Aug. 2, 1932. E. A. TURNER 1,870,198

STOKER MECHANISM

Filed May 11, 1929

Fig. 1

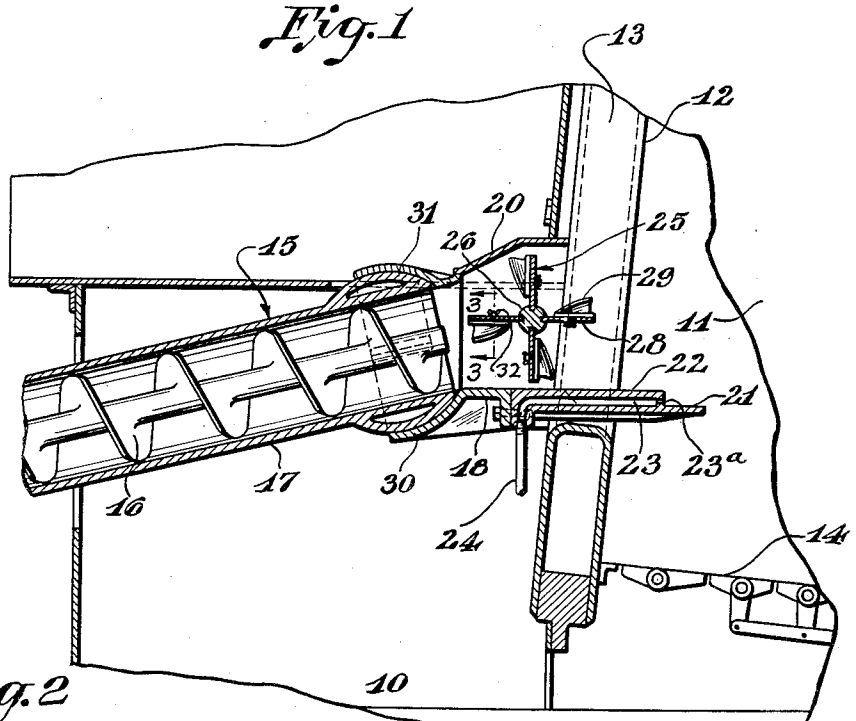


Fig. 2

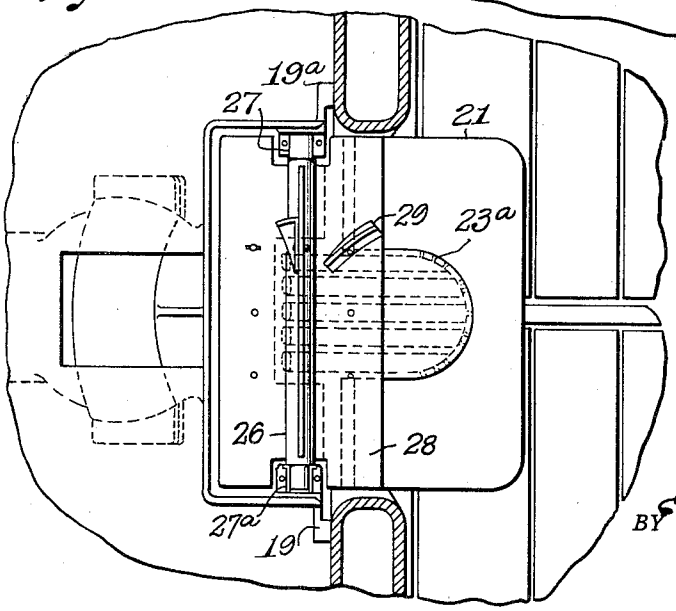
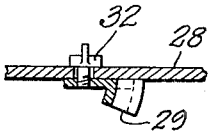


Fig. 3



INVENTOR

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UNITED STATES PATENT OFFICE

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STOKER MECHANISM

Application filed May 11, 1929. Serial No. 362,151.

My invention relates to stoking devices for locomotive and other steam boilers.

The general object of the invention is to provide a new and improved device of the type specified. More specifically, the invention particularly appertains to, and has for its outstanding object the provision of mechanism for deflecting and directing the coal being advanced to the firebox uniformly or in desired proportions to the fire.

As will later appear, my invention consists in the features of construction, and the combination and arrangements of parts hereinafter fully described.

In stoking devices which feed coal or like fuels to a fire, and in which the fuel is conveyed from a source of supply by a screw conveyor to a distributor which acts to scatter the fuel over the fire, it has been found that fuel is delivered unevenly by the screw to the distributor, there being more fuel conveyed to one side of the distributor than the other, this being dependent upon the direction of rotation of the screw, the angularity of its threads, and the grade and size of coal being conveyed. Actual use has proven that when run-of-mine coal which consists of lumps of varying sizes down to finer particles is conveyed, the larger lumps of coal will be delivered to one side of the distributor and the finer particles to its opposite side, resulting in more fuel being delivered to one portion of the fire than the other; and making it difficult for the operator to maintain an even fire and still more difficult to prevent the intense draft created in the locomotive fireboxes particularly, from tearing openings in that portion of the firebed receiving the finer particles of fuel.

To overcome these difficulties I provide a simple mechanism comprising a revoluble member interposed in the feeding system between the screw conveyor and the distributor, and functioning to spread and direct the fuel uniformly or as may be desired to the distributor. Preferably, the deflector or directing member is freely mounted in the conduit and rotary motion is imparted to it by the forward pressure of its direct contact with the advancing stream of fuel being moved onward by the screw conveyor.

One form of my invention is shown on the drawing, in which

Fig. 1 is a fragmentary longitudinal vertical section through the rear portion of a locomotive boiler with the invention applied thereto;

Fig. 2 is a plan view corresponding to Fig. 1 with the firebox backwall in section on a line taken through its firing opening and with the cover or top wall of the feeding conduit removed to better illustrate the novel deflector or directing mechanism of the invention; and Figure 3 is an enlarged section on the line 3—3 of Figure 1 illustrating the attachment of the deflecting rib to the blade of the revoluble deflector member.

In the drawing the locomotive as indicated by the numeral 10, has a firebox 11 provided with a backwall 12 having a firing opening 13 therein, which opening in this instance is shown as being an enlargement of the usual hand firing opening and through which the fuel is delivered manually through its upper portion and mechanically through its lower portion into the firebox onto the grates 14. The opening 13 is prolonged downwardly to permit the introduction of the fuel through its lower portion from the feeding conduit 15 through which the fuel is conveyed from a suitable source of supply to said opening by a screw conveyor 16 mounted for continuous rotation within a tubular portion 17 of the conduit. The screw 16 is suitably driven from its rearward end by any preferred form of motor and through suitable gearing as is well known in the art.

In addition to the tubular portion 17, the conduit 15 also is composed of a forward nozzle portion 18 rigidly attached to the backwall 12 by any suitable fastening means through the flanges 19, 19a, which nozzle opens into and is in communication with the lower portion of the firing opening. A rearward extension 30 of the nozzle forms one member of a universal connection 31 with the tubular conduit element 17 to provide for the necessary flexure of the conduit be-

tween the locomotive and its tender. Nozzle 18 at its delivery mouth is rectangular in form, having flat bottom and upright side walls and preferably a removable top wall or cover 20. The forward floor portion of the conduit 15 extends forwardly from the nozzle element into the opening 13, extending somewhat beyond the inner surface of the backwall 12 and assuming the form of a distributor plate 21 which may be made integral with a detachable floor portion 22 having formed therein at its central portion a plurality of recesses or cavities 23, each being supplied with steam from a suitable source of supply by an individual steam line as at 24. Each of the cavities or recesses 23 is provided with one or more jet openings 23*a*, these openings being so arranged as to direct a fan-shaped blast of steam over the depressed forward ledge portion of the floor forming the distributor plate 21.

Suitable mechanism is provided for deflecting and directing the fuel from the screw conveyor 16 into the zone of action of the fan-shaped steam blast issuing forth from the jet openings 23*a* over the distributor plate 21. For this purpose I provide a revoluble element or member 25, interposed between the screw conveyor and the fuel scattering blast or distributor. The member 25 preferably is freely journaled at each end of its horizontal hub or shaft 26, as at 27, 27*a* in the upright side walls of the conduit nozzle portion 18. The member comprises the hub or shaft 26 and a plurality of outstanding blades 28 which preferably are equally spaced about the hub and are rigidly held thereto in any desired manner. To each of the blades 28 is flexibly attached a guide rib 29, only one such rib being shown on each blade but any number of them may be used as is found necessary in carrying out the invention. The member 25 is disposed in the conduit adjacent the end of the screw 16 and is so arranged that in its rotation one of the blades 28 together with the guide rib 29 will extend into the path of the stream of fuel being advanced to the distributor by the direct action of said screw. The rib 29 is attached to the blade 28 by a cap screw 32, adjustment of which permits varying the angular position of the rib on the blade. This arrangement is best shown in Figure 3.

In the operation of my invention the fuel is conveyed from a suitable source of supply such as the coal bin of a locomotive tender by the screw conveyor 16 through the tubular portion 17 of the feeding conduit 15 from which the fuel is delivered by the direct action of the impelling flights of the screw to the nozzle portion of the conduit wherein the coal as it is being advanced forwardly comes directly in contact with one of the blades 28 of the revoluble deflecting or directing member 25. The contact of the fuel against the blade will cause a laterally spreading of the fuel tending to spread it uniformly across the conduit floor and the forward pressure of the coal resulting from the force being created by the screw 16 will continuously advance the fuel forward, imparting rotary motion to the member 25 by reason of contact of the fuel with its blades 28. The uniform delivery of the fuel to the distributing means is further assisted by the guide or deflecting members 29 which in their travel through the stream of coal direct portions of it to that side of the distributor which by reason of the direction of rotation and feeding of the screw 16 was receiving the lesser amount and the finer particles of fuel. If it is desired to vary the volume of fuel delivered to different portions of the firebox this can be accomplished by placing the deflecting or guiding rib 29 in a suitable position on each blade 28 to laterally deflect the desired amount of fuel to effect the desired distribution.

From the foregoing it is apparent that the deflector or directing member 25 functions in the path of the fuel being advanced to the distributor in such a manner that an uneven delivery of the fuel from the conveying means can be overcome and the stream of fuel spread laterally and uniformly before it is acted upon by the distributing means, thus effecting the maintenance of an even fire. It is also obvious that by suitably arranging the angular position of the guide or deflecting rib 29 on the blade 28, or mounting the rib still more to one side of the vertical longitudinal center plane of the member 25 than is required to obtain equal proportioning of the fuel stream it is possible to divide the fuel stream in predetermined unequal proportions before its delivery to the distributing means thus making the device capable of feeding the fuel to the firebox in desired proportions to cope with conditions of the firebed which at times makes it desirable to deliver more fuel to one portion of the fire than to its other portions.

While I have shown and described the deflector member 25 as being operable from the pressure of the advancing fuel it is conceivable that suitable driving mechanism can be provided to operate the member in synchronized relation with the screw conveyor 16 and it is believed that such a modification is within the scope of my invention.

I claim:

1. In a stoker, the combination of a fuel feeding system comprising a transfer conduit and a fuel distributing means, a screw conveyor within said transfer conduit, and a revoluble deflecting member interposed in said system between the distributing means and the terminus of said screw conveyor, said member arranged to be actuated by the

pressure of the fuel advanced by said conveyor.

2. In a stoker, the combination of a fuel feeding system comprising a transfer conduit and a distributor arranged to scatter fuel over a fire, conveying means within said transfer conduit for advancing fuel therethrough to said distributor, and a revoluble deflecting member mounted within said feeding system in the path of the fuel being advanced, said member being disposed between said conveying means and said distributor and formed and arranged to be actuated by the pressure of the advancing fuel.

3. In a stoker, the combination of a fuel feeding system comprising a transfer conduit and a distributor arranged to scatter fuel over a fire, conveying means within said transfer conduit for advancing fuel therethrough to said distributor, and a revoluble deflecting member freely mounted for rotation within said feeding system in the path of the fuel being advanced therethrough, said member formed and arranged to be actuated by the forward pressure of the advancing fuel.

4. In a stoker, the combination of a fuel feeding system comprising a transfer conduit and a distributor arranged to scatter fuel over a fire, conveying means within said transfer conduit for advancing a stream of fuel therethrough to said distributor, and a single revoluble deflecting member acting in the path of the advancing fuel stream to spread and direct said fuel laterally in predetermined proportions to said distributor.

5. In a stoker, the combination of a fuel feeding system comprising a transfer conduit and a distributor arranged to scatter fuel over the fire, a screw conveyor within said conduit, and a revoluble deflecting member interposed in said conduit between the distributor and the terminus of said screw conveyor, said member comprising a horizontal shaft freely journaled at its ends and a plurality of blades extending outwardly in spaced relation from said shaft, each of said blades having attached thereto adjustable means for directing the fuel laterally.

6. In a stoker, the combination of a fuel feeding system comprising a transfer conduit and a distributor arranged to scatter fuel over the fire, a screw conveyor within said conduit, a revoluble deflecting member interposed in said conduit between the distributor and the terminus of said screw conveyor, said member comprising a horizontal shaft freely journaled at its ends and a plurality of blades extending outwardly in spaced relation from said shaft, each of said blades having attached thereto means for directing the fuel laterally, and said blades being so arranged that all are never simultaneously out of the path of the advancing fuel and said member having rotary motion imparted thereto by the forward pressure of the advancing fuel contacting directly with said blades.

In testimony whereof I affix my signature.

EDWIN ARCHER TURNER.