

W. M. DUNCAN.
CHAIN GRATE.
APPLICATION FILED DEC. 21, 1911.

1,048,053.

Patented Dec. 24, 1912.

Fig. I.

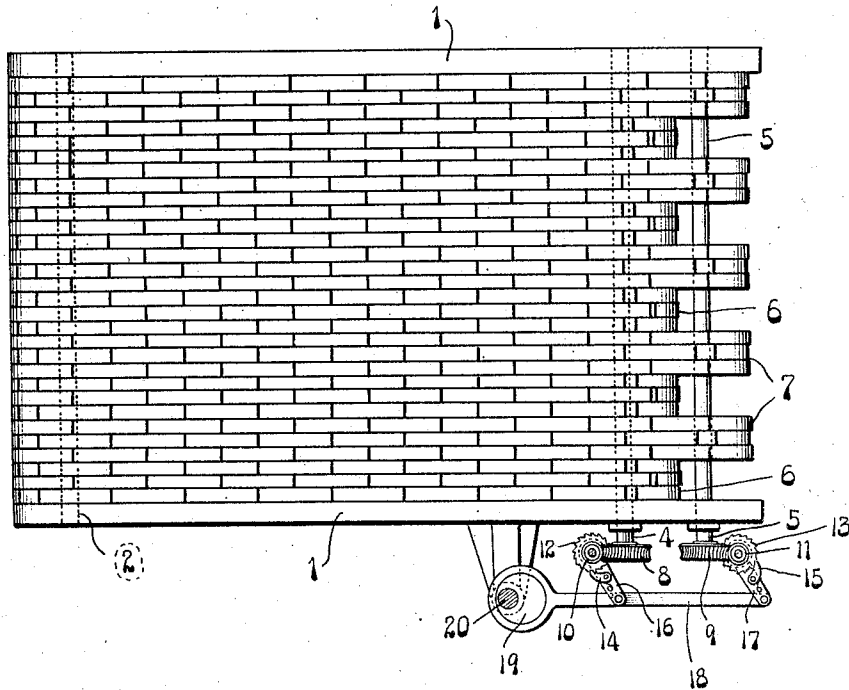


Fig. II.

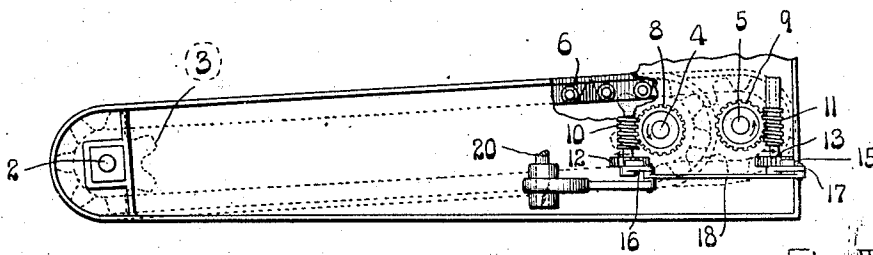


Fig. III.

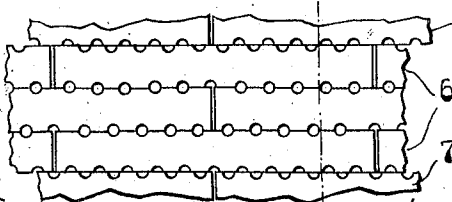
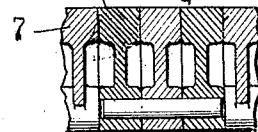


Fig. IV.



Attest
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UNITED STATES PATENT OFFICE.

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CHAIN GRATE.

1,048,053.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM M. DUNCAN, a citizen of the United States of America, and resident of Alton, in the county of Madison and State of Illinois, have invented certain new and useful Improvements in Chain Grates, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification.

My invention relates to a chain grate of the type commonly utilized in mechanical stokers, and it has as a particular object the construction of a grate of this description especially useful for the support and movement of coking fuel, such as coal, in a manner to break up the mass of fuel at intervals for the facilitation of combustion therein.

Figure I is a top or plan view of my chain grate. Fig. II is a side elevation of the grate partly broken out. Fig. III is an enlarged top or plan view of a fragment of the grate. Fig. IV is a vertical cross section taken on line IV—IV, Fig. III.

In the drawings:—1 designates the side frames of my grate. In the preferred construction of the grate, I utilize at the rear end thereof a supporting shaft 2 journaled in the side frames 1 and equipped with a plurality of idler wheels 3 under which the chains of the grate travel when moving in a reverse course after partaking of movement in a direction toward the rear end of the grate. At the opposite or front end of the grate are two independently movable inner and outer drive shafts 4 and 5 having fixed thereto drive wheels similar to the idler wheels 3 by which the chains of the grate are operated.

6 and 7 are chains composed of grate bars of the kind commonly employed in chain grates, the various bars entering into the chains being pivotally connected in a manner to permit flexing of the chains as they pass around the supporting idler drive wheels on which they operate. The chains 6 are arranged in engagement with the inner wheels on the inner drive shaft 4 and the chains 7 are arranged in engagement with the outer wheels on the outer drive shaft 5, and said chains are arranged alternately of each other transversely of the grate, as seen in Fig. I. It will, therefore, be seen that one series of the chains may be operated at one time and the other series

of chains operated at another time through the medium of the two separate inner and outer drive shafts 4 and 5. Each of the grate bar chains preferably comprises grate bar units containing a plurality of grate bars arranged side by side and united by transverse connecting members, as seen in Fig. IV, where three grate bars are shown connected by a pin passing transversely therethrough.

As preferred means of moving the inner and outer drive shafts 4 and 5 independently of each other and intermittently in order that a desired result of moving the grate bar chains intermittently may be accomplished, I employ the shaft operating means illustrated in the drawings. The inner and outer drive shafts 4 and 5 have fixed to them, respectively, worm wheels 8 and 9 that are engaged by worms 10 and 11 carried by shafts journaled in suitable supports located adjacent to said worm wheels; the left worm 10 pushing down and the right worm 11 pushing up on their respective worm wheels. The worm shafts 10 and 11 are provided respectively with ratchet wheels 12 and 13, that receive the engagement of pawls 14 and 15 carried by rockable arms 16 and 17. The pawl carrying arms are pivoted to a reciprocating bar 18 that is operable by an eccentric 19 on a shaft 20, which may be driven by power applied thereto in any suitable manner.

It will be perceived that the drive shaft operating means shown and described provides for the operation of the drive shafts 4 and 5 in an intermittent manner, and that one of these shafts will remain idle while the other shaft is being driven. This being understood, it will also be understood that the grate bar chains 6 have movement imparted to them while the grate bar chains 7 remain idle and that the former remain idle while the latter are being operated. The fuel resting upon the grate composed of the alternately arranged grate bar chains 6 and 7 is, therefore, shifted in a forward direction to the rear end of the grate at one time by one set of the grate bar chains, and shortly thereafter in the same forward direction to the rear end of the grate by another set of grate bar chains; and, as a consequence, it is frequently disturbed by an intermittent shuffling movement of the chains, resulting in the breaking up of the

fuel mass instead of allowing said mass to become solidified and remain in such condition, to the detriment of the entrance of oxygen thereinto for the promotion of combustion.

I claim:—

1. A chain grate comprising a plurality of sets of endless grate bar chains furnishing a single grate surface, the chains of one set being arranged alternately between chains of the other set, a separate drive shaft for operating each set of grate bar chains in one general direction, and driving mechanism for said shafts, said driving mechanism comprising means for operating

one of said shafts while the other shaft is idle.

2. A chain grate comprising a plurality of sets of endless grate bar chains furnishing a single grate surface, the chains of one set being arranged alternately between chains of the other set, a drive shaft for each set of grate bar chains, and means for operating first one and then the other of said shafts, whereby the sets of grate bar chains are moved alternately.

WILLIAM M. DUNCAN.

In the presence of—

A. B. STRATTON,

A. H. BLAIR.