Dec. 21, 1937. J. W. MYERS 2,103,210

LOCOMOTIVE STOKER

Original Filed Feb. 5, 1932 2 Sheets-Sheet 1

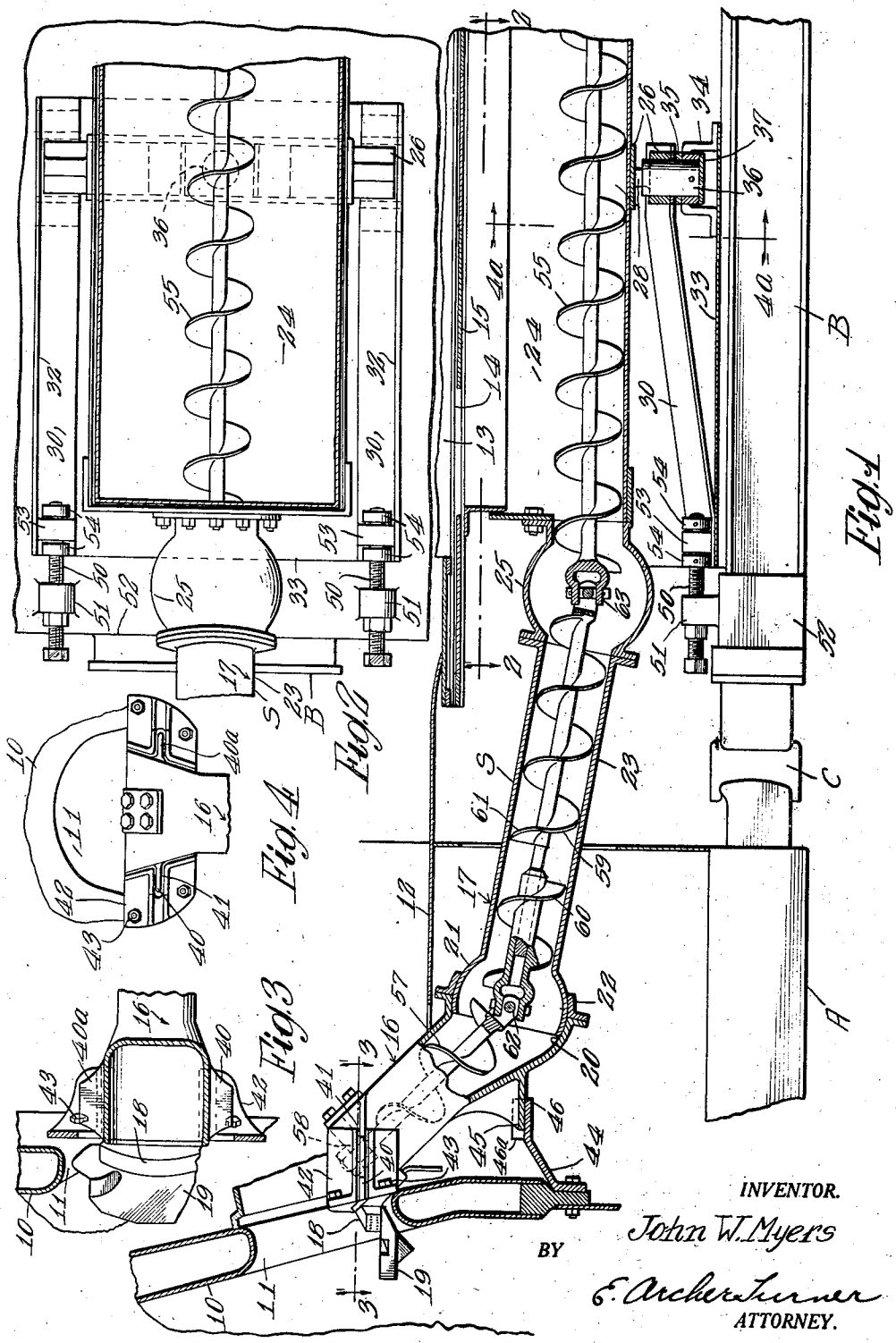


Fig. 1

Fig. 2

Fig. 4

Fig. 3

INVENTOR.
John W. Myers
BY
E. Archer Turner
ATTORNEY.

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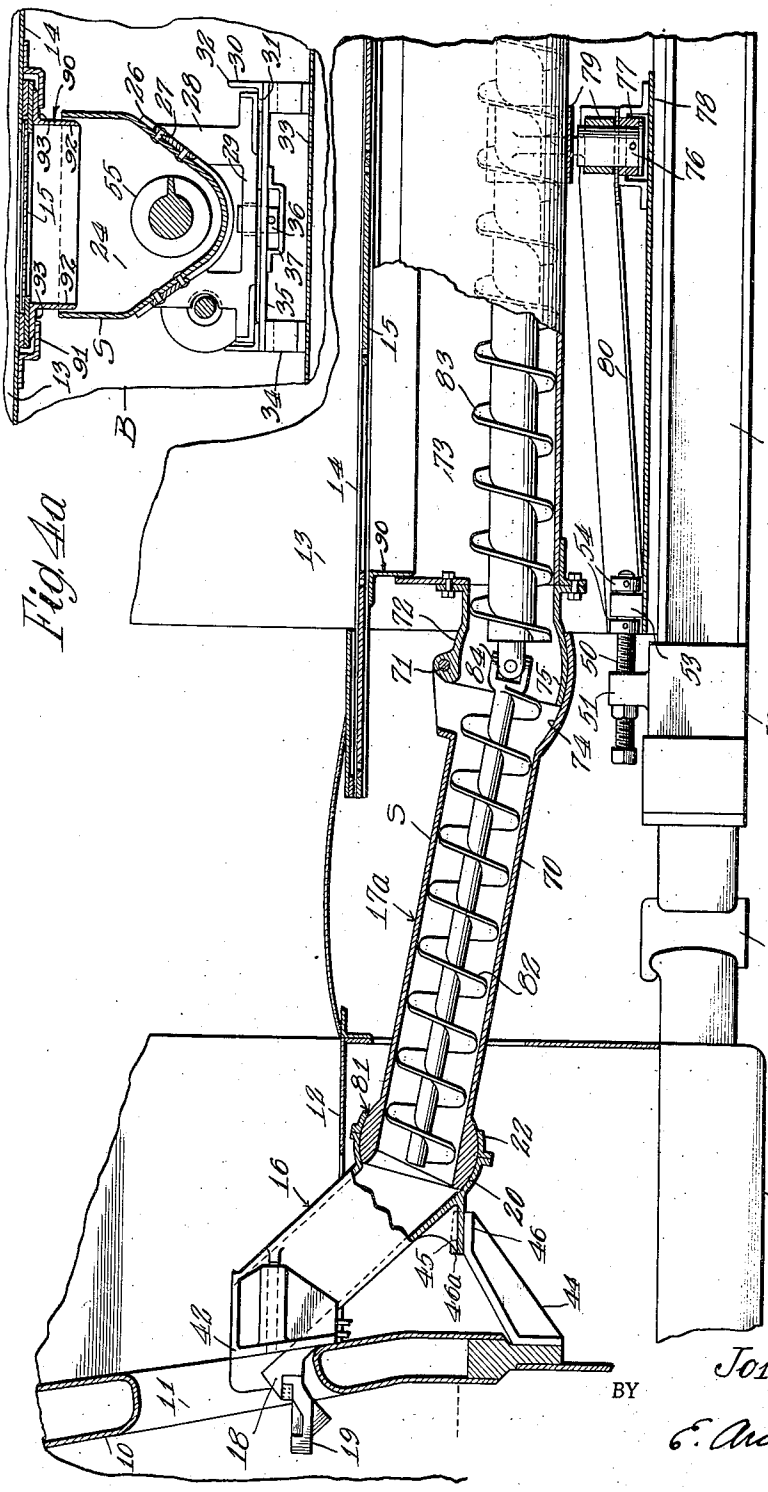


Fig. 4a

Fig. 5

INVENTOR.
John W. Myers
BY
E. Ackerman
ATTORNEY.

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LOCOMOTIVE STOKER

John W. Myers, Roanoke, Va., assignor, by mesne assignments, to The Standard Stoker Company, Inc. (1922), a corporation of Delaware

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Renewed April 23, 1935

20 Claims. (Cl. 198—15)

This invention which relates to locomotive stokers has for its main object the provision of a flexible and sectional stoker conduit system wherein there is no longitudinal movement between the conduit sections, but which conduit system is installed on the locomotive and its tender to permit of longitudinal movement between the forward or delivery conduit section and the locomotive firebox which system at the same time provides for all other movements necessary to allow for articulation between the locomotive and tender.

In carrying out the main object of the invention the forward conduit section, as shown in the accompanying drawings, is slidably mounted on the locomotive firebox and at its rearward portion it is flexibly connected to the forward end of the rearward conduit section which extends rearwardly on the locomotive tender to receive fuel from the fuel bin thereof. The rearward conduit section is movably mounted on the tender to pivot about a vertical axis normally fixed against any movement. However, to compensate for wear of the coupling connections of the locomotive and tender, and in order to make adjustments in the conduit system a further object of this invention is the provision of means for shifting the aforesaid axis longitudinally of the tender.

Other and more specific objects of the invention reside in the arrangement and relation of the conduit section and associated parts as hereinafter described and set forth in the appended claims.

On the drawings

Fig. 1 is a central longitudinal vertical section through a locomotive and tender with the stoker conduit system of the invention applied thereon and shown partly in similar section and partly in side elevation;

Fig. 2 is a fragmentary plan view taken on the section line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional plan view taken on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary view in end elevation of that portion of the conduit system adjacent the firebox firing opening;

Fig. 4*a* is a sectional view taken on line 4*a*—4*a* of Fig. 1; and

Fig. 5 is a view similar to Fig. 1 illustrating a modified form of the invention.

Referring particularly to Figures 1 to 4*a* inclusive, a preferred embodiment of the invention is illustrated. In these figures the locomotive is designated at A, its tender at B, and the coupling therebetween at C. The locomotive A is of the usual conventional form having a firebox backwall 10 provided with a firing opening 11 therein at or above the cab deck 12. Likewise, the tender is of conventional form and carries the usual fuel bin 13 provided with the apertured floor 14 in which are mounted shiftable plates 15 for controlling the flow of fuel from the bin into the stoker conduit system indicated as a whole at S.

This conduit system comprises a forward or riser conduit section 16 and the rearward or transfer section 17. The forward conduit section at its upper end communicates with the lowermost portion of the firing opening 11 and it carries a distributing means comprising the distributor head 18 and the distributor plate 19, which parts cooperate to project the fuel delivered by the conduit system to all parts of the firebox. The distributor parts per se form no part of the present invention and will not be described in detail. Such parts are fixed to the forward or riser conduit section 16. This section extends downwardly and rearwardly from the firing opening to a point below the cab deck 12 where at its lower end portion it forms a spherical seat 20 to receive the spherical ball member 21 at the forward end of the rearward conduit section 17. The ball 21 is held in the seat 20 by split spherical clamp members 22 which together with the seat 20 and the ball 21 form a universal or flexible connection between the forward and rearward conduit sections. It will be observed this joint does not provide longitudinal movement between the two sections.

The rearward conduit section 17 comprises the tubular forward conduit portion 23 and the open mouth rearward trough conduit portion 24. The aforesaid portions are rigidly united to form a continuous passage for the fuel by the spherical shell member 25 flanged at its ends for attachment to the aforesaid portions.

To permit of vertical and horizontal angling of the rearward conduit section 17 with respect to the forward or riser conduit section 16 the former is mounted so as to rotate or pivot about a substantially vertical axis as well as to rock about a substantially horizontal transversely extending axis. For this purpose a bracket 26 is rigidly secured to the trough portion 24 of the rearward conduit section 17 midway between its ends. This bracket is formed with an upper plate portion secured by a plurality of rivets 27 to the underside of the trough 24 and with downwardly extending portions 28 formed with a sub-

stantially horizontal lower member 29. This member extends transversely of the trough portion of the conduit system on opposite sides of the longitudinal axis of the latter and is supported adjacent its ends by angle members 30. Each of these angle members is provided with a substantially horizontal flange or portion 31 and with a substantially vertical flange 32, the latter extending adjacent the outer end of the member 29 of the bracket. The undersides of the end portions of the member 29 are curved so that the bracket and trough 24 may rock about a transversely extending horizontal axis.

The angle members 30 which extend forwardly and downwardly for attachment to the plate 33 mounted on the tender frame are supported adjacent the bracket 26 by substantially channel shaped members 34. These members are also mounted on the bottom plate 33. Interposed between the horizontal portions 31 of the angle members and the channel members 34 is a transversely extending bar 35 which underlies and is adjacent the member 29 of the bracket. The bar and members are provided with registering apertures for receiving a vertical pivot pin 36 which, although it enables rotation or pivoting of the rearward conduit section 17 about a vertical axis, prevents longitudinal movement thereof except as provided by shifting such vertical axis by adjusting the position of the bottom plate 33 as will presently appear. The pin 36 may be conveniently supported by a bracket 37 secured to the underside of the bar 35. The outer ends of the member 29 are also curved so that when the bracket 26 and the conduit 17 rotate about the pivot pin 36 sufficient clearance will be provided between them and the vertical flanges 32 of the angle members 30. It will, of course, be appreciated that sufficient clearance is also provided between the pin 36 and the opening therefor in the member 29 to permit free rocking movement of the bracket 26 and the conduit 17 about the transverse horizontal axis. Due to the fact that the section 17 is capable of moving relatively to the tender and therefore to the opening in the floor of the coal bin through which coal is permitted to fall into the conduit, means is provided for preventing the escape of coal between the sides of the conduit and the floor of the bin. It comprises a ring member 90 surrounding the opening and which is movably supported on the under side of the floor by brackets 91. The ring member is of angle shape in cross section having a vertical flange 92 extending downwardly within the conduit and a substantially horizontal flange 93 interposed between the supporting bracket 91 and the floor of the tender. From the foregoing it will be perceived that the rear conduit section 17 is movably connected to the tender in such manner as to compensate for the vertical and transverse movement that occurs between the intercoupled locomotive and tender. However, this construction does not permit of longitudinal movement between the rearward conduit section 17 and the forward conduit section 16, neither does it permit of such longitudinal movement between the conduit section 16 and trough 24.

To permit such longitudinal movement to take place, the forward or riser conduit section 16 is slidably mounted on the firebox backwall 10 to permit fore and aft movement between the conduit system S and the firebox, fore and aft with respect to the longitudinal axis of the locomotive and its tender. To this end the forward or riser conduit section 16 at its upper end carries laterally extending horizontally disposed flanges 40, 40a which are received in the groove or slot 41 of the fastening bracket 42. This bracket extends laterally from the sidewalls of the upper end of the conduit 16 to a point at each side of the firing opening 11, thus forming a closure for the lowermost portion of the opening. Bolts as at 43 secure the bracket to the firebox backhead 10. An additional slidable support is provided for the conduit 16 at its lower end. This support is formed by the support bracket extending rearwardly from the lower end of the backhead 10 to receive the foot plate or member 45 depending from the lower and backwall portion of the conduit 16. The foot plate 45 rests upon the horizontally disposed ledge 46 of the support bracket 44 and may slide thereon fore and aft with respect to the backhead. Sidewise movement of the forward or riser conduit 16 is prevented by the sidewalls 46a of the support bracket 44. Its walls closely fit the side edges of the foot plate 45. Consequently, the foot member 45 may slide on the bracket 44 fore and aft with respect to the backhead 10, but it is prevented from moving laterally. Vertical movement of the forward or riser conduit section 16 is not possible due to the mounting of the flanges 40, 40a in the grooves 41 of the bracket 42.

From the description thus far it will be seen that the stoker conduit system S is arranged to permit of all movements incident to articulation between the locomotive A and its tender B. At the same time, the conduit system differs from past practice and is of novel construction particularly as to that relation of its parts permitting of no longitudinal movement between the respective conduit sections and which relative disposition of the parts does permit of vertical and transverse movement between its sections.

Due to wear in the coupling connections between the locomotive A and the tender B and for other reasons it is desirable that the vertical axis about which the rearward conduit section 17 rotates be capable of adjustment with respect to the longitudinal axis of the tender. For this purpose means is provided for shifting the bottom plate 33 which carries the support brackets and the other members supporting the pivot pin 36. This means comprises a threaded tap bolt 50 which is threaded through a lug 51 of the tender frame 52 into and loosely through a lug 53 secured on the bottom plate 33. A collar as at 54 is fixed on the bolt 50 at each side of the lug 53. Thus, by threading the bolt 50 in or out of the lug 51 the bottom plate 33 and hence the pivot pin 36 may be moved or shifted fore and aft with respect to the longitudinal axis of the tender. Normally, the bottom plate 33 is held in a fixed position by the locknut on the bolt 50.

Any suitable conveying means may be employed for advancing the fuel through the conduit system. For purposes of illustration the drawings disclose a sectional screw functioning to convey the fuel through the conduit system from the fuel bin on the tender to the firing opening 11 of the firebox backwall where the fuel is received by the distributor parts 18 and 19 and spread over the fire. The screw conveyor comprises a rearward section 55 mounted in the trough 24, a forward section 57 at its forward end rotatably mounted and held in the bearing member 58, and the connecting section 59 composed of telescoping portions 60 and 61. The

screw sections 55, 57 and 59 are universally connected at their adjacent ends by the universal joints 62 and 63. The former is located in the vicinity of the universal joint connection between the conduit sections 16 and 17 and the latter is mounted within the enlarged spherical connecting member 25 between the trough portion 24 and the inclined tubular portion 23 of the rearward conduit section 17.

Figure 5 illustrates a modification of the invention, the conduit system of which differs chiefly from that heretofore described in the particular way in which the rearward conduit section designated as 17a in Figure 5 is mounted. In this form of the invention the forward or riser conduit section is precisely the same as that described in the preferred form of the invention with the exception that it does not house a screw section. The rearward conduit section in this modification of the invention comprises an inclined tubular conduit portion 70 which is pivoted on the horizontal transversely extending pin 71 to the semi-spherical extension member 72 of the rearward trough conduit portion 73. The rear end of the tubular portion 70 has a spherical seat 74 formed therein to receive the curved bottom wall section 75 of the extension member 72. This construction permits the conduit portion 70 to move up and down about the axis of the pin 71. The trough portion 73 of the rearward conduit section 17a of this form of the invention can not rock up and down and is movable only laterally about the axis of the vertically disposed pivot pin 76. The pin 76 which is fixed in a bracket 77 mounted on a shiftable bottom plate 78 is received loosely in a bracket 79 secured in any suitable manner to the trough 73. The bracket 79 rests upon the angle bar 80 which like the bracket 77 is mounted on the bottom plate 78. This plate, like the bottom plate 33 in the preferred form of the invention may be shifted fore and aft with respect to the longitudinal axis of the tender by the means for this purpose heretofore described.

A universal joint as at 81 is formed in the conduit system between the forward or riser section 16 and the rearward conduit section 17a similarly to that described in the preferred form of the invention and likewise a sectional screw conveyor is provided for advancing fuel through the conduit system. In this modified construction the screw conveyor is comprised of but two sections 82 and 83 connected by the universal joint 84 at the juncture of the conduit portions 70 and 73. Thus, in the modified construction longitudinal movement necessary to permit articulation between the locomotive and tender and its associated parts is provided for by the slidable mounting on the forward or riser conduit section 16 of the firebox backwall 10. As in the preferred form of the invention, transverse movement necessary in the stoker conduit system is provided by means of the universal joint 81 and the pivotal mounting of the conduit section 17a on the pivot pin 76. However, this modified construction differs from the preferred construction in that the up and down or vertical motion between the conduit sections is provided by the pivotal connection between the conduit portions 70 and 73 of the rearward conduit section. Hence, in this form of the invention like in the preferred construction the feed conduit system is constructed and mounted to permit of such movements as required due to articulation between the locomotive and its tender.

I claim:

1. In combination, with an intercoupled locomotive and tender, the former having a firebox and the latter a fuel bin, a flexible conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox thereof comprising a conduit section slidably mounted on said locomotive to permit fore and aft movement of said conduit system with respect to said firebox and a second conduit section flexibly connected to the first named section and being fixedly mounted on the tender with respect to longitudinal movement thereof and pivotally mounted on the tender about transverse and vertical axes, and means preventing vertical and transverse movement of the first named conduit section.

2. In combination, with an intercoupled locomotive and tender, the former having a firebox and the latter a fuel bin, a flexible conduit system extending from said bin to said firebox and arranged to deliver fuel thereto comprising a conduit section slidably mounted on said firebox to permit fore and aft movement of said conduit system with respect to the firebox and a second conduit section flexibly connected to the first named section being fixedly mounted on the tender with respect to longitudinal movement thereof and pivotally mounted on the tender about transverse and vertical axes, and means preventing vertical and transverse movement of the first named conduit section.

3. In combination, with an intercoupled locomotive and tender, the former having a firebox with a backwall having a firing opening therein and the latter a fuel bin, a flexible conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox through its firing opening comprising a conduit section at its upper end communicating with said firing opening and slidably mounted on the backwall of the firebox to permit fore and aft movement of said conduit system with respect to the firebox and a second conduit section flexibly connected to the first named section and being fixedly mounted on the tender with respect to longitudinal movement thereof and pivotally mounted on the tender about transverse and vertical axes, and means preventing vertical and transverse movement of the first named conduit section.

4. In combination, with an intercoupled locomotive and tender, the former having a firebox with a backwall having an opening therein and the latter a fuel bin, a cab deck for said locomotive, a flexible conduit system extending from said fuel bin to said firebox and arranged to deliver fuel through the opening therein comprising a conduit section at its upper end communicating with said firing opening above said deck and at its lower end extending beneath said deck and being slidably mounted on said backwall to permit fore and aft movement of said conduit system with respect to said firebox and a second conduit section flexibly connected to the lower end of the first named section and being fixedly mounted on the tender with respect to longitudinal movement thereof and pivotally mounted on the tender about transverse and vertical axes, and means preventing vertical and transverse movement of the first named conduit section.

5. In combination, with an intercoupled loco-

motive and tender, the former having a firebox and the latter a fuel bin, a flexible conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox thereof comprising a conduit section slidably mounted on said locomotive to permit fore and aft movement of said conduit system with respect to said firebox and a second conduit section flexibly connected to the first named section and being movably mounted on the tender in a position to receive fuel from said bin, and means preventing vertical and transverse movement of the slidably mounted conduit section.

6. In combination, with an intercoupled locomotive and tender, the former having a firebox and the latter a fuel bin, a flexible conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox thereof comprising a conduit section mounted on the locomotive to permit fore and aft movement only thereof with respect to the longitudinal axis of the locomotive and a second conduit section at its forward end being flexibly attached to the first named section and at its rearward end portion being movably mounted on the tender, said mounting and flexible attachment permitting vertical and transverse movement of the second conduit section with respect to the locomotive and tender.

7. In combination, with an intercoupled locomotive and tender, the former having a firebox and the latter a fuel bin, a flexible conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox thereof comprising a conduit section slidably mounted on said locomotive to permit fore and aft movement of said conduit system with respect to said firebox and a second conduit section formed of a plurality of rigidly connected conduit portions at its one end flexibly connected to the first named section and adjacent its opposite end portion being fixedly mounted on the tender with respect to longitudinal movement thereof and pivotally mounted on the tender about transverse and vertical axes, and means preventing vertical and transverse movement of the first named conduit section.

8. In combination, with an intercoupled locomotive and tender, the former having a firebox and the latter a fuel bin, a flexible conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox thereof comprising a conduit section slidably mounted on said locomotive to permit fore and aft movement of said conduit system with respect to said firebox and a second conduit section including a horizontally disposed rearward portion and an inclined forward portion rigidly connected by a conduit member of greater cross sectional area than that of the inclined member being flexibly connected at its one end to the first named section and being fixedly mounted on the tender with respect to longitudinal movement thereof and pivotally mounted on the tender about transverse and vertical axes, and means preventing vertical and transverse movement of the first named conduit section.

9. In combination, with an intercoupled locomotive and tender, the former having a firebox and the latter a fuel bin, a flexible conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox thereof comprising a conduit section slidably mounted on said locomotive to permit fore and aft movement of said conduit system with respect to said firebox and a second conduit section including forward and rearward conduit portions connected to permit up and down motion only therebetween, said forward portion being universally connected to said first named conduit section and said rearward portion being pivotally mounted on the tender to permit transverse movement only, and means preventing vertical and transverse movement of the first named conduit section.

10. In combination, with an intercoupled locomotive and tender, the former having a firebox and the latter a fuel bin, a flexible sectional conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox thereof comprising a conduit section slidably mounted on said locomotive to permit fore and aft movement of said conduit system with respect to said firebox, a second section universally jointed to said first named section and extending rearwardly therefrom and a third section pivotally connected for up and down motion to said second section and being pivotally mounted on the tender to swing about a vertical axis, and means preventing vertical and transverse movement of the slidably mounted conduit section.

11. In combination, with an intercoupled locomotive and tender, the former having a firebox and the latter a fuel bin, a flexible conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox thereof comprising a forward section slidably mounted on the locomotive for fore and aft movement with respect thereto, and a rearward section including a rearward portion mounted on the tender to swing transversely thereof about a vertical axis and a forward portion at one end pivoted for up and down motion to said rearward portion and at its other end being universally connected to the first said forward conduit section.

12. In combination, a locomotive tender having a fuel bin, a fuel conduit receiving fuel from said bin, a vertically disposed pin for pivotally mounting said fuel conduit on the tender to swing about a vertical axis, the axis of such pin being in a fixed relation with said fuel conduit, means operable at will for shifting said pin in any one of a number of positions, and means for locking said pin in such position.

13. In combination, a fuel bin, a fuel conduit receiving fuel from said bin, a vertically disposed pin for pivotally mounting said fuel conduit to swing about a vertical axis, the axis of said pin being in a fixed relation with said fuel conduit, means operable at will for shifting said pin in any one of a number of positions with respect to said fuel bin, and means for locking said pin in such position.

14. In combination, a locomotive tender having a fuel bin, a fuel conduit mounted on the tender below said bin to receive fuel therefrom, a vertically disposed pin for pivotally mounting said fuel conduit on the tender to swing about a vertical axis, the axis of such pin being in a fixed relation with said fuel conduit, means operable at will for shifting said fuel conduit and said pin as a unit in any one of a number of positions with respect to said fuel bin, and means for locking said fuel conduit and said pin in such position.

15. In combination, a locomotive tender having a fuel bin, a fuel conduit mounted on said tender below said bin to receive fuel therefrom, a vertically disposed pin for pivotally mounting said

fuel conduit on the tender to swing about a vertical axis, the axis of such pin being in a fixed relation with said fuel conduit, means operable at will for shifting said pin in any one of a number of positions fore and aft with respect to the longitudinal axis of said tender, and means for locking said pin in such position.

16. In combination, a locomotive tender having a fuel bin, a fuel conduit disposed on the tender below said bin to receive fuel therefrom, said fuel conduit being mounted to swing about transverse and vertical axes, the axes for such movement of the fuel conduit being in a fixed relation therewith, means operable at will for shifting said conduit and its axes in any one of a number of positions, and means for locking said conduit and its axes in such position.

17. In combination, a locomotive tender having a fuel bin, a stoker conduit pivotally mounted on said tender below said bin to swing about transverse and vertical axes, the axes for such movement of the fuel conduit being in a fixed relation therewith, means operable at will for shifting said axes fore and aft with respect to the longitudinal axis of said tender into any one of a number of positions, and means for locking the axes in such position.

18. In combination, with an intercoupled locomotive and tender, the former having a firebox and the latter a fuel bin, a flexible conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox thereof comprising a conduit section slidably mounted on said locomotive to permit fore and aft movement of said conduit system with respect to said firebox and a second conduit section including forward and rearward conduit portions, said rearward portion being pivotally mounted on the tender to permit transverse movement only and said forward portion uniting said rearward portion and said first named conduit section to permit lateral and vertical motion therebetween, and means preventing vertical and transverse movement of the first named conduit section.

19. In combination, a locomotive firebox having a backhead with an opening therein, a stoker conduit positioned adjacent the backhead with its discharge end communicating with and terminating at said opening, and a bracket fixed rigid on said backhead for supporting said conduit, said bracket and conduit each provided with one element of a rib and groove arrangement, the rib thereof slidably engaging the groove.

20. In combination with an intercoupled locomotive and tender, the former having a firebox and the latter a fuel bin, a flexible conduit system extending from said bin to said locomotive and arranged to deliver fuel to the firebox thereof, comprising a conduit section slidably mounted on said locomotive to permit fore and aft movement of said conduit system with respect to said firebox and a second conduit section flexibly connected to the first named section, said second conduit section mounted on the tender to swing about a vertical axis but being fixed against fore and aft movement with reference to such axis, and means preventing vertical and transverse movement of the slidably mounted conduit section.

JOHN W. MYERS.