Aug. 4, 1925. 1,548,065

A. F. SCHWENDNER

STOKER

Filed July 5, 1922 2 Sheets-Sheet 1

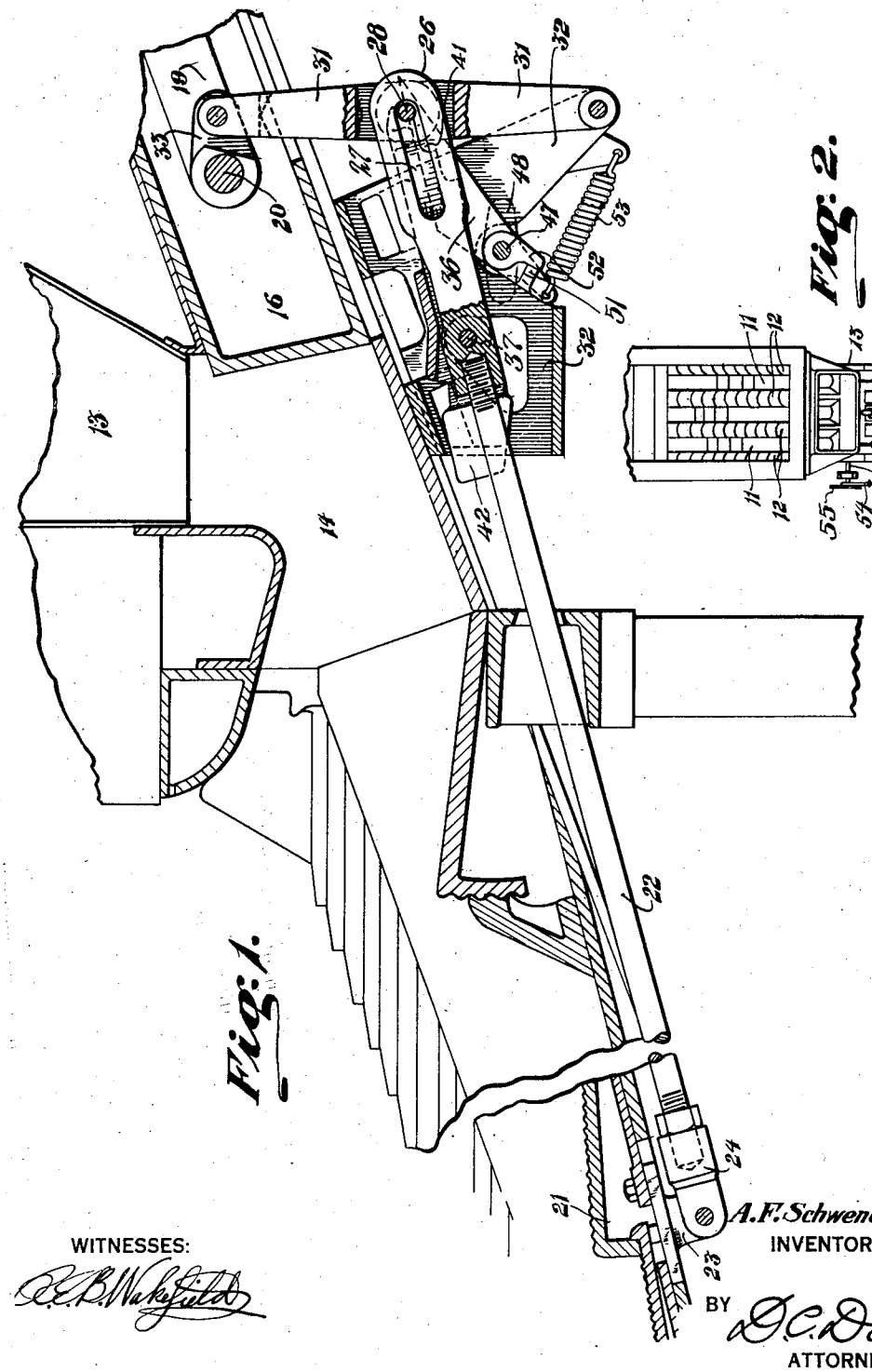


Fig. 1.

Fig. 2.

WITNESSES:

R. E. B. Wakefield

A. F. Schwendner
INVENTOR

BY D. C. Davis
ATTORNEY

Aug. 4, 1925. 1,548,065

A. F. SCHWENDNER

STOKER

Filed July 5, 1922 2 Sheets-Sheet 2

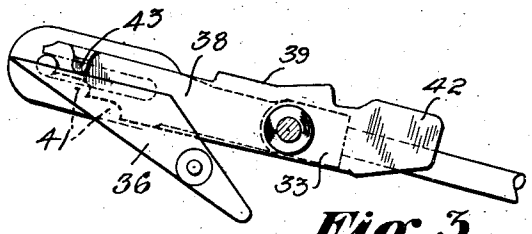


Fig. 3.

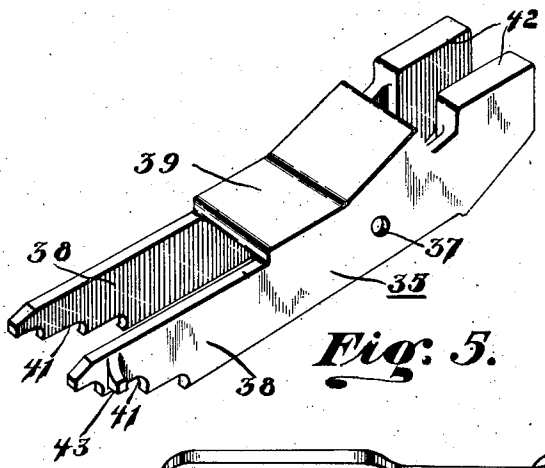


Fig. 5.

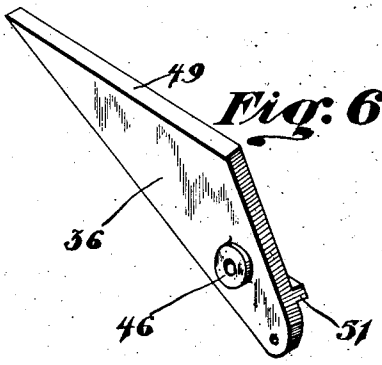


Fig. 6.



Fig. 7.

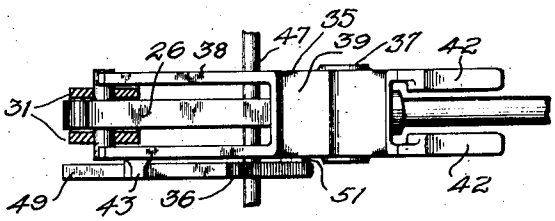


Fig. 4.

WITNESSES:

A. F. Schwendner
INVENTOR

BY J. C. Davis
ATTORNEY

Patented Aug. 4, 1925.

1,548,065

UNITED STATES PATENT OFFICE.

ANTHONY F. SCHWENDNER, OF GLEN OLDEN, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

STOKER.

Application filed July 5, 1922. Serial No. 572,985.

To all whom it may concern:

Be it known that I, ANTHONY F. SCHWENDNER, a citizen of Hungary, and a resident of Glen Olden, in the county of Delaware and State of Pennsylvania, have invented a new and useful Improvement in Stokers, of which the following is a specification.

This invention relates to mechanical stokers of the underfeed type, particularly to mechanism for driving and controlling the movement of reciprocating rams employed in such apparatus and has for an object to provide an apparatus of the character designated which shall embody a durable driving connection between the fuel-feeding ram and the driving mechanism of the stoker which may be adjusted so that the length of the stroke of the auxiliary rams may be varied while the stoker mechanism is in operation. A further object of my invention is to provide a driving mechanism for the purpose specified in which the length of the stroke of all auxiliary rams may be changed by a single manual operation, while the stoker mechanism is in operation, without regard to the position or direction of movement of the ram-operating mechanism.

These and other objects may be attained by means of a mechanism embodying the features herein described and illustrated in the accompanying drawings in which Fig. 1 is a longitudinal vertical section of an underfeed stoker embodying my invention; Fig. 2 is a plan view of the multiple retort stoker illustrated in Fig. 1; Fig. 3 is a side elevation of the variable stroke mechanism; Fig. 4 is a plan view thereof the ram operating levers being shown in section; and Figs. 5, 6 and 7 are detailed perspective views of the several parts of the variable motion connection illustrated in Figs. 3 and 4.

Referring to the drawings, the stoker in connection with which my improved apparatus is shown is of the multiple retort type having alternately disposed retorts 11 and twyer banks 12. Fuel is supplied to the stoker through a hopper 13 and ram boxes 14, whence the rams 16 force the fuel into the retorts 11 and onto the twyer banks 12 in a manner common in this art. The driving mechanism of the stoker may be of any conventional type. As shown, the rams 16 are connected to the power shaft 17 through cranks 18, connecting rods 19, and wrist-pins 20, the several cranks being preferably set in angular relationship one to the other to cause the reciprocation of the several rams 16 to occur in differing phases.

In each retort is disposed an auxiliary ram 21 which slides forward and rearward in the retort for the purpose of agitating and moving the fuel bed. A ram-operating member 22 is secured at its rear end to a depending lug 23 of the ram 21 by means of a fitting 24. The forward end of the ram-operating member 22 includes an extension fitting 26 having a longitudinally disposed slot 27 therein, for the receipt of a driving pin 28 forming a part of any suitable driving mechanism. As shown, the means for reciprocating the ram-operating mechanism 22 comprises a lever 31 fulcrumed at one end upon a frame 32 and connected at the other end through a link 33 to the wrist-pin 20, the driving pin 28 being secured to the lever 31 at an intermediate point.

A variable stroke connection operatively unites the ram-operating member and the actuating mechanism. As illustrated, it comprises a thrust member 35 and a guide member 36. The thrust member 35 is pivotally mounted at 37 upon the extension fitting 26 and comprises two side plate portions 38 connected by a bridge portion 39, each plate having at one end a series of stepped notches 41 formed preferably upon the underside of the plate, and at the other end a counterpoise 42. The thrust member is so balanced about its point of support 37 that the notched end is slightly the heavier. The thrust member is mounted on the fitting 26 in such relation thereto that the notches engage the pin 28 in the slot 27, different notches being brought into engagement with the pin 28 by a shift of the angular position of the thrust member 35 with respect to the extension fitting 26. A guide lug 43 projects from one of the side plates 38 and serves to support the thrust member in the desired angular position, as hereinafter appears. The two side plates 38 of the thrust member 35 are alike in structure, are equally spaced from the line of thrust of the ram-operating member and are adapted for sustaining without lateral strain the heavy load imposed thereon. It is to be understood,

however, that the thrust member may be constructed of a single plate if desired.

The guide member 36 is in effect a lever of triangular conformation having a fulcrum 46 relatively near the apex of one of the angles. The guide 36 is mounted loosely upon a shaft 47 which extends the width of the furnace and which is supported by brackets 48 secured to the frame 32. The guide 36 has a guide face 49 extending in the plane of reciprocation of the ram-operating member 22 and adapted slidably to support the thrust member 35 by reason of contact with the guide lug 43. A lug 51 formed integrally with the guide member 36 and disposed below the fulcrum 46 is provided to engage an arm 52, the latter being keyed to the shaft 47. A spring 53, secured at one end of the frame 32 and at its other end to the lower end of the guide member 36, tends to hold the lug 51 in contact with the arm 52 in all operative positions of the arm.

The shaft 47 carries an arm 52 for each variable stroke connection, one of which is associated with each retort. At one end of the shaft 47 is secured a lever 54, by means of which the arms 52 are moved into positions such that the guides 36 of the several variable stroke connections may support the thrust member 35 in angular position suitable for the engagement of the pins 28 with any of the notches 41 of the thrust members. A notched quadrant 55 of usual construction may serve to hold the lever 54 in any desired position.

The operation of the above described embodiment of my invention is as follows: Fuel is supplied to the hopper 13 and thence to the ram boxes 14. The rams 16 force the fuel into the retorts and onto the twyer banks so as to cover the grate surface of the stoker. The auxiliary rams move to and fro to agitate and facilitate the advance of the fuel. On the rearward stroke of the ram operating member 22, the pin 28 of the lever 31 acts in one of the notches 41 of the thrust member 35 to effect this rearward movement, and the return of the ram operating member is accomplished through the pin 28 engaging the outer end of the slot 27 of the extension fitting 26. Whenever it is desired to change the length of the stroke of the auxiliary rams, as frequently happens when the load conditions are changed, the operator moves the lever 54 to a position which will give a desired reciprocation of the auxiliary rams. Since the rams in a multiple retort stoker normally operate in different phases, the thrust members of some of the retorts will be carrying the load imposed upon them by the pins 28 and consequently cannot be removed to a new angular position with respect to the ram operating member until relieved of the load. My construction makes provision for the movement of any such thrust member to occur after the load has been removed. Thus, assuming in Fig. 1, that the ram 16 has just started its inward stroke and has placed a load upon the pin 28 and the upper notch 41 of the thrust member 35. If the shaft 47 is rotated in a counter-clockwise direction sufficiently to raise the guide member 36 to support the thrust member 35 in a position to engage the pin 28 at a lower notch, the thrust member now carrying a load and the guide member engaging the lug 43 are both held in their original position. The arm 52 has however withdrawn from the lug 51 a suitable distance to permit of the desired adjustment. The ram operating member therefore completes its full rearward stroke with the guide and thrust members in their original positions. Upon the return stroke of the lever 31, the load is removed from the thrust member and the spring 53 acts to move the guide member 36 into contact with the arm 52 and to raise the notched end of the thrust member into a position to effect a stroke of the desired length upon the succeeding rearward movement of the actuating mechanism. In a similar manner, changes in the length of stroke of the auxiliary rams may be effected, from no movement to the maximum stroke, and vice versa, for which the apparatus is designed, by a single manipulation of the lever 54, which adjustment may be made at any time, irrespective of the position of any ram, the changed stroke being effective for each ram at the beginning of the succeeding rearward stroke of the ram-operating member.

In stokers having from 7 to 14 retorts, the utility of the present apparatus over types commonly used in the adjustment of the auxiliary ram in which the adjustments are made separately for each ram, is obvious. A single manipulation of the lever 54 effects the desired change of stroke of all auxiliary rams and thus eliminates the chance of mis-setting any ram and the irregular feeding action of the fuel resulting therefrom.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications, without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1. In a mechanical stoker, a ram, a ram-operating member, means for reciprocating the ram operating member, a variable stroke connection between said member and said means comprising a thrust member pivot-

ally secured to the ram-operating member and having stepped notches along its under side, a pin operatively associated with said reciprocating means for engagement with said notches, and means for supporting the thrust member in a plurality of angular positions, whereby any one of the several notches of the thrust member may be positioned to engage the pin of the reciprocating means.

2. In a mechanical stoker, a ram, a ram-operating member, means for reciprocating the ram-operating member, a variable stroke connection betewen said member and said means comprising a thrust member pivotally secured to the ram-operating member and having stepped notches along its under side, a pin operatively associated with said reciprocating means for engagement with said notches, and means for supporting the thrust member in a plurality of angular positions, whereby any one of the several notches of the thrust member may be positioned to engage the pin of the reciprocating means, and means for changing the position of said supporting means.

3. In a mechanical stoker, a ram, a ram-operating member, means for reciprocating the ram operating member, a variable stroke connection between said member and said means comprising a thrust member pivotally secured to the ram-operating member and having stepped notches along its under side, a pin operatively associated with said reciprocating means for engagement with said notches on its inward stroke, means in said ram-operating member for engaging the pin on the outward stroke of said reciprocating means, and means for supporting the thrust member in a plurality of angular positions, whereby any one of the several notches of the thrust member may be positioned to engage the pin of the reciprocating means.

4. In a mechanical stoker, a ram, a ram-operating member, means for reciprocating the ram-operating member, a variable stroke connection between said member and said means comprising a thrust member pivotally secured to the ram-operating member and having stepped notches along its under side, a pin operatively associated with said reciprocating means for engagement with said notches on its inward stroke, means in said ram-operating member for engaging the pin on the outward stroke of said reciprocating means, means for supporting the thrust member in a plurality of angular positions, whereby any one of the several notches of the thrust member may be positioned to engage the pin of the reciprocating means, and means for changing the position of said supporting means.

5. In a mechanical stoker, a ram, a ram-operating member, means for reciprocating the ram-operating member, a variable stroke connection between said member and said means comprising a thrust member pivotally secured to the ram-operating member and having stepped notches along its under side, a pin operatively associated with said reciprocating means for engagement with said notches on its inward stroke, means in said ram-operating member for engaging the pin on the outward stroke of said reciprocating means, means for supporting the thrust member in a plurality of angular positions such that any one of the several notches of the thrust member may be positioned to engage the pin of the reciprocating means, and resilient means for changing the position of said supporting means upon the release of the thrust member from engagement with the pin.

6. In a mechanical stoker, a ram, a ram-operating member, means for reciprocating the ram-operating member, a variable stroke connection between said member and said means comprising a thrust member pivotally secured to the ram-operating member and having stepped notches along its under side, said thrust member also having a guide lug thereon, a pin operatively associated with said reciprocating means for engagement with said notches on its inward stroke, means in said ram-operating member for engaging the pin on the outward stroke of said reciprocating means, a member having a guide face on which said guide lug is adapted to ride for supporting the said thrust member, and means for changing the position of the guide face and the thrust member supported thereby, whereby any one of the several notches of the thrust member may be positioned to engage the pin of the reciprocating means.

7. In a mechanical stoker, a ram, a ram-operating member, means for reciprocating the ram-operating member, a variable stroke connection between said member and said means comprising a thrust member pivotally secured to the ram-operating member and having stepped notches along its under side, said thrust member also having a guide lug thereon, a pin operatively associated with said reciprocating means for engagement with said notches on its inward stroke, means in said ram-operating member for engaging the pin on the outward stroke of said reciprocating means, a pivoted lever having on one arm a guide face on which said guide lug is adapted to ride for supporting the said thrust member, resilient means secured to the other arm of the lever acting to hold the guide face in contact with the lug, and adjustment means acting upon said other arm of the lever in opposition to the resilient means to change the position of the lever, whereby the change of position of the thrust member when in operative con-

tact with the said pin may be caused upon the release of the thrust member from engagement with the pin.

8. In a mechanical stoker, the combination with a plurality of retorts each having a ram and ram-operating member for imparting a to-and-fro movement to its associated ram, and means for actuating the several ram operating members, out of phase with one another in their to-and-fro cycles, of a thrust member pivotally secured to each ram-operating member and having stepped notches along its under side, pins operatively associated with said actuating means for engagement with the notches of the respective thrust members, means for supporting each said thrust member in a plurality of angular positions, and means for changing, by a single operation, the angular position of all of said thrust members irrespective of the position of any ram-operating member at the time the last said means is actuated.

9. In a mechanical stoker, the combination with a plurality of retorts each having a ram and ram-operating member for imparting a to-and-fro movement to its associated ram, and means for actuating the several ram-operating members in different phases in their to-and-fro cycles, of a thrust member pivotally secured to each ram-operating member and having stepped notches along its under side, each said thrust member having a guide lug thereon, pin operatively associated with said actuating means for engagement with the notches of each of said thrust members, a member associated with each thrust member and having a guide face on which said guide lug is adapted to ride for supporting the said thrust member, and means for changing, by a single operation, the position of all said guide members irrespective of the position of any ram-operating member at the time the last said means is actuated.

In testimony whereof, I have hereunto subscribed my name this 30th day of June, 1922.

ANTHONY F. SCHWENDNER.