March 27, 1934. E. A. TURNER 1,953,032

STOKER MECHANISM

Filed June 26, 1930 2 Sheets-Sheet 1

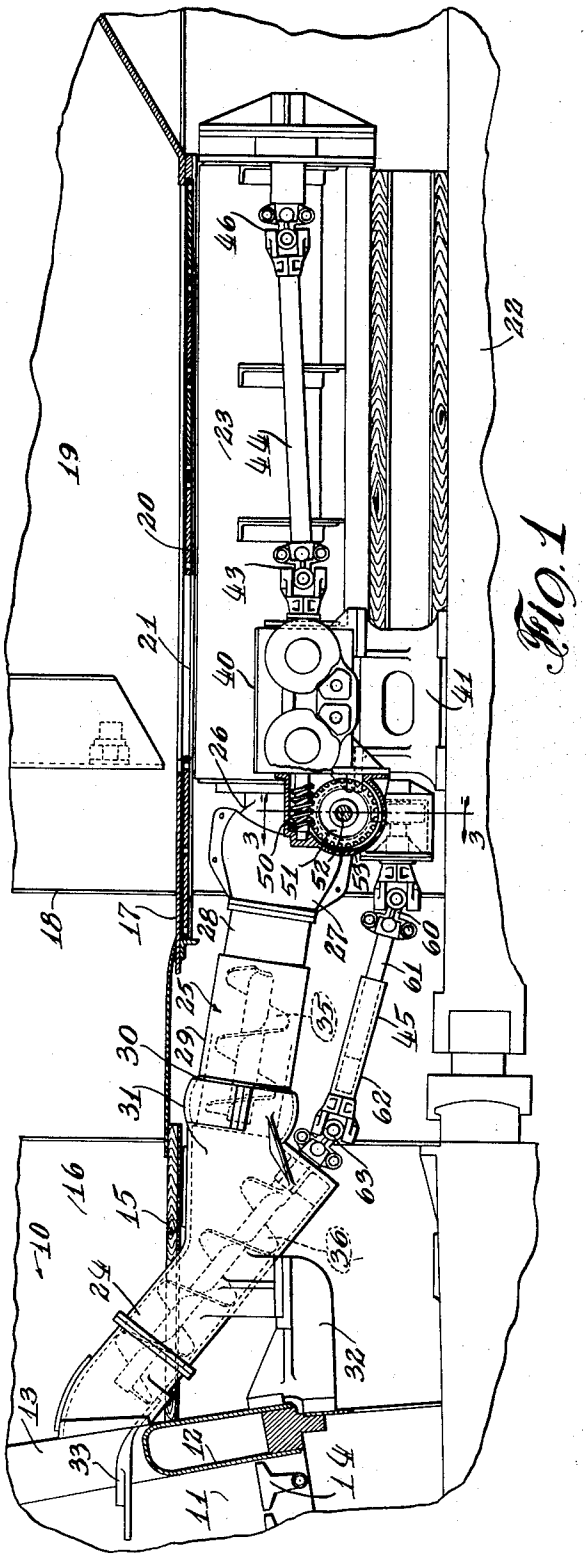

Fig. 1

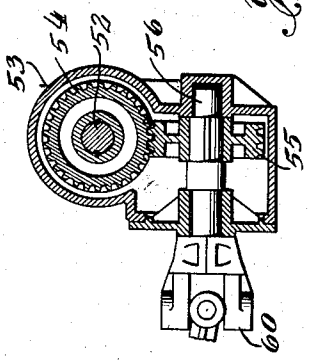

Fig. 4

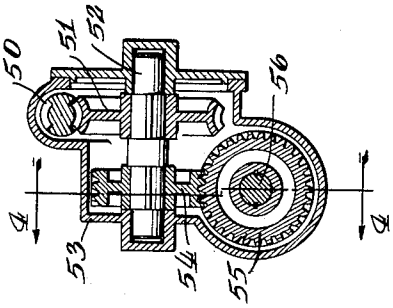

Fig. 3

INVENTOR

E. Archer Turner

March 27, 1934. E. A. TURNER 1,953,032

STOKER MECHANISM

Filed June 26, 1930 2 Sheets-Sheet 2

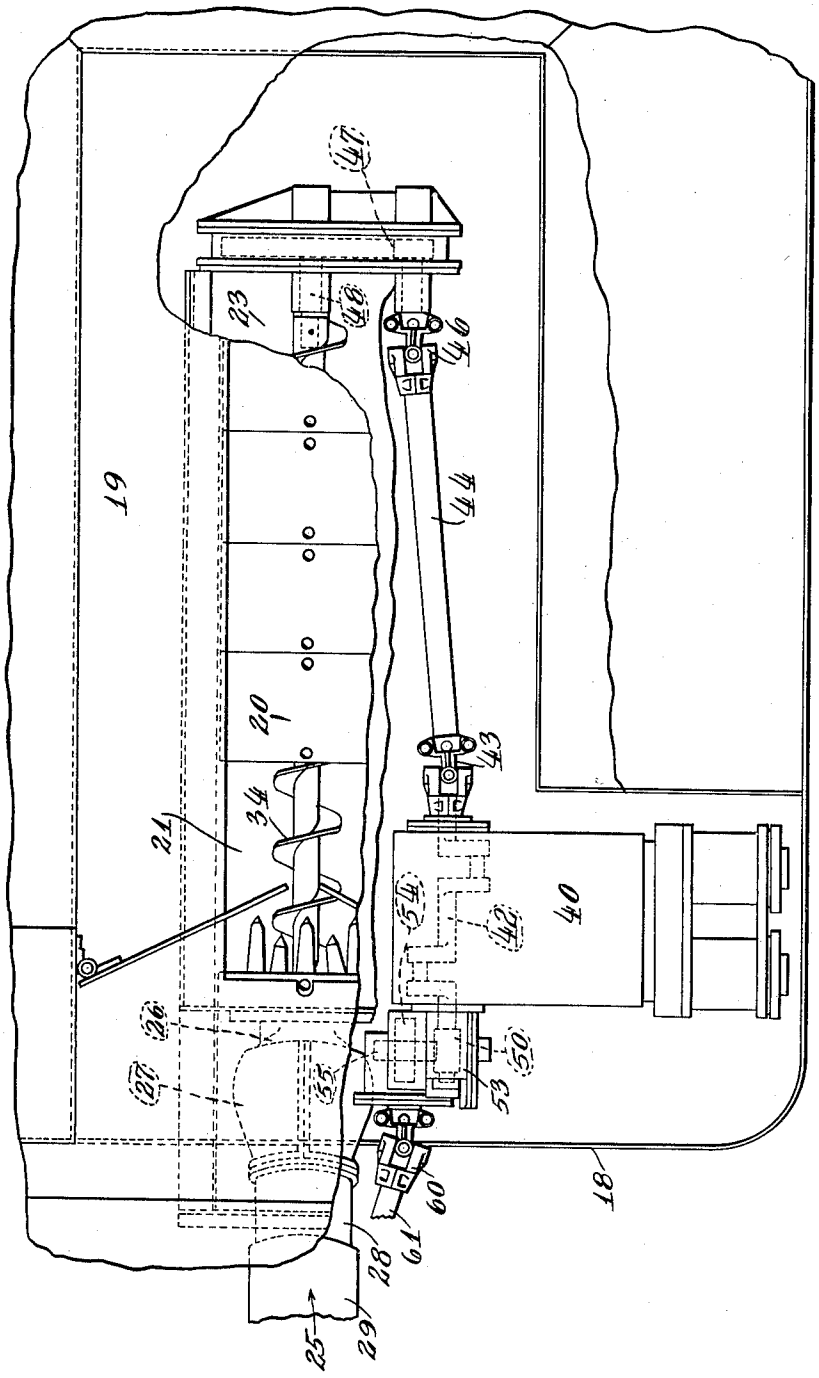

Fig. 2

INVENTOR

E. Archer Turner

Patented Mar. 27, 1934 1,953,032

UNITED STATES PATENT OFFICE

1,953,032

STOKER MECHANISM

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

Application June 26, 1930, Serial No. 463,846

3 Claims. (Cl. 198—15)

My present invention relates to locomotive stokers of the type employing communicating but separated fuel transferring and elevating conveyors, and has for its principal object the provision of an improved drive arrangement for imparting motion to the conveyors from a common source of power.

A more specific object of my invention is to provide a conveyor driving means wherein the gear drive for the elevating conveyor is directly associated with the prime mover and drives the elevating unit through a flexibly connected telescoping drive shaft section.

On the drawings

Figure 1 is a central vertical longitudinal section through a locomotive and tender with the apparatus of this invention shown thereon and some parts broken away;

Figure 2 is a plan view of Fig. 1 with portions of the tender broken away;

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

Figure 4 is a vertical section taken on the line 4—4 of Fig. 3.

On the drawings the numeral 10 designates a locomotive having a firebox 11 provided with a rear wall 12 having a firing opening 13 therein which is located a sufficient distance above the grates 14 to permit the fuel to be scattered over the firebed. The floor or firing deck 15 of the cab 16 extends rearwardly from the firebox backwall and is in substantial alignment with the floor 17 of the tender indicated as a whole by the numeral 18. The tender includes a fuel supply bin 19 which is located above the floor 17 provided with the usual slide plates 20 which are shiftable to create an opening 21 through which the fuel may be fed by gravity to the stoker mechanism which ordinarily is mounted beneath the floor 17 above the tender frame 22.

The embodiment of the invention selected to illustrate the invention provides a stoking device including a fuel feeding conduit system composed of a rear or trough section 23 rigidly mounted on the tender and disposed below the floor 17 thereof extending longitudinally along the vertical center line of the tender in a position to receive fuel through the opening 21, a forward or elevator conduit section 24 rigidly mounted on the locomotive and at its upper end delivering fuel to the firebox 11 through the firing opening 13 of the backwall, and an intermediate conduit 25 extending between the rear and forward conduits and so related with each as to permit the flexibility of parts required between the locomotive and its tender.

The rear conduit or trough may be of any suitable construction fixedly supported beneath the fuel bin or if preferred, forming an integral part thereof. The forward end of the trough 23 terminates in an extension 26 forming a hollow shell which is received in a spherical portion 27 of the rear tubular section 28 of the intermediate conduit 25, the front section 29 of this conduit telescopes with the rear section and carries at its forward end a spherical ball 30 cooperating with a horizontal split spherical flange 31 formed in the lower portion of the elevator conduit 24 to form a flexible joint connection between the two conduits.

In the construction illustrated the front end of the intermediate conduit 25 is offset from the rearward end of the elevator conduit 24, their adjacent ends being so related that the fuel passes from the intermediate conduit directly into the lower portion of the elevator conduit.

The rigid elevator conduit 24 is carried on the locomotive by a bracket 32 extending rearwardly from the firebox backwall. The upper end of the elevator conduit opens into the firing opening 13 and delivers fuel on to the distributing plate member 33 which may be of any preferred form.

Suitable means is provided for conveying the fuel through the conduits. This means is formed as shown by a series of screw conveyors, the two rear sections 34 and 35 being mounted for rotation in the trough 23 and intermediate conduit 25 respectively. The two screw sections are universally connected within the shell member 26 as is customary in the art and as the joint structure forms no part of the invention it is not shown. The third or forward screw section 36 is mounted in the elevator conduit 24 and is driven separately from the rearward screw sections through suitable means as will presently appear.

From another aspect of the invention the trough 23 and intermediate conduit 25 may be considered in its entirety as a transferring conveyor universally connected at 31 to the rigid elevator conduit 24 in the relation shown so that the screw within the elevator is separated from and driven independently from the screw within the transferring conveyor. An improved means for driving the screw conveyors is provided by this invention. The drive for the transferring conveyor screw sections 34 and 35 includes an engine or driving motor 40 suitably supported on the bracket 41 mounted on the left front corner of the tender frame 22. Preferably, a two cylinder

engine is used and having a crank shaft 42 extending to opposite sides of the engine casing disposed substantially parallel with the vertical longitudinal center line of the transfer conveyor and such shaft is flexibly connected at its tender end by the universal joint 43 with the rearward section 44 of the conveyor drive shaft which includes the forward telescoping section 45. The rearward section 44 of the drive shaft at its rearward end is universally connected at 46 with gearing 47 mounted at the rearward end of the transferring conveyor or trough 23. The gearing 47 transmits power to the transferring screw 34 through the shaft 48 operatively connected to the rear end of the screw 34 in any suitable manner. The end of the crank shaft 42 opposite the joint 43 carries a worm 50 meshing with the worm wheel 51 mounted on the transverse shaft 52 journaled at its ends in the casing 53 which is detachably secured to the locomotive side of the driving motor 40. In effect this casing is a part of the driving motor. The transverse shaft 52 carries the spiral gear 54 which in turn drives the gear 55 mounted on the shaft 56 which extends transversely of the shaft 52 and substantially parallel with the crank shaft 42 and the transferring conveyor.

The shaft 56 as best shown in Fig. 4 is journaled in the casing 53 and at its forward or locomotive end extends through the casing to carry the universal joint 60. Through the joint 60 the gearing is flexibly connected with the rearward end of the forward drive shaft section 45 being carried by the inner member 61 which telescopes with the outer shell 62 which is flexibly connected with the elevator screw 36 through the universal joint 63.

Thus it will be seen in operating the stoking device the driving motor 40 through its crank shaft 42 drives the transferring screw sections 34 and 35 through the flexibly connected rear drive shaft section 44 and the gearing 47 and drives the elevator screw 36 at any desired rate of speed through the gearing within the casing 53 transmitting power through the flexibly connected and telescoping forward drive shaft section 45.

The flexible mounting of the drive shaft and the provision of at least one of its sections being telescopic permits the motor 40 and the gearing within the casing 53 to be mounted in any desired position on the tender to suit the various structural differences in locomotives and tenders of the different types to which the stoking mechanism is installed, and also provides for the articulation between parts of the stoking mechanism and its driving arrangement mounted on the tender and those parts mounted on the locomotive. It will be understood the driving motor and elevator gearing can be moved laterally or longitudinally on the tender as may be desired to meet the changing conditions incident to its installation to different locomotives and to its use with differently constructed stoking devices.

Building the reduction gearing for the elevator drive as a functionally integral part of the drive motor 40 is considered an important feature of this invention for by so doing the necessity for gearing at the base of the elevator conduit 24 is obviated. The use of gearing at the base of the elevator is objectionable because it is impossible to prevent the coal dust from working into the gearing and the dust mixing with the lubricant forms a grinding compound and in a relatively short time creates excessive wear on the gears resulting in excessive maintenance cost and frequent renewal. It is also a fact that with many locomotives there is not sufficient space to permit the use of gearing at the base of the elevator screw in a stoking mechanism of the class disclosed wherein the lower end of the elevator is disposed below the forward end of the transferring conduit.

This invention consists in the combination and arrangement of the parts of the stoker drive as defined in the appended claims.

I claim:

1. In combination with a locomotive having a tender, a stoker having a transferring conduit mounted longitudinally of the tender and a single inclined elevating conduit on the locomotive adapted to receive fuel by gravity from said transferring conduit, the lower end of said inclined elevating conduit being disposed below the forward end of said transferring conduit, a spherical flange extending rearwardly of said elevating conduit and above the lower end thereof, said spherical flange constituting one element of a ball and socket connection between said conduits, a conveyor in said inclined conduit and a conveyor in said transferring conduit, drive mechanism for said conveyors carried by the tender and comprising a prime mover including a rotatable power shaft, a casing adjacent and rigid with said prime mover and arranged to receive one end of said power shaft, a gear on the end of the power shaft received by said casing, a driven shaft mounted in said casing, a gear on said driven shaft enclosed by said casing and arranged to be driven by the first named gear, and an extensible and contractible shaft connected at its rear end with said driven shaft and at its forward end universally connected directly with said elevating conveyor at a point rearward of said inclined conduit and immediately beneath said spherical flange, said transferring conveyor being operatively connected with said drive mechanism.

2. In combination with a locomotive having a tender, a stoker having a transferring conduit mounted longitudinally of the tender and a single inclined elevating conduit on the locomotive adapted to receive fuel by gravity from said transferring conduit, the lower end of said inclined elevating conduit being disposed below the forward end of said transferring conduit, a spherical flange extending rearwardly of said elevating conduit and above the lower end thereof, said spherical flange constituting one element of a ball and socket connection between said conduits, a conveyor in said inclined conduit and a conveyor in said transferring conduit, drive mechanism for said conveyors mounted on the tender and comprising a prime mover including a rotatable power shaft, a casing carried by said prime mover and arranged to receive one end of said power shaft, a gear on the end of the power shaft received by said casing, a driven shaft mounted in said casing, a gear on said driven shaft enclosed by said casing and arranged to be driven by the first named gear, and means operatively connecting said driven shaft with said elevating conveyor including a universal joint connected directly with the elevating conveyor at a point rearward of said inclined conduit and immediately beneath said spherical flange, said transferring conveyor being operatively connected with said drive mechanism.

3. In combination with a locomotive having a tender, a stoker having a transferring conduit mounted longitudinally of the tender and an

elevating conduit on the locomotive adapted to receive fuel by gravity from said transferring conduit, the lower end of said inclined elevating conduit being disposed below the forward end of said transferring conduit, a spherical flange extending rearwardly of said elevating conduit and above the lower end thereof, said spherical flange constituting one element of a ball and socket connection between said conduits, a conveyor in said inclined conduit and a conveyor in said transferring conduit, drive mechanism for said conveyors comprising a prime mover including a rotatable power shaft, a casing adjacent and rigid with said prime mover and arranged to receive one end of said power shaft, a gear on the end of the power shaft received by said casing, an intermediate shaft mounted in said casing, a gear on the intermediate shaft driven by said first named gear, a second gear on the intermediate shaft, a driven shaft mounted in said casing, and a gear on the driven shaft driven by the second named gear on the intermediate shaft, an extensible and contractible shaft at its extremities connected by universal joints to said driven shaft and said elevating conveyor respectively, the universal joint connecting said elevator conveyor with said contractible and expansible shaft being disposed rearward of said inclined conduit and immediately beneath said spherical flange, and a drive shaft operatively connecting said transferring conveyor and said drive mechanism.

E. ARCHER TURNER.