L. E. FEIGHTNER.

MULTIPLE WHEELED TRUCK FOR GEARED LOCOMOTIVES.

APPLICATION FILED JUNE 12, 1913.

1,075,772.

Patented Oct. 14, 1913.

3 SHEETS—SHEET 1.

Fig. 3.

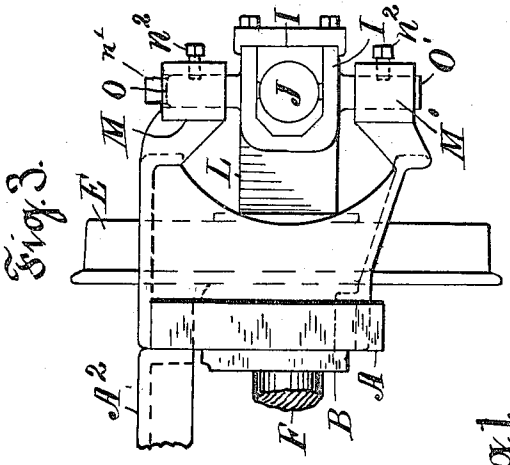


Fig. 1.

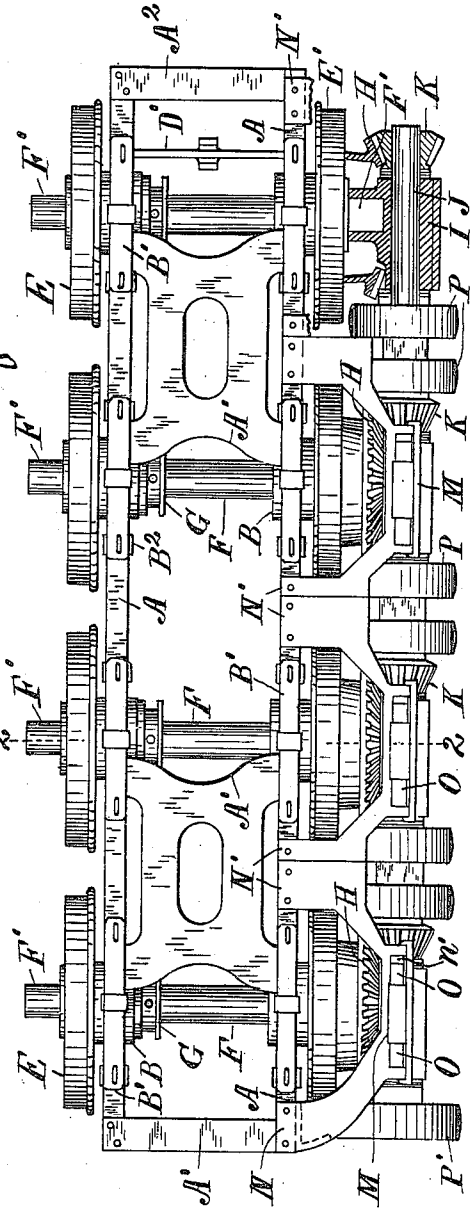
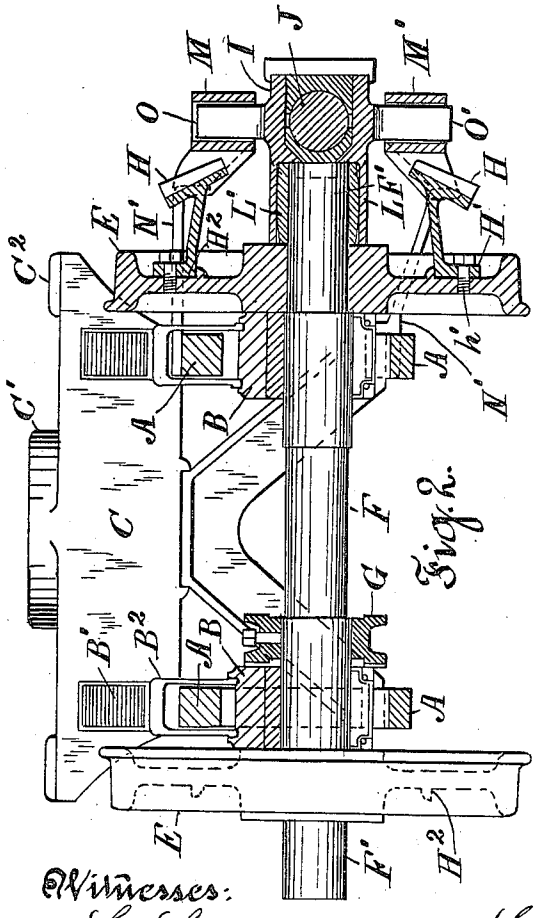


Fig. 2.



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3 SHEETS—SHEET 2.

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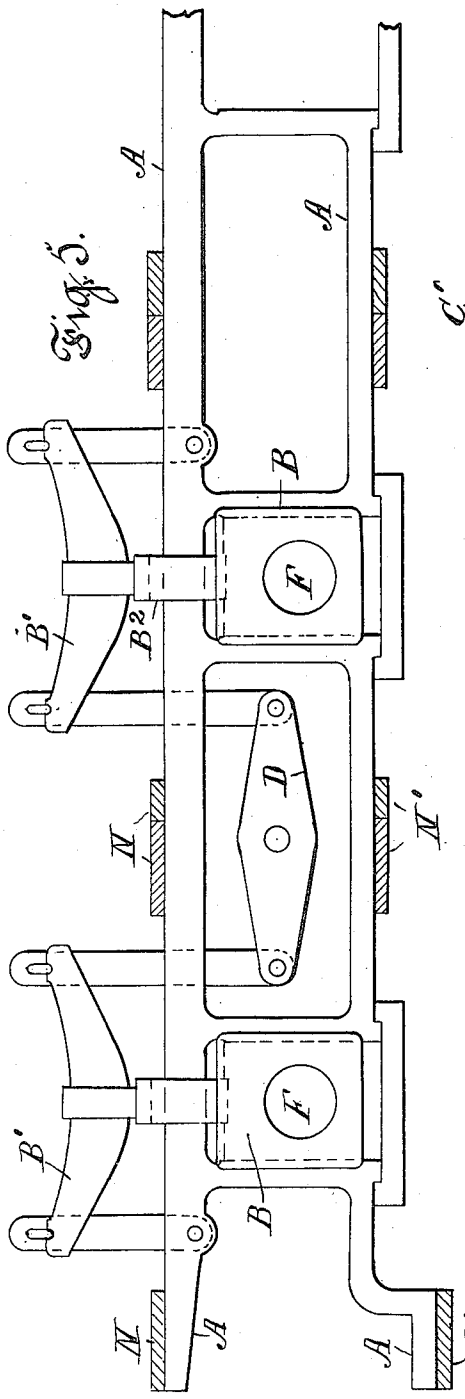
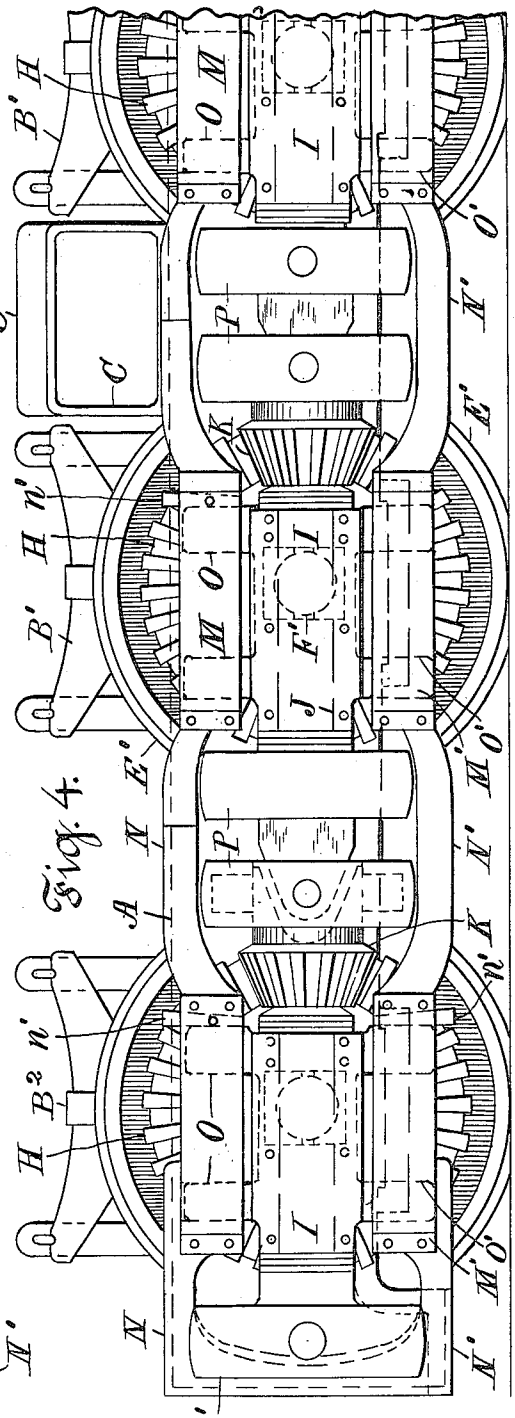


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 6

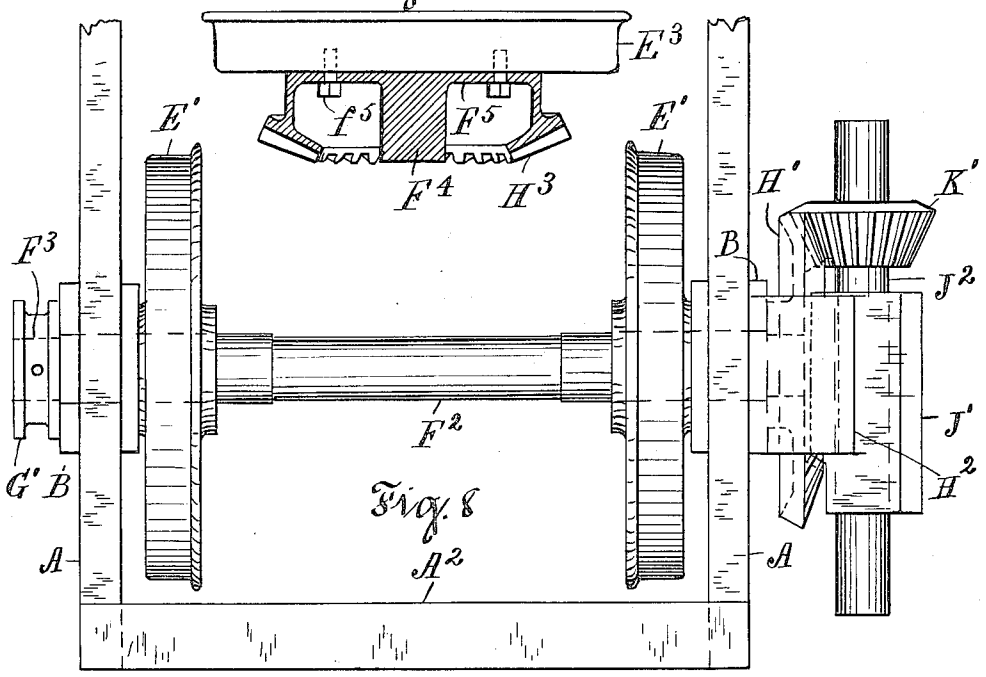
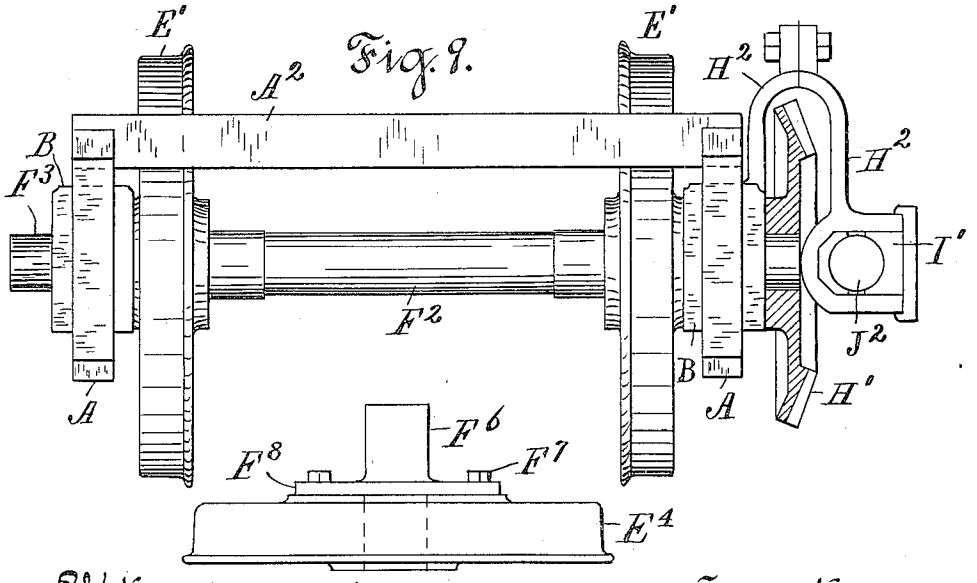


Fig. 8

Fig. 9.



Witnesses:
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Fig. 7.

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UNITED STATES PATENT OFFICE.

LEWIS E. FEIGHTNER, OF LIMA, OHIO, ASSIGNOR TO LIMA LOCOMOTIVE CORPORATION, OF LIMA, OHIO, A CORPORATION OF OHIO.

MULTIPLE-WHEELED TRUCK FOR GEARED LOCOMOTIVES.

1,075,772. Specification of Letters Patent. Patented Oct. 14, 1913.

Application filed June 12, 1913. Serial No. 773,157.

To all whom it may concern:

Be it known that I, LEWIS E. FEIGHTNER, a citizen of the United States, residing at 715 South Broadway, Lima, county of Allen, and State of Ohio, have invented certain new and useful Improvements in Multiple-Wheeled Trucks for Geared Locomotives, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to that class of locomotives in which the wheels that support it are all geared together and connected by a line-shaft with the crank-shaft of the engines; and the improvements are particularly applicable to geared locomotives having a longitudinal crank-shaft geared to the truck-wheels, and vertical engines connected with the said crank-shaft.

In such locomotives, four-wheeled trucks have been employed in which the two axles were geared to the same line-shaft, and were, therefore, not capable of independent vertical movement when passing over inequalities of the track; and the principal object of the present invention is to furnish a construction in which the ends and journals of all the axles are wholly independent of one another, and may thus rise and fall freely when the wheels pass over an uneven track. This object is attained by providing a separate section of line-shaft for each of the axles, and connecting each by bevel-wheels to the axle or a wheel thereon, all of such shaft-sections being connected together by universal joints, and each shaft-section being so mounted as to rise and fall with the truck-wheel and axle upon which it operates. This object may be attained in any desired manner, but in the preferred form of the construction the truck-wheels are overhung or fitted to their axles outside of the truck-frame, and an axial extension upon the axle or truck-wheel is projected outwardly beyond such wheel, and a transverse box for the line-shaft section is formed with a lateral socket in which such axial extension turns loosely. To hold such transverse box in a horizontal position guides are projected from the truck-frame above and below the shaft-box, and guide-arms upon the box are fitted to move vertically in such guides, the axial extension operating to keep the shaft-section and the gearing always in the same operative relation to the axle and its truck-wheel.

The invention will be understood by reference to the annexed drawing, in which—

Figure 1 is a plan of an eight-wheeled truck provided with the improvements and drawn upon half the scale of the other figures; Fig. 2 is a cross-section on line 2—2 in Fig. 1; and Fig. 3 is an end-view of the truck at the side where the gearing is connected to the truck-wheels. Fig. 4 is a side elevation of one end of the truck, and Fig. 5 is a side-view of one end of a truck-frame with the bearings for two of the axles, the right-hand end of the truck being broken off in both views. Figs. 6 and 7 represent axial extensions fastened on the truck-wheels. Fig. 8 is a plan of one end of a truck showing a modified construction for the shaft-box, and Fig. 9 is an elevation of one end of the truck showing the same.

A designates the side-frames of the truck, with axle-boxes B fitted to move vertically in pedestals upon the frame independent of one another. The side-frames are shown of the ordinary "bar-type" used in locomotive-frames, and are suitably braced and squared by braces A′ and cross-ties A^2, and have rigidly attached a center bearing-bolster C which is arranged to support in a suitable manner the weight of the superstructure that the truck is designed to carry. The bolster is shown provided with a swivel center-plate C′ and side-bearing attachments C^2; but the construction of the bolster is immaterial, as any form to carry the weight upon a sliding or rolling shoe is equally applicable, or one having a swivel-bearing with one or more sliding or radial-motion bearings applied at suitable points upon the frame-structure.

The construction of the frame is not essential, as it may be made in any manner (as of steel plates or castings) suitable for applying independent pairs of wheels in pedestals or other guides allowing independent vertical motion of both their journals, which construction makes the entire truck flexible to compensate for inequalities of track under every one of its supporting wheels.

Fig. 5 shows springs B′ bearing upon the

boxes B, through the medium of saddles B^2, and connected in pairs by equalizing bars D and D′. Any usual system of locomotive spring suspension can be applied in place of that shown.

In Figs. 1 to 5, axles F are fitted to the bearings B, the truck-wheels E, which in this construction form the driving-wheels of the locomotive, are mounted upon the axles outside of the frames A, and the axles have extensions F′ which project beyond the outsides of the wheels. A collar G is shown clamped upon the axle inside the off-bearing B, to transfer the thrust of the gearing to the carrying journal or axle-box on the opposite side of the frame. To one or both wheels on such axle, a bevel-gear may be fastened, to which system of bevel-gears power is applied from bevel-pinions secured upon line-shaft sections movable vertically with the axles.

In the drawing, the driving-wheels upon one side only of the truck are shown provided with bevel-gears H, and transverse shaft-boxes I are carried upon the axial extensions and provided with shaft-sections J, each of which carries a pinion K meshing with the adjacent bevel-gear H. The shaft-box is formed with a socket L containing bearing-brasses L′ adapted to fit rotatably upon the axial extension F′. Guides M and M′ are located above and below the shaft-box I, with legs extended from the upper and lower sides of the frames A, to which they are attached by feet N, N′. The guides are formed with vertical slots, and forked guide-arms O, O′ are projected upward and downward from the box I and fitted movably in the slots, thus holding the shaft-box from turning upon the axial extension while permitting it free vertical movement as the axle-box B plays up and down in the side-frame under variations of load and inequalities of track. The vertical play of the shaft-boxes thus allows variation between the truck-frames and the driving-wheels, which variation is necessary when the truck is in motion and has local oscillation due to track inequalities or disturbances in the load carried on its center bearing C′ and transferred to the springs B′.

The slots in the vertical guides are made, as shown in Fig. 2, wider at one side than the guide-arms, to introduce a taper key n', which can be adjusted to compensate for wear, and such key being secured by a set-screw n^2 when properly adjusted.

Each axle is thus provided with the shaft-section J, and gearing which is held constantly in the same relation to the axle, and each shaft-section is provided upon its opposite ends with universal joint-couplings P which are connected to the adjacent couplings by a squared slip-connection Q. A universal coupling P′ is provided upon the shaft-section at one end of the truck, by which it is in practice coupled to the engine crank-shaft by an extension coupling-bar which permits the truck free movement in relation to the crank-shaft, when the truck is rounding curves.

The brasses L′ in the socket L are slightly rounded upon their upper and lower surface, and are thus adapted to tip or rock within the socket L as required when one end of the axle is raised or lowered more than the other, thus slightly inclining the axial extension within the socket. Such inclination of the axle would necessarily wear and strain the brasses if they were not permitted such freedom to rock within the socket L. A sectional line-shaft and gearing such as shown herein may be connected with both ends of each axle, but where the gearing is connected with only one end, the axial-extensions F′ may be provided upon both ends. By making such extensions of similar dimensions, the axle may be reversed when one of the extensions is worn where connected with the transverse shaft-box, and the unworn extension can be fitted to the brasses in the socket L. For effecting such change, the bevel-gear H has a flange H′ fitted to an annular seat H^2 upon the outer face of the truck-wheel E, upon which it is secured by bolts h', and the truck-wheels at both ends of the axle are provided with such seats so that the bevel-gear can be readily transferred from one of the wheels to the other when the axle is reversed.

When the axle is reversed, the collar G may be shifted to occupy the same position as before in relation to the outer truck-wheel and its journals, so that the thrust of the gearing is always transmitted to the opposite truck-frame.

It will be understood that a sectional line-shaft and gearing may be applied to both ends of the axes if desired, and that the improvements may be applied to trucks having any desired number of wheels, within the ordinary limitations of rigid wheel-base and track-curvature, without departing from the invention.

The line-shaft sections may be maintained in the needed relation to the axle and truck-wheels, and may be geared to the axle, by any suitable means; a modification being shown in Figs. 8 and 9 where the truck-wheels E′ are shown hung inside of the truck-frames, and the bevel-gear is attached to the axle upon the outside of the journal-box B. A curved bar H^2 is shown extended from the top of the journal-box B over the top of the bevel-gear H′, to carry a bearing I′ for the line-shaft section J^2 which is provided with a pinion K′. By such construction, the support of the transverse shaft-box is thrown upon the journal-box B which, as it rises and falls in its pedestal, carries

the transverse shaft-box I′ with it, and thus maintains it in a uniform relation to the axle. The axle F^2 is formed with similar extensions F^3 at both ends adapted to receive the same bevel-gear, so that it can be reversed in the manner already described; such extension at the end opposite the bevel-gear being provided with a collar G′ if desired.

Fig. 6 shows a bevel-gear H^3 for a truck-wheel E^3, with an axial extension F^4 formed upon the plate F^5, by which it is secured on the truck-wheel by bolts f^5; and Fig. 7 shows a truck-wheel with a cast metal axial extension F^6 secured on the face of the wheel E^4 by a flange F^8 and bolts F^7.

Any other construction may be employed where an axial extension is desired, to maintain a shaft and gearing upon a line with a vertically movable axle.

From the above description it will be seen that the essential feature of the invention is the provision of each axle with a separate shaft-section geared to the axle directly or through the medium of a truck-wheel, and such shaft-section maintained by suitable means at the same level with the axle when the same rises and falls in its pedestal.

Having thus set forth the nature of the invention what is claimed herein is:

1. In a multiple wheeled-truck, for geared locomotives, the combination, with side truck-frames having axles and axle-boxes movable independently therein, of a transverse shaft-box supported across the end of each axle and a shaft-section therein connected to the axle by gearing to rotate the truck-wheels thereon, means for maintaining the shaft-box at the same level as the axle, and means for connecting all the shaft-sections flexibly together to permit each axle an independent vertical movement within the truck.

2. In a multiple wheeled-truck, for geared locomotives, the combination, with the side truck-frames having axle-boxes movable independently therein, of axles fitted to the boxes with overhung truck-wheels, and axial-extensions projected outside of the same, transverse shaft-boxes carried upon such axial-extensions, and line-shaft sections journaled in the transverse boxes and geared to the said driving-wheels and connected flexibly together to operate all of such wheels simultaneously and permit each axle an independent vertical movement when passing over inequalities of track.

3. In a multiple wheeled-truck, for geared locomotives, the combination, with side-frames having axle-boxes movable vertically and independently therein, of axles fitted to the boxes with overhung truck-wheels, and axial extensions projected outside of the same, transverse shaft-boxes carried upon such axial extensions, line-shaft sections journaled in the transverse boxes, gearing connecting the shaft-sections to the driving-wheels, and universal joints connecting such shaft-sections, whereby each axle in the truck is capable of independent vertical movement.

4. A multiple wheeled-truck, for geared locomotives, having side-frames with axle-boxes movable vertically therein and axles fitted reversibly to the boxes with overhung truck-wheels and similar axial extensions projected outside of the same at both ends of the axles, similar annular seats on the outer sides of all of the wheels, bevel-gears secured upon such seats on the wheels at one end of each axle, and transverse shaft-boxes fitted to the axial extension adjacent such bevel-gears and provided with line-shaft sections and pinions to drive the said bevel-gears.

5. In a multiple wheeled-truck, for geared locomotives, the combination, with side-frames having axle-boxes movable vertically and independently therein, of axles fitted to the boxes with overhung driving-wheels, and axial extensions projected outside of the same, transverse shaft-boxes carried upon such axial extensions, means for retaining them upon the said extensions and permitting vertical movement only of such transverse bearings, and shaft-sections journaled in the transverse bearings and geared to one another and to the driving-wheels, substantially as herein set forth.

6. In a multiple wheeled-truck, for geared locomotives, the combination, with side truck-frames having axle-boxes movable vertically therein, of axles fitted to the boxes, with driving-wheels overhung thereon and axial extensions projected outside of the same, transverse shaft-boxes carried upon such axial extensions, line-shaft sections journaled in the transverse boxes, gearing connecting the shaft-sections to the driving-wheels, and brackets attached to the truck-frames with guides thereon operating to movably support the transverse bearings upon the axial extensions and resist the torsional strain imposed upon the transverse bearings by the gearing.

7. In a multiple wheeled-truck for geared locomotives, the combination, with side truck-frames having axle-boxes movable vertically therein, of axles fitted to the boxes with overhung driving-wheels and axial extensions projected outside of the same, transverse shaft-boxes carried upon such axial extensions, line-shaft sections journaled in the transverse-boxes and geared to the said driving-wheels and connected flexibly together to operate all of such wheels, simultaneously, and provided with guide-arms, and brackets attached to the truck-frames with vertical guides thereon fitted to the guide-arms, and permitting

vertical movement of the transverse bearing while preventing rotation of the same upon the axial extension.

8. In a multiple wheeled-truck for geared locomotives, the combination, with side truck-frames having axle-boxes movable vertically therein, of axles fitted to the boxes with overhung driving-wheels, and similar axial extensions projected outside the driving-wheels at both ends of the axles, transverse shaft-boxes carried upon the axial extensions at one end of the axles, line-shaft sections journaled in the transverse boxes, gearing connecting such shaft-sections with the driving-wheels, and means connecting the shaft-sections flexibly together to permit independent vertical movement of each axle, the said driving-wheels and axles without any change being reversible in relation to the truck-frames and the transverse boxes.

9. In a multiple wheeled-truck for geared locomotives, the combination, with side truck-frames having axle-boxes movable vertically therein, of axles fitted to the boxes with overhung driving-wheels, and similar axial extensions projected outside the driving-wheels at both ends of the axles, transverse shaft-boxes carried upon the extensions at one end of the axle, line-shaft sections journaled in the transverse boxes, a bevel-pinion upon each shaft-section and a bevel-gear secured detachably upon the adjacent driving-wheel to engage the same, brackets attached to the truck-frames with guides thereon for holding the transverse boxes upon the axial extensions and permitting vertical movement of such transverse boxes, and means flexibly connecting the shaft-sections, the said driving-wheels and axles without any change being reversible in relation to the truck-frames and the transverse boxes, and both driving-wheels having corresponding seats to receive the same bevel-gear.

10. In a multiple wheeled-truck for geared locomotives, the combination, with side truck-frames having axle-boxes movable vertically and independently therein, of axles fitted to the boxes with overhung driving-wheels and axial extensions projected outside of the same, transverse bearing-boxes carried upon such axles, guides supported upon the truck-frames above and below the transverse bearings, guide-arms projected from the transverse bearings and fitted to move vertically in the said guides, and means for adjusting the guide-arms in the guides, as and for the purpose set forth.

11. In a multiple wheeled truck for geared locomotives, the combination, with truck side-frames having axles and axle-boxes movable independently therein, and a system of spring suspension and equalizers for all of such axle-boxes, of a transverse shaft-box supported across the end of each axle and a shaft-section therein connected to the axle by gearing to rotate the truck-wheels thereon, means for maintaining the shaft-box at the same level as the axle, and means for connecting all the shaft-sections flexibly together to permit each axle an independent vertical movement within the truck.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LEWIS E. FEIGHTNER.

Witnesses:
W. A. AUSTIN,
F. WELLS.