Oct. 2, 1928. 1,685,939

A. W. DAYTON

GRATE

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Fig. 1.

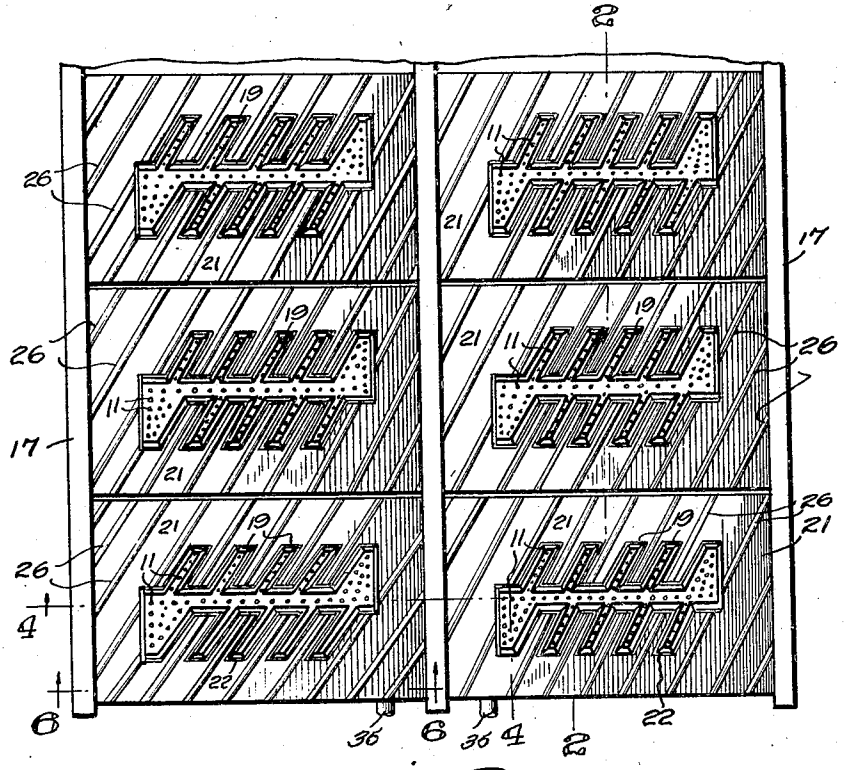


Fig. 2.

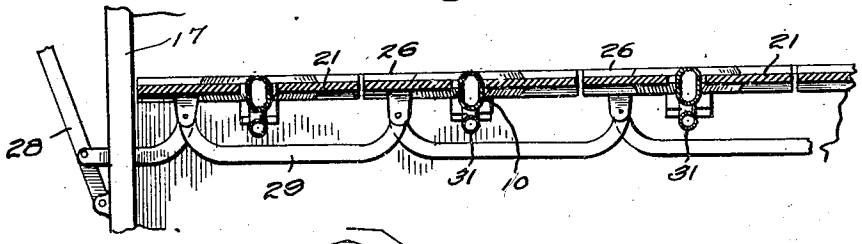
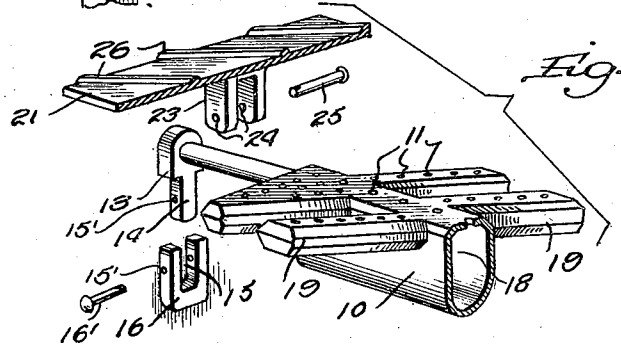


Fig. 3.



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Fig. 4.

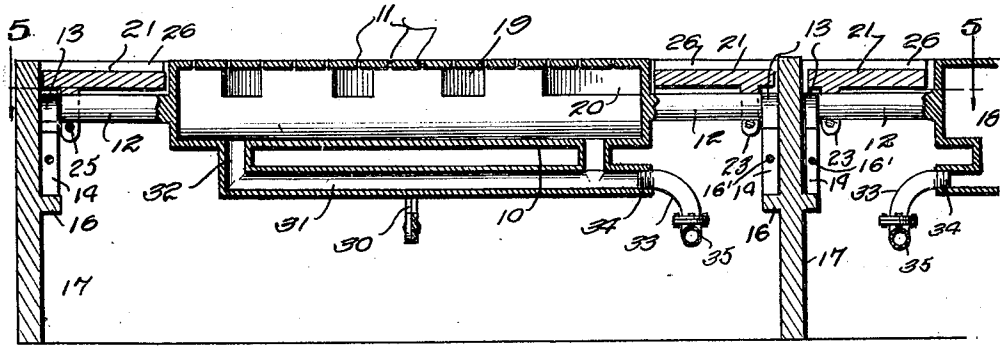
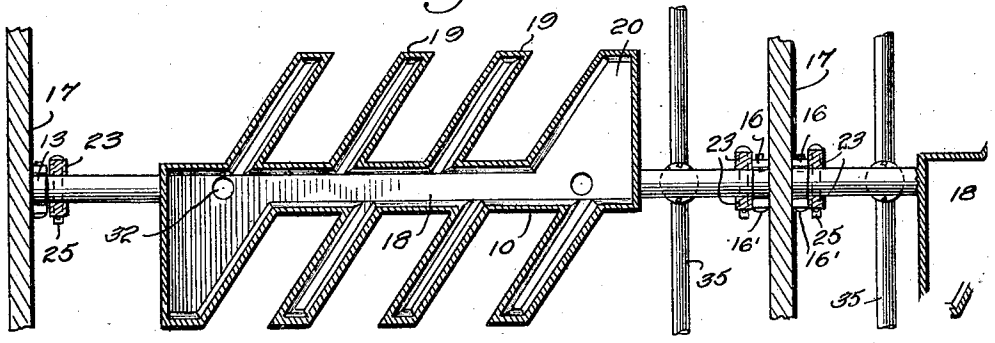


Fig. 5.



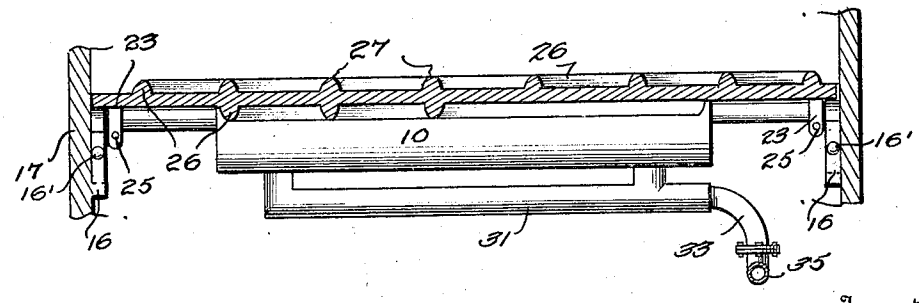


Fig 6.

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Patented Oct. 2, 1928. 1,685,939

UNITED STATES PATENT OFFICE.

ARTHUR W. DAYTON, OF NEWARK, OHIO.

GRATE.

Application filed July 24, 1926. Serial No. 124,746.

This invention relates to grates, and more particularly to rocking grates specially designed for steam locomotives.

An important object of this invention is to provide means for admitting dry steam or air to the underside of the fire supported on the grate.

Another object of the invention is to provide a grate comprising a perforated hollow stationary member for supplying the dry steam or air and a cut-away rocking member surrounding the stationary member, and providing on said rocking member spaced ridges angularly disposed with relation to said rocking member in order to present an uneven surface to the fuel to prevent it from packing on the grate.

The flat grate as now used in steam locomotives permits the fuel to pack on the grate thereby forming a compact mass preventing proper combustion, forming clinkers, and requiring excess fuel for the production of a given amount of steam. The steam draught as now used in the locomotive is effected by a blower conducting the exhaust steam through pipes from the cylinders to the smoke box and allowing it to escape up the smoke stack, from apertures called exhaust nozzles. The velocity of the steam produces a vacuum, by which the products of combustion are drawn into the smoke box with greater power and forced out of the smoke stack into the air, or the draught is produced by the movement of the engine. To prevent the too quick passage of the gases into the flues, a fire brick arch has been adopted, and in order to be self-supporting, it is built in the form of an arch supported by the two sides of the fire box which serve as abutments. The arch has sometimes been replaced by a hollow riveted arrangement known as a water bridge.

The draught as now produced is conducted over the fuel which permits a large part of the gases to escape before proper combustion, and causes the fire to burn vigorously at the top while leaving underneath the compact mass of unburnt coal and clinkers. Also when firing the locomotive the draught so produced will cause the fine coal to be drawn on top of the arch and pack it in the forward part of the fire box thereby retarding the draught. Often times at the end of a run as much as three wheelbarrows of fine unburnt coal are removed.

In the present invention dry steam or air taken from a supply pipe on the locomotive is supplied under pressure to the underside of the fuel thereby causing the coal to burn throughout, and causing the gases to be burned before they have time to escape, the result of which is that a greater amount of steam is produced from a given amount of fuel. The pressure is available regardless of whether the engine is stationary or moving, and is available from the station steam or air line when firing up a dead engine.

In the drawings I have illustrated a preferred embodiment of my invention. In this showing,

Figure 1 is a plan view of the grate,

Figure 2 is a section on line 2—2 of Figure 1,

Figure 3 is a detail view with parts separated,

Figure 4 is a section on line 4—4 of Figure 1,

Figure 5 is a section on line 5—5 of Figure 4, and

Figure 6 is a section on line 6—6 of Figure 1.

Referring to the drawings, reference numeral 10 indicates a hollow stationary member which serves as a manifold for supplying steam or air to the bed of the fire and this stationary member is provided with openings 11 for emitting the steam or air. Secured to the ends of the shafts 12 are depending attaching supports 13 provided at their lower ends with reduced portions 14 which are adapted to be received by openings 15 in substantially U-shaped receiving brackets 16 secured to bearing bars 17. The reduced portions 14 and the brackets 16 are provided with alined openings 15′ adapted to receive a pin or bolt 16′ whereby the reduced portions 14 may be detachably secured to the brackets 16.

The hollow stationary members 10 have a hollow central portion 18 to which are secured hollow fingers 19 which extend obliquely from opposite sides of said central portion and are

staggered with relation to each other. The ends of said central portion 18 are enlarged as at 20, and are substantially triangular in shape. The fingers 19 and the ends 20 are also provided with perforations or openings 11.

Surrounding the stationary members 10 are rocking plates 21, provided with openings 22 of substantially the same shape as, but slightly larger than, the stationary members 10. Secured to the lower face of said rocking plates at the ends thereof are substantially U-shaped mounting brackets 23 which are adapted to receive the shafts 12 whereby the rocking plates may be mounted thereon. The brackets 23 are provided with alined openings 24 to receive a bolt or pin 25, whereby the plates 21 may be detachably secured to the shafts 12.

The upper and lower faces of the plates 21 are provided as at 26 with spaced ribs, corrugations, or the like. The ribs on the upper surface of the plate serve to break up the fire when the plate 21 is rocked, and further serve as strengthening means to prevent the breaking or warping of the plates. The ribs on the lower face also serve as additional strengthening means. The ribs on the upper face of the plate are rounded or beveled as indicated at 27 to allow a hook or poker to freely pass over the same without catching when braking the fire from the top. The ribs are angularly disposed, preferably obliquely, with relation to the rocking plate. By so disposing the ribs on the rocking plate the angularly disposed fingers 19 may be received therebetween, and the ribs present greater breaking surface to the bed of the fire. A further advantage of so providing the ribs is that they cause the clinkers and ashes to pass off at the side of the rocking plate instead of being thrown on the adjacent rocking plates.

The plates 21 are caused to be rocked by means of the shaker arm 28 and connecting links 29 pivotally connected to the depending ears 30 secured to the lower faces of the rocking plates 21.

For supplying steam to the hollow member 10, I provide a distributing pipe 31 preferably integral with the hollow member 10 which is provided with fluid inlets 32 communicating with said distributing pipe. An elbow 33 is threaded as at 34 into the distributing pipe 31 and communicates with a supply pipe 35.

As indicated in Figure 1, the grate may be made up of a plurality of individual sections as heretofore described. The number of individual units may vary according to the size of the fire box and the purpose to which the device is to be put.

In assembling the grate the stationary members 10 are secured to the bearing bars by inserting the reduced portions of the attaching supports 13 into the openings 15 in the U-shaped brackets 16. It is to be noted that by so mounting the stationary members 10 they may be readily detached from the grate in case of breakage or stoppage of the openings 11. The rocking plates 21 are mounted on the shafts 12 by means of the depending U-shaped mounting brackets 23 and are secured thereto by inserting the pin 25 into the openings 24. By this arrangement the rocking plates are adapted to rock upon the shafts 12 and are readily removable therefrom in case of breakage. When the rocking plates and stationary members have been attached as described, the links of the rocking mechanism are secured to the depending ears 30 and the rocker arm 28. The elbow 33 is then threaded into the distributing pipe 31 and connected to the supply pipe 35.

A particular advantage is to be noted in forming the distributing pipe 31 integral with the hollow member 10 whereby threaded connections are avoided. By this arrangement the possibility of leakage is reduced to a minimum. The only threaded connection required is that for connecting the elbow 33 to the distributing pipe.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. A grate comprising bearing members, a plurality of hollow stationary members, shafts secured to said stationary members and to said bearing members, rocking members pivotally mounted on said shafts and adapted to rock thereon, and means for rocking said rocking members.

2. A grate comprising bearing members, a plurality of perforated hollow stationary members, shafts secured to said stationary members and detachably secured to said bearing members, rocking members detachably mounted on said shafts and adapted to rock thereon, and means for rocking said rocking members.

3. A grate comprising bearing members, a plurality of perforated hollow stationary members detachably secured to said bearing members, said hollow stationary members comprising an elongated central portion, and a plurality of perforated hollow fingers secured to said central portion and extending angularly therefrom, means for introducing air or steam into said hollow members, and cut-away rocking members surrounding said stationary members and adapted to rock with relation thereto.

4. A grate comprising bearing members, a

plurality of hollow stationary members, shafts secured to said stationary members and to said bearing members, said hollow stationary members comprising an elongated central portion, and a plurality of perforated hollow fingers secured to said central portion and extending angularly therefrom, means for introducing air or steam into said hollow members, cut-away rocking members pivotally mounted on said shafts and surrounding said stationary members, and means for rocking said rocking members.

In testimony whereof I affix my signature.

ARTHUR W. DAYTON.