Jan. 5, 1937. H. P. ANDERSON 2,066,756

CONVEYER

Filed Sept. 25, 1935

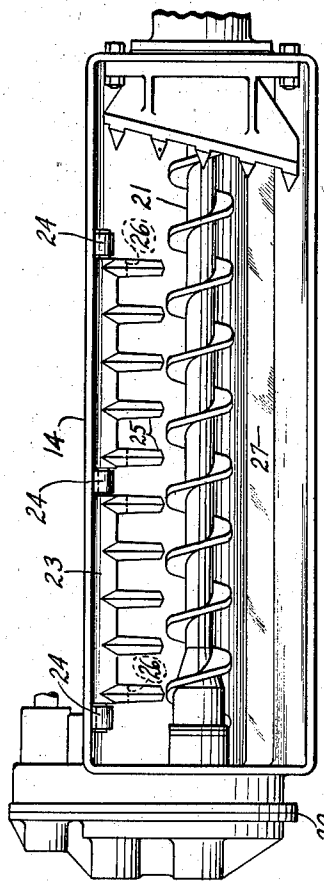


Fig. 2

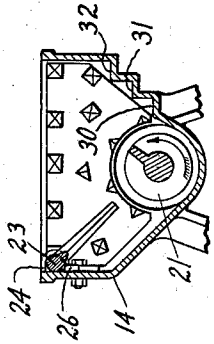


Fig. 4

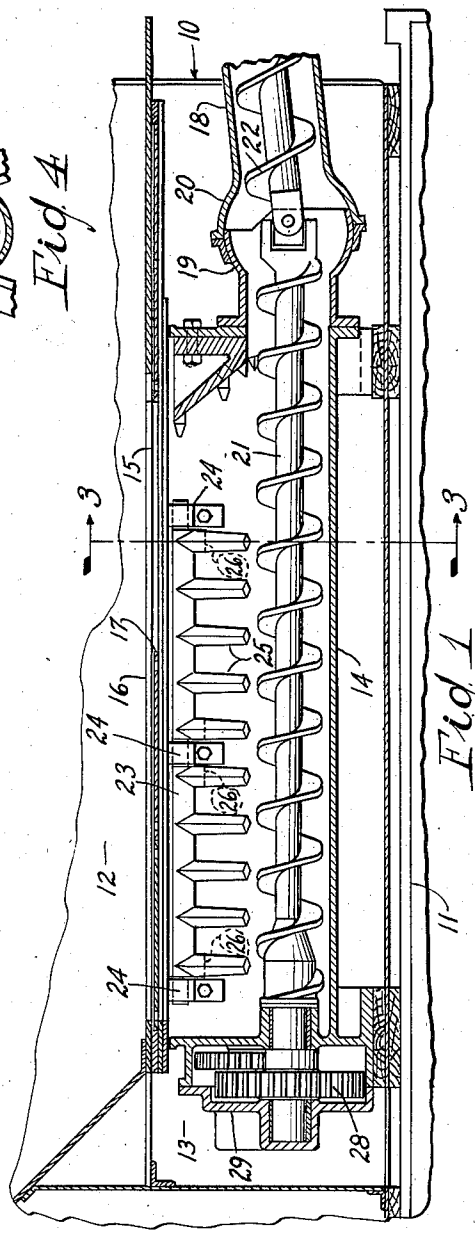


Fig. 1

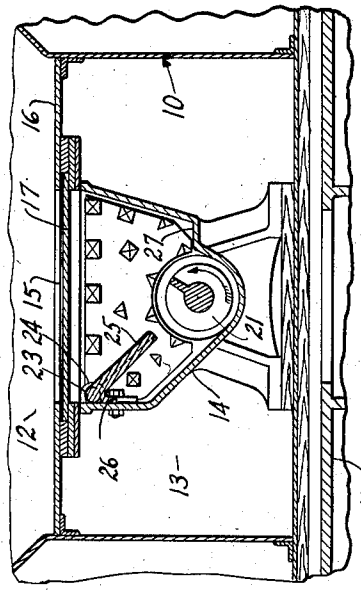


Fig. 3

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CONVEYER

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Application September 25, 1935, Serial No. 41,976

11 Claims. (Cl. 198—15)

My invention relates to improvements in conveyers of the type comprising a screw rotatably mounted in a trough-like conduit and especially to a fuel conveyer for a stoker.

The main object of the invention is to provide a novel conveyer of the type described having a maximum conveying action with a minimum of pulverization of the material conveyed.

Another object of the invention is to provide a novel fuel conveyer of the type described wherein the lumps of fuel are largely confined to that side of the trough along which the screw exerts the greatest fuel advancing action.

Other and more specific objects of the invention residing in advantageous forms, combinations and relations of parts will hereinafter appear and be pointed out in the claims.

In the drawing,

Figure 1 is a longitudinal sectional view through a portion of a locomotive tender with the novel conveyer mounted beneath the fuel bin thereof and shown in similar section;

Figure 2 is a plan view of the conveyer, the tender being omitted;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1; and

Figure 4 is a sectional view similar to the view shown in Figure 3, illustrating a modified form of the invention.

For convenience in description, the invention has been shown in the drawing as applied to the tender unit of a locomotive stoker.

In the preferred form of the device, shown in Figures 1, 2 and 3, a locomotive tender is indicated generally at 10 and comprises a frame 11, a fuel bin 12 and a compartment 13 between the fuel bin and the frame. In the compartment 13 is mounted a trough-like conduit 14 arranged to receive fuel from the bin 12 through a longitudinally extending central opening 15 in the bin floor 16. The opening 15 may be closed when desired by a plurality of slidably mounted plates 17 which are so arranged that they may be drawn forward one at a time as the coal is consumed to present a relatively small opening in the desired position in the floor of the bin.

The coal is conveyed from the trough-like conduit 14 to a point of delivery, as to the firebox of a locomotive, by a conveying system including a conduit, a portion of which is shown at 18. The trough-like conduit 14 is provided with a spherical extension 19 rigid therewith, and by providing the rearward end of the conduit 18 with a complementary spherical socket member 20 adapted to receive the spherical extension 19 to form therewith a ball and socket joint, universal movement between the conduits 14 and 18 is provided. Spiral feed screws 21 and 22 are respectively disposed in the conduits 14 and 18 for advancing or feeding fuel therethrough. The screws are rotated through gearing 28 disposed in a casing 29 at the rear of the trough-like conduit 14.

It is well known that in conveying material through a conduit by means of a screw, the advancing action of the screw is greater along one side of the conduit than the other. In the construction illustrated in the drawing, the flight of the screw is wound in a manner so that fuel will be advanced through the trough-like conduit 14 when the screw, viewed from its rearward end as in Figure 3, is rotated in a counterclockwise direction. With this arrangement, again referring to Figure 3, the screw will exert a greater fuel advancing action along the right side of the trough-like conduit 14. Now, since the screw is rotating in a counterclockwise direction there is a tendency for the fuel to be carried over the hub of the screw to the left side of the conduit 14. On the left side of the conduit 14, the flight of the screw exerts a forward and downward pressure on the fuel, which in the usual type of trough wedges the lumps of fuel between the screw flight and the wall of the conduit and crushes them.

In the present construction a bar 23 extends longitudinally along the upper inner marginal edge of the left side of the trough-like conduit, being mounted in bearings 24 for rotative movement. A plurality of spaced projections 25 formed with the bar 23 extend inwardly and downwardly of the conduit, terminating at their free ends near the upper left side of the periphery of the screw flight. Stop members 26 formed with the bar 23 limit the downward movement of the projections 25 by contacting the side wall of the conduit 14. This is the normal position of the projections 25 when the screw is advancing fuel through the conduit. The projections 25 may, however, be swung upwardly with the bar 23 as an axis to permit removal of clogs and to permit reversal of the screw when the conduit is filled with fuel without causing packing of fuel against the projections 25.

When the screw 21 is rotated in a direction to advance fuel through the conduit 14, that is, in a counterclockwise direction, the projections 25 prevent the larger lumps of fuel delivered from the bin through the opening 15 and lumps of fuel that are carried over the hub of the screw from the right to the left side of the conduit from dropping down to the lower left side of the con-

duit where they would be crushed to an undesirable extent. The projections furthermore keep the bulk of the fuel on the right side of the conduit 14, where the conveying action of the screw is most effective. On the right side of the conduit, the flight of the screw 21 exerts a forward and upward pressure on the fuel, and since the larger lumps cannot fall over to the bottom of the left side of the conduit, they float along with the fuel stream as the screw advances the fuel.

The right side wall of the trough-like conduit 14 is provided with a set back forming a ledge 27, increasing the carrying capacity of the conduit on that side where the conveying action of the screw is most effective. This ledge is at about the level of the axis of the screw 21 and forms a support or platform along which the fuel is urged by the screw preventing undue abrasion of the larger lumps of fuel by limiting the amount of surface of the lumps of fuel that contacts the screw flight.

In Figure 4 is illustrated a modified form of trough-like conduit, wherein a plurality of steps are formed in the right side wall of the conduit providing a plurality of ledges or platforms 30, 31 and 32, each a respectively greater distance from the periphery of the screw flight. In other respects, the construction is the same as in the preferred form of the invention. In the modified form of construction, the upper ledge 32 will form a partial support for the larger lumps of fuel, while the intermediate ledge 31 will form a partial support for the lumps of fuel that drop between the screw and the ledge 32 and are too large to drop between the screw and the ledge 31, and the lower ledge 30 forms a support for the fuel that drops between the screw and the ledge 31. Thus, the various sized lumps of fuel are each provided with a support tending to prevent wedging of the fuel between the screw and the side wall of the conduit and thereby minimizing abrasion of the lumps of fuel.

I claim:

1. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough and means including fingers on the side wall of said trough on the descending side of said screw, said fingers spaced lengthwise of the trough and extending downwardly and inwardly toward the periphery of said screw.

2. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough, a fuel retaining member extending lengthwise of the trough pivotally mounted on a longitudinal axis at a level above the screw adjacent the side wall of the trough on the descending side of the screw, and means for limiting the downward pivotal movement of said member, said member at the lower limit of its movement having its free end adjacent the upper periphery of the screw.

3. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough, the side wall of the trough on the descending side of the screw having a longitudinally extending shaft mounted thereon above the level of the screw and arranged for axial rotation, said shaft having a plurality of longitudinally spaced fingers movable with said shaft and means for limiting the downward pivotal movement of said shaft and fingers, said fingers at the lower limit of their movement having their free ends adjacent the upper periphery of the screw.

4. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough, the side wall of said trough on the descending side of said screw being provided with fingers spaced lengthwise of the trough and extending downwardly and inwardly toward the periphery of said screw, and the side wall of said trough on the ascending side of said screw being provided with a shelf extending lengthwise of the trough.

5. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough, a fuel retaining member extending lengthwise of the trough pivotally mounted on a longitudinal axis at a level above the screw adjacent the side wall of the trough on the descending side of the screw and means for limiting the downward pivotal movement of said member, said member at the lower limit of its movement having its free end adjacent the upper periphery of the screw, and the side wall of said trough on the ascending side of said screw being provided with a shelf extending lengthwise of the trough.

6. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough, the side wall of the trough on the descending side of the screw having a longitudinally extending shaft mounted thereon above the level of the screw and arranged for axial rotation, said shaft having a plurality of longitudinally spaced fingers movable with said shaft and means for limiting the downward pivotal movement of said shaft and fingers, said fingers at the lower limit of their movement having their free ends adjacent the upper periphery of the screw, and the side wall of said trough on the ascending side of said screw being provided with a shelf extending lengthwise of the trough.

7. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough, the side wall of said trough on the descending side of said screw being provided with fingers spaced lengthwise of the trough and extending downwardly and inwardly toward the periphery of said screw, and the side wall of said trough on the ascending side of said screw being provided with a shelf at about the level of the axis of said screw and extending lengthwise of the trough.

8. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough, a fuel retaining member extending lengthwise of the trough pivotally mounted on a longitudinal axis at a level above the screw adjacent the side wall of the trough on the descending side of the screw and means for limiting the downward pivotal movement of said member, said member at the lower limit of its movement having its free end adjacent the upper periphery of the screw, and the side wall of said trough on the ascending side of said screw being provided with a shelf at about the level of the axis of said screw and extending lengthwise of the trough.

9. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough, the side wall of the trough on the descending side of the screw having a longitudinally extending shaft mounted thereon above the level of the screw and arranged for axial rotation, said shaft having a plurality of longitudinally spaced fingers movable with said shaft and means for limiting the downward pivotal movement of said shaft and fingers, said

fingers at the lower limit of their movement having their free ends adjacent the upper periphery of the screw, and the side wall of said trough on the ascending side of said screw being provided with a shelf at about the level of the axis of said screw and extending lengthwise of the trough.

10. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough, the side wall of said trough on the descending side of said screw being provided with a fuel retaining member extending lengthwise of the trough and projecting downwardly and inwardly toward the periphery of said screw, and the side wall of said trough on the ascending side of said screw being provided with a plurality of steps.

11. A fuel conveyer comprising a trough having upwardly extending side walls and a screw rotatably mounted in said trough, the side wall of the trough on the descending side of the screw having a longitudinally extending shaft mounted thereon above the level of the screw and arranged for axial rotation, said shaft having a plurality of longitudinally spaced fingers movable with said shaft and means for limiting the downward pivotal movement of said shaft and fingers, said fingers at the lower limit of their movement having their free ends adjacent the upper periphery of the screw, and the side wall of said trough on the ascending side of said screw being provided with a plurality of steps.

HOWARD P. ANDERSON.