

Feb. 10, 1925.

1,525,997

E. S. JOHNSON

GEARED LOCOMOTIVE

Filed Jan. 22, 1923

2 Sheets-Sheet 1

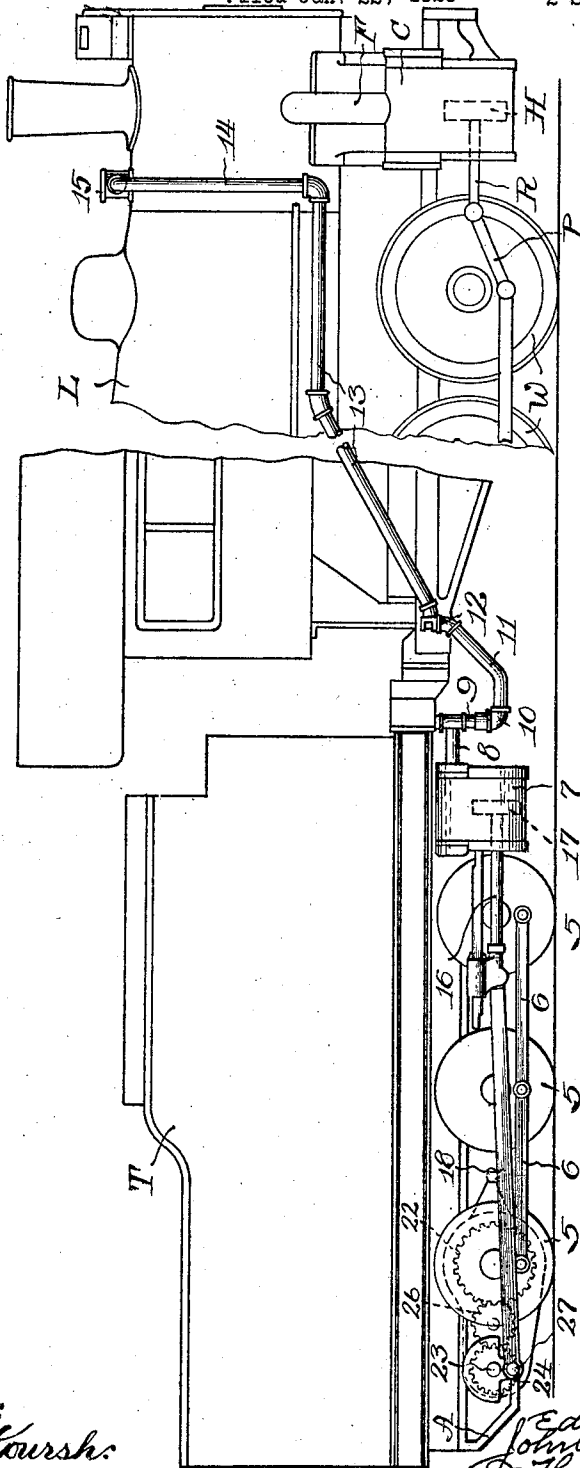


Fig. 1

Witness:
Chas. R. Koursh.

Inventor:
Edward Spencer Johnson
BY Frank D. Thomason Atty

Feb. 10, 1925.

1,525,997

E. S. JOHNSON

GEARED LOCOMOTIVE

Filed Jan. 22, 1923

2 Sheets-Sheet 2

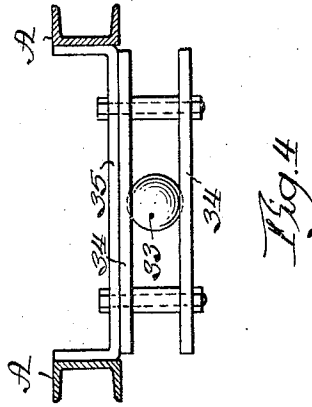
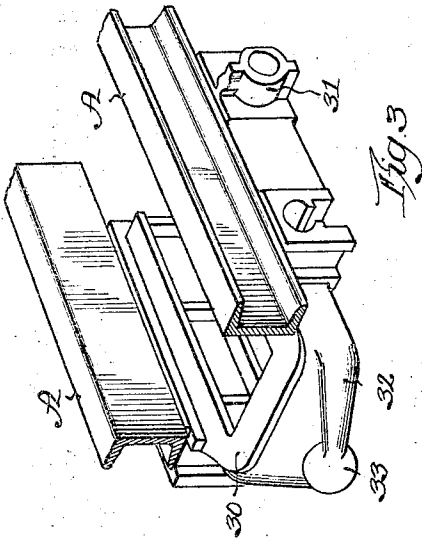
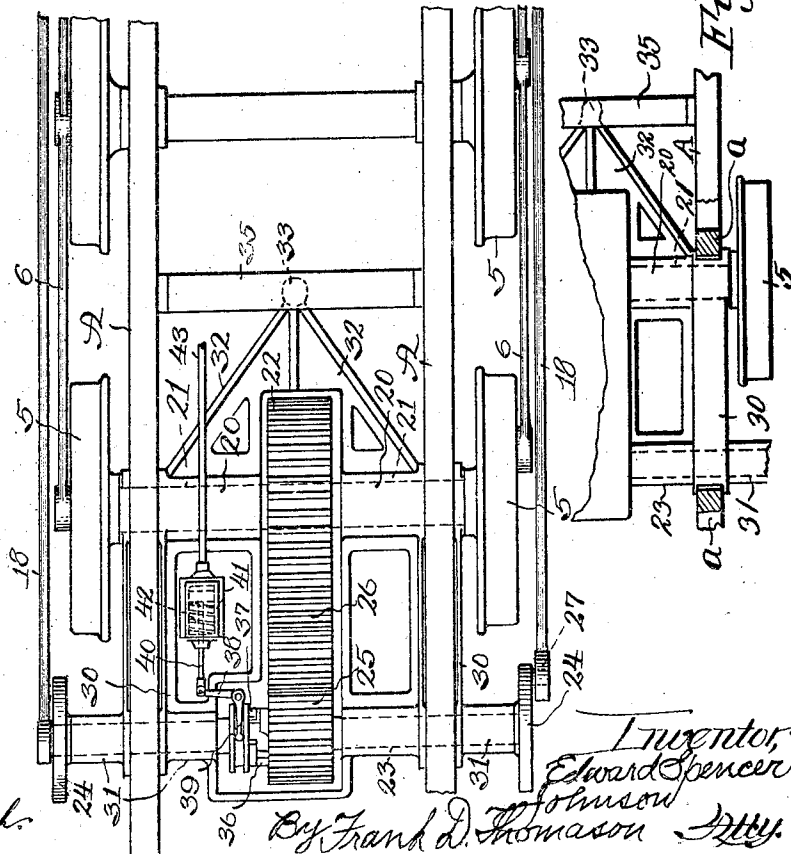


Fig. 2



Witness:
Charles Koursh.

Inventor:
Edward Spencer
Johnson
By Frank D. Thomason Atty.

UNITED STATES PATENT OFFICE.

EDWARD SPENCER JOHNSON, OF DAVENPORT, IOWA.

GEARED LOCOMOTIVE.

Application filed January 22, 1923. Serial No. 614,066.

To all whom it may concern:

Be it known that I, EDWARD SPENCER JOHNSON, a citizen of the United States, residing at Davenport, in the county of Scott and State of Iowa, have invented a new and useful Improvement in a Geared Locomotive, of which the following is a specification.

My present invention relates to articulated locomotives for railroad use, and more particularly to means for driving a geared tender in articulated relation to the locomotive, and for mounting the driving means in a frame or housing that has a three point support.

One of the principal objects of my invention resides in the provision of means for utilizing the superheated steam or other motive fluid from the locomotive, which, in addition to actuating the driving wheels of the locomotive, will also actuate a crank and gear mechanism mounted on the tender for driving the wheels of the latter, and I also utilize the superheated steam or the compressed air in the air-brake system to operate the mechanism for shifting the clutch. Other objects reside in arranging the mechanism in a compact manner in a triangular frame so that the gear mechanism may be conveniently and compactly mounted below the body of the tender or locomotive, where the space is more or less constricted. Also, it is an object to make the structure in unitary form and to provide means that permit the same to have a universal movement with respect to the truck or underframe. In this connection, I provide the housing or frame with a three-point support; that is, a fulcrum at the forward end of said frame and the other two points being on the axle of the driven wheel. The foregoing objects I prefer to accomplish in substantially the manner hereafter fully described, and as more particularly pointed out in the appended claims.

Reference is now made to the accompanying drawings that form a part of this specification, in which—

Fig. 1 is a longitudinal side elevation of a locomotive and tender in articulated arrangement showing the application of my invention thereto.

Fig. 2 is a top plan of the tender uncoupled from the locomotive, and drawn to a larger scale than Fig. 1.

Fig. 3 is a perspective of the three-point suspension frame and gear housing.

Fig. 4 is a vertical end elevation of the structure illustrated in Fig. 3.

Fig. 5 is a schematic view showing a portion of the suspension frame and its connection with the side-frame, the view being of horizontal section through the side frame.

The locomotive L and tender T may be of any well known type and coupled in the usual manner, the locomotive being provided with driving wheels W, W, that are actuated by pitmans P pivotally or hingedly connected to the adjacent ends of the reciprocating piston rods R having heads H at their opposite ends that operate in the cylinders C, the latter receiving the superheated steam from the boiler through the feed conduits F.

The wheels 5, 5, of the tender are connected by links 6, 6, so that they revolve in unison. The axles of the two forward wheels are journaled in bearings maintained in pedestals of the well known and commonly used types so that they need not be shown as they form no part of my present invention. The rear or driving axle 21 is journaled in tubular embossments 20 in a suspension frame to be hereinafter described in detail.

Adjacent the forward portion of the tender and in front of the forward wheels are mounted steam cylinders 7 that receive steam through a feed pipe 8 upon each side of the center line of the tender. Lateral stubs 9 disposed with their axes vertically connect the outer ends of pipes 8 with swivelled connections 10 which are in communication with pipes 11 leading upwardly and forwardly to suitable connections 12 upon the underframe of the locomotive. Leads of pipe 13 continue from connections 12 in an upwardly inclined direction, and then horizontally alongside the boiler of the locomotive, and at their forward ends are connected with pipes 14 that are transverse thereto and which extend up over the cylindrical portion of the boiler to a header or dome 15 where they receive the superheated steam or other motive fluid from the boiler.

The cylinder 7 on the tender have piston rods 16 that reciprocate therein by means of piston heads 17 carried upon the inner ends of said piston rods, while the outer ends of said piston rods are pivotally connected to pitmans 18 that are positioned

longitudinally of the truck and outside wheels 5 thereof. Adjacent its rear the tender has a combined gear housing and supporting frame mounted underneath the same

5 between side-frames A and secured in position so as to permit of relative movements between the body, truck and wheels without disturbing the general relation of the respective elements of the drive mechanism.

10 The parallel side pieces 30 of the suspension frame have alining tubular embossments 20 that are formed in its forward portion to journal axle 21 of the rearmost wheels which passes through the side pieces

15 and has the driving wheels 5 secured to it, and at its rear end said frame has other alining tubular bearings 31 to journal a crank shaft 23. The forward end of the frame has extensions 32 of side pieces 30 that converge

20 toward the center of width of the underframe or truck and merge into a substantially spherical bearing member 33 at the apex of the triangle formed by these parts. This bearing member 33 is journaled between

25 upper and lower transverse plates 34 that are suitably secured to the transverse member 35 that is connected to the upper members of side-frames A. The frames A are of somewhat skeleton form the upper

30 and lower member of which are connected by spaced pedestals *a* that are vertically disposed and act as guides to permit of up and down movement of the suspension frame but prevent sidewise movement and thereby

35 maintain the desired relation of the parts of the structure. Such arrangement is described and illustrated in detail in certain patents to Backer No. 1,369,212 and No. 1,360,709; and I have herein disclosed the same schematically in Fig. 5 of the drawings.

A gear 22 is fixedly secured to drive-axle 21 intermediate its ends and within the housing portion of suspension frame. In

45 the rear of the housing and between the bearings the driving crank shaft 23 has a toothed pinion 25 loosely mounted on it, and at each end said shaft has a counterbalanced crank 24 secured thereto. Interposed between

50 gear 22 and pinion 25, and in mesh therewith is a small transmission or idle gear 26 that has its spindle mounted in the housing so that all of said gears and pinions are in train and protected by the housing, and in longitudinal alinement. Shaft 23

55 is rotated by pitmans or links 18 that connect the outer ends of piston rods 16 with the eccentric lateral pins 27 of the respective cranks 24, so that the reciprocation of the piston rods will thereby rotate the cranks and their connecting shaft 23.

Mounted on crank shaft 23 within the housing member is a suitable jaw clutch mechanism the loose member 36 whereof is

65 secured to drive pinion 25 and the driving

or shiftable member 37 is splined on crank-shaft 23 to rotate therewith. A bell-crank 38, or the like, is employed to oscillate the fork or yoke 39 which straddles the usual grooved collar of the clutch and derives its

70 motion from a piston rod 40 that reciprocates in cylinder 41 suitably mounted on the structure. A spring 42 for releasing or returning the piston to normal position when the mechanism is not driving is interposed

75 between the piston head and the end of the cylinder and surrounds piston rod 40. A pipe line 43 leads from the opposite or forward end of the cylinder to the cab where the operator may control the clutch by

80 means of a valve to admit pressure fluid or steam to said pipe line for the purpose of reciprocating the piston and thereby operate the clutch which will connect pinion 25 to the crank-shaft and rotate gear 22

85 on drive axle 21 through pinion 26. This rotation of axle 21 will actuate the rear wheel of the tender which is operatively connected by the links to the other wheels of the tender, and the rotation of one of

90 the wheels will drive the other wheels of the tender.

It will be obvious the motive fluid from the engine can be controlled from the cab, and when excess power is desired the same can be obtained by admitting steam to cylinders 7 on the tender T, and pipe line 43 can be opened to operate the clutch whenever it is desired to utilize the additional power. Also it will be noted the crank shaft is back

100 of the driving wheel axle as well as the other axles of the tender or locomotive permitting of a longer reach for the pitman, and at the same time there will be less relative vertical movement between the rear

105 driving axle and the truck or underframe with which it has universal connection through the three-point suspension frame, all tending to increase the longevity of the structure.

What I claim is:—

1. A geared locomotive comprising a truck having side-sills, a drive-wheel and axle therefor, a three point suspension frame having articulated connection at its

115 forward end with said truck between the side-sills and the rear portions engaged with said side-sills, bearings in said frame for said axle, a driving gear-train on said frame having operative connection with said axle, a crank shaft journaled in the rear portion of said frame and loosely carrying one of

120 the gears of said train, a clutch operatively connecting said axle and loose gear, a piston and piston head operatively connected to said crank, a cylinder in which said piston head operates, and means for supplying steam to said cylinder.

2. A geared locomotive comprising a truck having side-sills, a drive-wheel and

130

axle therefor, a three-point suspension frame having articulated connection at its forward end with said truck between the side-sills and the rear portions engaged with said side-sills, bearings in said frame for said axle, a gear mounted upon said axle, a rotatable shaft extending transversely of said frame, a drive gear loose on said shaft, means operatively connecting said shaft and drive gear, an idle gear in mesh with said axle gear and drive gear, cranks at opposite ends of said shaft, piston rods and heads mounted alongside of said sills, means connecting said rods and cranks, and cylinders in which said piston heads operate.

3. An articulated driving mechanism comprising a plurality of wheeled trucks, independent driving devices supported by the respective trucks, a motive fluid generative system mounted upon one of said trucks, independent means leading from said generative system to the respective driving devices for conveying the motive fluid thereto; said conveying means having articulated connections between the respective trucks, a crank actuating one of said driving de-

vices, a clutch mechanism connecting said crank and said driving device, and a three-point suspension frame in which said crank and its associated driving device and axle are mounted.

4. A geared locomotive comprising a truck having side-sills, a drive wheel and axle, a three-point suspension frame having articulated connection at its forward end with said truck between the side-sills and the rear portion engaged with said side-sills, a crank-shaft disposed parallel with said axle, a gear-train interposed between said crank-shaft and axle, a housing on said suspension frame in which said gear train is mounted and through which said axle and crank-shaft pass, a clutch mechanism within said housing for operatively connecting said crank-shaft to said gear-train, means for actuating said clutch, and independent means for actuating said crank-shaft.

In witness whereof I have set my hand this 17th day of January, 1923.

EDWARD SPENCER JOHNSON.

Witness:

A. SEBILLEN.