Feb. 10, 1925 1,525,472

H. M. SWINDLER

UNDERFEED STOKER

Filed March 26. 1923 2 Sheets-Sheet 1

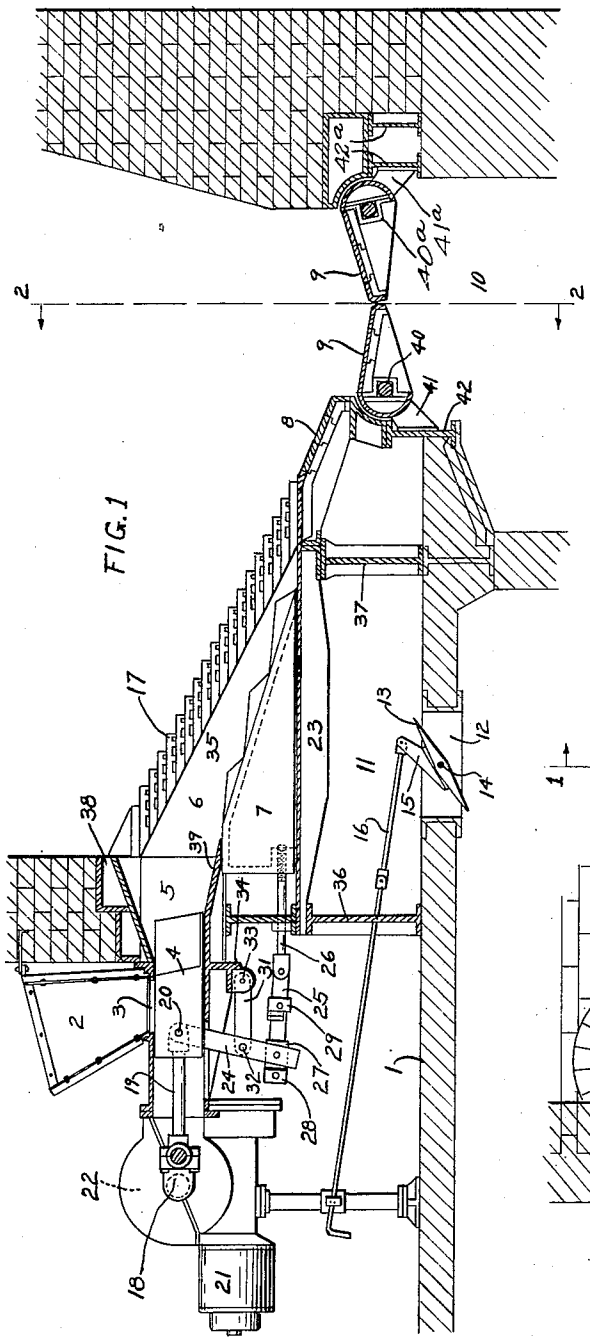


FIG. 1

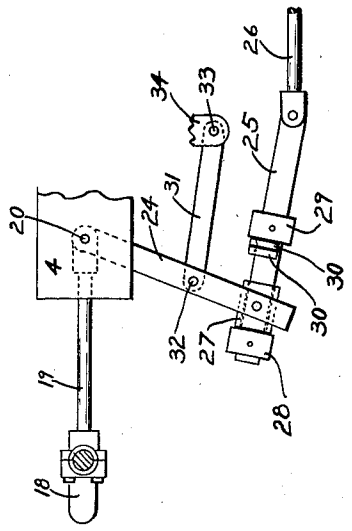


FIG. 3

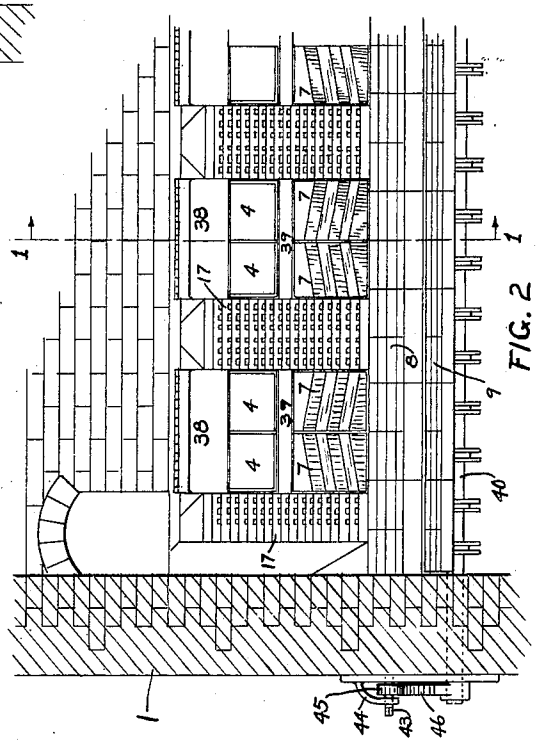


FIG. 2

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H. M. SWINDLER

UNDERFEED STOKER

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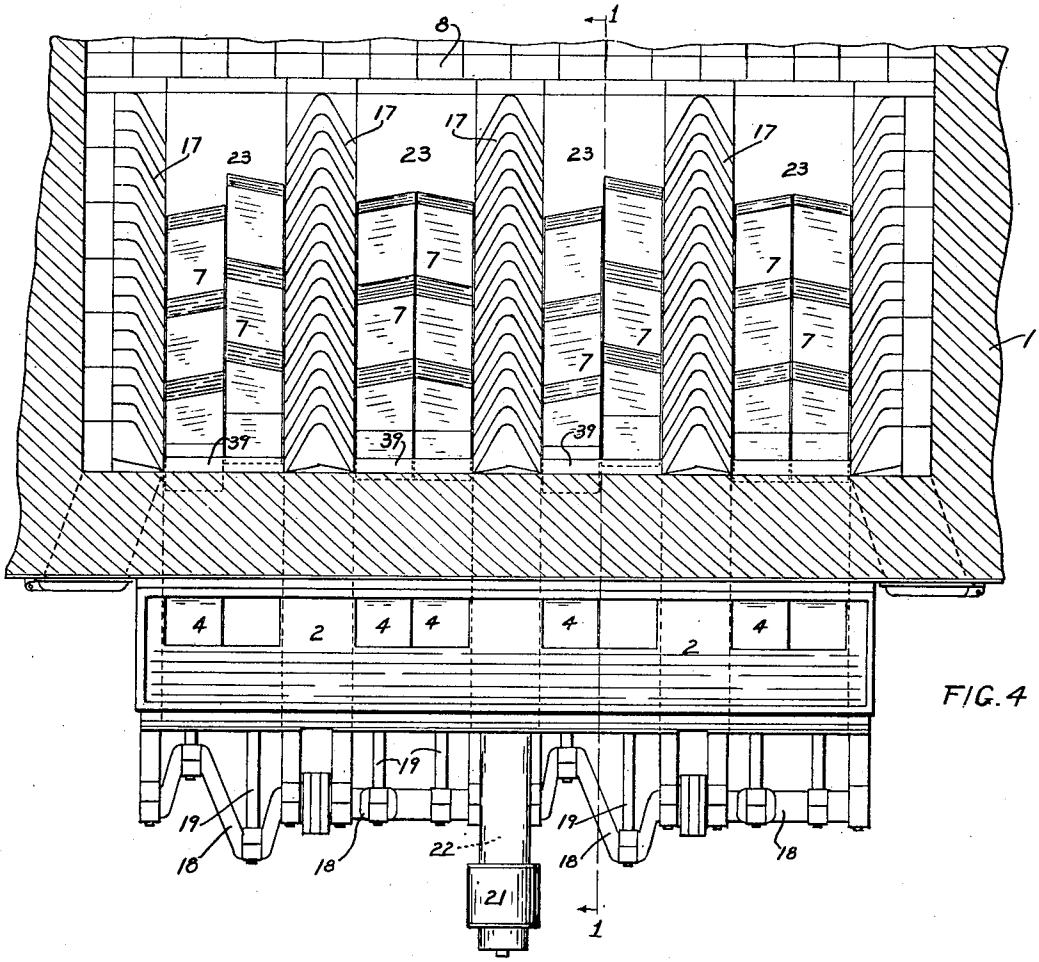


FIG. 4

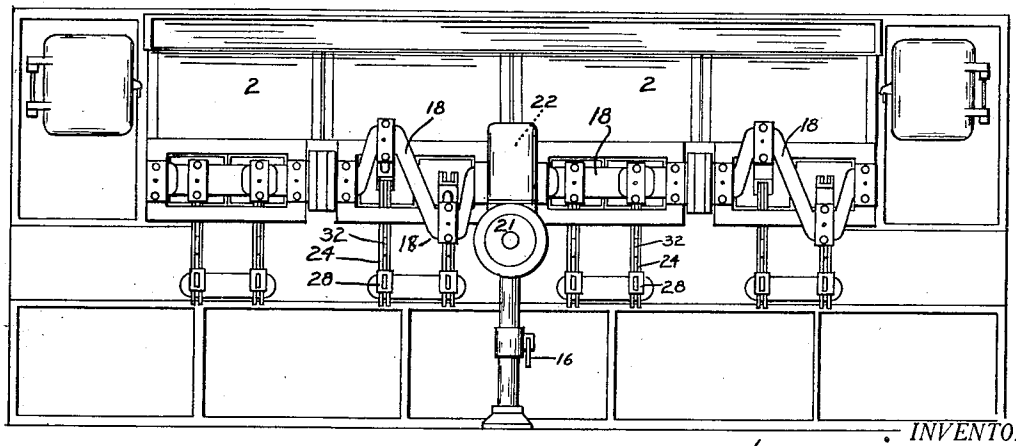


FIG. 5

INVENTOR,
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Patented Feb. 10, 1925.

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UNITED STATES PATENT OFFICE.

HARRY M. SWINDLER, OF DAYTON, OHIO.

UNDERFEED STOKER.

Application filed March 26, 1923. Serial No. 627,672.

To all whom it may concern:

Be it known that I, HARRY M. SWINDLER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Underfeed Stokers, of which the following is a specification.

This invention relates to new and useful improvements in underfeed stokers, and more particularly to an underfeed stoker of the type commonly known as a "multiple-retort", in which a plurality of retorts and tuyère sections are alternately disposed within the furnace.

It is the principal object of my invention to provide mechanism which will produce a continuous feeding and distributing action in each retort of a multiple-retort stoker. A prominent feature of my invention relates to means whereby adjacent fuel-feeding and fuel-distributing means are simultaneously reciprocated in opposite directions. Other features of my invention relate to certain mechanism and arrangement of parts which will be hereinafter described and more particularly pointed out in the subjoined claims.

A preferred form of embodiment of my invention is illustrated in the accompanying drawings, of which Figure 1 is a vertical, sectional view of my improved underfeed stoker, taken on the line 1—1 of Figures 2 and 4. Figure 2 is a fragmentary view of the same taken on the line 2—2 of Figure 1, looking from the rear, forward. Figure 3 is a diagrammatic view of the operating levers and related parts. Figure 4 is a plan view of a four-retort stoker embodying my improvements. And Figure 5 is a front view of the same.

Throughout the specification and drawings, similar reference characters denote corresponding parts.

In a detailed description of the form of embodiment of my invention illustrated in the accompanying drawings, to which reference will now be made, the numeral 1 designates an underfeed stoker comprising a hopper 2 adapted to supply fuel to a passage 3, from which it is fed by a ram 4, through a rearwardly enlarged passage 5, to a retort 6. The latter has a reciprocating bottom 7, to be hereinafter more fully described, for conveying the mixture of fuel and refuse over dead plates 8 toward drop plates 9, from which the refuse is discharged into an ash-pit 10. (See Figures 1, 2 and 3)

The space beneath the retorts is enclosed to form an air-chamber 11, which is supplied with air under pressure through a passage 12 controlled by a gate 13 fast on a shaft 14. Secured to this shaft is an arm 15 to which there is attached a jointed rod 16 for operating the gate. (See Figure 1) Air from the chamber 11 is distributed to the fuel by means of tuyeres 17.

In each passage 5 there are two fuel-feeding rams 4, adjacently disposed and arranged to be actuated separately from cranks 18, by means of connecting rods 19 and pins 20. (See Figures 1, 3, 4 and 5) Adjacent rams are connected to twin cranks which are 180 degrees apart, and are thereby simultaneously reciprocated in opposite directions. It will thus be seen that when one ram is pushing a charge of fuel into the retort, the adjacent ram is withdrawing from its forward position to receive a charge, and vice versa, thereby accomplishing a continuous feeding action in each retort. The cranks 18 are actuated by any convenient means such as a motor 21 through the enclosed reduction gearing 22. It will be understood that the specific means employed to actuate the cranks may be varied to suit conditions of operation.

Each retort bottom 7 is divided longitudinally into two sections that are supported, for reciprocation, by bars 23 or other suitable means, and are actuated separately from the cranks 18 by the connecting rods 19, pins 20, levers 24 which are fulcrumed as hereinafter to be described, links 25 and rods 26 which have a threaded connection with said sections. By these means adjacent retort bottom-sections are connected to twin cranks which are 180 degrees apart, and are thereby simultaneously reciprocated in opposite directions. It will thus be seen that when one bottom section or part is moving forward to distribute fuel, the adjacent section is receding to receive a fresh charge and vice versa, thereby accomplishing a continuous distributing action in each retort.

In order to provide a lost motion connection between each lever 24 and its link 25, whereby a retort bottom section may

be reciprocated for a shorter distance than the ram above it, and the relative movement between the two may be varied as desired, the following means are provided. Pivotally secured to the lower end of each lever 24 is a sleeve block 27, which is slidable on the link 25 between two collars 28 and 29 respectively, secured to the outer end of said link. When the lever 24 is moved by the connecting rod 19, the sleeve block 27 will engage the collars 28 and 29 at opposite extremes of its travel, thus having a lost motion connection to the link by means of which the retort bottom section is reciprocated for a relatively shorter distance than the ram above. This lost motion may be reduced by placing removable collars 30 on the link in front of the collar 29, the number and size of these collars determining the relative movement of the ram and the retort bottom section. (See Figure 3)

For the purpose of simultaneously reciprocating a ram 4 and the retort bottom section 7 below it, in opposite directions, an arm 31 is pivotally connected at its outer end to the fulcrum 32 of the lever 24 which reciprocates the retort bottom section, the other end of said arm being secured by a pin 33 to a projection 34 on the bottom of the passage 5. By this arrangement it is possible for the connecting rod 19 to which a ram is secured, to simultaneously reciprocate that ram and the retort bottom section below it in opposite directions through the instrumentality of the lever 24.

The tuyères 17 are stationary, and are supported on the retort side bars 35, which are, in turn, carried by I-beams 36 and 37. The front wall brick-work over the retorts is supported by the arch plates 38 which rest on the retort side bars 35. A stationary plate 39 forms the bottom of the passage 5 and fits closely over the retort bottom sections 7 to prevent coal from sifting into the air chamber 11. (See Figures 1 and 4.)

The stationary dead plates 8 extend from the retorts 6 to a set of the drop plates 9. The latter are mounted on a shaft 40 which is supported in bearing brackets 41 attached to I-beams 42, and are arranged for manual operation by means of a lever (not shown) which is adapted to be applied to a squared shaft 43 journaled in a bracket 44. A similar set of drop plates 9 is mounted adjacent the first set, on a shaft 40^a that is supported in bearing brackets 41^a attached to I-beams 42^a. Fast on the shaft 43 is a gear 45 which meshes with a toothed sector 46 on the shaft 40 whereby, when the squared shaft is turned, the first set of drop plates 9 will be actuated to release the refuse upon them, into the ash-pit 10. (See Figures 1 and 2.) The second set of drop plates 9 may be operated by a similar mechanism to release the refuse upon them, into the ash-pit 10.

Having thus described my invention, it is evident that changes and modifications can be made therein by those skilled in the art, within the spirit and scope of my invention as set forth in the claims, and I do not wish to limit the invention, in its broader aspects, to the specific structure shown, or the specific details of construction other than as set forth in the claims.

Having described my invention, I claim:

1. In an underfeed stoker, the combination with a retort, of two adjacently disposed fuel-feeding rams for feeding fuel thereto, a reciprocable bottom for said retort divided longitudinally into two adjacently disposed sections, and means to reciprocate said bottom sections in timed relation to said rams.

2. In an underfeed stoker, the combination with a retort, of two adjacently disposed fuel-feeding rams for feeding fuel thereto, a reciprocable bottom for said retort divided longitudinally into two adjacently disposed sections, and means for reciprocating said bottom sections in timed relation to said rams during only part of the stroke of the latter.

3. In an underfeed stoker, the combination with a retort, of two adjacently disposed fuel-feeding rams for feeding fuel thereto, a reciprocable bottom for said retort divided longitudinally into two adjacently disposed sections, twin cranks 180 degrees apart, means for rotating said cranks, and link mechanism connecting said bottom sections and the twin cranks for simultaneously reciprocating said bottom sections in timed relation to said rams.

4. In an underfeed stoker, the combination with a retort, of two adjacently disposed fuel-feeding rams for feeding fuel thereto, a reciprocable bottom for said retort divided longitudinally into two adjacently disposed sections, and means for reciprocating said bottom sections in timed relation to said rams during only a part of the stroke of the latter, said means comprising lost-motion connections between said rams and the retort bottom sections.

5. In an underfeed stoker, the combination with a retort, of two adjacently disposed fuel-feeding rams for feeding fuel thereto, a reciprocable bottom for said retort divided longitudinally into two adjacently disposed sections, a bottom section below each ram, twin cranks disposed 180 degrees apart, means for rotating said cranks, a pair of connecting rods coupled to said cranks, and means operatively connecting a ram and the retort bottom section below said ram, to each connecting rod, whereby said ram and bottom section

may be moved simultaneously in opposite directions.

6. In an underfeed stoker, the combination with a retort, of two adjacently disposed fuel-feeding rams for feeding fuel thereto, a reciprocable bottom for said retort divided longitudinally into two adjacently disposed sections, twin cranks disposed 180 degrees apart, means for rotating said cranks, a pair of connecting rods coupled to the latter and also connected to said rams, a lever secured to each connecting rod, a fulcrum for the middle portion of each lever, and means operatively connecting the other end of each lever to a retort bottom section for the purpose specified.

7. An underfeed stoker having, in combination, a plurality of retorts and tuyère sections, two adjacently disposed rams for feeding fuel to each retort, a reciprocable bottom for each retort divided longitudinally into two adjacently disposed sections, and means for reciprocating said sections in timed relation to said rams.

In testimony whereof I have hereunto set my hand this 23 day of March, 1923.

HARRY M. SWINDLER.

Witness:

HOWARD S. SMITH.