C. H. JEFFERS.

LOCOMOTIVE STOKER.

APPLICATION FILED JUNE 7, 1920.

1,423,221.

Patented July 18, 1922.

2 SHEETS—SHEET 1.

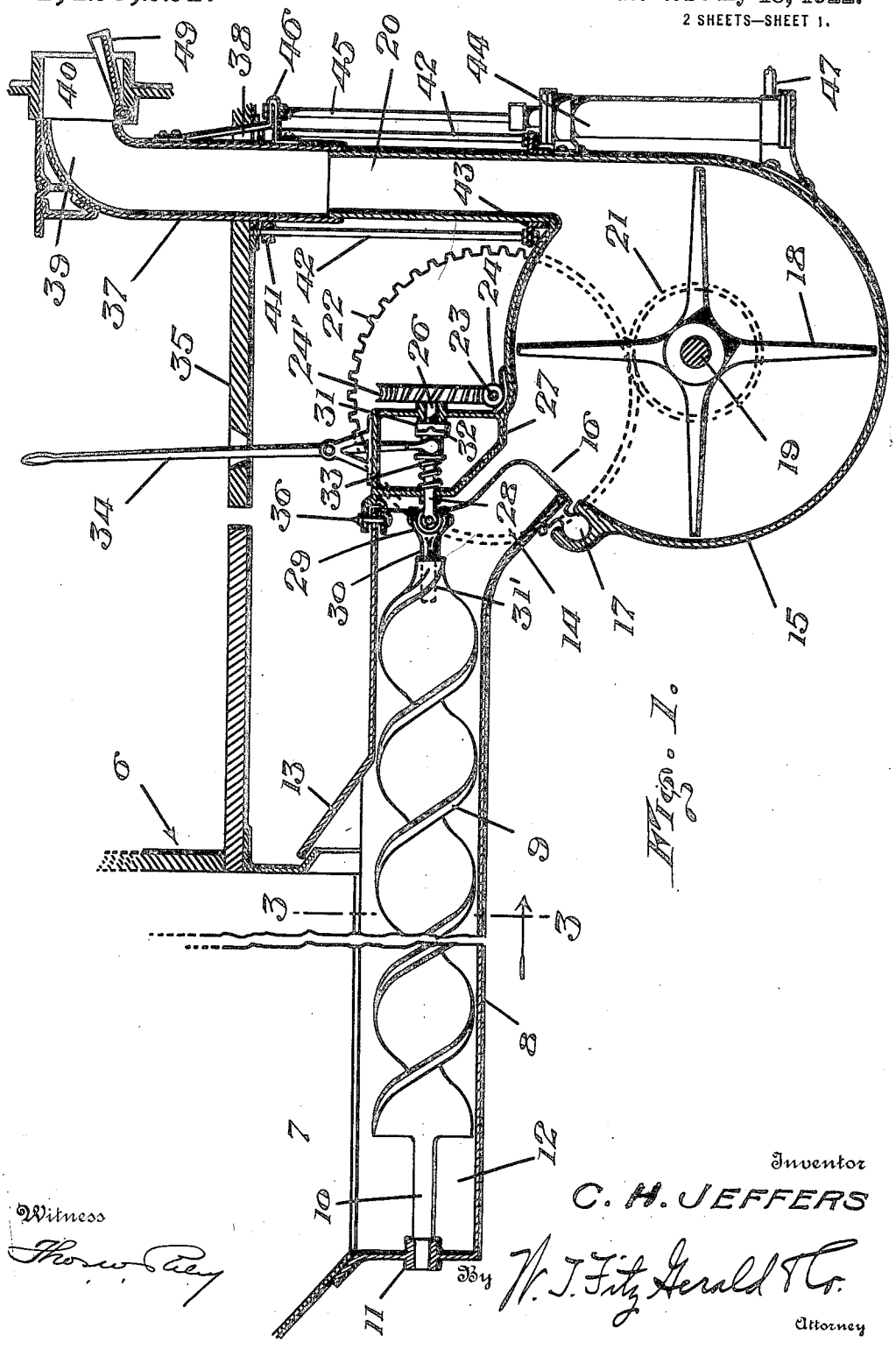


Fig. 1.

Witness

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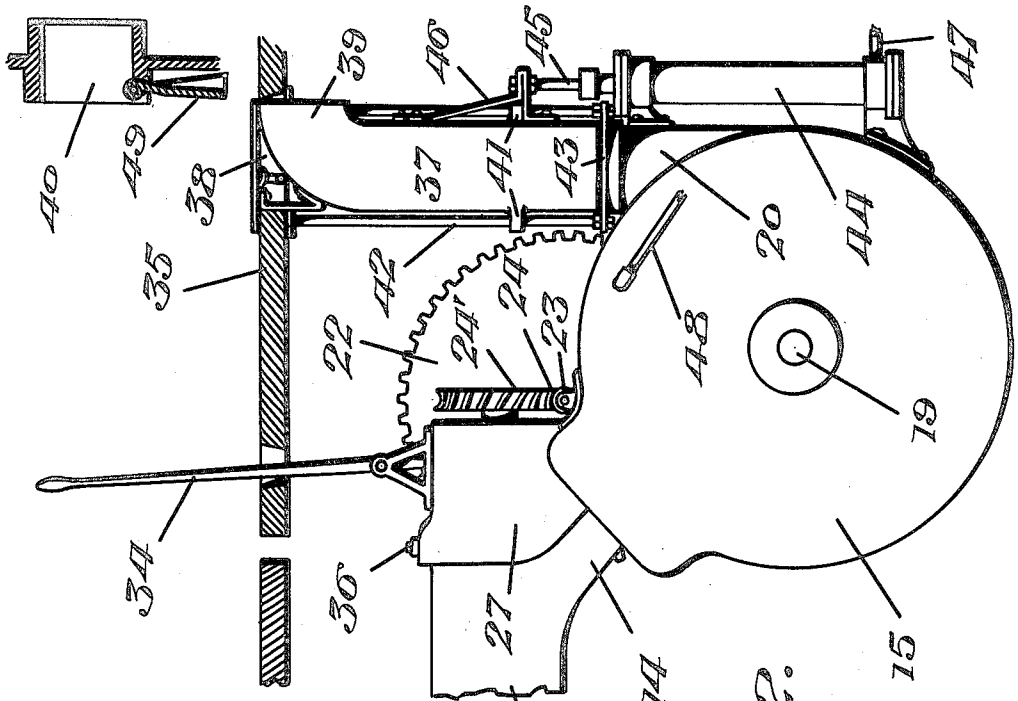


Fig. 2.

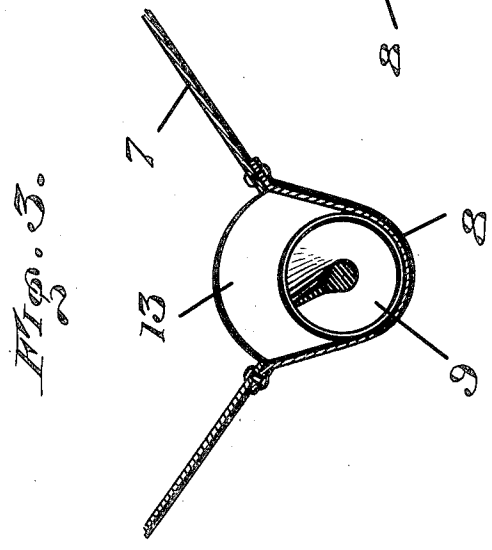


Fig. 3.

Witness

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To all whom it may concern:

Be it known that I, CARL H. JEFFERS, a citizen of the United States, residing at Kent, in the county of Portage and State of Ohio, have invented certain new and useful Improvements in Locomotive Stokers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a locomotive stoker, and aims to provide a novel and improved apparatus for feeding the coal from the tender to the locomotive and delivering it into the fire box, thereby saving labor.

A further object is the provision of an apparatus having an auger or worm conveyor for feeding the coal from the tender and to also crush the coal into small particles, and delivering same to a fan or blower for injecting the crushed coal into the fire box.

Another object is the provision of a fan or blower for delivering the crushed coal into the fire box, and novel means for so delivering the coal from the fan or blower, including a delivery nozzle which can be projected to a position to register with the fuel door or opening of the fire box, and to be retracted out of the way.

With the foregoing and other objects in view, which will be apparent as the description proceeds, the invention resides in the construction and arrangement of parts hereinafter described and claimed, it being understood that changes can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a longitudinal vertical median section of the apparatus, portions being broken away and others being shown in elevation, showing the apparatus in operation.

Fig. 2 is a fragmentary side elevation showing the delivery nozzle retracted.

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

In carrying out the invention, the tender 6 has a coal hopper 7 and a conveyor trough 8 has its rear end portion secured below the mouth of the hopper, to receive the coal therefrom, and said trough extends forwardly toward the locomotive. An auger or worm conveyor 9 is rotatable in said trough, and the shaft 10 thereof is journaled at its rear end in a bearing 11 at the rear end of the trough. The rear end of the conveyor is spaced from the rear end of the trough, leaving a space 12 for receiving lumps of iron, rock or other objects mixed with the coal, which can not be crushed. Disposed over the top of the trough 8 immediately in front of the hopper 7 is a flared crushing plate 13, which converges forwardly to the auger conveyor, whereby the coal in being carried forwardly with the conveyor under the plate 13, will be crushed into small pieces, in being worked under said plate and past the same to the forward end of the trough. Furthermore, the action of the conveyor against the sides and bottom of the trough will also assist in crushing the coal. The forward end of the trough 8 has a delivery chute 14 extending forwardly and downwardly for delivering the crushed coal from the trough.

A centrifugal blower or fan is used for delivering the crushed coal into the fire box, and, as shown, comprises a drum or casing 15 of cylindrical form with its axis disposed transversely of the locomotive, and said casing 15 has an inlet opening 16 near the top receiving the chute 14, in order that the crushed coal will pass into the blower casing. The chute 14 has a ball and socket connection 17, or other flexible joint, with the casing 15 to permit the trough 8 and casing 15 to swing relatively due to the relative motion of the locomotive and tender. The fan or blower wheel has blades 18 carried by a drive shaft 19 extending through the casing 15 concentrically thereof, and said shaft is rotated at a high speed, when operating the stoker, for delivering the crushed coal from said casing by centrifugal force up through a discharge spout or pipe 20 extending tangentially upward from the casing 15 opposite to the inlet 16.

The conveyor is driven from the shaft 19 but at a slower velocity. Thus, a gear wheel 21 secured on the shaft 19 meshes with a gear wheel 22 secured on a countershaft 23, and a worm 24 on the shaft 23 meshes with a worm wheel 24′ secured on a shaft 26 journaled within a housing 27 mounted on the blower casing 15. A second shaft 28

alining with the shaft 26 is also journaled in the housing 27 and is connected by a universal joint 29 with a stub shaft 30 having a telescopic connection, as at 31', with the forward end of the worm or auger conveyor 9, whereby to provide a flexible connection between the shaft 28 and conveyor. A slip clutch is used for connecting the shafts 26 and 28, including a clutch member 31 on the shaft 26 and a clutch member 32 slidable on the shaft 28 and held against the clutch member 31 by means of a spring 33. The clutch will drive the conveyor from the shaft 19, but will enable the conveyor to stop whenever a lump of iron, rock or other hard object lodges under the crushing plate 13. In this event, the shaft 19 can be reversed, to reverse the conveyor, thereby to force the lump of iron, rock or other object rearwardly beyond the rear end of the conveyor into the space 12, after which the blower and conveyor can be operated as before. The clutch can be opened by means of a hand lever 34 fulcrumed on the housing 27 and connected to the clutch member 32. Said hand lever extends upwardly above the deck 35 of the locomotive, to enable the engineer or operator to open the clutch and stop the conveyor, without stopping the fan or blower should the supply of coal be too rapid. The forward end of the trough 8 and housing 27 have a hinge joint 36 above the ball and socket joint 17.

In order to deliver the crushed coal from the discharge spout or pipe 20 of the blower into the fire box, a delivery nozzle 37 is slidable or telescoped over the pipe 20 and moves through an opening 38 in the deck 35. The upper end 39 of the nozzle 37 is curved forwardly to register with the fuel door opening 40 of the fire box when the nozzle is raised, thereby directing the coal rearwardly through the opening 40 into the fire box when forced up through the pipe 20 and nozzle by the action of the blades 18.

The nozzle 37 has guide ears 41 outstanding therefrom near its lower end and slidable on vertical guide rods 42 secured at their lower ends to an annular flange or seat 43 surrounding and carried by the pipe 20 near the casing 15, and said flange serves as a seat for the lower end of the nozzle 37 when it is lowered, as seen in Fig. 2.

The nozzle is raised by pressure fluid, such as steam, and for this purpose, a vertical cylinder 44 is mounted in front of the casing 15 and the piston rod 45 extends upwardly and is connected at its upper end to a bracket 46 secured to the front wall of the nozzle 37, whereby the nozzle is raised and lowered with the piston. A pressure fluid supply pipe 47 is connected to the lower end of the cylinder 44 for admitting the fluid, which will raise the piston and nozzle to the position shown in Fig. 1, and when the fluid is permitted to discharge, the nozzle and piston will gravitate, thereby bringing the nozzle out of the way under the deck 35.

A hot air supply pipe 48 is connected to the casing 15 for delivering heated air to mix with the crushed coal, thereby avoiding the delivery of too cold air to the fire box, as would be apt to chill the fire box.

A deflector 49 is pivoted or otherwise mounted to move into the opening 40, before the nozzle 37 is raised, and when in position, as seen in Fig. 1, it will serve to deflect the coal delivered from the nozzle, whereby to distribute it to the sides and rear end of the furnace, thereby scattering the coal over the bed of the fire box.

The present apparatus eliminates the manual labor necessary in firing locomotives, and all that is necessary is to move deflector 49 into the opening 40, raise the nozzle by admitting pressure fluid into the cylinder 44, and then start the shaft 19, which is driven by a suitable motor or other prime mover. Should the supply of coal be too fast as compared with the air delivered by the blower, the lever 34 can be swung to stop the conveyor, and the feeding of the coal to the conveyor can thus be retarded. The apparatus can be stopped whenever desired, and the nozzle then retracted under the deck 35, as seen in Fig. 2.

Having thus described the invention, what is claimed as new is:—

1. A stoker comprising a blower having means for delivering crushed coal to a furnace, a conveyor for delivering coal to the blower, and operating means for operating the blower and conveyor and including a slip clutch for disconnecting the conveyor only to retard the feeding of the coal to the blower and to permit the conveyor to stop if clogged up.

2. A stoker comprising a blower to be carried by a locomotive including a cylindrical casing having its axis disposed horizontally and a fan operating within said casing, said casing having an upwardly-extending outlet pipe and an upper inlet opening, a longitudinal coal trough for the delivery of coal from the tender having a downwardly-directed chute at its forward end entering said inlet of the blower casing, said casing and trough having a flexible connection for the realtive movement thereof, an auger conveyor working within said trough for feeding the coal to said chute, and operating means for said fan and auger having a flexible connection located between said casing and trough.

3. A stoker comprising a blower having a casing with an upwardly projecting outlet pipe, and a nozzle slidable on said pipe and

having its upper end curved to register with a furnace door opening when the nozzle is raised, said nozzle being slidable downwardly out of the way.

4. A stoker comprising a blower including a casing having an upwardly projecting outlet pipe, means for feeding coal into said casing, a nozzle slidable on said pipe and having an upper curved end to register with a furnace door opening when the nozzle is raised, and means for raising said nozzle.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CARL H. JEFFERS.

Witnesses:

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