

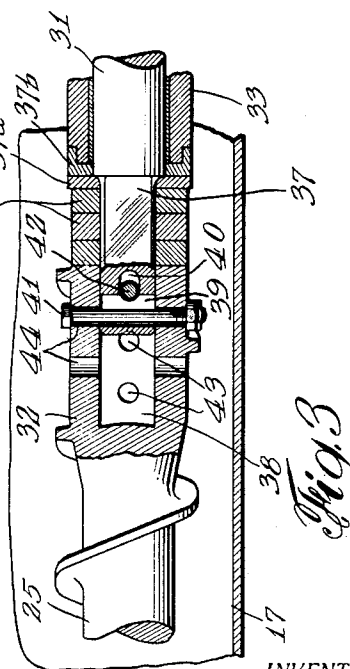
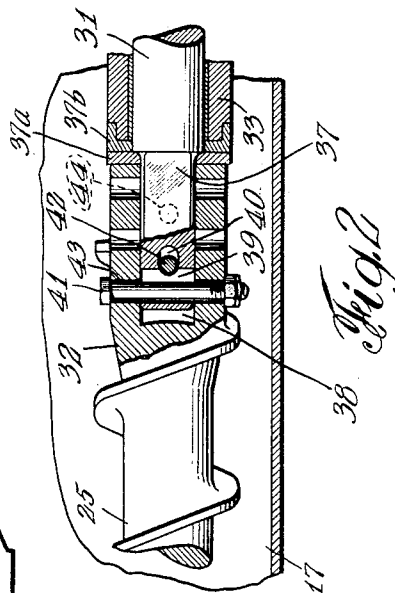
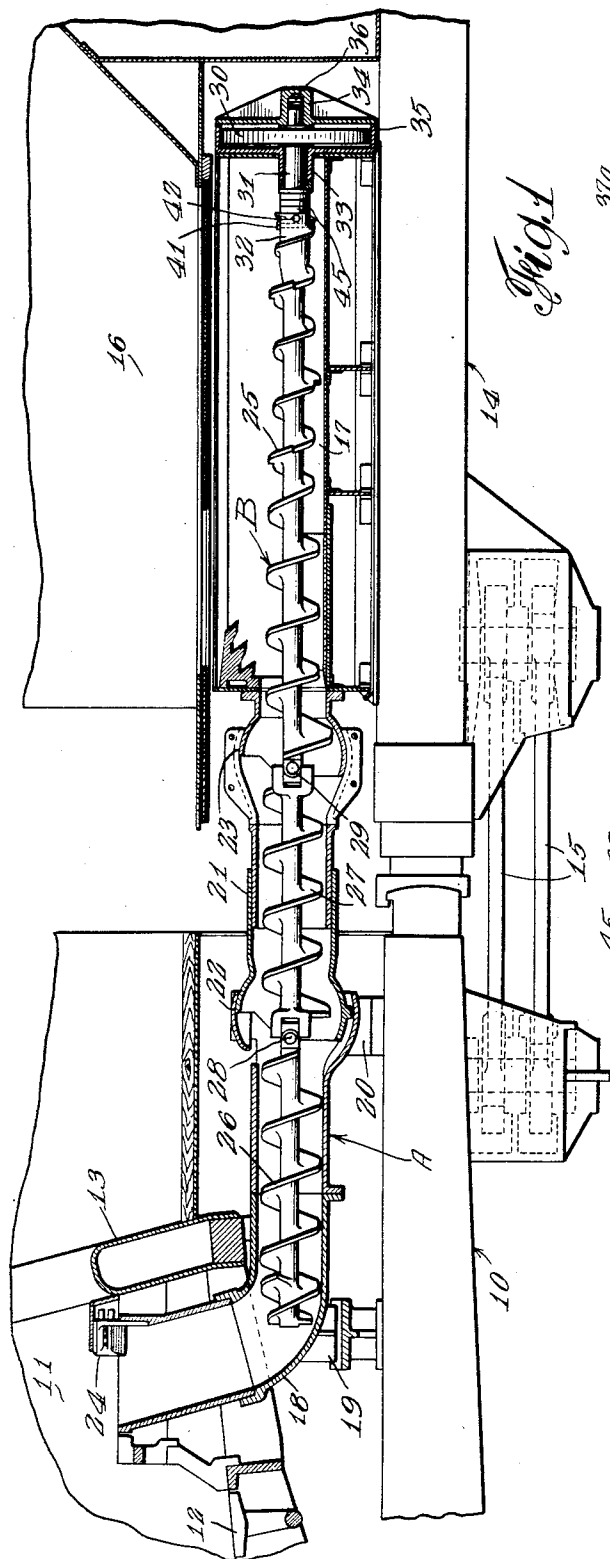
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STOKER CONSTRUCTION

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STOKER CONSTRUCTION

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7 Claims. (Cl. 198—15)

This invention appertains to stokers especially to locomotive stokers wherein a floating sectional screw conveyor is employed with an extensible and contractible conduit at its forward end terminating in an elbow through which coal enters the firebox.

In stokers of this type it is important that the forward end of the screw conveyor should terminate in the elbow at a point therein, which may be defined as that point which permits the screw conveyor to force the coal as far as possible forward of itself in a smooth continuous stream without causing the coal to pack or to block its flow through the elbow and such that a minimum of pressure of steam is required in the stoker driving engine. This point is determined by experimentation and when established it should be maintained to insure entirely satisfactory and most economical use of the stoker.

In the use of stokers of the above characteristics on locomotives, it is found that wear on the universal joint connections between the screw sections, on the thrust washers and associated parts and or together with wear of the draw bars between the locomotive and tender forces the screw conveyor back from its predetermined terminal point in the elbow a distance equivalent to such wear. When such wear exceeds permissible working tolerances causing a substantial change in the position of the screw in the elbow, the stoker under some conditions becomes less efficient in operation. It is desirable to compensate for this wear in order to maintain the screw conveyor in proper relation with the stoker elbow and the main object of the present invention is to provide means for effecting this result. For this purpose, I provide an adjustable coupling means at the rearward end of the screw.

Other objects and advantages of my invention will be apparent from the following description taken in connection with the accompanying drawing, in which

Figure 1 is a side elevation of a portion of a locomotive and tender with some parts in vertical section and with a stoker embodying my invention mounted therein and the conduit thereof being shown in vertical section;

Figure 2 is an enlarged side elevation of the rearward end of the screw conveyor illustrating the normal position of the coupling means with some parts broken away and others in section; and

Figure 3 is a view similar to Figure 2 showing an adjusted position of the coupling means.

On the drawing, 10 indicates a conventional

form of locomotive having a firebox 11 provided with grates 12 and a backhead 13. The locomotive is coupled to the tender 14 as is customary by the draw bars 15 arranged to permit articulation therebetween. Coal is transferred from the bin 16 of the tender to the firebox 11 by a stoker indicated generally by the letter A. The conduit system of this stoker comprises a rearward trough section 17 rigidly mounted on the tender, the forward or elbow section 18 rigidly fixed on the locomotive 10 as by the brackets 19 and 20, and an extensible and contractible intermediate section 21 at its ends flexibly connected with the trough and elbow sections by the universal joint formations of the sections at 22 and 23. The elbow section 18 extends forwardly beneath the backhead 13, thence curving upwardly through the grates 12 to extend into the firebox 11 at a sufficient height therein to permit the distributor head 24 to propel the coal rising from the elbow section over the grate in aerial paths.

Coal is advanced through the conduit sections by a sectional screw conveyor indicated as a whole at B. This conveyor is formed of the rearward section 25 mounted in the trough 17, the forward section 26 mounted in the elbow conduit section 18, and the intermediate section 27 carried within the intermediate conduit section 21. The screw sections are flexibly connected by the universal joints at 28 and 29 in the vicinity of the universal connections of the conduits. It is important that the front end of the screw conveyor terminate in the elbow section 18 at a predetermined point as heretofore set forth.

Continuous rotary motion is imparted to the screw conveyor from any suitable motor, not shown, through the gear 30 securely mounted on the screw drive shaft 31 which is secured to the rearward hub portion 32 of the screw section 25 in a novel and improved manner as will now be fully described.

The shaft 31 is loosely journaled in the bearings 33, 34, of the gear housing 35 and the gear 30 is disposed on the shaft between the aforesaid bearings. Normal thrust on the shaft is taken by the thrust button 36. That portion of the shaft 31 extending to the left of the bearing 33 is made in the form of a square shank 37 which is received in the square socket 38 of the screw hub 32.

Spaced slots 39 and 40 at right angle to one another are provided in the shank 37 to receive the securing bolts 41 and 42 extending through correspondingly spaced holes 43 and 44 of the hub 32. There are three such holes as at 43 ar-

ranged in parallelism and spaced apart, preferably, about two inches, and two holes as indicated at 44 are arranged at right angles to the others and spaced between them, hence, the
 5 holes 43 and 44 are spaced about one inch apart. This spacing as will presently appear permits adjustment of the screw conveyor.

The normal relation of the screw hub 32, the square shank 37 of the shaft 31, and the bolts
 10 41 and 42 constituting the improved adjustable screw coupling means of this invention is illustrated in Figure 2. In this view the hub 32 is positioned on the shank 37 to the extreme right thereof and the bolts 41 and 42 extending
 15 through the slots 39 and 40 hold the screw section 25 to the shank. The bolt 41 passes through the end hole to the left of the group of holes numbered 43 and similarly the bolt 42 passes through the end hole to the left of the group
 20 of holes numbered 44. The end thrust of the screw B is received by thrust washers 37a and 37b mounted over the shaft 31 between the end of the hub portion 32 and the gear housing 35. The washer 37b is mounted on the round portion
 25 of the shaft 31 and is rigid with the housing, whereas, the washer 37a has a square bore and is mounted on the shank 37 to turn therewith. By provision of the thrust washers in the position as shown no thrust is imparted to the bolts
 30 41 and 42, and likewise, the torsional strain in driving the screw is taken by the square shank 37 and the hub portion 32 so that the bolts do not function to drive the screw. The bolts serve merely to prevent the screw B from sliding forward on the screw shank 37 when the screw is
 35 operated in reverse motion.

Adjustment of the screw B with reference to the elbow portion 18 may be made, to compensate for wear and lengthening of the draw bars
 40 15 or such other wear of associated parts that would cause the screw B to move backward from its predetermined point in the elbow portion 18, by registering other of the group of holes 43 and 44 with the slots 39 and 40 of the shank. The
 45 maximum adjusted position of the screw B is shown in Figures 1 and 3. To secure this adjustment of the parts the screw section 25 is slid forwardly to disengage the shank section 37 and then turned ninety degrees and slid back on the
 50 shank with the end hole to the right of the group 43 registering with the slot 40 to receive the bolt 42 and the end hole to the right of the group 44 registering with the slot 39, to receive the bolt 41. This position represents an adjustment
 55 of the screw B of three inches to the left from the relation of the parts shown in Figure 2. The space between the rear end of the hub 32 and the washer 37 is filled with spacers or additional thrust washers 45, each one preferably
 60 being of one inch thickness equivalent to the one inch spacing of the holes 43 and 44. Similar adjustments of one and two inches of the parts from that shown in Figure 2 can be made by registering the intermediate holes of the
 65 groups 43 and 44 with the slots 39 and 40 together with the provision of one or two of the spacers 45.

While I have shown the coupling parts as being capable of moving the screw B forward in
 70 adjustments of one, two or three inches from its normal position as shown in Figure 2, it will be understood that smaller or longer adjustments may be provided by suitable spacing of the groups of holes 43 and 44 and the slots 39
 75 and 40 together with spacer washers of a thick-

ness equivalent to the spacing of the aforesaid groups of holes, and that a greater number of adjustments may be had by the provision of additional holes to the groups 43 and 44. Or from another aspect of the invention the predetermined position of the screw in the elbow portion
 80 of the conduit may be changed by the use of the invention if desired to meet varying conditions caused by different grades of coal or for other purposes.

I claim:

1. In an articulated locomotive and tender, said locomotive provided with a firebox and said tender having a fuel bin, a stoker for transferring fuel from said bin to the locomotive firebox comprising in combination a trough section rigidly
 90 mounted on the tender below said bin and receiving fuel therefrom, an elbow section rigidly secured to said locomotive and arranged to deliver fuel into the firebox, a telescopically arranged intermediate section flexibly connecting the adjacent ends of the trough section and said elbow section, a flexibly related sectional conveyor screw
 95 in said stoker for urging fuel from said tender into the firebox through said elbow section, the forward end of said screw terminating at a predetermined point in said elbow section, a gear housing at the rearward end of said trough, a gear in said housing, a shaft driven by said gear and extending forwardly through said housing,
 100 that part of said shaft which extends through the housing being in the form of a square shank, said screw at its rearward end having a square socket formed therein to receive said shank, said shank having a pair of slots extending there-
 105 through at right angles to each other, the rear end of said screw having a plurality of holes therethrough some being at right angles to others, and a bolt passing through one of said slots and extending into a selected hole through said conveyor screw for securing it in different longitudinal positions with respect to the square shank of said shaft whereby the forward end of said screw may be returned to its predetermined position when wear upon parts of the locomotive,
 110 tender and stoker mechanism causes the forward end of said screw to be removed from such predetermined position in said elbow section.

2. In an articulated locomotive and tender, said locomotive provided with a firebox and said tender having a fuel bin, a stoker for transferring fuel from said bin to the locomotive firebox comprising in combination a trough section rigidly mounted on the tender below said bin and receiving fuel therefrom, an elbow section rigidly secured to
 125 said locomotive and arranged to deliver fuel into the firebox, a telescopically arranged intermediate section flexibly connecting the adjacent ends of the trough section and said elbow section, a flexibly related sectional conveyor screw in said
 130 stoker for urging fuel from said tender into the firebox through said elbow section, the forward end of said screw terminating at a predetermined point in said elbow section, a gear housing at the rearward end of said trough, a gear in said housing,
 135 a shaft driven by said gear and extending forwardly through said housing, that part of said shaft which extends through the housing being in the form of a square shank, said screw at its rearward end having a square socket formed therein to receive said shank, said shank having a pair of slots extending therethrough at right angles to each other, the rear end of said screw having a plurality of holes therethrough some being at right angles to others, thrust trans-
 140 145 150

ferring washers interposed between the rearward end of said screw and said gear housing, and a bolt passing through one of said slots and extending through said conveyor screw for securing it in different longitudinal positions with respect to the square shank of said shaft whereby the forward end of said screw may be returned to its predetermined position when wear upon parts of the locomotive, tender and stoker mechanism causes the forward end of said screw to be removed from such predetermined position in said elbow section.

3. In an articulated locomotive and tender, said locomotive provided with a firebox and said tender having a fuel bin, a stoker for transferring fuel from said bin to the locomotive firebox comprising in combination a trough section rigidly mounted on the tender below said bin and receiving fuel therefrom, an elbow section rigidly secured to said locomotive and arranged to deliver fuel into the firebox, a telescopically arranged intermediate section flexibly connecting the adjacent ends of the trough section and said elbow section, a flexibly related sectional conveyor screw in said stoker for urging fuel from said tender into the firebox through said elbow section, the forward end of said screw terminating at a predetermined point in said elbow section, a gear housing at the rearward end of said trough, a gear in said housing, a shaft driven by said gear and extending forwardly through said housing, that part of said shaft which extends through the housing being in the form of a square shank, said screw at its rearward end having a square socket formed therein to receive said shank, said shank having a pair of slots extending therethrough at right angles to each other, the rear end of said screw having a plurality of holes therethrough some being at right angles to others, thrust transferring washers interposed between the rearward end of said screw and said gear housing, the thickness of said washers being equal to the axial distance between any pair of adjacent holes in said screw, and a pair of bolts each passing through such adjacent holes of the screw and extending through the slots of the shank of said shaft for securing said screw in different longitudinal positions with respect to said shank whereby the forward end of the screw may be returned to its predetermined position when wear upon parts of the locomotive, tender and stoker mechanism causes the forward end of said screw to be removed from such predetermined position in said elbow section.

4. In an articulated locomotive and tender, said locomotive provided with a firebox and said tender having a fuel bin, a stoker transferring fuel from said bin to the locomotive firebox comprising in combination a trough section rigidly mounted on the tender below said bin and receiving fuel therefrom, an elbow section secured to said locomotive and arranged to deliver fuel into the firebox, a telescopically arranged intermediate section flexibly connecting the adjacent ends of the trough section and said elbow section, a flexibly related sectional conveyor screw in said stoker for urging fuel from said tender into the firebox through said elbow section, the forward end of said screw terminating at a predetermined point in said elbow section, a bearing at the rear of said screw, a shaft journaled in said bearing having a polygonal shank extending beyond said bearing into said trough section, said screw at its rearward end having a complementary polygonal socket formed therein to receive said polygonal

shank, said polygonal shank having slots extending from one face to an opposite face, the rear end of said screw having a plurality of holes which pass through the faces of said polygonal socket, and a bolt passing through one of said slots and extending into a selected hole through said conveyor screw for securing it in different longitudinal positions with respect to said polygonal shank of said shaft whereby the forward end of said screw may be returned to its predetermined position when wear upon parts of the locomotive, tender and stoker mechanism causes the forward end of said screw to be removed from such predetermined position in said elbow section.

5. In an articulated locomotive and tender, said locomotive provided with a firebox and said tender having a fuel bin, a stoker transferring fuel from said bin to the locomotive firebox comprising in combination a trough section rigidly mounted on the tender below said bin and receiving fuel therefrom, an elbow section secured to said locomotive and arranged to deliver fuel into the firebox, a telescopically arranged intermediate section flexibly connecting the adjacent ends of the trough section and said elbow section, a flexibly related sectional conveyor screw in said stoker for urging fuel from said tender into the firebox through said elbow section, the forward end of said screw terminating at a predetermined point in said elbow section, a bearing at the rear of said screw, a shaft journaled in said bearing having a polygonal portion extending beyond said bearing into said trough section, said screw at its rearward end having a complementary polygonal portion to engage the polygonal portion of said shaft, the polygonal portions of said shaft and said screw having apertures extending through opposite faces thereof, and a bolt passing through a selected set of apertures in said polygonal portions for securing the screw in different longitudinal positions with respect to the polygonal portion of said shaft whereby the forward end of said screw may be returned to its predetermined position when wear upon parts of the locomotive, tender and stoker mechanism causes the forward end of said screw to be removed from such predetermined position in said elbow section.

6. In an articulated locomotive and tender, said locomotive provided with a firebox and said tender having a fuel bin, a stoker transferring fuel from said bin to the locomotive firebox comprising in combination a trough section rigidly mounted on the tender below said bin and receiving fuel therefrom, a conduit section secured to said locomotive and arranged to deliver fuel into the firebox, a telescopically arranged intermediate section flexibly connecting the adjacent ends of the trough section and said conduit section, a flexibly related sectional conveyor screw in said stoker for urging fuel from said tender into the firebox through said conduit section, the forward end of said screw terminating at a predetermined point in said conduit section, a bearing at the rear of said screw, a shaft journaled in said bearing having a polygonal shank extending beyond said bearing into said trough section, said screw at its rearward end having a complementary polygonal socket formed therein to receive said polygonal shank, said polygonal shank having slots extending from one face to an opposite face, the rear end of said screw having a plurality of holes which pass through the faces of said polygonal socket, and a bolt passing through one of said slots and extending into a selected hole through said con-

veyor screw for securing it in different longitudinal positions with respect to said polygonal shank of said shaft whereby the forward end of said screw may be returned to its predetermined position when wear upon parts of the locomotive, tender and stoker mechanism causes the forward end of said screw to be removed from such predetermined position in said conduit section.

7. In an articulated locomotive and tender, said locomotive provided with a firebox and said tender having a fuel bin, a stoker transferring fuel from said bin to the locomotive firebox comprising in combination a trough section rigidly mounted on the tender below said bin and receiving fuel therefrom, a conduit section secured to said locomotive and arranged to deliver fuel into the firebox, a telescopically arranged intermediate section flexibly connecting the adjacent ends of the trough section and said conduit section, a flexibly related sectional conveyor screw in said stoker for urging fuel from said tender into the firebox through said conduit section, the forward

end of said screw terminating at a predetermined point in said conduit section, a bearing at the rear of said screw, a shaft journaled in said bearing having a polygonal portion extending beyond said bearing into said trough section, said screw at its rearward end having a complementary polygonal portion to engage the polygonal portion of said shaft, the polygonal portions of said shaft and said screw having apertures extending through opposite faces thereof, and a bolt passing through a selected set of apertures in said polygonal portions for securing the screw in different longitudinal positions with respect to the polygonal portion of said shaft whereby the forward end of said screw may be returned to its predetermined position when wear upon parts of the locomotive, tender and stoker mechanism causes the forward end of said screw to be removed from such predetermined position in said conduit section.

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