Jan. 21, 1930. E. A. TURNER 1,744,595

STOKER

Filed Dec. 3, 1929 2 Sheets-Sheet 1

Fig. 1

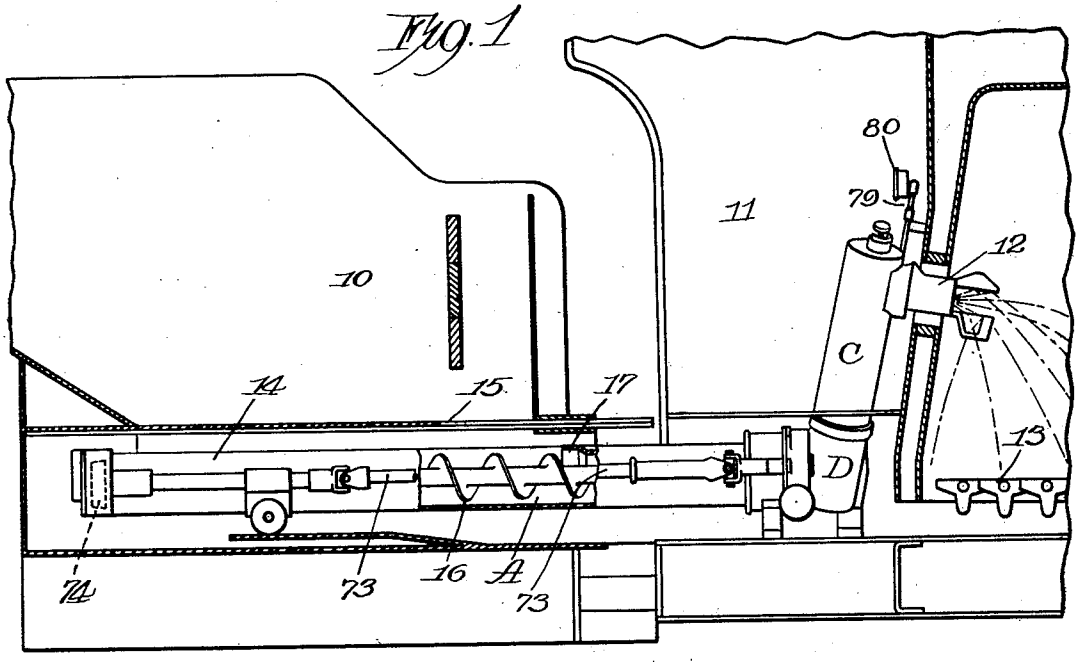
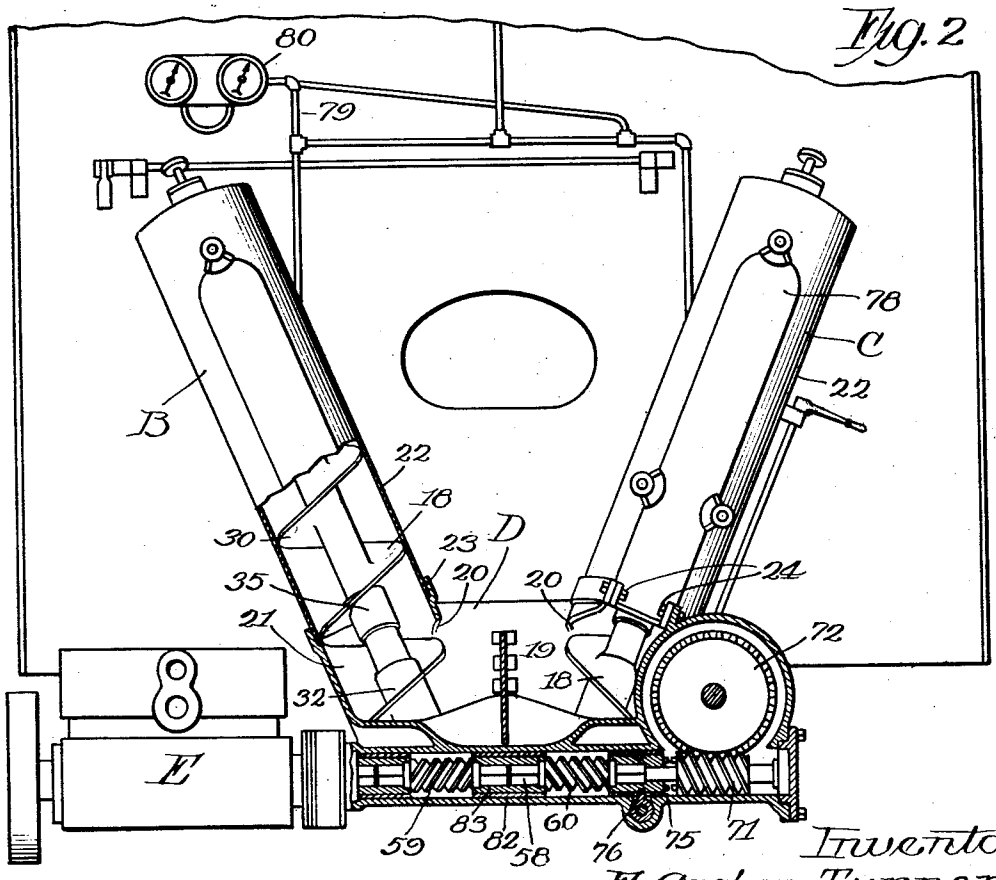


Fig. 2



Inventor:
E. Archer Turner
By Gillson, Mann & Gitty's.

Jan. 21, 1930. E. A. TURNER 1,744,595

STOKER

Filed Dec. 3, 1929 2 Sheets-Sheet 2

Fig. 7

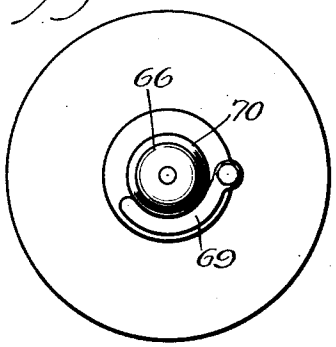


Fig. 3

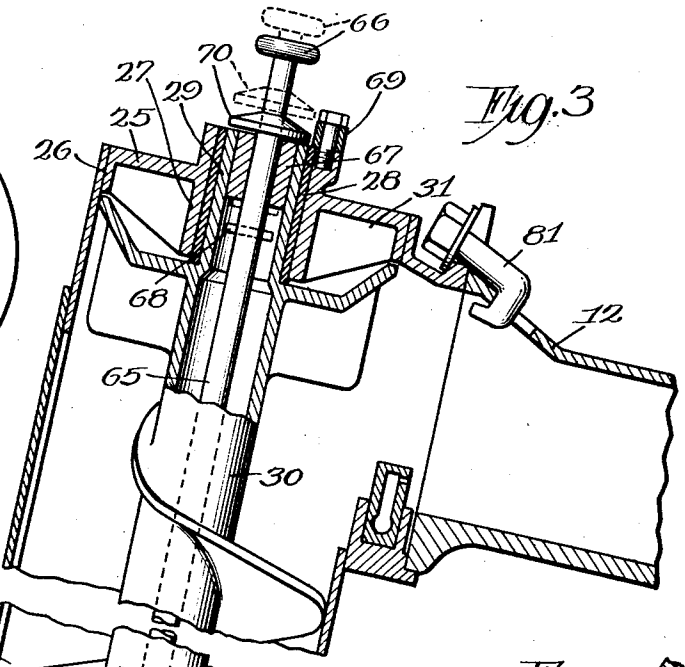


Fig. 5

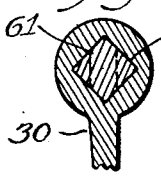


Fig. 6

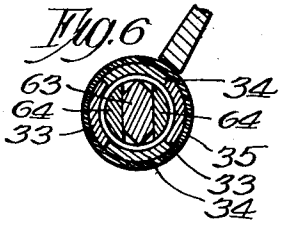
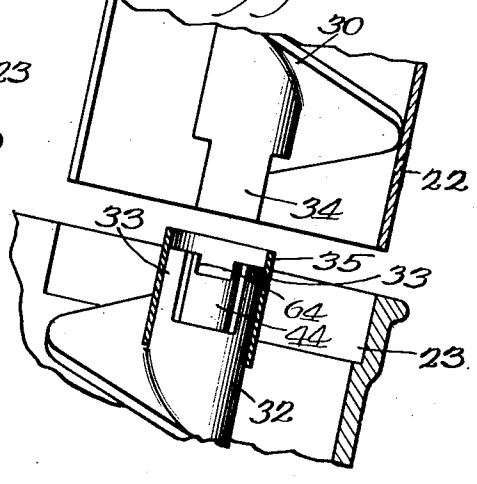


Fig. 4



Inventor:
E. Archer Turner
By Wilson, Mann & Co., Atty's.

Patented Jan. 21, 1930

1,744,595

UNITED STATES PATENT OFFICE

EDWIN ARCHER TURNER, OF NEW YORK, N. Y., ASSIGNOR TO THE STANDARD STOKER CO., INC., A CORPORATION OF DELAWARE

STOKER

Application filed December 3, 1929. Serial No. 411,374.

This invention relates to stoker mechanisms especially adapted for use on locomotives; and has for its principal objects to facilitate the location of clogs by permitting the conveyor screws to be driven independently; to facilitate the removal of clogs by permitting the conveyors to be reversed independently; to facilitate the removal of elevators and prevent conflict with other devices mounted adjacent thereto; and, where a plurality of elevators are used, to permit each of them to be driven alone, whereby coal may be supplied to a certain part of the furnace to the exclusion of other parts thereof.

Further objects and advantages of the invention will be revealed as the disclosure proceeds and the description is read in connection with the accompanying drawings, in which

Fig. 1 is a longitudinal sectional view showing the invention embodied in a stoker applied to conventional locomotive and tender;

Fig. 2 is a rear elevation of the stoker and the locomotive back head, parts being broken away to show the driving mechanism;

Fig. 3 is an enlarged fragment of an elevator in longitudinal section;

Fig. 4 is a sectional view illustrating the manner of separating the two sections of the elevator;

Figs. 5 and 6 are transverse sectional views taken on the lines 5—5 and 6—6, respectively, of Fig. 3; and

Fig. 7 is a plan view illustrating the latch, holding the elevator clutch released.

The general organization of the stoker includes a transfer conveyor A, mounted beneath a tender 10 and serving to bring coal forwardly to a locomotive 11 and two elevators B and C, which raise the coal in separate streams and deliver it to distributing devices 12, by which it is scattered over the grates 13, substantially as illustrated in Fig. 1.

The juncture between the forward or delivery end of the transfer conveyor, and the lower or receiving ends of the elevators, is formed by casting D, which becomes both the base for the stoker and a casing or casings for many of its parts.

The transfer conveyor consists essentially of a trough 14, loosely mounted beneath a slot 15 in the base of the tender and having a screw 16, adapted to urge the coal along the trough and, in cooperation with the crusher 17, reduce lumps of coal to proper size for firing.

Each of the elevators includes a casing made in two sections, separable longitudinally, and a screw 18 rotatably mounted in the casing to effect the elevation of the coal.

In the intermediate portion of the casting D there is a chamber 19, into which the screw 16 forces the coal and from which the coal passes through doorways 20 into upwardly and outwardly inclined bores 21, which form the lower sections of the elevator casings. The upper section of each casing is formed by a tube 22, the lower end of which is received in a rabbeted seat 23, and made fast by clamps 24.

The upper end of each tube 22 has a head 25 equipped with a peripheral flange 26, welded or otherwise securely made fast to the wall of the tube. The head also has a cylindrical portion 27 equipped with a bearing 28, receiving a reduced portion 29 on the upper section 30 of the screw 18. This cylindrical portion 27 takes the form of a hub cast integral with the web of the head 25, and braced by gussets 31 on the inside of the head.

The screw 18 is divided in the region of the seat 23, to form the upper section 30 and the lower section 32, which sections are equipped with interlocking fingers 33 and 34 by which the two sections are made to rotate together. A sleeve 35 covers the joint between the two sections, holding them in alignment and protecting the joint from dirt and dust. For convenience in assembling this sleeve may be welded to the lower section 32 and project above it sufficient to telescope with the lower end of the section 30, the vane 36 on such upper section being undercut for a short distance from the base to permit the assembly, as indicated in Figs. 4 and 6.

The screw sections are hollow, and the lower

section 32 is equipped with a cup-like flange 37 for receiving the dust flange 38 on the disk 39, which is equipped with ribs or threads 40 to prevent the dust from rising above the upper edge of the flange. A washer 41 between the base of the cup and the flange assists in checking the movement of dust.

The flange 38 and the lower section 32 of the worm are provided with soft metal bearings 42 and 43 for cooperation with a shaft 44, by which the screw is driven. The lower end of the shaft has a collar 45, resting upon anti-friction bearing 46, held in a flange 47 carried by a cage 48 having a flange 49 seated in the bore 21 of the base casting D and resting against a flange 50 (Fig. 3). The disk 39 has a flange 51 forming a seat for anti-friction bearing 52, mounted upon the extension 53 of a driving gear 54.

The disk 39 and, therefore, the shaft assembly is secured to the casting D by a split ring 55, seated in a groove 56 and covered by a dust ring 57.

The driving mechanism includes a reversible engine E, a transversely arranged driving shaft 58 lying beside the lower ends of the elevators, and gears 59 and 60 meshing with the gears 54 on the shafts 44. Preferably the gearing is of the worm type and arranged to drive one elevator clockwise and the other one counter-clockwise.

The clutch mechanism for connecting the shaft 44 with the screw 18 includes a second shaft 61 of polygonal section, slidably mounted in a polygonal bore 62 of the upper screw section 30, jaw clutch faces 63 and 64, and an operating rod 65 forming a continuation of the shaft 61 and projecting above the screw section 30, where it is provided with a knob 66 in convenient access to the fireman.

The reduced portion 29 of the screw section 30 is provided with a guide block 67, adapted to guide the rod 65 and, in connection with the pin 68 carried thereby, to form a stop to limit the upward movement of the rod.

The head 25 is equipped with a pivoted latch 69 adapted to cooperate with the collar 70 on the rod 65, to hold the clutch disengaged.

The shaft 58 is equipped with a worm 71, driving a worm gear 72, which drives the transfer screw 16 through a tumbling rod 73 and gearing 74 (Fig. 1). A clutch 75, operated by a lever 76, permits the transfer conveyor to be driven, or left idle, as occasion requires.

The elevator casings are provided with shoulders 77 for localizing clogs, and are equipped with removable doors 78 by which ready access to the offending material is had.

In case of a clog by manipulating the clutch 75 and the clutches formed by the jaws 63 and 64, two of the screws can be thrown out of operation while the other remains in driving engagement. In this way the conveyor in which the clog has occurred may be readily located, then by reversing the engine E it may be released. If the offending material happens to be in one of the elevators it will be found by removing the corresponding door 78. If it is in the transfer conveyor it is very likely to be at the crusher 17, and hence be readily accessible.

Either of the elevators B and C may be driven while the other remains idle, thereby permitting one portion of the firebox to be fed exclusively.

When, for any reason, it is desirable to remove an elevator it may be readily accomplished without disturbing the remainder of the stoker, or any of the devices carried by the backhead of the locomotive, as, for example, pipes 79, gages 80, etc. The procedure is as follows:—Remove the hook bolt 81 (Fig. 3) securing the upper end of the elevator to the distributing tube 12, release the clamp bolts 24, raise the upper elevator section slightly toward the position shown in Fig. 4, and take it away. The upper screw section 30, with the upper shaft section 61, can and usually will be removed with the upper section of the elevator casing.

If the remainder of the elevator is to be removed, it can be drawn upwardly from the position shown in Fig. 3.

If the shaft 44, with the driving gear, is to be removed, the corresponding worm, 59 or 60, must first be removed (when worm gearing is used), then by prying up the dust ring 57 and removing the split ring 55 the shaft, with its bearings, worm gear and cage, may be raised up through the bore 21.

When the worms 59 and 60 are of opposite hand, as shown, and the shaft 58 as a whole is within an integral bore 82 in the casting D, which is the preferred construction, the worms 59 and 60 should be made structurally separate and connected by suitable clutch mechanism 83, whereby they can be inserted and removed from opposite sides of the stoker.

I claim as my invention—

1. In a stoker for locomotives having a back-head, the combination of a pair of elevating screws extending upwardly along the back-head, a reversible engine operatively connected with a driving shaft extending transverse to the locomotive at one side of the screws adjacent to their lower ends, gearing connecting the shaft with the screws for simultaneous operation with the latter, and clutch mechanism permitting either screw to remain idle while the other is driven.

2. In a stoker for locomotives having a back-head, the combination of a pair of hollow elevating screws extending upwardly along the back-head, a reversible engine operatively connected with a driving shaft extending transverse to the locomotive at one side of the screws adjacent to their lower ends, worm gearing connecting the shaft and

screws to drive the latter in opposite directions, and a separate clutch for each screw permitting it to remain idle independently of the other.

3. In a locomotive stoker, the combination of elevating mechanism including a hollow elevating screw composed of upper and lower sections, means for engaging the sections for joint rotation, driving mechanism including a shaft rotatable in the lower section, and clutch mechanism connecting the shaft with the upper screw section.

4. In a locomotive stoker, the combination of elevating mechanism including a hollow elevating screw composed of upper and lower sections, means for engaging the sections for joint rotation, driving mechanism including a shaft rotatable in the lower section, a second shaft slidable but non-rotatable with respect to the upper section, and a clutch for the two shafts operated by the sliding movement of the second shaft.

5. In a locomotive stoker, the combination of elevating mechanism including a hollow elevating screw composed of upper and lower sections, means for engaging the sections for joint rotation, driving mechanism including a shaft rotatable in the lower section, a second shaft slidable but non-rotatable with respect to the upper section, a clutch for the two shafts operated by the sliding movement of the second shaft, and means projecting from the upper screw section for shifting the second shaft.

6. In a locomotive stoker, the combination of elevating mechanism including a hollow elevating screw composed of upper and lower sections, means for engaging the sections for joint rotation, driving mechanism including a shaft rotatable in the lower section, a second shaft slidable but non-rotatable with respect to the upper section, a clutch for the two shafts operated by the sliding movement of the second shaft, and means at the upper end of the upper screw section for supporting the second shaft in position to disengage the clutch.

7. In a locomotive stoker, the combination of elevating mechanism including a hollow elevating screw composed of upper and lower sections, means for engaging the sections for joint rotation, driving mechanism including a shaft rotatable in the lower section, a second shaft in driving connection with the upper section, and a jaw clutch for connecting the two shafts.

8. In a locomotive stoker, the combination of elevating mechanism including a casing, a hollow screw rotatable in the casing, a drive shaft within the screw, a clutch within the screw, an operating rod projecting from the upper end of the screw, and a latch on the casing for holding the rod in position to retain the clutch released.

9. In a locomotive stoker, the combination of a conveyor comprising a casing including two separable longitudinal sections, a conveyor screw in the casing and including two separable longitudinal sections, and means for connecting the screw sections for rotation together.

10. In a locomotive stoker, the combination of a conveyor comprising a casing, a hollow conveyor screw within the casing, a drive shaft extending into the screw, and a clutch within the screw for connecting it with the drive shaft.

11. In a locomotive stoker, the combination of a conveyor comprising a casing, a hollow conveyor screw within the casing, a drive shaft extending into the screw, a clutch adapted to connect the screw and the shaft, and a rod movable lengthwise within the screw for operating the clutch.

12. In a locomotive stoker, the combination of a conveyor comprising a casing including two separable longitudinal sections, a hollow conveyor screw in the casing and including two separable longitudinal sections, means for connecting the screw sections for rotation together, a driving shaft within the screw and including two separable longitudinal sections, one of the shaft sections being slidably mounted in one of the screw sections to rotate therewith, and a clutch for connecting the shaft sections to rotate together.

13. In a locomotive stoker, an elevator adapted to extend along the back-head of a locomotive and comprising a casing including longitudinal sections, and a conveyor screw within the casing and including longitudinal sections, the sections of the casing and the screw being separable with at most relatively short longitudinal movement.

14. In a locomotive stoker, a conveyor screw including separable longitudinal sections interengaging teeth connecting the screw sections to rotate together, and means telescoping with the screw sections for holding them in alignment.

15. In a locomotive stoker, a conveyor screw including separable longitudinal sections inter engaging teeth connecting the screw sections to rotate together, and a sleeve telescoping with the screw sections for holding them in alignment and excluding dust from the joint between them.

16. In a locomotive stoker, the combination of a transfer screw, a plurality of elevating screws fed by the transfer screw, a reversible engine, separate worm gearing connecting the engine with each screw, and a separate clutch between the engine and each screw.

17. In a stocker for locomotives having a back-head, the combination of a transfer conveyor bringing coal to the locomotive, an elevator receiving from the transfer conveyor and extending upwardly along the back-head, a base frame forming the juncture between the transfer conveyor and the elevator and

having a bore forming the bottom of the elevator casing, a removable upper section of the elevator casing, a screw within the casing divided adjacent to the lower end of the removable upper casing section whereby the upper casing section and the upper screw section may be removed with relatively small longitudinal movement.

18. In a locomotive stoker, the combination of an elevator including a casing, a hollow screw within the casing, a shaft rotatably mounted within the screw, a clutch connecting the shaft and screw between the ends of the latter, and a clutch operating rod projecting beyond one end of the screw.

19. In a locomotive stoker, the combination of an elevator including a casing, a hollow screw within the casing, a shaft rotatably mounted within the screw, a clutch connecting the shaft and screw between the ends of the latter, and a clutch operating rod projecting beyond one end of the screw, and a latch pivoted on the casing and holding the rod in position to retain the clutch released.

20. In a locomotive stoker, the combination of a conveyor comprising a casing including two separable longitudinal sections, a hollow conveyor screw including two separable longitudinal sections, means for constraining the two sections of the screw to rotate together, a drive shaft extending into the screw, and a clutch adapted to connect the screw and the shaft.

21. In a locomotive stoker, the combination of a hollow elevating screw, means for driving the elevator screw from below, and including a clutch, and a clutch operating rod in the hollow screw and projecting above its upper end.

In testimony whereof I affix my signature.

E. ARCHER TURNER.