June 7, 1938. T. H. BANFIELD 2,119,937

ASH REMOVER FOR UNDERFEED STOKERS

Filed March 21, 1932 2 Sheets-Sheet 1

FIG. 1.

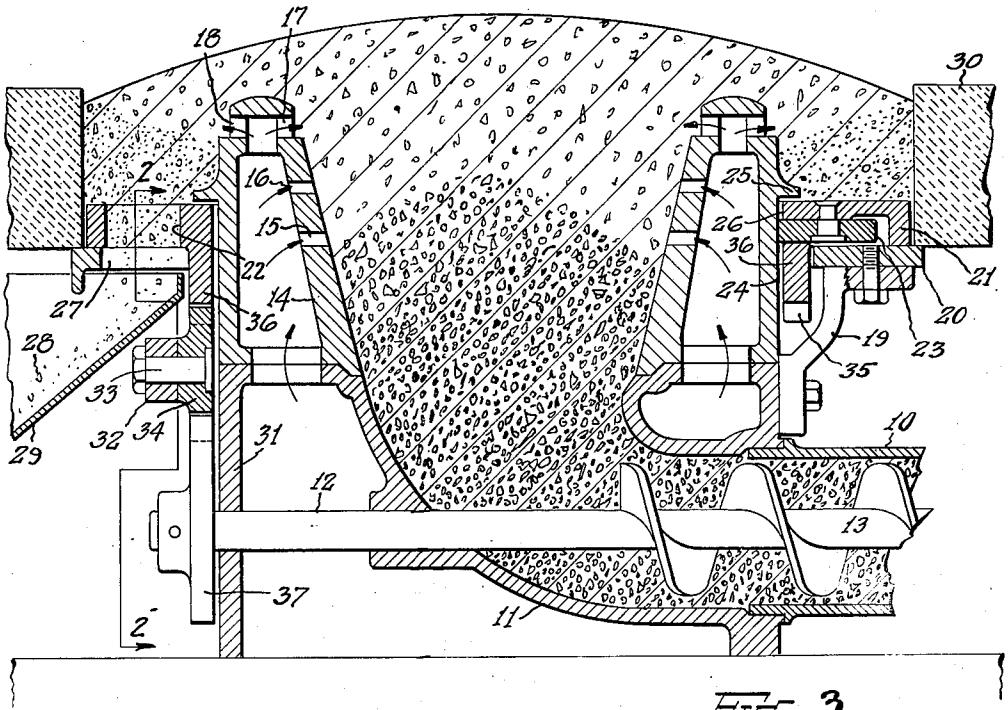


FIG. 2.

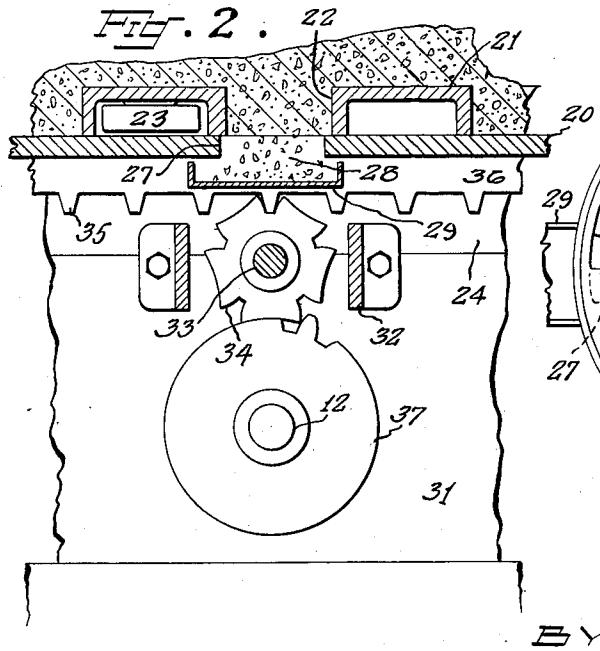
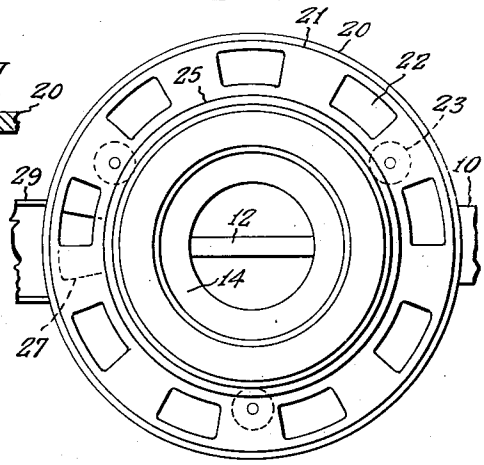


FIG. 3.



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Filed March 21, 1932 2 Sheets-Sheet 2

FIG. 4.

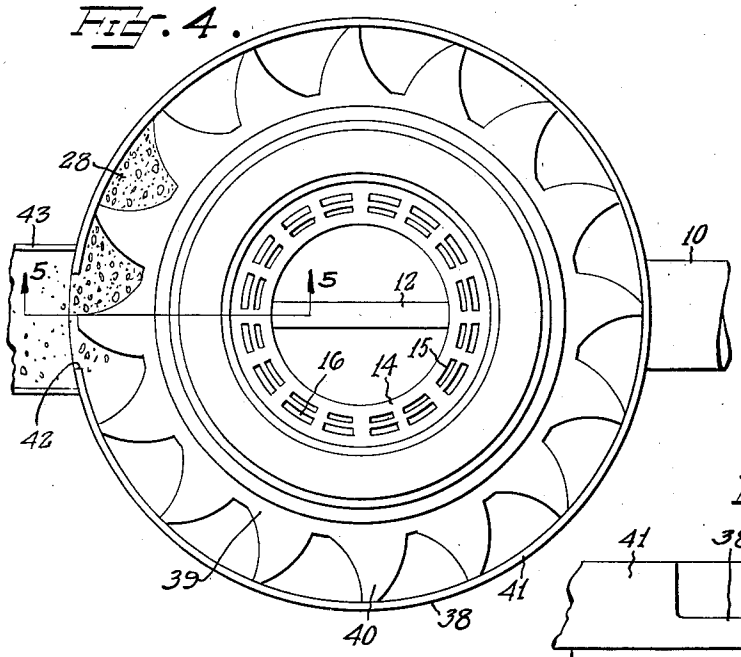


FIG. 6.

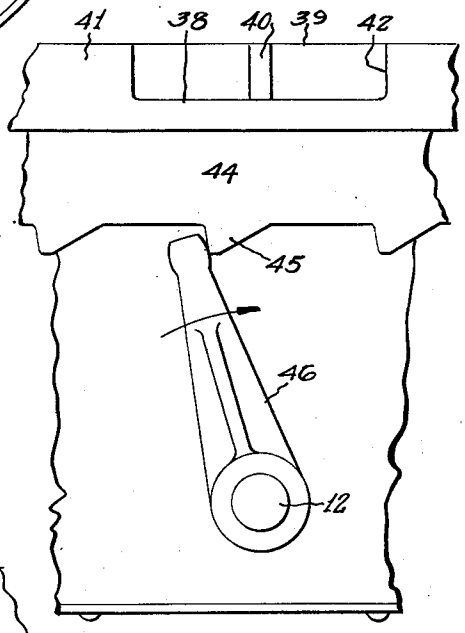
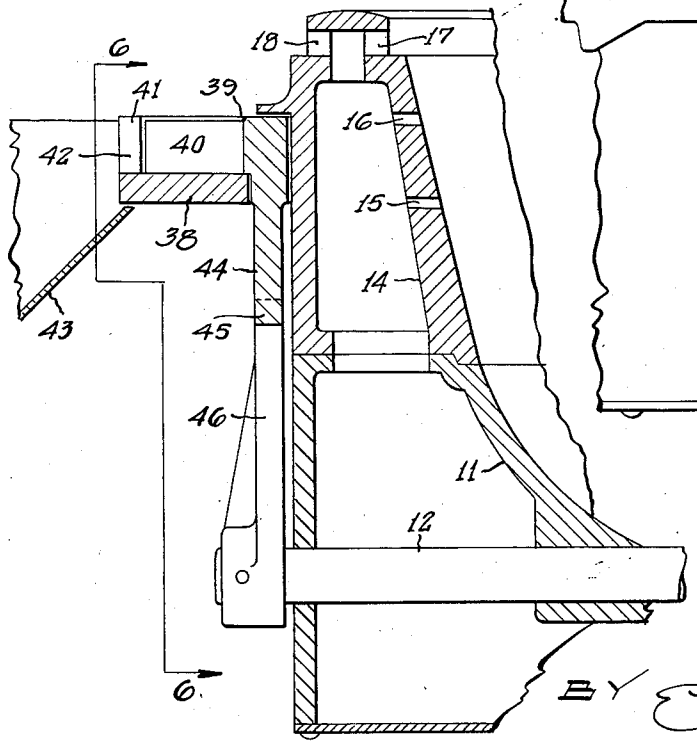


FIG. 5.



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UNITED STATES PATENT OFFICE

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ASH REMOVER FOR UNDERFEED STOKERS

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Application March 21, 1932, Serial No. 600,193

5 Claims. (Cl. 110—45)

This invention relates generally to underfeed stokers, and particularly to ash removers therefor.

The main object of this invention is the provision of a simple and efficient form of ash remover wherein the ashes are removed from the under side of the burning fuel as distinguished from those types of ash removers wherein the ashes pass over the top of an outer rim into a collector of some sort.

The second object is to produce an ash remover which will remove unclinkered fine particles before they can be subjected to heat for a sufficient period to reduce them to clinker form which would otherwise require a breaking up of the clinkers before they could be successively handled by any ordinary conveying apparatus.

The third object is to reduce the quantity of hard clinkers formed and in many cases eliminate the hard clinker altogether, depending entirely upon the kind of fuel being employed, the rate of burning and other factors which enter into the combustion.

These, and other objects, will become more apparent from the specification following as illustrated in the accompanying drawings, in which:

Fig. 1 is a vertical section through the device.

Fig. 2 is a section taken along the line 2—2 in Fig. 1.

Fig. 3 is a plan of device shown in Fig. 1 at a reduced scale.

Fig. 4 is a plan of an alternative form of the device.

Fig. 5 is a section taken on the line 5—5 of Fig. 4.

Fig. 6 is a fragmentary side elevation taken on the line 6—6 of Fig. 5 with the ash discharge chute removed.

Similar numbers of reference refer to similar parts throughout the several views.

Referring in detail to the drawings, there is shown the end of the common form of fuel feed duct 10 which discharges into a retort section 11 through which extends the shaft 12 of the feed screw 13 disposed within the duct 10. Upon the retort section 11 is mounted a tuyère section 14 provided with air outlet openings 15, 16, 17 and 18.

Supported on the brackets 19 is a circular table 20 upon which rides the ash remover ring 21 which is provided with a plurality of pockets 22. Rollers 23, carried by the ring 21, ride against the outer wall 24 of the tuyère section 14. The wall 24 is provided with an out-turned rim 25 which projects over the top of the inner edge 26 of the ring 21. It will be seen that the ash ring 21 in effect constitutes a rotatable base for the fire pot.

The table 20 is provided with an opening 27 through which ashes 28 can fall whenever one of the pockets 22 of the ring 21 is brought into register with the opening 27. After the ashes leave the opening 27 they enter a collector chute 29 from which they are disposed of in any desired manner. Resting upon the outer rim of the table 20 is a fire pot rim 30 preferably made of a refractory material.

Secured against the outer walls 31 and 24 is a bracket 32 which carries a stud 33 on which is mounted a pinion 34 which, in this instance, is shown as the driven element of a Geneva escapement. The pinion 34 meshes with the teeth 35 which are formed on the depending flange 36 of the ring 21. A driving gear 37 is mounted on the outer end of the shaft 12 and meshes with the pinion 34.

The operation of this form of the device is as follows: As ashes are formed and pass over the top of the tuyère section 14 onto the ring 21, that is, to the lowermost portion of the outermost zone of the almost completely burned fuel, they are subjected to the intermittent motion of the ash remover ring 21 which gathers its pockets full of fine unclinkered residue which it empties successively through the opening 27 into the discharge chute 29.

It can be seen from the foregoing that the fine ashes on the ring 21 are removed soon after they are formed, remaining in the presence of the intense heat only a short space of time, which need not be sufficient to fuse them to clinker form which would make same more difficult to be disposed of. Furthermore, with this construction even those partially formed clinkers which find their way into the pockets 22 are very fragile and are easily crushed by the shearing action occurring between the table 20 and the ring 21 whenever a pocket 22 passes out of register with the opening 27.

With the form of the device shown in Figs. 4, 5 and 6 the table 38 is imperforate and stationary and carries on its top surface the ash remover ring 39 which is provided with the outwardly projecting teeth 40, which latter extend to the upturned flange 41 of the table 38. The flange 41 is provided with an outlet 42 beneath which is the ash disposal chute 43. The ring 39 has a downwardly extending flange 44 having

widely spaced teeth 45 formed on the under side thereof.

In this form of the device the feed screw shaft 12 is employed to drive an arm 46 which engages the successive teeth 45 in its rotation about the shaft 12, imparting to the ring 39 an intermittent rotary motion.

The only difference in the operation of this form of the device from the one previously described is that the teeth 40 move the ashes 28 outwardly radially beyond the edge of the table 38 instead of permitting them to drop through an opening in the table.

I claim:

1. A coal burning stoker having in combination a circular tuyère section, a fire pot surrounding said tuyère section and spaced therefrom, a table within said space below the top of said fire pot and tuyère sections and spaced from said tuyère section, said table having an outlet for ashes accumulating thereon, a rotatable ash remover ring mounted on said table and having openings therethrough whereby ashes accumulating therein will be carried around said table at the bottom of the outer portion of the fuel bed and discharged therefrom into said outlet, said tuyère section having an encircling flange immediately overlying the top inner edge of said ring, a ring gear within the space between said table and tuyère, and a pinion actuated by the fuel feed screw of the stoker meshing with said gear.

2. A coal burning stoker having in combination concentric tuyère and fire pot sections spaced from each other with a table supported in said space below the upper portions of said fire pot and tuyère sections, said table being spaced from said tuyère section, said table having an outlet at one side thereof, a rotatable ring forming an annular extension for the fuel supporting surface of the stoker and mounted on said table and having pockets therethrough adapted to collect ashes and carry same around said table and to discharge said ashes from the opening thereof, said ring having a downturned central flange projecting through the space between said table and tuyère section, said flange having gear teeth on its lower edge, and a drive pinion meshing with said gear.

3. In an underfeed stoker employing a fuel feed screw and having a retort crowned by a circular tuyère section, an ash remover comprising a table disposed around the tuyère section below the upper edge thereof, said table constituting the outer portion of the fuel engaging surface of the stoker, said table having an outlet opening therein, an ash remover ring having openings therethrough for collecting ashes and transporting same around said table to its outlet opening, said ring having a downturned geared flange projecting below said table, a pinion supported by said tuyère section meshing with said flange and driven by the fuel feed screw of the stoker, and a chute for carrying ashes from the table opening.

4. An underfeed stoker having in combination a horizontal fuel feed duct terminating in an upwardly discharging retort, a fuel feed worm for conveying fuel through said duct, said worm having its drive shaft projecting through the side of said retort, a circular tuyère section mounted on said retort, a perforated table surrounding said tuyère section and spaced therefrom, a rotatable ring mounted on said table having a flange gear projecting downwardly from its inner edge through the space between said table and tuyère section, a gear driven by said worm shaft and driving said rotatable ring, and a chute under the perforation in said table whereby the ashes discharging therefrom will be deflected away from said gears.

5. In an underfeed stoker mechanism for furnaces incorporating a tuyère, the combination with a fire pot extending upwardly from the tuyère and a fuel feeding screw conveyor mechanism, of a rotatable ring having ash receiving cells therein carried by the stoker mechanism and actuated by the screw conveyor mechanism, and a base plate supporting the rotatable ring and having an ash outlet orifice therein with which the cells in the ring successively communicate.

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