 and 5, the links c being arranged in pairs, as indicated, while the links c^2 have lugs c^{20} at each end, which are joined by the cross pins c^4 to the link c. The bodies of the links c^2, however, are extended to a width which brings them into alinement with the sides of the links c, the said bodies having projecting members c^{22} which correspond to similar projecting members c^{12} from the sides of the links c. The projections c^{12} and c^{22} underlie internally projecting flanges A^2 formed in the side walls A which inclose the grate and ash pit, while the chain as a whole travels on rollers A^3 which are supported in bars A^4 and A^5 extending longitudinally along the grate. These bars in turn are supported upon cross members A^6 secured as by bolts or rivets A^7 in the side members A, and extending completely across from one side to the other of the fire chamber below the grate. The bars A^4 and A^5 are provided with flanges A^8 which are provided at intervals with sockets adapted to support the stems b^2 of the stationary teeth b which cooperate with the sprocket wheels a^4 to turn the grate bars in the travel of the chains. In order to protect the chains, each link is provided with a cover member e which is shaped at one end only to correspond approximately to the spherical outline of the grate bar, and is raised and flattened at the other end so as to shed the coal away from the side of the fire pot toward the grate bars proper. These members are provided with downwardly projecting tongues e^2 having lateral flanges e^3 which fit into correspond-

ing grooves c^{13} and c^{23} in the links c and c^2. The cylindrical bearings for the grate bars are formed partly in the members e and partly in the links, it being obvious that, by this construction, all the parts can be readily taken to pieces for replacement. In other words, if the grate bar is to be removed, it is necessary only to move the chain until the grate bar is accessible at the outer end, and then take off the members e from the chains at opposite sides by driving them out of the channels c^{13} and c^{23}, after which the grate bar can be lifted out and a new one put in.

As best shown in Fig. 1, the chain grate at the end opposite the driving shaft d is carried over an idler sprocket, the end of the shaft d^4 for which is shown as bearing in the side plates A and projecting through the same, there being an adjusting rod d^5 screw threaded in a lug d^6, and bearing against the end of the shaft d^4, so that any slack in the chain grate can be taken up, or if the grate contracts the tension can be loosened.

It will be seen from the foregoing description that the grate bars, while having ample draft space, have smooth surfaces with no abutments to accumulate and hold clinkers, while the rotation of the bars continually agitates the fuel and tends to keep the disks free from any crust or slag which would otherwise accumulate thereon. Furthermore, the drive chains will run smoothly over the rollers and will be amply protected by the cover members e, and the chain is further held down by the internally projecting flanges A^2, so that the grate bar sprockets a^4 cannot fail to engage the projections b, as might be the case if ashes were to accumulate in sufficient quantities to clog the sprockets and allow the grate to ride over without turning the bars. The coal is fed upon the traveling grate through a hopper B located in front of the furnace door B^2, and the amount of fuel which is actually fed to the fire pot may be regulated by means of a sliding door B^3 which is herein shown as vertically movable in front of the fire door B^2 and connected with a suitable operating device herein shown as a roller or windlass B^4. This affords a simple expedient for regulating the amount of fuel to be fed, the amount, of course, depending upon the size of the opening controlled by the slide or door B^3.

Claims.

1. In a mechanical stoker, a traveling grate having a plurality of revoluble grate bars adapted to receive fuel fed by gravity thereon, and being provided with drive chains consisting of links alternately provided with double and single lugs, the width of the bodies of the links being substantially equal, and each link being provided with a bearing socket for one end of one of said revoluble grate bars; a cover or projecting member coöperating with said bearing socket to complete the bearing for the grate bar, said member being detachable from the link for the purpose of removing the grate bar; means for imparting travel to said grate; and means for revolving the grate bars during the travel of the grate.

2. In a mechanical stoker, a traveling grate comprising a series of cylindrical grate bars each of which is composed of a revoluble bar and a series of disks thereon separated from each other to afford draft spaces, said grate being provided with drive chains the links of which are provided with bearings for the grate bars each consisting of a bearing socket formed in the link and a detachable cover or projecting member having a corresponding socket to complete the bearing; means for imparting travel to said grate; and means for revolving the grate bars during the travel of the grate.

3. The combination with a fire box; of inclosing side members therefor; transverse supporting members extending from one side member to the other; longitudinal internal supports within said side members and mounted on said transverse supporting members, said internal supports being provided with bearings; rollers in said bearings; a traveling grate having driving chains at opposite sides resting on said rollers; means for imparting travel to said grate; rotatable grate bars having bearings in the links of said driving chains; sprocket wheels rigidly mounted on said grate bars; and stationary projections extending upward from said internal supports to coöperate with said sprocket wheels, whereby the graté bars are rotated during the travel of the grate.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

PETER J. HARLEMAN.

Witnesses:
M. E. Covenly,
H. J. Livermore.