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H. E. LIPPERT

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LOCOMOTIVE STOKER

Filed July 6, 1929

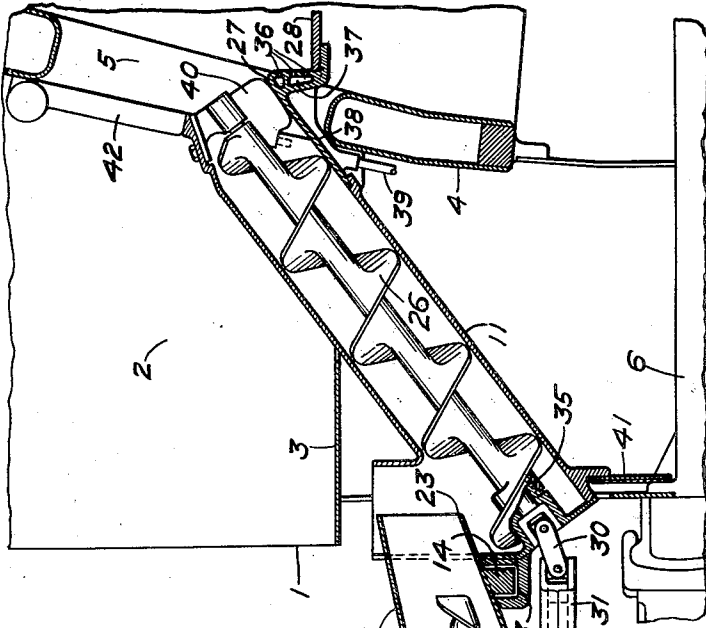


Fig. 1

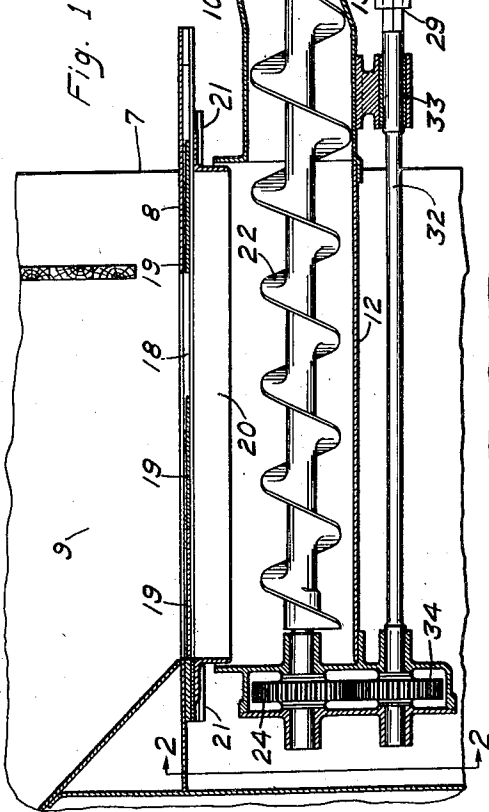
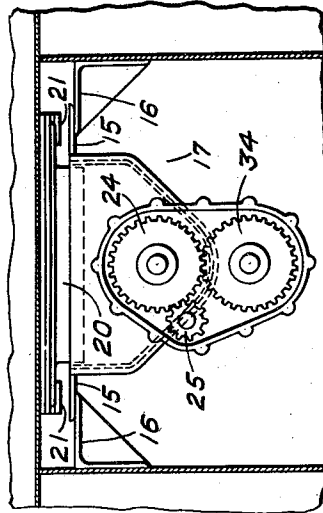


Fig. 2



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LOCOMOTIVE STOKER

Application filed July 8, 1929. Serial No. 376,301.

This invention relates to mechanical stokers for locomotives of the type that transfers the fuel from the tender into the firebox through the lower portion of the firing opening by screw conveyors.

An object of the invention is to provide a stoker in a locomotive and tender that will convey the fuel from the fuel bunker in the tender direct to fuel distributing means in the firing opening of the locomotive with very little forcing and abrasion, and to eliminate the universal joint between the screw conveyors which is present in the latest type of locomotive stokers.

It has been found that the coal becomes packed around this universal joint and is greatly pulverized, with the result that a large amount of the fine coal is drawn through the locomotive stack unburnt. By eliminating the joint between the screws and positioning the conduits so the coal will fall from one directly into the other, a relatively coarser grade of coal will be delivered to the locomotive firebox and more economical firing is obtained.

Other objects and advantages of the invention will be apparent during the course of the following description and appended claims taken in connection with the accompanying drawings, in which;

Fig. 1 is a vertical sectional view taken on the center-line of the locomotive, the tender, and the invention, showing the invention as applied thereon.

Fig. 2 is a sectional view taken on line 2—2 of Figure 1 with the gear box cover removed for the purpose of illustrating the gearing, and also shows the method of supporting the fuel transfer conduit in the tender.

In Figure 1 the numeral 1 designates the locomotive; 2, the cab; 3, the cab deck; 4, the backhead; 5, the firing opening; 6, the locomotive frame; 7, the tender; 8, the tender deck; 9, the coal bunker; and 10, the complete stoker. The stoker 10 comprises a fuel elevating conduit 11 and a fuel transfer conduit 12. The fuel elevating conduit 11 is fixed on the locomotive and is provided at its rear end with a pocket 13 for receiving the downwardly extending pin 14 at the forward end of the

fuel transfer conduit. Extending along the sides of the fuel transfer conduit 12 are the angle irons 15 (Figure 2) which rest on the fixed supports 16 in such a manner that the fuel transfer conduit 12 can rock vertically, slide horizontally, or swing laterally in the compartment 17 beneath the tender deck. This construction permits angular movement between the locomotive and tender as they travel on curves, cross-overs and turn-tables.

The coal falls from the coal bunker 9, through the opening 18 in the tender deck, and into the fuel transfer conduit 12. Slide plates 19 are arranged in the tender deck to regulate the position of the opening 18. A sealing angle iron 20 is movably attached to the underside of the tender deck by the clips 21 and extends down into the fuel transfer conduit to prevent the coal from spilling out over the sides of the fuel transfer conduit.

The coal is moved along the fuel transfer conduit by the conveying screw 22 to its forward end where it falls over the edge 23 into the fuel elevating conduit 11. The conveying screw 22 is driven from its rear end through the gear 24 and the pinion 25 by power means (not shown) which may be mounted on the locomotive or tender. The forward end of the fuel transfer conduit extends beyond and above the rear end of the fuel elevating conduit whereby the coal will fall vertically from one conduit into the other. The forward end of the transfer conduit 12 terminates in an upwardly inclined tapered spout which decreases in cross-sectional area toward its outlet end to keep the overall height of stoker parts adjacent the juncture of the conduits at a minimum so that the stoker can be applied to a locomotive and tender having the conventional arrangement and location of the cab and tender decks with relation to the locomotive and tender frames, respectively. By constructing and testing one of applicant's stokers, it was found that the restriction to the passage of coal through the spout did not materially pulverize the lumps of coal. As the coal falls over the edge 23 of the fuel transfer conduit into the fuel elevating conduit a screw 26 moves the coal through the fuel elevating conduit direct to

the top edge 27 where it falls by gravity onto a distributing table 28. The elevating screw 26 is connected at its lower rear end with the drive shaft 29 by the double universal joint 30. The drive shaft 29 extends along the underside of the fuel transfer conduit and comprises two telescopic sections 31 and 32 to allow for the relative movement of the locomotive with the tender. A bearing 33 is provided at the forward end of the shaft 29 and is secured to the underside of the fuel transfer conduit. A gear 34 is mounted on the rear end of the shaft 29 and is in mesh with the gear 24. The gear 24 drives the gear 34 which turns the shaft 29 and drives the elevating screw 26 through the double universal joint 30. A sealing ring 35 at the lower rear end of the elevating screw 26 prevents any coal dust from leaking out of the fuel elevating conduit.

As the coal falls on the distributing table 28 it is discharged therefrom evenly over the firebed of the locomotive by a plurality of steam jets 36. The steam jets 36 are in communication with the cored passages 37 in the jet plate 38. The jet plate 38 forms a continuation of and is secured to the fuel elevating conduit. The cored passages 37 have pipe lines 39 leading to a source of pressure and suitable valves (not shown) for varying the pressure. For more accurate control of the distribution of the coal over the firebed the side vanes 40 are provided for governing the flow of coal to the distributing table 28.

The fuel elevating conduit 11 slopes forwardly and upwardly from beneath the forward end of the fuel transfer conduit 12 to the lower portion of the firing opening 5. The fuel elevating conduit is secured to the backhead 4 in the well known manner (not shown) and is supported at its rear end by the bracket 41. The fire door 42 closes the remainder of the firing opening 5 above the fuel elevating conduit.

From the foregoing description it is apparent that I have invented a novel stoker which will not reduce coal to an undesirable size, which has few movable parts, which can readily be applied on a locomotive and easily fitted into the room available.

Although I have shown and described what I believe is the preferred embodiment of my invention I do not want to be limited to this construction, except in-so-far as I have included such limitations within the terms of the following claims.

What is claimed is:—

1. The combination with a locomotive and tender, a stoker substantially longitudinal of the locomotive and tender having flexibly related conduits, a continuously actuated conveyor screw in each of the conduits, the forward end of one conduit being immediately above and extending beyond the rear end of

the adjacent conduit and arranged so fuel will pass directly from one to the other without obstruction by the driving mechanism for said screws.

2. In combination, a locomotive having a backhead provided with a firing opening, a tender, a stoker comprising a fuel transfer conduit movably mounted beneath the deck of the tender and a fuel elevating conduit in communication with said opening, the forward end of said transfer conduit being immediately above and extending beyond the rear end of said elevating conduit whereby fuel will pass downwardly from one to the other, and a conveyor screw in each of said conduits for delivering the fuel therethrough.

3. In combination, a locomotive having a backhead provided with a firing opening, a tender, a fuel transfer conduit mounted beneath the deck of the tender, a substantially straight fuel elevating conduit in communication with said opening, said elevating conduit inclined at an angle less than forty-five degrees with the horizontal, a conveyor screw in each of said conduits, the forward end of said transfer conduit being immediately above the rear end of said elevating conduit and arranged so fuel will be conveyed to a point terminating short of the forward end of said transfer conduit and pushed to its forward end where it will pass directly to said elevating conduit, and be conveyed through said elevating conduit to said opening.

4. In combination, a locomotive having a backhead provided with a firing opening, a tender, a stoker comprising a fuel transfer conduit mounted beneath the deck of the tender and a substantially straight fuel elevating conduit inclined at an angle less than forty-five degrees with the horizontal and in communication with said opening, the rear end of said elevating conduit being immediately beneath the forward end of the transfer conduit, and conveyor screws in both said conduits driven separately at their rear ends.

5. In combination, a locomotive having a backhead provided with a firing opening, a tender, a stoker comprising a fuel transfer conduit beneath the deck of the tender and a fuel elevating conduit mounted on the locomotive in communication with said opening, the rear end of said elevating conduit being immediately beneath the forward end of said transfer conduit and arranged so there will be direct passage of fuel from one conduit to the other, a conveyor screw in each of said conduits, gearing at the rear of said transfer conduit, and a drive shaft connecting the screw in said elevating conduit with said gearing.

6. In a locomotive having a backhead provided with a firing opening and a tender having a deck; a stoker comprising a fuel transfer conduit mounted in the tender beneath the deck and an inclined elevator conduit

on the locomotive in communication with said opening, the rear end of the elevator conduit being below the forward end of the transfer conduit whereby fuel will fall from the transfer conduit into the elevator conduit, a conveyor screw in the transfer conduit driven at its rear end through gearing at the rear of the transfer conduit, and a conveyor screw in the elevator conduit unversally jointed to and driven by a shaft extending along the underside of the transfer conduit through said gearing.

7. In a locomotive having a backhead provided with a firing opening and a tender having a deck; a stoker comprising a transfer conduit mounted in the tender beneath the deck and an inclined elevator conduit on the locomotive in communication with said opening, the rear end of the elevator conduit being below the forward end of the transfer conduit and arranged so fuel will fall from the transfer conduit into the elevator conduit, a conveyor screw in each of said conduits, a gear case at the rear of the transfer conduit, and a plurality of shafts extending forwardly from said gear case and driving said screws at their rear ends.

8. In a locomotive having a backhead provided with a firing opening and a tender having a deck; a stoker comprising a transfer conduit mounted in the tender beneath the deck and an elevator conduit on the locomotive in communication with said opening, the rear end of the elevator conduit being below the forward end of the transfer conduit whereby fuel will fall from the transfer conduit into the elevator conduit, a conveyor screw in the transfer conduit driven at its rear end, a conveyor screw in the elevator conduit having its rear end directly beneath the forward end of the transfer conduit and arranged so fuel will be continuously removed from the rear portion of the elevator conduit as it is received from the transfer conduit.

9. In a locomotive having a backhead provided with a firing opening and a tender having a deck; a stoker comprising a transfer conduit movably mounted in the tender beneath the deck and an elevator conduit rigidly secured to the locomotive in communication with said opening, the rear end of the elevator conduit being immediately below the forward end of the transfer conduit, the forward end of the transfer conduit extending to or beyond the rear end of the elevator conduit and positioned so fuel will pass directly into the elevator conduit, conveyor screws in both said conduits, both said screws being driven at their rear ends and arranged so fuel will be transferred from the tender to said opening without a flexible screw connection in the path of the fuel.

10. In a locomotive having a backhead provided with a firing opening and a tender having a deck; a stoker for transferring fuel continuously from the tender to the firing opening, said stoker comprising a transfer conduit mounted substantially longitudinal of the tender beneath the deck and a single straight inclined elevator conduit on the locomotive in communication with said opening, the forward end of the transfer conduit being immediately above and extending to or beyond the rear end of the elevator conduit whereby fuel will fall from the transfer conduit into the elevator conduit, a conveyor screw in the transfer conduit driven at its rear end, and a conveyor screw in the elevator conduit for transferring fuel through the entire length of the conduit to said opening.

In testimony whereof I affix my signature.
HENRY E. LIPPERT.

10. In a locomotive having a backhead provided with a firing opening and a tender having a deck; a stoker for transferring fuel continuously from the tender to the firing opening, said stoker comprising a transfer conduit mounted substantially longitudinal of the tender beneath the deck and a single straight inclined elevator conduit on the locomotive in communication with said opening, the forward end of the transfer conduit being immediately above and extending to or beyond the rear end of the elevator conduit whereby fuel will fall from the transfer conduit into the elevator conduit, a conveyor screw in the transfer conduit driven at its rear end, and a conveyor screw in the elevator conduit for transferring fuel through the entire length of the conduit to said opening.

DISCLAIMER

1,797,871.—*Henry E. Lippert*, Pittsburgh, Pa. LOCOMOTIVE STOKER. Patent dated March 24, 1931. Disclaimer filed January 30, 1932, by the assignee, *The Standard Stoker Company, Inc.*

Hereby enters this disclaimer to that part of the claim in said specification which is in the following words, to wit:

"1. The combination with a locomotive and tender, a stoker substantially longitudinal of the locomotive and tender having flexibly related conduits, a continuously actuated conveyor screw in each of the conduits, the forward end of one conduit being immediately above and extending beyond the rear end of the adjacent conduit and arranged so fuel will pass directly from one to the other without obstruction by the driving mechanism for said screws.

"2. In combination, a locomotive having a backhead provided with a firing opening, a tender, a stoker comprising a fuel transfer conduit movably mounted beneath the deck of the tender and a fuel elevating conduit in communication with said opening, the forward end of said transfer conduit being immediately above and extending beyond the rear end of said elevating conduit whereby fuel will pass downwardly from one to the other, and a conveyor screw in each of said conduits for delivering the fuel therethrough.

"3. In combination, a locomotive having a backhead provided with a firing opening, a tender, a fuel transfer conduit mounted beneath the deck of the tender, a substantially straight fuel elevating conduit in communication with said opening, said elevating conduit inclined at an angle less than forty-five degrees with the horizontal, a conveyor screw in each of said conduits, the forward end of said transfer conduit being immediately above the rear end of said elevating conduit and arranged so fuel will be conveyed to a point terminating short of the forward end of said transfer conduit and pushed to its forward end where it will pass directly to said elevating conduit, and be conveyed through said elevating conduit to said opening.

"4. In combination, a locomotive having a backhead provided with a firing opening, a tender, a stoker comprising a fuel transfer conduit mounted beneath the deck of the tender and a substantially straight fuel elevating conduit inclined at an angle less than forty-five degrees with the horizontal and in communication with said opening, the rear end of said elevating conduit being immediately beneath the forward end of the transfer conduit, and conveyor screws in both said conduits driven separately at their rear ends."

"8. In a locomotive having a backhead provided with a firing opening and a tender having a deck; a stoker comprising a transfer conduit mounted in the tender beneath the deck and an elevator conduit on the locomotive in communication with said opening, the rear end of the elevator conduit being below the forward end of the transfer conduit whereby fuel will fall from the transfer conduit into the elevator conduit, a conveyor screw in the transfer conduit driven at its rear end, a conveyor screw in the elevator conduit having its rear end directly beneath the forward end of the transfer conduit and arranged so fuel will be continuously removed from the rear portion of the elevator conduit as it is received from the transfer conduit.

"9. In a locomotive having a backhead provided with a firing opening and a tender having a deck; a stoker comprising a transfer conduit movably mounted in the tender beneath the deck and an elevator conduit rigidly secured to the locomotive in communication with said opening, the rear end of the elevator conduit being immediately below the forward end of the transfer conduit, the forward end of the transfer conduit extending to or beyond the rear end of the elevator conduit and positioned so fuel will pass directly into the elevator conduit; conveyor screws in both said conduits, both said screws being driven at their rear ends and arranged so fuel will be transferred from the tender to said opening without a flexible screw connection in the path of the fuel.

"10. In a locomotive having a backhead provided with a firing opening and a tender having a deck; a stoker for transferring fuel continuously from the tender to the firing opening, said stoker comprising a transfer conduit mounted substantially longitudinal of the tender beneath the deck and a single straight inclined elevator conduit on the locomotive in communication with said opening, the forward end of the transfer conduit being immediately above and extending to or beyond the rear end of the elevator conduit whereby fuel will fall from the transfer conduit into the elevator conduit, a conveyor screw in the transfer conduit driven at its rear end, and a conveyor screw in the elevator conduit for transferring fuel through the entire length of the conduit to said opening."

[*Official Gazette March 1, 1932.*]