Aug. 15, 1939. C. M. STEIN 2,169,534

LOCOMOTIVE STOKER

Filed July 14, 1936 2 Sheets-Sheet 1

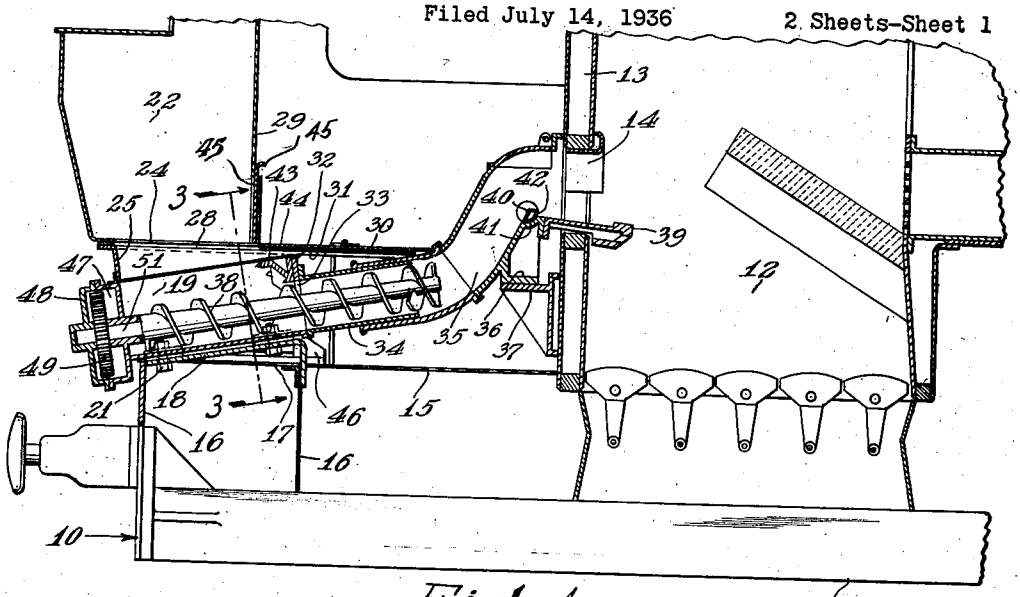


Fig. 1

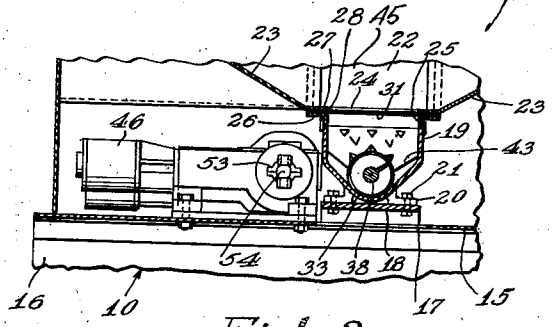


Fig. 3

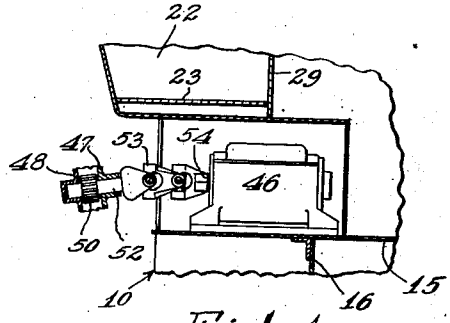


Fig. 4

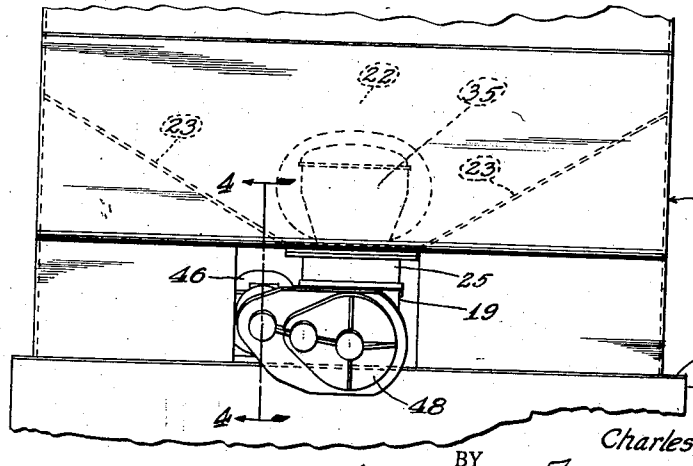


Fig. 2

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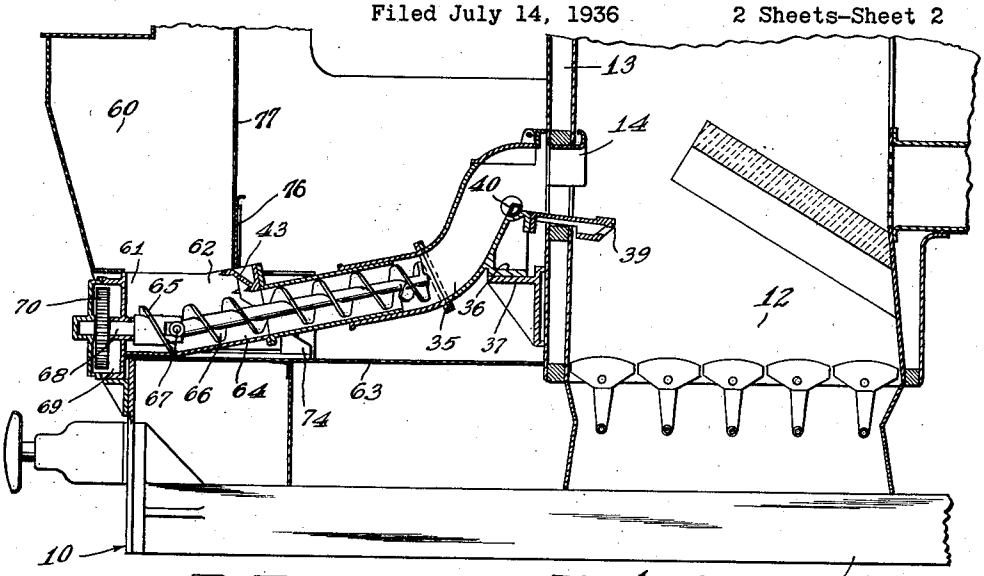


Fig. 5

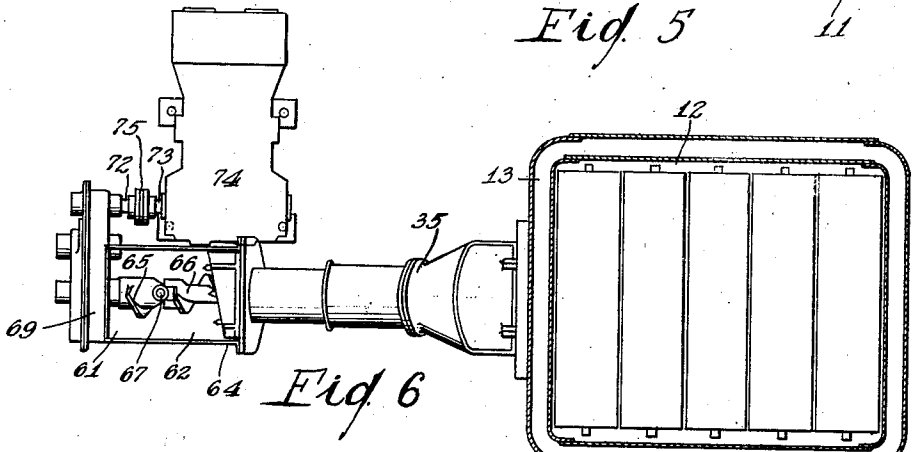


Fig. 6

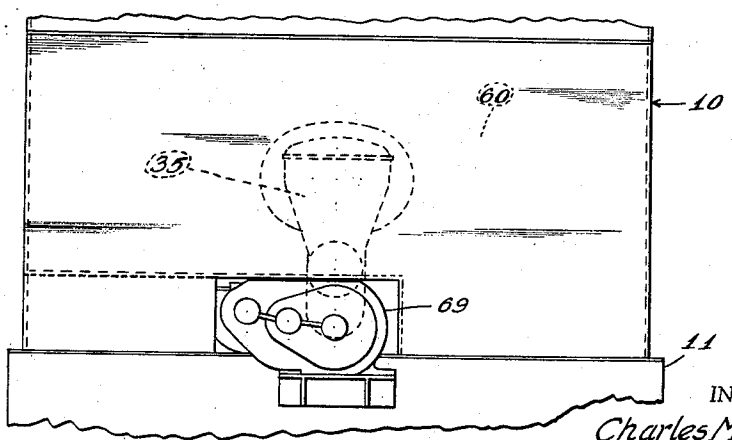


Fig. 7

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UNITED STATES PATENT OFFICE

2,169,534

LOCOMOTIVE STOKER

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Application July 14, 1936, Serial No. 90,477

3 Claims. (Cl. 110—101)

My invention relates to stokers for locomotives and particularly to stokers for locomotives of the switcher or industrial type wherein the fuel bin is carried by the locomotive.

An object of my invention is to provide a compact and efficient stoker especially adaptable to locomotives of the type described above.

Another object of my invention resides in the novel construction of the stoker and associated parts of the locomotive and the novel arrangement and combination thereof.

Other and further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a vertical longitudinal central section through the rearward portion of the locomotive with the stoker applied thereto and shown in similar section;

Fig. 2 is a rear end elevation of the fuel bin of the locomotive with the stoker applied thereto and shown in similar elevation;

Fig. 3 is a section taken on the line 3—3 of Fig. 1;

Fig. 4 is a section taken on the line 4—4 of Fig. 2;

Fig. 5 is a vertical longitudinal central section through the rearward portion of the locomotive, showing a modified construction thereof and a modified form of stoker applied thereto;

Fig. 6 is a top plan view of the modified form of stoker, the stoker engine and driving connection therebetween, a portion of the locomotive boiler being shown in section and the hopper being removed; and

Fig. 7 is a rear end elevation of the modified form of fuel bin of the locomotive with the stoker applied thereto and shown in similar elevation.

Referring now to the form of the invention shown in Figures 1 to 4, inclusive, a locomotive is indicated generally by the numeral 10, comprising a frame 11, a fire-box 12 having a backwall 13 with a firing opening 14 therethrough, and a cab deck 15 extending rearwardly from the backwall 13 below the level of the firing opening 14 and above the frame 11. Transversely extending plate members 16 support the cab deck 15 from the frame 11.

The deck 15 is provided at its rearward end with a recess 17 located centrally between the sides of the deck. Mounted in the recess 17 and sloping upwardly and forwardly from a point below the level of the deck 15 to a point above the level thereof is a plate-like member 18. An open mouth trough 19 having feet 20 is mounted in an inclined position on the plate-like member 18 and is rigidly secured thereto by any suitable means, as by bolts 21 extending through the feet 20 and the member 18.

A fuel bin 22 extends transversely across the rearward end of the locomotive and is provided with side slope sheets 23 sloping downwardly from the sides of the fuel bin 22 and spaced apart at their lower ends to form a discharge opening 24 through which fuel will drop by gravity into the open mouth trough 19. A sealing ring 25 forms a fuel passage between the discharge opening 24 of the fuel bin 22 and the open mouth of the trough 19. The upper edge of the sealing ring 25 is provided with a horizontal outwardly extending flange 26 cooperating with the inturned horizontal lower end portions 27 of the slope sheets 23 to form guideways 28. The flange 26 of the sealing ring 25 extends forward of the front wall 29 of the fuel bin and cooperates with the cover 30 to form continuations of the guideways 28. In the guideways 28 are mounted slide plates 31 arranged when moved to the rearmost position to form a closure for the discharge opening 24. The size of the discharge opening 24 can be controlled by moving the slide plates a desired distance from the rearmost position, thus regulating the amount of fuel that passes therethrough into the trough 19.

The front wall 32 of the trough 19 is provided with a discharge opening 33 and a tubular conduit 34 registering with the opening 33 is rigidly secured to the front wall 32 and extends forwardly and upwardly toward the firebox backwall 13. A riser conduit section 35 is telescopically connected at its rearward lower end to the forward end of the tubular conduit 34 and at its upper end communicates with the firing opening 14. The riser conduit 35 is rigidly supported from the firebox backwall 13 by the brackets 36 and 37. The telescopic connection referred to above permits convenient removal of the trough 19 and tubular conduit 34, by simply removing the bolts 21 and sliding the trough 19 rearwardly along the plate-like member 18. Since the riser conduit 35 is rigidly supported by the firebox backwall 13, it will move as contraction and expansion of the boiler occurs. The relative movement between the riser conduit 35 and the rigidly mounted trough 19 and tubular conduit 34 is compensated by the telescopic connection.

The fuel is conveyed forwardly through the trough 19 and tubular conduit 34 by the screw conveyor 38 which delivers the fuel to the riser conduit 35 and forces it therethrough delivering

it into the firing opening 14. The fuel from the riser conduit 35 is delivered onto a distributor plate 39 extending through the firing opening and the plate is detachably secured at its rearward end to the conduit 35 by any suitable fastening means. A distributor head 40 is disposed in a seat 41 formed in the bottom wall of the riser conduit 35 adjacent its discharge end and is provided with jet openings 42 through which fluid under pressure issues for projecting fuel from the plate 39 and scattering it in aerial paths over the fire in the firebox 12.

A crusher 43 is mounted in the trough 19 on the front wall 32 thereof over the screw conveyor 38 with which it cooperates to break up the large lumps of fuel to a size suitable for firing. The movable hinged portion 44 of the cover 30 and the door 45 for the opening in the front wall 29 of the fuel bin 22 permit access to the crusher 43 for purpose of removing clogs or for any other purpose. The hinged portion 44 when swung upward about its hinge also provides for access to the slide plates 31.

The motive power for driving the conveyor screw 38 is provided by an engine 46 mounted at one side of the trough 19 on the deck 15. A speed reducing gear case 47 is preferably formed integral with the rear wall of the trough 19 and with its cover 48 encloses the gear 49 and pinion 50. A shaft 51 from the gear 49 extends into the trough 19 for driving the screw 38 and a shaft 52 from the pinion 50 extends forwardly through the case 47 where it is connected by the universal connection 53 to the drive shaft 54 of the engine 46. The universal connection 53 is necessary since the drive shaft 54 of the engine is out of alignment with the gear shaft 51 and the pinion shaft 52.

In order to avoid unnecessary repetition, only these features of the modified form of the invention shown in Figures 5, 6 and 7 that distinguish from the form shown in Figures 1, 2, 3 and 4 will be described. The fuel bin 60 of the modified construction is not provided with side slope sheets as is the form of construction first described. The fuel bin 60 is therefore not self cleaning but it does provide a reserve source of fuel that can be hand fired. In this form of construction slide plates, such as the slide plates 31 of the preferred form of construction, are dispensed with as well as the cover 30 which in the preferred form constitutes one element of the guideway for the slide plates.

In the modified form of the invention, the rear portion 61 of the trough 62 is disposed horizontally on the cab deck 63 while the forward portion 64 is upturned. The trough 62 is removable from the rear of the locomotive. Raising the door 76 for the opening in the front wall 77 of the bin 60, permits the crusher 43 and the wall of the trough to which the crusher is attached to pass through the opening upon rearward withdrawal of the trough. The fuel conveying means comprises a short screw section 65 in the horizontal portion 61 and a conveyor screw 66 in the upturned portion 64, connected together by a universal joint 67. The fuel conveying means is driven through the shaft 68 mounted in the gear case 69. The shaft 68 carries a gear 70 which is operatively connected by suitable gearing to the shaft 72. The shaft 72 is connected to the drive shaft 73 of an engine 74 by a flexible coupling 75. In this construction since the shafts 72 and 74 are in approximate horizontal alignment, a flexible coupling such as shown at 75 may be employed instead of the universal connection 53 as shown in Figure 4. With a flexible connection 75, the engine 74 can be moved up closer to the gear case 69 than if a universal connection were employed.

I claim:

1. In a locomotive having a firebox provided with a backwall having a firing opening therethrough and a cab deck extending rearwardly from the backwall and a fuel bin supported on the rearward end of the cab deck and spaced from said backwall, a trough detachably mounted on the rearward end of the cab deck for receiving fuel by gravity from said fuel bin, a conduit extending forwardly from said trough to said firing opening, conveying means in said trough and conduit for advancing fuel therethrough to the firebox, an engine for driving said conveying means mounted at one side of said trough below the fuel bin, a gear casing at the rear of and formed with said trough and gearing in said casing operatively connecting said engine with the conveying means, said trough and gear casing being separable from said bin and removable rearwardly from the rearward end of the locomotive independently of movement of said bin.

2. In a locomotive having a firebox provided with a backwall having a firing opening therethrough and a cab deck extending rearwardly from the backwall and a fuel bin supported on the rearward end of said cab deck and spaced from the firebox backwall, a compartment formed in the bottom of said bin, a fuel conveyor including a trough portion detachably mounted in said compartment and arranged to receive fuel from said bin, a conduit extending forwardly from said trough to said firing opening and conveying means in said trough and conduit for advancing fuel therethrough to the firebox, said trough having a gear casing formed with the rearward end thereof disposed exteriorly of said compartment and means for operating said conveying means including gearing housed in said gear casing, said trough and gear casing being separable from said bin and removable rearwardly from the rearward end of the locomotive independently of movement of said bin.

3. In a locomotive having a firebox provided with a backwall having a firing opening therethrough and a cab deck extending rearwardly from the backwall and a fuel bin supported on the rearward end of said cab deck and spaced from the firebox backwall, said cab deck being provided in its rearward end intermediate the sides thereof with a recess, a fuel conveyor arranged to receive fuel from said bin and leading forwardly to said firing opening, said fuel conveyor including a rearward conduit portion rigidly and detachably mounted on the locomotive with respect to said cab deck, said rearward conduit portion extending into said cab deck recess and being removable rearwardly from the rearward end of the locomotive independently of movement of said bin, and a forward conduit portion rigidly fastened to the firebox backwall and a screw conveyor for advancing fuel through said conduit portions, said conduit portions being telescopically connected at their adjacent ends.

CHARLES MARIE STEIN.