

May 22, 1934.

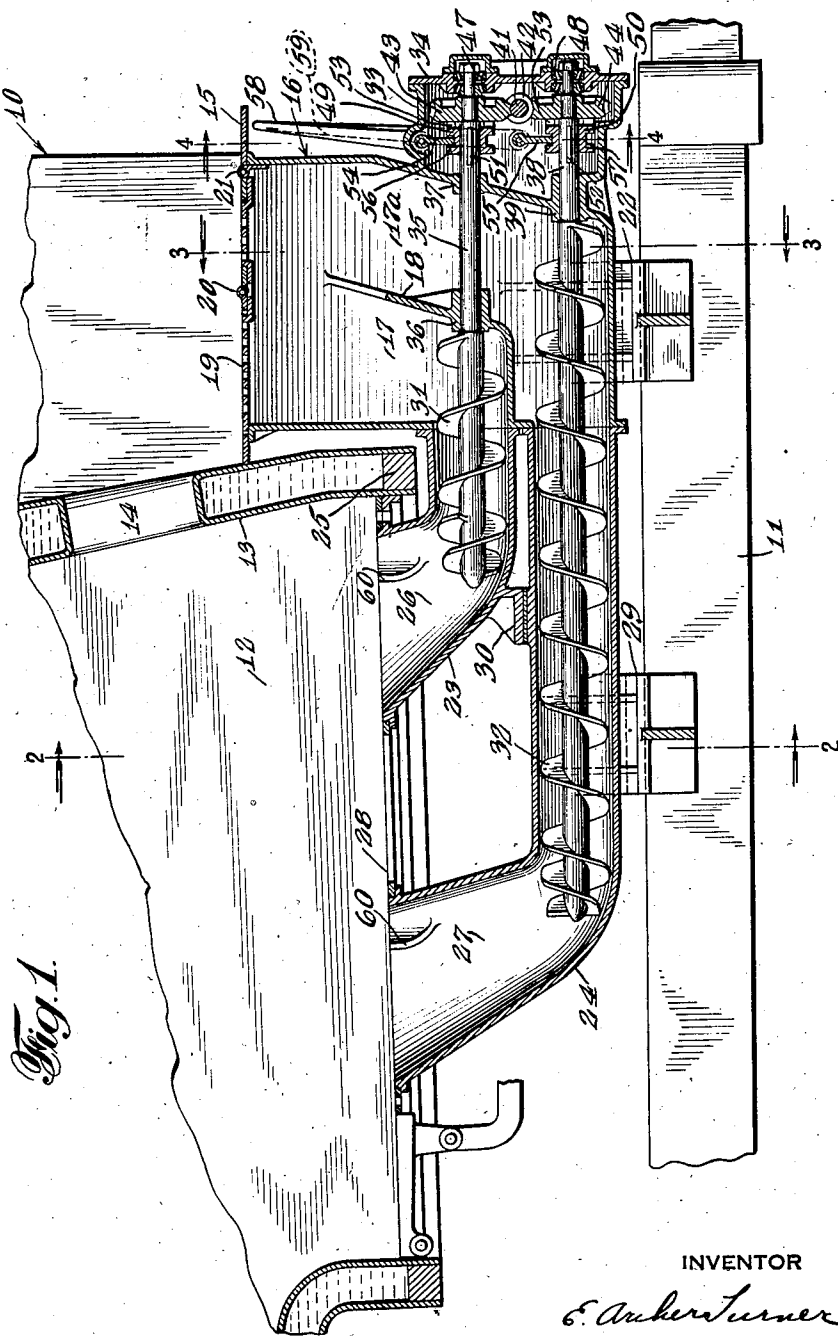
E. A. TURNER

1,960,072

UNDERFEED STOKER

Filed Oct. 25, 1930

3 Sheets-Sheet 1



May 22, 1934.

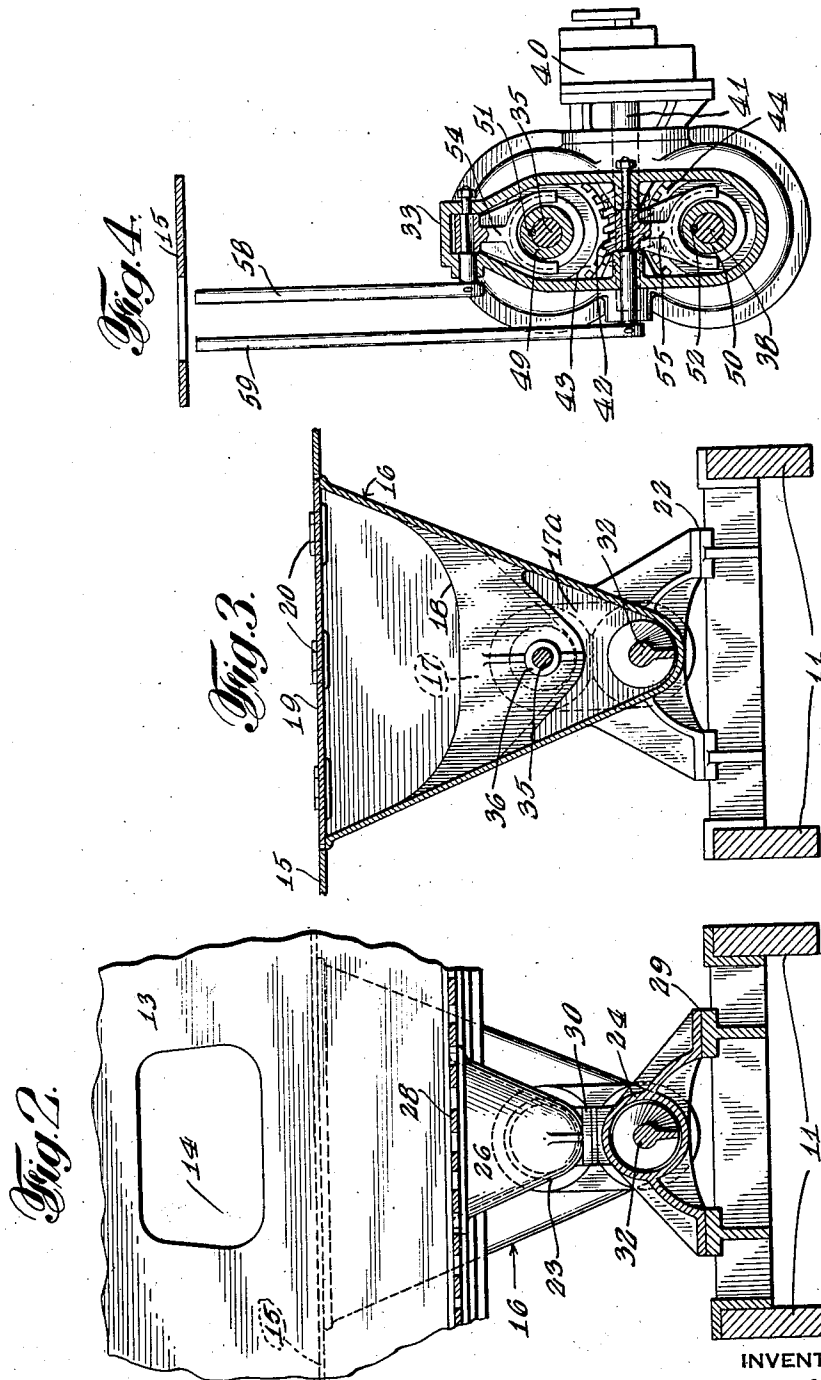
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3 Sheets-Sheet 2



INVENTOR

E. A. Turner

May 22, 1934.

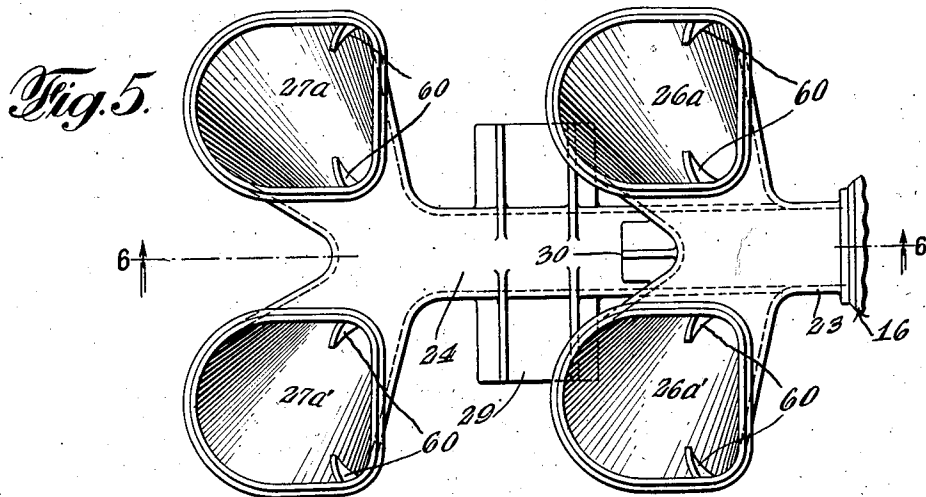
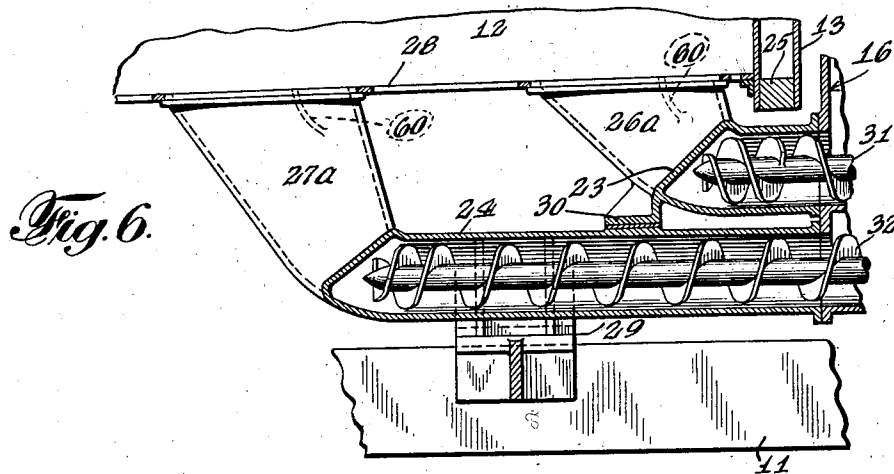
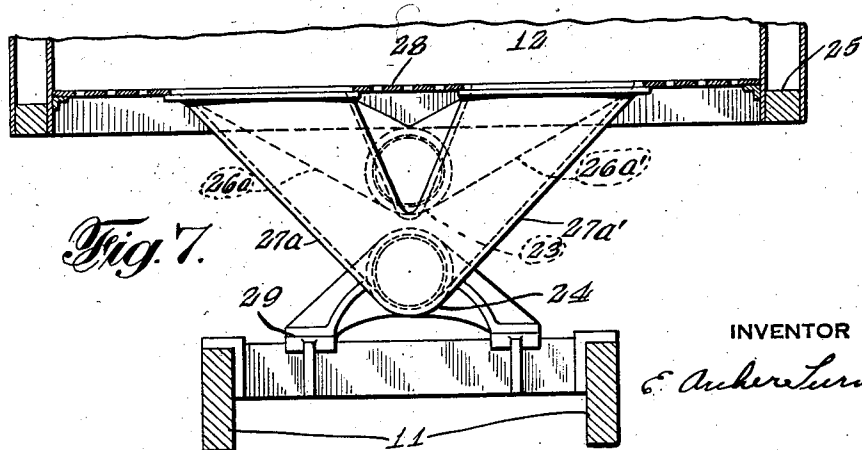
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UNDERFEED STOKER

Filed Oct. 25, 1930

3 Sheets-Sheet 3



INVENTOR

E. A. Turner

UNITED STATES PATENT OFFICE

1,960,072

UNDERFEED STOKER

Edwin Archer Turner, New York, N. Y., assignor
to The Standard Stoker Company, Incorporated,
a corporation of Delaware

Application October 25, 1930, Serial No. 491,109

7 Claims. (Cl. 110—44)

My invention relates to underfeed stokers and particularly to underfeed stokers for locomotives.

It is an object of this invention to provide a stoker of the type described which combines the advantages of simplicity, ruggedness, compactness and economy of construction, and convenience of repair and replacement of parts.

Another object of the invention is the provision in stokers of the type described of an improved fuel receptacle and means for conveying fuel from the receptacle.

To the above and other ends the invention consists in the arrangement of parts and in their relation and association one with the other or in combination as hereinafter described and as illustrated in the accompanying drawings, in which

Fig. 1 is a central longitudinal vertical section through a portion of a locomotive showing the stoker mechanism in place in like section;

Fig. 2 is a section on the line 2—2 of Fig. 1;

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

Fig. 4 is a section on the line 4—4 of Fig. 1;

Fig. 5 is a diagrammatic plan view of a modified form of a portion of the stoker;

Fig. 6 is a section on the line 6—6 of Fig. 5; and

Fig. 7 is an end view of the modified form of the stoker.

My improved stoker is applicable to locomotives and particularly locomotives of the switcher type and for the purpose of best illustrating the invention it will be so described, but its use is not limited to such application for it is equally applicable in other furnaces of like conditions.

Referring now to the drawings, the locomotive is indicated generally at 10, its main frame at 11, its firebox at 12 having a backhead 13 with a hand firing opening 14 therein.

Beneath the deck 15 of the locomotive is a fuel hopper 16 divided into the fuel compartments 17 and 17a by the partition wall 18. A cover 19 for the hopper 16 is formed in the deck 15 and is hinged as at 20 and 21 so that one half of the cover 19 may be thrown back or the entire cover thrown back as desired. The hopper 16 is supported from the locomotive main frame 11 by the foot members 22.

The fuel conveying mechanism comprises the conduits 23 and 24 which communicate with the hopper 16 and extend forwardly therefrom beneath the boiler mud ring 25, terminating in the magazines 26 and 27 respectively which open upwardly and deliver fuel to the firebox 12 through apertures in the grate 28. The conduits 23 and

24 are disposed one below the other, the conduit 24, delivering fuel to the forward portion of the firebox, being below and supported from the locomotive main frame 11 by the foot members 29, and the conduit 23, delivering fuel to the rearward portion of the firebox, being above and supported from the conduit 24 by the bracket 30. The conduit 24 communicates with the compartment 17a, and the conduit 23 communicates with the compartment 17 of the hopper 16. The screw conveyors 31 and 32 disposed in the conduits 23 and 24 respectively extend rearwardly into the compartments 17 and 17a respectively and advance fuel to and through the magazine 26 and 27 respectively, into the firebox.

The screws 31 and 32 are driven from their rearward ends by gearing housed in the casing 33, which is preferably formed as an integral part of the hopper 16. The gear casing 33 is provided with a removable cover 34 to permit access to the gearing. The screw shaft 35 transmits motion to the screw 31 and is mounted in the bearings 36 and 37 which are formed as an integral part of the partition wall and rear wall respectively of the hopper 16. The screw shaft 38 transmits motion to the screw 32 and is mounted in the bearing 39 which is formed as an integral part of the rear wall of the hopper 16.

Motion is transmitted from a motor 40 to a drive shaft 41 carrying the worm 42 which engages the worm gears 43 and 44 on the shafts 35 and 38 respectively. The shafts 35 and 38 are mounted in the roller bearings 47 and 48 respectively disposed in the removable cover 34. Clutch members 49 and 50 are slidably mounted on the shafts 35 and 38 respectively and are prevented from rotating about said shafts by the keys 51 and 52. The adjacent faces of the clutch members 49, 50 and the worm gears 43, 44 are provided with complementary teeth 53 arranged to engage each other as shown in Fig. 1 whereby motion is transmitted to the screw conveyors 31 and 32.

One or both of the screw conveyors 31, 32 may be thrown out of operation by disengaging the teeth 53 by sliding the clutch members 49, 50 along the keys 51 and 52 respectively away from the worm gears 43 and 44 respectively. The fork members 54, 55 are held in engagement with the clutch members 49, 50 respectively by the shoulders 56, 57 on the clutch members 49, 50 respectively. The fork members 54, 55 are operated through the handles 58, 59 respectively, so that movement of the handle 58 backward or forward throws the clutch member 49 out of or into en-

gagement with the worm gear 43 and likewise movement of the handle 59 backward or forward throws the clutch member 50 out of or into engagement with the worm gear 44.

5 A modified form of the invention is shown in Figures 5, 6, and 7, wherein the conduits 23 and 24 terminate in a pair of branching magazines 26a, 26a', and 27a, 27a', enabling fuel to be spread over grate surfaces of larger area.

10 In operation, the hinged cover 19 is opened and a supply of fuel is manually supplied into the hopper 16, the fuel is then advanced from the hopper compartments 17, 17a through the conduits 23, 24 by the screws 31, 32 and urged upwardly through the magazines, 26, 27 into the firebox. It will be understood that the fuel may be supplied into the hopper by power means if desired. The magazines are made flaring so that their upper ends are larger than their lower ends, for the purpose of effecting a loose and free delivery of fuel into the firebox. The magazines are shown as being inclined slightly forward to permit the fuel to be advanced therethrough more readily, however, such a construction has a tendency to deliver more fuel forward of the magazine than rearward thereof. Inwardly curving vanes 60 are provided on the inner side-wall of the magazines toward the rear thereof to deflect a portion of the fuel rearwardly whereby an even distribution of fuel may be obtained.

I claim:

1. In a locomotive having a cab deck, a firebox, and grates therefor, the combination of a fuel hopper beneath said cab deck, said hopper having front, rear and side walls, an arcuate bottom wall, a single partition wall extending between said side walls and dividing said hopper into an upper and a lower fuel compartment, said upper compartment having an arcuate bottom wall parallel throughout its length to the bottom wall of said lower compartment, a screw conveyor in each of said compartments having their axes in vertical alignment, drive means for operating said screws, mechanism for placing either of said screws in or out of operation independently, a fuel conduit extending forwardly from each compartment to a point beneath said firebox grates, said fuel conduits encasing said screw conveyors and being in axial alignment therewith throughout their length, a plurality of openings in said grate, and magazines directly connecting said openings and said fuel conduits.

2. In combination with a furnace having a firebox with grates therein, a fuel hopper having front, rear and side walls disposed exteriorly of said furnace, a partition wall included between the sides of said hopper, said wall extending downwardly and then forwardly to intersect the front wall of the hopper, dividing the latter into an upper and a lower fuel compartment, a screw in each compartment having their axes in vertical alignment, a pair of fuel conduits each communicating with and extending forwardly from a respective compartment of said hopper to a point beneath said grate, said fuel conduits encasing said screw conveyors and being in axial alignment therewith throughout their length, said screws each provided with a shaft extending outside the backwall of said hopper, gearing associated with said shafts for transmitting motion to said screws, clutch mechanism arranged with said gearing for placing either of said screws in or out of operation independently, a plurality of openings in said grate, and magazines directly connecting said openings and said fuel conduits,

the vertical axes of said magazines lying in the same plane formed by the vertically aligned axes of said screws.

3. In a locomotive having a cab deck, a firebox and grates therefor, the combination of a fuel hopper beneath said cab deck, means arranged for the introduction of fuel into said hopper, a partition wall dividing said hopper into a plurality of compartments, a plurality of fuel conduits each communicating with and extending forwardly beneath the firebox from a respective hopper compartment, a screw in each of said conduits, bearings for each of said screws in the rear wall of said hopper, said partition wall having an opening in horizontal alignment with one of said bearings, gearing at the rear of said hopper for transmitting motion to said screws and clutch mechanism for throwing one or more of said screws into or out of operation, a casing formed integral with said fuel hopper for housing said gearing and said clutch mechanism, a plurality of openings in said grate, and magazines directly connecting said openings and said fuel conduits.

4. In a locomotive having a cab deck, a firebox and grates therefor, the combination of a fuel hopper beneath the deck, means arranged for the introduction of fuel into said hopper, a partition wall dividing said hopper into two compartments, fuel conduits each communicating with and extending forwardly from a respective compartment beneath the firebox, a screw in each of said conduits extending rearwardly into each of said fuel compartments, drive mechanism for operating said screws, bearings for one of said screws formed in the partition and rear wall of said hopper, a bearing for the other of said screws formed in the rear wall of said hopper, openings in said grate, and magazines directly connecting said openings and said fuel conduits.

5. As a new article of manufacture a fuel hopper having rear, front, side and bottom walls, a hinged cover, a partition wall dividing said hopper into two compartments, openings in the front wall of said hopper each communicating with a respective compartment, bearings formed in the partition and rear wall of said hopper in horizontal alignment with one of said openings, a bearing formed in the rear wall of said hopper in horizontal alignment with said other opening, and a gear housing compartment at the rear of said hopper and formed integral therewith.

6. In a locomotive having a cab deck, a firebox and grates therefor, the combination of a fuel hopper beneath the deck, means arranged for the introduction of fuel into said hopper, a partition wall dividing said hopper into a plurality of compartments, fuel conduits each communicating with and extending forwardly into each of said hopper compartments, a screw conveyor in each of said conduits for advancing fuel therethrough, drive means for operating said screws, bearings for each of said screws in the rear wall of said hopper, said partition wall having an opening in horizontal alignment with one of said bearings, openings in said grate, and magazines directly connecting said openings and said fuel conduits.

7. In a locomotive having a cab deck, a firebox and grates therefor, the combination of a fuel hopper beneath the deck, means arranged for the introduction of fuel into said hopper, said hopper comprising front, rear, side and bottom

walls, said side walls converging towards said bottom wall, an upstanding transverse partition wall intermediate the front and rear walls terminating at its lower end short of said bottom wall and extending forwardly from its lower end to said front wall intermediate the top and bottom walls of said hopper dividing said hopper into two compartments, openings in the front wall of said hopper each communicating with a respective compartment, fuel conduits each communicating with a respective compartment through the openings in the front wall of said hopper and extending forwardly from said hopper to a point beneath the firebox, a screw in each of said conduits extending rearwardly into each of said hopper compartments, drive means for operating said screws, bearings for each of said screws in the rear wall of said hopper, said partition wall having an opening therein in alignment with one of said bearings, openings in the grates of the firebox, and magazines directly connecting said openings and said fuel conduits.

E. ARCHER TURNER.

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