

W. A. AUSTIN & L. E. FEIGHTNER.  
 GEARED LOCOMOTIVE WITH INDEPENDENTLY HUNG AXLES.  
 APPLICATION FILED JUNE 26, 1913.

1,077,580.

Patented Nov. 4, 1913.

2 SHEETS—SHEET 1.

Fig. 2.

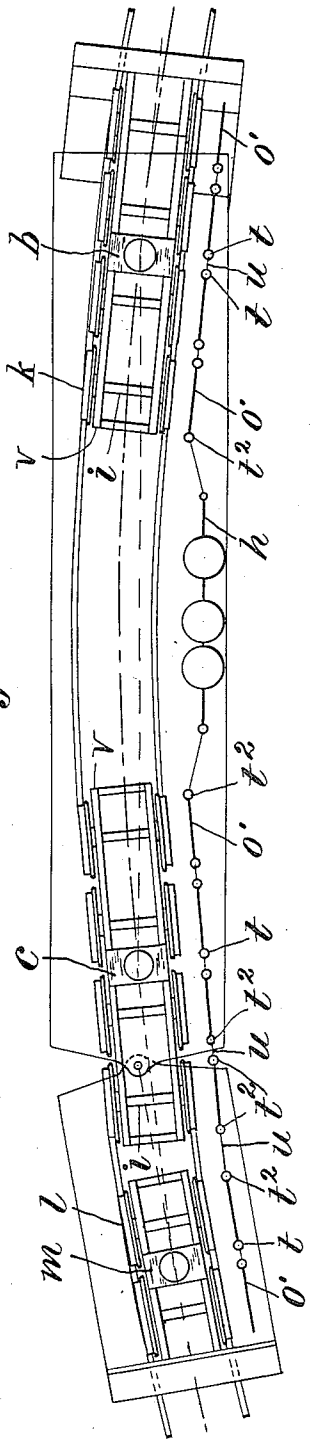
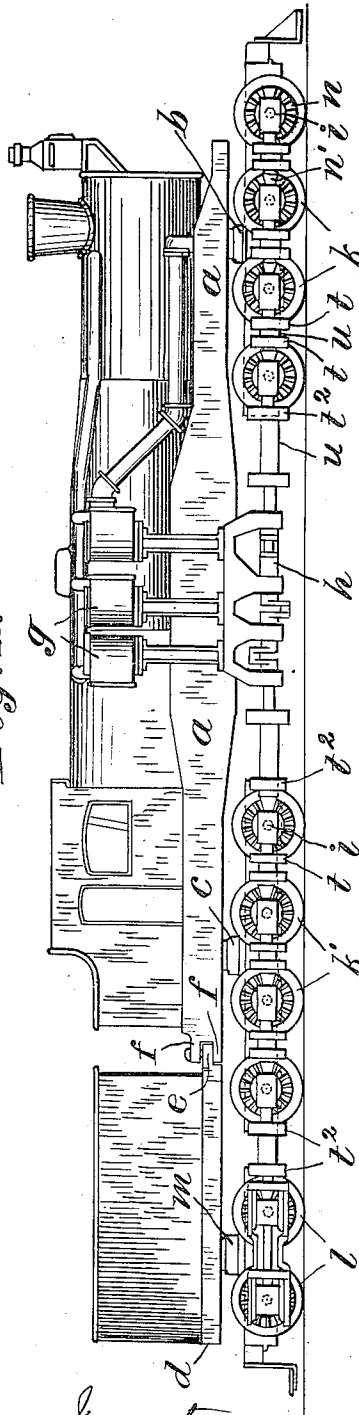


Fig. 1.



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Inventors.  
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 Thomas S. Crane, Atty.

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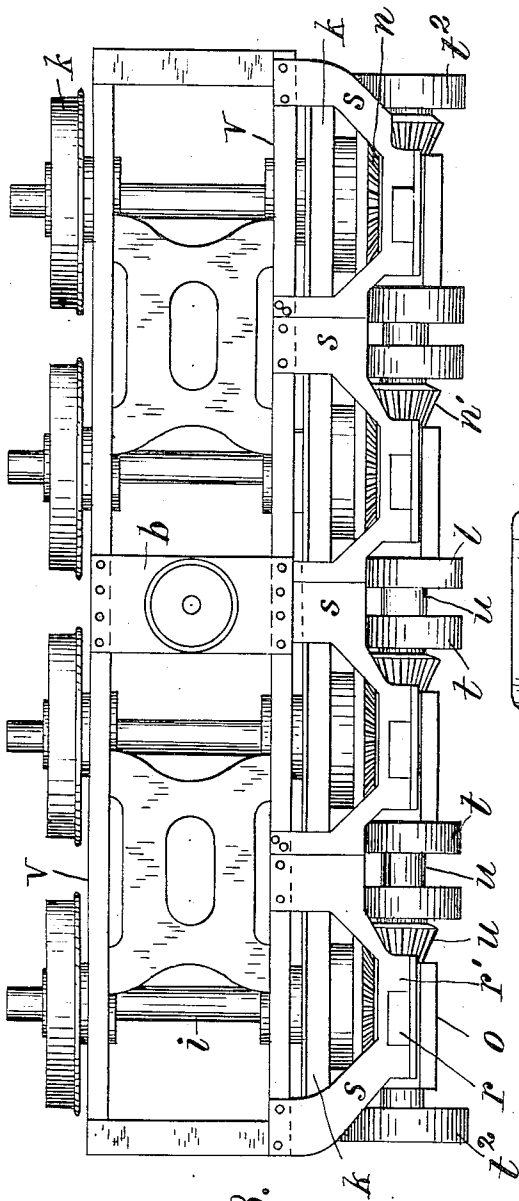


Fig. 3.

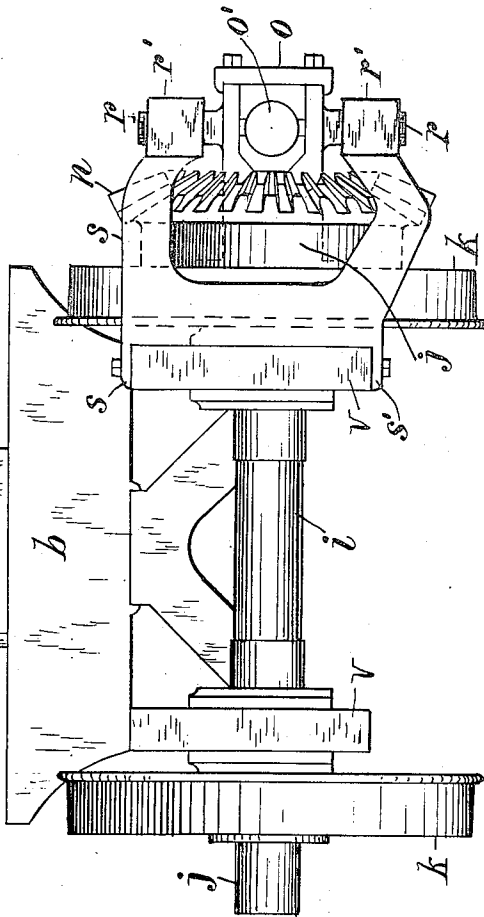


Fig. 4.

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# UNITED STATES PATENT OFFICE.

WILLIAM A. AUSTIN AND LEWIS E. FEIGHTNER, OF LIMA, OHIO, ASSIGNORS TO LIMA LOCOMOTIVE CORPORATION, OF LIMA, OHIO, A CORPORATION OF OHIO.

GEARED LOCOMOTIVE WITH INDEPENDENTLY-HUNG AXLES.

1,077,580.

Specification of Letters Patent.

Patented Nov. 4, 1913.

Application filed June 26, 1913. Serial No. 775,960.

*To all whom it may concern:*

Be it known that we, WILLIAM A. AUSTIN and LEWIS E. FEIGHTNER, both citizens of the United States, the said W. A. AUSTIN's residence and post-office address being 1305 Lakewood avenue, and the said L. E. FEIGHTNER's residence and post-office address being 715 South Broadway, both of Lima, county of Allen, and State of Ohio, have invented certain new and useful Improvements in Geared Locomotives with Independently-Hung Axles, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of the present invention is to furnish a means of supporting a combined locomotive and tender wholly upon wheeled-trucks so as to facilitate in the highest degree the turning of the locomotive around curves, and at the same time to permit the accommodation of each truck-wheel independently to the inequalities of the track, while geared together and to the source of power upon the locomotive. This object is effected by making each axle-box movable independently in the truck, and providing each axle with a separate line-shaft-section and gearing for driving the same, and connecting all the separate line-shaft-sections flexibly together and to the power-shaft upon the locomotive.

The invention also includes a geared "locomotive-tender" having one or more multiple-wheeled-trucks so arranged as to admit of the application of power to all its pairs of wheels by a system of line-shafting on one or both sides of the tender. In such construction, the axles in the truck or trucks are geared to sections of line-shafting, and such sections coupled to the power-shaft through shaft-sections upon one of the locomotive-trucks, thus securing perfect flexibility in the transmission of the power to the truck-wheels under the tender.

The invention also includes the combination with a rigid locomotive-frame having multiple-wheeled-trucks under its opposite ends, of a tender having a pivot-lug upon its front end resting upon and supported by the rear of the locomotive-frame, and a truck

supporting the rear end of the tender upon the track, whereby the tender is supported in part by its own truck and in part by the truck under the rear of the locomotive-frame.

The invention is obviously applicable to a locomotive having its motor operated by steam, electricity, gas, or any other agency, and is illustrated herein upon a locomotive having steam-engines for rotating the power-crank-shaft.

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

Figure 1 is a side elevation of a locomotive constructed with the improvements; Fig. 2 is a diagram indicating the outlines of the truck-frame and tender-frame and the relation of the trucks to the said frames and to the power-shaft upon the locomotive-frame. Fig. 3 is a plan, and Fig. 4 an end view of one of the eight-wheeled-trucks under the locomotive-frame.

*a* designates the locomotive-frame having bolster *b* under its forward end and a bolster *c* under its rear end with eight-wheeled-trucks pivoted to each of said bolsters.

The frame *d* of the tender is provided under its rear end with a four-wheeled-truck, and has its front end coupled to the rear end of the locomotive-frame by a permanent pivot-joint in which a lug *e* upon the front of the tender-frame fits between two lugs *f* and *f'* upon the locomotive-frame, the lug *f* wholly supporting the front end of the tender, whose weight is transmitted to the truck under the bolster *c*.

Engine-cylinders *g* are shown mounted upon the locomotive-frame *a* and connected with a crank-shaft *h* carried in bearings at nearly the same level as the axles *i* of the truck-wheels. The wheels are marked *k* in the forward truck; *k'* in the truck under the bolster *c*, and *l* in the truck under the tender, which is pivoted to a bolster *m*.

In the present invention, the crank-shaft may be geared in any suitable manner to each axle in each truck so as to drive all the truck-wheels independently, while permitting them to play independently in their truck-frames when passing over inequalities of track. The means illustrated for thus

driving the truck-wheels is shown in Figs. 3 and 4, in which the wheels are shown overhanging upon the axles and provided each with a bevel-gear  $n$  upon its outer side.

5 Each axle has a projecting end or extension  $j$  upon which a transverse shaft-box  $o$  is fitted, and is held from turning upon the axle-extension by guide-arms  $r$  movable vertically in guides  $r'$  which are bolted by arms  $s, s'$  to the upper and lower edges of the adjacent truck-frame. A shaft-section  $o'$  is carried in the shaft-box  $o$  and has a bevel-pinion  $n'$  to drive the gear  $n$ . Each axle is thus furnished with an independent section  
10 of the line-shaft and is coupled to the adjacent section by driving-rings  $t$  and sliding extension-bar  $u$ . The axle-bearings are thus permitted vertical movement in their pedestals to allow variation between the truck-frames and the truck-wheels, such variation being necessary whenever the truck is in motion and has local oscillation owing to track inequalities or disturbances in the load carried by the bolsters. The truck-wheels of  
15 the tender are also driven separately by bevel-gearing, which is connected with the line-shaft upon the rear truck under the locomotive-frame.

The end shaft-section upon each truck is provided with a driving-ring  $t^2$  by which the end-shafts are connected together, or to the crank-shaft  $h$  in the case of the trucks under the locomotive-frame. The entire weight of the locomotive and tender is thus  
20 carried by truck-wheels which are free to rise and fall independently and which are connected flexibly with the other wheels and with the power-shaft  $h$ , thus enabling all the wheels to conform perfectly to inequalities  
25 of the track.

A system of spring-suspension is, in practice, supplied to the axle-boxes in any usual manner.

The frames of the trucks are shown of the ordinary "bar-type" used in locomotive-frames, but the construction of the truck-frames and the nature and application of the springs is immaterial to the present invention, the essential feature of which is a  
30 geared locomotive having a rigid engine-frame mounted upon two multiple-wheeled-trucks and each axle in said trucks having a separate line-shaft-section movable vertically therewith and geared to the said axle,  
35 and connected flexibly to the other shaft-sections and to the power-shaft, thus securing perfect flexibility of motion upon uneven track, and greatly promoting easy operation of the trucks in rounding curves.

40 The special construction of the trucks and driving connections for the wheels is not claimed herein, but is made the subject of a separate application No. 773,157 filed June 12, 1913, by L. E. Feightner for patent

on multiple wheeled truck for geared locomotives.

The locomotive can be provided with more than one tender if desired, or with tenders at both ends, and all the axles in such tenders may be mounted and geared to move independently, so that all wheels under the locomotive and tenders may accommodate themselves perfectly to inequalities of the track.

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

1. In a geared locomotive carried by two multiple-wheeled-trucks, the combination, with the locomotive-frame, of a power-shaft rotated by power upon the locomotive, axle-boxes movable vertically and independently in the trucks, a separate line-shaft-section movable vertically with each axle, gears connecting each shaft-section separately with one of the axles, and mechanism flexibly  
80 connecting such shaft-sections with one another and with the power-shaft.

2. In a geared locomotive carried by multiple-wheeled-trucks, the combination, with a rigid locomotive-frame having bolsters under opposite ends, of trucks supporting the said bolsters, a tender having a pivot-lug upon its front end resting upon and supported by the rear of the locomotive-frame, a truck supporting the rear end of the tender upon the track, axle-boxes movable vertically and independently in the trucks, a separate line-shaft-section movable vertically with each axle, a power-shaft operated by a motor upon the locomotive, and gearing with universal joints connecting the said power-shaft with each axle in the locomotive and tender-trucks.

3. In a geared locomotive carried by two multiple-wheeled trucks having their axle boxes movable vertically and independently, the combination, with the said trucks, of a rigid locomotive-frame having bolsters under opposite ends resting upon the said trucks, vertical engines and a crank-shaft mounted upon the said locomotive-frame, a separate line-shaft-section and gearing for separately operating each truck-axle, and universal joints connecting such shaft-sections with the said crank-shaft, thus securing flexibility upon uneven track and easy movement around curves.

4. In a geared locomotive carried by two multiple-wheeled-trucks, the combination, with the said trucks, of a rigid locomotive-frame having bolsters under opposite ends resting upon the said trucks, a tender having a pivot-lug upon its front end resting upon and supported by the rear of the locomotive-frame, a truck supporting the rear end of the tender upon the track, axle-boxes movable vertically and independently in the trucks, a separate line-shaft-section mov-

able vertically with each axle, vertical engines supported wholly or in part upon the said frame, a crank-shaft operated thereby, and gearing with universal joints connecting the said crank-shaft with each axle in the locomotive and tender-trucks.  
In testimony whereof we have hereunto

set our hands in the presence of two subscribing witnesses.

WILLIAM A. AUSTIN.  
LEWIS E. FEIGHTNER.

Witnesses:

WM. HYLAND;  
WM. O'CONNOR.

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