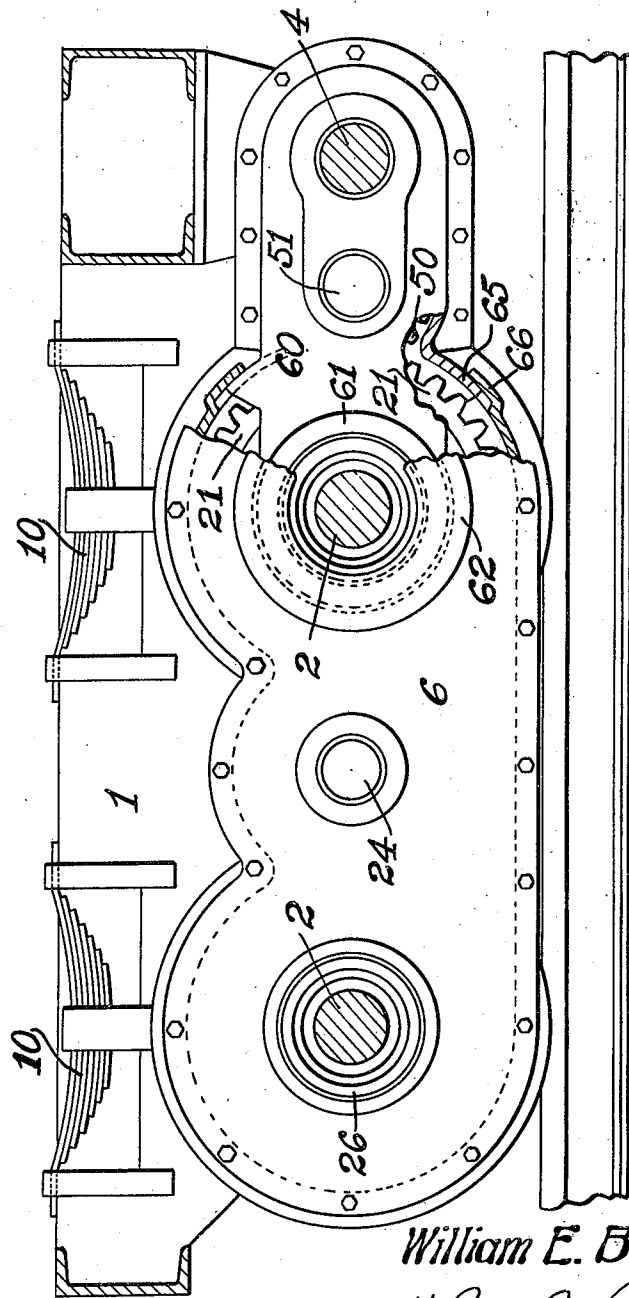


W. E. BOUSCHOR.
GEARED LOCOMOTIVE.
APPLICATION FILED APR. 25, 1922.

1,435,374.

Patented Nov. 14, 1922.
3 SHEETS—SHEET 1.

Fig. 1.



Inventor

William E. Bouschor

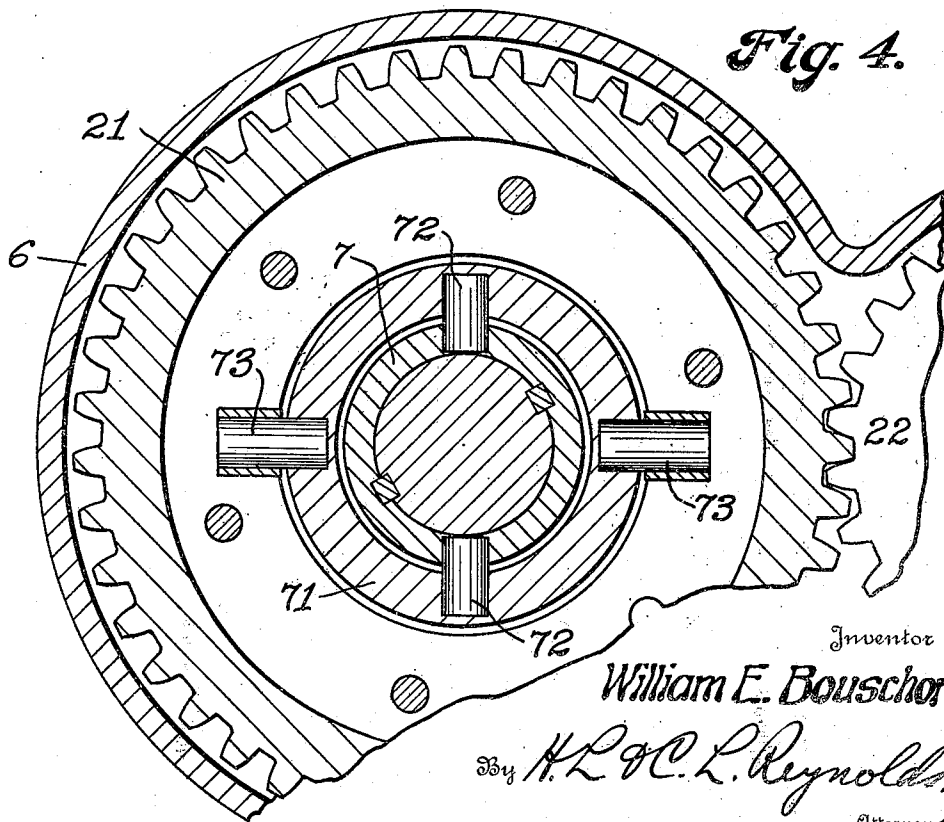
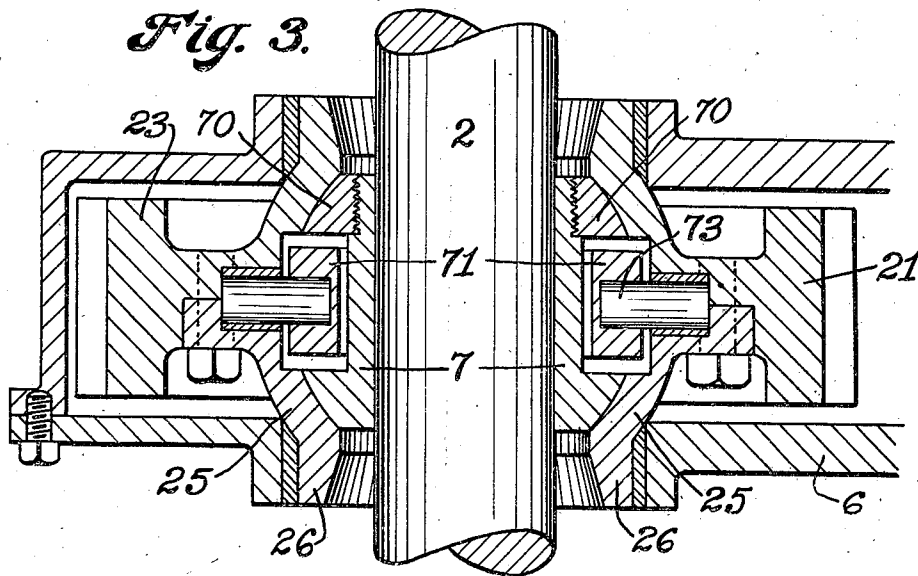
By *H. R. & C. L. Reynolds.*
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By *H. R. C. L. Reynolds.*

Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM E. BOUSCHOR, OF SEATTLE, WASHINGTON.

GEARED LOCOMOTIVE.

Application filed April 25, 1922. Serial No. 556,374.

To all whom it may concern:

Be it known that I, WILLIAM E. BOUSCHOR, a citizen of the United States of America, and resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Geared Locomotives, of which the following is a specification.

My invention relates to gear driven locomotives. It consists of a type of construction which is especially adapted for operating upon rough and uneven tracks and also upon tracks having a high degree of curvature.

The object of my invention is to provide a locomotive geared so that high tractive pull may be obtained with a relatively small engine, and one capable of operating upon industrial tracks which frequently contain curves of very short radius and also frequently have tracks which are very rough and uneven.

My invention consists of certain combinations of parts which will be hereinafter described and then pointed out in the claims.

The accompanying drawings show my invention embodied in the form of construction I now prefer.

Figure 1 is a longitudinal sectional elevation through a truck equipped in accordance with my invention.

Figure 2 is a plan view of the same showing, however, the gear housing in section and a portion of the gears on the axles, also in section.

Figure 3 is a section through one of the gears which is provided with a universal coupling with its axle, the section being taken on an axial plane.

Figure 4 is a section of a similar gear and its universal coupling, taken in a plane perpendicular to the axis of the axle.

The usual type of construction for geared locomotives employs a shaft extending lengthwise of the locomotive and having driving connection with the axles through bevel gears. One of the objects sought to be secured by my invention is to provide a spur gear train which may be used to directly connect the axles of a truck and to connect these with a transversely extending shaft of the engine. Another object is to provide a construction of the above type in which the engine is mounted directly upon the truck frame and at the side thereof where it is accessible for taking care there-

of. The accompanying drawings show the manner in which my invention is preferably constructed, the construction of the parts being, however, simplified in every way possible without really interfering with the operation of the device.

Referring to Figure 1, this shows a truck frame 1 which may be of any suitable construction, and two axles 2. These axles are provided with wheels as 20 of any usual or suitable type of construction designed for operating upon rails. The axles may be journaled in the truck frame in any suitable way. It is contemplated that these be carried in the truck frame in such manner as to permit limited vertical movement of the axles with relation to the frame. This method contemplates the use of springs upon which the truck frame is supported from the axles.

Two engines, 3, are shown mounted one at each side of the truck frame and without the wheels. These engines are mounted horizontally and are connected, as by connecting rods 30 and crank disks 31, to operate a transversely extending shaft 4. This shaft is journaled on the truck frame. It is preferred that this shaft be given a supporting bearing as near as is feasible to the pinion of the gear train which is connected therewith. This, in the design shown, may be accomplished by supporting the bearing from the member 40 which is a part of or secured to the truck frame.

To connect the axles 2 and the engine shaft 4 a spur gear train is provided. This gear train comprises a pinion or gear secured, one to each axle and engine shaft and idler gears connecting the adjacent gears of those which are mounted upon said shaft and axles. The engine shaft 4 has a pinion 5 mounted thereon. This meshes with an idler pinion 50 which in turn meshes with the gear 21 carried by the first axle 2. This gear 21 meshes with an idler pinion 22 and this in turn with a gear 23 carried by the other axle 2. The gear train above described is enclosed within a housing which is composed of two sections 6 and 60. This housing is preferably of such a character as to entirely enclose the gear train and protect it from dirt. It is also desirable that it be of a type of construction which will receive and hold grease or oil so that the gears will be lubricated.

The pinions 5 and 50 may or may not be

fixedly secured upon their respective shafts. The idler pinion 50 is mounted upon a stub shaft 51 which is carried by the section 60 of the housing. The other idler pinion 22 is mounted upon a stub shaft 24 which in turn is carried by the section 6 of the housing. The two gears 21 and 23 which are mounted upon the truck axles, are secured thereto by means of a universal joint or coupling. A preferred type of construction for the same is shown in Figures 3 and 4. This is as follows.

Secured to the shaft 2 is a ball shaped member 7. This has outer surfaces which are sections of a spheroid. The gear 21 has a hub which is given a complementary spheroidal inner surface adapted to fit the spheroidal surfaces of the block 7. To assemble these parts in place the member 7 is provided with a removable ring 70 which may be secured thereon in any suitable way. It has been shown as screwing in place. This central hub or member 7 is provided with a groove extending about the same and adapted to receive a ring 71 which forms a part of the universal coupling. This ring is provided with radially positioned pins 72 and 73 which engage respectively with the hub 7 which is secured to the shaft and with the gear 21. These are positioned 90° apart so as to form a gimbal joint. The gear 21 is provided with a removable hub section 25 so that it may be put in place over the spheroidal hub 7.

The gear 23 which is secured to the other axle 2 is of the same or an equivalent type of construction. The purpose of the universal joint in mounting these gears is to insure that all the gears of the gear train shall maintain parallelism of their axes. If the driving gear 5 is fixedly secured to its shaft, the gear 21 mounted upon the axle 2, if fixedly secured to said axle, would cause a cramping effect in the gear train whenever the wheel at one side of the truck dropped lower than the wheel on the other side. This gives a slight swinging movement of the axle in a vertical plane extending lengthwise of the axle.

With a gear train in which the gears fit with reasonable snugness and in which one gear of the train was movable relative to the other in the manner described, such movement would cause cramping in the train. For this reason the entire train is fixed in its position with relation to movements of the character described through its connection with one only of the shafts thereof. By connecting the other gears with their shafts in the universal manner described, such gears may have a slight movement relative to their axle without interfering seriously with the action between the gears of the train.

To compensate for the up and down movement of the axles as a whole, due to varia-

tions in loading, I provide a hinged connection between the two sections 6 and 60 of the housing. This has been done by providing the section 60 with flanges 61 which intermesh with sockets 62 formed upon the other housing section. The gear 21 is provided with a hub 26 which is journaled in the flange 61 of the housing section 60. The gear 23 is similarly journaled in the housing section 6. By this type of construction there can be a limited swinging or hinging action about the axis of the shaft 2 which is next to the engine shaft. This will compensate for any vertical variation between the levels of this shaft and the axle.

One end of the housing section 60 enters the adjacent end of the other section 6. At the sides these are designed to fit closely so that dirt may not enter. At top and bottom they are also preferably provided with flanges as 65 and 66 carried by the respective housing sections and permitting a slight arcuate telescoping action or swinging about the axis of the shaft 2. It is designed that the housing be provided with grease or oil of suitable character so that the gear train will run in oil.

What I claim as my invention is:

1. The combination with a bogie truck having a plurality of axles and a frame spring supported therefrom, of an engine shaft journaled on said frame, a gear train connecting said shaft and axles, a housing in which the gears are journaled and a universal coupling between each axle and its gear.

2. The combination with a bogie truck having a plurality of axles and a frame spring supported therefrom, of an engine shaft journaled on said frame, a gear train connecting said shaft and axles, a two part housing in which said gears are journaled, one part extending from the engine shaft to one axle and the other between the axles, said housing parts being pivoted together to swing about the axis of their common axle.

3. The combination with a truck frame, axles journaled in said truck for limited vertical movement, an engine mounted at each side upon the truck frame alongside of the wheels, an engine shaft journaled transversely of and at one end of the truck frame, and a gear train connecting the engine shaft and the axles.

4. The combination with a truck frame, axles journaled in said truck for limited vertical movement, an engine mounted at each side upon the truck frame alongside of the wheels, an engine shaft journaled transversely of and at one end of the truck frame, a gear train connecting the engine shaft and the axles, and a housing enclosing said gear train and having two parts hinging about the axis of an axle which is adjacent to the engine shaft.

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5 5. A locomotive having a truck frame, a plurality of driving axles and wheels journaled in said truck frame, an engine carried by the truck frame, the engine shaft extending transversely of the truck, a spur gear train connecting said engine shaft and the axles and containing an idler gear between each of said shaft and axles, whereby the removal of said idler gears permits transportation of the locomotive without operation 10 of its engine or gear train.

Signed at Seattle, King County, Washington, this 20th day of April 1922.

WILLIAM E. BOUSCHOR.